Prepared by Emmons & Olivier Resources, Inc.

Prepared for Brown's Creek Watershed District

Brown's Creek Restoration Project

Environmental Assessment Worksheet

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ENVIRONMENTAL ASSESSMENT WORKSHEET

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

The project is called Brown's Creek Restoration Project. This will be referred to as "the project" in the EAW.

2. PROPOSER

Proposer: Brown's Creek Watershed District
Contact Person: Karen Kill
Title: Administrator
Address: 455 Hayward Ave North
City, State, Zip: Oakdale, MN 55128
Phone: 651-330-8220
Email: kkill@mnwcd.org

3. RESPONSIBLE GOVERNMENT UNIT (RGU)

RGU: Brown's Creek Watershed District
Contact Person: Karen Kill
Title: Administrator
Address: 455 Hayward Ave North
City, State, Zip: Oakdale, MN 55128
Phone: 651-330-8220
Email: kkill@mnwcd.org

4. REASON FOR EAW PREPARATION

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

The project requires a mandatory EAW since the proposed project design will disturb more than 500 linear feet of stream and will reconnect several oxbow channels that occur within the project site. Brown's Creek is a public water of the state and designated trout stream.

5. PROJECT LOCATION

County: Washington

City/Township: Stillwater

Table 1. PLS Location (¼, ¼, Section, Township, Range).

¼, ¼	Section	Township	Range
NE ¼, SE ¼	19	30 N	20 W
NW ¼, SW ¼	20	30 N	20 W

Watershed (81 major watershed scale): 37 St. Croix River - Stillwater

GPS Coordinates: (45.07067, -92.84368)

Table 2. Tax Parcel Numbers.

Parcel ID	Section	Township	Range	Owner
1903020410001	19	30N	20W	City of Stillwater
2003020320020	20	30N	20W	State of MN DNR
2003020320015	20	30N	20W	Beltram H Van Tassel TRS

The project site is located along Brown's Creek approximately between McKusick Road and the Brown's Creek State Trail in Stillwater, Washington County, Minnesota (Figure 1). Figure 2 shows the project site overlaid with 2-foot topographic contours.

6. PROJECT DESCRIPTION

a. Project Summary

BCWD proposes to conduct a stream habitat enhancement project in Brown's Creek to address floodplain abandonment, accelerated bank erosion, invasive species, and degraded instream habitat to restore the ecological and hydrologic functions of the creek and adjacent floodplain. The project will include reconnecting the creek with the floodplain, installing grade control riffles to limit channel incision, installing woody material and boulders for instream habitat, removing woody invasive species, and reestablishing native riparian vegetation. The project will be funded by a federal 319 grant

administered by the Minnesota Pollution Control Agency and funds levied on property within the jurisdiction of the Brown's Creek Watershed District.

b. Description

BCWD proposes to enhance approximately 2,500 feet of stream along Brown's Creek and reconnect several cutoff oxbow channels. The existing reach begins immediately south of McKusick Road and ends just downstream of the Brown's Creek State Trail (Figure 3). The project will include earthwork to reconnect the creek with the floodplain (approximately 1 to 2.7 feet of cut depending on existing creek bank heights) and to reconnect several cutoff oxbow channels. Several new stream meanders will also be implemented to increase stream length and sinuosity to reestablish a natural meandering stream channel. The project will also include invasive tree and shrub harvest and installation of tree trunks, brush bundles, and rock riffles for fish and macroinvertebrate habitat. Figure 4 shows the proposed project elements. Grade-control riffles will emulate natural rock riffles and will be installed in the creek to increase the baseflow water elevation to restore riparian hydrology that has been impacted by channel incision. In general, earthwork and selective tree harvest will occur within 50 feet of the creek, but invasive shrub harvest is proposed up to 200 feet from the stream where dense stands of common and glossy buckthorn occur. Many of the trees and shrubs proposed to be harvested will be reincorporated into the project for bank stability and habitat features. The project will also include the creation of an American Disabilities Act-compliant "spur" off Brown's Creek State Trail to improve public access to the creek. Construction site access will occur off McKusick Road and Neal Avenue. No alterations to existing infrastructure are proposed.

Erosion control measures that will be implemented during project construction include installation of temporary sediment BMPs such as biologs and soil berms to capture surface soil erosion, and installation of both hydromulch and crimped straw mulch on all disturbed soils. All disturbed soils will be seeded with a cover crop (oats and winter wheat) and native state seed mixes based on land cover type. Erosion control measures will be installed prior to construction, and hydromulch and native seeding will occur immediately after final grading per the project Stormwater Pollution Prevention Plan.

Construction Phasing:

1. Installation of erosion control BMPs
2. Initiate selective tree harvest and temporary stockpile of harvested wood
3. Bank grading and installation of grade control riffles and instream habitat
4. Installation of hydromulch and native seed to establish permanent vegetation
5. Removal of erosion control BMPs following establishment of native vegetation

c. Project Magnitude

Table 3. Project Quantities.

Project Feature	Quantity
Total Project Acreage	11.06 acres
Stream Corridor Length	2,500 ft
Number of Housing Units	N/A
Residential Building Area	N/A
Commercial Building Area	N/A
Industrial Building Area	N/A
Institutional Building Area	N/A
Other Uses	none
Structure Heights	N/A

d. Purpose

Rapid stream assessments and geomorphic surveys have identified floodplain abandonment (channel incision), bank erosion, invasive species, and degraded instream and riparian habitat throughout the project reach. The BCWD engineer estimates that the reach contributes 25.4 tons of sediment and 22.9 pounds of phosphorus per year to Brown's Creek. One of the primary purposes for this project is to address the biotic impairments identified in Brown's Creek, which is impaired for both aquatic life and aquatic recreation uses due to low fish and macroinvertebrate bioassessment scores, dissolved oxygen, thermal loads, and *E. coli*. The main water quality concerns for Brown's Creek and its tributaries are total suspended solids, total phosphorus, *E. coli*, and thermal loads. In addition to the impairments of Brown's Creek, the Brown's Creek watershed is a part of the St. Croix River and Lake St. Croix watersheds. As such, Brown's Creek was assigned a phosphorus load reduction target of 848 pounds per year in the Lake St. Croix Nutrient Total Maximum Daily Load implementation plan. Stream stressors identified for Brown's Creek include excess sediment and elevated stream temperatures; therefore, a project that reduces bank erosion and channel incision would directly benefit the biotic community of the creek and downstream aquatic resources by reducing sediment contributions to the creek. Stream channel narrowing proposed for the project will reduce the channel width and create deeper water through the reach that will help mitigate thermal impacts to the creek. The overarching goal of this project is to reestablish a connected floodplain that will minimize stream bank erosion and reduce sediment and nutrient loading to the creek and downstream waterbodies.

e. Future Stages

Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ☒ No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Prior Stages

Is this project a subsequent stage of an earlier project? ☐Yes ☒ No

If yes, briefly describe past development, timeline and any past environmental review.

7. CLIMATE ADAPTATION AND RESILIENCE

a. Climate Trends

Climate change will cause Minnesota to become warmer and wetter, and already there have been dramatic increases in the intensity and frequency of rainstorms on an annual basis (MNDNR, 2023a). In the Lower St. Croix River Watershed where the project is located, the average annual precipitation has increased by 4.01 inches since 1895 (MNDNR, 2023b). The average annual temperature has increased by 2.75° F since 1895, with the most dramatic increases being in the average minimum temperature (increase of 3.86° F since 1895) and modest increases in the average maximum temperature (increase of 1.66° F since 1895).

Climate change will result in more frequent and intense rainstorms that are expected to result in increased flood events through the riparian corridor. However, the post-project riparian corridor will be more resilient to climate change due to a larger floodplain that will reduce overall flood energy in the floodplain. Reconnecting the floodplain will slow flood waters and allow the water to spread out over a wider area, thereby decreasing flood energy and bank scour.

b. Design Adaptations

Table 4. Climate Trends and Adaptations.

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	Increase in annual precipitation, increase in frequency and intensity of rainstorms	Increase in rainstorm intensity may increase the severity of flooding along the stream channel	The project is designed to allow dissipation of flood energy over the reconnected floodplain

Resource Category	Climate Considerations	Project Information	Adaptations
Land Use	Increase in average annual temperature	Removal of some of the riparian canopy may increase ground and water temperatures	All disturbed soil will be revegetated with native species that will also provide near-stream shade of the creek Installation of rock riffles will maintain deep pools, and narrowing the stream channel in select areas will help counteract the increase in solar radiation
Water Resources	Addressed in section 12	Addressed in section 12	Addressed in section 12
Contamination/ Hazardous Materials/Wastes	Addressed in section 13	Temporary increased risk of fuel contamination from construction vehicles working in the floodplain	Construction will not occur during storms and vehicles will not be parked or refueled in the floodplain
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in section 14	Addressed in section 14	Addressed in section 14

8. COVER TYPES

Table 5 describes the land cover features pre-project and post-project. The pre-project land cover consists of a disturbed floodplain forest dominated by boxelder, alder, and woody invasive species with scattered black willow, silver maple, elm, and cottonwood. The upland areas contain boxelder, aspen, bur oak, pin oak, and black cherry with an understory dominated by common buckthorn. The post-

project land cover will still consist of a wet meadow/ shrub carr adjacent to the creek with a semi-open canopy floodplain forest. All woody invasive species including common buckthorn, exotic bush honeysuckles, amur maple, and black locust will be removed within the construction limits. No impervious surfaces are proposed for the project. The project will open the canopy above the stream banks to promote the growth of deep-rooted herbaceous vegetation to help stabilize the soil long-term. See Figure 5 and Figure 6 for existing and proposed land cover maps, and Table 6 for a summary of proposed tree harvest within the project boundary.

Table 5. Land Cover Before and After.

Project Feature	Before (acres)	After (acres)
Wetlands (wet meadow/ floodplain/ shrub carr)	8.58	8.58
Streams	1,960 linear ft	2,500 linear ft
Upland Woodland/Forest	1.78	0.43
Oak savanna	0	0.34
Grassland/Prairie	0.40	1.41
Impervious Surfaces	0.30	0.30
Total Acreage	11.06	11.06

Table 6. Proposed Tree Harvest.

Trees	Percent	Number
Percent tree canopy removed or number of trees >6" DBH removed for the project	N/A	212 (184 are boxelder)
Number of new trees planted	N/A	TBD

9. PERMITS AND APPROVALS REQUIRED

Table 7. Permits and Approvals Required.

Unit of Government	Type of Application	Status
City of Stillwater	Land Alteration Permit	To Be Applied For
City of Stillwater	Floodplain Permit/No-Rise Certificate	To Be Applied For
City of Stillwater	Grading Permit	To Be Applied For

Unit of Government	Type of Application	Status
Local Government Unit/Board of Water and Soil Resources/U.S. Army Corps of Engineers	Joint Permit Application (Wetland Delineation Review / Wetland Impacts) Section 401 Water Quality Certification	To Be Applied For
Brown's Creek Watershed District	Floodplain and Drainage Alterations Wetlands Management Erosion and Sediment Control Shoreline and Streambank Improvements	To be assessed during project design
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System/State Disposal System permit	To Be Applied For
Minnesota Department of Natural Resources	Public Waters Work Permit Special Use Permit (State Trail)	To Be Applied For

10. LAND USE

a. Land Use Descriptions

i. Existing Land Use

The project area consists of a disturbed floodplain forest with adjacent upland woodlands on an elevated terrace. The project area occurs within Brown's Creek Nature Preserve (owned by the City of Stillwater) and the Brown's Creek Aquatic Management Area managed by the MNDNR. A small portion of the project occurs on a private parcel. Brown's Creek State Trail occurs along the southern edge of the project boundary. No building structures occur within the project site.

ii. Planned Land Use

Land use within the project boundary will not change as a result of the project.

The Brown's Creek Restoration Project is part of BCWD's Nine Key Element (NKE) Plan. The Environmental Protection Agency approved the NKE plan which provides a list of best management practices that when implemented will yield the estimated reductions needed to meet water quality standards and improve habitat quality in the creek. The strategies listed in the NKE plan are intended to provide the flexibility to BCWD to choose the best practice with the available implementation opportunity, taking into account landowner outreach and permission along with coordinating efforts with multiple public entities that work within the watershed. The milestone strategies found in table 7

of the NKE plan include the planned years for the activities and the completed years for the activities if the activities have been completed. This project is Phase 1 in the implementation of the NKE plan to restore and protect the water quality of surface water resources in the watershed. The design for the project will include BMPs identified in the NKE that will address reducing phosphorus, total suspended solids, thermal stressors, and E. coli.

iii. Zoning

The project reach contains two zoning districts designated by the City of Stillwater. Brown's Creek Nature Preserve is zoned PROS (Park, Recreation, or Open Space) and the two parcels east of Brown's Creek Nature Preserve are zoned RA (One-Family Residential). Most of the project reach is within Federal Emergency Management Agency Regulatory Floodway Zone AE (Figure 7).

iv. Critical Facilities

No critical facilities are proposed within the project area.

b. Land Use Compatibility

The project is compatible with applicable land use, zoning, and watershed plans, though the City of Stillwater will be alerted to the advisability of addressing the inconsistency of current land-use guidance calling for medium-density residential development of the project parcel designated by property identification number 20 0303 20 32 0020 (owned by the State of Minnesota), given the incompatibility of the parcel's condition (largely floodplain) and features (the creek runs through it) with development.

The proposed project will help enhance the native vegetation within the stream corridor, improve water quality, and enhance fish and wildlife habitat, consistent with goals set out in BCWD NKE plan.

Although a large proportion of the project area is within the FEMA floodplain, no structures or fill will be added that might change the flood elevations within or upstream of the project area.

c. Mitigation Measures

No mitigation measures are required for project compatibility with local land use code.

11. GEOLOGY, SOILS, AND TOPOGRAPHY

a. Geology

Precambrian bedrock is exposed along the St. Croix River, and the depth of glacial drift over bedrock is generally less than 100 feet but can be close to 200 feet in depth. Ordovician and Devonian dolomite with some limestone, sandstone, and shale occur locally in the area, particularly in dissected stream valleys near the St. Croix River valley (MNDNR, 2023c).

There are no susceptible geologic features in the project area. The geology will not limit any aspect of the project, and the project will not have a significant effect on any geologic features.

b. Soils and Topography

The Web Soil Survey mapped 3 unique soil units within the project area. The soils consist of a range of soil types and textures common to floodplains and uplands. Two of the three mapped upland areas are considered prime farmland while the entire floodplain is not considered prime farmland. Table 8 lists the soils identified in the project area.

Table 8. Soils Data from the Web Soil Survey.

Soil Unit	Parent Material	Farmland Class	Hydric Classification	Drainage Class
49B – Antigo silt loam, 2 to 6 percent slopes	Loess and/or silty glaciofluvial deposits over loamy glaciofluvial deposits over stratified sandy and gravelly outwash	Prime farmland	Not hydric	Well drained
189 – Auburndale silt loam, 0 to 2 percent slopes	Loess and/or silty alluvium over dense loamy till	Not prime farmland	Primarily hydric	Poorly drained
454D – Mahtomedi loamy sand, 12 to 25 percent slopes	Outwash	Not prime farmland	Not hydric	Excessively drained

The mapped soils along the stream corridor are susceptible to erosion due to floodplain abandonment and channel incision that concentrate flood energy within the stream channel. Reconnecting the creek to the floodplain will allow flood flows to spread out and slow down to limit erosive stream bank scour. Increasing native herbaceous vegetation will promote further soil stabilization along the stream banks and in floodplain through establishment of deep-rooted plants. Additional measures to stabilize soils during project construction are listed in #6 Project Description.

12. WATER RESOURCES

a. Surface Water and Groundwater Features

i. Surface Water

Brown's Creek is a state-designated Public Water watercourse (AUID 07030005-520) and designated trout stream. From the downstream end of the project reach, Brown's Creek flows east for approximately 2.3 miles until it empties into the St. Croix River near the northern extent of Lake St. Croix. Brown's Creek is the primary drainage for the watershed. Nearby Public Waters basins include Twin Lakes located one-quarter mile north of the project area and Lake McKusick which is located a one-half mile southeast of the project area. Twin Lakes is in an adjoining watershed that does not discharge into Brown's Creek. An unnamed Public Water Wetland located 0.23 miles northeast of the project area is within the Brown's Creek watershed, but it lacks a definable surface water connection to Brown's Creek.

The upper Brown's Creek watershed contains a mosaic of riparian wetlands. Emergent marshes, shrub swamps, and floodplain forests border the creek from the headwaters downstream to the project reach. Most of the project area is mapped as emergent marsh and shrub swamp by the National Wetland Inventory.

Two disjunct reaches of Brown's Creek are protected by the MNDNR as part of the Brown's Creek Aquatic Management Area. The AMA includes a short section of creek within the project area located immediately downstream of Neal Avenue, and another section of creek that measures approximately 4,500 feet in length within the Brown's Creek gorge. Permitted activities in these areas include angling and wildlife observation.

Brown's Creek is listed as impaired for aquatic life and aquatic recreation. According to the MPCA, the creek may not be suitable for swimming or wading due to high bacteria levels and is also impacted by low dissolved oxygen content, lack of coldwater assemblage, and turbidity. Lake St. Croix, which is the receiving water of Brown's Creek, is listed as impaired for aquatic consumption for high levels of mercury, PCBs, and perfluorooctane sulfonate in fish tissue. The St. Croix River, which flows through Lake St. Croix, is designated as an Outstanding Resource Value Water by the MPCA and is also designated by Minnesota and the National Park Service as a Wild and Scenic River.

ii. Groundwater

Groundwater is expected to be at or near the elevation of Brown's Creek through the project area. Outside the immediate stream corridor, the depth to groundwater is generally less than 20 feet.

The project site is located within the Drinking Water Supply Management Area for Stillwater that has a moderate vulnerability rating. The project site is located just outside the Wellhead Protection Zone for Stillwater, with the boundary of the wellhead protection zone located approximately 600 feet east of the project site.

Three MNDNR observation wells are located within the project site and are clustered near the southwest corner of McKusick Road and Neal Avenue. The nearest wells outside the project site are private domestic wells located at the residences along McKusick Road northeast of the project site. Well locations were identified from the Minnesota Well Index which is maintained by the Minnesota Department of Health (MDH, 2023). Well logs are included in Appendix B.

b. Impacts and Mitigation

i. Wastewater

No wastewater will be stored onsite or produced during or after this project.

ii. Stormwater

Pre-Construction Site Runoff

The project area is naturally vegetated which helps filter and trap runoff from the surrounding roads and developed areas. There are several stormwater outfalls within the project area, but these will not be altered by the proposed project.

Post-Construction Site Runoff

One of the primary goals of this project is to reduce bank erosion and instream sedimentation by reconnecting the floodplain, reshaping stream banks to a stable slope, and promoting the growth of native herbaceous vegetation to help stabilize floodplain soils. This will reduce sediment and nutrient loading to downstream resources. The filtering capacity of the floodplain will be enhanced through reconnection to the creek and establishment of diverse, native riparian species. Runoff from the surrounding land will not be altered.

Stormwater and Erosion Control BMPs

The project will disturb of more than one acre of land; therefore, the construction contractor will be required to apply for coverage under the National Pollutant Discharge Elimination System/State Disposal System General Permit to the MPCA prior to the start of construction. A Stormwater Pollution Prevention Plan will be required and will include erosion prevention and sediment control best management practices to comply with the requirements of the permit. BMPs will be employed during construction, and inspection of BMPs will be required after each rainfall event that exceeds one-half inch in 24 hours. Sediment-control BMPs will be installed to prevent runoff to the creek while earthwork is in progress. Immediately after the earthwork is complete, all disturbed areas will be seeded and stabilized with hydromulch, crimped straw mulch, and other BMPs as necessary.

iii. Water Appropriations

No water appropriations will be required during or after construction. No dewatering or well abandonment will occur for the project.

iv. Wetlands

The National Wetlands Inventory indicates that most of the project reach is mapped as either PEMA1 (freshwater emergent wetland), PSS1A/ PSS1C (freshwater shrub wetland), and PSS1/EM1Ad (freshwater shrub/emergent wetland). A level 2 wetland delineation completed for the project delineated several wetlands above the ordinary high water level (OHWL) of Brown's Creek. Below the OHWL, in-channel wetlands and small floodplain benches were documented adjacent to the creek and within disconnected oxbow channels. This project may change the type and extent of wetlands by

reducing the tree canopy and increasing the inundation period in the reconnected floodplain, but it will not convert wetlands to non-wetlands, so no loss of wetlands is anticipated from construction of the project.

v. Other Surface Waters

Downstream receiving waterbodies including the lower reach of Brown's Creek and Lake St. Croix could be affected by the proposed project activities. As such, installation and maintenance of construction and sediment-control BMPs will be completed to minimize water quality impacts to downstream resources. In the long-term, the restored floodplain and stabilized bank soils will reduce sediment and nutrient loading to the downstream waterbodies.

13. CONTAMINATION, HAZARDOUS MATERIALS, AND WASTE

a. Pre-Project Site Conditions

According to historical aerial photos accessed through Minnesota Historical Aerial Photographs Online, the project area has been in mixed agricultural use since at least the 1930s. Hay fields/ pastures and small farmsteads can be seen in aerial images taken in 1938 and 1964. By 1992, development began to increase in the area and has progressed to the present day with numerous housing developments and residential streets now located within one mile of the project site.

