July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: The EQB webpage of Environmental Review Guidance Documents /http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.
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: Spider Creek Stream Restoration Project

2. Proposer: U.S. Steel Corporation

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3. RGU MN Department of Natural Resources

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4. Reason for EAW Preparation (check one)

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

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s): *Minnesota Rule:* part 4410.4300, Subpart 26 (Stream Diversion)

5. Project Location

County: St. Louis
City/Township: Ness
PLS Location (¼, ¼, Section, Township, Range): NE ¼, Section 24, Township 52N, Range 19W
Watershed (81 major watershed scale): St. Louis River (#3)
GPS Coordinates: 46.9818, -92.6906
Tax Parcel Number: 470-0010-03830 and 470-0010-03850

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

- County map showing the general location of the project; (Figure 1)
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); (Figure 2) and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

Figure 3: Proposed Restoration Reach
Figure 4: Proposed Restoration Plan
Figure 5: Reference Reaches
Figure 6: Prime Farmland
Figure 7: NRCS Soils
Figure 8: Wetland Delineation
Figure 9: Cultural Survey

Attachments to the EAW:

Attachment A: Spider Creek Plan Set
Attachment B: Spider Creek Wetland Delineation Report
Attachment C: Spider Creek 2015 Aquatic Biota Assessment
Attachment D: Phase I Archaeological Survey Report

6. Project Description:

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

U. S. Steel proposes to restore the pattern, profile, and dimension of an approximately 2,660-foot channelized reach of Spider Creek. The project would reposition the existing straightened stream channel to restore approximately 4,050 feet of channel. The restoration aims to ensure sustainable stream characteristics and to improve riparian and floodplain vegetation.

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.

The proposed project would restore the pattern, profile, and dimension of a reach of Spider Creek located near Ness, Minnesota. This portion of Spider Creek was first channelized prior to 1940, according to a review of historical aerial photos. The creek has been chosen for restoration as compensatory mitigation for mining-related stream impacts approximately 40 miles north of Spider Creek.

Stream Restoration Design

The restoration plan would utilize existing historical meanders and additional excavation to reestablish a channel alignment that is longer and more sinuous than the existing, channelized alignment (Figure 3). Based on channel condition history, the new channel alignment would have

Type E entrenchment ratios, using the Rosgen classification system (Rosgen 1996), and would have improved connection to the adjacent floodplain.

The proposed stream restoration design is based on evaluation of historical aerial photos of the stream, topographic data obtained from site surveys and LiDAR, U.S. Geological Survey (USGS) regional regression curves (Rosgen, 2014), and MNDNR Eastern Minnesota Regional Curves. The design plan is informed by surveys of the existing channelized reach (i.e., restoration reach), a primary reference reach, and other supporting reference reaches. The primary reference reach is located on a 1,400-foot portion of Spider Creek just upstream of the restoration reach (Figure 4). Additional reference reaches were evaluated to verify that the primary reference reach was an appropriate reference reach and to help determine the stream design parameters (Figure 5). Spider Creek (including both the primary reference and restoration reaches) is a second-order perennial stream.

The stream restoration plans and typical drawings are provided in Attachment A. The restoration plans show the existing and planned channel alignments and dimensions, locations of riffles and pools, typical cross-sections, and details.

The length of the existing channel in the restoration reach is 2,660 feet. The proposed channel length for this reach is 4,050 feet with a sinuosity of 1.6 (Attachment A, Sheet C-01). Additional length would be achieved by routing the new channel through historic meanders that were cut off when Spider Creek was straightened and by creating some new portions of the channel. The elevation of the restored stream-bed would be 0 to 2 feet higher than the existing straightened channel bed. In general, the restored channel would have a bankfull width of approximately 17.7 feet through riffle areas, and pool widths ranging from 20 to 30 feet.

Lateral scour pools would be constructed/established at the bends in the restored stream channel. Compound pools are common throughout the primary reference reach on Spider Creek, and would be incorporated in several locations throughout the new project. Constructed pools would range from 5.1 to 5.6 feet deep on the outside of the bend rising at about a four to one (4H:1V) slope ratio to the inside of the bend. Design pool maximum depth ranges from 4.1 to 4.6 feet; the expectation is that the constructed pools would fill in to a self-sustaining shallower depth over time. Pool edges would be stabilized with toe wood, vegetated reinforced soil slopes (VRSS), and erosion control blanket (with wildlife-friendly mesh). For construction of the pools, toe wood would be installed on the outside of the meander bends by layering wood and small branches to counteract the high shear stress in those areas. In less potentially erosive areas of new channel construction, natural sod mats obtained during construction may be utilized along with coir fiber fabric to protect new channel banks and allow for vegetation to become established. The vegetation would provide long-term protection. Toe wood, woody debris, and live stakes would be obtained from the site or from other nearby sources. Woody plant collection would follow the guidelines of the Minnesota Forest Resource Council (2005, Part III pages 29-67). In addition to those guidelines, no wood would be harvested from within 50 feet of the proposed stream alignment and shrub cuttings collected from live plants would be limited to that which would allow for continued growth of existing shrubs.

Two riffle types are proposed for construction: grade-control riffles and mobile bed riffles. Grade-control riffle sections would be constructed with gravel- to cobble-sized material to withstand the shear stress created by bankfull flow and to maintain the planned channel slope.

Riffles not designed for grade control would contain a bed that is designed to be mobile during large flow events. Riffle material sizing would be based on the riffle function and shear stress analysis results.

The reference reach riffle width-to-depth ratios ranged from 7.2 to 7.4, which is in the expected range for a typical E-channel. Assuming some existing floodplain vegetation can be maintained adjacent to the re-meandered stream channel, and the new excavated channel has a full growing season to establish vegetation before inundation, an E-channel with a riffle width-to-depth ratio of 7.2 to 7.4 is proposed.

One 8-foot high bottomless arch culvert currently passes flow beneath a driveway near the downstream end of the restoration reach. The restoration design proposes to remove the existing arch culvert and place new box culverts at two locations along the creek to allow for re-establishment of a natural stream meander pattern. The proposed locations are shown on Sheet C-01 (Attachment A). Culverts would be sized and designed based on Aquatic Organism Passage design principles (FHWA 2010).

The culvert sizing and placement approach would match the culvert width with the natural stream dimensions while maintaining sediment balance, including burying the culverts below the streambed and providing a low-flow channel for late season fish migrations (typically August to November). This approach also minimizes the need for maintenance by reducing scour and aggradation. The larger culverts would be more than adequate hydraulically for design flows, and would benefit the stability of the stream and the aquatic wildlife functions.

In addition to the two new box culverts, one to two smaller floodplain culverts are proposed to be placed beneath the county road at each box culvert location, as well as beneath the new county road segment proposed to be routed southerly at the western end of the restoration. These culverts would remain above water level for events lower than bankfull, but would act as floodplain connectors during flows exceeding the 2-year event.

Floodplain excavation would be completed within the project area to create the new channel and restore the current channel. Disturbed areas of the floodplain and near bank areas would be seeded with a native wet meadow/sedge meadow seed mix. The constructed streambank slopes would be seeded with a native seed mix, composed of species such as rice cut grass (*Leersia oryzoides)*, blue joint grass (*Calamagrostis canadensis)*, woolgrass (*Scirpus cypernius*), cord grass (*Spartina pectinatus*), or similar moist soil species.

