July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at:
http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title:** Big Lake Flood Risk Reduction Project

2. **Proposer:** Bois de Sioux Watershed District
   Contact person: Jamie Beyer
   Title: Administrator
   Address: 704 Hwy 75 South
   City, State, ZIP: Wheaton, MN 56296
   Phone: 320-563-4185
   Fax:
   Email: bdswd@runestone.net

3. **RGU:** Bois de Sioux Watershed District
   Contact person: Jamie Beyer
   Title: Administrator
   Address: 704 Hwy 75 South
   City, State, ZIP: Wheaton, MN 56296
   Phone: 320-563-4185
   Fax:
   *Email:*bdswd@runestone.net

4. **Reason for EAW Preparation:** (check one)

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

   If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):
   4410.4300, subpart 27(A), Public waters, public waters wetlands, and wetlands

5. **Project Location:**
   County: Grant
   City/Township: Herman
   PLS Location (¼, ¼, Section, Township, Range): NW1/4 NW1/4 S18 T127 R43W (Outlet for Big Lake)
   Watershed (81 major watershed scale): Mustinka River Watershed
   GPS Coordinates: 45°48'57" N 96°07'33" W (channel coming out of SW side of lake)
   Tax Parcel Number: 10-0073-500, 10-0074-500, 20-0424-000

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

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

Figures

Figure 1: Project Location
Figure 2: Project Site (USGS Topo)
Figure 3: Project Site Detail
Figure 4: Public Lands
Figure 5: Water Resources
Figure 6: Wetlands of Interest

Attachment

Draft Operation and Maintenance Plan – Big Lake Outlet

6. Project Description:

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

The Bois de Sioux Watershed District (BdSWD) proposes to install a water control structure on the west end of Big Lake to manage water levels and provide flood risk reduction for the City of Herman and downstream lands and communities, while enhancing natural resources within Big Lake.

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

Project Location

Big Lake (290 acres) is located one mile northeast of the City of Herman in Grant County, Minnesota (T127N R43W Sections 13 and 18) (Figures 1 and 2). The lake is located within the Fivemile Creek Watershed, a tributary to the Mustinka River which discharges to Lake Traverse. The project area includes Big Lake (Public Waters #26-0194) and the drainage channel that serves as the natural outlet to the lake. The drainage channel flows southwest from the lake through a culvert under MN State Highway (Hwy) 27 and continues toward the City of Herman. The project area also includes wetlands adjacent to Big Lake that may be impacted by the project from water level management activities.

Project Purpose

The purpose of the project is to provide additional flood storage, resulting in downstream flow reduction and flood risk reduction for the City of Herman, agricultural lands, farmsteads, and roads. The Red River Basin Commission (RRBC) Flood Damage Reduction Strategy identifies goals for creating distributed watershed storage including gated storage in late contributing areas of the Red River Valley, and releasing the volume once the downstream flooding has subsided. The project will contribute to meeting these flood storage goals that are supported by both the BdSWD and Red River Watershed Management Board (RRWMB). The project will also result in enhancements to wildlife habitat, and submergent and emergent vegetation within the Big Lake basin.

Background

The BdSWD, RRWMB, and RRBC support a Flood Damage Reduction (FDR) Strategy (BdSWD, 2013) that identifies three major options in the Red River Valley of Minnesota for reducing flows and increasing flood storage to reduce the risks of flood damage to property and public infrastructure. The three options include gated impoundments, culvert sizing, and land use changes within three hydrologic timing zones in the watershed: early, middle, and late, which indicate flood flow contribution to the Red River Valley in Minnesota and the Bois de Sioux Watershed. According to the FDR Strategy, water in the late areas, such as Big Lake, should be slowed and/or stored until downstream areas can handle the increased volume of water, making the late areas a good location to implement projects that temporarily detain water. High water levels have reduced the natural flood storage capacity of the lake.

The 1997 spring flood was a significant flood within the City of Herman, which initiated additional discussion for flood damage reduction efforts. In response to this flooding, the City took steps to evaluate potential projects that would reduce the risk of flooding associated with Big Lake discharges. The City also evaluated their stormwater system and made improvements to increase the system capacity to better accommodate upstream watershed flows through the City. However, the combined capacity of the stormwater system improvements is less than the desired capacity to handle a 100-year event, and therefore, the BdSWD identified a flow reduction opportunity that utilizes Big Lake to further reduce the flood risk to the City of Herman. Additionally, Big Lake has been dominated by algae (Minnesota Pollution Control Agency, 2011) with limited emergent vegetation in isolated shoreline areas in recent years. High water levels have been perpetuating the undesirable water quality and lack of wildlife habitat value.

Alternatives

Discussions about water level management for Big Lake between the BdSWD, state and federal agencies, landowners, and other potential project partners have been ongoing for a number of years. In 2005, Ducks Unlimited completed a design report for the Big Lake outlet project (Ducks Unlimited, 2005), but the project was not built at that time. In 2013, the BdSWD submitted a permit application to the Minnesota Department of Natural Resources (DNR) for a water level control structure on Big Lake, which included a 2011 Engineer's Report. This initiated DNR's involvement with the project planning process. Since that time, there have been numerous discussions, which have primarily focused on drawdown elevation, flood storage elevation and the potential impacts to wetlands and adjacent landowners.

Alternatives have focused on the ability to lower the pre-flood lake levels below the natural runout elevation, which will provide temporary flood storage and flow reduction during times of heavy runoff. Alternatives focused on flow reduction, rather than techniques that would simply push the problem downstream. The most efficient way to reduce flow for a targeted location is to locate the flood storage as close to the protection location as possible. The further storage is located from the protection area, the greater the volume of storage that is needed to accomplish the same level of flow reduction. The more volume that is constructed, the greater the impacts. Big Lake is located near the City of Herman, it is a natural basin, and it offers the potential for wildlife enhancements. These are the primary reasons why Big Lake was chosen as the location to create flood storage. Understanding the existing conditions for Big Lake has been a key component in the evaluation of alternatives. The following elevations were used as a starting point for evaluating alternatives for an outlet control structure and its associated operation.

Elevation*	**Description**
1067.8	Approximate bottom of Big Lake determined by the Ducks Unlimited Report
1075.7	Existing Natural Runout Elevation of Big Lake
1077.4	Ordinary High Water Level (OHWL) set by DNR
1079.5	Peak 100-year Runoff Pool Elevation (starting pool elevation of 1075.7)

*Note: All elevations in this EAW are based on NAVD88 datum

Initial discussions focused on drawing the lake level down approximately three feet below the natural runout elevation as a fixed elevation for Big Lake, and occasionally manipulate water levels above or below that level to manage the lake (e.g., vegetation management) and provide flood storage benefits. However, there were concerns that in some years when water levels would be held higher to control vegetation, there would be less flood storage available. Water levels could also be lowered to allow for vegetation reestablishment, which would also provide more flood storage, which would be useful for summer flooding. However, when flood risks are greatest in the spring, the BdSWD needed assurance that the starting elevation would provide enough flood storage to reduce flood risk downstream, and this alternative did not provide that assurance.

A number of project design alternatives have been considered and evaluated. These alternatives evaluated the feasibility and outcomes relative to increasing storage capacity of Big Lake and managing downstream flows. The primary alternatives evaluated included:

- Embankment construction to allow lake levels to bounce higher than the natural runout elevation;
- Various outlet structures and associated runout elevations;
- Flow discharge to the existing channel or to an underground pipe that would outlet to the City stormwater system downstream; and
- Combination of different elements of each of these alternatives.

Several primary criteria were used to evaluate and modify the alternative designs to determine the proposed project. These criteria included potential downstream impacts, flooding to surrounding lands, impacts to wetlands, permitting feasibility, and ability to achieve flood storage and manage peak flows to meet the project's purpose and need.

Proposed Project Description (All Elevations in NAVD 88 Datum)

The proposed project will install two water control structures on Big Lake: one on the western side near the natural outlet, and one on the southeastern side near the natural inlet. The western control structure will allow water levels in the lake to be temporarily lowered to increase flood water storage (Figure 3). This control structure will include an inlet pipe with a grate that extends far enough into the lake to get past the shoreline fringe cattails. A lake basin inlet channel will convey flows to the inlet pipe. Within the structure there will be a weir wall that includes flashboards and a gated orifice. There will also be an outlet pipe extending from the control structure through State Highway 27 to an existing downstream channel. The existing channel will be graded and shaped from Big Lake to the City of Herman. Riprap will be used where necessary to stabilize areas of high velocity and steep slopes. The southeastern control structure will control flows into Big Lake and manage water levels in the Art Hawkins Waterfowl Production Area (WPA). The purpose of the southeastern control structure is to prevent the Big Lake outlet structure from impacting wetlands associated with the WPA.

The project will provide up to approximately 730 acre-feet (1.3 inches of runoff) of gated flood storage between the natural runout elevation of 1075.7 and the proposed maximum drawdown of 1072.7. The project will also allow for better vegetation management, potential wildlife habitat, and water quality benefits.

Water Control System

The outlet water control structure is comprised of three main components: inlet pipe with grate, internal weir wall with flash boards, and gated outlet pipe. Upstream of the inlet pipe, there will be a V-shaped lake bottom inlet to convey flows toward the outlet control structure. The lake bottom inlet, approximately 100 feet long and 3 feet deep, will require grading of the lake bottom and riprap placement or other erosion/sedimentation control along the bottom of the channel. This shallow channel will direct water toward the inlet pipe of the control structure in order to manage the water levels as desired for the project.

The control structure will be placed on the downstream (western) side of Big Lake near the natural outlet and will allow the lake elevation to be managed below the natural runout elevation. The control structure will not provide control above the natural runout. Preliminary concepts for the control structure resemble a concrete box or corrugated steel riser with an internal weir wall with flash boards and gated orifice for water level management. The structure will add temporary flood storage by lowering the elevation of Big Lake below the natural runout, not by adding storage above the runout elevation.

The highest flash board control of the internal structure wall will be set at 1075.7, the runout elevation. The top of the internal weir wall, meaning all flash boards removed, will be 1072.7. A 24-inch gated orifice on the outlet pipe will have an invert elevation of 1072.7. The flashboards will be the main tool for controlling the elevation of Big Lake below the runout elevation, and the gate will be the main tool for controlling flow out of the structure.

A buried 24-inch HDPE outlet pipe of approximately 1,200 feet in length will be installed from the structure downstream through State Hwy 27 and outletting into the existing private channel.

This channel ultimately outlets into the existing stormwater system in the City of Herman. The water will then flow through the stormwater system.

A the southeastern control structure will be placed at the natural inlet of Big Lake, which flows from the WPA through three centerline culverts under State Hwy 27 into the lake. The three centerline culverts from east to west have the following invert elevations, respectively: 1074.9, 1072.7, and 1076.6. The eastern and middle culverts are set below the natural runout elevation of the lake (1075.7), while the western culvert is above the natural runout elevation. The southeastern control structure will include flashboards, or similar, and be managed by the U.S. Fish and Wildlife Service (USFWS).

