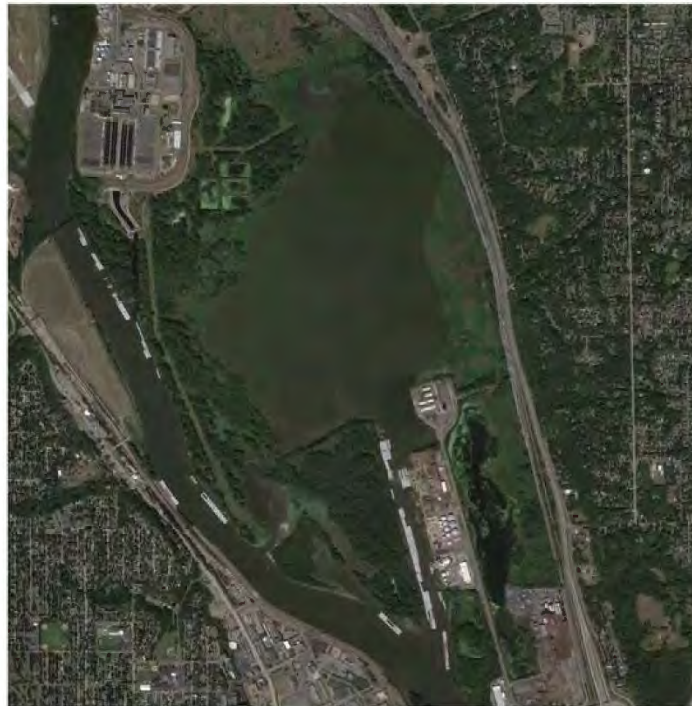




**US Army Corps
of Engineers®**
St. Paul District

Appendix A Correspondence and Coordination Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers

May 2018

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1 Summary of Comments Received During Public Review

During the 30-day public review and comment period, correspondence was received from the individuals and agencies listed below. Copies of the comment letters received are also included following this summary. Comments are summarized below, along with responses.

1. Telephone call from Mr. Daniel Richardson, Newport; *14 March 2018*
2. Telephone call from BioCleaner company, Monterey Park, CA; *21 March 2018*
3. Email from Minnesota Pollution Control Agency Remediation Division; *2 Apr 2018*
4. Minnesota Pollution Control Agency; *5 April 2018*
5. Friends of the Mississippi River; *5 April 2018*
6. Minnesota Department of Transportation, Metro District; *5 April 2018*
7. Minnesota Department of Natural Resources; *12 April 2018*
8. National Park Service; *12 April 2018*
9. Metropolitan Council; *12 April 2018*
10. City of St. Paul, Minnesota; *12 April 2018*

Comment 1: The commenter indicated that a side channel near Newport, MN may contain sediments suitable for project construction. (*Mr. Daniel Richardson*)

Response: As discussed on the phone with the commenter, this opportunity is acknowledged and would be considered for potential future needs. The purpose of the current project is to utilize material dredged in support of the congressionally-authorized navigation channel for ecosystem restoration and because dredging the identified area near Newport would not support the authorized navigation channel, it cannot not be pursued as part of the proposed project.

Comment 2: The commenter solicited the sale of products and services to clean up organic wastes. (*BioCleaner*)

Response: No comments regarding the project were offered, and therefore, no response is provided.

Comment 3: The commenter indicates support for the project. Commenter notes that there is an area of contamination outside of the project footprint in the northern part of Pig's Eye Lake that will need to be addressed by other entities. (*MPCA Remediation Division*)

Response: Comment acknowledged.

Comment 4: The commenter provided several editorial comments. (*MPCA Remediation Division*)

Response: Comment acknowledged and typographical errors have been fixed in the final document.

Comment 5: In regards to EAW Item 17, commenter encourages project contractors to appropriately manage project construction noise and recommends limiting construction activities to the hours of 7 a.m. to 10 p.m. (*MPCA*)

Response: Comment acknowledged. Contractors will be obligated to comply with local noise regulations.

Comment 6: Commenter suggests partnering with local organizations to develop planting plans for the islands that would allow experimentation or study of responses to climate change and environmental stressors. (*Friends of the Mississippi River*)

Response: Comment acknowledged. Planting plans will be completed during the Design and Implementation phase of the project, and input will be sought at that time.

Comment 7: The Minnesota Department of Transportation has reviewed the project and provides no comments. (*MNDOT*)

Response: Noted.

Comment 8: Commenter requests additional explanation why direct shoreline stabilization was not carried forward in planning analyses and how benefits of creating habitat along the shoreline would compare to the proposed habitat creation. (*MNDNR*)

Response: Direct shoreline stabilization was considered but did not appear to provide as much benefit as the proposed plan. Using rock groins similar to what is proposed for the islands appeared to be technically feasible. However, this measure remained uncompetitive with the currently proposed alternative because it would only provide benefits in the form of protecting existing habitat, rather than enhancing and restoring additional habitat as the proposed project would. Placing a blanket of sand around the perimeter of the lake instead of rock groins was also considered. This would likely have more habitat value than the rock groins, but the cost to benefit ratio would again be higher than the selected alternative which both restores a substantial quantity of habitat and provides some protection for the shoreline. These measures could be considered in the future as additional projects.

Comment 9: Commenter questions how the setting of the proposed project compares with other island building projects completed in the past, and whether additional risks and uncertainties were identified for the proposed project. (*MNDNR*)

Response: The Corps has constructed islands for habitat restoration and enhancement purposes throughout the Upper Mississippi River, under widely varied conditions. Often they are areas of the floodplain that were likely once ephemeral marshes that were permanently inundated following hydrologic alterations. Many of these areas have faced similar problems to Pigs Eye Lake with large expanses of open water and loose, silty sediments. The largest uncertainty identified is the extent of settlement, and these risks have been incorporated into project design through adding contingencies.

Comment 10: Commenter requests quantification of the excavation that may be required to gain access to the lake for island construction, what the disposition of any dredged material would be, and asserts that additional environmental review may be necessary. (*MNDNR*)

Response: The necessity of or amount of dredging for access into Pigs Eye Lake are both uncertainties at this time. The goal of this stage in planning is to verify that the construction would be feasible, with the intent to continue coordination as project designs progress. A variety of construction methods were considered during planning to broadly assess whether they were generally feasible, including methods that would not require access dredging. Preliminary testing of the lake sediments revealed a number of areas that could provide suitable topsoil and would potentially benefit the lake by creating bathymetric

variability. If construction methods are selected which require additional environmental review, reviews would be conducted as needed.

Comment 11: Commenter requests clarification of if and how the project construction schedule may overlap with the sensitive nesting period of April 1 – July 15. (*MNDNR*)

Response: The project schedule is dependent on many unknown factors at this time, including funding. The Corps and Ramsey County will continue coordination on the topic of construction timing and best practices or restrictions to limit disturbance to sensitive wildlife as project design advances.

Comment 12: The commenter has provided editorial comments and supplemental information that is suggested for inclusion within the report related to species present in the project area, project coordination needs, and fish movement studies. (*MNDNR*)

Response: Supplemental information has been incorporated into the report as appropriate.

Comment 13: The commenter states they have no objections to the project and support the proposed work. (*National Park Service – Mississippi National River and Recreation Area*)

Response: Noted.

Comment 14: The commenter would like Pigs Eye Lake to be referenced a wetland throughout the document as they believe the area functions as a wetland and is classified as a wetland on Minnesota state wetland mapping. (*Metropolitan Council*)

Response: The open water area of Pigs Eye Lake does not meet the definition of a wetland. Although the area is inundated at sufficient frequency by surface water to create the hydrologic and soil conditions to meet the legal definition of a wetland, the area does not support “a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR §328.3(b)). As such, the area is referred to as a contiguous, shallow, backwater floodplain lake. The reference in Chapter 6.5 of the report is a typographical error and will be changed to reflect this fact.