Within the floodplain, species appropriate for a shrub-carr community would be planted throughout the disturbed areas. Depending on availability, shrubs and a limited number of trees may be installed from containerized plants, bare-root plants, and/or live cuttings. The planting of the trees and shrubs may take place in the first growing season following initial construction. Shrub species selected for planting may include species of willows (*Salix* spp.), red-osier dogwood (*Cornus alba*), speckled alder (*Alnus incana*), and meadowsweet (*Spirea alba)*. Tree species selected for planting may include quaking aspen (*Populus tremuloides*), tamarack (*Larix laricina*), black spruce (*Picea mariana*), and red maple (*Acer rubrum*), among others. Native species appropriate for this area would be selected. The plants and seeds for the project would come from a source within 200 miles of the site.

Project Reference Reaches

One primary, and five supporting, reference reaches were selected to guide the design of the restoration reach (Figure 5). The criteria used to identify suitable reference stream reaches included streams that meet the following characteristics:

- Naturally meandering channel patterns
- Within the St. Louis River watershed and in close proximity to the restoration site
- Within relatively undisturbed watersheds
- Drainage areas of similar size to the Spider Creek watershed

The supporting reference reaches were evaluated to verify that the primary reference reach (a portion of Spider Creek) was not incised, which could skew the bankfull channel dimensions away from those of a stable reference stream. These additional reference streams were surveyed in the field to capture several cross-sections; however, only one of these reaches (on Bear Trap Creek) was evaluated using the full Rosgen Level II assessment and classification system.

The Spider Creek (primary) and Bear Trap Creek reference reaches were chosen after investigating several sites selected from aerial photography and desktop assessments. The reference reaches on Spider Creek and Bear Trap Creek have similar geologic settings, both are highly sinuous, relatively low gradient, and have similar geology and valley types. One difference between the two is the percentage of lakes within the watersheds; Bear Trap Creek's drainage area includes 17% lakes, while Spider Creek has less than 1%. Another difference is that Bear Trap Creek's measured bankfull cross-sectional area is low relative to its drainage area, in comparison with Spider Creek's cross-sectional area relative to its drainage area.

The reference cross-sections were measured at riffles to obtain bankfull dimensions. Slightly entrenched streams with high sinuosity and low gradients are generally classified as C or E types. The main differentiator between the two stream types is the ratio of bankfull width to bankfull mean depth (W/D). Streams with W/D ratios greater than 12 are classified as C channels, and W/D ratios less than 12 indicate E channels.

The Spider Creek reference reach was classified as a Type E channel; the Bear Trap Creek reference reach was classified as a Type C channel. The Spider Creek reference channel classification was determined to be consistent with the historical condition of the proposed stream restoration reach and was, therefore, used as a primary basis for the restoration design.

Proposed Construction Methods and Sequencing

Construction is planned to occur in two phases with monitoring and management to follow. Both phases of construction are proposed to take place during late-summer low-flow conditions; however, construction may need to occur in frozen conditions due to the wet, soft soil conditions in the project area. In general, project construction methods and sequencing would be planned to minimize the potential for erosion and downstream sedimentation to the extent practicable. Stream restoration would be sequenced to limit the area of open soil disturbance during construction. The nearby areas of high ground would be utilized for equipment and material staging. The equipment employed is expected to include a tracked excavator, small dozer, and possibly a loader. The equipment would be selected by the chosen contractor with specifications

that the contractor shall minimize disturbance in wetlands and other areas to the extent practicable.

Construction – Phase One

Initial construction is expected to take approximately two months. The new channel would likely be constructed in late 2017, after all permits and approvals are obtained, and would remain offline (disconnected from stream flow) for one full growing season. Grade control stream riffles would be constructed at the upstream end of the project and downstream of the project to establish and maintain the thalweg through the project area and prevent headcutting within and upstream of the project. The new channel banks, floodplain, and all other disturbed soils would be seeded with native species, and shrubs and trees would be planted within portions of the floodplain.

Soil excavated within the floodplain, as well as from establishment of the new stream meanders, would be set aside for storage and utilized to fill the existing channel to match the proposed floodplain elevations.

Stream channel excavation and construction are planned to be completed without stream flow present during the first phase, though portions of the new channel may be wet due to the high groundwater table in the area. Excavation of the new channel would not be connected to the flowing stream until all vegetative restoration is completed and the vegetation has one full growing season to become established.

Construction – Phase Two

Once vegetation is established in and adjacent to the new channel, the second phase of construction would take place. Phase Two would include back-filling the existing channel and connecting flow to the newly-created stream.

Additionally, two concrete box culverts would be installed beneath County Road 167 to allow the restored stream to follow its original meander pattern (Appendix A, Sheet C-01). The culverts would be installed with inverts embedded below the proposed channel grade and would be filled with streambed material to establish a consistent streambed and maintain biological connections.

During the second phase of construction the contractor would be required to divert the flow around the active in-channel work area until all restoration and site stabilization is completed within that reach. Diverted flows would be discharged downstream utilizing energy dissipation methods to minimize erosion in the channel. Phase Two construction work would take one to two months and would be sequenced so that any work within the actively flowing stream would be limited to that which can be completed each day.

Monitoring and Management

Monitoring and management of the restored stream would be conducted for a period of up to five years following the completion of construction to demonstrate that project objectives have been met.

For the first five years (following the completion of the Phase One of construction), three site inspections would be conducted each year: one following snowmelt, one during mid-summer, and one in September. Additionally, site inspections would be conducted following all rain events exceeding two inches within 24 hours.

During each site inspection, the entire project area would be observed to identify and manage any potential erosion, failures or problem areas, particularly focusing on the stability of the stream bed and banks along with the stability of floodplain areas. Any noted substantial failures or deficiencies would be documented and reported to the U.S. Army Corps of Engineers (USACE). U. S. Steel would develop a corrective measures plan for approval by the USACE before implementation.

Quarterly reports detailing the progress of the restoration and other work required in the MPCA 401 certification shall be submitted to the MPCA. A comparison of the baseline and post-restoration geomorphology, physical habitat, fisheries, invertebrates, water chemistry, hydrology and connectivity is also due to the MPCA.

Following the primary maintenance and monitoring period, once the mitigation approval is provided, the restoration site would enter into the long-term management phase. It is expected that the restored stream channel would be stable and fully functional and that it would require minimal maintenance or monitoring. Once the channel has been re-located it would remain within a permanent easement held by the Minnesota Department of Natural Resources (MDNR) as an Aquatic Management Area (AMA). These easements are managed by the MDNR to maintain access for fishing and other recreational uses along these streams. Therefore, the MDNR would continue to manage the site in perpetuity.

c. Project magnitude:

Construction/Infrastructure Elements	**Size**
Total Project Acreage	32.5 acres
Linear project length	4,050 linear feet
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
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.

The stream restoration project is the result of a plan developed to provide compensatory stream mitigation required by the USACE and MPCA as part of Clean Water Act Section 404 authorization and Section 401 certification for U. S. Steel's Minntac Mine Extension near Mountain Iron, Minnesota. The Spider Creek restoration was selected as the preferred alternative

based upon an evaluation of other potential stream mitigation sites provided to the USACE and MPCA.

Project Goals and Objectives

The goal of this restoration project is to reestablish a reach of Spider Creek channel to its original meander pattern and profile to the degree practicable. Reestablishing the natural meander pattern, feature distribution, and stream connectivity to the floodplain would result in a more stable system with natural in-stream habitat. Connecting the channel to floodplain vegetation would help the system maintain a higher and more consistent baseflow than the current system allows, which has limited floodplain connectivity. A secondary benefit of the restoration would be increased fish, waterfowl, and reptile/amphibian habitat in the floodplain and adjacent wetland communities, where the natural hydrology would be restored.

