September 2021 version; Contains greenhouse gas quantification and assessment as well as adaptation and resiliency information

DRAFT, Revised
Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at**:** https://www.eqb.state.mn.us**/** The EAW form provides information about a proposed project's potential environmental effects, and also used as the basis for scoping an Environmental Impact Statement. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project title:
Gorman Creek Channel Restoration

2. Proposer:

Contact person: Kevin Stauffer
Title: Area Fisheries Supervisor
Address: 1801 South Oak Street
City, State, ZIP: Lake City, MN 55041
Phone: 651-299-4032
Fax:
Email: kevin.stauffer@state.mn.us

3. RGU

Contact person: Kathy Metzker
Title: EWR Environmental Review Project Manager
Address: 500 Lafayette Road
City, State, ZIP: St. Paul, MN 55155
Phone: 651-259-5694
Fax:
Email: Kathleen.metzker@state.mn.us

4. Reason for EAW Preparation: (check one)

Required:	Discretionary:
☐ EIS Scoping	☐ Citizen petition
XX Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

Minnesota Rules, part 4410.4300, subpart 26, Stream diversion

5. Project Location:

- County: Wabasha
- City/Township: Kellogg/Highland
- PLS Location (¼, ¼, Section, Township, Range): NE NE of Section 1, T109N, R11W
- Watershed (81 major watershed scale): Mississippi River-Winona
- GPS Coordinates: 44.27781°N, -92.07188°W (project parcel center point)
- Tax Parcel Number: R06.00001.12

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.
- List of data sources, models, and other resources (from the Item-by-Item Guidance: *Climate Adaptation and Resilience* or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project during the life of the project (as detailed below in item 7. Climate Adaptation and Resilience).

Figures and Attachments

- Figure 1. Project location in Wabasha County, MN.
- Figure 2. U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries.
- Figure 3. Aerial photograph of the Gorman Creek project area from October 1949.
- Figure 4. Time series of aerial photographs showing stream channel pattern of Gorman Creek prior to restoration (1991) and post restoration (2011 and 2019). Restoration work was completed in 2001.
- Figure 5. Photos of existing conditions on Gorman Creek and the Costello Spring tributary.
- Figure 6. Overview of the project area showing existing and proposed stream channel patterns for Gorman Creek and the spring tributary.
- Figure 7. Project grading plan overview showing areas of excavation, old channel fill areas, and temporary soil stockpile locations.
- Figure 8. Overview of proposed stream habitat and stabilization features.
- Figure 9. Proposed locations for construction access, equipment staging, and equipment maintenance.
- Figure 10. FEMA 100-year floodzone for the project area.
- Figure 11. Karst features in the project vicinity.
- Figure 12. Soil unit map of the project area from the USDA Web Soil Survey.
- Figure 13. National Wetland Inventory Circular 39 map of project area.
- Figure 14. Spring locations near proposed project.
- Figure 15. Minnesota Department of Health – County Well Index for the project area.
- Figure 16. Minnesota Biological Survey sites of biodiversity.
- Figure 17. Map of Rusty Patch Bumble Bee High Potential Zones.
- Attachment A. Restoration plan set and specifications.
- Attachment B. Floodplain Analysis for Gorman Creek Restoration.
- Attachment C. Minnesota Department of Health, Well Logs.
- Attachment D. Minnesota Department of Natural Resources, Natural Heritage Information System.

- Attachment E. Email confirming prior NHIS results.
- Attachment F. DNR Fisheries stream assessment report.
- Attachment G. DNR Forestry/Fish & Wildlife Archaeologist and State Historic Preservation Office.
- Attachment H. Climate Change Projections and Impacts.

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The Minnesota Department of Natural Resources (MNDNR) proposes a stream restoration project on channelized reaches of Gorman Creek (M-033) and a spring tributary (Costello Spring, M-033-014), near Kellogg, in Wabasha County. The project will replace 2,060 feet of unstable, channelized stream with 4,800 feet of sinuous stream channel that would enhance ecological function, improve water quality, and establish stable ecological habitat.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

Gorman Creek is a coldwater trout stream in Southeast Minnesota. The proposed project is located in Wabasha County, approximately 4.5 miles south and west of Kellogg, Minnesota (Figures 1 and 2). The project reach of Gorman Creek was channelized sometime before 1949, based on aerial photography records (Figure 3) and the proposed project is an extension of a similar restoration project completed in 2001 (Figure 4). The stream and tributary in the project area are incised and highly unstable. The section to be restored currently contributes excessive sediment downstream of this site. The channelized reach of Gorman Creek in the project area is currently 1,330 feet long and the channelized spring tributary reach is 730 feet long, for a total of 2,060 feet of channelized stream. MNDNR proposes a channel restoration that will re-establish dimension, pattern, and profile as well as establishing additional habitat on these channelized stream reaches. An additional benefit to completing this restoration is that the stream section would be reattached to its floodplain. Post project stream lengths are estimated to be 2,500 feet for Gorman Creek and 2,300 feet for the spring tributary, due to the increased sinuosity.

Project Concept and Design. In 2001, the MNDNR Stream Habitat Program restored a portion of the channelized reach using a Natural Channel Design (NCD) approach. The restored stream channel has been very stable over time (Figure 4). In 2014, the MNDNR purchased an Aquatic Management Area – Angler Easement (AMA) on a private land parcel immediately downstream from the 2001 restoration project. The AMA easement allows the MNDNR to do habitat restoration projects and provides public access for fishing.

MNDNR is proposing a restoration project within the AMA easement. The stream reaches in the AMA currently have poor habitat quality, unstable banks, and little diversity of riparian vegetation (Figure 5). NCD would be used to establish a stable dimension, pattern, and profile of the currently channelized reaches of Gorman Creek and a spring tributary. The NCD approach evaluates the measured morphological relations associated with bank full flow, geomorphic valley type, and geomorphic stream type of a deteriorated stream reach and compares it to a stable reach of a similar character. The

approach identifies characteristics of channels that are stable and of similar stature then extrapolates and applies those metrics into the design of the disturbed stream segments. This project utilized reference reach values from local streams: a lower reach of Gorman Creek and the South Branch Whitewater River; then validated with regional (Upper Red River) data. The NCD approach has been adopted by several state and federal agencies as a legitimate approach to channel restoration and is included in the Natural Resources Conservation Service National Engineering Handbook – Chapter 11.

Currently, the stretch of Gorman Creek in the project area is a channelized stream that is very incised below its floodplain. The existing condition restricts the frequency of smaller floods overtopping the banks and spreading into the floodplain. Bank erosion is also exacerbated in the incised channel during smaller floods, because the energy cannot be dissipated into a functional floodplain. The proposed project would excavate a functional floodplain along the stream and allow smaller, more frequent floods to overtop streambanks at a lower elevation. The elevation of the stream bed would also be raised slightly to reduce the volume of floodplain materials that will need to be excavated.

A stable stream channel would be established by forming and grading the land to proper channel dimension, pattern, and profile (Attachment A; Figures 6 and 7). Instream habitat for fish and aquatic organisms would also be enhanced through a variety of practices implemented during construction (Attachment A; Figure 8)). These include installation of rock riffles, log root wads and log deflectors, hammerhead pools, and toe wood. These features will increase the complexity of aquatic habitat in the stream channel by creating a diversity of depths, substrate types, and flow velocities. These features will not affect floodplain dynamics because they will be located in the wetted channel below bank full discharge levels. The lower end of the project will have a riffle structure that directs the flow in a way that centers velocities down the channel and away from banks of the existing downstream ditched channel. Centering of the flow will reduce any likelihood of increased erosion levels above current rates.

Improvements in land use along the stream reaches will also be part of this project. The riparian corridor and adjacent land are currently used for livestock grazing and occasional hay harvest. Cattle are currently allowed to free range and access Gorman Creek and the spring tributary throughout the project area. As part of the angler easement purchase, the landowner was provided fencing materials to control access to the stream corridor once the project is completed. While cattle grazing will be allowed in the riparian corridor, it will be done in a manner that protects the stream channel and stream banks. A grazing plan will be developed to achieve these goals. In addition, a low water riffle type cattle crossing will be installed so that cattle can be moved to pasture areas on both sides of the stream without causing damage to the banks or bed of the stream. An off-channel watering system or limited point stream access will also be developed to provide water for cattle.

Project Description. This channel restoration, including construction of riffle & in channel habitat structures, increasing sinuosity, and using the NCD methodology, is designed to:

- Re-establish ecological function and reach stability
- Lower sediment contributed from the restored reach
- Establish an aesthetically pleasing channel and connected floodplain
- Establish perennial native vegetation and healthy riparian corridor
- Improve instream trout habitat
- Improve land use in the riparian corridor by implementing a grazing plan and watering system for cattle.