Downstream Channel

The existing drainage channel downstream of Big Lake will be altered to stabilize the channel bottom and side slopes. The 1,200 feet of 24-inch HDPE pipe will be placed underground, via trenching, adjacent to the existing channel from the outlet structure to the downstream side of State Hwy 27. The construction area for the pipe installation is cultivated agricultural land. The area between the control structure and State Hwy 27 (cultivated agricultural land) will have disturbance from installation of the pipe and other project components. On the downstream side of State Hwy 27 the pipe will outlet to the existing private drainage channel. This private channel will be shaped and graded as necessary to match the elevation of the pipe. Additionally, riprap will be placed in the channel where necessary to stabilize areas of high velocity and steep slopes, resulting in a more long-term stable channel upstream of the City stormwater system.

Landownership and Right-of-Way

There are a total of nine landowners with land immediately adjacent to project activities (Grant County Assessor's Office, 2020). There are six private landowners adjacent to Big Lake, the State of Minnesota, the USFWS (Figure 4), and one private landowner between State Hwy 27 and the City of Herman. Through their authority under Minnesota Statute 103D, the BdSWD will acquire easements for the project prior to permitting and construction. Easements along the downstream channel between Big Lake and the City of Herman will be acquired to allow for future maintenance and potential channel cleanouts.

Construction

Project construction is planned for the fall of 2021 and is anticipated to take one construction season. Construction hours will typically occur between 8:00 a.m. and 5:00 p.m. Monday through Saturday over approximately three months. Underground pipe will be installed by open cut excavation except for a boring through MN State Hwy 27. The open cut excavation will range in depths up to 10 feet with a trench width up to 20 feet wide. Except for areas of regrading and ripraps installations. All areas disturbed during construction will be restored to preconstruction conditions with the exception of slope stabilization in the channel, which will require placement of riprap. Once the outlet infrastructure is installed, the elevation of Big Lake will be drawn down in accordance with Minnesota Rule 6115 and the operation and maintenance plan.

Operation and Maintenance

A draft operations and maintenance (O&M) plan (Attachment A) has been developed for the project that outlines the key project elevations. The elevations were used to determine an appropriate operational plan to achieve flood reduction by controlling peak flows, while providing for vegetation benefits and minimizing environmental impacts through specific design features and placement of the control structure. The following table provides a summary of the proposed project operation. A separate O&M plan will be developed by the USFWS for the southeastern control structure associated with the WPA.

General Season	Operation	Flash Board Elevation	Earliest Date	Latest Date	Notes
Early Winter	No active drawdown (Gate is closed during this time)	1074.2	October 1	Spring snow melt begins	Check structure and monitor lake levels
Winter	Commence Winter Drawdown (Remove all flashboards and open gate)	1072.7	When 3-inch snow-water equivalent is met or exceeded	Spring snow melt begins	Only occurs with 3-inch snow-water equivalent within snowpack Will not occur if in dry cycle or if it poses a significant threat to downstream flooding
Late Winter/ Early Spring	End Winter Drawdown (Close gate and replace all flashboards)	1075.7	Lake level reaches 1072.7	Spring snow melt begins	End as close to desired lake level of 1072.7 as feasible if there is a winter drawdown
Spring - Summer	No active drawdown. (Gate closed)	1075.7	Spring snow melt begins	August 1	Lake level will naturally fluctuate depending on precipitation and other water inflow.
Late Summer	Commence Late Summer/Fall Drawdown (Remove flashboards to 1074.2 and open gate)	1074.2	July 25	August 1	In case of dry year, check water levels before commencing drawdown.
Fall	End Late Summer/Fall Drawdown (Close gate and flashboards will remain at 1074.2)	1074.2	October 1	October 8	Check lake levels, and end drawdown with consideration for wildlife use in fall and before sustained freezing temperatures.

The current natural runout elevation of Big Lake is 1075.7. The proposed operation of the project is to keep the control structure sluice gate closed until late summer, which will allow the lake

level to naturally fluctuate from the natural runout elevation of 1075.7 (MNDNR, 2018). Drawdown below 1075.7 would be conducted annually each late summer/early fall. As detailed in the Operations and Maintenance Plan (Attachment A), the minimum annual summer/fall drawdown would be 1.5 feet below the natural runout elevation to 1074.2 and the maximum spring drawdown would be up to three feet below the natural runout (i.e., 1072.7 (with gate open and all flashboards removed)). The amount of drawdown would be dictated by snow water equivalent conditions.

Prior to the spring snowmelt runoff, the 24-inch sluice gate will be closed which would assure that the 24-inch outlet pipe remains out of operation. However, the natural runout of 1075.7 would remain unimpeded by the project. During the spring runoff event, the lake will temporarily bounce based on the variable volume and rate of runoff, but it will have a lower starting elevation than in the past due to the drawdown. After the spring runoff event, the lake is anticipated to naturally drain back down toward the natural runout of 1075.7. It should be noted that all the water levels will naturally fluctuate based on precipitation and other potential sources. The project will not maintain a constant lake level elevation.

During the annual summer/fall drawdown, which will begin approximately August 1, the lake will be gradually drawn down to an elevation of 1074.2. This is 1.5 feet below the natural runout elevation of 1075.7, and is anticipated to take approximately 60 days depending primarily on precipitation. The lake will remain drawn down through the winter. Per the O&M Plan, an annual work group will meet during the winter to review lake data and determine if a winter drawdown is feasible. If during the course of winter, three inches or more of water in the snowpack of the contributing watershed is observed, the lake will be drawn down another 1.5 feet to 1072.7. Under normal operations, the project will provide approximately 730 acre-feet (1.3 inches) of gated storage between the lowest drawdown elevation of 1072.7 and the natural runout elevation of 1075.7.

After the winter drawdown, the project gate will be closed, and Big Lake will be allowed to function solely through its natural outlet. Drawdowns are not allowed by Minnesota Rule 6115.0271, part C, item 4 to occur for longer than two years, and therefore, the proposed project operation will stay in compliance with the regulatory requirements.

The BdSWD will be responsible for all monitoring and maintenance of the project, such as recording pool elevations three times per year (e.g., August 1, freeze-up, and March 1), removal of debris and pipe cleanouts, regular maintenance, emergency repairs, and notification of landowners.

The draft operation and maintenance (O&M) plan are provided in Attachment A.

c. *Project magnitude:*

Total Project Acreage	17 acres
Linear project length	1,200 feet (outlet pipe)
Number and type of residential units	0
Commercial building area (in square feet)	0
Industrial building area (in square feet)	0
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	0
Structure height(s)	approximately ground level

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

The purpose of the project is to provide additional flood storage, resulting in flood risk reduction for the City of Herman, downstream agricultural lands, structures, and roads. The RRBC Flood Damage Reduction (FDR) Strategy identifies goals for creating distributed flood storage throughout the Red River watershed including gated storage in late contributing areas, and releasing the volume once the downstream flooding has subsided. The project will contribute to meeting these flood storage goals that have been supported by the BdSWD and RRWMB. The project will also result in enhancements to wildlife habitat, and submergent and emergent vegetation within the Big Lake basin.

Big Lake has experienced abnormally high water levels during the recent wet climate cycle. The abnormally high water level of the lake has reduced the natural flood storage volume of the basin. As a result, peak flows discharging from the basin are excessively high, especially during spring snowmelt runoff events. This situation results in an increased flood risk for downstream landowners, road authorities, and the City of Herman. There are also frequent flooding problems along the natural and man-made channels downstream of Herman, particularly Grant County Ditch 8. The proposed project is also a component of the BdSWD FDR Strategy for reducing overall flood flows within the watershed and Red River Valley.

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

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

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

This table shows the predominant land cover types (2016 National Land Cover Database Multi-Resolution Land Characteristics, 2016) within 50 feet of the project construction site for the

control structures and outlet pipe. The construction portion of the project will not change land cover, except for areas where riprap will be placed for stabilization: two small areas around the control structures, inlet to stormwater system, and some areas of the existing drainage channel. The majority of the project causes temporary disturbance during construction, which will be restored to its pre-construction condition. Vegetation growth along the lakeshore areas is anticipated during drawdowns, but is not reflected in the table.

	Before	**After**		**Before**	**After**
Wetlands	2.85	2.85	Lawn/landscaping	0	0
Deep water/streams	0.37	0.37	Impervious surface	0.47	0.47
Wooded/forest	0	0	Stormwater Pond	0	0
Brush/Grassland	0	0	Other (describe)	0	0
Cropland	13.31	13.31			
			TOTAL ACRES	**17.0**	**17.0**

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

Unit of government	**Type of application**	**Status**
US Army Corps of Engineers (USACE)	Section 404 Permit	Application to be submitted
Minnesota Department of Natural Resources (DNR)	Public Waters Work Permit	Application to be submitted
	Water Appropriation General Permit	Application to be submitted, if needed
Minnesota Department of Transportation (MnDOT)	Utility Accommodation on Trunk Highway Right of Way (Form 2525)	Application to be submitted
	Application for Drainage (Form 30795-02)	Application to be submitted
Minnesota Pollution Control Agency (MPCA)	NPDES General Construction Stormwater Permit	Application to be submitted by contractor
MPCA	Section 401 Certification	TBD
Grant Soil and Water Conservation District (SWCD)	Wetland Conservation Act	Application to be submitted
Bois de Sioux Watershed District (BdSWD)	Design Plan Review	Pending
Grant County	Conditional Use Permit or Grade/Fill Permit	Application to be submitted, if needed

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

9. Land use:

a. Describe:

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

Project Site

The project site is located along the shoreline on the southwestern side of Big Lake, which is a shallow lake located outside of the city limits of Herman in Grant County. The lake has abundant aquatic vegetation and provides waterfowl and other wildlife habitat, including feeding, staging, breeding, and migration areas for waterfowl. There is no DNR maintained boat launch on Big Lake, and therefore, recreational use of the lake is limited. The lake is accessible from the right of way of MN State Hwy 27 and the public land on the south side of the lake.

Adjacent Lands

The land use surrounding the lake is rural and primarily used for agricultural purposes and also includes public lands, such as DNR wildlife management areas (WMAs) and USFWS waterfowl production areas (WPAs) (Figure 4). Minnesota State Highway 27 runs along the south side of the lake. There is one rural residence located on the north side of the lake, approximately 200 feet from the shoreline. In addition to agricultural fields, there are a number of wetlands adjacent to the lake and project site (Figure 5). Wetlands in close proximity to the lake (Figure 6) are classified as freshwater emergent (Cowardin classification) or shallow marsh and seasonally flooded/saturated emergent (Circular 39 classification). The majority of the land surround the lake is classified as prime farmland by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (see Item 10 for additional discussion on soils and prime farmland).

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

The BdSWD was established in 1988 under the provisions of Minnesota Statute Chapter 103D (i.e., the Minnesota Watershed Act). Minnesota Statutes requires the BdSWD to manage water resources through the development and periodic updating of a comprehensive watershed management plan (i.e., Overall Plan). The Overall Plan discusses the BdSWD water resources, identifies known problems in the watershed, outlines potential solutions, and states policies. The Overall Plan is intended to guide watershed project implementation and policies. Some of the problems identified in the Overall Plan include flooding of agricultural land, flood damages to public and private property, and water quality impairment. The potential solutions identified in the Overall Plan include impoundments and drainage system modifications, wetland and watercourse restorations, and watershed permitting programs.