The primary goals of the stream restoration project are:

1. Bank stabilization
2. Restoration of a naturally-sustainable stream channel
3. Maintenance of aquatic habitat
4. Restoration of the natural characteristics of the stream ecosystem (as appropriate for the Spider Creek landscape and watershed)

The preliminary objectives for the proposed project include the following:

1. Hydrology
    a. Restore groundwater connectivity of the system, which would improve baseflow conditions for aquatic habitat.
    b. Reduce peak flow velocities through more effective floodplain connectivity and reduced channel slope.
2. Geomorphology
    a. Restore Spider Creek's historical pattern, profile, and dimension to the degree practicable;
    b. Restore a sustainable stream channel that maintains its form without aggradation or degradation and moves its bedload during high flow events in a way that approximates its historical condition.
3. Connectivity
    a. Reconnect the channel to the surrounding floodplain.
4. Vegetation diversity
    a. Preserve existing floodplain vegetation and restore disturbed areas with diverse native vegetation.

5. Water Quality
    a. Reduce sediment loading by stabilizing bank erosion and vertical down-cutting.
    b. Improve baseflow conditions; potentially reduce in-stream water temperatures.
6. Biology
    a. Maintain aquatic and floodplain habitat.
    b. Restore the natural characteristics of the stream ecosystem, appropriate for this landscape and watershed.

c. Elevate groundwater levels in the reconnected floodplain.

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

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

7. Cover types:

Estimate the acreage of the site with each of the following cover types before and after development:

The assessment of land cover types was estimated using GIS. The ESRI ArcMap geometry calculator was used to calculate acreage through North American datum 1983, Universal Trans Mercator 15N Projection.

A wetland delineation completed on August 3, 2016 identified the proposed project area to be dominated by hydrophytic vegetation but not meeting hydric soil nor wetland hydrology indicators. Figure 8 shows aerial imagery and the two delineated wetlands that are located within the former floodplain of Spider Creek (see Section 11.iv.a for more information).

The area of wetland is expected to remain unchanged following the stream restoration. The area of deep water/streams would increase due to the increased length of the restored channel by approximately 1.3 acres. As a result of the longer channel, the area of brush/grassland would decrease by approximately 1.3 acres.

Cover Type	Before	After	Cover Type	Before	After
Wetlands	0.3	0.3	Lawn/landscaping	0.0	0.0
Deep water/streams	0.6	1.9	Impervious surface	1.4	1.4
Wooded/forest	2.8	2.8	Stormwater Pond	0.0	0.0
Brush/Grassland	27.4	26.1	Other (describe)	0.0	0.0
Cropland	0.0	0.0			
			TOTAL	**32.5**	**32.5**

8. 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.*

Unit of government	Type of application	Status
St. Louis County	Wetland Conservation Act No Loss Application Land Alteration Permit Right-of-Way Permit	To be submitted To be submitted To be submitted
MDNR	Public Waters Work Permit Aquatic Management Area easement Dewatering Permit	To be submitted In progress To be submitted if needed
MPCA	NPDES/SDS Construction Stormwater General Permit	To be submitted
Minnesota State Historic Preservation Office (SHPO)	Archaeological and Cultural Resource Reviews (NHPA Section 106)	To be submitted
USACE	Clean Water Act Section 404 Permit	To be submitted
MPCA	Clean Water Act Section 401 Certification	Approved January 21, 2014 and amended May 29, 2015

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

Much of the area surrounding Spider Creek is owned by the State of Minnesota as tax-forfeit land (approximately 64 percent within the project area) that is primarily forested with some homes and small farms (Figure 3). A portion of the land affected by the project is privately held (approximately 36 percent), with the majority owned by the Spider Creek Hunting Association (approximately 28 percent). There is prime farmland located nearby the project site, with approximately 3.2 acres of farmland of statewide importance within the project boundary (Figure 6).

Spider Creek currently has a perpetual conservation easement for an AMA that is held by the State of Minnesota and applies to all land within 60 feet from the top edge of the stream banks on either side. AMA properties are managed by the MDNR to maintain access for fishing and other recreational uses along these streams.

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.

St. Louis County Recreation Plan for the Cloquet, St. Louis and Whiteface River Corridors: Section 21 of St. Louis County Ordinance #27 (St. Louis County Recreation Plan) examines several issues of concern for river systems in this area of Minnesota that include in-stream flow management, erosion, and sedimentation, among others.

The St. Louis County Recreation Plan proposes river classifications that can be used by local units of government to establish appropriate land use classifications. The principles and policies of this plan are intended to "guide state and federal management to the same degree as private individual's actions to promote the protection, preservation, and proper and orderly management of these river systems and their adjacent shoreland environments."

The restoration project is within an area that is currently zoned as a Forest Agricultural Management (FAM) district by St. Louis County, which was determined to meet the management goal of a "Remote Area". The proposed "Remote Areas" outlined in the St. Louis County Recreation Plan were determined to have the following characteristics: some human impact is noticeable from the river, multiple-use forestry practices are evident in the corridor, river front lands are largely undeveloped, corridor and river front lands are partially accessible by trails, paved and non-paved roads, or bridges, overall shoreline use is of relatively low intensity, and overall the shoreline is in a mostly natural state. The "Remote Areas" management goal is to protect and maintain existing natural, undeveloped state of the river and its adjacent shoreland environment.

Statewide Conservation and Preservation Plan (2008), commissioned by the Legislative-Citizen Commission on Minnesota Resources, outlines land use and habitat recommendations, including alterations to topography and establishment of new features, such as roads, are discussed as impacting natural resources. Hydrologic modification and solids, nutrient, and contaminant loading associated with the construction of roads and buildings are listed as drivers of change for community land use, which is associated with an increase in total runoff of sediment, phosphorus, and contaminants to surface water. The Spider Creek restoration project aligns with the plan recommendations related to reducing stream-bank erosion through reductions in peak flows and protection of critical shorelands of streams.

St. Louis County Comprehensive Water Management Plan, Update 2010-2020 (Amended June 24, 2015) outlines a number of priority concerns, including ground and surface waters that may be applicable to the proposed project. Within this priority concern there are two additional sub-goals that include:

- Protection of ground and surface water from the combined impacts of point and non-point source pollutants

- Monitoring, assessing, and restoring watersheds

Wetlands Restoration Strategy: A Framework for Prioritizing Efforts in Minnesota (2009) discusses key elements of the statewide strategy that include prioritizing restorations based on desired outcomes, such as water quality improvements, habitat gains, flood damage reduction, and other hydrologic benefits that may be applicable to the Spider Creek restoration project. Other relevant general principles of the wetlands restoration strategy include:

- Riverine wetlands restoration can be a priority when flood water retention, wildlife habitat, and certain water quality outcomes are needed within river and stream corridors
- Restoration in the upper reaches of tributaries within watersheds generally provide the greatest benefits

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

The proposed project area is located within the St. Louis County zoning district FAM-1, which is intended to encourage recreational use of such areas. This land use zone district is typically used in areas with land developed at very low densities and often there is considerable government ownership.

The restoration project area is also located in a shoreland district. According to Minnesota Rule 6120.2500, Subp. 15, shoreland is defined as "land located within… 300 feet from a river or stream." Spider Creek is classified as a public water and, as such, has "shoreland" along it.

Spider Creek, including the stream reach to be restored, currently has a perpetual conservation easement as an AMA that would continue to be managed by the MDNR to maintain access for fishing and other recreational uses along the stream.

There are no Federal Emergency Management Agency (FEMA)-designated floodplains, designated wild and scenic rivers, agricultural preserves, or other designated critical areas within the restoration project area.