Comment 15: The commenter believes that the Corps should collect water quality samples prior to progressing on the project as a means of certifying that improved habitat conditions could be realized following a project. (*Metropolitan Council*)

Response: The Corps goal within the feasibility planning process is to collect the data necessary to make decisions of how to design or whether to proceed with a project. Improving water quality is not an objective of the project, and is not an objective of the CAP authority under which the project is being planned. Therefore, the only reason additional water quality data would be needed is if water quality was identified as a constraining factor. Considering the ability for wetland plants to grow around the edge of the lake and the documented use of the lake by fish, birds, and mammals, there is no apparent reason to collect additional water quality data. The approximate residence time of water in the lake is a little less than 5 days. This relatively short residence time suggests that there is probably not enough time for sediment contaminants diffusing into the water column to concentrate up to levels far exceeding what is seen in Pool 2 of the Mississippi River. No further action or change to the plan is required as a result of this comment.

Comment 16: The commenter expresses concern that the eroding shoreline may be a result of water fluctuation and plants dying due to toxic water quality and thus the project would not improve the habitat conditions of Pigs Eye Lake. (*Metropolitan Council*)

Response: The comment is acknowledged. The Corps and Ramsey County are not aware of any evidence that would suggest contaminants are a cause of vegetation loss in Pigs Eye Lake. Contamination concerns have been closely coordinated with the Minnesota Pollution Control Agency - the state experts and regulatory authority. The plan has been designed to avoid impacting areas where higher levels of contamination are present. Historic sediment studies were collected and substantial additional sediment testing within the lake was conducted with input from the MPCA and Metropolitan Council, as presented in the main feasibility report and Appendix E. Healthy plant communities exist behind the eroding shoreline at similar elevations, suggesting that upon reduction of wind fetch a healthy plant community will reestablish. No further action or change to the plan is required as a result of this comment.

Comment 17: The commenter expresses concerns about the suitability of establishing woody plants on the islands and requests additional study be completed on what species may be more adept at establishing in the project setting. (*Metropolitan Council*)

Response: A detailed planting plan will be developed during the design and implementation phase, which will more closely consider the appropriate species for the site conditions. This will be developed in consultation with applicable resource agencies and the monitoring and adaptive management will provide the ability to adjust as necessary.

Comment 18: The commenter is concerned about the settlement of the islands during construction and wants to know what would occur if settlement in excess of what is expected takes place during and post construction. (*Metropolitan Council*)

Response: The settlement estimate was developed utilizing knowledge obtained from experience constructing islands on the river. The amount of material estimated to be required for construction was developed with large contingencies to account for the uncertainties regarding settlement. The successful completion of the project will hinge on meeting standards outlined in the Plans and Specifications developed in the design phase of the project. The roles and responsibilities of the operation and maintenance of the project post construction will be outline in the Project Partnership Agreement as well as in the operation and maintenance manual that is developed prior to completion of the project. No further action or change to the plan is required as a result of this comment.

Comment 19: The commenter is questioning who will have monitoring and maintenance responsibility following the construction of the project. They also request additional details regarding the monitoring and adaptive management plan, specifically when the project Sponsor would obtain sole responsibility and what that means from a funding perspective. (*Metropolitan Council*)

Response: The monitoring and adaptive management responsibilities will be further detailed during the Project Partnership Agreement development and the design and implementation phase of the project. Additional details are not typical at the feasibility phase of the project. Ultimately the Corps will ensure that the project is completed to design specifications before closing out the project and moving the project to Sponsor responsibility.

Comment 20: The commenter claims that it is unlikely that neither hardstem nor softstem bulrush will spread sufficiently to prevent shoreline erosion due to the “frequency and extent of bounce in the basin”. *(Metropolitan Council)*

Response: The comment is acknowledged, and will be considered during planting plan development. Bulrush is present around the perimeter of the lake, growing at similar elevations to what is proposed. No further action or change to the plan is required at this time as a result of this comment.

Comment 21: The commenter is concerned with the use of benthic material from the basin for the purposes of topsoil on the constructed islands. *(Metropolitan Council)*

Response: It is not anticipated at this time that the project would utilize benthic muds for topsoil. If preparation of project plans and specifications leads to a proposal to utilize material from Pigs Eye Lake for topsoil, existing contaminant data would be examined and additional testing may be required to ensure the material is acceptable for this use. MPCA, the regulatory authority and regional experts on contamination have been closely consulted with during the development of the feasibility study. No further action or change to the plan is required as a result of this comment.

Comment 22: The commenter is concerned about the project “promoting unrestricted public access for recreation.” Specifically, the commenter is worried about drawing the public into the dump site as well as the lack of a safe public access to the area. *(Metropolitan Council)*

Response: The authority in which this project is proposed is specifically to restore, protect, and create aquatic and wetland habitats. The promotion of recreation is not a project objective. The project area is presently under public ownership; the project would not alter access or land ownership. It is noted that the Regional Park and five-year Capital Improvement Plan will need to be updated by the project Sponsor. No further action or change to the plan is required as a result of this comment.

Comment 23: The commenter is concerned about the likelihood of significant quantities of benthic material discharging into the Mississippi River during construction. The commenter requests the Corps clarify their position on the likelihood of this situation occurring and how it expects the potential mud wave to dissipate without mixing into the water column. *(Metropolitan Council)*

Response: As stated in the feasibility report (pg. 63), construction techniques to reduce the risk of mud waves would be used. Several potential specific measures were discussed during project planning meetings, but were not discussed in detail within the report because: (1) The appropriateness of these measures would be dependent on the construction methods selected by the contractor, and (2) The necessary measures may change as more detailed plans and specifications are developed. Contractors would be required to meet all permit conditions including those identified in the Clean Water Act Section 401 Water Quality Certification provided by the MPCA as well as the Public Waters Work Permit provided by the DNR. Contractors’ plans for environmental protection would be reviewed for acceptability by the Corps as part of the contracting process and quality control would be performed by the Corps during construction. This allows for potential innovative construction techniques, while at the same time requiring that unacceptable impacts are avoided.

Comment 24: The commenter questions the presence of reptiles and amphibians in the project area and is concerned about creating habitat that could attract reptiles and amphibians to an area with contaminated benthic material. (*Metropolitan Council*)

Response: The study teams collaborated closely with local wildlife experts from key state and federal agencies. The plan has been designed to avoid impacting areas where high levels of contamination are present. Historical sediment studies were reviewed and substantial additional sediment testing within the lake was conducted with input from the MPCA and Metropolitan Council, as presented in the main feasibility report (Sec. 7.1.6) and Appendix E. No further action or change to the plan is required as a result of this comment.

Comment 25: The commenter suggests that Battle Creek flows be entirely isolated from the rest of the basin with a floating silt curtain during construction to ensure that disturbed contaminated benthic material isn't carried into the Mississippi River. For the same reason the commenter requests that all barge movement also occurs behind a silt curtain. (*Metropolitan Council*)

Response: This comment suggests that benthic material in the construction area is contaminated to a level that would require special precautions take place. It is important to note that Corps projects are required to avoid being constructed on Hazardous, Toxic and Radioactive Waste (HTRW). Therefore, substantial investigation and coordination went into determining if the benthic material did or did not reach the levels of HTRW or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) level material. Analysis and coordination of HTRW testing results indicated that: (1) CERCLA materials in the project area are at acceptable levels for construction of the proposed project features, and (2) Constructing the proposed ecosystem restoration features within the lake would have positive incidental benefits to the lake and surrounding areas. As a result of these facts, no further action or change to the plan is required as a result of this comment. Construction of the project will be required to meet the conditions of the Clean Water Act Section 401 Water Quality certification provided by the MPCA as well as the Public Waters Works permit provided by the DNR. Compliance with these conditions would assure that water quality downstream is not significantly adversely impacted by project construction.