The major actions of the restoration project include: 1) developing a preferred alternative based on geomorphological modeling as described above; 2) permitting, surveying, staging, and scheduling project construction; 3) clearing and grubbing of trees that will be used for habitat and stabilization features; 4)

constructing new channels and a series of rock riffles; 5) installing channel/bank stabilization features that also create habitat for fish and aquatic life; 6) grading a floodplain along the new channel alignment; 7) removing soil between constructed areas and the existing channel to reroute the stream; 8) filling the old channel where the stream will no longer be running; 9) revegetating disturbed and exposed soil areas and installing erosion control features for Stormwater Pollution Prevention Plan (SWPPP) permitting requirements; and 10) post-project monitoring of the stability of erosion control measures, habitat practices and performance of the new channel, habitat practices, and floodplain landform. Construction activity is estimated to take a total of 4-6 weeks phased over a period of 10-12 months. The first phase of the project will be to construct the new channel offline (i.e., no work in the existing channel). This will involve 1) clearing, grubbing and stockpiling trees for later use, 2) excavating the new channel and floodplain without affecting the current existing stream channel, 3) installing habitat and stabilization features, and 4) seeding of disturbed soil areas. Once constructed, the new channel and floodplain will be allowed to vegetate for most or all of one growing season. Because disturbed soil areas will be stabilized by seeding of grasses and forbs, there will be minimal (if any) use of erosion control blankets or hydromulching. If these methods are used, only wildlife friendly erosion control blankets and plastic free hydromulch products will be used.

The second phase of the project will allow stream flow to enter the new constructed channel. During this phase, channel blocks will be placed in the old channel where the new channel intersects, and streamflow will be diverted into the new channel. Water will not be diverted into the new channel until the channel has been completed and its banks have been stabilized using vegetation and erosion control BMPs.

The last phase of the project will be to fill the old, abandoned channel will surplus material from the excavation of the new channel and flood plain. Final removal of surplus fill, final site grading, and seeding will also occur in this phase.

Construction will ideally occur during low flow times and drier conditions in mid to late summer and into fall, or winter. No work will occur in the wetted channel between October 15 and April 15, as required for trout streams in this part of the state. Approximately 23,000 cubic yards of soil will be excavated to create the new channel and floodplain. Of the total amount excavated, an estimated 4,500 cubic yards will be temporarily (< 1 year) stockpiled in the floodplain. This material will be used to fill the old channel areas after the new channel is connected. The remaining material will be permanently relocated outside of the floodplain and wetland areas within 1 year. Exact timing and dates will be determined as project details and permits are approved. Construction project oversight and SWPPP compliance will be performed by the NRCS Southeast Technical Assistance Service Area #7, Wabasha SWCD staff and MNDNR River Ecology Unit professionals to ensure compliance and proper construction of the floodplain and channel as well as habitat practices.

To enable efficient management of machinery and available materials, the design and construction staff will work closely with all landowners to ensure that minimal disturbance outside of the proposed construction area occurs throughout the project duration. All construction activities will occur within the AMA easement, with the possible exception of temporary stockpiling of excavated material. Any temporary stockpiling will be done under agreement with the adjacent landowner and will follow the SWPPP.

“No- go” areas (such as seeps, high quality vegetation areas, and any sensitive features that may be discovered) will clearly be outlined in plans and will be off-limits to construction equipment and material placement. Potential stockpile areas will also be identified (Figure 7). Prior to initiating construction activities, all areas excavated, used for stockpiling, and no-go areas will be clearly staked on-site. During clearing, grubbing and grading, a variety of materials will be salvaged and stockpiled, including topsoil,

tree trunks, and root wads. The organic materials will be redistributed to critical areas for improving the success of revegetating the site after the final grade is established. All excavated channel material not devoted to permanent blocks or riffle construction will be removed from the site. All disturbed areas will receive erosion control measures installed concurrent with excavation activities and construction phasing and within SWPPP requirements.

Rock riffles are typically installed to buy time for vegetation to establish and avoid downcutting until the bed can armor itself with parent materials. The rock riffles will remain post construction and embed into the natural sediments through natural processes. Rock riffles will be constructed of stone properly sized not to move through various flooding events expected through time. The configuration of the stones will promote converging flows toward the stream center. Footer boulders, if deemed necessary, will be buried under and slightly downstream of rock riffle structures to prevent undercutting and movement. Locations and number of structures will be established and located as per design and budgetary constraints are better understood.

The designed channel dimension will improve sediment transport and drastically reduce head and bank cutting. The riffle-pool sequence will help reestablish the natural pattern and enhance fish habitat for the new stream channel. The proposed bottom-of-river profile will be retrofitted to mimic natural profiles by installing pools and riffles. Generally, the average grade-line of the river surface may vary depending on final earthwork and budget. Excavation of the new channel will occur in a dry, non-flowing state where possible. Construction of the channel, habitat practices and floodplain is phased to efficiently manage material movement and stockpiling.

The re-grading and transfer of alluvial substrates and organic materials will require the use of heavy construction equipment, including excavators, bull dozers, and dump trucks. Public roadways adjacent to the project site will be used to bring construction equipment to the site. Existing field approaches are sufficient to bring equipment and materials to the site. An excavator would dig the new stream channel according to designated dimension, pattern, and profile of the alignment and cross-section outline within the project plans and specifications. A bulldozer may be used to smooth excavated material along the bank and upstream to re-grade the floodplain slopes.

Equipment staging, cleaning and maintenance will be done in a designated area (Figure 9). This area has an existing field approach off the township road and is currently used by the landowner to access the parcel. Appropriate BMPs will be implemented to protect stream and wetland resources when equipment cleaning or maintenance is being done. The contractor will be required to have necessary supplies onsite in the event of fuel/fluid spills.

Soil protection measures will be implemented at each phase until project completion. Erosion control measures will be incorporated as required by the SWPPP. These will be applied along stream banks to speed up the process of stabilizing the erosion prone area. The salvaged vegetated mats, if available, would be placed along applicable channel reaches, where necessary. About 11.4 acres of total site disturbance is anticipated; generally positioned above the normal river flow level, this area will be reseeded with a seed mix approved for riparian habitats (similar to MnDOT Seed Mix No. 34-261). All perennial seed will be locally sourced, selected and planted in consultation with River Ecology Unit staff. Areas, such as haul roads, where soil has been compacted by construction equipment will be scarified or tilled to loosen soil prior to seeding. Deep rooting grasses will be seeded in these areas to help restore soil conditions.

Monitoring during construction will include evaluating compliance with appropriate equipment maintenance, equipment cleaning, use of haul roads, and identifying BMPs and techniques that minimize impact; this will be covered in the SWPPP. After construction, surveys will be conducted

to evaluate the effectiveness of erosion control measures, such as mulching, seeding, sod/root mat applications, and invasive plant species management. Fish sampling will be conducted pre- and post-project to assess the condition of aquatic habitat response. Analysis of stream bank erosion rates and channel stability will be repeated post-project at representative measurement locations to determine changes that have occurred, particularly in the rate of erosion and sedimentation.

c. Table 1. Project magnitude:

Description	Number
Total Project Acreage	**14.8**
Linear project length	**4,800 ft**
Number and type of residential units	**0**
Residential building area (in square feet)	**0**
Commercial building area (in square feet)	**0**
Industrial building area (in square feet)	**0**
Institutional building area (in square feet)	**0**
Other uses – specify (in square feet)	**N/A**
Structure height(s)	**N/A**

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Through many decades of human impact, the present condition of the channel is poor and provides little habitat for fish and other aquatic organisms. This poor condition is due to many re-routes and channelization adjustments that have been made through time on this reach. The primary purpose of this project is to re-establish stable habitat conditions, based upon known stable metrics, to provide essential physical habitat that supports the various life stages of the many biological organisms that utilize this natural corridor to live in and around.

An additional need is to provide a channel that has a useful floodplain. Currently, the incised condition of the channelized stream forces a larger volume of water at higher velocities through the channel, depriving the floodplain of smaller scale floodwaters and depriving the area of these benefits. Consequently, the surrounding land is deprived of more frequent, smaller scale flooding events and associated sediment deposition, while the channel itself undergoes further scour and increased sediment load. A restored stream floodplain would provide many useful functions by allowing more frequent flows of smaller volumes to spread out over a larger width thereby decreasing velocities and erosion. Additional benefits include reduced sedimentation, improvements in water quality, and providing water during flood events to adjacent low areas in the floodplain where many varieties of species can thrive and exist.

Goals of this project include:

- Restoring proper channel pattern, profile, and dimension.
- Restoring a connected floodplain & function.
- Educating the public and professionals on the value of channel restorations.
- Improving angling opportunities and success.
- Improving habitat, water quality, biological diversity, and connectivity.
- Increasing reach resiliency to major flooding.

The project is located in the heart of the southeastern Minnesota trout angling region and, if successful, can serve as an example to convey key messages about river system management, land use and protection, and natural resource stewardship. Given that the upstream reach was restored through application of the same design principles, likelihood of success is high and will 'tie' nicely into the upper reaches of Gorman Creek.

e. Are future stages of this development including development on any other property planned or likely to happen? **X** Yes ☐ No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

To date, there are no specific plans to continue downstream from this project, but it is hoped that the stream restoration project can continue downstream as part of a complete watershed effort. Any future work will require cooperation from landowners, as well as securing required legal permissions and project funding. Several landowners downstream have recently expressed interest in completing similar projects.

f. Is this project a subsequent stage of an earlier project? **X Yes** ☐ No
If yes, briefly describe the past development, timeline and any past environmental review.