The BdSWD supports the Flood Reduction Strategy for the Red River Valley. This strategy identifies three major options that can provide flood damage reduction benefits: impoundments (flood storage), culvert sizing, and land use change. The strategy indicates

flood storage reduces peak flows to downstream receiving waters and can also provide benefits such as wildlife habitat, stream flow augmentation, and allows sediment and nutrients to settle. The strategy identifies three timing zones as it relates to flow contribution to the Red River Valley and Bois de Sioux Watershed. Big Lake is located in the late zone. The strategy indicates waters in the late zone should be slowed or stored with gated controls until downstream areas can handle the release of water.

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

Grant County administers a shoreland management ordinance, dated June 19, 2018. Part of the project site is within the shoreline management zone and below the ordinary high water level (OHWL). Shoreland alterations are considered a conditional use by the County ordinance and require a conditional use permit (CUP) or grade/fill permit. Projects must adhere to the shoreland alterations standards outlined in the County ordinance. Any shoreland alteration/excavation below the OHWL will require a DNR Public Waters Work Permit.

Excavation of soil is planned to occur in the summer and fall of 2021. When the excavation at the site occurs, top soil will be segregated from the other soil layers and will be placed temporarily in soil piles in the surrounding area. Efforts will be made to minimize the potential footprint of the temporary soil piles and equipment tracts within the shore management areas. Once the pipe is placed underground, the original soils will be placed around the pipe, and the same topsoil that was segregated will be placed back on top. Project areas with soil disturbance will be graded and restored to preconstruction conditions using appropriate seed mix. The contractor will be responsible to practice BMPs to limit erosion, sedimentation control and stabilizing measures during and post project construction.

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

The project will not change existing land use. The project is compatible with the BdSWD Overall Plan to reduce flood damages and FDR Strategy Plan to implement distributed flood storage projects in the late timing zone of the Red River Valley. These projects will help reduce flood risk to areas downstream, such as the City of Herman.

The project will comply with the Grant County Shoreland Management Zone by obtaining a CUP or grade/fill permit if needed and comply with the conditions of that permit, including re-establishment of vegetation after construction. In general, the project operation starting around August 1 during the growing season will allow for potential establishment of shoreland vegetation and potential wildlife habitat.

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

Once construction is completed, disturbed areas will be restored to pre-construction conditions. Proper permits will be obtained prior to construction, and BMPs will be used to minimize potential impacts to the project site and adjacent areas. A CUP or Grade/Fill Permit from Grant County will be obtained if needed, and regulatory requirements of the permit will be met.

10. Geology, soils and topography/land forms:

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

There are no susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions within the vicinity of the project site (Minnesota Geological Survey, 2020).

b. *Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.*

The USDA NRCS web soil survey (United States Department of Agriculture, 2020) was reviewed to determine soil types in the project area. The soils in the project area are poorly drained, hydric soils classified in the Flom-Hamerly complex. If drained these soils can be prime farmland. These soils are classified by the ecological site classification as loamy, shallow marsh, linear meadow, and limy subirigated. The soils are characterized as having little slope (0-2%) and have high available water storage in the profile. The soils surrounding the project area are classified as Aazdahl- Formdale- Balaton clay loams, are moderately well-drained, and have a 0-4% slope. These soils are classified by the ecological site classification as loamy, subirrigated, and limy subirrigated. All areas with this soil type are prime farmland.

There will be temporary construction and ground disturbance at the project site, approximately 11,000 cubic yards of excavation occurring across approximately 17 acres. During construction, excavation of soil (i.e., trenching) will occur where the HDPE pipe will be installed underground. When the excavation at the site occurs, top soil will be segregated from the other soil layers. Once the pipe is placed underground, the original soils will be placed around the pipe, and the same topsoil that was segregated will be placed back on top. Project areas with soil disturbance will be restored to preconstruction conditions. Additional discussion regarding erosion and stormwater runoff is provided in Item 11.b.ii.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

11. Water resources:

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

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

Surface Water Features

Big Lake (DNR PWI #26-0194) is located one mile northeast of the City of Herman in Grant County. Big Lake has an average depth of about six feet with a maximum depth of about eight feet, and is approximately 283 acres. Big Lake is located within the Fivemile Creek Watershed, a tributary to the Mustinka River which discharges into Lake Traverse. Water flows from the southeast through a series of DNR Public Waters Inventory (PWI) lakes and wetlands before entering Big Lake (Figure 5). Water from Big Lake flows into an existing drainage channel on the southwest side of the lake. The drainage channel flows into the City of Herman stormwater system and eventually into Pullman Lake (Figure 5).

There are a number of wetlands located adjacent to and surrounding Big Lake (Figures 5 and 6). According to the USFWS National Wetland Inventory (NWI), the primary type is freshwater emergent wetland. There are several wetlands on the north side of Big Lake that are directly connected to the lake with others on the east and south sides that are either directly connected or in close proximity and are likely hydrologically connected. The table below provides a summary of wetland types and associated acreage for NWI wetlands within close proximity to Big Lake.

Map ID Code	NWI Wetland Code	Wetland Type	Circular 39 Type	Acres
01a	PEM1C	Freshwater Emergent Wetland	3	2.3
01b	PEM1F	Freshwater Emergent Wetland	3	8.8
01c	PUBF	Freshwater Pond	4	1.1
01d	PEM1Af	Freshwater Emergent Wetland	1	0.4
02a	PEM1A	Freshwater Emergent Wetland	1	3.3
02b	PEM1Af	Freshwater Emergent Wetland	1	2.8
02c	PEM1C	Freshwater Emergent Wetland	3	7.3
02d	PEM1F	Freshwater Emergent Wetland	3	4.3

Map ID Code	NWI Wetland Code	Wetland Type	Circular 39 Type	Acres
02e	PUBF	Freshwater Pond	4	1.6
03a	PEM1C	Freshwater Emergent Wetland	3	1.6
03b	PEM1F	Freshwater Emergent Wetland	3	0.8
03c	PUBF	Freshwater Pond	4	0.4
04a	PEM1C	Freshwater Emergent Wetland	3	9.8
04b	PEM1F	Freshwater Emergent Wetland	3	12.5
04c	PUBF	Freshwater Pond	4	0.6
04d	PUBH	Freshwater Pond	5	13.9
04e	PUBF	Freshwater Pond	4	0.3
05a	PEM1C	Freshwater Emergent Wetland	3	1.7
05b	PUBF	Freshwater Pond	4	1.4
06	PEM1C	Freshwater Emergent Wetland	3	2.4
07	PEM1Ad	Freshwater Emergent Wetland	1	1
08a	PEM1C	Freshwater Emergent Wetland	3	7.2
09	PEM1C	Freshwater Emergent Wetland	3	0.6
10a	PEM1Cd	Freshwater Emergent Wetland	3	4.9
10b	PEM1Fd	Freshwater Emergent Wetland	3	6

The Art Hawkins WPA (Figure 4), a 370-acre wetland complex (DNR PWI wetlands #26-0201, #26-0340, and #26-0200), is located along the southeastern side of the Big Lake and on the south side of State Highway 27. Land to establish the WPA was purchased by the USFWS in 2010 to provide habitat for wildlife (waterfowl, birds, mammals, amphibians, and insects), improve water quality, erosion control, flood protection and recreation. In 2013, Outdoor Heritage Funds were used to restore five wetland basins within the WPA using a native forb and grass seed mix (MNDNR, 2015). This area is used for public hunting and outdoor recreation.

Biological Features

Big Lake is not designated as an outstanding resource value water under Minnesota Rule 7050.0335. The DNR conducted a biological survey along the southeastern side of Big Lake on August 15, 2006 (MNDNR, 2006). The biological report identified several species of submersed plants and floating leaf plants, comprising a larger native plant community. One of the identified submersed plants is a Minnesota species of special concern commonly known as Widgeon Grass (*Ruppia cirrhosa*). No other recent information is available regarding this species at this site.

The DNR completed a Wildlife Lake Habitat Survey Report (DNR, 2013) of Big Lake in July and August 2012. During the survey, waterfowl, American white pelicans, double-crested cormorants, and various shorebirds were observed. There was a fringe of cattails and bulrush. Submerged vegetation was only present near the shore and shallower areas of the lake.

Water Quality

The MPCA maintains a monitoring site (station ID 26-0194-00-201) which was sampled once in 2002 for total phosphorus concentration (0.033 ug/l) as part of the DNR Shallow Lakes Monitoring Program in order to assign an overall trophic state index (TSI) value of 55, indicating a eutrophic state (MPCA, 2011). The DNR Wildlife Lake Habitat Survery Report (DNR, 2013) noted the lake appeared to be in poor condition with Secchi disk readings of one foot throughout the lake. Overall, there is not enough data available to determine aquatic recreation or aquatic consumption conditions.

Big Lake and waterbodies within one mile of the project area are not listed on the Draft 2020 Impaired Waters List, which includes the 303(d) TMDL List, Inventory of All Impaired Waters, and the Statewide Mercury TMDL.

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

The Minnesota Department of Health (MDH) County Well Index was reviewed indicating the closest well to the project site is approximately 1,000 feet away, unique Well ID 215689. Other nearby wells include Well ID: 214437, 215676, 215677, and 215672 (MDH, 2020). Based on the well logs, the static water level is between 18 to 25 feet below the ground surface. None of the identified wells will be affected by the proposed project. Groundwater levels will not be adversely impacted by project operation.

The City of Herman is identified as a drinking water supply management area (MDH, 2020). The City is also within a MDH wellhead protection area (MPCA, 2020a). The construction area of this project does not lie within the drinking water supply management area (DWSMA) or the wellhead protection area. The HDPE pipe will drain into the City stormwater system which is located in the MDH designated areas, but will not affect the drinking water supply. There are no wells in the project construction area.

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

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

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

The project will not create wastewater discharge. The project includes stormwater discharge which will be directed into the City's stormwater system. Peak flow rates for this stormwater discharge will not exceed current peak flow rates, and therefore, will not impact the existing stormwater system capacity or infrastructure.

2) *If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.*

Not applicable.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Not applicable.

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

Stormwater runoff at the project site flows from adjacent agricultural fields through grass upland and wetland into an existing drainage channel at the outlet of Big Lake. The drainage channel flows through a culvert under State Highway 27 until it eventually enters the City stormwater system. The stormwater system is comprised of a series of pipes, culverts and shallow drainage channels that eventually flow into Pullman Lake on the west side of the City of Herman. Water flows from Pullman Lake into Grant County Ditch 8, which flows into Five Mile Creek. The creek then flows northwest approximately three miles where it flows into Judicial Ditch 14 and eventually outlets to the Mustinka River, flowing into Lake Traverse and the Red River Basin.

The City stormwater system was developed in three primary stages: original system (pre-1999), additional/bypass system (1999), and Minnesota State Hwy 9 improvements system. Each of these three parts eventually outlets into the drainage channel west of Hwy 9 in Pheasant Creek Park, which flows into Pullman Lake and downstream. The original stormwater system is comprised of the existing drainage channel from Big Lake to the east side of the City. From the drainage channel inlet, the original stormwater system flows through a series of shallow drainage channels, culverts, and underground pipes, located between 1st Street East and 3rd Street East, flowing west to the drainage channel through Pheasant Creek Park. After the 1997 Spring flood, an additional/bypass stormwater system was constructed in 1999, which begins at the inlet in the drainage channel on the east side of the City and flows southwest via an underground 48-inch pipe. From there, the underground pipe flows west under 1st Street East until it outlets to the drainage channel west of Hwy 9. When Hwy 9 was reconstructed, a third stormwater system was installed within the roadway corridor, which flows via underground pipe to the drainage channel in Pheasant Creek Park. From Pheasant Creek Park, the drainage channel flows into Pullman Lake and areas downstream as previously described.