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

Minnesota Rule 6120.2500-3900 outlines the State's Shoreland Management Program. The basis of these sets of rules is to preserve and enhance quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of water and related land resources of the state. The Shoreland Management Program provides the backbone of statewide standards that local governmental units must adopt into their own land use controls to provide for the orderly development and protection of Minnesota's shorelands (both rivers and lakes). St. Louis County adopted these State Standards in 1993.

St. Louis County Shoreland Standards have limits or thresholds of allowable land alteration which if exceeded may cause a project to require a permit. The Spider Creek restoration project

would exceed the "limits" for land alteration. Specifically, any alteration of natural topography located within the shore impact zone or within 50 feet of the shore. Since a limit is exceeded, St. Louis County would require a land alteration permit and would require an evaluation of the project to determine if benefits resulting from this project were greater than potential negative impacts and to determine if there were any unnecessary erosion risks involved with the project. Minnesota Rule 6120.3300, Subp.4. requires that evaluation of such projects include determining if other permits, such as Section 404 Authorization and 401 Certification, are required.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

The Spider Creek restoration project is fully compatible with the nearby land use and applicable zoning and plans for the project area.

U. S. Steel has been in discussion with the Spider Creek Hunting Association and would obtain the necessary permissions for the proposed work on their property. U. S. Steel would also provide documentation from the MDNR that the agency is willing to continue site management along Spider Creek after all conditions of the restoration plan and the agreement between MDNR and U. S. Steel are met.

10. 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 bedrock geology of the project area consists of argillite, slate, and greywacke of the Precambrian age Animikie Group. Limestone is not present and Animikie Group bedrock is not susceptible to formation of sinkholes or karst conditions. The bedrock is associated with fine-grained, metamorphic rocks of the Thompson Formation.

Depth to bedrock is 100 to 200 feet below ground surface. Bedrock would not be encountered during site activities.

The surficial geology at the site consists of lake-modified, clayey till deposits. Clayey till was deposited during the advance of the St. Louis Sublobe of the Des Moines Lobe glaciation. The till was modified within Glacial Lake Upham that was formed from glacial meltwater behind the Culver End Moraine. Additional fine grained sediment was also deposited within Glacial Lake Upham, and the relatively flat, low-relief topography in the area is the result of sediment deposition within the glacial lake. Till associated with earlier Rainy Lobe glaciation likely underlies Des Moines Lobe till. Rainey Lobe till is generally sandier in texture than the clay rich Des Moines Lobe till.

Post-glacial fluvial and peat deposits are present in areas overlying till. Peat deposits are present in low lying poorly drained areas. Sandy fluvial deposits are deposited in stream and river channels and are localized within stream and river valleys.

Construction activities would be at depths that would remain within the surficial clayey deposits and the project is not anticipated to have any geologic environmental consequences.

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 11.b.ii.

Soils present on the site are primarily mucks and loams. The soil types, classified by NRCS, are: Bowstring and Fluvaquents, Schisler-Ellsburg-Baden, depressional, complex, Melrude-Schisler-Baden, depressional, complex, Tacoosh mucky peat, and Dinham-Dusler complex (Figure 7). Soil along and most closely adjacent to Spider Creek is classified as Bowstring and Fluvaquents consisting primarily of muck.

Due to the channelization and creation of spoil berms along Spider Creek, the soils and hydrology within the project area have been altered. A majority of the project area is dominated by hydrophytic vegetation but did not meet hydric soil indicators (Attachment B, Section 4.3, Table 5). It is likely that the majority of the project area was formerly within a wetland in the floodplain of Spider Creek. The creek channelization and incised channel conditions appear to have lowered the water table in the area and disconnected the floodplain from flooding in the creek. The proposed restoration project would elevate the new stream bed approximately 0 to 2 feet higher than the existing stream bed elevation to reconnect Spider Creek with its floodplain. Construction of the restored stream would require excavation of approximately 19,000 cubic yards as well as the placement and grading of approximately 19,000 cubic yards of the excavated soil.

The majority of the site slopes are at an approximate 0-2 percent grade with the southwest corner sloping at an approximate 1-8 percent grade; surface water drains towards Spider Creek. Potential impacts to erosion and sedimentation would be associated with construction activities and stormwater management. During site preparation and construction, control measures would be used to manage erosion and sedimentation. Planned erosion and sedimentation control measures are described in Section 6b. The stormwater management plan is described in detail under Section 11.b.ii.

Since construction of the proposed project would disturb more than one acre of land, U. S. Steel would apply for a construction National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit from the MPCA. The permit would require U. S. Steel to develop a stormwater pollution-prevention plan (SWPPP) for the project which would include best management practices (BMPs) for site erosion and sediment control. The material excavated to create the new stream channel would be used to fill the existing stream channel. Any excess material would be placed on site to create mounds in the floodplain and surrounding upland areas, or disposed of at an approved off-site location. The mounds would be field fit, so are not included

in the design. Disturbed soils would be kept to a minimum and would be revegetated as soon as possible following construction.

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 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. 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, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include 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 takes place within Spider Creek, which is identified as a public water on the MDNR's Public Water Inventory (PWI No. S-002-035-002). It is a second order, perennial stream that begins approximately 4 miles east of the project area in a wetland complex associated with Muskrat Lake. Spider Creek flows north and west to the Whiteface River, located approximately 4.25 miles downstream. The Whiteface River discharges into the St. Louis River, approximately 4 miles downstream.

Spider Creek was considered a designated trout stream until 2008, when the MDNR de-listed it. The MPCA proposes re-classifying Spider Creek as a Class 2B (warm water/cool water) stream, though it is currently listed as a Class 2A (cold water) stream. Spider Creek is not listed on the MPCA's Draft 2016 Impaired Waters List, and there are no impaired waters within one mile of the proposed project; however, the Whiteface River and St. Louis River are both impaired for mercury in fish tissue. The Whiteface River is also impaired for mercury in the water column, and the St. Louis River is impaired for aquatic macroinvertebrate bioassessments.

The drainage area of the reach of Spider Creek proposed for restoration is 15.6 square miles. The majority of the drainage area is forested rolling hills and wetlands. Most of the drainage area is undeveloped and undisturbed by human activity, though there is evidence of logging, pastures, hayfields and ditching in the surrounding area. Several local roadways traverse the surrounding vicinity. About a quarter of the larger Spider Creek watershed was historically ditched, presumably for agricultural purposes. The existing immediate floodplain along Spider Creek is low-gradient, consisting primarily of grasses and shrubs. The surrounding landscape is primarily forested with some rural homes and small farms.

Spider Creek currently has a perpetual conservation easement for an AMA held by the State of Minnesota. The AMA is managed by the MDNR to maintain access for fishing and other recreational uses along these streams.

The reach of Spider Creek proposed to be restored as part of this project is visibly straightened, with the disconnected floodplain to the north containing remnants of the historically meandering channel. The earthen embankments that constrain this reach of Spider Creek are tall (approximately 8 to 10 feet above the water surface and 3 to 5 feet above existing ground), steep, and are likely the spoil piles from when the creek was originally straightened. The steep banks are actively eroding and undercutting, particularly along the outside bends of the creek. The sinuosity of this reach of Spider Creek is estimated at 1.09, confirming that the channel is very straight and highly altered from the expected natural state.