Comment 26: The commenter is concerned about utilizing data obtained from the New Orleans area to estimate consolidation values and suggested that we obtain a local sample to estimate the consolidation value. (*Metropolitan Council*)

Response: In the feasibility phase of the project the estimation utilizing available data was sufficient to determine that the project will be feasible. Additional testing, if required, will occur during the design and implementation phase of the project. No further action or change to the plan is required as a result of this comment.

Comment 27: The commenter recommends that the Monitoring and Adaptive Management plan annually review the number of reported bird strike by month following the construction of the project and prepare a mitigation plan if an observed change occurs. (*Metropolitan Council*)

Response: The project was closely coordinated with the Metropolitan Airport Commission (MAC) and the Federal Aviation Administration (FAA). The results of that coordination were changes to the project plans as outlined in the report that appeased the concerns of the MAC and FAA. The monitoring of bird strikes will not be a responsibility of the Corps or Sponsor.

Comment 28: The commenter has concerns regarding the long-term stability the project. Specifically the commenter is concerned about the success of vegetation establishment as it is a critical aspect of habitat creation and island stability. (*City of St. Paul*)

Response: The concerns of the commenter are noted; however, there is no evidence to suggest that vegetation will not establish. There are strong plant communities throughout the basin and with the reduction of wind-generated wave erosion, vegetation is expected to establish. If problems are discovered during the 10-year monitoring and adaptive management period, measures will be taken to correct the problem. No further action or change to the plan is required as a result of this comment.

Comment 29: The commenter asserts that the proposed maintenance budget is “woefully inadequate” and that there is not enough detail on adaptive management practices that could be utilized to address the problems. (*City of St. Paul*)

Response: The monitoring and adaptive management plan presented as Appendix J in the feasibility study was developed to address the largest uncertainties of project performance identified during project planning. Monitoring commences upon construction completion and is continued up to 10 years, or until ecological restoration success is documented. The budget for monitoring and adaptive management presented in the report was developed based on cost estimates from those who have completed the proposed tasks in the past, and is consistent with congressional authorizations for monitoring and adaptive management. Similar ecosystem restoration projects planned and constructed by the Corps have required very minimal adaptive management to meet similar success criteria. The detail put forth in the study is adequate for feasibility phase purposes; further detail on adaptive management will be developed in the design and implementation phase of the project. No further action or change to the plan is required as a result of this comment.

2 Public Release Documents



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

RAMSEY COUNTY
PARKS AND RECREATION DEPARTMENT
2015 VAN DYKE STREET
MAPLEWOOD, MN 55109-3796



March 12, 2018

Dear Interested Parties:

The U.S. Army Corps of Engineers, St. Paul District – in close collaboration with the non-federal project sponsor, Ramsey County, Minnesota – has completed a draft feasibility study for the Pigs Eye Islands Continuing Authorities Program Section 204 project. The project documentation is being released for concurrent public review and comment under applicable Federal and State laws:

Federal: National Environmental Policy Act (NEPA)
Section 404 of the Clean Water Act

State (MN): Minnesota Environmental Policy Act (MEPA)

Enclosed for your information, review, and comment is the draft Environmental Assessment, Clean Water Act Section 404(b)(1) evaluation, Public Notice, and Minnesota Environmental Assessment Worksheet (EAW) supplement appendix. These documents and all additional appendices are posted at: <http://www.mvp.usace.army.mil/Home/PublicNotices.aspx>. A 30-day public review and comment period will begin on March 12, 2018.

National Environmental Policy Act (NEPA) and Section 404 of the Clean Water Act:

A draft Environmental Assessment has been prepared for the proposed action in accordance with the NEPA. If public review identifies any significant concerns or results in project modifications, a revised NEPA document may be prepared. A Section 404(b)(1) evaluation has been prepared to evaluate the proposed placement of fill in waters of the United States, in accordance with the Clean Water Act of 1977.

Minnesota Environmental Policy Act:

The proposed project exceeds the threshold requiring a Mandatory EAW (*Minnesota Rules, part 4410.4300, subpart 27A, Wetlands and Public Waters*). The Federal Environmental Assessment that was prepared for the project is being circulated in place of the Environmental Assessment Worksheet (EAW) form (*as allowed by Minnesota Rules, part 4410.1300*). For your convenience, a supplemental document has been prepared and is presented as **Appendix II** that identifies where each of the EAW items can be found within the project report. The publication of the notice of availability will be posted in the EQB Monitor on March 12, 2018. This signed cover letter serves as the certification found in the EAW form by the responsible governmental unit (RGU), assuring the document's completeness and accuracy.

Comment Submission:

Comments should be submitted no later than **April 12, 2018 at 4:30 pm**. All comments will become an official part of the administrative record and will be available for public examination.

Comments will be addressed jointly as applicable, unless the commenter specifies that the comment should be directed to a particular environmental review process or agency. In efforts for efficiency, if your agency is reviewing and providing comments for both the Federal NEPA review and the non-federal review, please submit one set of responses to avoid duplication of comments

Questions or comments can be submitted electronically to Aaron McFarlane, project Biologist at (651) 290-5660 or at aaron.m.mcfarlane@usacre.army.mil. If submitting comments electronically, please include your name and U.S. mailing address.

Written comments must be received by Thursday, April 12, 2018, at 4:30 pm, and sent to:

District Commander
St. Paul District, Corps of Engineers
Attention: Regional Planning and Environment Division North
180 Fifth Street East, Suite 700
St. Paul, Minnesota 55101-1678

Sincerely,



Terry J. Birkenstock
Deputy Chief, Regional Planning and
Environment Division North



Jon Oyanagi
Director, Ramsey County
Parks and Recreation



**US Army Corps
of Engineers®**
St. Paul District

Public Notice

Project: Pigs Eye Lake – CAP Section 204
Ramsey County, Minnesota

Date: 12 March 2018
Expires: 12 April 2018

In Reply Refer to:
Regional Planning and
Environment Division North

1. Project Proponent. St. Paul District, Corps of Engineers, 180 Fifth Street East, Suite 700, St. Paul, Minnesota 55101-1678, in conjunction with the local sponsor: Ramsey County Parks and Recreation.

2. Project Authority. The proposed actions were authorized under Section 204 of the Water Resources Development Act of 1992, as amended.

3. Project Location. The proposed actions would be located in Pool 2 of the Mississippi River in Ramsey County, Minnesota, in the Saint Paul metro area.

4. Summary of the Proposed Project.

- a. The proposed project would enhance and restore backwater habitat by creating island and wetland features within Pigs Eye Lake. Construction of project features would primarily use material dredged from the Mississippi River by the Corps of Engineers during routine maintenance of the navigation channel. A complex of seven islands would be constructed; three of these would incorporate wetland creation and plantings in the centers of the islands. Islands would be planted with a mix of native plants that would be appropriate for floodplain soils. The project would benefit the area by: (1) Serving as wind barriers within the lake to reduce sediment resuspension and shoreline erosion; (2) Improving habitat for migratory birds; (3) Stabilizing the lake bottom; and (4) Providing a positive and productive use of dredged material.
- b. The proposed fill action would involve placing clean sand, topsoil, and rock into Pigs Eye Lake with a total footprint of approximately 40 acres. The total estimated fill quantity is estimated to be 413,300 cubic yards.

5. Construction Schedule. Construction of the proposed actions is scheduled to be carried out beginning in 2019.

6. Permits/Coordination.

- a. General. The proposed action has been coordinated with Ramsey County, the U.S. Fish and Wildlife Service, the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, National Park Service, local airport authorities, and others.

b. State. The filling for the proposed project is subject to regulation by the State of Minnesota in accordance with Section 401 of the Clean Water Act. A request for Water Quality Certification will be made to the Minnesota Pollution Control Agency (MPCA). Any comments relative to the MPCA's Section 401 Certification for the activity proposed in the public notice may be sent to the following address:

Minnesota Pollution Control Agency,
Resource Management and Assistance Division.
Attention 401 Certification
520 Lafayette road North
St. Paul, MN 55155-4194

c. Federal. A Draft Environmental Assessment and Finding of No Significant Impact was prepared and coordinated in accordance with the National Environmental Policy Act. Coordination with the U.S. Fish and Wildlife Service occurred during the planning process. A Section 404(b)(1) evaluation was prepared in accordance with the Clean Water Act of 1977.