Over one acre of land disturbance will occur, and therefore, a National Pollutant Discharge Elimination System (NPDES)/State Disposal System Program (SDS) Stormwater Construction General permit (stormwater permit) will be required from the Minnesota Pollution Control Agency (MPCA). The stormwater permit will require a Storm Water Pollution Prevention Plan (SWPPP), which will require erosion control measures to be installed and maintained, including but not limited to: floating silt fence in public water basins, standard silt fence, bio-rolls or straw wattles, and erosion control blankets. A DNR Public Waters Work Permit will also be required for the project and will also outline erosion control measures and best management practices (BMPs) consistent with the SWPPP. Other BMPs will be used as needed to minimize impacts from erosion and sedimentation that may occur during project construction. The contractor will be responsible for BMPs at the project site to manage stormwater runoff as needed. The contractor will also be responsible to practice BMPs to limit erosion, sedimentation control and stabilizing measures during and post project construction.

The post construction stormwater system will generally be the same. The main difference being that peak flows from Big Lake will be controlled via a 24-inch underground outlet pipe that will be installed directly adjacent to the existing drainage channel.

iii. *Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.*

The project does not anticipate appropriation of surface or groundwater. The project will not involve well abandonment or connections to municipal water supplies.

iv. Surface Waters

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

Based on NWI data (USFWS et al., 2020), project construction of the control structure is not anticipated to directly impact wetlands (Figure 6). If placement of the control structure and inlet pipe require alterations to wetland, the construction footprint and associated impact to that wetland will be minimized as feasible and result in a small area of wetland impact. The NWI indicates wetland areas near the

State Highway 27 culvert and the existing drainage channel from Big Lake. The specific location of the outlet pipe has not been finalized. It is anticipated the outlet pipe will be placed in upland areas or land that is currently being used for cultivated agricultural crops, and is not anticipated to directly impact wetlands.

Project construction will avoid wetlands as feasible, and minimize wetland impacts. Wetland Conservation Act (WCA) requirements will be followed, including obtaining a permit prior to construction and mitigating, if needed, for wetlands impacts. Overall, wetlands will be avoided as feasible, and impacts to wetlands, if any, are anticipated to be a small area.

Project alternatives considered potential direct and indirect impacts to wetlands. Various drawdown scenarios evaluated pool elevations and wetland hydrology to develop a project that will accomplish the purpose and need for flood risk reduction and also minimize impacts to wetlands. Estimations were based on preliminary lake bathymetry from the 2005 Ducks Unlimited Survey.

The proposed annual summer/fall drawdown of 1.5 feet from the natural runout elevation of 1075.7 to 1074.2 is approximately 379 acre-feet of lake volume, or 0.69 inches of runoff over the watershed. A statistical 2-year 24-hour rain event produces 0.79 inches of runoff, which would replenish the lake level to its natural runout elevation from the proposed drawdown level. The average annual precipitation in this area is approximately 25 inches, meaning that in an average year, there would be more than enough runoff to replenish Big Lake from the proposed annual drawdown. In dry years, project operation would be reviewed and modified as needed to address water levels in Big Lake, as described in the O&M Plan (Attachment A).

As part of an adaptive management strategy for the project, an additional 1.5 feet drawdown is proposed, which would be implemented if conditions are supportive. The additional 1.5-ft drawdown would only be completed if there is at least three inches of water in the snowpack. This additional drawdown would provide an estimated additional 350 acre-feet of flood storage in years when greater flood risk reduction is needed. If Big Lake is drawn down to 1072.7, a total of approximately 1.3 inches of runoff would be required to replenish the lake to 1075.7, which is slightly more than the runoff from a 5-year 24-hour event (1.28-inch runoff). It is anticipated that the 3-inch snow-water equivalent trigger will be self-mitigating as the full 3-ft drawdown would only occur when sufficient water exists in the snowpack to replenish Big Lake. Water level drawdown operations below the natural runout elevation will be temporary and occur during the fall and winter months (not during spring or summer). Periphery wetlands are not expected to be adversely impacted by this operation because the drawdown is temporary, and freshwater emergent wetland species are typically tolerant of temporary seasonal changes in hydrology.

Drawdown of Big Lake during project operation will affect wetlands by changing water levels annually for a specific timeframe. The potential indirect effects to wetlands was evaluated based on water flow and duration of water level management. There are two general wetland areas that were considered, those

wetlands that receive water flow before entering Big Lake and those wetlands on the periphery of the lake.

Flows from the southeast into Big Lake typically provide enough water to support wetland hydrology in the Art Hawkins WPA before entering Big Lake via three culverts under State Highway 27. The three culverts from east to west have the following invert elevations, respectively: 1074.9, 1072.7, and 1076.6. The eastern and middle culverts are set below the natural runout elevation of the lake (1075.7), while the western culvert is above the natural runout elevation. This indicates that Big Lake controls the elevation of water in the WPA when the lake is at its natural runout elevation. Annual project operation will temporarily draw down Big Lake in the fall/winter approximately 1.5 feet to 1074.2. At this elevation, two of the three culverts will be higher than the proposed Big Lake pool elevation and maintain the elevation of water in the WPA relative to their respective culvert inverts. The project includes a southeastern control structure placed on the middle culvert that will prevent the Big Lake outlet control structure from influencing water levels upstream of State Hwy 27. As a result, the existing hydrology of the wetland complex will be maintained, and therefore, impacts to the wetlands in the WPA are not anticipated from the proposed drawdown.

Wetlands directly connected to the lake are anticipated to experience the drawdown (Figure 6). These emergent wetlands are type 3 (Circular 39) meaning they are generally flooded by water either permanently or seasonally. In Big Lake, many of these wetlands are dominated by cattails and are typically tolerant of temporary, seasonal differences in water levels.

Wetland areas downstream from Big Lake, including Lake Pullman, are not likely to be significantly impacted from the project as the flow rate and volume of water passing through the system will be controlled as described in the O&M Plan (Attachment A).

b) *Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.*

Project construction does not involve physical alteration of Big Lake with the exception of the lake bottom inlet channel and potential excavation to construct the control structure and place the inlet pipe. The exact location for these two project components has not been finalized, but will likely involve excavation of a small area of shoreline along Big Lake. Efforts will be made to minimize the potential impacts to shoreland and lake bottom, including structure placement, timing, and other factors

determined during the permitting process. Coffer dams will likely be used for inlet pipe placement. During inlet pipe construction, in-water BMPs will be used to minimize turbidity and sedimentation to Big Lake.

As previously described under Item 11.b.iv., project operation will involve water level management and will operate at a proposed pool elevation that is approximately 1.5 feet lower (1074.2) than the natural runout elevation (1075.7) of the lake. The summer/fall drawdown will allow some time for emergent vegetation growth along the shoreline, which could provide habitat enhancement. The temporary summer/fall drawdown is not anticipated to adversely impact Big Lake. Potential impacts to wetlands was previously discussed in Item 11.b.iv.

There is no DNR or USFWS public boat access on Big Lake and only one home located along the shoreline. There is public access from State Hwy 27 right-of-way or public lands along the south shore of the lake. Public access, water use and recreation will not be impacted by the project.

12. Contamination/Hazardous Materials/Wastes:

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

There are no known sources of contamination or potential environmental hazards within the project construction area. The project does not pose a hazard to soil or groundwater contamination and is not within proximity to an abandoned dump or landfill, storage tank or pipeline (MPCA, 2020b). Excavated soils will be reused for restoration on site to preconstruction conditions as previously discussed in Item 10.b.

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

The project will generate minor amounts of solid waste, such as plastic wrapping or scrap materials from the job site during construction. This solid waste will be collected and disposed of by the contractor in an appropriate facility.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the

use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Minor quantities of petroleum fuel, oil and hydraulic fluid will be used for operation and maintenance of construction equipment, but will not be stored or present in large quantities on the project site. Small quantities of fuel in portable containers will be stored in the construction vehicles for refueling of equipment. The construction SWPPP identifies notification, containment and management procedures in the event of a spill.

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

The project will not include storage of hazardous materials.

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

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

Fisheries

Big Lake is a shallow, eutrophic waterbody (MPCA, 2011) with approximately 283 acres of surface water, surrounded by periphery wetlands. There have been no formal fisheries, macroinvertebrate or stream habitat assessments of the public watercourse (Big Lake #26-0194). A Minnesota Biological Survey of Big Lake was completed by the DNR in August 2006 and a Wildlife Lake Habitat Survey Report (DNR, 2013) in July and August 2012. The submersed plants observed in 2012 were sago pondweed (*stuckenia pectinata*), bulrush group (*scirpus spp.*) and clapsing-leaf pondweed (*potamogeton richardsonii*). Overall, the DNR report indicated the lake was in poor condition. There has been no known fisheries assessments completed for Big Lake.

Wildlife

The Minnesota Biological Survey (MNDNR, 2006) surveyed an area on the southeastern side of Big Lake and reported several species of emergent plants, including common reed grass (phragmites australis), hard-stem bulrush (schoenoplectus acutus var. acutus), soft-stem bulrush (schoenoplectus tabernaemontani), and narrow-leaved cattail (typha angustfolia). The bulrush and common reed grass can be good for waterfowl and other wildlife habitat. Narrow-leaved cattail can be good for some wildlife habitat, but too much in an area is considered poor conditions for waterfowl habitat. The shoreline plants observed were swamp milkweed (asclepias incarnata), reed canary grass (phalaris arundinacea), and willow (salix sp.). The swamp milkweed is attractive for monarch butterflies and other pollinators. Reed canary grass is considered an invasive plant that can crowd out more beneficial plants, but can offer potential cover and forage for waterfowl when flooded. Willow trees can be good for waterfowl and other wildlife habitat and can help stabilize banks, provide a windbreak, and provides cover for wildlife.

The project site is also located within the Minnesota Prairie Conservation Plan's Prairie Corridor (MNDNR, 2020). The Prairie Corridor connects habitat in core areas to reduce the effects of fragmentation and allow for better species dispersal. The goal of the prairie corridor is to protect 10% of each square mile as either grassland or wetland. Within the prairie corridors, strategic habitat

complexes have been identified, which group corridor complexes and wetland complexes. The intent of strategic habitat is to provide "stepping stones" for mobile wildlife species within the corridor. The land within each strategic habitat should be 40% grassland and 20% wetland. Big Lake is located within the prairie corridor and between two strategic habitat complexes: Blakesley WMA and Johnson WPA.

b. *Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20210051) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.*

The DNR Natural Heritage Information System (NHIS) data request was submitted on June 4, 2020. DNR provided the NHIS query results on September 14, 2020 (ERDB 20210051), which indicated several rare features, which includes two ecologically significant areas and state-listed species of concern within a one-mile radius of the project site. No state-listed threatened or endangered species have been identified within the vicinity of the project site.