No existing site contamination is known within the project boundary. A desktop review of both the Minnesota Department of Agriculture and MPCA's "What's In My Neighborhood" databases did not identify any known environmental contamination within the project boundary, but several construction stormwater projects related to stormwater improvements and residential developments were located within 0.5 miles of the project. In addition, one hazardous waste site was located approximately 0.15 miles northeast of the project area that is related to an automotive repair shop.

b. Project Related Generation/Storage of Solid Wastes

Project construction will require tree and brush removal and grading to reconnect the floodplain. Excess soil derived from the project will be spread in an upland area delineated within the project boundary. All spread soils in the upland will be seeded with native prairie seed and covered with straw mulch. Woody material from tree and shrub harvest will be repurposed for instream habitat features or used as brush piles in the stream corridor for non-game habitat. Any non-biodegradable waste generated from installation of temporary erosion control BMPs will be removed from the project site by the contractor.

c. Project Related Use/Storage of Hazardous Materials

Construction of the project will not require storage of hazardous materials. Portable tanks of diesel fuel and hydraulic fluid will be used to service heavy machinery but will not be stored onsite. Small

amounts of grease and petroleum will be stored in weatherproof containers and stored inside a job box or a contractor trailer. Construction equipment will be refueled outside of the immediate floodplain and liquid storage tanks will not be kept onsite.

d. Project Related Generation/Storage of Hazardous Wastes

The project is not anticipated to generate hazardous waste during construction. The only waste generated will be those discussed in Item 13.b: soils, woody debris, and scraps from BMP materials.

14. FISH, WILDLIFE, PLANT COMMUNITIES, AND ECOLOGICAL RESOURCES

a. Fish and Wildlife Resources

Original public land survey records indicate that pre-settlement vegetation consisted of bur oak and other timber with an undergrowth of oak bushes and hazel. Post-settlement, the riparian corridor has been impacted by a history of agriculture and drainage alterations. Much of the stream channel has been disconnected from its floodplain with exposed eroded banks along outside bends of meanders. The western half of the project area (upstream of Neal Avenue) is part of Brown's Creek Nature Preserve and consists of a mosaic shrub-carr/open meadow wetland and degraded floodplain forest. The floodplain forest is dominated by common buckthorn and boxelder with scattered black willow, silver maple, elm, and cottonwood. The upland forest contains boxelder, aspen, bur oak, pin oak, and black cherry.

Despite impacts from historic land use, the stream corridor provides habitat for a variety of wildlife and serves as an important wildlife corridor within the city. Fish surveys conducted in the project reach by the MNDNR in 1999 recorded green sunfish, bluntnose minnow, central mudminnow, creek chub, black bullhead, fathead, and stickleback. MNDNR fish surveys conducted in 2021 recorded central mudminnow, fathead minnow, longnose dace, and rainbow trout. Approximately 1,000 rainbow trout yearlings are stocked annually within the Brown's Creek Nature Preserve.

b. Rare Features

A review of rare features for a one-mile search area around the project boundary was conducted using the Natural Heritage Information System database. No state-listed endangered, threatened, or special concern species were identified within the project site, but three state-listed species were identified within one mile of the project boundary, including Louisiana waterthrush (*Parkesia motacilla*), Blanding's turtle (*Emydoidea blandingii*), and water-willow (*Decodon veticillatus* var. *laevigatus*).

The Blanding's turtle is a state-threated species that uses a variety of habitats including ephemeral wetlands, open marshes, and bottomland wetlands as well as sandy upland areas for nesting (MNDNR, 2023d). A combination of wetland complexes and adjacent sandy upland areas are required to support viable populations for Blanding's turtles. The project area contains suitable foraging habitat such as the wet meadows and floodplain areas near the creek, and suitable nesting habitat may occur in the

dry upland areas near the Brown's Creek State Trail. Overwintering habitat is marginal within the creek, but possible overwintering wetlands and deep marshes occur in both the Brown's Creek Nature Preserve and the Oak Glen golf course just south of the project area.

The Louisiana waterthrush is listed as a species of special concern. It is a migratory neotropic warbler that generally occurs in mature riparian forests near swiftly flowing streams in steep-sided forested valleys. In east-central Minnesota, the Louisiana waterthrush is associated with the St. Croix River valley and its tributaries (MNDNR, 2023e). The Louisiana waterthrush has been found in the lower gorge of Brown's Creek where steep forested bluffs occur adjacent to the stream. The lower gorge contains excellent foraging and nesting habitat where there is a prevalence of rocky riffles and swift-flowing water that supports abundant macroinvertebrates. Conversely, most of the stream bed through the project reach is covered with fine sandy substrates and lacks swift-flowing water to expose coarse substrates preferred by a variety of macroinvertebrates. In addition, the surrounding floodplain forest consists of young trees dominated by boxelder and woody invasive species that provide marginal nesting opportunities along the creek.

Water-willow is a species of special concern that grows along marshy or boggy fringes of lakes or slow-moving streams, often within the beds of cattails and bulrushes (MNDNR, 2023f). This type of habitat does not exist within the project site, and the species is unlikely to occur within the project reach. The known population within one mile of the project reach occurs along a lake shore.

A review of Native Plant Communities and Sites of Biodiversity Significance was completed for the project, and no mapped Native Plant Communities or Sites of Biodiversity Significance occur within the project boundary. However, the Natural Heritage Information System review identified the lower gorge of Brown's Creek as an area of High Biodiversity Significance as mapped by the Minnesota County Biological Survey. This area contains several native plant communities that support habitat for rare species such as the Louisiana waterthrush. The gorge is located approximately one mile downstream of the project reach.

In addition, the USFWS Information for Planning and Consultation (IPaC) Resources List was reviewed for information on endangered species, critical habitats, migratory birds, refuges and hatcheries, and wetlands that may occur within the same county as the project reach. The IPaC report identified 7 federally-listed species that may occur within the project area and 13 additional bird species that are either protected under the Migratory Bird Act or the Bald and Golden Eagle Protection Act (Table 9, Appendix A). The IPaC report did not identify any critical habitats, refuges, or hatcheries within the project area.

Table 9. IPaC Federally Listed Wildlife.

Common Name	Taxa	Scientific Name	Federal Status
Northern Long-Eared Bat	Bat	*Myotis septentrionalis*	Endangered
Tricolored Bat	Bat	*Perimyotis subflavus*	Proposed Endangered

Whooping Crane	Bird	*Grus americana*	Experimental Population; Non-essential
Monarch Butterfly	Insect	*Danaus plexippus*	Candidate
Rusty Patched Bumblebee	Insect	*Bombus affinis*	Endangered
Higgins Eye (pearlymussel)	Mussel	*Lampsilis higginsii*	Endangered
Winged Mapleleaf	Mussel	*Quadrula fragosa*	Endangered

The project reach may provide suitable foraging habitat for monarch butterflies and rusty patched bumblebees due to the presence of forbs in the project reach. Northern long-eared bats and tricolored bats may utilize the mature, larger trees within the project reach as roosting trees during the spring, summer, and fall months, and as such, it is proposed that all tree harvest activities for the project will be conducted in the winter months between January 1 – March 1 when the bats are in hibernation. The project reach does not contain habitat for whooping crane, Higgins eye pearlymussel, or the winged mapleleaf.

The project reach contains possible nesting habitat for several of the migratory birds listed in the IPaC report including black-billed cuckoo and cerulean warbler, and to a lesser extent, red-headed woodpecker, wood thrush, and bald eagle. The remaining bird species listed in the IPaC report may use the area for foraging and stop over during migration, but the project area either lacks suitable nesting habitat (for black tern, bobolink, and chimney swift) or the species is not known to nest in this part of the state (golden eagle, golden-winged warbler, Canada warbler, rusty blackbird, and lesser yellowlegs).

c. Impacts to Ecological Resources

The project will impact forest and wetland communities through select tree harvest and grading adjacent to the stream channel, but it will yield an increase in wet meadow habitat within the floodplain. Although the natural habitats in the project area have been historically degraded by invasive species and stream channel erosion, the flora and fauna that currently exist within the construction limits will be temporarily impacted by project construction. Select tree removal will occur within 30 feet of the stream banks and will have an impact on any species using the trees for nesting or roosting. Grading and clearing has the potential to temporarily impact nesting bumblebees and floral resources for monarch butterflies and other insects. Likewise, the installation of rock riffles and instream habitat will temporarily disrupt the streambed and the aquatic species that live there such as small fishes and macroinvertebrates.

Project construction will impact habitat that could potentially be used by rare and protected species. Removing trees from the project area could impact migratory and breeding birds as well as the northern long-eared bat and tricolored bat if they roost within the project boundary. The northern

long-eared bat hibernates in caves in the winter and roosts in tree cavities and under exfoliating tree bark during the spring and summer. The tricolored bat also hibernates in caves during the winter and typically roosts in forested areas among tree leaves in the spring, summer, and fall (USFWS, 2023). To limit impacts to these species and other migratory wildlife, tree harvest is proposed to occur in the winter months between January and early March when many species are in hibernation, dormant, or have migrated out of the area.

Stream habitat improvement projects have the potential to degrade habitat for the Louisiana waterthrush through canopy thinning and stabilization of eroded stream banks. In addition, stream projects may also increase the chance of brood parasitism by disturbance-associated species like brown-headed cowbird (Stucker and Cuthbert, 2000). There have been several sightings of Louisiana waterthrush in the Brown's Creek gorge dating back to 1988, including confirmed nesting in 2019 (pers. comm. M. Majeski 2023). However, as previously described, these sightings have occurred over one-mile downstream of the project reach in a steep, forested gorge along swift-flowing water; these habitat features are lacking within the project reach.

Climate change threatens to exacerbate some of the impacts to fish and wildlife. Hotter summers and warmer winters combined with canopy removal have the potential to increase stream temperatures within the project reach. However, stream channel narrowing, creation of deep pools, and shading the stream with overhanging native herbaceous vegetation will help mitigate impacts to water temperature from solar radiation.

Invasive reed canary grass and buckthorn are currently well-established within the project boundary, and project construction may spread existing weedy and invasive species within the project site through soil disturbance. As such, the project will include a three-year vegetation management plan that will be conducted by the project contractor with oversight from BCWD to manage both woody and herbaceous invasive species using cut-stump and spot herbicide treatments. In addition, the project contractor will be required to decontaminate their construction equipment before entering and leaving the project site to minimize the spread of invasive species outside the project. The outcome of the project will be a reduction in invasive species over the long term through invasive species management and the establishment of a diverse community of native grasses and forbs.

Overall, the project will have a net-positive impact on fish, wildlife, and the plant communities within the stream reach and will have a long-term positive benefit to the natural resources in the project area through the following:

- Creation of rock riffles will improve and increase macroinvertebrate habitat and fish spawning opportunities and will also help maintain deep-pool habitat.
- The project will increase the number and depth of pools for thermal refugia during the summer months and provide overwintering habitat for fish and other aquatic biota.
- The reconnected floodplain will improve riparian hydrology, benefit native hydrophytic vegetation, and support wetland habitat adjacent to the stream.
- Reducing sediment and nutrient loading within the project reach will improve downstream resources (Brown's Creek and St. Croix River).

- Native seeding will increase the diversity and extent of native vegetation, and the project will target populations of invasive species documented in the project reach including common buckthorn, glossy buckthorn, exotic bush honeysuckles, black locust, reed canary grass, creeping charlie, and garlic mustard.
- Seeding native forbs will also improve habitat for pollinators including the federally listed rusty patched bumblebee and monarch butterfly.
- Establishment of brush piles will provide refugia for terrestrial fauna.

d. Ecological Impact Mitigation

The project will have a net positive impact on fish and wildlife habitat as mentioned above in Item 14.c. The temporary negative impacts the project construction will be mitigated by the following measures:

- No instream work will occur between September 1 to April 1 per MNDNR work exclusion dates to allow for fish spawning and migration.
- Tree harvest will occur in the winter months between January and early March to minimize impacts to migratory species and tree-nesting/roosting species such as the northern long-eared bat and tricolored bat.
- Work is only proposed on degraded stream banks and will bypass stream banks that are stable or that are currently providing quality near-stream/ instream habitat.
- Significant native trees and stable root masses adjacent to the creek will be preserved for bank stability and habitat diversity.
- Implementation of appropriate sediment BMPs, including rapid soil stabilization, to minimize soil erosion during project construction.
- Upon completion of the project, all disturbed soils will be seeded with native species and stabilized with hydromulch and crimped straw.

15. HISTORIC PROPERTIES

A Phase I Archaeological and Cultural Resources field survey was completed by Mississippi Valley Archeology Center (MVAC) in August 2023 (Appendix C). This study showed: 1) No properties currently listed on the National Register of Historic Places are located within or proximate to the study area; 2) Four previously inventoried cultural sites were located within one-mile of the project area, including one site that overlaps the study area; 3) Soils are classified as deep post-settlement alluvium with limited potential for intact archaeological deposits due to significant stream migration and floodplain erosion interpreted from historic aerial imagery.

EOR submitted the Phase I Archaeological and Cultural Resources report to the Minnesota State Historic Preservation Office for review and comment.

As part of the Section 404 permitting process, the U.S. Army Corps of Engineers will conduct its own internal review of the project to fulfill its responsibilities under Section 106 of the National Historic Preservation Act to identify and consider impacts the project may have on historic or potentially

historic resources. A copy of the MVAC report will be included in the permit application submitted to the USACE.

16. VISUAL

Visitors to the project site will notice disturbance to the stream corridor during project construction, but these impacts are considered temporary since the proposed seeding of native herbaceous vegetation is expected to mature within three years following completion of the project.

17. AIR

a. Stationary Source Emissions

No stationary source of emissions will be employed during the construction of the project or in its completed state.

b. Vehicle Emissions

Heavy equipment such as dump trucks, excavators, bulldozers, and tractors will be used during construction. Engine emissions including particulate pollution, carbon monoxide, hydrocarbons, and nitrogen oxides will increase at the project site during construction, but the release of these pollutants will be limited to periods of active construction during the day. Emissions from construction are considered temporary and are not anticipated to cause or contribute to a violation of ambient air quality standards for any pollutants. After construction, there will not be any project-related air emissions.

c. Dust and Odors

The project will generate dust during construction from grading activities and from importing materials over dirt access trails. The effects on air quality from fugitive dust generated during construction will be temporary and localized. Dust minimization and prevention efforts are expected to be consistent with state standards contained in Minn. R. ch. 7011. There is one business and 14 residential houses located within 500 feet of the project boundary. Rapid soil stabilization is proposed for the project which will mitigate the release of dust from the work area. After construction is complete and vegetation becomes established, the project area will not create any dust.

Odors generated by the project during construction will be temporary and are expected to be odors typical of construction equipment, primarily dust and diesel exhaust. There will be no man-made odors emanating from the project area after construction.

18. GREENHOUSE GAS (GHG) EMISSIONS/CARBON FOOTPRINT

a. GHG Quantification

GHG emissions caused by the project will result from two sources: the operation of construction equipment, and tree and brush removal during the conversion of forest to prairie/wetland. Emissions from construction equipment emissions were calculated by using methods identified in the Environmental Quality Board guidance document and standard metrics from the EPA's Greenhouse Gas Emission Factors Hub (https://www.epa.gov/climateleadership/ghg-emission-factors-hub). Project construction is estimated to take 25 days to complete and require the use of 4 diesel construction vehicles per day: one excavator, one skidsteer, one bulldozer, and one dump truck. Fuel consumption at an average of 4 gallons per hour and 8-hour working days was used to calculate total fuel use:

Fuel use = days * hours * fuel use per hour * number of vehicles

Emissions were calculated using this equation from the EQB EAW guidance document:

Tons CO2 = fuel use in physical units *CO2 Emission Factor (kg CO2/physical unit of fuel use) * conversion of kg to tons

Emissions rates in Table 10 were retrieved from the Emissions Factors for Greenhouse Gas Inventory (EPA, 2023) for diesel nonroad construction vehicles.

Table 10. Rates of GHG Emissions for Nonroad Construction Equipment.

CO2 (kg/gal)	CH4 (grams/gal)	N2O (grams/gallon)
10.21	0.94	0.87

Totals emissions from construction equipment were estimated at 37.01 tons of carbon dioxide equivalents (CO_2e) which were calculated using the appropriate global warming potential for each GHG and the appropriate unit conversion factor.

Land use conversion from forest to grassland is the second category of emissions from the project. It is estimated that select tree harvest proposed for the project will remove approximately 80% of the trees from a 2.02-acre area, which is equivalent to 1.62 acres of forest converted to grassland. (It should be noted that the proposed removal of buckthorn and other invasive bushes from the understory does not constitute a change from forest to grassland.) Using the EPA's Inventory of Greenhouse Gas Emissions and Sinks to estimate an average carbon loss per acre for conversion from forest to grassland, there would be an estimated loss of 14.81 tons of CO2e per acre converted, which equates to 24.00 tons for the proposed land conversion. However, all harvested trees and brush will be reincorporated into the project for stream and floodplain habitat enhancements, which is assumed to be a carbon sink. As a result, the total potential project-related emissions are estimated at 37.01 tons of CO2e (Table 11).

Table 11. Construction Emissions.

Scope	Type of Emission	Emission Sub-type	Project-related CO_2e Emissions (tons)	Calculation method(s)
Scope 1	Combustion	Mobile Equipment	37.01	Linear rate of diesel nonroad construction vehicle emissions
Scope 1	Land Use	Conversion from Forest to Grassland	24.00	Estimated from nationwide averages for conversion from forest to grassland
Scope 1	Land Use	Carbon Sink	(24.00)	100% of woody material will be reused for bank stabilization and habitat enhancements
TOTAL			**37.01**	

d. GHG Assessment

The project will follow Tier 4 Emissions standards for nonroad diesel engines as defined by the Environmental Protection Agency. It is estimated that the project will be constructed in 25 working days, and air quality impacts from project construction will be temporary and limited to the hours of equipment operation.

It is not anticipated that the project will require other inputs during its life, and the project will not emit greenhouse gases. The project will reduce the potential for bank erosion through bank reshaping and reconnection of the floodplain. Establishment of diverse, native vegetation will increase sequestration of carbon through the dense growth of plants and subsequent storage of carbon in the soil through the root systems.

19. NOISE

Existing Noise Levels and Sources

The project is located in a suburban area near Brown's Creek Park and Oak Glen Golf Course. The residential setting, park, and golf course are all generally quiet with little to no noise contribution. Sources of noise are mainly from the nearby roads including McKusick Road and Neal Avenue.

Noise Generated During Construction

The project is expected to generate noise during active construction. Daily hours of construction will follow regulatory and construction permit regulated times. Noise will be generated by construction equipment during import of materials, earthwork, and tree removal activities. Noise levels will vary depending on equipment in use and the distance between construction equipment and receptors.

Noise Generated After Construction

After construction, the project is not expected to generate noise. All noise after construction will be from pre-project sources; primarily traffic on McKusick Road and Neal Avenue.

Nearby Sensitive Receptors

Sensitive receptors near the project include an automotive repair shop approximately 250 feet to the northeast, a residential area starting approximately 260 feet to the south, and Oak Glen Golf Course approximately 175 feet to the southeast.

Conformance to State Noise Standards

State noise standards are contained in Minn. R. ch. 7030. The noise standards are based on the land use at the location of the person that hears the noise and the sound level in A-weighted decibels (dBA) over ten percent (L10) or fifty percent (L50) of an hour.

The land in the vicinity of the site is mostly open space and residential with one commercial business. Noise limits for residential locations are L10 = 65 dBA and L50 = 60 dBA during the daytime, and L10 = 55 dBA and L50 = 50 dBA during the nighttime. Commercial area noise limits are L10 = 70 dBA and L50 = 65 dBA during the daytime and the nighttime. Noise generated from construction will be limited by Stillwater ordinance to the hours between 7am to 10pm Monday through Friday, and 9am to 9pm on any weekend or holiday.

20. TRANSPORTATION

a. Traffic Related Aspects

There are no consequential traffic related aspects of this project. Only a small number of vehicles will be working onsite during construction.

b. Effects on Traffic Congestion

It is not anticipated that there will be a significant impact to traffic operations on any of the nearby roads.

c. Traffic Mitigation Measures

No traffic mitigation measures will be necessary.

21. CUMULATIVE POTENTIAL EFFECTS

a. Geographic Scales and Timeframes

Cumulative effects result from the incremental impact of the project added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. The geographic area considered for cumulative potential effects is the area proximate to the project limits. No additional developments are anticipated on the properties bordering the proposed project area.

The project will aid in building resiliency in the stream channel to buffer potential effects of further urbanization and specific effects of climate change such as increased rain events. Rain events are considered seasonal and sporadic and have been gaining in intensity for several decades. Average annual temperatures have also been increasing which may have cumulative potential effects with partial removal of the tree canopy. Climate change effects are anticipated to increase for the foreseeable future.

Table 12 summarizes project related environmental effects that could combine with other environmental effects and the geographic extent of the anticipated impacts.

Table 12. Project-Related Environmental Effects and Mitigation.