7. Summary of Environmental Impacts. The project would have temporary minor adverse impacts on noise levels, aesthetic values, recreational opportunities, air quality, terrestrial habitat, aquatic habitat, biological productivity, and surface water quality; the project would have substantial beneficial effects on terrestrial habitat, wetlands, aquatic habitat, and habitat diversity and interspersion; the project would have additional minor beneficial effects on aesthetic values, recreational opportunities, commercial navigation, biological productivity, and surface water quality; and the project would have temporary, minor beneficial effects on employment.

8. Report. A Draft Environmental Assessment that describes the project and the environmental impacts in detail is available to the public and can be viewed at <http://www.mvp.usace.army.mil/Home/Public-Notices/>. The report includes project drawings, a Draft Finding of No Significant Impact, and letters of coordination from regulatory agencies.

9. Public Hearing Requests. The Section 404(b)(1) evaluation is being distributed as part of this environmental assessment. Anyone may request a public hearing on this project. The request must be submitted in writing to the District Engineer within 15 working days of the date of this Public Notice. Interested parties are also invited to submit to this office written facts, arguments, or objections to this project prior to the expiration date of this Public Notice. These statements should clearly state the interest the project would affect and how the project would affect that interest. A request for public hearing may be denied if substantive reasons for holding a hearing are not provided or there is otherwise no valid interest to be served. All statements will become an official part of the project file and will be available for public examination.

10. Review and Comment. If you have any comments on the environmental assessment they should be provided before the expiration date of this notice. Persons submitting comments are advised that all comments received will be available for public review, to

include the possibility of posting on a public website. Questions on the project or comments on the Environmental Assessment can be directed to Aaron McFarlane, project biologist at (651) 290-5660 or at aaron.m.mcfarlane@usace.army.mil. Please address all formal written correspondence on this project to District Commander, St. Paul District, Corps of Engineers, ATTN: Regional Planning and Environment Division North, 180 Fifth Street East, Suite 700, St. Paul, Minnesota 55101-1600.

A handwritten signature in black ink, appearing to read "Terry J. Birkenstock". The signature is stylized with a large initial "T" and a long horizontal stroke at the end.

Terry J. Birkenstock
Deputy Chief, Regional Planning and
Environment Division North

3 Copies of Comments Received

Comment letters received during the public review period (March 12 – April 12, 2018) are provided in this section.



520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity/Employer

April 5, 2018

District Commander
St. Paul District, Corps of Engineers
ATTN: Regional Planning and Environment Division North
180 Fifth Street East, Suite 700
St. Paul, MN 55101-1600

Re: Pigs Eye Lake Section 204 Environmental Assessment

Dear District Commander:

Thank you for the opportunity to review and comment on the Environmental Assessment (EA) for the Pigs Eye Lake Section 204 project (Project) in Ramsey County, Minnesota. The Project consists of restoration of Pigs Eye Lake via the creation of aquatic and wetland habitats in connection with maintenance dredging. Regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility or other interests, the MPCA staff has the following comments for your consideration.

Noise (Item 17)

The MPCA agrees with the Army Corps of Engineers, and does not expect that there will be any noise impacts to the area after completion of the Project. The MPCA encourages the contractors to ensure that all construction equipment is fitted with the appropriate mufflers during Project activities, as feasible, and that construction activities take place between 7 a.m. and 10 p.m., during which time the state noise standards are slightly higher.

We appreciate the opportunity to review this Project. Please provide your specific responses to our comments and notice of decision on the need for an Environmental Impact Statement. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the Project for the purpose of pending or future permit action(s) by the MPCA. Ultimately, it is the responsibility of the Project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this EA, please contact me by email at Karen.kromar@state.mn.us or by telephone at 651-757-2508.

Sincerely,

A handwritten signature in blue ink that reads 'Karen Kromar'.

Karen Kromar
Project Manager
Environmental Review Unit
Resource Management and Assistance Division

KK:bt

cc: Dan Card, MPCA, St. Paul
Christine Steinwand, MPCA, St. Paul
Teresa McDill, MPCA, St. Paul



*Working to protect the Mississippi River
and its watershed in the Twin Cities area.*

101 East Fifth Street
Suite 2000
Saint Paul, MN 55101

651-222-2193
www.fmr.org
info@fmr.org

April 12, 2018

District Commander
St. Paul District, U.S. Army Corps of Engineers
ATTN: Regional Planning and Environment Division North
180 Fifth Street East, Suite 700
St. Paul, MN 55101

RE: Environmental assessment of the ACOE Pigs Eye Lake habitat restoration project.

District Commander:

Friends of the Mississippi River (FMR) is a local non-profit community-based organization that works to protect and enhance the natural and cultural assets of the Mississippi River and its watershed in the Twin Cities. We have 2,400 active members, more than 3,000 volunteers and 1,600 advocates who care deeply about the river's unique resources. FMR has long been an active and ongoing participant in environmental review processes occurring in and along the Mississippi River in the Twin Cities.

We are writing today with brief comments on the draft environmental assessment for the proposed Pigs Eye Lake restoration project.

FMR is generally in support of the draft environmental assessment and proposed creation of seven islands in Pig's Eye Lake. The stated project objectives are in line with FMR's mission to protect, restore, and enhance habitat along the Mississippi River. However, we also believe that this project presents an important opportunity to build in experimentation around climate resilience, which is not currently presented in the plan.

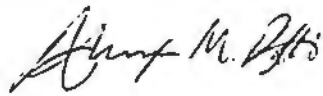
Creation of new habitat in any given area must take into account historical, current, and potential future conditions of that area. Facing an uncertain climate future, one in which the state of Minnesota is expected to experience increases in temperature and subsequent range shifts of both plant and animal species, any project creating new habitat would be wise to consider the implications of these changes.

The proposed seven islands in Pig's Eye Lake present an opportunity for a living laboratory of sorts, in which different combinations of plant communities or plant ecotypes on each island could provide important insights into how shoreline and wetland communities will respond to a changing climate. This idea also builds resilience into the overall project itself, preventing a large loss of investment if a particular island or plant community were to fail due to pests, disease, climate change, or other related stressors.

FMR proposes that the Corps consider using this Pig's Eye habitat project as a study site, in partnership with organizations like FMR and the University of Minnesota, to experiment with plant community assembly questions in the face of a changing climate. By monitoring these changes in the long-term, we could gain important insights that could influence how non-profit, local, state, and federal agencies approach the field of habitat restoration.

Thank you for your consideration of these comments. I would be happy to discuss these further – please do not hesitate to contact me at 651-222-2193 x 33, or aroth@fmr.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Alex M. Roth". The signature is fluid and cursive, with the first name "Alex" being more prominent.

Alex Roth, PhD
FMR Ecologist

From: [Yonke, Scott](#)
To: [McFarlane, Aaron M CTV USARMY CEMVP \(US\)](#)
Subject: FW: EAW18-007 Pigs Eye Lake Islands
Date: Thursday, April 05, 2018 10:16:45 AM
Attachments: [Undeliverable EAW18-007 Pigs Eye Lake Islands.msg](#)

PY1

Scott Yonke, PLA | Director of Planning and Development

Ramsey County Parks and Recreation Department
2015 Van Dyke Street

Maplewood, MN 55109-3796

DD 651-363-3786

Blockedwww.co.ramsey.mn.us <Blockedhttp://www.co.ramsey.mn.us/>

From: Pansch, Joshua (DOT) [<mailto:josh.pansch@state.mn.us>]
Sent: Thursday, April 05, 2018 8:02 AM
To: Yonke, Scott <scott.yonke@co.ramsey.mn.us>
Subject: FW: EAW18-007 Pigs Eye Lake Islands

Hello Scott

I attempted to send the following email to Aaron McFarlane regarding the Pigs Eye Lake Islands EAW and it was undeliverable (attached). Can you please have this sent on to the appropriate people?"