In 2001, the MNDNR River Ecology Unit completed a similar restoration of 4,100 feet of channel immediately upstream of the proposed project. The 2001 project also used Natural Channel Design (NCD) principals to create a new meandering channel that replaced a straightened and ditched reach of Gorman Creek. The previous project also used a phased construction approach where the new channel was built offline and allowed to vegetate for a full growing season. DNR Fisheries and the River Ecology Unit have monitored the 2001 project for nearly two decades. Monitoring has shown that the stream channel has been very stable over time, with almost no bank erosion or excessive channel migration. Allowing time for deep rooted vegetation to become established created good bank stability, as did creating a channel with the proper pattern, profile and dimension to reduce shear stress on the stream banks. The techniques used were very similar to those proposed in the current project, however the new project will incorporate more habitat features to benefit trout and aquatic life. Given the location of these two projects in the watershed and the parent materials in the active floodway, there is little chance of coarser substrate being recruited into the new channel. The new project will incorporate the addition of larger gravels and cobbles into the stream bed to create a diversity of substrate types, as this was noticeably lacking in the earlier project. Another lesson learned from the 2001 project was that depth diversity in the channel was somewhat lacking. Due to the relatively low shear stresses of the designed channel, there has been little scouring of deeper pools. The proposed project will account for this by creating some deeper pool areas as the channel is constructed and will also use several "hammerhead pools" that will create a diversity of depths and current velocities.

7. Climate Adaptation and Resilience:

a. Describe the climate trends in the general location of the project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location during the life of the project.

According to MNDNR's Minnesota Climate Explorer, Wabasha County shows the following general trends since 1895, and is predicted to show the following trends until the end of the 21st century:

Table 2. Historic and Projected Climate Trends, Wabasha County.

Climate Variable	Overall Historical Trend, 1895-2021	Expected Trend, 1980-2099
Average Temperature (Annual)	warming	continued warming
Maximum Temperature (Annual)	increasing	continued increasing
Minimum Temperature (Annual)	increasing	continued increasing
Precipitation (Annual)	increasing	Increased variability
Palmer Drought Severity Index (PDSI)	more wet periods and fewer dry periods	not available

Temperature and precipitation trends are projected by MN DNR using data from University of Minnesota climate modeling, using eight different climatic models (BCC-CSM1-1, CCSM4, CMCC-CM, CNRM-CM5, GFDL-ESM2M, IPSL-CM5A-LR, MIROC5, and MRI-CGCM3), developed by different institutions, and modeled under different emissions scenarios to generate a range of projected values. See Attachment H for the results for all variables listed above, for Wabasha County for the remainder of the 21st century. Also see Attachment H for a more detailed discussion of the models, and their methods and assumptions.

According to the EPA's CREAT Climate Scenarios Projection Map, Wabasha County is expected to see an increase in 100-year storm intensity of approximately 6 to 25%, depending on whether the modeled scenario is 'not as stormy' or 'stormy'.

b. For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.

Table 3. Projected Climate Impacts on Proposed Project Activities.

Resource Category	**Climate Considerations**	**Project Information**	**Adaptations**
Project Design	Increase in extreme precipitation events.	The project will restore stream pattern and dimension to better accommodate flood events.	N/A
Land Use	N/A – land use pre and post project will be unchanged.	None	N/A
Water Resources	Addressed in item 12	Addressed in item 12	Addressed in item 12
Contamination/ Hazardous Materials/Wastes	N/A – project will not generate any contamination or hazardous materials	None	N/A
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in item 14.	Addressed in item 14.	Addressed in item14.

8. **Cover types:** Estimate the acreage of the site with each of the following cover types before and after development:

Table 4. Cover types.

Cover Types	Before (acres)	After (acres)
Wetlands and shallow lakes (<2 meters deep)	12.2	13.9
Deep lakes (>2 meters deep)	0	0
Wooded/forest wetland	2.1	0.1
Rivers/streams	0.5	0.8
Brush/Grassland	0	0
Cropland	0	0
Livestock rangeland/pastureland (also Type 2 wetland)	12.7	13.9
Lawn/landscaping	0	0
Green infrastructure TOTAL (from table below*)	0	0
Impervious surface	0	0
Stormwater Pond (wet sedimentation basin)	0	0
Other (describe)	0	0
	14.8	14.8

Table 5. Green Infrastructure.

Green Infrastructure*	Before (acreage)	After (acreage)
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	0	0
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL*	0	0

Table 6. Tree Cover.

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during development	95	n/a
Number of new trees planted	0	0

9. Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Table 7. Permits and Approvals.

Unit of Government	Type of Application	Status
U.S. Fish and Wildlife Service	Section 7 concurrence	To be obtained
Minnesota Pollution Control Agency	NPDES/SDS Construction stormwater permit	To be obtained
Minnesota Pollution Control Agency	401 Water Quality Certification	To be obtained
Minnesota Department of Natural Resources	Work in public water permit	To be obtained
Minnesota Department of Natural Resources	Water appropriation permit	To be obtained, if required
State Historic Preservation Agency	Section 106 concurrence	Issued Attachment G
Minnesota Office of State Archaeologist	Project approval	Issued Attachment G
Minnesota Department of Natural Resources	Natural Heritage Information System Data	Issued Attachments D, E
State of Minnesota	Lessard-Sams Outdoor Heritage Grant	Funded
U.S. Army Corps of Engineers	Section 404 Permit	To be obtained
Wabasha County	Permits or Approvals for Off Site Sediment Storage, other work requiring county permits or approval	To be obtained, if required

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use:

a. Describe:
   i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.

The project area is in private ownership and is currently being used as pasture/hay ground. The Minnesota Department of Natural Resources holds a permanent easement along Gorman Creek and the tributary on this parcel. The easement allows the public to access the stream for angling and allows work by MNDNR for habitat improvement, stocking, and other management activities.

Currently there is very little angling use of this stream reach or the DNR easement because there is very poor stream habitat and minimal trout population. While access to the easement is very good from two different public roads, angler use has been minimal. Streambanks are near vertical banks on much of the stream reach and water depths are generally shallow with soft bottom substrates. All combined, the current state of the stream is not providing a trout population that is of interest to anglers.

The riparian corridor along the streams does currently meet requirements for a buffer of perennial vegetation and there is no agricultural tillage in the riparian zone. However, the unstable and steep banks are still susceptible to erosion. The riparian corridor and adjacent land are currently used for livestock grazing and occasional hay harvest.

Land use in the vicinity of the project is a mix of row crop agriculture, pasture and hay ground, and wooded hillsides that are typical in the Blufflands of southeast Minnesota.

   ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Gorman Creek Restoration Project addresses multiple priority concerns identified in the Wabasha County 2015-2025 Comprehensive Local Water Management Plan (https://wabashaswcd.com/water-plans) that were recommended by the Local Water Management Task Force. To meet soil erosion objectives, action items include identifying priority and sensitive area solutions and obtaining funding for stream bank projects, as well as providing staff time to work on stream easements with partners such as MNDNR (pg. 2).

The plan also identifies as a priority the promotion of healthy pasture and forestland by establishing riparian buffers in formerly grazed or cropped areas (pg. 36). Targeting impaired waters for restoration is also mentioned as a strategy for overall watershed health management. “Target largely unimpaired areas of natural diversity for protection. Identify potential stressors and watershed BMPs that will control the threat potential” (pg. 38).

   iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The project is located within FEMA’s 100-year floodzone, referred to as a Significant Flood Hazard Area (Figure 10), and is classified as Zone A, meaning that flood zones were determined using approximate

methodologies, without application of detailed hydraulic analyses and no Base Flood Elevations (BFEs) established. Wabasha County Floodplain Ordinances are applicable.

Although this project is located below the OHWL of Gorman Creek, more than one acre is expected to be disturbed above the OHWL and within the shoreland zone of the stream. Gorman Creek is classified as Tributary in the DNR's shoreland classification system. As a Tributary Class watercourse, septic systems must be at least 75 feet away from the river and structures must be at least 100 feet away. No known septic systems or structures are located within the shoreland zone on the project site.

iv. If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity. **N/A**

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The proposed project is compatible with existing nearby land uses, zoning, the AMA, and management plans.

MNDNR will comply with applicable provisions in Wabasha County's 2015-2025 Comprehensive Plan, Local Water Management Plan, and Zoning Ordinances during the construction and maintenance of the channel restoration project.

No buildings or septic systems are proposed in the shoreland zone. Stormwater management will be conducted in a manner the meets the NPDES Construction Stormwater General Permit standards and/or the Wabasha County Shoreland Performance Standards identified in part 11.3.7.18.

This project is compatible with previous upstream work performed in 2001.