The wetland delineation completed in August 2016 identified two wetlands, collectively totaling 0.26 acres in the project area (Figure 8). The first wetland was an alder thicket that is depressional and did not appear to have a surface water connection to Spider Creek, though it was located within the creek's floodplain. The second wetland was a depressional shrub-carr/hardwood swamp wetland. It was likely connected to Spider Creek historically, but has been cut-off from the channel by a berm on the south side of the creek. Though the National Wetland Inventory shows an abundance of wetlands in the project area, the field delineation found that soils and hydrology within the wetland investigation area did not meet the criteria to be considered wetlands (USACE 1987; USACE 2012; and USACE 2015), likely because this area has been altered due to channelization of this reach of Spider Creek.

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.

Groundwater is present in till soils in the area although the lake-modified till deposits are generally not considered an aquifer.

According to the Minnesota Department of Health, the nearest Wellhead Protection Area is approximately 6.5 miles northwest of the project area.

A search for water wells within a two-mile radius of the project area was conducted through the County Well Index (CWI), MPARS Active Well Permits, MDNR Observation Wells, Surface Water Quality Monitoring Sites, and "What's in my Neighborhood" data sources. The CWI identified one well, #721312, recorded approximately 0.85 miles from the project area. The well is 113 feet deep and water is extracted from a deep gravel layer overlain by 109 feet of clay and sandy clay.

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.

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.
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.

There are no sanitary, municipal/domestic, or industrial wastewater sources in the project area, and the proposed project is not anticipated to generate wastewater. Portable sanitary facilities may be imported for use by work crews during construction of the project. Upon project completion, sanitary facilities would be transported off-site and wastes disposed of as appropriate.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

Spider Creek flows approximately 4.25 miles to the Whiteface River, which is a tributary of the St. Louis River. Short-term impacts to Spider Creek include localized physical disturbance caused by construction equipment during site preparation, including vegetation clearing, grading, excavation, and soil stockpiling. These activities increase the potential for localized soil erosion and subsequent sedimentation, specifically to Spider Creek. The presence of exposed topsoil or disturbed vegetation during construction may also increase sediment runoff from stormwater, which may also have a short-term influence on turbidity in Spider Creek.

Project construction methods and sequencing have been planned to minimize erosion potential and downstream sedimentation to the extent practicable. Stream restoration activities would be sequenced to limit the area of open soil disturbance during construction. The project would result in re-meandering of a straightened segment of Spider Creek and re-connection to its historical floodplain. The first phase of the project includes excavation of the new, re-meandered channel. During this phase of project construction, silt fence would be placed at the downstream edges of disturbed areas to capture any sediment that may runoff of the site and into Spider Creek. Any temporary soil stockpiles that would not be used within three days of placement would be protected from eroding into surface waters by placing silt fence or other measures around the stockpile.

The second phase of project construction includes connecting Spider Creek to the new channel and filling the old channel. This would be completed one full growing season after the initial phase to allow vegetation to establish on the new streambanks, minimizing bank erosion potential. In order to limit downstream impacts, an instream improvement structure, such as a rock riffle or an equivalent control structure, would be placed in the downstream end of the channel to capture sediment that may be generated during this construction phase. The sediment control structure(s) would be monitored throughout the project and sediment would be cleaned out as necessary.

The restoration project is not expected to result in any measureable change to stormwater drainage patterns, discharge rates, or locations because no structures or features (i.e. impervious surfaces) would be created that would affect land surface elevations or surface drainage patterns. Once the project is established, the quality of downstream stormwater runoff could improve as channel banks are stabilized. The restored Spider Creek channel would be designed to transport sediment throughout the watershed, but at lower levels.

A SWPPP would be developed prior to construction as part of the construction NPDES/SDS permit. Specific BMPs used for site stabilization and sediment control during project construction would be identified in the SWPPP and detailed site plans.

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. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The proposed project would not appropriate water for construction or operation.

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. 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.

A wetland delineation report was completed for the proposed project area in October 2016 (Attachment B). Construction activities are not expected to impact the 0.26 acres of wetlands delineated within the project area (Figure 8). The delineated wetlands are not identified as public water wetlands and are not within the proposed Spider Creek channel. The Minnesota Wetland Conservation Act (WCA) rules would apply to these wetlands, but the project is expected to avoid all wetland impacts, meeting the criteria for "No Loss" under Chapter 8420.0415. If project plans changes or temporary impacts to the wetlands are necessary, approval for any unavoidable impacts to wetlands would be coordinated with the USACE and the St. Louis County Land and Minerals Department (the local government unit responsible for administering WCA). Silt fencing or other exclusionary methods would be used to avoid potential impacts to the two delineated wetlands within the project area. It is expected that compensatory wetland mitigation would not be required.

The wetland delineation report was submitted to the LGU for review and approval on November 21, 2016. A "No Loss" application will be submitted to the LGU once delineation approval is received.

The proposed project would elevate the groundwater levels and reconnect the floodplain, which may promote the formation of wetland plant communities.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) 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. 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 the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The primary goals of the Spider Creek restoration include bank stabilization, restoration of a naturally-sustainable stream channel, maintenance of aquatic habitat, and restoration of the natural characteristics of the stream ecosystem, as appropriate for this landscape and watershed. Re-establishing the natural meander pattern, feature distribution, and stream connectivity to the floodplain would result in a more stable system with natural in-stream habitat. Connecting the channel to the floodplain would help the system maintain a higher and more consistent base flow than the current system allows, which has extremely limited floodplain connectivity. A secondary benefit of the restoration would be increased fish, waterfowl and reptile/amphibian habitat in the floodplain and adjacent plant communities, where the natural hydrology would be restored.

The restoration project would utilize existing, historical meanders and additional excavation to re-establish a channel alignment that is longer and more sinuous than the existing, channelized Spider Creek alignment. The length of existing channel in the restoration reach is 2,660 feet. The proposed channel length for this reach is 4,050 feet with a planned mean sinuosity of 1.6. Most of the additional length would be achieved by directing the new channel through new and historical meanders that were cutoff when the creek was straightened.

The elevation of the new channel bed would be up to two feet higher than the existing bed. The new elevation would be established and maintained by installing grade-control rock riffles within the channel at the upstream and downstream ends of the project, as well as riffle sections throughout the newly re-aligned channel. Lateral scour pools would be constructed at channel bends, and compound pools ranging from 5.1 to 5.6 feet deep would be constructed in several locations through the new channel. Design pool maximum depth ranges from 4.1 to 4.6 feet; the expectation is that the constructed pools will fill in to a self-sustaining shallower depth over time. Pool edges would be stabilized using a variety of bioengineering methods, including toe wood, vegetated reinforced soil slopes, and erosion control blanket (with wildlife-friendly mesh). In locations with less erosion potential, natural sod mats may be utilized along with coir fabric to protect the

new channel banks and allow for vegetation to become established. Well-established vegetation is expected to provide long-term bank protection.

The proposed project would be constructed in two phases, both of which are planned to take place during late-summer, low-flow conditions. However, portions of construction may need to occur in frozen conditions due to soft, wet soils in portions of the project area. Project construction methods and sequencing would be planned to minimize erosion potential and downstream sedimentation to the extent practicable and to limit the area of open soil disturbance during construction. Construction equipment used for the project may include a tracked excavator, small dozer, and possibly a loader. The equipment would be selected by the chosen contractor with specifications that the contractor shall minimize disturbance to the creek channel to the extent practicable.

Phase one would include construction of the new channel and is expected to take approximately two months. The new channel would remain offline (i.e. disconnected from stream flow) for one full growing season to allow vegetation to establish along the banks of the new channel. Soil excavated to construct the new channel would be stockpiled in nearby upland areas and would then be utilized to backfill the existing channel. Grade control stream riffles would be constructed at the upstream and downstream ends of the project to establish and maintain the thalweg through the project area and to prevent headcutting within and upstream of the project. The new channel banks, floodplain, and other disturbed areas would be seeded, and shrubs and trees would be planted within the floodplain.