Thank you

josh

Josh Pansch, Senior Planner

MnDOT Metro District

1500 W. County Road B-2

Roseville, MN 55113

(651) 234-7795

josh.pansch@state.mn.us <<mailto:josh.pansch@state.mn.us>>

From: Pansch, Joshua (DOT)
Sent: Thursday, April 5, 2018 7:57 AM
To: Aaron.m.mcfarlane@usace.army.mil <<mailto:Aaron.m.mcfarlane@usace.army.mil>>
Cc: Olson, Nicholas (DOT) <nicholas.olson@state.mn.us> <<mailto:nicholas.olson@state.mn.us>> >, Craig, E. (DOT) <buck.craig@state.mn.us> <<mailto:buck.craig@state.mn.us>> >, Coddington, Ryan (DOT) <ryan.coddington@state.mn.us> <<mailto:ryan.coddington@state.mn.us>> >, Straumanis, Sarma (DOT) <sarma.straumanis@state.mn.us> <<mailto:sarma.straumanis@state.mn.us>> >, Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us> <<mailto:nick.tiedeken@state.mn.us>> >, Sherman, Tod (DOT) <tod.sherman@state.mn.us> <<mailto:tod.sherman@state.mn.us>> >, Scheffing, Karen (DOT) <karen.scheffing@state.mn.us> <<mailto:karen.scheffing@state.mn.us>> >, Wiltgen, Jennifer (DOT) <jennifer.wiltgen@state.mn.us> <<mailto:jennifer.wiltgen@state.mn.us>> >, Pansch, Joshua (DOT) <josh.pansch@state.mn.us> <<mailto:josh.pansch@state.mn.us>> >
Subject: EAW18-007 Pigs Eye Lake Islands

Good Morning,

The Minnesota Department of Transportation (MnDOT) has reviewed the above-referenced EAW and has no comments, as the proposed project should have little or no impact on MnDOT's highway system.

If you have any questions please let me know.

Thanks

Josh

Josh Pansch, Senior Planner

MnDOT Metro District

1500 W. County Road B-2

Roseville, MN 55113

(651) 234-7795

josh.pansch@state.mn.us <<mailto:josh.pansch@state.mn.us>>



Minnesota Department of Natural Resources
Ecological and Water Resource
1200 Warner Road
St. Paul, MN 55106

April 12, 2018

Transmitted Electronically

Scott Yonke
Director of Planning and Development
2015 Van Dyke St
Maplewood, MN 55109

Re: Pigs Eye Lake Islands EA/EAW

Dear Scott Yonke,

The Minnesota Department of Natural Resources (DNR) has reviewed the Environmental Assessment Worksheet (EAW)/Environmental Assessment for the Pigs Eye Lake Islands project. While staff from the DNR have been involved with project discussions over the course of the last couple of years we have some questions regarding the project, in many cases, our comments below are aimed at better understanding the Project and how it would be carried through. Other comments include areas where DNR has information that could have been included in the EAW as additional information/background. We offer the following comments for your consideration.

Clarification requested:

Section 4.3.6 Shoreline Stabilization (p 39):

- Explain in more detail why stabilization of the existing shoreline was not given greater consideration as a construction design alternative. The narrative describes the use of rock groins and other structures along the shoreline as feasible but not preferable for shoreline stabilization because they would reduce the aesthetic value of the area. However, rock groins are included in the island design to provide shoreline stabilization. How is the impact on the aesthetic value of the area from the rock groins associated with island building different than if groins were constructed on the shoreline of the lake?
- How do the benefits of habitat creation in the middle of the lake compare to habitat creation along the shoreline of the lake, where habitat is currently being lost from erosion? Table 4 (p 43) states that shoreline stabilization would not be efficient in terms of cost. What factor did cost play in removing this management measure from further consideration?

Section 5.4.2 Risk and Uncertainty (p 56):

- Describe in greater detail how the setting of this project (a large riverine wetland) compares with the river settings where island building projects have been constructed in the past. What potential risks and uncertainties were identified for this particular setting, in comparison to other island building locations on the Upper Mississippi River?

Section 6.3.1 Construction Restrictions (p 63):

- In the plan formulation, the feasibility of construction access was mentioned as an engineering constraint for this project, but this issue was not discussed in any detail. From the north end of the Red Rock Barge Terminal to the north end of the area of construction, the depth of Pigs Eye Lake varies from 2 – 4 feet. Provide more detail on how access to the interior of the lake would be obtained for the type of construction that is proposed. For example, if barge access into the lake is required for construction, explain and quantify what excavation would be required to gain access and to build islands. Would

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material excavated for construction be incorporated into the islands or disposed of offsite? Additional Environmental Review may be needed, depending on the design and degree/need for dredging.

- Please describe what is meant by “staggered lifts” and the amount of time required for staggering.

Section 6.3.2 Construction Schedule:

- Much of the construction schedule described lies within the sensitive nesting period of April 1 – July 15. It’s not clear how long construction of the project is expected to take. It’s stated that it is optimum to construct the project under one contract, but, it’s not clear the length of time that might be needed (e.g. one month or eight months). Provide information on the expected duration of the project.

Supplemental information from DNR:

- Section 2.1.1 Pigs Eye Lake Heron Rookery. In addition to the information provided within this Section, please note that the SNA is also designated as a Sanctuary during the peak breeding and brooding period for the many birds using the colony. Sanctuaries are sites within Natural Areas that are closed year-round or during specific seasons and help protect rare and sensitive natural features, such as nesting sites. Pigs Eye Island Heron Rookery Scientific and Natural Area Sanctuary is closed April 1 – July 15. Entering a closed sanctuary is in violation of state law. While the closure dates are noted within the EAW, we feel the designation as a “sanctuary” should be noted, and proposers should be aware of this status.
- Section 2.8.1 Fish. Invasive silver carp are also present.
- Section 2.8.4.2 State-listed Species. Paddlefish, a state threatened species, were thought to inhabit Pig’s Eye Lake at various times of the year, though they had not actually been documented in the lake. However, in 2017 one paddlefish implanted with a transmitter in the Minnesota River was detected on a passive acoustic receiver in the middle of Pig’s Eye Lake on three separate occasions (in June, September, and October). The importance of Pig’s Eye Lake to paddlefish is not currently known; islands are not believed to be detrimental to paddlefish in Pig’s Eye Lake. This information was not entered into the NHIS database and therefore would not have been discovered in an NHIS inquiry, ~~but should be~~ included within this section.
- 6.7 Project Performance
- Section 7.2.6 Biological Productivity. DNR should be contacted and be involved in evaluating impacts from contractor proposed activities to ensure impacts to nesting birds utilizing the Pigs Eye Island Heron Rookery Scientific and Natural Area Sanctuary do not occur.
- Appendix E: Pages 40-42 of Appendix E Sediment Report highlights fish and PFC concentrations in Pool 2. It states “Ye et al. examined common carp in particular, and noted that because common carp are known to generally stay within a smaller home range, the 27 km distance between Pig’s Eye Lake and Lower Pool 2 is likely to limit the movement of carp between these areas, and therefore, the differences in PFC concentrations between the two areas may be a good indicator of significantly different levels of PFC inputs to the system.” A fish telemetry study initiated in 2013 (and still ongoing) in the Mississippi and St. Croix rivers has implanted acoustic transmitters in over 230 fish representing 12 species. Specific to common carp, the mean river mile range for 10 common carp implanted with transmitters in Pool 2 was 18.46 miles (29.71 km) in the Mississippi River (one of which routinely travels to Pool 1). All 10 of these common carp were also detected in the Minnesota River ranging from 2.21 miles (3.56 km) to 209.4 miles (337 km) up the Minnesota River. Five of these common carp were detected in Pig’s Eye Lake, of which three had over 58% of their detections within the lake. Three of the common carp traveled downstream at least as far as Spring Lake. Transmitters implanted in common carp have a 10 year life expectancy so data collection continues on the travels of these fish, however half have either died, been harvested, expelled their transmitter, or are in a location not within range of a passive