Environmental effects of the project that could affect nearby residents will be discussed under those items specifically addressing the environmental effects (noise, exhaust fumes, dust, etc.). Stormwater management will be addressed under Item 12.b.i.2. Otherwise, no incompatibility has been identified.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential. N/A

11. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

The project site is within the karst region of southeast Minnesota; however, there are no known karst features on the project site. Sinkholes are present in the vicinity and the nearest known sinkhole is approximately 0.5 miles north of the project site (Figure 11). If construction activities reveal bedrock or possible karst features, a DNR Groundwater Specialist will be consulted as to the best methods of construction near the bedrock to prevent failure due to possible karst features.

The project area lies within the Blufflands Subsection (a sub-unit of the Paleozoic Plateau Section) and the Elba Slopes Land Type Association (LTA).

Nearly 450 million years ago, shallow seas covered most of North America, including southeastern Minnesota. On its bed, sediment accumulated and gradually turned into rock hundreds of feet thick. When the sea withdrew, erosion carved through the bedrock, creating the valleys and bluffs found in what is now the Gorman Creek Site area. More recently, glacial meltwaters sculpted the cliffs and valleys. The subsection is characterized by bluff prairies, steep bluffs sensitive to erosion, and deep stream valleys. Impressive dolomite cliffs that rise 600-feet above the valley floors and cold-water trout streams add to the appeal of Gorman Creek. River-bottom forests grow along major streams and backwaters, and upland forests are found along the bluff slopes.

A thin blanket of wind-blown silt covers clayey and loamy sediment that contains high amounts of rocks and bedrock in the Blufflands Subsection. The depth of drift over bedrock varies from 0 to 50-feet. Devonian dolomite and limestone are more locally exposed along the western edge of the subsection, where the Gorman Creek Site is located. The Elba Slopes LTA contains a landscape characterized by steep hill sides and gullies with slope gradients of 20% to 70%. The transition from ridge top to steep side slope is usually very abrupt.

The representative substrate of the project's construction area is primarily silt clay with small areas of fine gravel veneering the channel bed. Alluvium consists of sediments and limestone rocks deposited by running water.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.

Topography of the landscape surrounding the project area is rugged, forming break lands of steep slopes and deep valleys that form an interface between relatively flat plateaus above and floodplains below. The proposed project is within a deep valley with a natural valley wall pattern. The valley type is generally wide throughout the project area.

The soil inventory for this site shows that loess soils occupy the gently rounded ridge tops. Loess and limestone residual soils occupy the upper valley slopes along the tributary streams, and alluvial soils are found in the valleys. The project area consists of 3 soil types: Arenzville Series, Ceresco Series and Dockery Series (Figure 12).

The Arenzville series consists of very deep, moderately well drained soils which are moderately deep or deep to a buried soil formed in mostly light-colored, relatively recent (post-settlement), mostly silty alluvium overlying buried soils with dark colored A horizons. These soils are on flood plains and upland drainageways. Slope ranges from 0 to 5 percent.

The Ceresco series consists of very deep, somewhat poorly drained soils that formed in loamy alluvium on flood plains in river valleys. Slope ranges from 0 to 3 percent. The Dockery series consists of very deep, somewhat poorly drained, moderately or moderately slowly permeable soils formed in alluvium. These soils

are on flood plains and slopes range from 0 to 5 percent.

Project plans call for stockpiling fine sediments known as "topsoils" for top dressing areas that will be revegetated.

Table 8. Soils found in the Project Area

Soil Symbol	Soil Unit Name	Slope (%)	Erosion (T) Factor	Hydrologic Group	Hydric Rating	Farmland Classification	Acres in Project Area	Percent of Project Area
Az	Arenzville	0 to 2	5	B	Yes	Prime farmland	7.4	52.6%
N646A	Ceresco	0 to 3	5	A/D	Yes	Not prime farmland	3.7	31.8%
N670A	Dockery	0 to 2	5	B/D	Yes	Prime farmland if protected from flooding	3.2	15.6%

- NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 11.

12. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

The proposed project is located on the upper portion of Gorman Creek (M-033) and a spring tributary (Costello Spring, M-033-014) within the Mississippi River – Winona Major watershed; HUC12 070400030602. Gorman Creek originates in east central Wabasha County 4.5 miles west southwest of Kellogg and it flows in a northeasterly direction toward Kellogg, eventually draining into the Mississippi River. Costello Spring is a joint fracture fault spring originating in sandstone/siltstone of the St. Lawrence formation.

Gorman Creek and the spring tributary are designated trout waters listed in *Minnesota Rules*, part 6264.0050, subpart 4. A naturally reproducing population of brook trout (*Salvelinus fontinalis*) is present in this reach of Gorman Creek. The creek is subject to flooding during the spring and flash flooding after heavy

rains. FEMA classifies this reach as a Zone A floodplain.

The proposed channel and floodplain metrics were evaluated using HEC-RAS as part of FEMA compliance. According to the modeling results, the restoration project causes an increase of up to 0.06-ft (RS 12177). Due to the increase, the floodplain analysis does not meet the no-rise conditions. However, since the project is located in an approximate study area, a Letter of Map Change (LOMR) is not required. Furthermore, since the increase is less than the allowable cumulative increase of 0.5-ft for approximate study areas, a CLOMR is not required (Attachment B).

This reach of the Gorman Creek is classified by the MPCA (see *Minnesota Rules*, part 7050.0470) as a Class 1B, 2A,3B, 4A, 4B, 5, and 6 waterbody. The applicable state classifications and the referenced water quality standards for the reach are: Class 1B (drinking water use with approved disinfection); Class 2A [aquatic life and recreation, coldwater sport fish (trout waters)], Class 3B (use for general industrial purposes, except for food processing), Class 4A and 4B (agriculture and wildlife), Class 5 (aesthetics and navigation), and Class 6 (Other uses). It is protected as outlined by the numeric and narrative water quality (WQ) standards found in *Minnesota Rules*, parts 7050.0220 through 7050.0223, and *Minnesota Rules*, part 7050.0210.

Wetlands are present in the project area and extend up and down the valley (Figure 13). Several onsite evaluations by Wabasha County SWCD, Minnesota Board of Water and Soil Resources (BWSR), and DNR have determined that hydric soils, hydrophytic plants, and saturated soils are present throughout the project area. Wetland grasses and sedges are also scattered throughout the project area. Therefore, the entire project area will be considered a Type 2 wetland for design and permitting purposes. No fill in these areas is proposed except for filling of existing channelized reaches that will be abandoned during this project.

There are no impaired water bodies within one mile of the project area.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The project area lies within the Minnesota Karst Water Province. Two regional aquifers are identified in the southeastern part of Wabasha County: the Prairie du Chien – Jordan (PCJ) aquifer and the Franconia – Ironton – Galesville (FIG) aquifer. The Prairie du Chien-Jordan aquifer consists primarily of dolomites (Prairie du Chien) and sandstone (Jordan), with some thin shales interbedded in the dolomites. The Franconia-Ironton-Galesville aquifer is a confined aquifer composed of sandstones.

There are two springs in the vicinity of the project (Figure 14). Both the Canfield and Costello springs contribute substantially to the base flow in the upper reaches of Gorman Creek. Both of these springs originate from the St. Lawrence formation.

Depth to groundwater in the project area is 0 to 10 feet (Minnesota Hydrogeology Atlas series HG-03).

The project area is not in a MDH wellhead protection area. The nearest wellhead protection area is located more than three miles away, near Kellogg, MN.

There are no known wells on the project site. Three wells are located within a 1-mile radius of the project site (Figure 15). Minnesota Department of Health logs for these wells are found in Attachment C and all of these wells are set in the Tunnel City/Lone Rock formation of the Franconia-Ironton-Galesville aquifer. If unknown wells are encountered during construction, they will be sealed in accordance with Minnesota Department of Health regulations.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

The proposed project will not produce any sanitary, municipal/domestic, or industrial wastewater.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. N/A

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. N/A

ii. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

The project purpose, as described above in Section 6, is to re-establish and mimic natural sediment transport processes in which 90% of all sedimentation produced would come from the riverbed itself and not from bank/uphill disturbances. It is anticipated that approximately 11.4 acres of disturbance will occur on the project site. Of this total, approximately 8 acres of disturbance will be from the excavation of new stream channels (~ 1 acre), excavation of the new floodplain bottom (~ 3 acres), and the remaining four acres for bank sloping from the new floodplain bottom to existing ground (Figure 7).

Work below the OHWL will almost exclusively occur offline in dry or non-flowing conditions. As noted in Section 6, the new stream channels will be constructed at a slightly higher elevation than existing channels and will be built offline. Similarly, the channels to be abandoned will not be filled with soil until flow has been diverted into the new stream channels. The primary work that will be completed below OHWL in wet conditions will be when channel plugs are removed to allow flow to enter the new channels. Additionally, the rock arch rapids at the lower end of the project area will be constructed in the flowing stream below the OHWL. Construction equipment will be used in the flowing stream to build the rock arch rapids and to remove channel plugs when flow is routed to the new channels. The construction equipment and the rocks would be cleaned and inspected prior to any instream work to ensure that their presence would not introduce aquatic invasive species or extra sediment into the stream, and to the extent possible it would work from the dry side. These activities will cause increased turbidity to downstream reaches, but it is unavoidable and will be temporary. Instream BMPs used to minimize the consequences of turbidity include speed to complete the work as quickly as possible, and downstream sediment barriers.