EAW Section	Project-Related Effects	Mitigation
7 – Climate Adaptation and Resilience	Increase in rainstorm intensity may increase the severity of erosion along the stream channel	After project completion, the streambanks will be better protected against the effects of erosion from increased rainfall and flow and will allow dissipation of floodwaters over the reconnected floodplain
	Removal of some of the riparian canopy may increase ground and water temperatures	All disturbed soils will be revegetated with perennial native vegetation Installation of rock riffles will maintain deep pools for thermal refugia
8 – Cover Types	Conversion of forest to native prairie / wetland	No effect
10 – Land Use	The project is compatible with city zoning and is consistent with long-term land use planning	No mitigation is required
11 – Geology, Soils, and Topography	Disturbed ground and exposed soil during construction	Erosion control plan will be implemented and BMPs will be installed during construction
12 – Water Resources	Conversion of forested wetlands to non-forested wetlands	Disturbed areas within floodplain will be revegetated with native wetland species

EAW Section	Project-Related Effects	Mitigation
13 – Contamination, Hazardous Materials, and Waste	Construction Debris and Waste	Hauled to disposal sites and appropriate on-site storage of construction materials, fuels, and chemicals
14 – Fish, Wildlife, Plant Communities, and Ecological Resources	Temporary disruption of stream and riparian habitat	Minimization of grading and tree removal (selective tree harvest) Timing of construction to avoid impacts to nesting / roosting species and spawning fish. Invasive vegetation will be removed and replaced with native species, thereby increasing pollinator habitat Habitat enhancements will be installed to improve aquatic and terrestrial wildlife habitat
15 – Historic Properties	None anticipated	Phase 1 archaeological survey completed
16 – Visual	None anticipated	No additional actions are required
17 – Air	Emissions and dust during construction	Temporary impacts in a suburban setting and will only occur during active construction
18 – Noise	Construction noise impacts	Temporary impacts in a suburban setting and will only occur during active construction
	After construction – none	Compliance with city and state noise standards
19 – Transportation	None anticipated	No additional actions are required

b. Future Projects

There are no future associated projects.

c. Cumulative Potential Effects

The project will result in partial conversion of disturbed forest habitat to open prairie and wetlands with a net improvement in habitats for fish, macroinvertebrates, herptiles, mammals, and pollinators. In general, the project will mitigate the cumulative effects of climate change and future land

development in the area. The project will have net positive effects on soils and vegetation in the riparian corridor as a result of restored hydrology in the reconnected floodplain and through removal of invasive species and reestablishment of native species. The project will also have a net positive effect on downstream water resources by improving water quality and expanding habitat for aquatic biota.

22. OTHER POTENTIAL ENVIRONMENTAL EFFECTS

No other additional environmental effects are anticipated from this project. Potential environmental effects have been addressed in Items 1 through 21.

REFERENCES

EPA, 2023. GHG Emissions Factors Hub. Available online at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub. Accessed on 8/28/23.

EPA, 2023. Emissions Factors for Greenhouse Gas Inventories. Available online at: https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf. Accessed on 8/28/23.

Levitt, Jim. 2021. Population Assessment Stream Survey. Minnesota Department of Natural Resources.

Minnesota Department of Agriculture, 2023. What's in my Neighborhood? Agricultural Interactive Map. Available online at: https://mnag.maps.arcgis.com/apps/webappviewer/index.html?id=85bade4ea512411aa32a80079246255f. Accessed on 8/28/23.

Minnesota Department of Health, 2023. Minnesota well index. Available online at https://mnwellindex.web.health.state.mn.us/#. Accessed on 8/28/23.

MnDNR, 2023a. Climate Trends. Available online at https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html. Accessed on 8/28/23.

MnDNR, 2023b. Minnesota Climate Explorer. Available online at https://arcgis.dnr.state.mn.us/ewr/climateexplorer/main/historical. Accessed on 8/29/23.

MnDNR, 2023c. St. Paul-Baldwin Plains and Moraines Subsection. Available online at: https://www.dnr.state.mn.us/ecs/222Md/index.html. Accessed on 8/29/23.

MnDNR, 2023d. Rare Species Guide – Blanding's turtle. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ARAAD04010. Accessed on 8/29/23.

MnDNR, 2023e. Rare Species Guide – Louisiana waterthrush. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBX10030 Accessed on 8/29/23.

MnDNR, 2023f. Rare Species Guide – Water-willow. Available online at: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDLYT03010 Accessed on 8/29/23.

Minnesota Pollution Control Agency, 2023. What's in My Neighborhood, An Environmental View of Your Community. Available online at: https://webapp.pca.state.mn.us/wimn/search. Accessed on 8/29/23.

Stucker, Jennifer Hathaway, and Francesca J. Cuthbert. 2000. "Biodiversity of Southeastern Minnesota Forested Streams: Relationships between Trout Habitat Improvement Practices, Riparian Communities and the Louisiana Waterthrush." University of Minnesota, Department of Fisheries and Wildlife. http://files.dnr.state.mn.us/eco/nongame/projects/consgrant_reports/2000/2000_hathaway.pdf

University of Minnesota, 2023. Minnesota Historical Aerial Photographs Online. Regents of the University of Minnesota. Available online at: https://apps.lib.umn.edu/mhapo/. Accessed on: 8/28/23.

U.S. Fish and Wildlife Service, 2023. Rusty Patched Bumblebee Map. Available online at https://www.fws.gov/midwest/endangered/insects/rpbb/rpbbmap.html. Accessed on 8/29/23.

U.S. Fish and Wildlife Service, 2023. Northern Long-Eared Bat. Available online at https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis. Accessed on 8/29/23.

RGU CERTIFICATION

I hereby certify that:

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

Signature _____ Date _____

Title _____

FIGURES

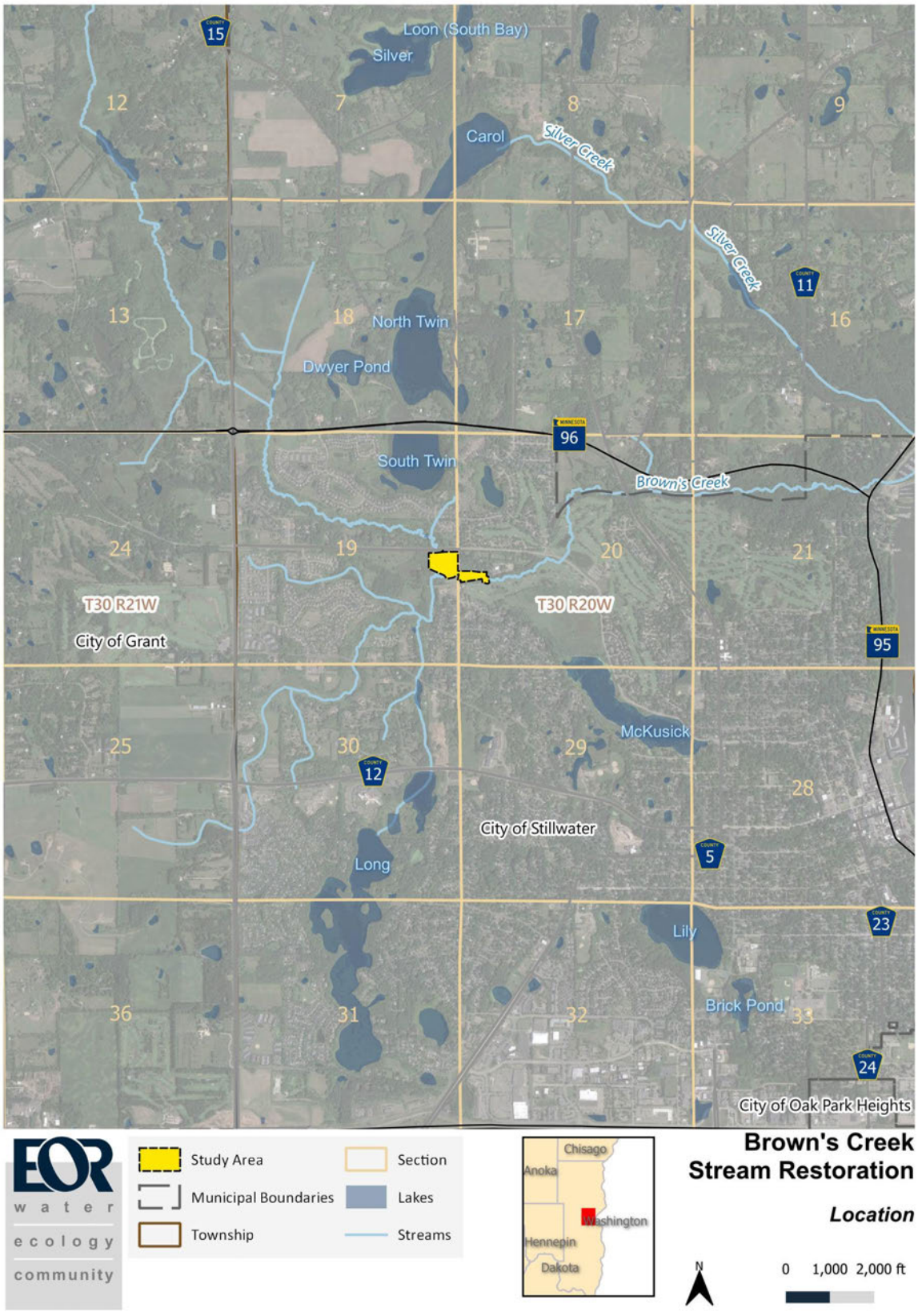


Figure 1. Project location map

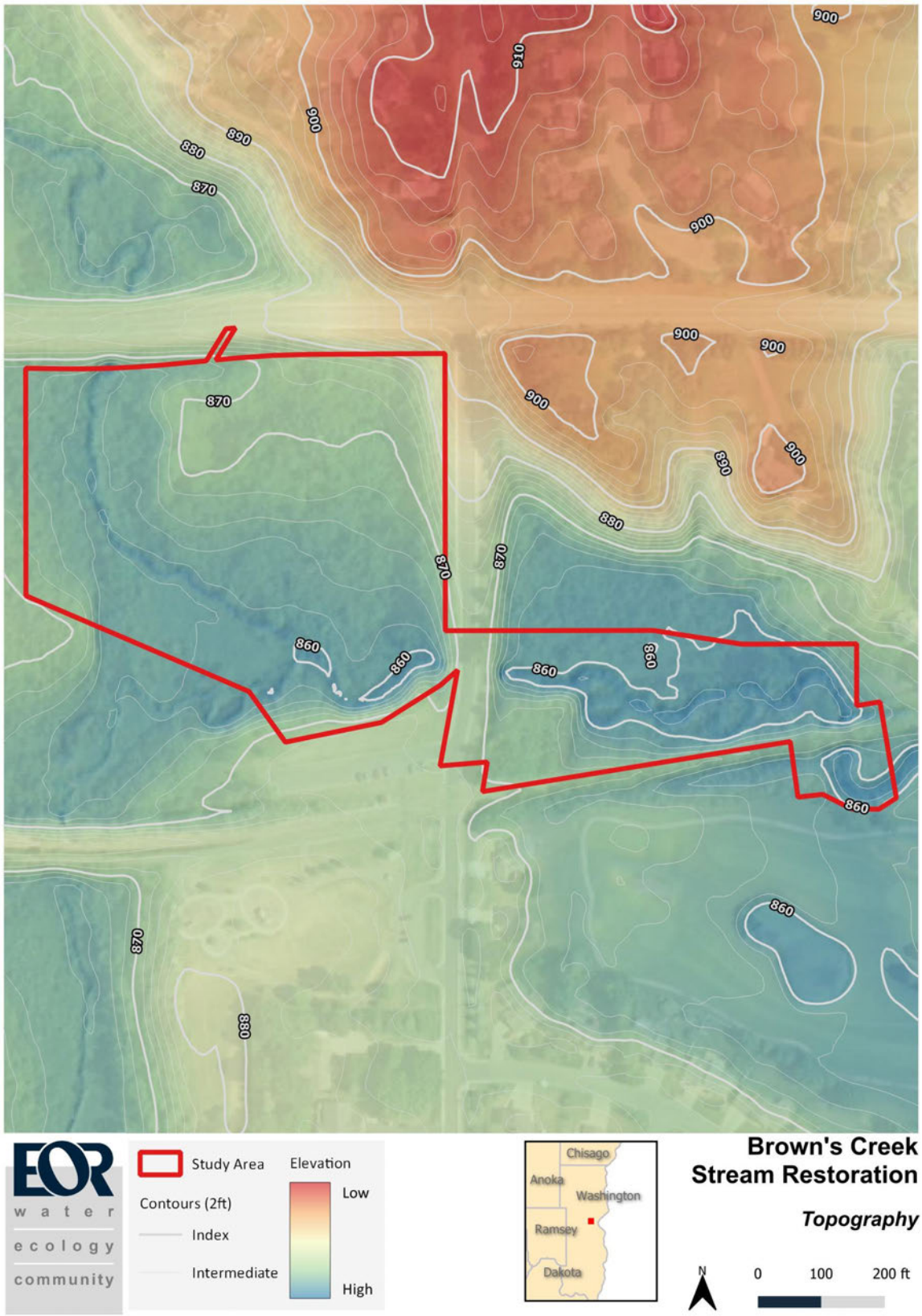


Figure 2. Project topography map

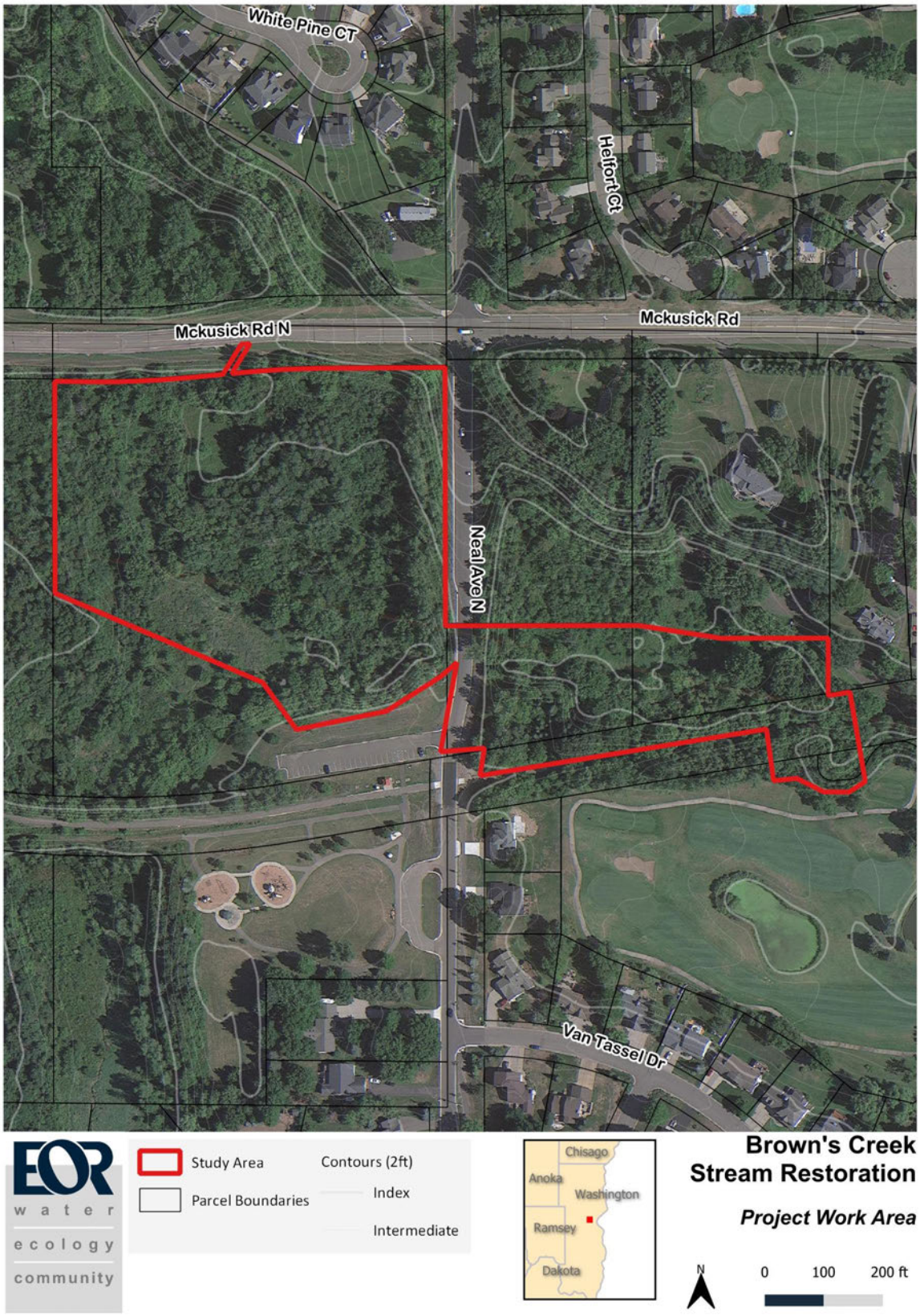


Figure 3. Project area with parcel lines and topography

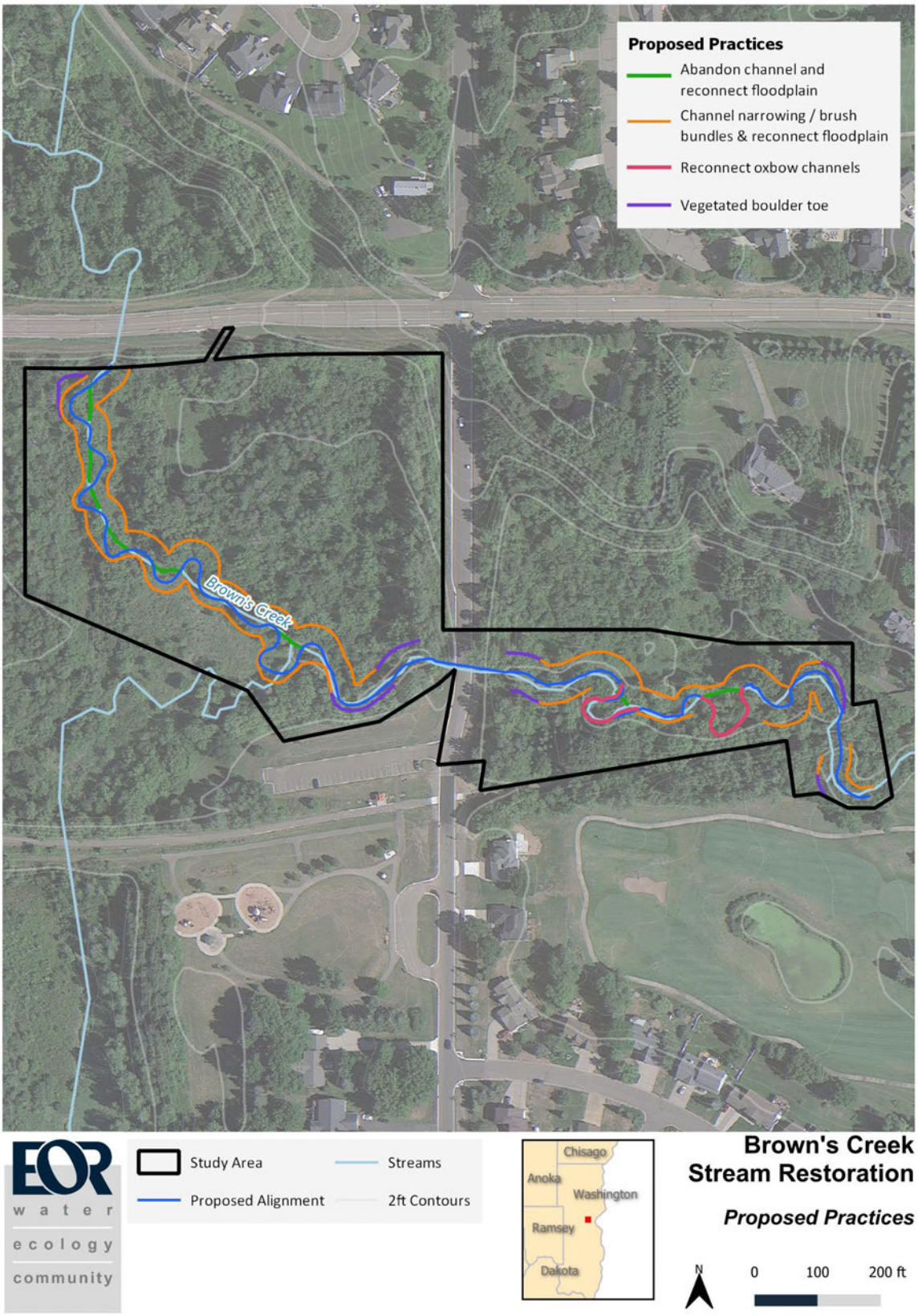


Figure 4. Proposed project practices

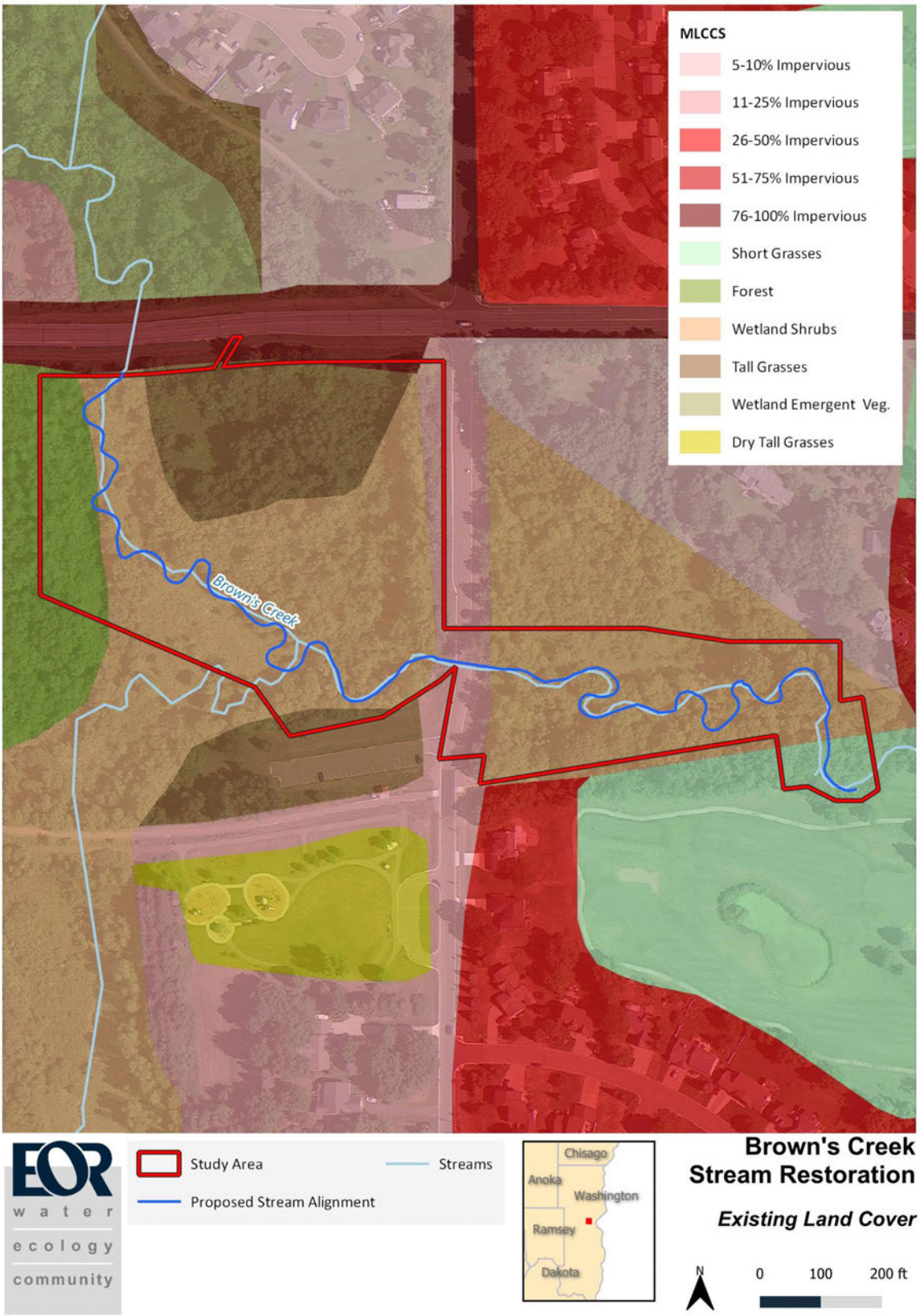


Figure 5. Existing land cover

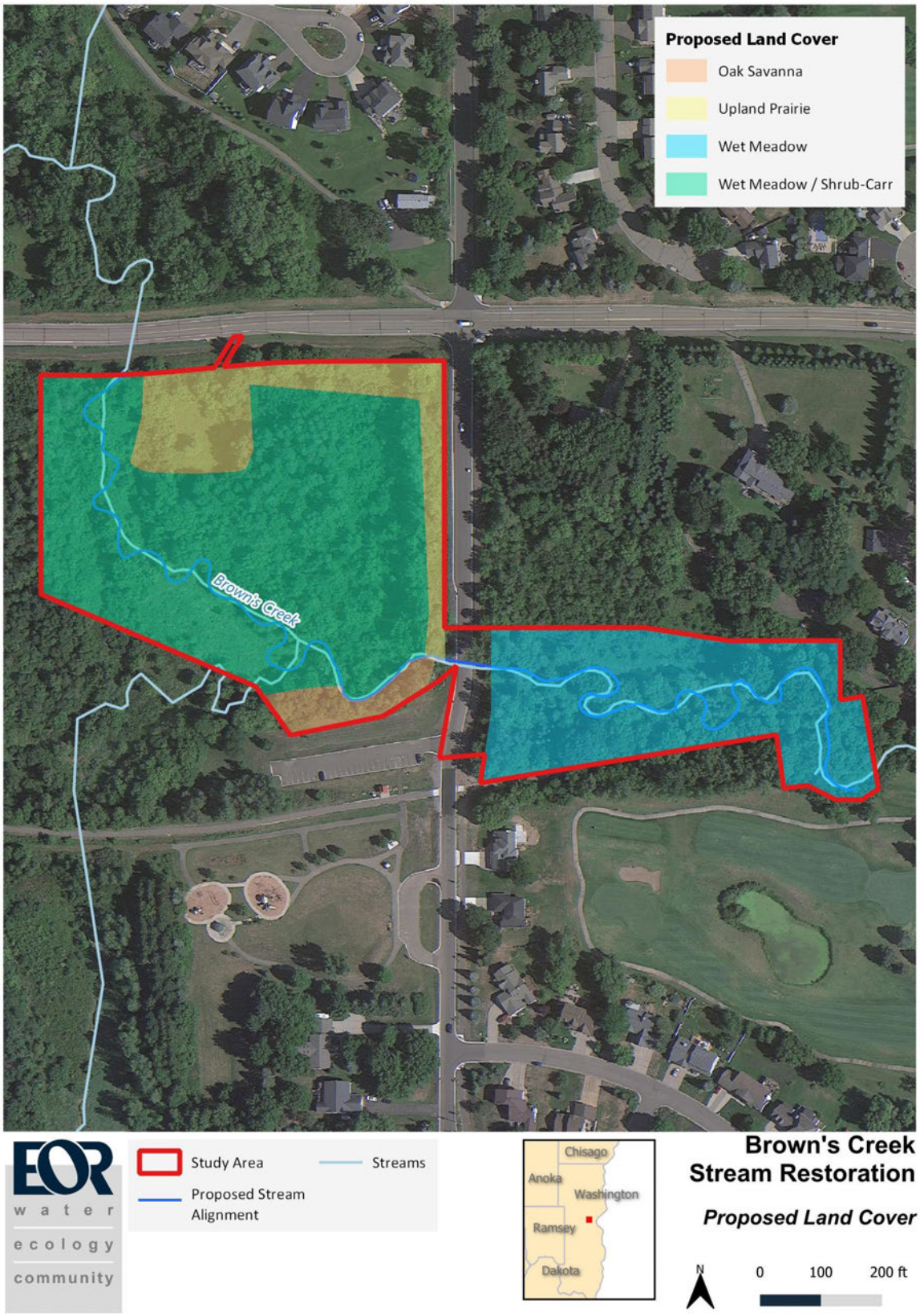


Figure 6. Proposed land cover after construction

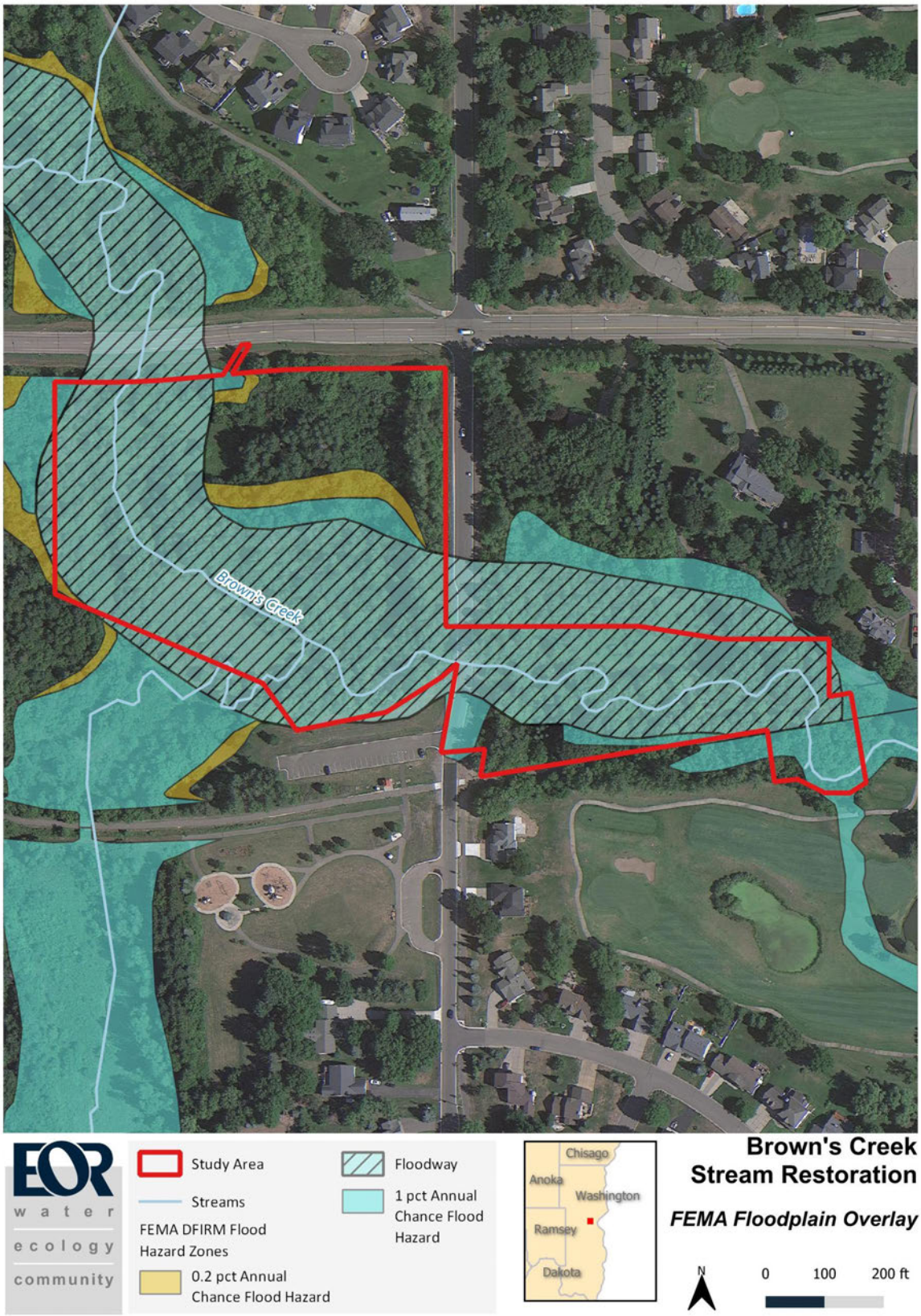


Figure 7. Project area with FEMA FIRM overlay

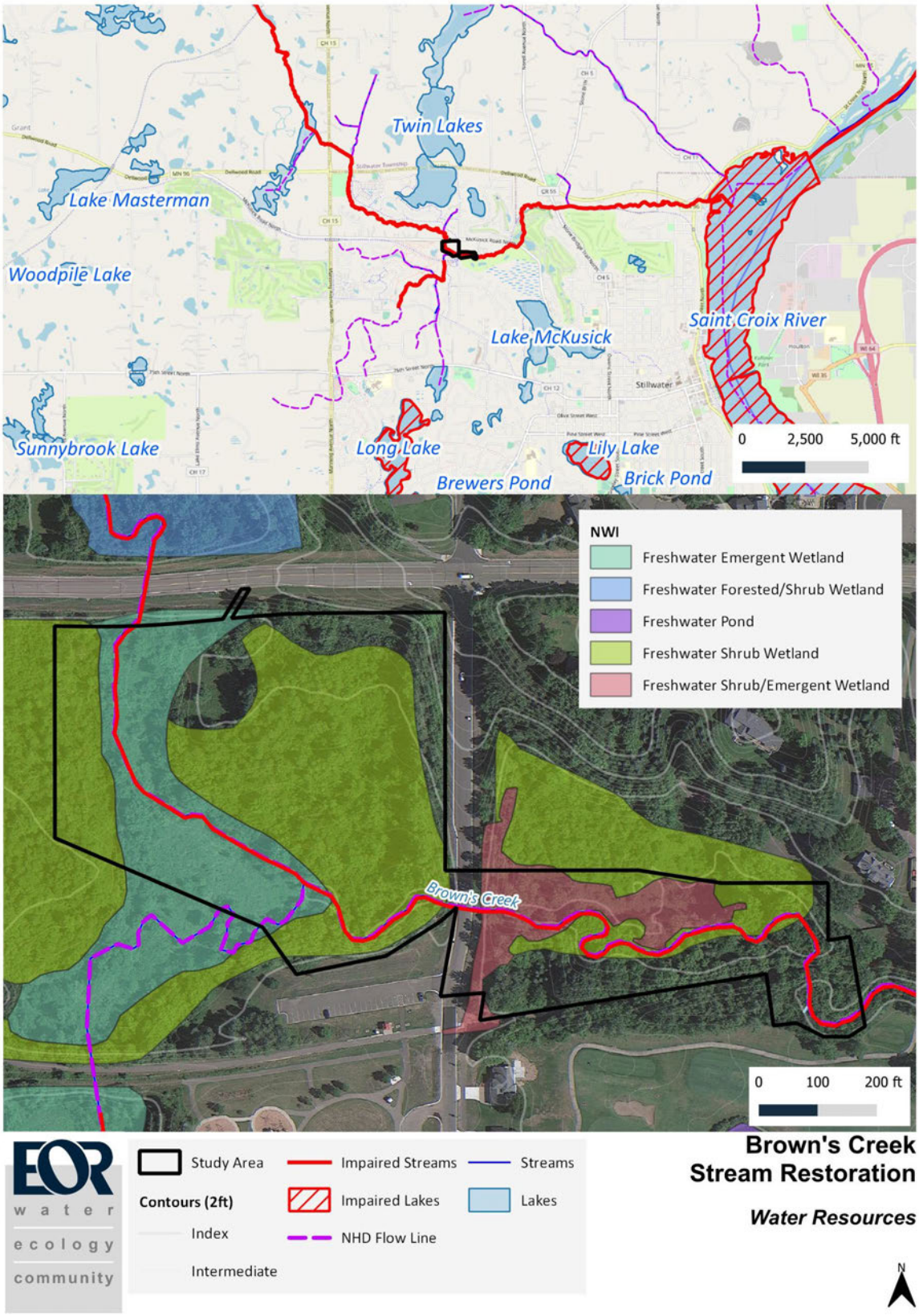


Figure 8. Water resources

APPENDIX A – USFWS IPAC RESOURCES LIST

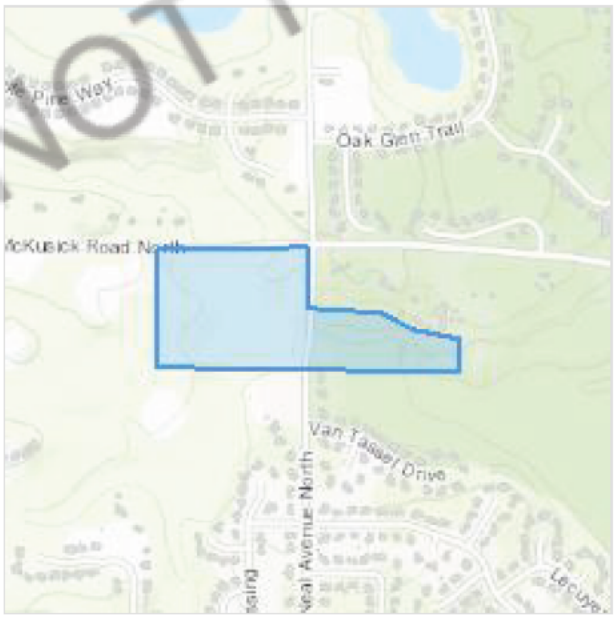
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Washington County, Minnesota



Local office

Minnesota-Wisconsin Ecological Services Field Office

(952) 858-0793
(952) 646-2873

3815 American Blvd East
Bloomington, MN 55425-1659

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Birds

NAME	STATUS
Whooping Crane Grus americana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/758	EXPN

Clams

NAME	STATUS
Higgins Eye (pearlymussel) Lampsilis higginsii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5428	Endangered

NAME	STATUS
Winged Mapleleaf Quadrula fragosa No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4127	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate
Rusty Patched Bumble Bee Bombus affinis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9383	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list,click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ( )
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

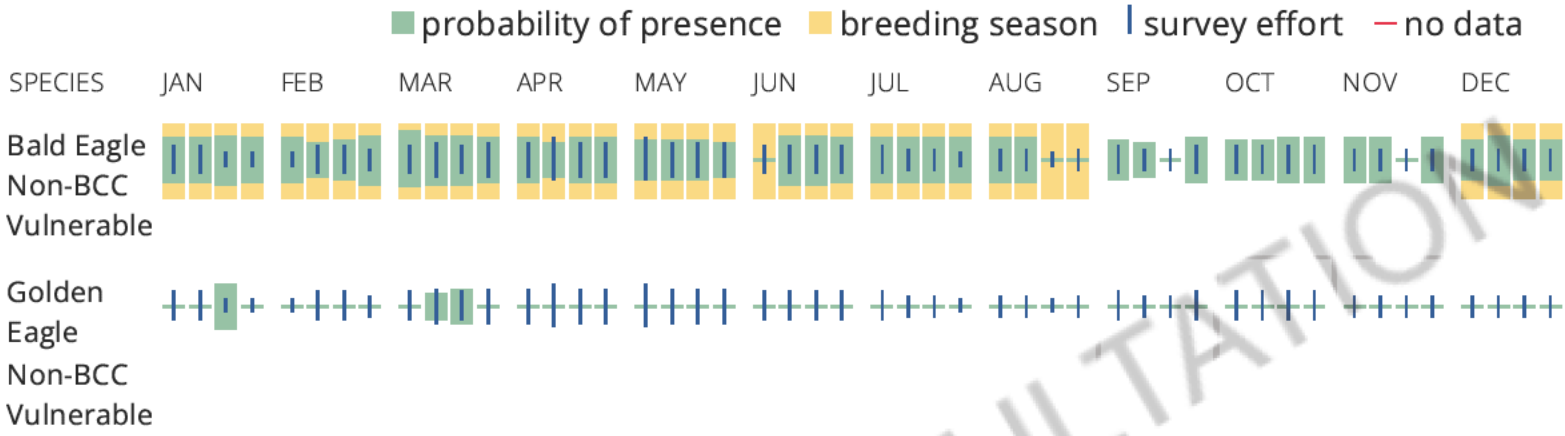
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip:

enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black Tern *Chlidonias niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10

Cerulean Warbler Dendroica cerulea — Breeds Apr 22 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Golden-winged Warbler Vermivora chrysoptera — Breeds May 1 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8745

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird Euphagus carolinus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

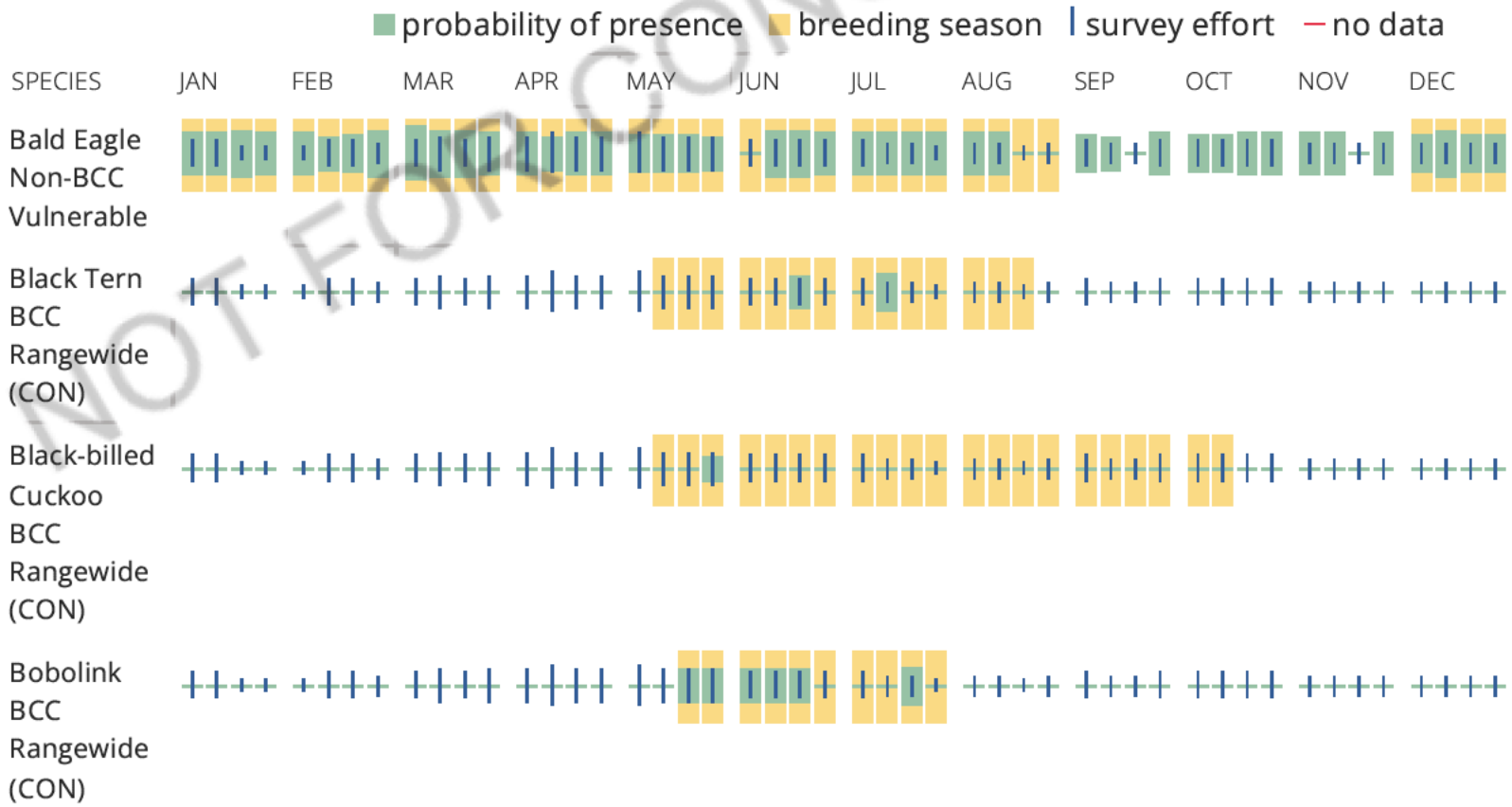
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