The prairie mimosa (*Desmanthus ilinoesis*) and the northern grasshopper mouse (*Onychomys leucogaster*), both state-listed species of concern, have been documented within the vicinity of the project. The prairie mimosa, documented on the western shore of Big Lake, is a flowering perennial that when fully grown is around two to four feet tall with a white ball shaped flower. In Minnesota, the prairie mimosa is primarily located along shaded sandy lake shores, although there are some documented occurrences in mesic prairies. This species can be impacted by herbicide, water level changes, and disturbances in its habitat.

The northern grasshopper mouse has dark gray brown and a short tail. It is about 5.9 inches from nose to tail. It inhabits western Minnesota's upland prairie habitats with gravelly or coarse soils that can lack vegetation.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Most of project construction will occur along the upland areas of the excavated drainage channel and through cultivated agricultural fields. The control structure will likely be placed in a transitional area of upland and lake shore. The project construction disturbance area will be small, but may impact individual species primarily associated with grassland areas if present at the time of construction and unable to avoid the active construction area. In general, various reptiles, amphibians, and small mammals could be encountered during construction if they fail to relocate themselves during excavation of the upland areas. The project will also involve shallow excavation in the lake bed, which has the potential to impact aquatic, amphibian, and some types of reptile species that may not be able to relocate to avoid active construction. The project may impact a small number of individual species, but will not likely have adverse impacts to species' populations.

Once the project is completely installed, project operation and annual drawdown of Big Lake will be conducted each late summer into early fall. This annual drawdown will lower the pool of the lake to approximately 1.5 feet below the natural runout elevation pool. The lake level will fluctuate at this lower pool elevation through the winter. This may impact migrating waterfowl use of wetlands along the periphery of Big Lake if the water levels in those wetlands are too low. This may cause waterfowl to find other wetland and sources of food or stopover habitat nearby, such as the Art Hawkins WPA wetland complex. The drawdown may also further concentrate species of fish, herps, and invertebrates into overwintering habitat in the deeper areas of this already shallow lake. Oxygen supply may be limited in the lake, especially in shallow areas, which may result in loss of some individual species.

Overall, the project will allow for the management of water levels for not only flood risk reduction, but can be used to manage shoreline vegetation and adjacent wetlands by providing periods of lower water levels for vegetation establishment. Pool elevation changes from project drawdown have the potential to impact the prairie mimosa if present. The population size and its specific location relative to Big Lake is currently unknown. Adjacent wetlands and surrounding wetland complexes are not anticipated to be impacted by the drawdowns as the proposed pool elevation for the annual summer/fall drawdown will lower the water 1.5 feet for a temporary time period (August through Spring). A spring drawdown of an additional 1.5 feet would only occur if the water content of the snowpack allowed, and a drawdown was necessary to provide flood risk reduction to the City of Herman in a particular year. A draft operations and maintenance plan (Attachment A) provides additional detail for the each drawdown and the criteria to determine whether a spring drawdown is feasible in a given year.

Soil disturbance from project construction has the potential to foster the establishment of noxious weeds and invasive vegetation species.

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

Project construction will result in soil disturbance, and therefore several measures will be used to avoid, minimize and mitigate potential impacts to water quality and adjacent land. Areas of project disturbance will be restored to a condition similar to pre-construction conditions. The project will be over one acre of land disturbance, and therefore, a NPDES/SDS stormwater permit and associated SWPPP will be required, including implementation of erosion control measures. The required DNR Public Waters Work Permit will also outline erosion control measures and BMPs. The contractor will also be responsible to practice BMPs to limit erosion, sedimentation control and stabilizing measures during and post project construction. Wildlife-friendly materials, where feasible and appropriate, will be used for erosion control measures to avoid and minimize potential impacts to the northern grasshopper mouse and other wildlife species.

BMPs will be used by the contractor to prevent the spread of invasive species within the project area by cleaning equipment and clothing prior to arriving on site. Equipment and clothing will also be cleaned prior to leaving the site to prevent potential off site spreading. Areas of disturbance will be revegetated with an appropriate seed mix as needed to reduce the exposure of bare soil that can lead to noxious weeds. All water will be drained from the equipment, and all vegetation will be removed prior to entering or leaving the project site. Excess spoil will be spread in adjacent cultivated

agricultural fields that are subject to typical agricultural practices which prevent the establishment of noxious weeds and invasive species.

Lake level alteration for flood risk reduction will be completed seasonally. The annual drawdown will occur in August and extend through the winter when vegetation is not growing and aquatic species typically move to deeper water to avoid freeze out. Spring drawdowns will be evaluated based on snowpack and would only occur as needed to accomplish adequate flood storage. These operational measures will help maintain hydrology that supports the natural emergent vegetation and wetlands of Big Lake. The prairie mimosa has been documented along the western shores of Big Lake, but its specific location is currently unknown. This species is susceptible to impacts from soil disturbance and water fluctuations. The DNR will be consulted regarding potential project impact concerns and measures to minimize these impacts to this state-listed species of concern.

14. Historic properties:

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

On June 22, 2020, a data request was sent to the Minnesota State Historic Preservation Office (SHPO) inquiring about historic structures in the proposed project area. SHPO responded on June 23, indicating there are no archaeologic records in their database for the project area. The nearest historic structures occur in the City of Herman. This historic structure will not be impacted. No historic structures will be impacted by the proposed project.

SHPO provided a comment letter on August 3, 2020 recommending an archaeological survey, and also indicated they would reconsider this recommendation if the project area can be documented as previously surveyed or disturbed to the extent of the proposed project limits. Once a final design is completed, the project construction area will be evaluated to determine if the construction limits are within previously disturbed areas. An archaeological survey will be completed, if needed, prior to construction.

15. Visual:

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

The project is located within a rural area on the southwestern side of Big Lake. The project will include construction of a concrete water control structure, which will be placed near the existing drainage channel and tie into adjacent ground. The majority of the structure will be below ground level. The control structure will have minimal visual effects. The inlet pipe and outlet pipe will not be visible. Project construction will occur during daylight hours and will include temporary use of heavy equipment. Project operation will cause the water level of Big Lake to decrease during the late summer/fall season, which may create visual effects depending on weather conditions and snow cover.

16. Air:

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

There will be no stationary source air emissions during construction or operation of the proposed project.

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

Project construction will generate temporary/short-term vehicle-related emissions from the use of heavy equipment in localized areas. Construction will last approximately four months. This short-term duration in emissions will be temporary and have no or minimal effect on air quality and carbon monoxide levels. Residential areas will not be affected.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Generation of odor and dust will be minimal as the work is anticipated to be completed in moist/wet soil conditions. There will be an increase in construction equipment use, which may generate some dust along the roadway. This depends on the weather and road conditions. This minimal amount of dust will not affect the quality of life in the area. It is not anticipated that any odor or dust mitigation measures will be needed.

17. Noise

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

Project construction activities are anticipated to generate temporary noise from use of heavy equipment. This temporary construction noise will occur during daylight hours for approximately four months. The project site is located in a rural, agricultural area, where heavy machinery operation is common. The project site is also in close proximity to State Highway 27, which is a main transportation route for vehicles and truck traffic that generate noise. The nearest residential home is

approximately 1,000 ft. away. The project would not cause adverse impacts from noise and would not affect the quality of life to nearby residences.

Potential noise impacts will be reduced by proper equipment maintenance, use appropriate mufflers, and conducting construction during daylight hours only.

18. Transportation

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

Heavy equipment will be used at the project site for construction. Access to the project site will likely be from State Highway 27 via a field access. Once the equipment is onsite, it will generally stay onsite until project construction is completed, which is anticipated to be about four months. The project is not anticipated to cause increases in traffic. Vehicle trips to and from the site will be minimal and short-term.

Construction will be coordinated with the Minnesota Department of Transportation (MnDOT) for boring under State Highway 27. Appropriate signage and other safety measures will be used during construction as required for the MnDOT permit. Construction equipment is anticipated to be at the project site approximately July 1 and will be completed by November 1.

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

There will be no effect on the regional transportation system. According to MnDOT, the annual average daily traffic (AADT) on State Highway 27 in 2018 was 1,500 cars. The project is not anticipated to generate traffic. There may be heavy equipment that periodically enters and exits the project site via access from State Highway 27, but this would be minimal and only occur during the construction timeframe.

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

Through coordination with MnDOT, proper traffic signage will be used to inform the public about project construction.

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

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

The proposed project will occur within the Fivemile Creek Watershed. Project construction will occur in 2021 with subsequent project operation after construction is completed. Construction is anticipated to require less than one year.

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

There are flood risk reduction projects occurring within the larger geographic area of the Red River Basin and BdSWD. Specifically, there is a flood risk reduction project that has been discussed within the Fivemile Creek watershed, downstream of the City of Herman, which would involve the construction of a floodwater diversion that would direct excessive flood flows into the proposed Redpath impoundment. At this time this proposed diversion project is preliminary and has not been designed. However, construction of the Big Lake project is anticipated to reduce peak flows, and therefore, may result in being able to downsize the floodwater diversion project to achieve the desired flood risk reduction benefits downstream.

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

The intent of the project is to provide flood risk reduction and provide wildlife habitat enhancements, which is part of a larger flood damage reduction strategy for the Red River Basin. Project impacts are expected to be minimal and temporary, but result in long-term benefits. No adverse cumulative potential effects are anticipated from construction and operation of the project. Any wetland impacts are anticipated to be minor. Wetland alterations will be mitigated as necessary per applicable regulations.

20. Other potential environmental effects:

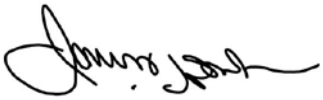
If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

No additional environmental impacts have been identified.

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

I hereby certify that:

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



Signature _ _____ Date ___1/21/2021_____

Title ___District Administrator_____

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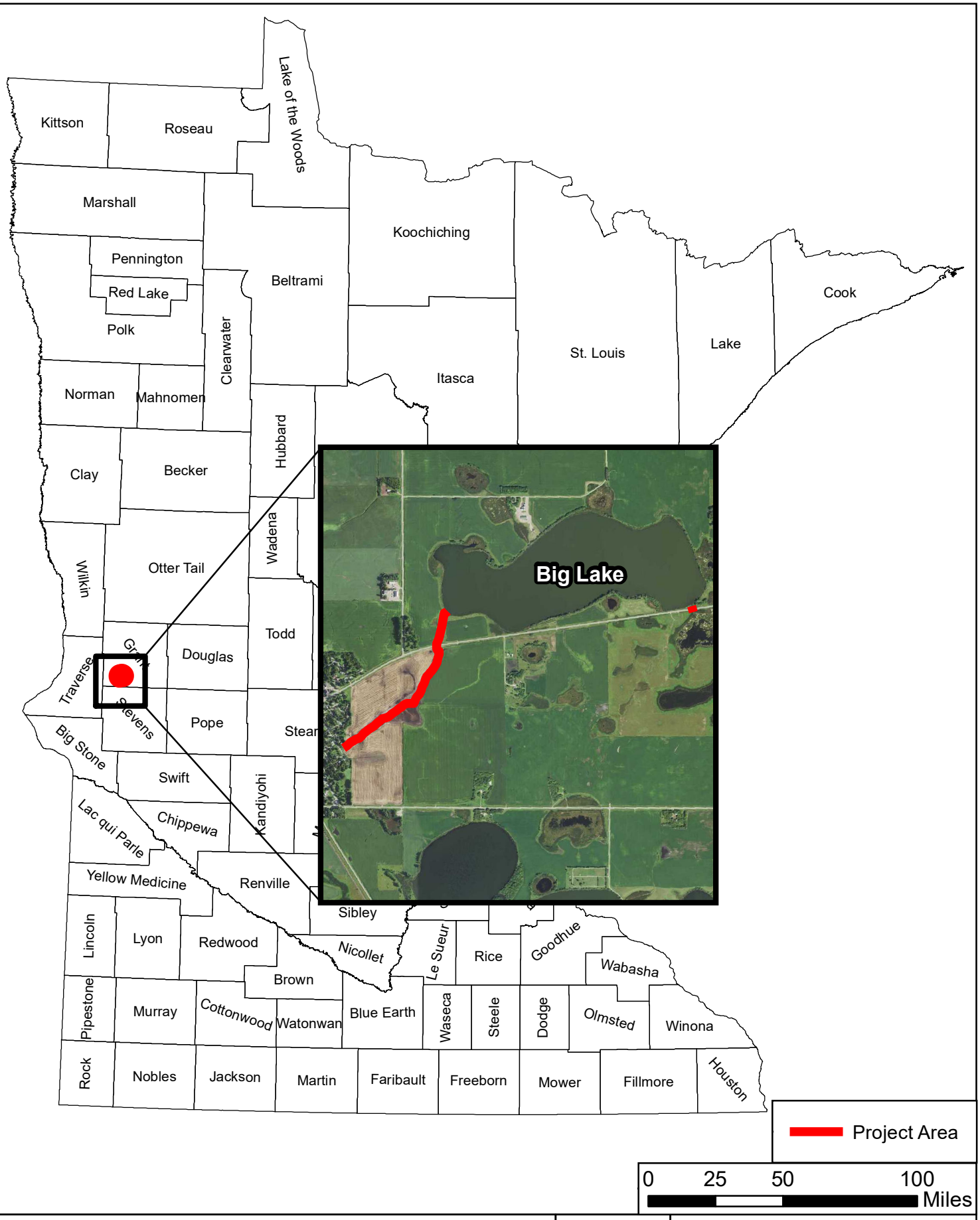
FIGURES

Figure 1: Project Location
Figure 2: Project Site (USGS Topo)
Figure 3: Project Site Detail
Figure 4: Public Lands
Figure 5: Water Resources
Figure 6: Wetlands of Interest



BIG LAKE FLOOD RISK REDUCTION PROJECT
PROJECT LOCATION
HERMAN, MINNESOTA

FIGURE 1

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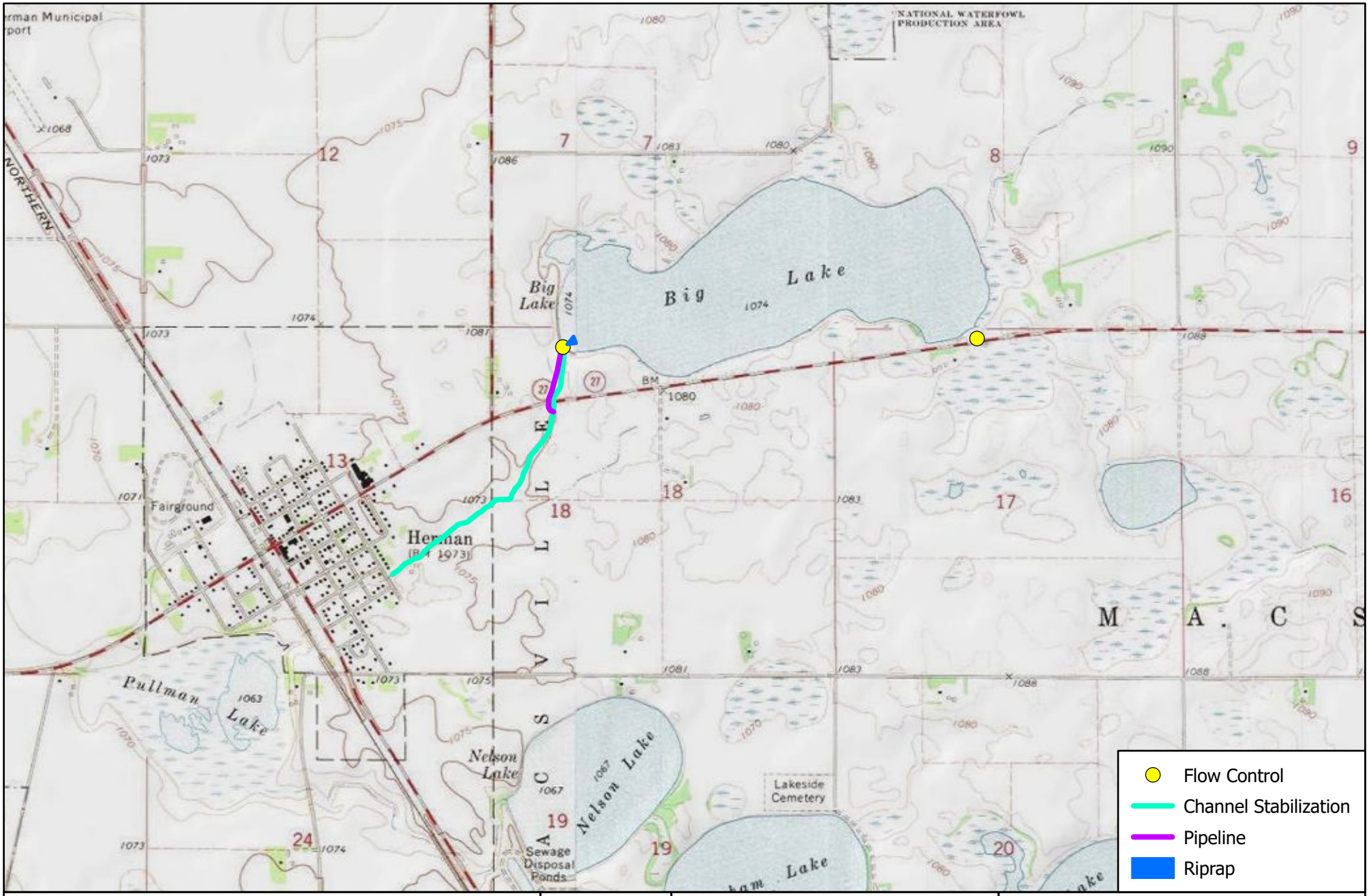

BIG LAKE FLOOD RISK REDUCTION PROJECT
PROJECT SITE
HERMAN, MINNESOTA

Figure 2

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BIG LAKE FLOOD RISK REDUCTION PROJECT
PROJECT SITE DETAIL
HERMAN, MINNESOTA

Figure 3

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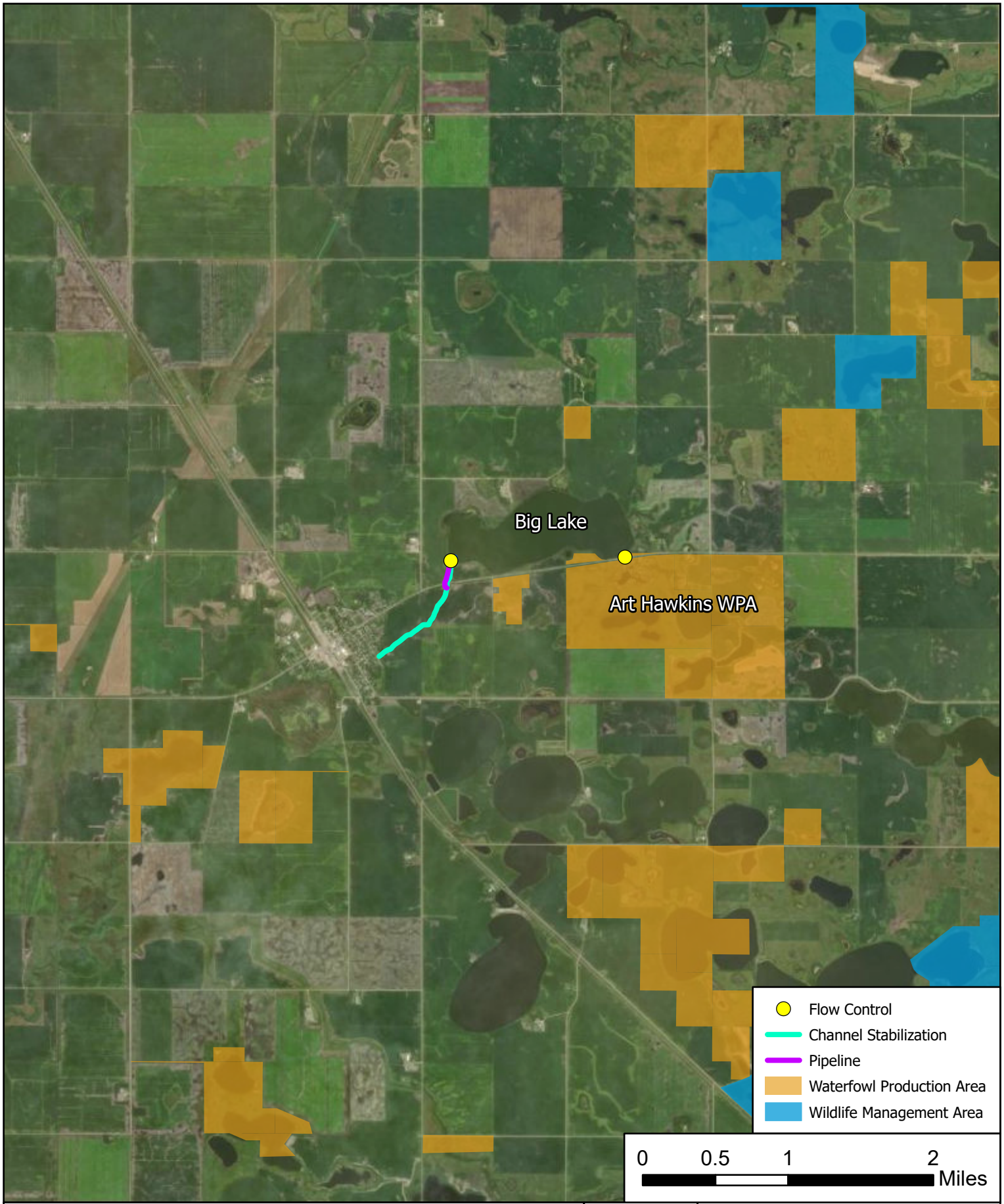