During construction, the project will utilize a variety of storm water BMPs, including devices and methods to prevent turbulent water and polluted discharges into the river. These include:

1) Phasing. Project staging has been developed to minimize in-water construction and reduce the amount of disturbed soils throughout the period of active construction (Attachment A). No work would be done in the old channels until after the new channels are fully vegetated and flow is diverted out of abandoned channels. The abandoned channels will be backfilled with soil from stockpiles after all flow has been diverted into the new channels. This phasing will minimize work below the OHWL in a flowing channel.

2) Slope/Bank Stabilization. Formation of the new channel will require excavation work to shape the streambanks. Reshaping of the banks is proposed to occur as soon as possible upon completion of the channel form. The work will include shaping the slopes to a low angle (6:1) of repose, placement of locally obtained stone, vegetation mats, erosion control blankets, and/or other treatments to reduce the potential of bank failure occurring along the new channel. To minimize the amount of disturbance of the riverbank at any given time, work of stabilizing the new channel banks will be completed in phases.

3) Soil stockpiles in the project area will be stabilized within seven days of placement. Stabilization will include seeding with oats or other cover crop and silt fencing will be placed around the base, both to prevent soil loss. Wherever possible, existing vegetation will be kept in place between the stream channels and soil stockpile areas. Also, to the extent possible, silt fencing will be installed prior to soil being placed, while allowing access for equipment to deposit soil. The soil in these stockpiles will be used to fill the old channel once the new channel has vegetated and flow is rerouted.

4) Disturbed and actively worked soils will also be seeded and stabilized within seven days. Silt fencing and redundant (double) sediment controls, such as fiber roll or staked bales, will be installed in construction areas that are within 100 ft of the existing (channelized) stream reaches.

5) Material stockpiles. Stockpiles of material are proposed within the project limits. Materials such as stones & gravel may be temporarily stored in the floodplain and the inactive portion of the newly created stream channel until final placement. These materials will be used to create riffles, grade control features and diversify substrates. The stone and gravel materials will be of large enough size that they are unlikely to be displaced by floodwaters. Silt fencing will be placed around these materials, primarily to prevent colonization by snakes, turtles, and other animals (see Section 14.d.) The silt fencing will serve a secondary purpose to ensure these materials remain in place.

6) Minimize erosion and sediment contribution during restoration phase: If used, only wildlife friendly erosion blankets and/or plastic free hydro-mulch will be specified by project designers. Oats or other cover crops will be used as necessary to quickly establish vegetative cover and reduce soil exposure. The entire site will be seeded by the contractor with winter wheat to quickly establish ground cover during the fall after construction and the following spring. Native seeding will be completed by MNDNR. Stream banks and stream plugs will be seeded with sedges and other wetland species. Tree plantings will be completed in years 2-5 depending on site conditions. These will likely be bare root plantings to supplement salvaged and volunteer woody vegetation. Protection measures will be implemented into the design for post construction protection to ensure successful establishment of critical vegetation locations. Many of the grasses will establish along this corridor without requiring post construction protection measures.

Very little on-site erosion is expected throughout construction due to the limited / manageable flow conditions and the phasing of construction. No net increase in stormwater runoff quantity will result from the project post-construction, and a reduction in sedimentation from streambank erosion is expected. No net change in storm water runoff quality from the adjacent watershed is anticipated as part of this project.

Climate change projections for Wabasha County include increased precipitation variability, with the possibility of more intense storms. The existing stream channel conditions on the project site are poorly suited to potentially more frequent and/or larger storm events, as they are subject to severe erosion and not well connected to the floodplain. Creating a longer and more sinuous channel will decrease stream velocities and shear stress on stream banks, significantly reducing bank and bed erosion. Restoring natural floodplain connections would enhance the project area's capacity to absorb precipitation, streamflow, and runoff from these events and temporarily store any additional water, thus reducing downstream flood impacts.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.

The proposed project is not expected to appropriate surface or groundwater. However, it is possible that construction dewatering may be needed if the offline "dry" channel intercepts a substantial amount of groundwater or surface water runoff while the project is under construction. It is unlikely that groundwater will be intercepted because the new stream channel will be constructed at a slightly higher elevation than the currently incised ditched reach of Gorman Creek. Also, the excavation of the new channel is planned for periods of dry and/or frozen conditions which will reduce the chances of groundwater or surface water accumulating in the new channel. However, if unforeseen circumstances occur, project proposers will consult with MNDNR hydrologists and apply for appropriate water appropriation permits if construction dewatering is necessary. The 2001 project upstream of the proposed project was constructed in similar conditions and the offline channel did not require construction dewatering.

Because the proposed project is not expected to appropriate any surface or groundwater resources, this would not be affected by any changes in precipitation totals or patterns, changes to surface area flow, or changes in growing seasons.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

Outside of the open water channels, the project area is entirely type 2, wet meadow, wetland that is also seasonally flooded. This was confirmed by Wabasha SWCD and BWSR staff through onsite investigation including soil boring and plant identification. Project managers will work through Wetland Conservation Act (WCA) steps and a Technical Evaluation Panel (TEP) as necessary. Because this project is designed to restore stream and hydrologic functions on the project site, it is likely the project will have a no-loss or self-mitigating determination. The project includes a complete realignment of both stream channels and floodplains including increased meanders and sinuosity. Increasing meanders and floodplain capacity results in a net removal of approximately 23,000 cubic yards of sediment. The increase in stream channel lengths will result in an increase of open water area from approximately 0.48 acres to 0.8 acres. The only locations where fill will be placed are in the existing incised channels after flow has been redirected into designed channels resulting in abandonment of flow. These fill areas will be only to the extent necessary for floodplain function and blending with existing ground.

The remaining material will be temporarily stockpiled onsite or nearby with an established plan to transfer all this material to upland locations within a 1-year timeframe. Possible locations for permanent relocation include nearby agricultural fields and construction sites. Transfer locations will be reviewed to ensure they are non-wetland. The temporary stockpiles will include appropriate wetland protection measures including silt fence and a minimal length access path. The area will be restored to previous grade and cover once material is completely removed.

The project area would remain a Type 2, wet meadow wetland after completion. Its reconnection to Gorman Creek's floodplain would increase the ability of the watershed to absorb, temporarily store, reduce flashiness, and attenuate the magnitude of local flooding from storm events, including the possible increased storm events projected for Wabasha County due to climate change.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicialditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project

may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering thewater features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The project affects approximately 2,500 feet of Gorman Creek and 2,300 feet of a spring tributary, both of which are designated trout streams. The project has been designed using NCD methodology by utilizing reference reach information available on a stable reach upstream of the proposed project. The proposed project will address near and long-term erosion of the stream banks, runoff from agricultural land, and improve aquatic habitats. Expected physical changes to the watercourses include increased sinuosity, greater variety of aquatic habitats, decreased erosion, restoration of degraded streambanks, restored connection to the floodplain, decreased suspended sediment, and increased water clarity. The project is also expected to increase downstream water clarity by reducing sediment load.

The project area is currently used primarily for livestock grazing and the grazing activity is generally well managed. However, due to the near vertical and eroding banks along much of the stream, cattle activity further contributes to bank erosion and sediment input to the stream. The completed project will include a designed cattle crossing and access to water that will allow for better management of riparian vegetation. Stream banks will be sloped to a more gradual profile, and this will significantly reduce bank material from entering the stream.

Impacts on downstream resources will be minimized by constructing and stabilizing the bank during low flow conditions and also completing sections that are not connected to the channel until such time that the vegetative measures have become established sufficiently to minimize erosion and downstream sedimentation. The new stream channels will be constructed offline to maximize the length of time planted and seeded vegetation can become established before flow is introduced. The project will occur outside the exclusion dates to limit impacts to trout spawning and migration.

The proposed modifications to surface water features would increase the area's resilience to projected changes in precipitation and storm patterns due to climate change, by increasing the sinuosity of the stream and reconnecting the stream to its floodplain. The proposed project will also increase available habitat for coldwater obligate species like brook trout and sculpin, which may experience a reduction in optimal thermal habitat in SE MN due to climate change.

The proposed project includes removal of most of the trees lining Gorman Creek. It is expected that removal of the existing tree canopy would have little, if any, warming effect on water temperatures in Gorman Creek and the spring tributary for the following reasons:

1) the current condition on Gorman Creek is an over-wide channel that slows current velocities and increases both the amount of time and surface area that the water is exposed to sunlight;
2) the current stand of scattered boxelder canopy does not shade the entire stream;
3) inputs of cold ground water from Costello and Canfield springs are significant in the project area and properly sized stream channels would reduce residence time of water surface area exposed to sunlight;
4) robust stands of overhanging grasses would provide significantly more shading than the existing stands of trees; and
5) shading from overhanging grasses would persist for a longer period of time each year than will shade from deciduous tree species.