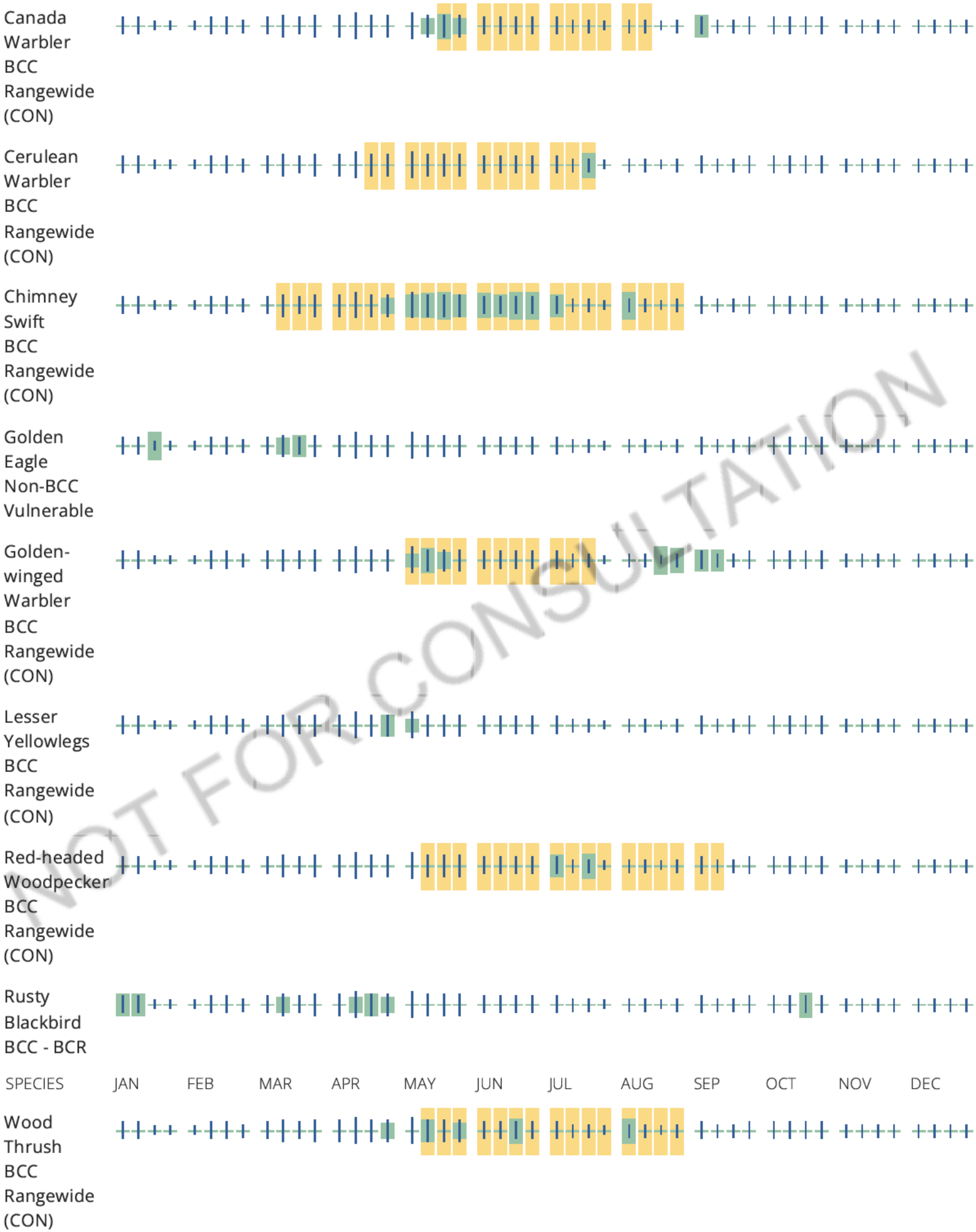
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX B – GROUNDWATER WELL LOGS

Minnesota Unique Well Number

109689

County Washington
Quad Stillwater
Quad ID 118D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/31/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
TRENT, JOHN	30	20	W	20	CBBBAC

Elevation 901 ft. **Elev. Method** 7 5 minute topographic map (+/- 5 feet)

Address

C/W 13033 MCKUSICK RD N STILLWATER MN 55082

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	51	BROWN	SFT-HRD
CLAY & BOULDERS	51	148	RED/BRN	SFT-HRD
SANDROCK	148	180	YEL/BRN	MEDIUM

Remarks

Well Depth	Depth Completed	Date Well Completed
180 ft.	180 ft.	11/28/1975

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter		Weight	
4	in. To 174 ft.	11	lbs./ft.

Open Hole From 174 ft. To 180 ft.

Screen? ☐ **Type** **Make**

Static Water Level
50 ft. land surface Measure 11/28/1975

Pumping Level (below land surface)
55 ft. 2 hrs. Pumping at 15 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
bentonite	2	Cubic yards	0 ft.	174 ft.

Nearest Known Source of Contamination
80 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/05/1975
Manufacturer's name REDA PUMP CO.
Model Number 9D9P051 HP 0.5 Volt 230
Length of drop pipe 90 ft Capacity 12 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 148 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 512407 Y 4990945
Unique Number Verification Address verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Mantyla Well Co.	82084	SANDERS, G.

Minnesota Unique Well Number

156399

County Washington
Quad Stillwater
Quad ID 118D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/17/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
VAN TASSEL,	30	20	W	20	CBBAAB

Elevation 901 ft. **Elev. Method** 7 5 minute topographic map (+/- 5 feet)

Address

C/W 13093 MCKUSICK RD N STILLWATER MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	30	BROWN	SOFT
SAND & GRAVEL	30	145	BROWN	SFT-HRD
SANDROCK	145	157	WHITE	SOFT
SANDROCK	157	170	YEL/BRN	MEDIUM

Remarks

Well Depth 170 ft. **Depth Completed** 170 ft. **Date Well Completed** 12/18/1978

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Welded

Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter **Weight**

4 in. To 167 ft. 11 lbs./ft.

Open Hole From 167 ft. To 170 ft.

Screen? ☐ **Type** **Make**

Static Water Level

55 ft. land surface Measure 12/18/1978

Pumping Level (below land surface)

60 ft. 2 hrs. Pumping at 20 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	0	0 ft.	167 ft.

Nearest Known Source of Contamination

85 feet Northeas Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/22/1978

Manufacturer's name REDA

Model Number 12D9P021 HP 0.75 Volt 230

Length of drop pipe 100 ft Capacity 12 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan

Last Strat Jordan Sandstone Depth to Bedrock 145 ft

Located by Minnesota Geological Survey

Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)

System UTM - NAD83, Zone 15, Meters X 512483 Y 4990957

Unique Number Verification Name on mailbox Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Mantyla Well Co.	82084	SANDERS, G.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Well Index Report | **156399** | Printed on 07/21/2023 HE-01205-15

Minnesota Unique Well Number

595649

County Washington
Quad Stillwater
Quad ID 118D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 09/12/2000
Update Date 09/04/2018
Received Date

Well Name	Township	Range	Dir	Section	Subsection
DNR OB 82047	30	20	W	19	DAAAAB

Elevation 876 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 216 4TH ST N STILLWATER MN 55082
Well NEAL AV STILLWATER MN 55082

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	70		
SAND	70	75		
SAND & GRAVEL	75	100		
SAND & GRAVEL	100	149		
SANDSTONE	149	154	BROWN	
ST LAWRENCE	154	185		
TUNNEL CITY GROUP	185	240		

Remarks

GAMMA LOGGED 6-21-2000 BY MNDNR M G S NO 4021
DNR OBWELL 82047

Well Depth 240 ft. **Depth Completed** 240 ft. **Date Well Completed** 06/20/2000

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use observation well **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 215 ft.	lbs./ft.	8 in. To 215 ft.
		4 in. To 240 ft.

Open Hole From 215 ft. To 240 ft.

Screen? ☐ **Type** **Make**

Static Water Level
16 ft. land surface Measure 06/20/2000

Pumping Level (below land surface)
20 ft. 1 hrs. Pumping at 30 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	20 Sacks	0 ft.	150 ft.
bentonite	20 Sacks	150 ft.	215 ft.

Nearest Known Source of Contamination
60 feet North Direction Other Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Tunnel City
Last Strat Tunnel City Group Depth to Bedrock 149 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 512289 Y 4990961
Unique Number Verification Information from Input Date 10/24/2000

Angled Drill Hole

Well Contractor
Schultz, Nicholas 10622 SCHULTZ, N.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

623066

County Washington
Quad Stillwater
Quad ID 118D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/27/2001
Update Date 09/04/2018
Received Date

Well Name	Township	Range	Dir	Section	Subsection
DNR OB 82048	30	20	W	19	DAAABA

Elevation 876 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 216 4TH ST N STILLWATER MN 55082

Contact 500 LAFAYETTE RD ST PAUL MN 55155

Well Location NE AV N STILLWATER MN 55082

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILTY CLAY	0	9	BROWN	
SAND & GRAVEL	9	18	VARIED	
SAND CLAY	18	31	BROWN	
SAND & GRAVEL	31	47	VARIED	

Remarks

DNR OBWELL 82048

Well Depth	Depth Completed	Date Well Completed
47 ft.	47 ft.	08/23/2000

Drill Method Auger (non-specified) **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint**

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 37 ft.	lbs./ft.	6.7 in. To 47 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make**

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	37 ft. 47 ft.

Static Water Level

6.4 ft. land surface Measure 08/23/2000

Pumping Level (below land surface)

6.4 ft. hrs. Pumping at g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	1.25 Sacks	4 ft.	33 ft.
neat cement	1 Sacks	ft.	4 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer Quat. Water

Last Strat sand +larger Depth to Bedrock ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)

System UTM - NAD83, Zone 15, Meters X 512272 Y 4990960

Unique Number Verification Site Plan Input Date 09/04/2018

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Minnesota DNR	M0058	LILJEGREN, M.

Minnesota Unique Well Number

834170

County Washington
Quad Stillwater
Quad ID 118D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 10/14/2021
Update Date 10/14/2021
Received Date

Well Name	Township	Range	Dir	Section	Subsection
DNR OB 82080	30	20	W	19	DAAAAA

Elevation 886 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 216 4TH ST N STILLWATER MN 55082
Contact 500 LAFAYETTE RD ST PAUL MN 55155

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOPSOIL (FILL)	0	1	BLACK	SOFT
LOAMY SOIL (FILL)	1	5	BROWN	SOFT
SILTY SAND CLAY, TR.	5	11	BLK/BRN	SOFT
SILTY CLAY W/ FINE	11	14	BROWN	SFT-HRD
SILTY SAND TR.	14	20	BROWN	SOFT
FINE SAND, TR. SILT,	20	32	BROWN	SOFT
FINE SAND TR. SILT	32	34	BROWN	SOFT
FINE TO COARSE	34	63	BROWN	SOFT

Remarks
DNR OB 82080

Well Depth 63 ft. **Depth Completed** 60.5 ft. **Date Well Completed** 11/20/2020

Drill Method Power Auger **Drill Fluid**

Use observation well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Solvent Welded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 50.5 ft.	lbs./ft.	8 in. To 60.5 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	50.5 ft.	60.5 ft.

Static Water Level
12.8 ft. land surface Measure 11/20/2020

Pumping Level (below land surface)
13.6 ft. 1 hrs. Pumping at 8 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
high solids bentonite	4 Sacks	ft.	41.5 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer Quat. Water
Last Strat sand-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 512319 Y 4990962
Unique Number Verification Info/GPS from data Input Date 10/14/2021

Angled Drill Hole

Well Contractor
MN DNR Waters 1759 MEYER, M.
Licensee Business Lic. or Reg. No. Name of Driller

APPENDIX C – PHASE 1 ARCHEOLOGICAL AND CULTURAL RESOURCES REPORT

August 19, 2023 MVAC SR 2023-100

Mike Majeski
EOR, Inc.
Ste 300
1919 University Avenue West
St Paul, MN 55104

From: Wendy Holtz-Leith, Mississippi Valley Archaeology Center (MVAC), University of Wisconsin-La Crosse
Principle Investigator: Constance Arzigian, Constance Arzigian

Re: Phase I Archaeological Survey for proposed trout stream habitat improvements on Brown's Creek, Washington County, Minnesota.

License Number: 23-193

This letter summarizes a Phase I archaeological investigations along an approximately 1,900-foot stretch of streambank on Brown's Creek, Washington County, Minnesota (Figure 1), for trout stream habitat improvements. Portions of the project area are located on land owned by the State of Minnesota Department of Natural Resources (MNDNR) and the City of Stillwater and require a license from the Office of the State Archaeologist, License No. 23-193 and a Research Permit from the Minnesota Department of Natural Resources Parks and Trails Division (Special Permit No. 2023). The work was completed for EOR, Inc. by Wendy K. Holtz-Leith, Senior Research Archaeologist, with Constance Arzigian, Principal Investigator and Senior Research Archaeologist, Mississippi Valley Archaeology Center (MVAC) at the University of Wisconsin-La Crosse.

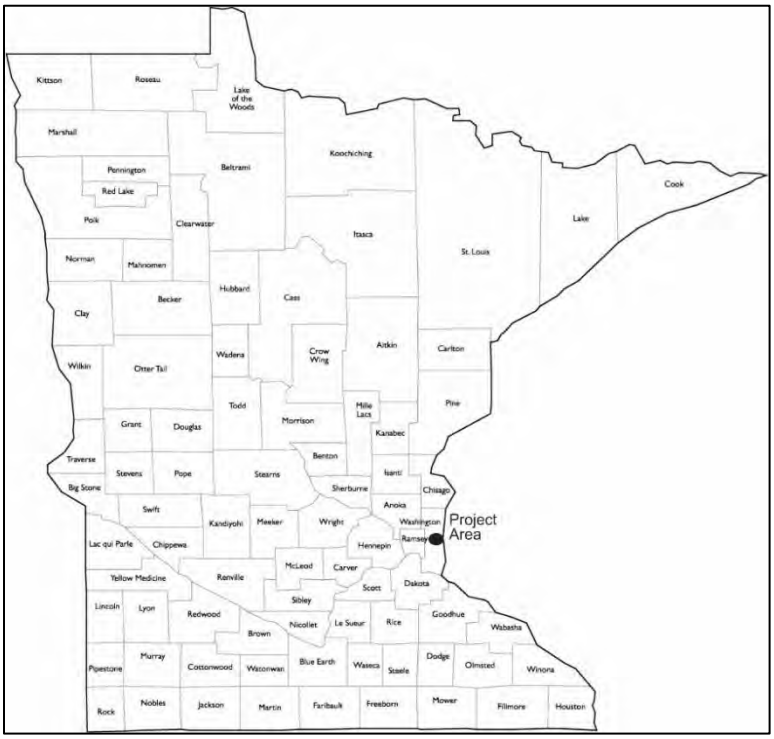


Figure 1. Project area within Minnesota.

Project description: The project area covers an approximately 1,900-foot stretch along Brown's Creek. A field survey was conducted for proposed stream modifications for trout stream habitat improvements. The project area begins in the NE ¼, SE ¼ of Section 19 and ends in the NW ¼, SW ¼ of Section 20, T30N R20W, Stillwater Township (Figures 2 and 3). Brown's Creek generally flows through the project area from the northwest to the southeast and flows to the St. Croix River north of Stillwater. The project area starts where Mc Kusick Road North crosses Brown's Creek and ends near the Brown's Creek State Trail. Historic aerials show meandering of the stream from 1938, 1949, 1966, 2010, to 2023 (Figures 4 and 5). Sometime between 1997 and 2003, near the east end of the project area, Brown's Creek was rerouted to its current location.

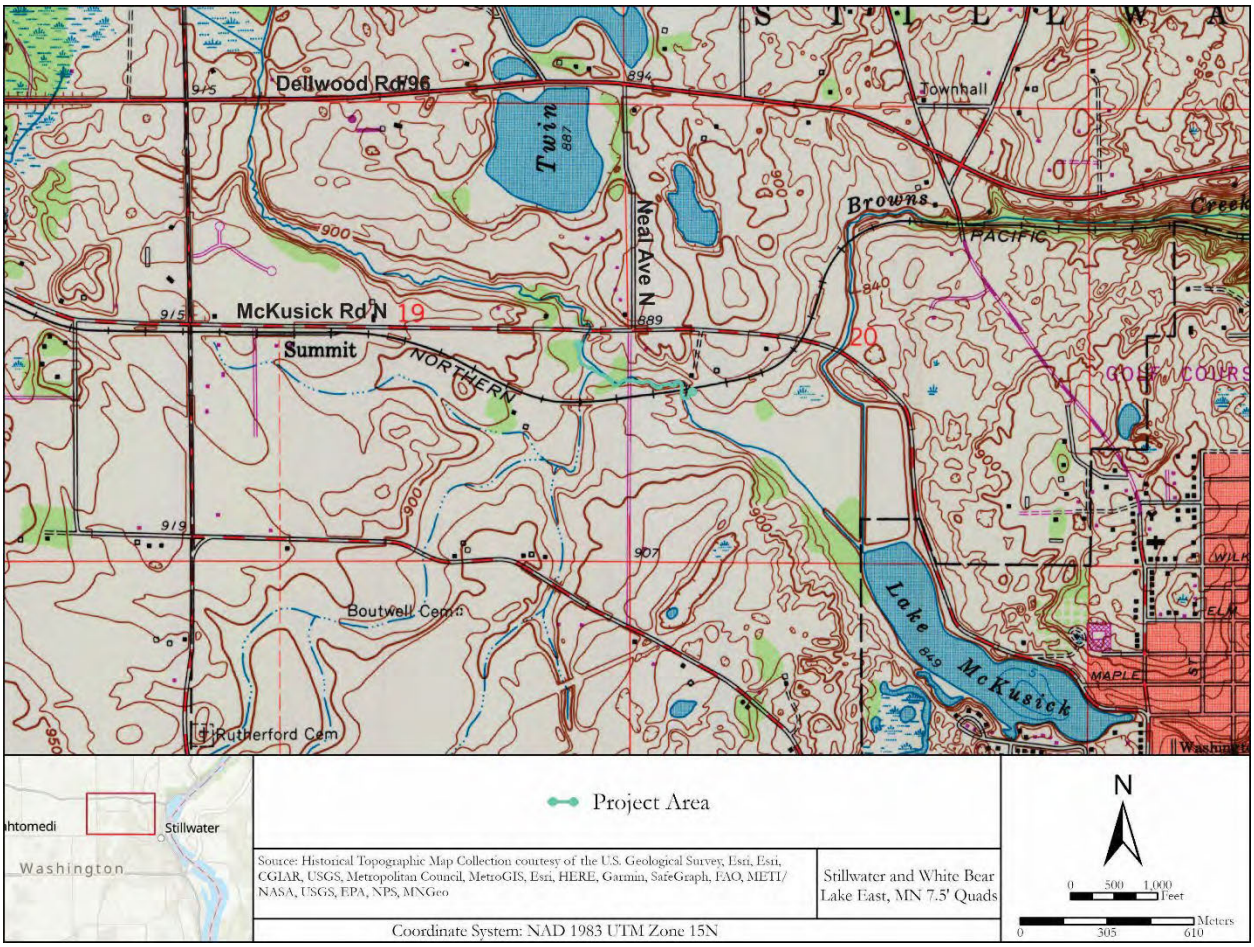


Figure 2. Project area on the Stillwater and White Bear Lake East, Minnesota 7.5' Quadrangles (Generated in ArcGIS).