The second phase would commence once vegetation is established in the new channel. This phase would include backfilling the existing ditched channel and connecting stream flow to the new channel. Phase Two would include installation of two concrete box culverts beneath County Road 167 to allow Spider Creek to follow a more natural meander pattern. The culverts would be installed with inverts embedded below the channel grade and would be filled with streambed material to establish a consistent streambed and maintain biological connections. Floodplain culverts would also be installed adjacent to the channel culverts to allow more natural flow during larger than bankfull flow events.

During the second phase, the contractor would be required to pump streamflow around the active in-channel work area until all restoration and site stabilization within the reach is completed. Pumped flows would be discharged downstream of the project utilizing energy dissipation methods to minimize in-channel erosion. Construction would be sequenced so that any work within the actively flowing stream would be limited to that which could be completed within each workday.

12. 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 evidence of contamination has been identified in the project area. What's In My Neighborhood database (MPCA) indicates that a site less than three miles east of the project area uses hazardous materials and generates small or minimal quantities of hazardous wastes. Between 4 and 5 miles to the southwest of the project are two companies that each generate small amounts of hazardous waste. An inactive dump site is located nearly 5 miles to the east of the project area. Two feedlots are located approximately 4.5 miles to the northwest, on the other side of the Whiteface River.

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.

Minor amounts of construction-related wastes, such as plastic and paper containers and packaging, would be generated. All solid waste generated during construction would be removed from the site and properly disposed.

Plant debris, soil, gravel, sand, rock, and erosion control materials would be temporarily stockpiled onsite until incorporated into project features.

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 above or below ground tanks to store petroleum or other materials. 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.

During the construction phases of the restoration project, fuels, oils, lubricants and other materials typical for use by earthmoving equipment would be used during construction. No other chemicals or hazardous materials would be needed for, or generated by this project.

Refueling spills and equipment breakdowns, such as a broken hydraulic line, could introduce contaminants into the soil during construction. A spill could result in potentially adverse effects to on-site soils. However, the amounts of fuel and other lubricants and oils would be limited to that needed by the equipment on-site. Supplies and equipment needed to quickly limit and remediate any contamination would be located on site.

The contractor would be required to prepare a Spill Prevention and Response Plan to address accidental spills or the release of any hazardous material or petroleum products. To minimize the likelihood of potential spills and leaks of petroleum and hydraulic fluids during project construction, equipment would be inspected daily for leaks and petroleum contamination, fuels for construction would be stored at staging areas away from Spider Creek and floodplain vegetation, and equipment refueling and maintenance would be done away from the stream and

wetlands. In addition, the contractor would be required to utilize double-walled tanks or secondary containment for single-walled tanks used for storage of petroleum products. Any bulk lubricants would also be stored with secondary containment protection. All petroleum and lubricant storage containers would be inspected on a weekly basis and the inspections would be documented.

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.

Not Applicable – the proposed construction is not anticipated to generate any hazardous waste.

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

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

Native plant communities expected to be present in the area would be those typical of the Tamarack Lowlands subsection of the Northern Minnesota Drift and Lake Plains section in the Laurentian Mixed Forest Province. Riparian vegetation consists of herbaceous plants and woody vegetation less than 20 feet tall, typical of a scrub-shrub and emergent floodplain habitat. Spider Creek is classified as a second order perennial stream in the Minnesota PWI. Spider Creek is currently listed as a Class 2A (cold water) stream. In 2015, the aquatic biota were sampled to determine fish and macroinvertebrate communities present in the stream. The summary report is provided in Attachment C. The fish community present in the channelized reach proposed for restoration includes many blacknose dace, creek chubs, Johnny darters, and pearl dace, as well as several other species.

The project site is located in a larger complex of open floodplains, emergent wetlands, scrub-shrub wetlands, forested wetlands, and forested uplands.

The area is likely used by commonly occurring species such as migratory songbirds, small mammals such as voles, mice, shrews and medium to large mammals such as raccoons, opossum, white-tailed deer, bear, and gray wolves.

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 _____) 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.

Barr Engineering Co. (Barr), the project proposer's consultant, maintains a license agreement (LA-772) with the MDNR to access the Natural Heritage Information System (NHIS) database. Barr queried the database on August 25, 2016. According to the NHIS database, two state-listed plant species occur within one mile of the project site. None of the documented records overlap the

restoration project site. Species identified within one mile of the proposed project are listed in Table 13-1.

Table 13-1. NHIS-documented Species within One Mile of the Project

Common Name	Scientific Name	Status
Eastern Hemlock	*Tsuga canadensis*	Endangered
Western Jacob's-ladder	*Polemonium occidentale* ssp. *lacustre*	Endangered

According to GIS data obtained from the MDNR, there are no Minnesota County Biological Survey (MCBS) sites located within one mile of the proposed project site. Additionally, no state owned Wildlife Management Areas (WMA), Scientific Natural Areas (SNA), or native plant communities are present within one mile of the proposed project site.

The U.S. Fish and Wildlife Service (USFWS) State and County Distribution List website identifies four federally listed species and two designated Critical Habitats as occurring in St. Louis County. Federal species and critical habitat occurring in St. Louis County are listed Table 13-2.

Table 13-2. Federally Listed Species and Critical Habitat in St. Louis County, MN

Common Name	Scientific Name	Status
Canada lynx	*Lynx canadensis*	Threatened
Gray wolf	*Canis lupus*	Threatened
Northern long-eared bat	*Myotis septentrionalis*	Threatened
Piping plover	*Charadrius melodus*	Endangered
Rufa red knot	*Calidris canutus rufa*	Threatened
Canada lynx	*Lynx Canadensis*	Critical Habitat
Piping plover	*Charadrius melodus*	Critical Habitat

A wetland delineation was completed at the project site on August 3, 2016. A total of 0.26 acres of wetland was identified during the delineation, comprising 0.8 percent of the approximately 32.5 acre investigation area. No additional habitat or survey work has been completed within the site.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. 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 project area would encompass an area of 32.5 acres, with temporary impacts to aquatic and riparian habitat occurring on approximately 13.4 acres during construction. Vegetation removal, including clearing of woody shrubs and trees would be required to establish new stream meanders.

Much of the floodplain within the project area is currently dominated by reed canary grass (*Phalaris arundinacea*), an invasive species. The contractor would ensure that equipment brought onto the site is cleaned prior to entering the site to prevent introducing additional invasive species. All equipment used during construction would be pressure washed to remove soil or other debris before being transported to the project site. All seed used on the project would be site-appropriate native seed mix and mulch would be certified weed-free. During mid-summer monitoring visits, it would be determined if treatment is needed to control invasive species before they can dominate and become established in the disturbed (seeded) areas as compared to the undisturbed adjacent areas. Invasive species in the disturbed areas would be reduced with appropriate use of herbicide, mowing, or other methods of control as consistent with the MN DNR Operational Order 113.

To minimize the risk of the introduction of aquatic invasive species, contractors shall be certified as Lake Service Providers (LSP) in Minnesota and adhere to their LSP permit conditions. In addition, the equipment would be thoroughly cleaned before being transported to the next construction project. Soils or rock used in the project would be inspected or purchased from certified invasive species free sources. Material for the toe wood and root wads is proposed to be obtained from on-site or nearby properties, in coordination with property owners. Woody material collection for the project would follow the guidelines of the Minnesota Forest Resources Council.