BMPs to limit onsite erosion and minimize wetland impacts during the project include avoidance, utilization of construction mats, maintaining and protecting natural buffers, installing silt fences, and installing silt wattles. Construction will be conducted in phases (Attachment A) to minimize the length of disturbance in each area and to establish permanent erosion control with native seeding and plantings. Disturbed areas will also be covered in wildlife-friendly natural erosion control materials.

Gorman Creek and the Costello Spring tributary are too small to support any type of watercraft use (pre or post project), therefore the project will have no effect on watercraft usage.

13. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

No known contamination or environmental hazards have been identified within the project area.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

The proposed project is not expected to generate significant amounts of solid waste. The project will utilize natural materials such as boulders, rocks, gravel, sand, other mineral soils, and organic materials to establish various BMPs and structures. The contractor will be responsible for hauling any construction-generated wastes off site to appropriate solid-waste management facilities.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

There are no storage tanks on site. The construction, monitoring, and maintenance of the proposed project have limited potential for releases of toxic or hazardous substances. Vehicular fluid from typical construction and operational machinery is the only likely source of toxic or hazardous materials. Petroleum fuels, oils, and lubricants will be used by earthmoving equipment for construction phases of the proposed project elements. Accidental fuel spillage from tanks or during refueling, and leakage reaching the ground may occur and is limited to construction machinery. A Spill Prevention and Countermeasure Plan (SPCC Plan) will be prepared prior to the construction phase of the project. The SPCC Plan will include measures and methods to minimize the potential for spills and mitigation plans to contain spills. Also, the SPCC Plan will include a site-specific Health and Safety Plan for use by workers during construction. Equipment operators are instructed to take precautions when refueling equipment. Refueling will be conducted away from surface waters and equipment will be regularly inspected and repaired to prevent

inadvertent loss of fuels, oils, or other hazardous fluids. Spills will be reported to the Minnesota Pollution Control Agency (MPCA).

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Sludge, animal waste and ash material will not be generated during construction or operation of the proposed project. General construction wastes will be managed by the contractor.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The MNDNR, in collaboration with the U.S. Forest Service, developed an Ecological Classification System (ECS) for hierarchical mapping and classification of Minnesota land areas with similar native plant communities and other ecological features. Based on the ECS, the Gorman Creek restoration site is located in the Blufflands subsection, which is in the Paleozoic Plateau section of the Eastern Broadleaf Forest province. Pre-settlement vegetation types on ridge tops and dry upper slopes were primarily Tallgrass prairie and bur oak savanna. Red oak-white oak-shagbark hickory-basswood forests were present on moister slopes, and red oak-basswood-black walnut forests in protected valleys. Prairie was restricted primarily to broader ridge tops, where fires could spread, but also occurred on steep slopes with south or southwest aspects.

The proposed project lies primarily in the Elba Slopes Land Type Association (LTA) of the Blufflands subsection, west of the Mississippi River channel and floodplain. When European settlers first arrived in the area, the vegetation around Gorman Creek was a mixture of bottomland hardwoods, oak savanna, big woods (mesic hardwood forests), and dry prairie. Bottomland forest was located on the broad, moist floodplains near the Mississippi River. Oak savanna and prairies were found on the dryer, south and west slopes and mesic hardwood forests were located on north and east slopes of the valley. The upper gently rolling plateau, when influenced by natural and aboriginal fire, consisted primarily of prairie and oak savanna. Numerous cold-water trout streams, including Gorman Creek, fed major rivers in the area. These communities, though altered by human land use, continue to dominate the LTA.

The project location has been in some type of agricultural land use since at least the 1930's. Attempts at wetland drainage for conversion to row crop agriculture were generally not successful due to the high water table in the area. Currently, the land is used for grazing livestock and cutting hay. Given the long history of agricultural use, there is generally poor fish and wildlife habitat in the immediate project site.
There is a narrow, wooded riparian corridor along the existing channelized stream. Wabasha County SWCD staff conducted a tree species inventory in December 2020 and found the predominant species in the project area were box elder (*Acer negundo*; 87%), willow (*Salix sp.*; 7%), and silver maple (*Acer saccharinum*; 6%). A few larger trees and willow clumps that are not to be removed have been identified in project plans.

Fisheries – High quality coldwater streams in Southeast Minnesota typically have low fish species diversity due to their thermal regime. An ideal fish population in these coldwater streams will only have brook trout (*Salvelina fontinalis*), brown trout (*Salmo trutta*), and slimy or mottled sculpin (*Cottus sp.*). The upper reaches of Gorman Creek have a self-sustaining population of brook trout, however it is typically a low-density population because instream habitat is lacking. The Costello Spring tributary is a known spawning and nursery location for brook trout. Minnesota DNR has periodically stocked fingerling brook trout

upstream of the project area, but these stockings have been discontinued (DNR file data). It was determined that natural reproduction was sufficient to sustain the population without the need for stocking. Other fish species found in Gorman Creek include Johnny darter (*Etheostoma nigrum*), bigmouth shiner (*Notropis dorsalis*), brook stickleback (*Culea inconstans*), creek chub (*Semotilus atromaculatus*), and fathead minnow (*Pimephales promelas*). These species are not typically found in high quality trout streams, so their presence indicates that stream temperatures and/or habitat conditions may currently be marginal for coldwater obligate species like trout and sculpin.

As mentioned above under EAW item # 12, Gorman Creek and the Costello Spring tributary are MNDNR designated trout streams. These stream reaches have the potential to provide spawning and added habitat for brook trout and other aquatic organisms. However, at present, the poor channel morphology and eroding banks are contributing sand and fine sediments in the project area and downstream. The proposed project will improve habitat by restoring a stream channel with the proper dimension, pattern and profile. This will reduce streambank erosion and fine sediments in the stream, as well as restoring ecological functions in the stream channel and riparian area. Establishing robust stands of grasses on the streambanks will improve shade conditions and maintain, or improve, cold water temperatures (See Section 12.b.iv.b)

Wildlife - The Blufflands subsection provides a critical migratory corridor for forest songbirds, raptors, and waterfowl. It is the most important subsection for reptiles and one of the most important subsections for mollusks, however, there are no known mollusk populations on the project site. Nearly 50 species of mammals and 250 species of birds use this region during the course of a year. Although there is limited wildlife habitat on the project site, there is a diversity of wildlife habitat in the vicinity. As such, there is a diversity of organisms, including amphibians, such as frogs, toads, and salamanders; reptiles including snapping turtles (*Chelydra serpentine*), painted turtles (*Chrysemys picta*), Blanding's turtles (*Emydoidea blandingii*), wood turtles (*Clemmys insculpta*), timber rattlesnake (*Crotalus horridus*), North American racer (*Coluber constrictor*), and garter snakes (*Thamnophis sirtalis*); birds such as American bald eagle (*Haliaeetus leucocephalus*), hawks, great blue heron (*Ardea herodias*), Eastern wild turkey (*Meleagris gallopavo*), wood ducks (*Aix sponsa*), and perching birds; and mammals, such as red fox (*Vulpes vulpes*), white-tailed deer (*Odocoileus virginianus*), squirrels, beaver (*Castor canadensis*), and muskrats (*Ondatra sibethicus*).

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20170391) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

The MNDNR's Natural Heritage Information System (NHIS) database was queried in May 2017 to assess whether state or federally listed species have been documented in the vicinity of the proposed project. The data associated with this assessment is included in the NHIS correspondence assigned number ERDB 20170391. The NHIS letter is included in Attachment D. Given the amount of time that had elapsed, a second NHIS query was conducted in December 2020, as well as an additional query in April 2022. These confirmed that no new records had been documented in the vicinity of the project (Attachments D, E).

The NHIS query identified a Site of *Moderate* Biodiversity adjacent to the proposed project area (Figure 16). Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. Indirect impacts to such sites, such as surface runoff and spread of invasive species, should be considered during project design and implementation.

According to the NHIS query, the following state-listed species are known to occur within an approximate one-mile radius of the proposed project:

- Timber Rattlesnake (*Crotalus horridus*) – State Threatened
- North American Racer (*Coluber constrictor*) – State Special Concern
- Wood Turtle (*Clemmys insculpta*) – State Threatened
- Blanding's Turtle (*Emydoidea blandingii*) – State Threatened

The Blanchard's Cricket Frog (*Acris blanchardi*), a state-listed species, has not been detected in or near the project area. However, the species' behavior patterns and its current distribution in Minnesota suggest that it is possible that this frog could have moved into the project area in recent years. Because of this, MNDNR will conduct a survey in June 2022 to determine whether the Blanchard's Cricket Frog has moved into the area.

High Potential Zones (HPZ) for the federally endangered Rusty Patch Bumble Bee (*Bombus affinis*) occur in Wabasha County, MN. However, the nearest HPZ is approximately five miles from the project site (Figure 17).