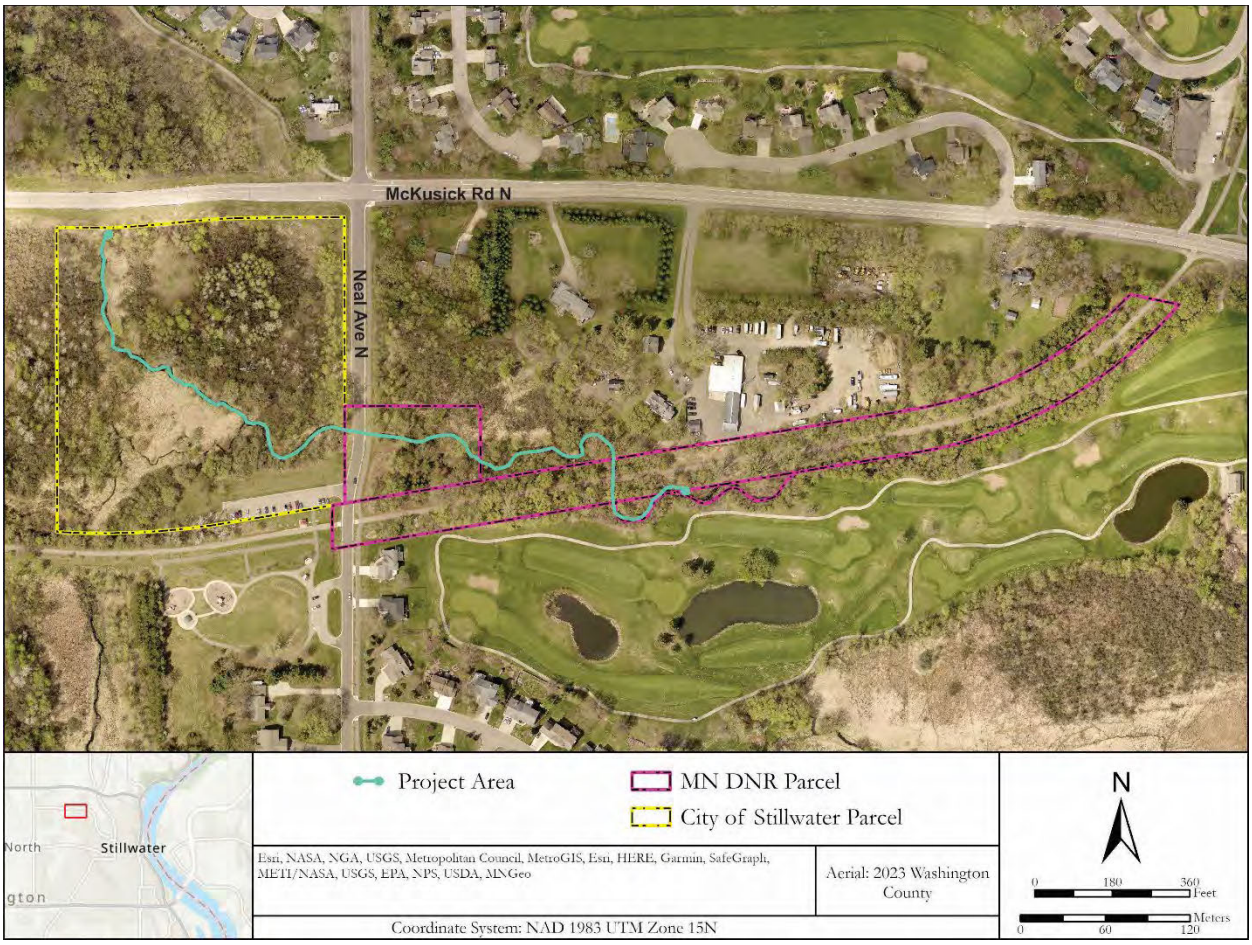
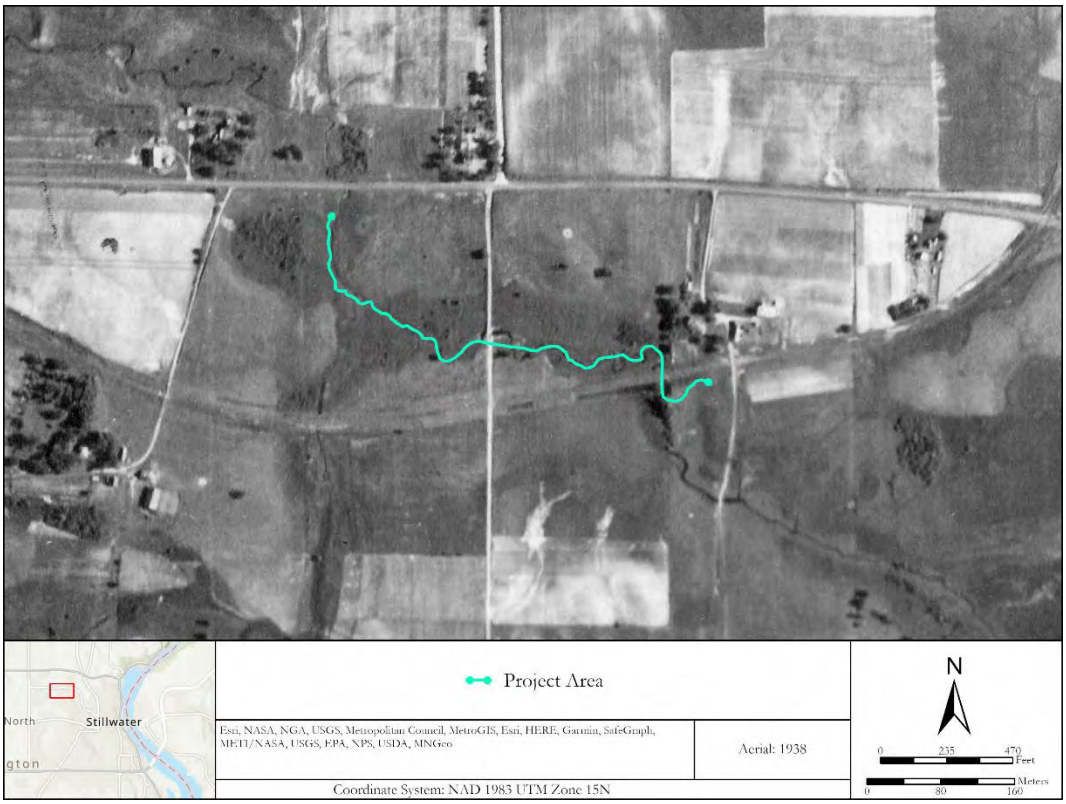


Figure 3. Brown's Creek project area on aerial map (Generated in ArcGIS).



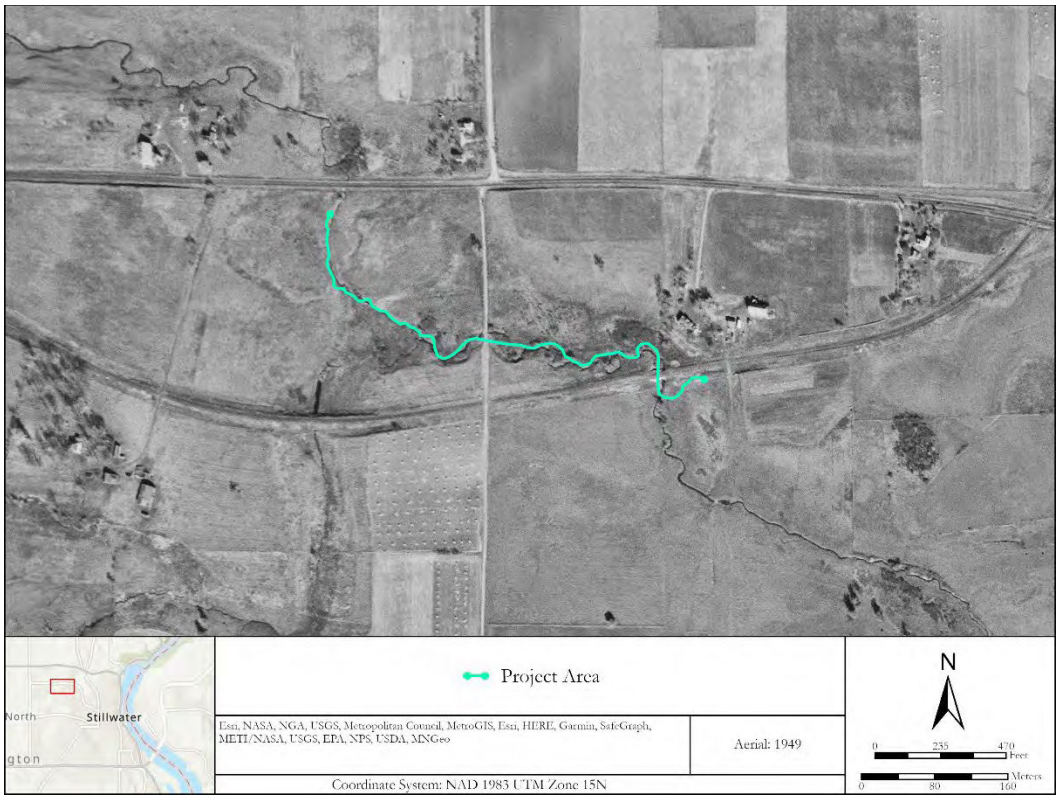


Figure 4. 1938 and 1949 aerial photos with project area (current location of Brown's Creek) overlaid (University of Minnesota-Minnesota Historical Aerial Photographs Online).

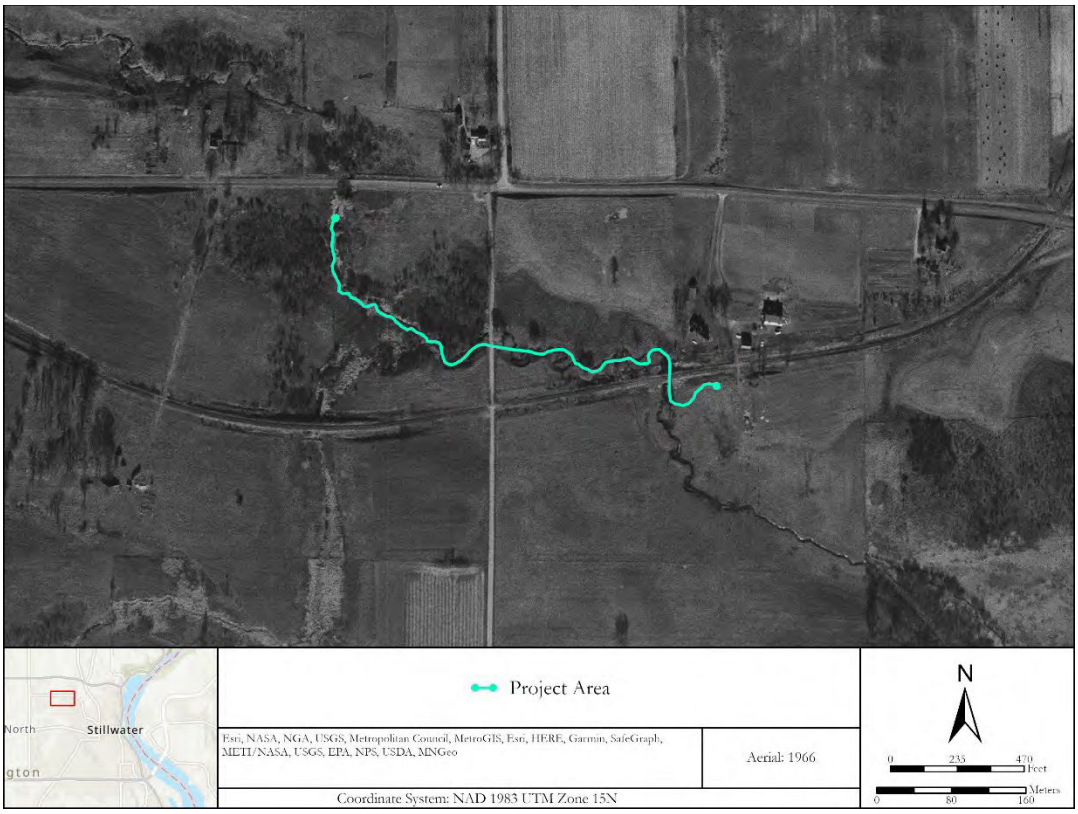


Figure 5. 1966 and 2010 aerial photo with project area (current location of Brown's Creek) overlaid (University of Minnesota-Minnesota Historical Aerial Photographs Online).

Previously reported sites: A site search was requested from the State Historic Preservation Office and research was conducted using the Office of the State Archaeologist (OSA) Portal. One previously identified site overlaps the project area, and three others are located within one mile (Figure 6 and 7).

The project area overlaps the mapped location of 21WAac. The site is based on the 1874 plat map of Washington County (Andreas 1874). The map shows structures in Section 19, [redacted]. No other information is given in the OSA portal.

21WA30 is a small precontact find artifact scatter of unknown age and cultural affiliation located on a ridgetop north of Brown's Creek in a plowed field. The site is located [redacted] of the project area.

21WA26 is a precontact habitation site of unknown age and cultural affiliation located on the northwest side of Twin Lakes. In 1971 a survey for proposed highway work found no cultural resources in the area but the landowner reported that he and the previous landowner had found numerous projectile points in the area. The site is located [redacted] of the project area.

21WA73 is a small precontact find spot of unknown age and cultural affiliation located on a knoll overlooking the north shore of Lake McKusick. The site is located [redacted] of the project area.

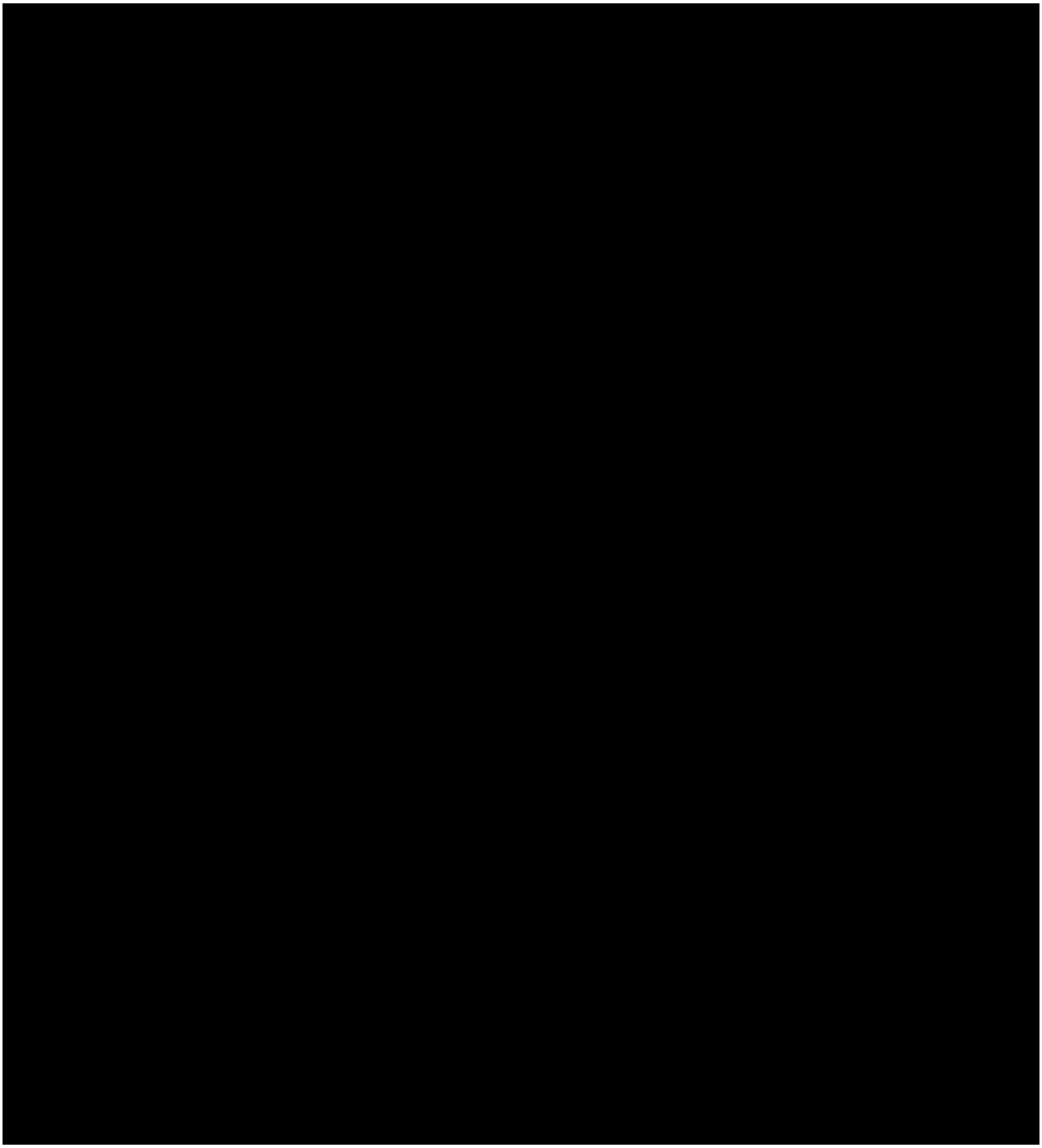


Figure 6. Previously reported sites in relationship to the project area on the Stillwater and White Bear Lake East, Minnesota 7.5' Quadrangles, adapted from the OSA portal.

Figure 7. Previously reported sites in relationship to the project area on aerial imagery, adapted from the OSA portal.

Soils, vegetation and landscape change: The United States Department of Agriculture, Natural Resources Conservation Services Web Soil Survey (USDA-NRCS) was consulted to determine soils mapped within the project area (USDA-NRCS 2023). All of the project area is mapped as Auburndale silt loam, 0-2 percent slope (Figure 8). This soil type is found on drainageways on ground moraines or depressions on ground moraines and are formed in loess and/or silty alluvium over dense loamy till. It is a poorly drained soil type. The Auburndale soil series consists of deep, poorly drained soils formed in loess or silty alluvium. These soils are frequently saturated. Native vegetation consists of wetland grasses, alder shrubs, and trees such as black ash, quaking aspen, and bog willows.

Figure 8. USDA-NRCS soils map of the project area.

Vegetation near the project area was noted in the 1847 Government Land Office surveys [GLO) (GLO Historic Plat Map Retrieval System 2023]. Sections 19 and 20 of T30N, R20W was described as rolling, third-rate soils with timber Bur, black, and white oak.

The OSA Portal identifies the project area as deciduous savanna. Since the mid-nineteenth century, the region around the project area has seen intensive land clearing and agriculture. Prior to this period the uplands would have been predominantly short grass prairies with hardwoods in the narrow, often steep, stream valleys. More than 150 years of agriculture has eroded the uplands and deposited thick accumulations of fine-grained sediments in the valley margins. This post-settlement-alluvium (PSA)

or legacy sediment as it is sometimes called, is ubiquitous in small stream valleys such as Brown's Creek. The portal also has a survey implementation model that identifies the area as high site potential and has been poorly surveyed.

Field investigations: Field investigations were conducted on August 16, 2023, by the author, under the direction of Constance Arzigian, Principal Investigator. The project area is located in a wooded area near the Brown's Creek State Trail (Figure 9). The survey was conducted by walking along either side of the creek bank, and in the stream where it was feasible. The stream is fairly shallow and clear in most areas, so the stream banks and the stream bed could be surveyed by walking in the stream (Figure 10). Exposed banks were inspected for the presence of any cultural materials or evidence of a buried soil horizon and soil probes were placed in areas without good exposure.

The western half of the project area, west of Neal Avenue N., is located in a low, wider stream valley located southwest of higher hills and bluff margins. The stream bank is approximately three feet tall through much of this area. There is active stream meandering, old meander scars and pockets of wetlands throughout this area. Approximately 30 % of the banks were exposed, with visibility of the banks themselves being 50-100%. The exposed banks provided excellent visibility and discernibility, permitting the identification of any potential cultural materials or cultural horizons (Figure 11). Soil probes were also placed approximately 1.5-3 meters (5-10 feet) on either side of the stream at various points along the route to confirm the soils profiles noted in the cut banks. The general soil profile for the western half of the project area was a very dark gray to very dark grayish brown (10YR3/1-3/2) sandy loam with streaks of iron from saturation at about 60 cm (2 feet). All of the soil in the probes were moist to wet (Figure 12).

The east half of the project area, east of Neal Avenue N., is located in a narrower stream valley with fairly steeply sloped margins. In a few areas where it widened out there were cut banks with very good visibility. The stream bed was again visible and could be surveyed for artifacts. At the very eastern end of the project area the stream crosses under the old railroad bed, now the Brown's Creek State Trail.

In the historic air photos and in the field, there was evidence of past meanders. There are no mapped wetlands but areas along the project area were saturated, even with the lack of rain this summer.

The cutbanks and soil probes showed deep profiles with no soil horizon development. The primary soil profile noted throughout the project area was a very dark gray to dark grayish brown (10YR3/1-10YR3/2) sandy loam, interpreted as PSA. The amount of PSA depended on the depth of the cut bank or soil probe and had no visible stratigraphy in profile. No intact soil horizons were noted in the project area.