BIG LAKE FLOOD RISK REDUCTION PROJECT
PUBLIC LANDS
HERMAN, MINNESOTA

Figure 4

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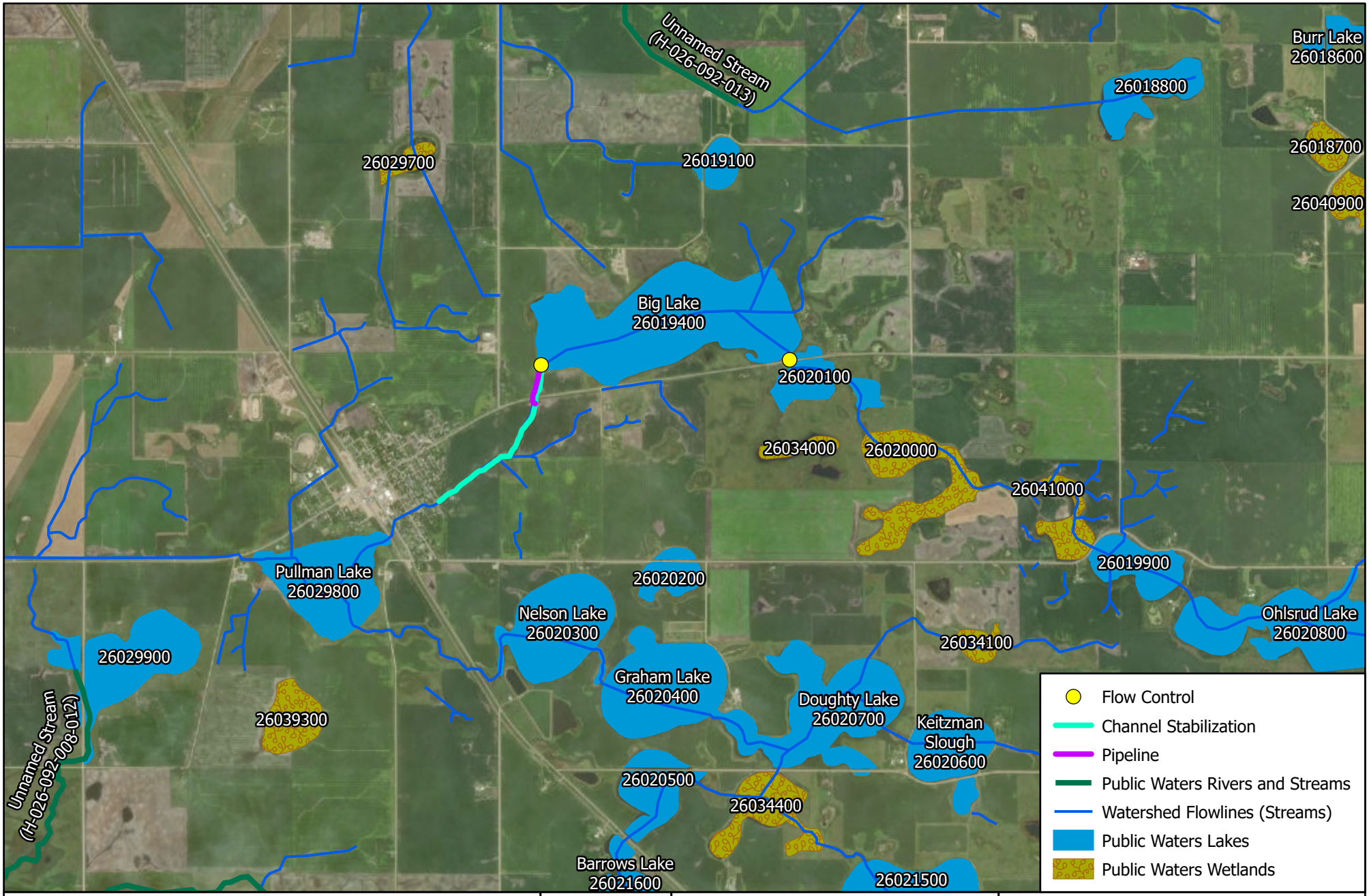

BIG LAKE FLOOD RISK REDUCTION PROJECT
WATER RESOURCES
HERMAN, MINNESOTA

Figure 5

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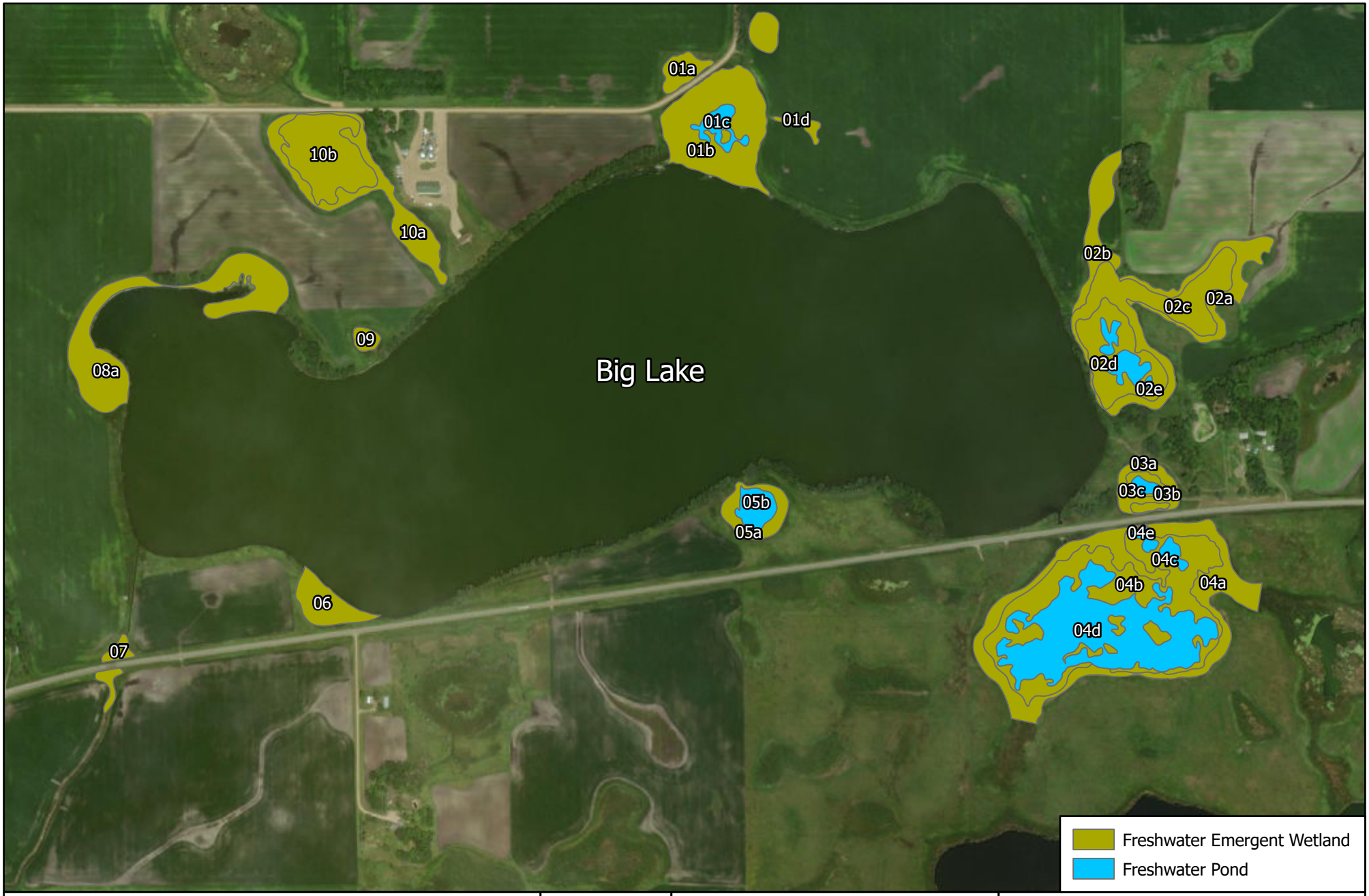

BIG LAKE FLOOD RISK REDUCTION PROJECT
WETLANDS OF INTEREST
HERMAN, MINNESOTA

Figure 6

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ATTACHMENT A

Draft Operation and Maintenance Plan – Big Lake Outlet

Draft
Operation & Maintenance Plan
Big Lake Outlet
January 2021

Bois de Sioux Watershed District

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II. Responsible Parties 1
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Draft Operation & Maintenance Plan
Big Lake Outlet Project
January 2021

I. Intent and Purpose

The Big Lake Outlet Project, hereinafter referred to as the "Project", was developed for the purpose of reducing peak flows from the outlet of Big Lake. The project consists of a control structure and buried pipe that allow Big Lake water levels to be temporarily lowered providing additional floodwater storage. A Project Map displaying the project features and relevant elevations is included as Attachment 1. All elevations are reported in NAVD 88 survey datum. The control structure, located at the west end of Big Lake and north of MN Trunk Highway 27, provides the ability to control discharges from Big Lake below the natural runout. The Project will be operated to reduce existing adverse downstream flood impacts resulting from excessive discharges from the Lake. This operation plan is necessary to provide the Bois de Sioux Watershed District, hereinafter referred to as the "District", with guidelines for operating and maintaining the Project. This document, hereafter referred to as the "Plan", will serve as a plan for operation of the control structure, and conducting regular maintenance and repair activities during the life of the Project.

II. Responsible Parties

The Project is owned by the District, and the District shall be solely responsible for all operation and maintenance activities identified by this Plan and others that may arise during the life of the Project. The District Board of Managers will designate a Manager, staff member or agent of the District that will be responsible for monitoring, operating and maintaining the Project. The designated agent and other key stakeholders are listed in the contact list in Section XII.

III. Other Agencies

The Project may have direct and/or indirect impacts that have the potential to involve the following agencies:

- Minnesota Department of Transportation: MN Hwy 27
- Minnesota Department of Natural Resources
- Grant County Soil and Water Conservation District
- US Fish and Wildlife Service: Art Hawkins Waterfowl Production Area
- City of Herman, MN
- Grant County, MN

The Plan has been developed with specific input from many of these agencies. While the District has sole responsibility for the operation and maintenance of the Project, the District will operate the Project with the interests of all parties in mind.

IV. Key Elevations

Big Lake Culverts Crossing Highway 27	
1076.6	West Hwy 27 24” RCP (Art Hawkins wetland outflow)
1076.5	Hwy 27 48” RCP (upstream wetland outflow)
1074.9	East Hwy 27 30” RCP (Art Hawkins wetland outflow)
1074.5	Hwy 27 48” Culvert (Big Lake outlet channel)
1072.7	Middle Hwy 27 60” RCP (Art Hawkins wetland outflow)

Big Lake Control Structure Design Component Elevations	
1082.0	Top of Control Structure (does not control natural runout elevation)
1075.7	Max Flash Board Control of Internal Structure Wall
1072.7	Outlet Pipe with Sluice Gate Invert

Big Lake Key Water Surface Elevations	
1079.5	Pre & Post Project Peak 100-yr Runoff Elevation (Starting El. 1075.7 Natural Runout)
1077.4	Big Lake OHWL
1075.7	Natural Runout Elevation (Pre-Project and Post-Project gate closed)
1074.2	Annual Temporary Summer/Fall Drawdown
1072.7	Maximum Spring Drawdown (gate open, all flash boards removed)

A sketch of the outlet structure and design water levels is included in Figure 1.