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

The proposed project may have minor temporary adverse impacts on wildlife in the vicinity of the proposed project area. Temporary impacts to wildlife may include increased noise and human activity during construction. Many species, even those accustomed to human proximity, could temporarily abandon habitats near the proposed project area until the work is completed. These temporary impacts are not expected to irreparably harm wildlife individuals or populations.

Most of the new stream channel will be constructed "offline," so fish and aquatic organisms will be minimally affected during grading and channel construction. The new channel will be allowed to fully vegetate before flow is connected. Channel blocks will be implemented in a few areas where the new stream channel will cross the old, channelized stream. In these areas there may be temporary disturbances to fish and aquatic organisms, however mobile organisms such as fish are expected to avoid and move away from these areas during construction. Trees will be cleared and grubbed along the existing channelized stream and used in the construction of the new channel. Areas where trees are cleared and grubbed will be stabilized to prevent sediments from entering the stream. Ultimately, the proposed project will improve aquatic habitat and reduce erosion with this stretch of the Gorman Creek and the Costello Spring tributary.

Non-native invasive terrestrial species have been documented in the vicinity of the proposed project area. In upland areas adjacent to Gorman Creek, reed canary grass (*Phalaris arundincea*) and common buckthorn (*Rhamnus cathartica*) are present. The non-native invasive Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), plumeless thistle (*Cardus nutans*), and purple loosestrife (*Lythrum salicaria*) are also likely to be present in the vicinity of the project. Gorman Creek is not listed for any aquatic invasive species.

The state-endangered Blanding's turtle has been noted within the project vicinity. Practices to avoid and minimize impacts to Blanding's turtle will include distribution of a Blanding's turtle fact sheet to all

contractors in the work area; protection of wetlands from dredging, deepening, and filling; and protection from pollution. Sediment and material stockpiles would be surrounded by fencing to prevent turtles from using the stockpiles for nesting, overwintering, or other habitat. In addition, any disturbed areas will be left with as much natural contour as possible and revegetated with native grasses, forbs and shrubs.

Wabasha County is expected to see increased temperatures, increased variability in precipitation patterns, and possibly increased intensity and severity of storm events due to climate change. Without the proposed project, such changes could result in increased surface water temperatures, an increase in the number of severe heat events, and an increase in sedimentation in Gorman Creek during storm events. These would have a negative impact on the aquatic fauna in the creek, especially the brook trout. Because the proposed project would restore lost or degraded ecosystem functions in the project area, it is expected that the consequence would be increased resiliency in the project area and amelioration of these effects. Restoration, regrading, and replanting of stream banks would decrease erosion during storm events, and reconnection to the creek's floodplain would ameliorate the flashiness of local flooding. The brook trout and other aquatic organisms in the project area would benefit from these changes.

d. Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

In order to minimize the spread of non-native invasive plant species, construction equipment will be cleaned before arriving on site and cleaned again upon leaving the site to minimize the potential for invasive species transfer, per DNR Operational Order 113 – Invasive Species Prevention and Management. The project site will be monitored during and after construction for the occurrence of non-native invasive plant species and control measures will be applied as necessary to prevent establishment.

Currently there are relatively few brook trout and other fish species inhabiting the project reach of Gorman Creek, however higher numbers of brook trout are found in the Costello Spring tributary (Attachment F). Project sequencing will be the primary method of avoiding impacts to existing fish populations. No work will be done in existing stream channels from October 15 to April 15, which is the standard period to avoid impacts to spawning trout. Flow will not be introduced into the newly constructed channels until they are stabilized with vegetation. As noted in Section 12.b.ii. BMPs will be implemented to ensure that stormwater runoff and sediment transport are minimized during construction. The phased construction will reduce the amount of bare soils present at any given time and allow contractors to implement erosion control BMPs promptly. Prior to cutting off flow to the existing stream reaches, DNR Fisheries will capture and relocate fish to a nearby reach of Gorman Creek that has suitable habitat. DNR Fisheries will also monitor the abandoned stream channels as they are filled with soil and will transport any stranded fish to nearby stream reaches.

Although the federally threatened (state-special concern) northern long-eared bat has not been documented in the proposed project area, removal of trees could remove potential habitat for bats during summer months. To minimize potential impacts to northern long-eared bats, no tree removal will occur during the pupping season, between June 1 and July 31st, as outlined in the Threatened Species Status for the Northern Long-Eared Bat with 4(d) Rule Federal Register posting (80 FR 17973 18033).

DNR Regional Nongame Specialists and MN Biological Survey Herpetologists were consulted on recommendations to protect any listed species of frogs, snakes or turtles during this project. The project proposers will work with the Regional DNR Nongame Specialist to prepare an impact avoidance plan specifically for this project. The avoidance plan will include, but not be limited to, items below:

- Seasonal restrictions for certain work activities, such as any dewatering would occur between July 1 and September 15 to avoid take of hibernating aquatic wildlife. When fill is to be placed in aquatic habitats (i.e., the abandoned channel) it should occur after being dewatered.

- Timber rattlesnakes may move through the project area in mid to late summer. Contractors will be made aware of this possibility and provided information on what to do if rattlesnakes are encountered.

- A turtle survey will not be required, but construction contractors will be provided information on how to avoid unintentional impacts and what they should do if they encounter turtles during the construction process.

- Silt fencing will be installed around any temporary stockpiles of soil, rock, or wood to prevent amphibians and reptiles from accessing these areas during construction.

- Frequent site visits by DNR and SWCD staff during active construction.

- A frog survey will be conducted by MNDNR in June of 2022 to assess presence of Blanchard's Cricket frogs. If the survey shows the presence of this species, MNDNR will develop avoidance plans for the project.

15. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The Minnesota State Historic Preservation Office (SHPO) was contacted to consult with the SHPO database and performed a site visit for known occurrences of archeological, historical, or architectural resources in the vicinity of the project. SHPO responded on January 24, 2018, reporting that no historic properties or known/suspected archaeological sites are within the project area (Attachment G).

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

Several scenic overlooks exist around Gorman Creek, with most being on private lands. The proposed project area may be visible from some of these overlooks. However, the project does not pose a negative impact to the views of the valley or surrounding landscapes. Once complete, this project is expected to improve visual features through establishment of a meandering stream corridor.

No environmental effects associated with visual glare or vapor plumes will occur during construction.

Visual impacts in the form of bare soil will be temporary, but obvious, during construction and early establishment phases of the proposed project.

17. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

Not applicable, no stationary source emissions will be created by the proposed project or its use post-development.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

The proposed project will result in short-term, localized air quality impacts due to emissions from construction vehicles during construction activities. Emissions from powered equipment would be minor and temporary during construction and are expected to have an overall negligible impact on air quality.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Construction activities will create dust and odors during daytime operations. Dust from agricultural activities is not uncommon in the project vicinity and dust from construction activity will be localized to the project area. To minimize impacts, construction phasing will be used to limit the amount of open area worked at any one time.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.

The proposed project is a stream restoration. Greenhouse gas emissions would be generated during construction, through the use of construction and landscaping equipment such as graders, excavators, dump trucks, and chainsaws. Greenhouse gases would also be generated by hauling and personnel vehicles, from supplies and equipment hauled to and from the project site and from workers commuting. Because the proposed project is a restored ecosystem and there is no permanent infrastructure or ongoing operations, no operational GHG emissions are anticipated. Construction is slated to begin in summer 2022 and finish before the end of 2023. As noted in earlier sections, this is a phased project with several short periods of construction activity during this timeframe.

For this assessment, construction GHG emissions included:

- On-road vehicle emissions: haul trucks.
- On-road vehicle emissions: commuter vehicles
- Off-road vehicle emissions: earthmoving equipment (excavators, loaders, bulldozers, etc.)

On-road vehicle emissions include those generated by the haul trucks, which will bring needed equipment and supplies to the project site. Haul trucks will also be used to move 23,000 cubic yards of soil to a permanent placement site approximately 0.75 mile from the project site. Estimated total use of haul trucks is 3,785 miles. Emission estimates for gasoline commuter vehicles are also shown in Table 9 below. The on-road vehicle emissions are estimated to be 9.768 short tons.

Table 9. Estimated emissions from On-road equipment

On-road Equipment	No. Vehicles	Days	Miles Round Trip	Est. Total miles	Miles per gal	Est. gals	Emission Factors[1]			Emissions (short tons)			
							CO_2 kg/mile	CH_4 g/mile	N_2O g/mile	CO_2	CH_4	N_2O	CO_2e [2]
Diesel Haul Trucks	N/A	N/A	N/A	4,025	6	671	10.21	0.0095	0.0431	7.550	0.0000421	0.0002	7.608
Gasoline Commuter Vehicles	3	40	80	3,200	15	213	8.78	0.0095	0.09	2.065	0.0000335	0.0003	2.160
									Totals	**9.615**	**0.0000757**	**0.0005**	**9.768**

[1] EPA Emission Factors for Greenhouse Gas Inventories Tables 2, 3, and 4 (updated March 26, 2020)
https://www.epa.gov/sites/production/files/2020-04/documents/ghg-emission-factors-hub.pdf

[2] CO2e emissions calculated using Global Warming Potentials from 40 CFR Part 98 Subpart A Table A-1 (CO2e= 1*CO2+25*CH4+298*N2O)

Off-road vehicle emissions include those generated by construction equipment that will used on the project site for construction (Table 10). This includes earthmoving equipment such as excavators, bulldozers, and loaders. There are potential differences in the specific equipment utilized based on the contractor selected to complete the work. For the purposes of this assessment, we assumed that two diesel-powered off-road construction vehicles would be in operation during the construction period, though one is expected to operate at only half the daily hours.