Figure 9. General setting for the west half of the project area, view northwest.

Figure 10. Example of clear, shallow nature of the creek.

Figure 11. Example of cutbank soil profile.

Figure 12. Soil probe from near center part of the project area. Iron staining near base of probe and soil saturated.

Results: The Brown's Creek project area is located in a moderately narrow stream valley. There is active erosion, with banks being undercut by the stream, providing excellent visibility for the survey. There are also areas of past and ongoing stream meandering and small wetland areas. Aerial photos dating back to 1938 show the stream moving across the project area, especially the central and

eastern half of the project area. During the field investigations extensive accumulations of PSA were verified throughout the project area. Both the stream banks, the stream bed, and soil probes were inspected for cultural resources and/or potential non-PSA soil horizons and none were observed.

Recommendations: The entire project area is within historic alluvial deposits, PSA. There are no previously identified cultural resources within or near the project area and none were found during this survey. 21WAac is a historic site of some kind mapped within the project area. The site is based on an 1874 map and there is no other information given. No historic resources were found during the survey. The nearest previously reported precontact sites are located over 0.5 miles away from the project area and are located on higher landforms. Based on these findings there is very little chance that if cultural resources ever existed within the project area that they would remain intact. Consequently, it is recommended that the proposed trout habit improvements go ahead as planned.

However, it is always possible that deeply buried materials, including human remains, may be encountered during the course of construction. If human remains are discovered, all work must cease in that area immediately, and the Minnesota Office of State Archaeologist must be contacted promptly.

Please let me know if you have any questions or need clarification regarding this report.

Sincerely,

Wendy K. Holtz-Leith

Wendy K. Holtz-Leith
Research Archaeologist
608-785-8455
wholtz-leith@uwlax.edu

References cited:

Andreas, A.T.

1874 Illustrated Historical Atlas of the State of Minnesota. Published by A.T. Andreas, Chicago, Illinois.

GLO Historic Plat Map Retrieval System

2023 Digital Public Land Survey plat maps images. Accessed online July 2023. http://www.mngeo.state.mn.us/glo/

USDA-NRCS Soil Survey Division (USDA-NRCS)

2023 Web Soil Survey. Accessed online July 2023 at https://websoilsurvey nrcs.usda.gov/app/WebSoilSurvey.aspx

University of Minnesota

2023 Minnesota Historical Aerial Photographs. Accessed online July 2023 at https://www.lib.umn.edu/apps/mhapo/

Attachments:
Office of the State Archaeologist, License No. 23-193
Research Permit Minnesota Department of Natural Resources Parks and Trails Division (Special Permit No. 2023)

MINNESOTA ARCHAEOLOGICAL SURVEY LICENSE APPLICATION

This license only applies to **Phase I survey fieldwork**[1] conducted under **Minnesota Statute 138.31-.42**[2] at the location listed below and during the **2023** calendar year[3]. Any archaeological investigation performed on publicly owned or managed (non-federal) land must have a licensed archaeologist associated with the project. Archaeological investigations include, but are not limited to, the following methodologies: assessing archaeological potential, mapping, geophysical studies, drone surveys, surface survey, shovel testing, coring, soil, chemical and biological sampling, augering, and excavation[4].

The Principal Investigator must have a separate license for each Phase I survey project. Each Phase II evaluation, Phase III major investigation, and burial site work must also be individually licensed. Only the individual indicated below is licensed as the principal investigator[5]. *The principal investigator is responsible for all work conducted by their employees, contractors, and subcontractors*[6]. The licensed individual (principal investigator) is responsible for reading, understanding, and complying with all Conditions attached to this license. Future licenses may be denied or revoked for failure to comply with this license, its conditions, professional ethics, or professional work standards.

Applicant Information

Name: Constance Arzigian

Institution/Agency/Company Affiliation: Mississippi Valley Archaeology Center

Title/Position: Senior Research Archaeologist E-Mail: carzigian@uwlax.edu

Address: University of Wisconsin-La Crosse, 1725 State Street, La Crosse, WI 54601

Work Phone: 608-785-8452 Cell Phone: 608-386-3682

Education/Qualifications

Name of Advanced Degree Institution: University of Wisconsin-Madison Degree: PhD

Department Name: Anthropology Year of Completion: 1993

Required documentation:

☐ Curriculum Vita and documentation of appropriate experience attached (*submit an updated CV annually*)

■ Up-to-date CV and documentation on file at the OSA

---

[1] The study of the traces of human culture at any land or water site by means of surveying, digging, sampling, excavating, or removing objects, or going on a site with that intent (MS 138.31 [Subd. 7])

[2] State archaeological licenses are required on publicly owned and managed (non-federal) land.

[3] January 1st through December 31st of a given year

[4] As technologies change, survey options increase. This list is not intended to be nor can it be comprehensive.

[5] The individual named on this license. The Principal Investigator is responsible for the methods, implementation, standards, results, and recommendations of all work conducted under this license.

[6] Any person or entity working for or under the Principal Investigator's direction or contract as part ofthis license.

License History

Year of most recent license: 2023

Type of License (survey, evaluation, etc.): survey License #: 23-105

Have you ever been denied an archaeological license? If not, check "NO" and leave this section blank.)

☒ No ☐ Yes; If yes, when:_____ Where:_____

Explain:

Contact Name:_____ Phone: _____

Email: _____

Curation

☒ Minnesota Historical Society #: 1031

☐ Other Approved Curation Facility Name:_____ #: _____

By signing this license application, I consent to the sharing of information submitted as part of the licensing process among the Office of the State Archaeologist (OSA), the Minnesota Historical Society (MHS), and the Minnesota Indian Affairs Council (MIAC). As the primary licensing agencies, OSA and MHS may share license application information with MIAC and Tribal Historic Preservation Offices (THPOs) as part of the tribal consultation process. I understand that the information shared with MIAC includes only the information I submit as part of the license application process. This consent expires upon completion of the above-stated purpose.

Signatures

Applicant: Constance Arzigian Date: 7/14/2023

Minnesota Historical Society Approval: _____ Date: 07/24/2023

Minnesota State Archaeologist Approval: _____ Date: 7-17-2023

LICENSE NUMBER: 23-193

MINNESOTA HISTORICAL SOCIETY

DEPARTMENT OF ADMINISTRATION
STATE ARCHAEOLOGIST

MINNESOTA ARCHAEOLOGICAL PROJECT INFORMATION

LICENSE #: 23-193

** IMPORTANT -This information will be shared with MIAC and tribal officials as part of the tribal consultation process.*

Applicant Information

Name: Constance Arzigian

Institution/Agency/Company Affiliation: Mississippi Valley Archaeology Center

Land Management

Type of Land: (check all that apply)

- [■] State-Owned or Managed
- [ ] County-Owned or Managed
- [■] Township/City Owned or Managed
- [ ] Other non-federal public (describe): _____

Dates

Dates of proposed fieldwork: July 24 to August 4, 2023 (ASAP)

Is the project within a recorded archaeological site? [✓] **Yes** [ ] **No**

If so, what are the site number(s)? 21WAac

Survey:

Location (attach a detailed map, and provide an address or Property ID #, and PLSS location):

The project area is located west of the city of Stillwater, south of CR 64 to just south of Brown's Creek State Trail. Portions of the project area are located in property owned by the City of Stillwater (parcel ID is 1903020410001), NE, SE of Section 19 T30,R20 and the Minnesota Dept of Natural Resources (parcel IDs 2003020320020, 2003020320023, and 2003020320018) NW, SW of Section 20, T30,R20.

MINNESOTA HISTORICAL SOCIETY

DEPARTMENT OF ADMINISTRATION
STATE ARCHAEOLOGIST

Name and purpose of the project, and proposed survey methods (attach pages if necessary) (400 word limit - attach additional pages if more space is needed.)

Brown's Creek Washington County: The survey will be conducted for trout stream habitat improvements and will examine banks for presence of cultural materials or intact soils other than post-settlement alluvium. Shovel test and probing as needed where there is insufficient bank exposure and to establish soil profiles. Both sides of the creek will be surveyed either from the bank or within the creek. The mapped location of 21WAac overlaps the project area. The site is based on historic Andreas documentation and there is no other information given in the OSA portal.

CONDITIONS OF MINNESOTA ARCHAEOLOGICAL SURVEY LICENSE

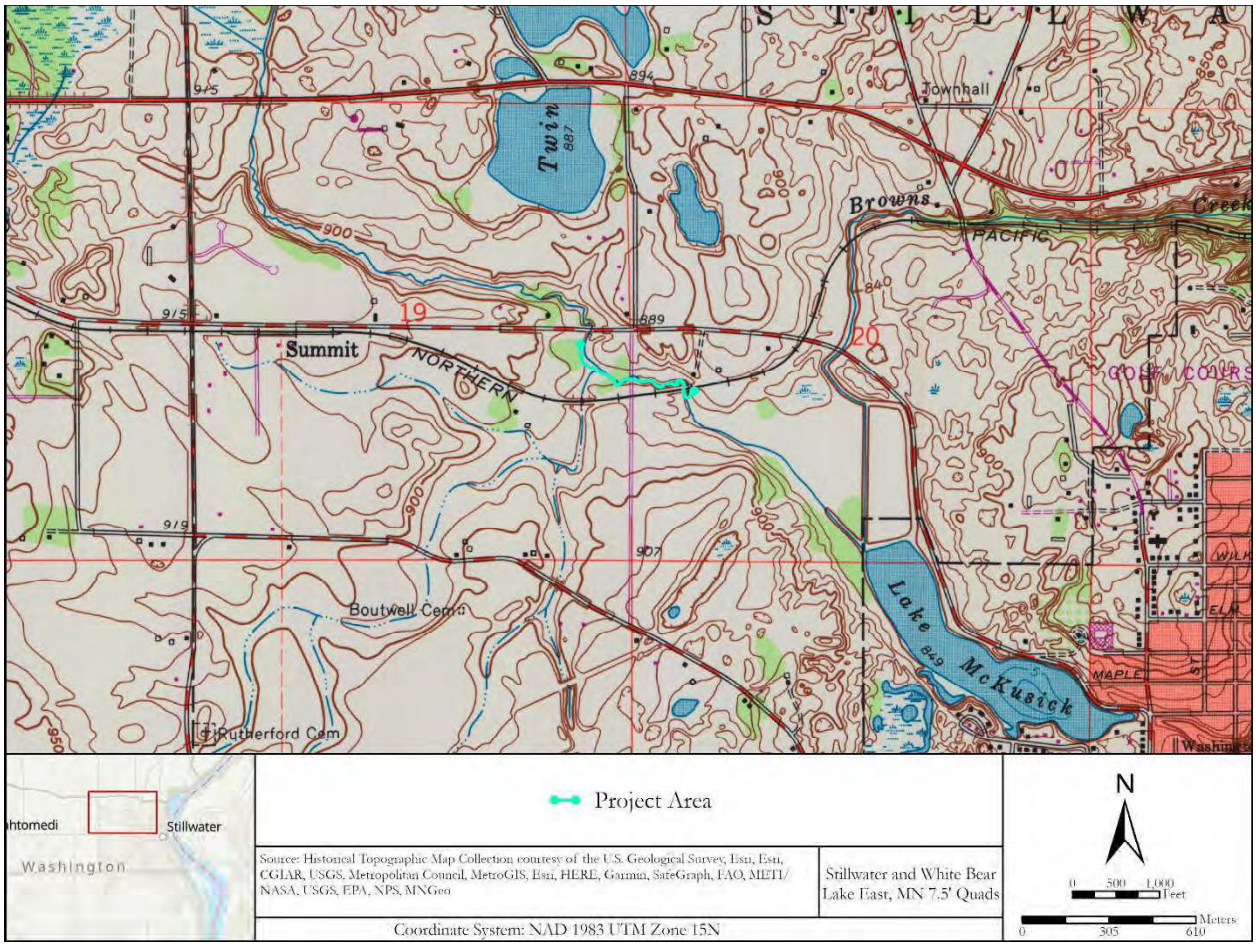
1. The licensed individual and the sponsoring institution/agency/company must comply with all the conditions attached to the license. If the licensee does not comply with these conditions, the license could be revoked and impact one's ability to obtain future licenses.
2. All information given on this license application is accurate and up to date.
3. The individual listed on this license is responsible for all work of their employees, contractors, and subcontractors.
4. A license can be denied for any of the following reasons: a) failure to meet the required professional qualifications standards, b) failure to possess the necessary regional, topical, or managerial experience, c) failure to fulfill the conditions of a previous license, or d) exhibiting unethical professional behavior, including, but not limited to falsifying field notes or reports, plagiarism, intentionally misrepresenting professional qualifications or experience, mishandling archaeological and site information or materials owned by the state per MS 138.37 (Subd. 1).
5. This license can be revoked or suspended by the State Archaeologist or the director of the MHS, or their agent, at any time for failure to fulfill the license conditions or for exhibiting unethical behavior such as listed above (4). Appeals of license denial, suspension, or revocation must follow procedures outlined in Minnesota Statutes 138.36, Subd. 6
6. As part of this license and in support of Executive Order 19-24, licensing information will be submitted to MIAC and tribal officials as part of the tribal consultation process. The licensee is strongly encouraged to continue consultation with MIAC and appropriate THPOs.
7. If the project area is within the boundaries of a reservation or Dakota community, archaeologists should directly communicate with the appropriate THPO or tribal cultural resource specialist regarding the proposed work.
8. If the project area is on Federal land, archaeologists should directly communicate with the federal agency regarding proposed work.
9. Under the provisions of Minnesota Statutes 138.31-138.42, the license applicant must be a Qualified Professional Archaeologist as specified in Minnesota Statutes (MS) 138.31, Subd. 10, and meet the Secretary of the Interior's Professional Qualifications Standards for Archaeology. The applicant must also possess the appropriate regional, topical, and managerial experience to undertake reconnaissance surveys.
10. This license only applies to Reconnaissance/Phase I archaeological surveys conducted on non-federal public lands in Minnesota. If more than two square meters of formal unit excavation or procedures that involve terrain disturbance (e.g., machine excavation) at a known site are planned, the principal investigator must consult with the Office of the State Archaeologist (OSA) before implementation.
11. This license does not authorize activities within cemeteries, per Minnesota Statutes 307.08. No ground disturbance within 50 feet of recorded cemeteries is allowed, without the prior approval of the State Archaeologist and the Minnesota Indian Affairs Council, in the case of American Indian cemeteries. If human remains or suspected burial-related items are encountered, all work must immediately cease, the remains or items left in situ, and law enforcement contacted (e.g., county sheriff). If the remains are not deemed a crime scene, the licensee must immediately contact the State Archaeologist.
12. This license only applies to fieldwork conducted between the dates specified on this license application.
15. This license applies only to the location specified on this license application.
16. If the licensee ceases association with the institution/agency/company before completing the project, immediately notify the OSA. The OSA and licensee or institution/agency/company

will develop a plan to fulfill reporting and curation obligations.

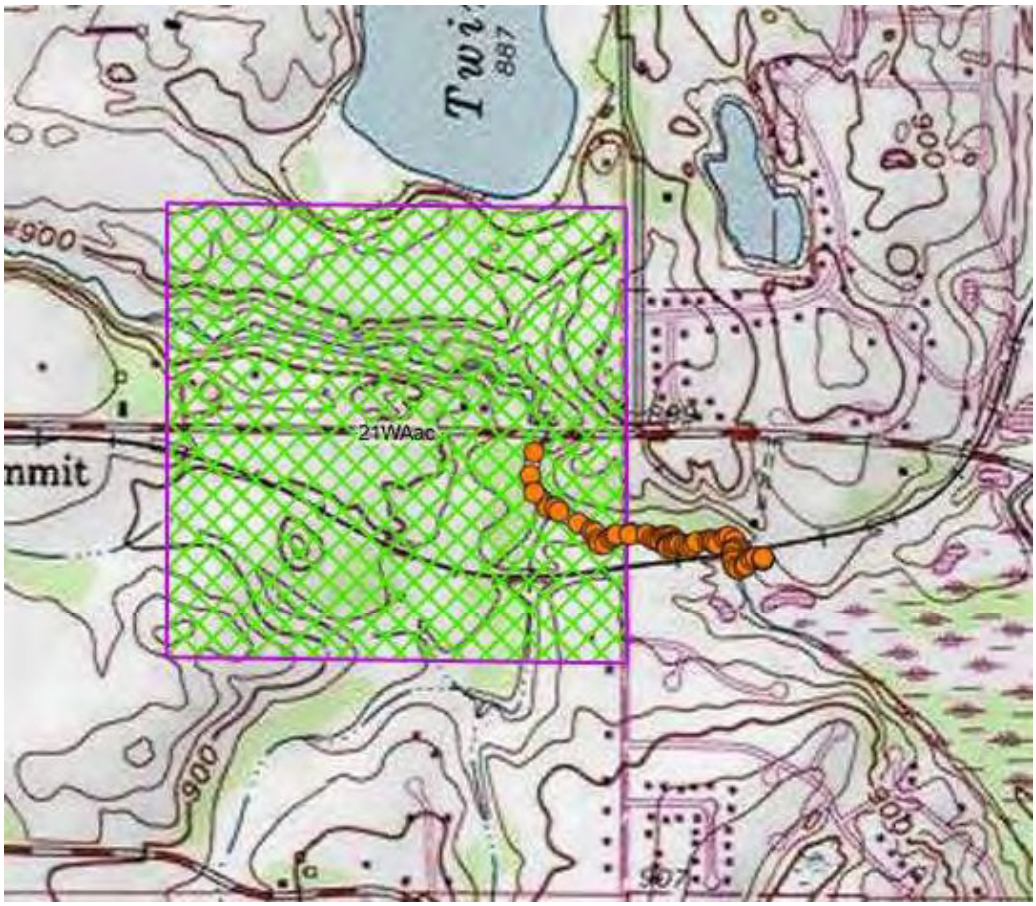
17. The license is non-transferable and applies only to work conducted under the direct supervision of the licensee.
18. The licensee must comply with the field, laboratory, and reporting guidelines in the *OSA Manual for Archaeological Projects in Minnesota*. Any exceptions must be discussed with the OSA before work occurs.
19. The licensee must obtain permission from the landowner or land manager to enter the land for archaeological investigations.
20. All archaeological materials and data recovered from non-federal public property in Minnesota are the state's property and should be curated with the MHS (http://www.mnhs.org/collections/archaeology/curation.htm), or other OSA approved facility.
21. If materials, samples, or data are being processed or analyzed by an entity other than that with which the principal investigator is associated, the principal investigator must notify the OSA and MHS.
22. If materials or samples are to leave the state of Minnesota, the OSA and MHS must approve the transport before materials, samples, or data leave the state.
23. Official OSA Minnesota site inventory forms must be completed for all archaeological sites identified during surveys (previously recorded and known sites). The site forms must be submitted to the OSA within three months of site discovery. Professional archaeologists are also ethically obligated to inform the OSA if previously unrecorded archaeological sites located outside their project boundaries are identified during their project survey.
24. One copy of the report (see *OSA Manual for Archaeological Projects in Minnesota*) must be submitted to the OSA for each project within six months of completing the fieldwork. The licensee may submit a written application requesting an extension of this deadline. Digital copies of reports are accepted as .pdf files.
25. If presentations or publications develop from this project, the OSA and MHS must be notified, and the following information submitted for inclusion in the archaeological site files:
    a. Location of presentation or publication,
    b. Date
    c. Title
    d. Abstract
    e. The final and complete version of the presentation, publication, etc.
26. The licensee must submit a summary report of all licensed activity to the OSA by the end of January of the following year. Summaries should include:
    a. project name and description (e.g., road construction),
    b. sponsor/review agency,
    c. location,
    d. type of work (Phase I, Phase II) and field methods (e.g., shovel testing),
    e. results (number of sites located/type of sites or official site numbers) and recommendations
27. Upon completing the project, the licensee must submit.shp files to the OSA. These files should show the project's Area of Potential Effect and archaeological survey areas, including the type of survey conducted in each survey area. Templates for submitting .shp files are at https://mn.gov/admin/archaeologist/professional-archaeologists/manuals-licenses/apply/. Please do not alter these templates.
28. Additional conditions may be added, as appropriate. If this occurs, the applicant will be notified of the update and asked to submit a response accepting the Condition.

29. Minnesota Department of Health and the Center for Disease Control recommendations regarding COVID-19 and limiting its spread. These recommendations include, but are not limitedto, social distancing, appropriate personal protective equipment (e.g., masking), and sanitation. This Condition does not supersede stricter landowner, agency, or employer restrictions. This Condition will remain in effect until state health officials determine that social distancing is no longer necessary.