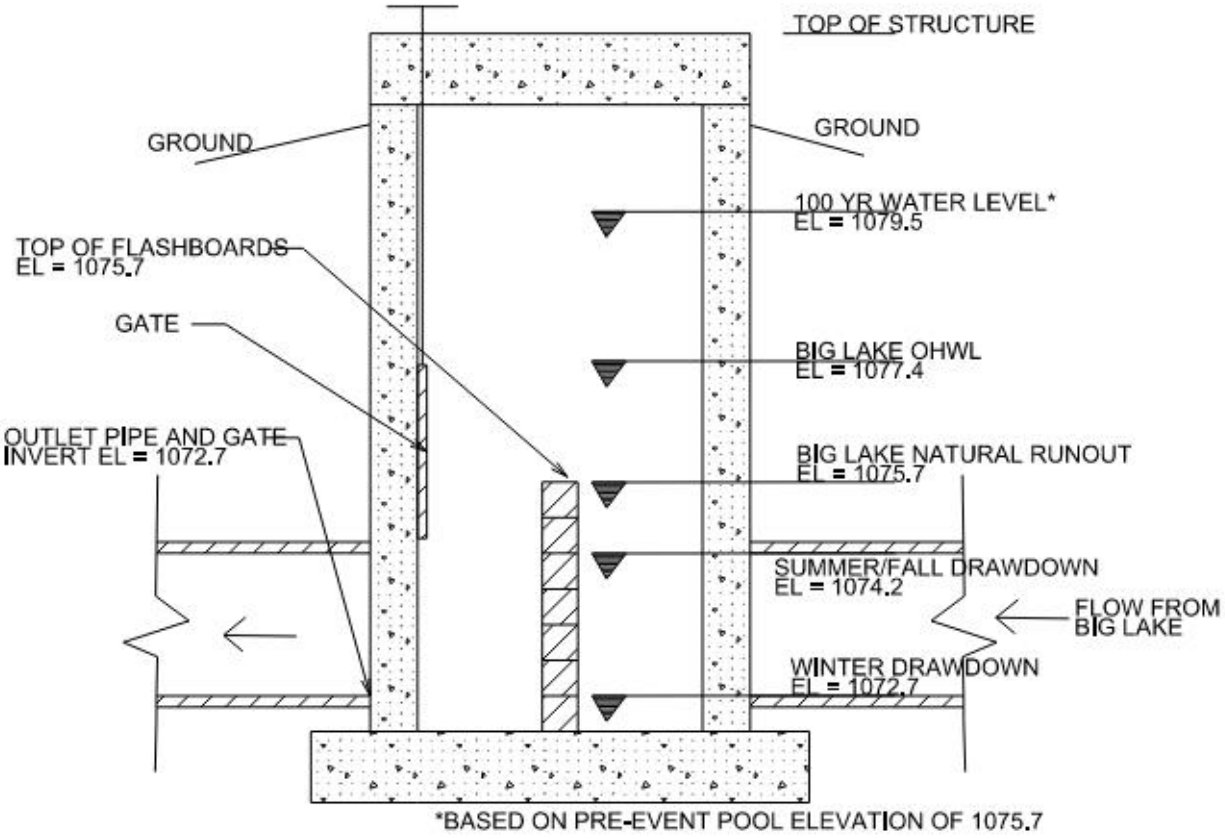


Figure 1 Outlet Structure Schematic

V. Plan of Operation

Water Surface Elevation

Natural runout elevation begin at elevation 1075.7. Under existing conditions the water surface may fluctuate above and below this point depending on precipitation and other weather conditions. After spring drawdown until the annual summer/fall drawdown this condition will remain the same.

Summer/Fall Drawdown

The summer/fall drawdown will be achieved by opening the gate and removing flashboards one and a half (1.5) feet below the natural runout elevation to an elevation of 1074.2. The gate and board should remain open through the drawdown periods. After the drawdown period the gate should be closed for the winter. The lake will remain drawn down through the winter and will be reevaluated to determine if extra flood storage is needed. Refer to the annual schedule below for key dates.

Winter Drawdown

Winter drawdown should occur based on the annual schedule when the average Snow Water Equivalent within the contributing watershed is three (3) inches or greater as determined by the National Weather Service. The lake will be drawn down three (3) feet below the natural runout elevation to an elevation of 1072.7. The drawdown will be achieved by removing all flashboards to said elevation. Refer to the annual schedule below for key dates.

Watershed District staff will closely monitor the downstream drainage system and remove any snow or ice that they determine could impede drainage in a way that would be detrimental to any structures or roadways in the vicinity.

Spring/Early Summer Structure Operation

The gate will remain closed through the early summer to allow the lake to function with only its natural outlet until the summer/fall drawdown. Refer to the annual schedule for key dates.

Dry Cycle

If the lake fails to reach the natural runout elevation during a given year, the gate should remain in a closed condition until it does. During a time of extended closure the system should be exercised as shown in the annual schedule to mitigate against seizing.

Exercise System

Exercising the system consists of the following.

Step 1: Check that gate is closed and remove all flash boards.
Step 2: Place all flash boards back in place
Step 3: Open gate fully.
Step 4: Close gate fully.

Art Hawkins control structure

The United States Fish and Wildlife Service will be responsible for the Art Hawkins control structure operation. The District will be responsible for maintenance costs.

VI. Annual coordination meeting

The District will host a project coordination meeting during the time period shown in the annual schedule. Invites will be sent to the key contacts identified in this document for the US Fish and Wildlife Service, Minnesota DNR, Grant County and the City of Herman to discuss any operational concerns.

VII. Monitoring

A staff gage will be installed within the structure to track lake elevations. The District Technician will be responsible for monitoring. Elevations will be recorded at the times shown in the annual schedule.

VIII. Maintenance

The District shall be responsible for completing all routine maintenance activities on the Project. Typical maintenance may include, but shall not be limited to, the following:

- Removal of shoreline heaving resulting from ice expansion adjacent to the control structure inlet.
- Removal of debris and other obstructions from the pipe end sections, grates, and inlet structure.
- Removal of debris and other obstructions from the control structure.
- Repair and/or replacement of any structures (inlets, control, manholes, etc.) due to damage or age.
- Remove any woody vegetation above and around the structures.
- Conduct pipe (tile line) cleanouts as necessary to remove any debris or sediment to maintain Project operation.
- Conduct routine maintenance of sluice gates to ensure functionality.
    - The District shall follow manufacturer's recommendations on maintenance activities and address any deficiencies.
- Conduct any additional maintenance within Project limits to ensure the Project is operational.
- Complete any maintenance work outside of the growing season as feasible. Should maintenance work be required during the growing season, the District shall reimburse the landowner in accordance with the easement documents.
- Notify landowners prior to any maintenance work being completed, unless emergencies do not allow for pre-notification.

IX. Annual Schedule

The section identifies a baseline minimum schedule. Inspection, maintenance, water level checks, etc. are also be anticipated on dates not listed herein.

Task	Earliest Date	Latest Date	Notes
Check seals and condition of outlet in the lake. Remove large debris from ice. Annual coordination meeting	January 5th	January 10th	
Check water/ice level Commence Winter Drawdown (Remove all stop logs and open gate) If triggers aren't met or in a dry cycle - exercise gate.	3 inch or greater snow water equivalent in contributing watershed	3 inch or greater snow water equivalent in contributing watershed	Only Occurs with 3 inch snow equivalent or greater in the contributing watershed Clear obstructions and ice downstream if structures or roads are threatened by flow Should occur as early in time frame as feasible Should not occur when it poses significant threat to downstream flooding
End Winter Drawdown (Close gate and place all stop logs)	Spring snow melts begins	Spring snow melts begins	
Check seals and condition of outlet in the lake. Check lake water level	April 20th	May 1st	
Check lake water level	June 25th	July 3rd	
Check lake water level Typical Years: Remove flashboard to 1074.2 Open Gate Dry Cycle: Exercise system	July 25th	August 1st	
Check lake water level, inspect system Check condition of Art Hawkins control structure	October 1th	October 8th	Provide USFWS with condition notes on Art Hawkins control structure. Coordinate any repairs with USFWS operations.
Check stop logs and gate are maintaining seal	December 8th	December 15th	

X. Maintenance Costs

Operation and maintenance related costs will be the responsibility of the District. The District, at its discretion, may choose to implement a 103D Water Management District for the purposes of generating revenues to pay for the operation and maintenance of the Project.

XI. Reporting

The District will keep operation and maintenance logs on file for a period of five years. Water level logs will be kept on file for a period of ten years.

XII. Contact List

In the event of an emergency, the first point of contact for each entity is noted with an asterisk (*).

Bois de Sioux Watershed District:

*Troy Fridgen (District Technician): (320) 815-2657 Cell

Chad Engels (District Engineer): (701) 388-6614 Cell

Linda Vavra (District Manager): (320) 760-1774 Cell

Jamie Beyer (District Administrator): (701) 866-2725 Cell, (320) 563-4185

Grant County, MN:

*Tracey Von Bargen (Grant County Engineer): (218) 770-2840 Cell

Bill LaValley (County Commissioner): (218) 770-0840 Cell

City of Herman, MN:

City Clerk: (320) 677-2297

Minnesota Department of Transportation:

District 4: (800) 657-3984 or (218) 846-3600

United States Fish and Wildlife Service

Chad Raitz (218) 739-2291

XIII. List of Attachments

1. Project Map

Legend:

- Proposed Control Structure
- 24" HDPE Pipe
- BdSWD Culvert Inventory
- Downstream Flowpath
- MN Public Waters
- BdSWD Legal Ditches

Control Structure
Structure Wall Max Board Control: 1,075.7'
Structure Outlet Elevation: 1,072.7'

Big Lake Existing
Runout Elevation = 1,075.7'

48" RCP EXISTING CULVERT
Inv.: 1,074.5'

CHANNEL GRADING

HERMAN STORM SYSTEM DISCHARGE

FLOWS INTO HERMAN STORM SYSTEM

Operating Elevations:
Normal Summer Pool: 1,075.7' (Natural Runout)
Minimum Fall Draw Down: 1074.2' (Board Operation)
Maximum Drawdown: 1,072.7' (Board Operation)

Big Lake
(OHWL = 1,077.4')

Grant County

Herman

Macsville twp.

GCD 29 L3

GCD 29 L3A

GCD 8

290th Ave

Frankfort Ave N

Atlantic Ave N

Atlantic Ave S

Lois Ave N

Hamburg Ave S

285th St

130th St

Jones St E

8th St E

7th St E

6th St E

5th St E

3rd St E

1st St E

8th St W

7th St W

M-31

7

8

11

27

6

13

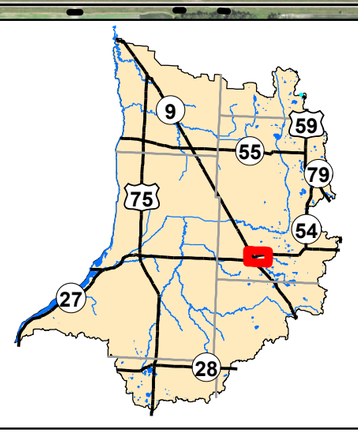
14

18

17

19

5



Attachment 1 - Project Map
Big Lake Lake Outlet Project
Bois de Sioux Watershed District, MN

Created By: NHT Date Created: 06/03/2020 Date Saved: 01/26/21 Date Plotted: 09/29/17 Date Exported: 01/26/21
Plotted By: kevin.pederson Parcel Date: XX/XX/14 Aerial Image: 2019 SIDs Elevation Data: NAVD88
Horizontal Datum: NAD 1983 UTM Zone 14N Vertical Datum: NAVD1988
T:\Projects\20900\20953\20953 O-M Project Map.mxd

N W E S

0 1,000 2,000 Feet

1 inch = 1,000 feet

Bois de Sioux Watershed District

moore engineering, inc.