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acoustic receiver and their whereabouts are unknown. DNR fisheries staff believe that the movement assumptions by Ye et al. are underestimates and not relevant as they were based on a common carp movement study in Australia (Stuart IG, Jones MJ. Movement of common carp *Cyprinus carpio*, in a regulated lowland Australian river: implications for management. Fish Manag Ecol 2006; 13: 213-9). Stuart and Jones stated less than 20% of tagged common carp moved more than five km from their original capture site over a five year period (based on recaptures of externally tagged fish, not transmitters). However over 7% moved over 100 km. In our current ongoing study, including the missing common carp and travels into the Minnesota River, all 10 have traveled over 3.1 miles (5 km) in a four year period. Based on our preliminary data, there is no reason to conclude that the distance between Pig's Eye Lake and Lower Pool 2 is great enough to limit interchange of common carp. Additional fish contaminant testing was conducted on Pool 2 in 2016 and included fish specifically from Pig's Eye Lake. It does not appear that the Pig's Eye Lake fish were tested for PFC's, but were tested for other contaminants like PCB's and Dioxins (Bruce Monson at MPCA can be contacted regarding this data). It is not believed fish movement data currently being collected by the MNDNR should preclude island construction.

On behalf of the DNR, thank you for consideration of these comments.

Sincerely,

/s/ Rebecca Horton
Region Environmental Assessment Ecologist

CC: Jen Sorenson, Joel Stiras

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1200 Warner Road, St. Paul, MN 55106



IN REPLY REFER TO

L3033

United States Department of the Interior

NATIONAL PARK SERVICE
Mississippi National River and Recreation Area
111 E. Kellogg Blvd., Ste 105
St. Paul, Minnesota 55101-1256

April 12, 2018

Col. Sam Calkins
District Commander
Corps of Engineers, St. Paul District
Attention: Regional Planning and Environment Division North
180 East Fifth Street, Suite 700
Saint Paul, MN 55101

RE: Comments - Pigs Eye Lake Ramsey County, MN Section 204 Draft Feasibility Study
Report with Integrated Environmental Assessment

Dear Col. Calkins:

This letter is in regards to the draft "Pigs Eye Lake Ramsey County, MN Section 204 Draft Feasibility Study Report with Integrated Environmental Assessment" recently sent out for comment. The entirety of Pool 2, which includes Pigs Eye Lake, is within the boundaries of the Mississippi National River and Recreation Area (NRRA). In 1988, Congress established the NRRA to protect and enhance the nationally significant historical, recreational, scenic, cultural, natural, economic and scientific resources of the 72-mile Mississippi River corridor through the Twin Cities metropolitan area.

After reviewing this document and the attached appendices, we find the project supports the enabling legislation of the NRRA, as well as the goals and objectives found in our Foundation Document. We, therefore, have no objections to this project and support work done to enhance the Pigs Eye Lake area for the benefit of the river system and its inhabitants.

Thank you for the opportunity to comment on this draft, and we are interested in being part of continuing work on this endeavor. If you have any questions, please contact me at 651-293-8432, or email john_anfinson@nps.gov.

Sincerely,

John O. Anfinson
Superintendent

April 12, 2018

Mr. Aaron McFarlane
Saint Paul District, Corps of Engineers
ATTN: Regional Planning and Environment Division North
180 Fifth Street East, Suite 700
Saint Paul, MN 55101-1678

RE: Pigs Eye Lake Project
CAP Sections 204 – Clean Water Act - Public Notice
City of Saint Paul, Ramsey County, Minnesota
Metropolitan Council District 13, Richard Kramer
Review File No. 21896-1

Dear Mr. McFarlane:

Metropolitan Council (Council) staff have reviewed the Public Notice for this proposed project (Project) to determine its adequacy and accuracy in addressing regional concerns and its potential for significant environmental impacts. The project proposes to construct seven island structures within Pigs Eye Lake primarily out of reclaimed Mississippi River navigation channel dredge material under Section 204 of the Corps' Continuing Authorities Program (Program). This Program provides authority for the Corps of Engineers to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized Federal navigation project (in this case, the Mississippi River). The islands would be constructed to meet the Project objectives of improving aquatic habitat, increase available nesting and resting bird habitat, and maintain or enhance the quantity of shoreline habitat within Pigs Eye Lake.

While Council staff has not made a specific determination that an Environmental Impact Statement needs to be prepared for the Project, we have identified a number of concerns that we believe should receive additional review prior to proceeding with the Project as currently designed. We also have concerns with this project proceeding without a more comprehensive approach or plan to addressing the contamination issues in the area.

The following comments are offered concerning the Public Noticed Project Draft Feasibility Study Report, EA/EAW, and Appendices.

Draft Feasibility Study Report

Section 1.3 – Project Area

The text here and throughout the document identifies the Pigs Eye Lake basin (basin) as a shallow backwater lake. Text in Section 6.5 however, specifically classifies the basin as a "large riverine wetland", which seems more accurate since Section 2.1 and Figure 2 indicate water depths to benthic muds average only 3-4 feet deep in the deepest areas of the 628-acre open-water basin which is surrounded by 131 acres of shallow marsh wetland. We would expect that the basin currently exhibits predominately wetland functions over those of a lake. While the basin may at some point in its life have met the definition and exhibited the functions of a lake – after the creation of Mississippi River Pool 2 in approximately 1930 and before disposal of waste

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began in the upstream dump area in the mid-50s and before the Red Rock (barge) Terminal was dredged from the basin to the main channel of the River, Council staff proposes it should be referred to only as a wetland throughout the Feasibility Study Report (Report) and Appendices, and as a lake in its mapped name only.

Section 2.5 – Water Quality

The text indicates that no water quality samples were taken from within the basin in preparation of the Report, and that the most recent samples of record available were obtained between 1970 and 1988. The only water quality values presented were one mean concentration for total phosphorus of 0.365 mg/l and a mean Secchi disk transparency of 1.3 feet – both of unknown time or location. Council staff believes that this level of water quality information for the 628-acre basin is inadequate to base a \$15M+ Project's objective assumptions that the construction of sand bench islands as proposed will lower basin turbidity and result in improved aquatic plant diversity, fishery, and migratory bird habitat in the basin.

Water column turbidity would likely persist after construction of the project as proposed solely due to the anticipated continued dominance of Chironomidae and Oligochaeta in the poor quality benthic muds and their ability to continue to attract a persistent overabundance of rough-fish into the basin. We recommend that water quality and toxicity testing be carried out on water column samples within the basin before progressing with the project to determine if the quality of water in the basin will support a more diverse fishery; enhanced populations of phytoplankton and zooplankton (should turbidity drop); and propagation of the palate of wetland plant species proposed to be planted on the islands. With no DO, BOD/COD, ammonia/nitrogen, phosphorus, pH, heavy metals, or chronic/acute aquatic toxicity test data available on the basin water column to support the Project's many assumptions, we believe it is premature to move the Project forward.

Section 3.2.3 – Shoreline Erosion

The text and Figure 12 document shoreline erosion, observed to have occurred from 1951 to 2015, with an intermediate observation point in 1991. There is no doubt that the basin boundaries have not stabilized, but Council staff is not convinced that they are primarily due to wind fetch, or that the proposed Project will be effective in stabilizing the shorelines if constructed as proposed.