I have read, understand, and agree to all Conditions attached to this license. ca _____(Initial)

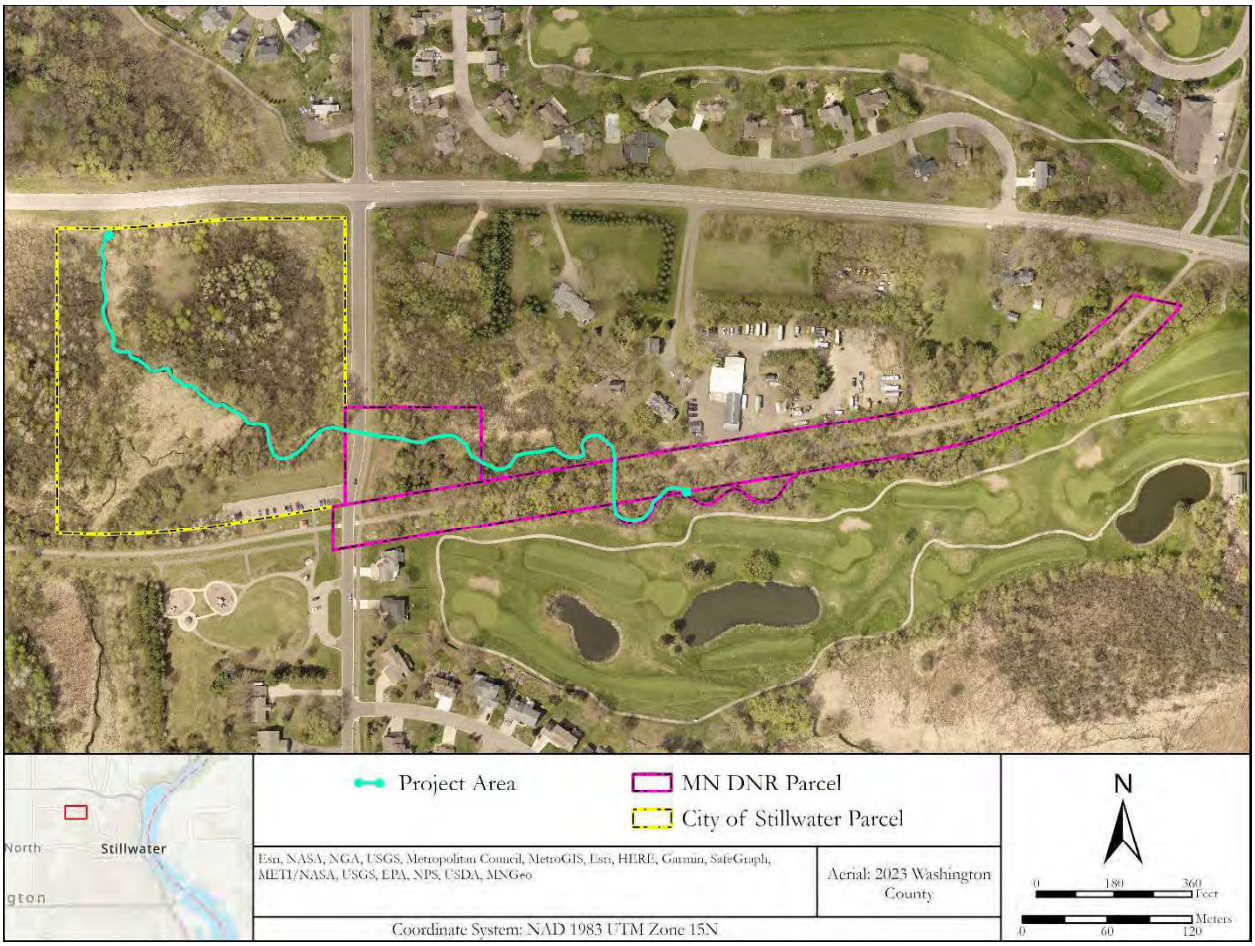


Project area on the Stillwater and White Bear Lake East, MN 7.5’ quadrangles.



Brown's Creek trout stream project area and 21WAac on Stillwater, MN 7.5' quadrangle.

Project area on current aerial.



Project area and parcel ownership.

DEPARTMENT OF NATURAL RESOURCES

Parks and Trails Division Research Permit

Special Permit Number: 2023

Date: August 9, 2023

Permission is hereby granted to:

The individual(s) listed below to do a project entitled **Archaeological investigations on Brown's Creek for proposed trout stream habitat improvements** as described in the research application. This permit applies only to those lands administered by the Parks and Trails Division listed below. The permittee is also subject to any other state or federal permits which may apply.

Permittee	Parks and Trails Unit	Unit Supervisor Contact Information
Constance Arzigian, Wendy Holtz-Leith	Browns Creek ST	Rachel Henzen, 651-259-5875 Rachel.henzen@state.mn.us

-Standard Conditions:

1) You must contact the unit supervisor to notify them when permitted activities are scheduled to begin.
2) The unit supervisor, or designee, may approve or disapprove where research activities may occur.
3) Permitted research activities must be carried out in a way that minimizes the potential to introduce, establish or spread invasive species.
4) Research locations may be subject to management actions such as prescribed burning, invasive species control, and timber harvest. Unless prior arrangements have been made with the unit supervisor, research locations will not be exempt from these actions.
5) Interim progress reports must be submitted annually by the end of the calendar year. A final report is also required at the conclusion of the research project. Please submit interim and final reports to Katie.immel@state.mn.us.
6) The permittee, or designees listed under this permit, must carry a copy of this permit when conducting research activities.
7) All markers, equipment, and other items used during the research must be removed at the end of the research project. Marking ribbons, stakes or similar items must be marked with the researcher's name and permit number.
8) You are using lands administered by the Parks and Trails Division at your own risk. You agree to take all necessary safety precautions to protect yourself, all designees listed under this permit, and the general public when conducting research activities.

9) You must comply with all applicable federal, state and local laws when conducting the work authorized by this permit. All Parks and Trails rules remain in effect except those necessary to be waived to conduct this research (MN Rule 6100.0100 – 6100.2400).
10) The ownership of any samples collected under this permit remains in the State of Minnesota, in its sovereign capacity for the benefit of all people of the state. Permittee shall not file any patent application covering any samples.
11) Permittee may retain the entire right, title and interest throughout the world to any invention derived or otherwise originating from the samples. With respect to any subject invention in which the permittee retains title, DNR and all political subdivisions of the state of Minnesota, and the providing Federal Agency if federal funding is involved, will have a nonexclusive, nontransferable., perpetual, irrevocable, royalty free license to practice or have practiced the invention for its governmental purposes throughout the world. The DNR shall also have the right to claim royalties resulting from any such invention, the royalty rate to be negotiated between the permittee and DNR upon disclosure of the invention, but in no event will the DNR's royalty rate exceed 50%.
12) The samples and any portions or derivatives thereof shall not be sold, assigned, transferred, or otherwise distributed from the custody of the permittee (i.e., shall not be shared with any other person or entity) without prior approval from the DNR, unless it is for the purposes of laboratory analyses specified in the study design and the laboratory collaborator does not retain any samples or portions or derivatives thereof after completing the analyses.

Special Conditions:

1) The researcher must have a license from the Office of the State Archaeologist before the project start date.

2) The researcher will provide archaeological GIS data/shapefiles from survey inside of the DNR boundaries to the DNR cultural resource team including excavation/shovel test locations, archaeological features and site boundaries.

3) Provide a copy of resulting report(s) to MnDNR cultural resources for review before submittal to other agencies.

4) All archaeological researchers are responsible for the curation of any cultural material collected during research.

5) Any professional and/or public presentations of data obtained through this research requires advanced notice of presentation title, date/time, and location. All required information and questions can be sent to PATCulturalRes.dnr@state.mn.us

This permit is valid from the date of issuance through December 31, 2023, but it may be revoked at any time.

SARAH STROMMEN, COMMISSIONER

DEPARTMENT OF NATURAL RESOURCES

By_

Philip G Leversedge

Parks and Trails Deputy Director

Cc: Resource Program Consultant, Regional Resource Specialist, District Resource Specialist, Unit Supervisor, Archaeologist (if applicable)

APPENDIX D – NHIS REVIEW LETTER FROM DNR

APPENDIX E – EAW COMMENTS AND RESPONSES

Brown's Creek Park EAW Comments and Responses to Comments
Dated completed: 01/03/2024

Organization / Person	Comment	Response to Comment
Minnesota Indian Affairs Council	The Minnesota Indian Affairs Council (MIAC) has completed the EAW for the proposed - Brown's Creek Restoration Project, Following review, the proposed project does not seem in any way to potentially damage or alter known cultural resources within the area. MIAC does not have any specific recommendations. For any questions or concerns regarding this review, please reply back to MIAC's cultural resource personnel.	Comment noted, no response needed.
Minnesota Pollution Control Agency	MPCA staff has reviewed the EAW and have no comments at this time. Requested that a notice of decision on the need for an Environmental Impact Statement.	Comment noted, notice of decision on need for an EIS forthcoming.
State Historic Preservation Office	We previously provided comments on this project in a letter dated November 3, 3023, to Mike Magner of the Minnesota Department of Natural Resources. We have reviewed the cultural resources survey letter report, Phase I Archaeological Survey for proposed trout stream habitat improvements on Brown's Creek, Washington County, Minnesota (August 19, 2023) as prepared by Mississippi Valley Archaeology Center. Based on the results of the survey, we conclude that there are no properties listed in the National or State Registers of Historic Places, and no known or suspected archaeological properties in the area that will be affected by this project. (SHPO also noted the potential need for historic-resource review under federal law.)	Comment noted. As noted in the EAW, the project will be supported by federal grant funds provided through the Minnesota Pollution Control Agency, and all applicable regulatory requirements will be addressed in obtaining permits for the project.
Metropolitan Council	Item 6. Project Summary: The EAW states "The project will also include the creation of an American Disability Act-compliant 'spur' off Brown's Creek State Trail to improve public access to the creek." No additional expansion of the existing fixed route transit network is planned given the current transit investments and surrounding development patterns. Increasing the availability of existing (non-fixed route) public transportation services within Stillwater may be an option.	Comment noted. The BCWD is working with the Minnesota Department of Natural Resources Parks & Trails to incorporate ADA-site access from Brown's Creek State Trail, and will note the opportunity for transit connections in working with the City of Stillwater on the project as well.
Metropolitan Council	Item 7. Climate Adaptation and Resilience: The EAW adequately addresses climate adaptation and resilience, including disclosure of potential climate hazards and impacts, with proposed on-site adaptations. The project will include reconnecting the creek with the floodplain, installing grade control riffles to limit channel incision, installing woody material and boulders for instream habitat, removing woody invasive species, and reestablishing native riparian vegetation. The project would restore stream pattern and dimension to better accommodate flood events. The project proposes planting native vegetation to provide deep rooted vegetation to stabilize the creek, which would improve resiliency of the creek. Reconnecting the floodplain will slow flood waters and allow the water to spread out over a wider area, thereby decreasing flood energy and bank scour. These are all best management practices for stormwater management over the long-term. The project's nature and scale appears to reduce on-site vulnerabilities related to potential climate hazards (extreme heat and localized flooding).	Comment noted. No response needed.
Metropolitan Council	Item 10. Land Use: The EAW does not acknowledge the future land use guidance of the parcels. It should note that the western parcel has a future land use guidance of "Park, Rec, or Open Space" and that the eastern two parcels have a future land use guidance of "Medium Density Residential." Additionally, the parcel owned by the DNR (PIN 2003020320020) has a future land use guidance of Medium Density Residential; however, on page 14, the EAW indicates that this area will remain as open space. The City will need to submit a comprehensive plan amendment in the future to reflect that change in the City's 2040 Plan. Similarly, the noted RA zoning for the eastern two parcels does not align with the parcels' Medium Density Residential land use guidance. Minn. Stat § 473.865 requires that planned land use and zoning be reconciled.	Comments noted. EAW text will be updated to reflect the future land use guidance as specified in the comment provided. BCWD also will work with the City of Stillwater on the project under terms that will be captured in a cooperative agreement between the parties. While BCWD will confirm that the project is consistent with the city's long-term land-use planning and zoning, Stillwater will retain decisionmaking authority and responsibility for compliance with applicable statutory requirements.

Metropolitan Council	Item 18. Greenhouse Gas (GHG) Emissions/Carbon Footprint: The GHG emission sources for this project include the operation of construction equipment, and tree and brush removal during the conversion of forest to prairie/wetland. Total emissions from construction equipment were estimated at 37.01 tons of carbon dioxide equivalents (CO_2e) which were calculated using the appropriate global warming potential for each GHG and the appropriate unit conversion factor. Land use conversion from forest to grassland is the second category of emissions from the project. It is estimated that select tree harvest proposed for the project will remove approximately 80% of the trees from a 2.02-acre area, which is equivalent to 1.62 acres of forest converted to grassland. The average carbon loss per acre for conversion from forest to grassland would be an estimated loss of 14.81 tons of CO_2e per acre converted, which equates to 24.00 tons for the proposed land conversion. However, all harvested trees and brush will be reincorporated into the project for stream and floodplain habitat enhancements, which is assumed to be a carbon sink. As a result, the total potential project-related emissions are estimated at 37.01 tons of CO_2e. In summary, the project will reduce the potential for bank erosion through bank reshaping and reconnection of the floodplain. Establishment of diverse, native vegetation will increase sequestration of carbon through the dense growth of plants and subsequent storage of carbon in the soil through the root systems. The project, as proposed, does not have the potential for significant environmental effects based on the type, extent and reversibility of impacts related to emissions of greenhouse gasses which are reasonably expected to occur.	Comment noted. No response needed.
Minnesota Trout Unlimited	No specific comment on EAW; statement of support for the proposed project.	Comment noted, no response needed.
Washington County	Ensure traffic control for access off the County Road; access should be via Neal Ave if possible. If not, possible access should meet the county road at a 90-degree angle.	Proposed access to project area west of Neal will be off McKusick Road to limit impacts to existing wetlands. Access to the project area east of Neal Ave will be off Neal Ave.
Washington County	There is the possibility of a future pedestrian underpass under the county road. This is an area that pedestrians want to cross to reach Brown's Creek Trail, and the steam culvert is a promising location elevation-wise. Would a trail along the creek ever be plausible, and is it compatible with the work being done?	A trail along the creek from an underpass under the county road is not compatible with soft soils associated with seepage wetland in the area.
Washington County	The project will need to protect the existing curb and gutter, storm sewer outlets, and guardrail.	Comment noted. Coonstruction plan notes and contract requirements will ensure all existing infrastructure is protected.
Washington County	While the disposal site is located on the City of Stillwater property, this location would make for a good stormwater management basin for a future project.	Comment noted. The proposed spoils area is a disturbed upland meadow that appears have been filled previously, based on notes from members of the Technical Advisory Committee for the project. Hauling soil off the project site would incur significant cost to the project. This site would have limitations as a stormwater managment basin given the proximity to a cold-water trout stream. BCWD would be willing to discuss project specific ideas to determine feasiblity.
Washington County	We find the Brown's Creek Restoration Project EAW in general alignment with the Washington County Groundwater Plan. In particular note, we appreciate considerations taken for habitat protection/securement at various trophic levels and for planning efforts to increase long-term native species' and floodplain resilience.	Comment noted, no response needed.
Washington County	This project is within the Browns Creek Central High Priority Area of the Washington County Land and Water Legacy Program Top Ten Priority Areas. The county appreciates the effort to restore critical water resources in this area. This project is aligned with the goals of the Land and Water Legacy Program and has taken the necessary precautions to maintain best stewardship practices.	Comment noted, no response needed.
Minnesota Department of Natural Resources	Page 7, Project Description. We support the Brown's Creek Restoration Project that connects the incised channel with the floodplain and reconnects several oxbows.	Comment noted, no response needed.
Minnesota Department of Natural Resources	Page 12, Permits and Approvals. Please submit the floodway no-rise certificate to the DNR as part of the public waters work permit application.	Comment noted. The no-rise certificate is in development and will be provided once complete (expected by January 15, 2024).
Minnesota Department of Natural Resources	Page 14, Geology. This section states that there are no susceptible geologic features in the project area. Please be aware that a portion of the project area is mapped as a region prone to surface karst feature development, and that natural springs and seeps have been documented extensively throughout the project area. Great care should be taken if karst features are encountered during construction to avoid contamination groundwater.	Comment noted. We will preserve any surface karst features encountered including spring seeps and springs. There are construction plan call outs that depict the locations of springs and seeps identified in the project area.
Minnesota Department of Natural Resources	Page 17, Stormwater. Please be sure that all requirements regarding state-listed species from the Natural Heritage letter are incorporated into the SWPPP and construction plans. Please use only appropriate BWSR-approved native seed mixes, and do not apply fertilizer. Wildlife-friendly erosion control materials are required.	Comment noted. Requirements regarding state-listed species from the Natural Heritage Review Letter will be incorporated into the stormwater pollution prevention plan and construction plans as noted. In addition, the project specifications include state-approved seed mixes, and no fertilizers are proposed. The existing construction plan includes requirements for wildlife-friendly erosion control materials.

Minnesota Department of Natural Resources	Page 19, Rare Features. This section should discuss that a Natural Heritage letter was issued on May 9, 2023 and include it in the appendix. Please see the attached Natural Heritage letter and include it with DNR comments in the Record of Decision. It contains required avoidance measures for the state-threatened Blanding's turtle. The Natural Heritage letter also recommends a rare plant survey be conducted. This section of the EAW does not mention that state-threatened Tubercled rein orchid (Platanthera flava var. herbiola), has also been documented in the vicinity. Please refer to the Natural Heritage letter for further direction on the rare plant survey process.	The May 9, 2023 letter addressed to Aaron DeRusha was in response to a potential Conservation Partners Legacy Program grant for a larger project area than is proposed under the EAW for Brown's Creek stream restoration. Removal of invasive species from City of Stillwater property may be undertaken in the future, under a separate scope of work. As stated in the EAW, "A review of rare features for a one-mile search area around this project boundary was conducted using the Natural Heritage Information System database. No state-listed endangered, threatened, or special concern species were identified within the project site, but three state-listed species were identified within one mile of the project boundary, including Louisiana waterthrush (Parkesia motacilla), Blanding's turtle (Emydoidea blandingii), and water-willow (Decodon veticillatus var. laevigatus)." The difference between these reviews was that for our smaller project area, tubercled rein orchid and Goldie's fern were not found within one mile. It should be noted that the BCWD engineer has a NHIS license (LA-1068) and submitted a project-specific MCE (2023-00785) for review on October 13, 2023; no response has been provided to date. Blanding's turtle avoidance measures will be required in the construction plans and specifications.
Minnesota Department of Natural Resources	Section 14.c. Impacts to Ecological Resources. The project proposes increases in floodplain connectivity and infiltration in the riparian and upland habitats. Some questions still remain that should be addressed in this section: **a**. What method will be used to limit compaction or remedy areas of soil compaction following construction? **b.** Where any considerations made regarding aquatic organism passage through the box culvert? **c.** What method will be used to remove black locust to prevent a flush of black locust sprouts or seedlings? **d.** What method(s) will be taken to remove common buckthorn, glossy buckthorn, and exotic bush honeysuckle to limit resprouting and subsequent ongoing maintenance? **e.** We recommend that vegetation management include control of Sandbar Willow (Salix interior) migrating into the project area.	**a:** Soil compaction to be addressed through soil scarification/decompaction methods after construction and before seeding and final soil stabilization. **b:** Yes, the proposed project includes installation of constructed riffles downstream of the box culverts to raise the creek bed and increase the baseflow water elevation specifically to allow fish passage through the culverts. **c:** Cut stump treatment will be used on black locust and any other woody invasive species, and the project will include an post-construction vegetation-maintenance plan that will include followup treatments of resprouts. **d:** Same method as described under c. **e:** We will add sandbar willow to the list of species to manage as part of the vegetation-management plan.
Minnesota Department of Natural Resources	Project Design. As the project designs are finalized, DNR would like more information on how key features were determined in the design of the new stream channel, and offers the following questions and comments: **a.** What are the general stream widths and bankfull height in the design? **b**. Are all the constructed riffles grade control? Will some riffle material be mobile at bankfull to migrate downstream to the next riffle? This application may be limited by the sediments migrating in from upstream. Hopefully, the efficient channel will recruit some gravels into the project area. **c.** Will the project consider additional roughness across channel plugs to limit cutoffs occurring in the near term? Consider using remaining woody material that can be placed/partially buried onto the newly created floodplain. **d**. There may be an opportunity/benefit for BCWD and DNR Fisheries to coordinate management of the Aquatic Management Area (AMA) so the subsequent handoff of project and benefits can continue within the Brown's Creek AMA. **e.** With the added sunlight herbaceous wetland vegetation should do well in this area.	**a:** general stream width (minimum toe to toe width) is 9 feet (refer to Sheet 26, detail 1/26), bankfull height above baseflow water elevation is 1.8 feet per multiple details on Sheet 24. These dimensions are based off reference reach data collected upstream and downstream of the project area. **b:** Yes, all constructed riffles will act as grade control, but note the details shown on Sheet 26 (detail 2/26) call out the use of existing native gravel within the void spaces of the constructed riffle and over the riffle surface to emulate natural conditions. Some of these gravels are anticipated to be carried downstream to the next riffle during bankfull or greater flows. The reduced channel width should improve fine sediment transport and minimize embeddedness of coarse substrates in the channel. **c:** Yes, all channel plugs are being protected by woody material and toewood to prevent cutoff of oxbow channels. However, the project is located in a Zone AE floodplain which means certification of no-rise of the 100-year flood will be required. This will limit the ability to manipulate floodplain roughness. **d:** Comment noted; BCWD will work with DNR staff to coordinate long-term management of the Aquatic Management Area. **e:** Agreed.