The off-road vehicle emissions will be in operation for the duration of the construction of the project. For the purposes of this assessment, we assumed there will be about 40 days of active construction. Construction is assumed occur for approximately 8 hours per day, however this may vary seasonally (i.e., longer days in the summer months, shorter days in the winter months) for different phases of the project.

According to our assessment, carbon emissions related to construction equipment emissions are estimated to be 43.832 short tons (Table 10).

Table 10. Estimated emissions from Off-road equipment

Off-road Equipment	No. per day	Hours per day	Total Days	Gal. per hour	Est. gals	Emission Factors[1]			Emissions (short tons)			
						CO_2 kg/gal	CH_4 g/gal	N_2O g/gal	CO_2	CH_4	N_2O	CO_2e^2
Diesel Construction Equipment	1.5	8	40	8	3,840	10.21	0.20	0.47	43.218	0.00085	0.00199	43.832

[1] EPA Emission Factors for Greenhouse Gas Inventories Tables 2, 3, and 4 (updated March 26, 2020)
https://www.epa.gov/sites/production/files/2020-04/documents/ghg-emission-factors-hub.pdf
[2] CO2e emissions calculated using Global Warming Potentials from 40 CFR Part 98 Subpart A Table A-1 (CO2e= 1*CO2+25*CH4+298*N2O)

b. GHG Assessment
   i. Describe any mitigation considered to reduce the project's GHG emissions.
   ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.
   iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

No mitigation to reduce the Project's GHG emissions is proposed. Construction-related emissions will be exempt as *de minimus* and they will meet the conformity requirements under Section 176 (c) of the Clean Air Act, and 40 CFR 93.153. Predicted GHG emissions related to the Project are limited to those generated during construction. There will not be any operational GHG emissions. The Project sponsor will encourage the selected contractor to reduce GHG emissions from construction, which may include minimizing idling equipment or encouraging carpooling to the site by equipment operators.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Existing ambient noise in the project vicinity is generally low. Some noise is generated from nearby farming operations and vehicles on roadways. There are two private residences near the project site that may experience additional noise during construction activities. Noise from construction activities will be temporary and limited to normal daily work periods. All construction work and future use of the area will conform to state noise standards. MNDNR will establish limited daily working hours to minimize noise disturbance to area residents and wildlife. The confined area of the work zone will help mitigate the temporary effects of machinery noise.

20. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Minor additional traffic to transport crew and materials will be generated during construction. The site will be accessed by approximately two to four vehicles arriving in the morning and departing in the afternoon. Construction equipment will be delivered to the site and remain on site until the work is completed. Occasional truck traffic, typically one or two trips a week, may be necessary to deliver materials, but it will not affect traffic. This is a rural setting on a gravel road that has little vehicle traffic and no long-term changes to existing conditions are anticipated.

After restoration, this stretch of Gorman Creek is expected to be visited more frequently by anglers than it is now. This is expected to generate approximately the same amount of increased traffic that the previously restored section just upstream of the proposed project area has experienced, which is approximately 1 to 3 visitors per week during trout fishing season.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance (MNDOT, 2020).

The amount of increased traffic in the area due to the proposed project is expected to be roughly comparable to the amount generated by the previous restoration project, which is very minor. This is not expected to create any traffic congestion problems in or around the project area.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects. **N/A**

21. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Land Use

The proposed project would have a permanent beneficial impact on land use throughout the project area, due to restoration of natural hydrologic patterns, addition or increase in landscape appropriate habitats, increase in angling opportunities, and better management of cattle in the project area. Currently, the proposed project area is degraded and unstable, so there would be no short-term loss of or impact to land uses during project activities.

Soils and topography

The proposed project would have a temporary adverse effect on soils in the areas in which land alteration activities are conducted. This adverse effect would last for the duration of earth disturbance activities, until soils are stabilized. Adverse effects include the possibility of soil loss through exposure and erosion. After completion, the project would have a permanent beneficial effect on soils, topography and small-scale landscape features in the project area, as the current unstable topography is replaced with stable, sloped and varied features appropriate to the landscape; the currently steep and exposed streambanks are replaced with more gently sloped banks covered with vegetation that holds the soil better; and cattle are managed.

Water Resources

Surface water and water quality would experience a short temporary adverse impact, limited in geographic extent to the project area and the area immediately downstream. This would be due to sedimentation and stormwater runoff from active construction and land alteration activities, as well as from the action of connecting the existing stream to the new stream channel. After project completion, water resources would experience a permanent beneficial impact from reduction in sedimentation and erosion due to restoration of the stream banks, restoration of natural hydrology, and reduction in flashiness of flood events.

Aquatic habitat

The project would have a temporary adverse impact on aquatic habitat, limited in geographic extent to the portion of Gorman Creek and the Costello Spring tributary in the active project area and limited in time to the duration of the project. Although the project staff would minimize disturbance to and impacts on the watercourses, a minimal amount of disturbance would be unavoidable when the old channel is cut off from its upstream and downstream ends and the new channel is connected. After completion of the project, habitat quality in the project area would be enhanced due to restoration of natural stream features and aquatic habitats.

Fish, wildlife, plant communities and rare features

The proposed project would have temporary minor adverse impacts on wildlife due to increased noise and human activity during construction. The geographic extent of this impact would be limited to the project area and its immediate surroundings. Fish and other aquatic organisms would experience a minor temporary negative impact due to increased sedimentation in the stream and the construction activities associated with joining the new stream bed to the upstream and downstream intersections with the existing stream and severing the connections with the current channelized stretch. After completion, the project would have a permanent beneficial impact on fish and other aquatic organisms due to restoration of natural stream features and aquatic habitats and an increase in water quality.

Brook trout (*Salvelina fontinalis*), brown trout, and other cold water fishes associated with designated trout streams are expected to experience a permanent beneficial impact due to restoration of natural trout stream habitat.

Visual, Air, and Traffic Qualities

All of these would experience minor temporary adverse impacts due to construction activities. The geographic extent of these effects would be limited to the project area and its immediate surroundings, and the impacts would last for the duration of construction activities. After completion, the project would result in permanent beneficial impacts on visual qualities due to the restoration of the stream.

It is expected that this stretch of Gorman Creek would experience permanent increased angling use due to the stream restoration, and if so then traffic and its impacts on air quality would be permanent minor adverse impacts.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

To date, MNDNR has no specific plans to continue downstream from this project, but it is hoped that the stream restoration project can continue downstream as part of a complete watershed effort. Any future work will require cooperation from landowners, as well as securing required legal permissions and project funding. Several landowners downstream have recently expressed interest in completing similar projects. Any future projects will be designed in a similar manner with NCD principles and connect directly into previous project areas when possible.

An inquiry concerning whether Wabasha County was planning any projects in the area in the next few years was sent to Wabasha County Planning and Zoning, and the county indicated that it had nothing planned. According to the Minnesota Department of Transportation's' (MNDOT's) project planning website, MNDOT has no projects planned for this area in the foreseeable future.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

The project would temporarily impact approximately 30 acres during an overall period of approximately one year, with an estimated 4-6 weeks of active construction time. It would remove approximately 2,060 feet of existing, channelized stream and replace it with 4,800 feet of sinuous stream channel. Trees and shrubs currently lining the stream would be removed and the existing steep stream sides would be regraded and revegetated or reseeded. It is expected that the project would temporarily increase erosion and sedimentation due to runoff from the land alteration and channel construction activities, especially if heavy precipitation events occur during these activities.

The current channelized stream degrades water quality in and downstream of the project area because its steep sides experience high rates of erosion and its isolation from the floodplain increases flashiness and magnitude of minor flooding events. Water quality may be further degraded during construction but would increase after construction due to restoration of the natural stream system. The new channel would not be connected to the existing channel until it

is completed, vegetation has been planted, and erosion control measures are in place; this is to minimize erosion and sedimentation impacts downstream. Downstream impacts from flooding would be attenuated by the increase in stream sinuosity and its reconnection to the floodplain.

The project area's biodiversity and habitat value for wildlife would be temporarily decreased while the project is underway, but after completion these are expected to increase.

The permanent beneficial impacts of this project would enhance the beneficial impacts of a previous stream restoration project undertaken on Gorman Creek immediately upstream of the proposed project area.

22. **Other potential environmental effects:** If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

All potential environmental effects have been addressed above.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature  Date 5/3/22

Title MNDNR-EWR Environmental Review Project Manager