The 1951 aerial depicts a point in time shortly before the upstream dump began its operation and significant level of disturbance in the upstream area. It is possible that the direct runoff containing peat and woody (construction waste) debris during dump excavation and operation and continual seepage of fine silt and clay particles, organics, and toxic materials disposed of in that 300-acre site from the mid-1950s until 1972 are likely responsible for the observed succession of sediment that has accumulated into the 10 to 22 feet thick layer of very soft, highly organic benthic muds in the bottom of the basin. We believe that the degraded quality of the water and accumulated sediment may have contributed to the gradual die-off of more sensitive vegetation species over the observed period of time. And, since neither the extensive accumulation of benthic muds in the basin, nor the upstream 300-acre dump are proposed to be further encapsulated or removed, their negative influence on the basin's health can be expected to continue.

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We would expect that wind fetch should have had a similar effect from 1930 to 1951 if it is a current primary cause of the erosion, but aerial photo evaluation of that period of time has not been evaluated in the document. Aerial photos from 1937 and 1947 are included in an unlabeled section between Appendices J and L, but do not show the entire basin so that perimeter landmarks can be compared with later aerials. If toxicity in the water column and basin substrate has, since the mid-1950s been one of the primary reasons for limited aquatic plant germination and diversity, construction of the Project as proposed may have little change in the erosional progression of the basin's shoreline in the future as predicted in Figure 14.

Council staff believes that a primary contributor to erosion of the basin shoreline is water level fluctuation in the basin and extended periods of root crown inundation during periods of high water elevation. The River's stated 'normal summer elevation' is 687.1 feet at the South Saint Paul Gage (Gage) at River Mile 833.7 just downstream from the barge channel outlet of the basin (as shown on Figure 5 in Appendix G). We would expect that the water level within the basin should closely mirror that of the River at the nearby Gage based upon the proximity and size of the interconnecting barge channel. In examining historic daily water level readings at the Gage for 2016 and 2017, obtained from <http://rivergages.mvr.usace.army.mil/WaterControl/stationinfo2.cfm?sid=SSPM5&fid=SSPM5&dt=S>, the water level exceeded 690 feet (also the approximate maximum elevation of Project constructed sand islands) for approximately 50 days in 2016 and 65 days in 2017, almost exclusively during the growing season. There were five time periods during those two years when there were two to three weeks of continuous water level above elevation 690 – two in 2016 and three in 2017. Few plant species are able to withstand that extent of water level rise and period of inundation. Any degree of wind fetch could be expected to exacerbate shoreland erosion. The study does not provide any shoreline cross-sections or elevations at any locations around its perimeter to adequately determine the full potential negative effects of water surface level fluctuations of this magnitude and frequency.

Section 6 – Recommended Plan

Study Alternative 6m has been recommended based upon aquatic ecosystem enhancements anticipated from 16.3 acres of newly created floodplain forest habitat, reduced wind-wave action and 17.6 acres of new wetland marsh habitat. Council staff is concerned with the assumption that deciduous hardwoods will be able to become established on the sand islands constructed over unconsolidated benthic muds as well as they have historically on the adjacent floodplain soils. Young deciduous trees are more vulnerable to extended periods of inundation than mature trees. It is also unknown if there will be sufficient oxygen available to the tree roots for the trees to thrive. As deciduous trees grow taller in this setting, their root systems may struggle to become established and attain sufficient stability to resist overturning in windy conditions. The only woody species mentioned in the study as planned for planting on the islands at present is 'willow' – presumably sandbar willow, a medium sized shrub and not a hardwood tree.

Additional study of specifically what hardwoods might survive in the shallow contaminated substrate and repeated extended periods of crown inundation without sinking or toppling in periods of sustained winds should be carried out during the planning phase and not following construction. Without some indication of what species of trees are going to be viable on the proposed 16.3 acres of bottomland forest, we are unable to provide an adequate review of the

Mr. Aaron McFarlane
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proposal. The maximum planned depth of the coarse sand islands of approximately five feet will be over poorly consolidated organic muds which exhibit no soil structure for tree roots to gain stable footing. While we are aware of several areas where the Corps has successfully constructed vegetated islands to improve habitat within the River corridor, we are not aware of any which have been undertaken on sediment with exhibits the extent of chemical and physical limitations the basin's benthic muds present.

Section 6.2 – Design Considerations

Settlement of sand islands into the benthic mud is assumed to be 2.5 feet where the sand islands will be 4 to 5 feet thick, and an average of 1.5 feet where shallower. Notes from a meeting held on January 20, 2016 contained in Section 2 of Appendix A indicate it was estimated that sediment consolidation of soft soils over time under the weight of the constructed islands was estimated at 1.5 to 3 feet. Should that estimate fall short of actual settlement by one half foot, and the islands continue to settle to a maximum depth of 3.5 feet during the first few years after construction, they will all be submerged during all but low River flow periods. Would this situation be considered a maintenance issue, and the responsibility of Ramsey County, or might alternatives be considered to either abandon the effort or add further material to the constructed islands and replant all vegetation?

Section 6.4 – Operation and Maintenance Considerations

Critical issues that will have significant implications on the long-term cost for Operations, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) will be how quickly the islands reach their stable settlement point, and how long it takes for vegetation to become established on the islands. Annual OMRR&R will only be minimal as anticipated (currently estimated at \$2000/year) if full stability is achieved by the Project before its responsibility is turned over to Ramsey County, the identified Project Sponsor. It is unclear from the Study how long monitoring and joint (Corps and County) responsibility for monitoring and replanting will extend and when the County will assume full responsibility for future expenses.

Section 11 in Appendix I states that cost-shared Monitoring and Adaptive Management (MAM) will continue for 10 years following implementation. Does that mean that Ramsey County will not assume sole maintenance responsibilities for the Project until after this 10-year MAM period is completed?

Section 7.1.5.3

The text indicates that softstem and hardstem bulrush are prevalent along much of the basin shoreline. Typically, softstem varieties tend to grow in softer sediment and hardstem varieties in firmer sediment, and both expand rhizomatously. It is unlikely that either plant type have or will spread sufficiently to prevent shoreline recession due to the frequency and extent of bounce in the basin.

Section 7.1.6.2 – Proposed Fill Material

The text indicates the potential for use of benthic muds from the basin for proposed Project island topsoil. Council staff strongly discourages any use of benthic muds sourced from the basin as topsoil for the Project. Heavy metals including copper, cadmium, lead, and zinc; in addition to PAHs, PCBs, and PFCs in particular are reportedly found to be abundantly adsorbed

Mr. Aaron McFarlane
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to benthic sediments throughout the basin. Copper and cadmium in particular have both been reported to inhibit plant growth (including willow), exert negative effects upon both shoot and root growth, and tend to accumulate preferentially in plant roots.

The indicated high organic content (9 to 17%) in benthic muds in the basin would also be expected to increase their heavy metal adsorption capacity over typical clay or silica sediment particles. Copper is specifically reported to interfere with the metabolism of many plant species, inhibiting photosynthesis, nitrogen fixation, and phosphorus uptake in algae, if present in sufficient concentrations. Additionally, continual wetting and drying of the benthic material can be expected to result in the chemical release of heavy metals and other bound pollutants. Choice of plants to be grown on the proposed islands should be made carefully, as some species have a high ability to absorb and accumulate elevated levels of metals in various plant areas (root, crown, stem, seeds, etc.), which if/when consumed by fauna, can become magnified through the food chain. Additionally, acidic water is reported to enhance the uptake of heavy metals by plants, and the pH of water within the basin is presently unknown.