Records for eastern hemlock have been identified outside of the proposed project boundaries; suitable habitat for this species is not likely to occur within the project area. In Minnesota, eastern hemlock typically occurs in mixed hardwood-conifer forests in well-drained soils. Few trees would be affected by the project, only those that occur on the edge of the channelized stream on the spoil mounds from historic channel excavation. In addition, the NHIS database records indicate that the last observation of eastern hemlock at this location is from 1960. As a preventative avoidance measure, all trees to be removed for the project would be identified by an ecologist prior to clearing. If any eastern hemlocks are identified, they would be avoided; if they cannot be avoided, coordination with the MDNR would be required.

A population of western Jacob's-ladder has been identified along Spider Creek approximately 0.90 miles upstream of the project area. This population occurs along the edge of a northern cedar swamp in a brushy riparian zone growing with sphagnum mosses. In this area, Spider Creek is a relatively undisturbed natural channel and the adjacent floodplain likely has natural hydrology. Suitable habitat for this species is not likely to occur within the project area. Western Jacob's-ladder occurs in forested black-spruce, tamarack, or cedar swamps in areas with high groundwater table. The project area is primarily open floodplain dominated by non-native grasses; the groundwater table has been lowered by previous channelization of Spider Creek. The area was previously used for agriculture and was highly disturbed. The wetland portions of the site would not be directly impacted during construction and tree removal would be minimal.

The restoration project is anticipated to have no effect on the Canada lynx, gray wolf, piping plover, and rufa red knot. The Canada lynx and gray wolf are long-ranging mammals with large home ranges that would not construct a den in a riparian and wetland habitat. Although both species may be present in the area, the project would not impact suitable habitat or individuals of either species. The piping plover and rufa red knot are migratory bird species that occupy open, sparsely vegetated sandy areas whereas the project site is a well vegetated riparian area. In St.

Louis County, both species are associated with Lake Superior and would not be expected inland at the project site.

Potential summer roosting and foraging habitat for the federally threatened northern long-eared bat may be present within the proposed project area. According to guidance provided by the USFWS, northern long-eared bat habitat can occur where there are trees measuring at least 3 inches in diameter at breast height with peeling bark or crevices. It is not known whether trees fitting this description are present on full site; however, if tree clearing is needed during June or July, a survey would be completed prior to any clearing. Further, it is expected that any clearing would not occur over the full site, only where there may be trees within the work areas as shown on the plan set. According to USFWS and MDNR data, there are no known roost trees or hibernacula within the township (T52NR19W). Tree clearing for the project would not occur during June or July, when bats may be roosting within the trees. Therefore, according to the final 4 (d) rule published by USFWS, no prohibited take would occur as a result of the project activities.

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

Native vegetation on site would be retained to the extent practicable during construction. Woody plant collection would follow the guidelines of the Minnesota Forest Resource Council. In addition to those guidelines, no wood would be harvested within 50 feet of the restoration reach and shrub cuttings collected from live plants would be limited to that which would allow for continued growth of existing shrubs.

Erosion and sediment control BMPs would be installed to prevent impacts from migrating off site. To keep wildlife from entering areas where construction activities are occurring, silt fence or exclusion fencing will be used where appropriate based on the construction activities scheduled and will ensure compliance with all permit conditions and other necessary approvals.

All trees to be removed for the project would be identified by an ecologist prior to clearing. If any eastern hemlocks are identified, they would be avoided. If they cannot be avoided, coordination with the MDNR would be required.

All impacts would be temporary and effects would be mitigated by the long-term result of an improved stream and riparian area.

14. 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.

A Phase I cultural resources survey was conducted in early December 2016 for the proposed project by the Duluth Archaeology Center, LLC (DAC). One archaeological site, Spider Creek Farmstead

(21SL1244) was identified during the survey along the north/northeastern boundary of the project area (Figure 9). The site is located in the NW ¼ of the SE ¼ of the NE ¼ of Section 24, Township 52N, Range 19W and consists of three structural features, two collapsed log structures and a bermed root cellar. The site is reached via a road that extends north and then east from Richardson Road (County Road 167). The site was not evaluated for eligibility for listing on the National Register of Historic Places.

Project plans were assessed and it was determined that the Spider Creek Farmstead (21SL1244) and the road that accesses the site would not be disturbed by the proposed stream restoration (Figure 9). As such, DAC recommends a determination of No Properties Affected. The Phase I archaeological survey report is included in Attachment D.

15. 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.

There are no designated scenic views or vistas in the vicinity of the project area.

No environmental effects associated with visual glare or vapor plumes are expected during construction activities.

Temporary visual impacts would include clearing, ground disturbance, and material stockpiling associated with the construction activities, as well as during the early establishment phases of the project. Additionally, during the first two phases of the project, construction activities would be limited to up to two months at a time to minimize the visual effects and allow for restoration of disturbed areas.

Disturbed areas would be seeded and/or planted with native species. It is anticipated that the re-meandering and re-vegetation efforts, as well as the improved stream function, would improve the visual quality of the stream over the long-term.

16. 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, and any greenhouse gases. 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 would be created by the restoration project.

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 project would result in temporary, localized air quality impacts due to emissions from construction vehicles for two periods of up to two months during the construction phases, a total of up to four months. Emissions from the powered equipment would be minor and temporary in nature during the construction and are expected to have an overall negligible impact on air quality. Moreover, not all equipment would be operating at the same time, further minimizing emissions from construction equipment.

In order to reduce on-site emissions, efforts will be made to ensure that the selected contractor utilizes equipment that was purchased within the last 10 years. Additionally, construction activities will progress along the linear corridor of the project area, which will minimize emissions by-products within any one given area.

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 16a). 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 may create temporary dust and odors during daytime operations depending on site conditions. Affects associated with fugitive dust and any potential offensive odors are expected to be limited to the construction site. Fugitive dust impacts will be temporary and and localized to the area along the linear stream corridor where the construction work is occurring. Additionally, the selected contractor will be required to implement dust control measures and other appropriate BMPs to minimize fugitive dust.

Two private residences are located within 200 feet and 350 feet of the project area. The surrounding forested vegetation between the restoration project and the private residences would be maintained and is anticipated to help reduce the spread of dust and odors outside of the construction limits.

17. 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.

1. The surrounding land use is rural. Existing ambient noise is primarily generated from natural sources (water, wind in vegetation and animals), traffic along St. Louis County Roads 166 and 167, and from outdoor recreational users in the vicinity. Baseline levels are likely in the 30-40 dBA range.

2. The nearest sensitive receptor is a private residence, owned by the Spider Creek Hunting Association, located approximately 200 feet away from the project boundary. Coordination with the landowner has indicated support for the restoration project. An additional nearby dwelling is approximately 350 feet from the project area. To minimize noise-related impacts, construction activities would be temporary and limited to daytime hours.

3. Construction noise is expected to be minimal and limited to the noise generated by construction equipment and workers accessing the project. Daytime noise regulations limit impacts to an L50 level of 60 dBA (the level not to be exceeded more than 50% of the hour), and an L10 of 65 dBA (the level not to be exceeded more than 10% of the hour). The equipment associated with the project is expected to be limited to general earthmoving equipment (dozers, loaders, excavators, etc.). Maximum noise emissions cited by the Federal Highway Authority (FHWA) construction noise guidance for this type of equipment range from 74 to 95 dBA measured at 15 meters.

   These represent peak noise levels and may not reflect the levels expected over the course of an hour of operation at the project site. Raw distance decay will provide at least 12 dB of reduction noise levels at the nearest point, with additional decay for operations farther from the residences. Additional decay would likely be provided by vegetation separating the construction activity from the residences. Based on the available data, peak levels may be above state thresholds at times, but is not expected to be of long enough duration to be non-compliant (i.e. operations at maximum noise levels, at the very nearest point to the residences are unlikely to occur together, and unlikely to be of a sufficient duration to affect state threshold compliance).

   The construction equipment levels cited from FHWA construction guidance is conservatively based on older, noisier equipment, with more modern equipment likely incorporating additional noise controls and quieter than these estimates. Construction noise would progress through the project area, with no single area subject to peak impacts throughout the construction process. No change in long-term noise level is expected after completion of the restoration project.

4. Noise generated from construction activities would be limited to daytime hours during two months, likely in 2017 and again in 2018. The surrounding forested vegetation will help mitigate the temporary effects of machinery noise and nearby property owners would be informed of the construction schedule in advance. The limited duration and coordination of activities with nearby property owners is expected to minimize impacts to quality of life.

18. 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.

   The restoration project is located in a rural setting with no constructed parking spaces. No additional parking is proposed as part of the project, nor would formal parking spaces be required during construction and monitoring activities. It is anticipated that construction crews would park work vehicles at an existing gravel turnaround and along St. Louis County Road 167. Temporary staging areas would likely be required for the equipment and construction material.

Local traffic would be temporarily increased during construction due to the movement of work crews and construction materials.

Following the completion of the project, minimal additional, localized daily traffic may be generated as a result of the improved stream function for recreational purposes.

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.

This project is not expected to generate an additional 250 vehicles or 2,500 total daily trips. The number of trips generated as a result of this project is not expected to adversely affect local traffic.

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

Not Applicable – no additional measures are proposed to mitigate project-related transportation effects.

19. 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.

The environmentally relevant area for all of the listed environmental effects includes the restoration project footprint and nearby upland areas utilized for equipment and material staging. The geographic scale of this project is within 300 feet of Spider Creek along 2,550 feet of the existing straightened channel. The total project area is 32.5 acres, with a disturbed area of approximately 13.4 acres.

Potential environmental effects associated with the project that may combine to result in cumulative environmental effects include: temporary disturbance or displacement of fish, wildlife and habitats, and disruption of plant communities due to tree and vegetation removal. While construction is in progress, water resources may be impacted by sedimentation, turbidity, and runoff. Air quality impacts from use of construction vehicles including noise and dust would also occur during construction.

The project, once completed, would re-establish the natural meander pattern, feature distribution, and stream connectivity to the floodplain, resulting in a more stable system with natural in-stream habitat. Connecting the channel to the floodplain would help the system to maintain a higher and

more consistent base flow than the current system allows. The proposed restoration would also increase habit for fish, waterfowl, and reptile/amphibian in the floodplain community where the natural hydrology would be restored.

Timeframe
The timeframe of the proposed construction restoration Project is planned to occur in two phases. Both phases are proposed to take place during late-summer low-flow conditions with Phase One estimated to potentially occur in late 2017 (likely beginning in August). Phase Two would then likely occur in late 2018. Each phase of construction would occur within a two-month timeframe. Phase One would consist of initial construction of the new channel, stream riffles, and seeding of native species, shrubs, and trees. Following a full growing season, Phase Two would include back fill of the existing channel and connecting flow to the newly-meandered stream. Monitoring activities are anticipated to take place for up to five years following the completion of the first construction phase.

Fish and Wildlife:
Fish and other aquatic species would experience increased stream turbidity the new channel is connected to the streamflow of Spider Creek. Potential effects for wildlife include temporary loss of habitat due to excavation and construction.

Following the completion of construction activities and the connection of the new stream channel during Phase Two, the project is expected to have long-term positive effects to aquatic habitat and restoration of the natural characteristics of the Spider Creek ecosystem.

The project would also have temporary negative effects to surrounding plant communities in upland areas within the project area due to equipment and material staging. The construction of a new channel would require excavation and minimal tree removal that would affect wildlife habitat in the immediate area of the project.

Water Resources:
During Phase Two, the project would affect surface water by filling in the existing channel after the construction and revegetation of a new channel in Phase One. This could contribute to temporary sedimentation and turbidity following the connection of the new channel to streamflow of Spider Creek during Phase Two. Stormwater runoff is anticipated to be temporarily greater between Phases One and Two until the disturbed areas are revegetated. Spider Creek would also be directly impacted during Phase One and Two of construction. However, the Whiteface River, which is the downstream receiving water, is not expected to receive more than a negligible increase in sediment during the construction, with no anticipated increased effects following construction.

Air/Noise/Dust:
Project construction activities would produce exhaust emissions, dust, and noise typical of earthmoving equipment. Air quality may be temporarily affected by exhaust emissions and dust from this equipment. Construction noise would progress through the project area, causing short-duration increases in noise levels. It is anticipated that nearby neighbors would not be subject to peak impacts throughout the construction process. No change in long-term noise is expected after project completion.

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.

St. Louis County Planning Department and Lands and Minerals were contacted to identify any reasonably foreseeable future project in the area. At this time, there are no known future projects identified within the geographic scale and timeframe of the proposed project and associated environmental effects. Therefore, no other projects are known would contribute to the cumulative potential effects of the proposed project on Spider Creek.

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.

Cumulative potential effects are limited to those created by this project. Environmental effects resulting from the project would be expected to be temporary in nature and minor. It is also anticipated that following project completion the affected environment would benefit from restoration of a natural-sustainable stream channel, maintenance of aquatic habitat, and restoration of the natural characteristics of the Spider Creek ecosystem. This would include re-establishing the natural meander pattern, feature distribution, and stream connectivity to the floodplain that would result in a more stable system with natural in-stream habitat.

To reduce impacts on water resources, the proposed timeframe for construction activities would be in the fall, when stream flows are typically low and riparian soils are dry. Dry conditions would also help reduce potential runoff and erosion as well as potential rutting or soil compaction by construction equipment. Appropriate erosion control measures would be utilized at the downstream edges of the construction areas to capture any sediment that may runoff during project construction and prevent it from entering the stream. Temporary soil stockpiles would be protected from erosion and sedimentation when not utilized within three days of placement. Effects on water resources are expected to temporary, limited, and minimal.

Air, noise, and dust impacts would be mitigated by limiting the duration and timing of the construction activities. Additionally, the two adjacent landowners would be notified about the project, including the schedule and anticipated temporary impacts of the construction-related activities. Overall potential environmental effects due to air, noise, and dust would be expected to be minimal and temporary.

The project erosion control and stabilization plan would include several methods of stabilizing the constructed or modified stream banks, including the use of toe wood, VRSS, sod mats, erosion control blankets (with wildlife-friendly mesh), and seeding the area with native seed mixes as appropriate. The use of a particular stabilization method would vary according to the location within the stream. During the Phase Two of construction, a temporary rock riffle structure or equivalent control structure would be placed at the downstream end of the new channel to capture sediment that may be generated during construction to limit downstream impacts. The new channel would be constructed in the Phase One of construction, in absence of flowing water, to allow vegetation to become established.

Following project completion, impacts to habitat for wildlife, fish and reptiles/amphibians is anticipated to increase in the floodplain and adjacent communities, where the natural hydrology would be restored.

20. 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.

There are no additional environmental effects that have not already been addressed.

References

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U.S. Army Corps of Engineers (USACE), 2015. Public Notice: Guidance for Submittal of Delineation Report to the St. Paul District Army Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota, Version 2.0, March 4, 2015.

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 Cynthia J. Novak-Krebs Date July 10, 2017

Title EAW Project Manager