Section 7.4.3.1 – Recreation

At this time the document has provided limited information from which to determine the appropriateness of proposed expanded recreational opportunities for Pigs Eye Lake. The basin is located within the boundaries of Battle Creek – Indian Mounds Regional Park which is jointly operated by Ramsey County and the City of Saint Paul. There are four units within the park master plan – Battle Creek, Fish Hatchery Lake, Indian Mounds Park/Municipal Forest, and Pigs Eye Lake. Saint Paul independently oversees the Indian Mounds and Fish Hatchery Lake portion of the park, and Ramsey County the Battle Creek and Pigs Eye Lake portion. Battle Creek – Indian Mounds Regional Park is a component of the regional parks system and is governed and afforded additional protection by the Metropolitan Council's *2040 Regional Parks Policy Plan*.

While there have been more recent master plan (Plan) amendments to the park boundaries, the Plan for the Battle Creek portion which contains Pigs Eye Lake dates to June 1981. At that time, the Plan indicated that the Pigs Eye Lake unit was not yet in a development stage, so plans and information were extremely limited.

There are several regional trails and a trail search corridor in vicinity of the proposed Project. The Mississippi River Regional Trail is located directly adjacent to the Project site area, on the western bank of the River. The Samuel Morgan Regional Trail, and State and Ramsey County components of the trail pass through the adjacent Indian Mounds Park and Battle Creek Regional Park units across the rail yard and adjacent to CSAH 61 to the east of the Project site. Additionally, the Point Douglas (Bruce Vento-Washington County) Regional Trail Search Corridor, a wide potential siting corridor in which a future trail is planned, passes through the Project site, trending along the River and CSAH 61 in the immediate vicinity of the area. These facilities should be acknowledged in the Report and EA/EAW as current and future regional trail facilities that may be affected by the Project.

As noted in the document text, the Plan for the Battle Creek portion of the Regional Park and five-year Capital Improvement Program (CIP) will need to be updated or amended by Ramsey

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Page 6

County Parks and Recreation to include the proposed project. The Metropolitan Council will need to review the plan amendment for conformance with the Council's *2040 Regional Parks Policy Plan* (Policy Plan). The Policy Plan requires that any regional park that involves more than one implementing agency submit only one master plan for that park. Additionally, that master plan shall be approved by each of the implementing agencies and shall identify the nature of each agency's responsibilities for carrying out compatible development and operation of the park. Funds for regional recreational facilities, made available through the Council, are only available after a master plan and CIP covering those facilities has been reviewed by the Council and found to be in conformance with the Policy Plan.

At this point in time, however, the Council's primary concerns regarding promotion of recreation within the proposed Project site area are two-fold. First, Council staff are concerned that shallow marsh-ringed perimeter of Pigs Eye Lake is already exhibiting significant shoreline erosion, and the construction of islands as currently proposed has the potential for significant environmental effect through long-term displacement and disturbance of toxic benthic muds into the water column over an extended period of time, both during island construction and a subsequent unknown time period of settling and benthic mud disturbance.

The second is the absence of safe access to and within the site which is surrounded by busy CSAH 61, the active BNSR Railway and CP Railway and hump yard; active Aggregate Industries barge terminal within a narrow dredged Lake outlet channel; a Minnesota DNR heron rookery Scientific and Natural Area; the Council's Metropolitan Wastewater Treatment Facility and adjacent retired ash pond area; the 300-acre CERCLIS/MPCA Superfund dump area; and over 130 acres of surrounding shallow marsh wetlands.

Additionally, the sediment in the northern-most portion of the basin adjacent to the mouth of Battle Creek was determined to be too contaminated to subject to disturbance or alteration by this Project. The cumulative effect of these factors, as well as the uniform coverage of the bottom of the 628-acre basin with 10 to 22 feet of unconsolidated organic sediment rich in heavy metals and pollutants that have overflowed or leached out of the dump do not lead Council staff to conclude that Pigs Eye Lake is currently an appropriate site to promote unrestricted public access for recreation.

Appendix A

Section 2 – Initial Interagency Coordination Meeting Notes

During the January 20, 2016 meeting, it was stated that due to the unconsolidated nature of the benthic muds in the basin that it was "likely that mud will displace above the water surface" in response to (sand) material placement. This finding is also discussed in some detail in Section F.1.5 of Appendix F. We have grave concerns relative to the potential for the Project to discharge significant quantities of benthic material into the Mississippi River during its construction if this is still the position of the Corps, as placement is anticipated to be occurring in water that is 3 to 4 feet deep. Council staff requests the Corps clarify their position on the likelihood of this situation occurring and how it expects this mud wave to dissipate without mixing into the water column and being discharged into the River.

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Section 7 – Habitat Sub-Group

The sub-group expressed consideration for promoting habitat for reptiles and amphibians. Did existing area habitat surveys give indications that the basin is currently inhabited by observed populations? Council staff question their presence in the basin based upon its limited food supply sources and their general sensitivity to pollutants. Based upon the extent of benthic mud contamination in the basin which will remain following Project construction as proposed, we do not believe the basin to be a healthy or preferred location to attract them to in greater numbers either with a food source or place to overwinter.

Great variation is reported among amphibian species in their sensitivity to heavy metal and organic contaminants, but they generally tend to be more sensitive to pollutants than fish, and water quality criteria established for fish may not be protective of amphibians

Appendix B

Section II. C. – Suspended Particulate/Turbidity Determination – Actions Taken to Minimize Impacts

Council staff suggests that a channel for Battle Creek flows be entirely isolated from the rest of the basin from its entrance into the basin to the barge channel exit with a floating silt curtain during any activities that might disturb the benthic substrate within the basin, to prevent those pollutants from being swept into the River. Additionally, all barge movement during any construction phase in the basin should also take place behind a separate silt curtain to prevent disturbed sediment from being swept out of the basin through either of the interconnecting passages between the basin and River.

Appendix F

Section F.2.5. – Settlement

Text in the Appendix states that it was impossible to obtain an undisturbed sample of the benthic muds in the basin due to the loose, liquid nature of the soft soils. Acquisition of a disturbed sample should be adequate however, if it is to be utilized to calculate the density of the benthic material (and not perform a laboratory consolidation test).

Table 2 in the Appendix indicates that a value of 90 pounds per cubic foot (pcf) for 'very soft silty clay' and 115pcf for 'dredge sand' were utilized to estimate settlement of the constructed islands – data obtained from the New Orleans area. Council staff is concerned that the assumed value of 90pcf assigned to the benthic mud significantly overestimates its actual density by not taking into consideration its indicated 9 to 17 percent (high) organic component, likely resulting in an underestimated degree of settlement. The 115pcf value associated with the New Orleans dredge sand may be close to the actual value for the locally dredged navigation channel material that would be utilized for the Project, but we recommend an actual local sample value be obtained and utilized in the calculations, since it is so readily available. Densities for the additional topsoil and quarry rock material quantities planned for use, while relatively small, should also be factored into the calculations.

We strongly suggest that the Corps take and average a number of actual site samples to obtain more accurate benthic material density values with which to calculate settlement assumptions that would result in a greater degree of confidence in the estimated settlement assumption

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range than what is currently provided in the Appendix. We request that this Appendix be updated and expanded to present the revised assumptions, data, and revised settlement estimate calculations.

Appendix I.11 – Monitoring and Adaptive Management

Council staff recommends that the Project MAM plan also annually review the 'number of reported bird strikes by month' data following construction of the Project, as is historically presented in Figure 23 and Section 7.1.5.2 of the text of the Report, in addition to fall waterbird counts, and to prepare a mitigation plan, should there be an observed seasonal change or overall increase in the number of bird strikes with aircraft.

Given the issues described in this letter, Council staff are concerned about this project proceeding at this time. Because of the extent of environmental contamination and the number of stakeholders, including the Metropolitan Council, that might be affected by this project, we strongly encourage the project proposer and project sponsor to convene all stakeholders to develop a shared vision for this area and a comprehensive approach to addressing the environmental issues and reaching those goals. Without that comprehensive approach, we have concerns that individual projects might have unintended impacts or might not be as effective in addressing the environmental concerns.

In addition, Council staff requests that the Corps of Engineers address and respond to the above issues prior to drafting the final Feasibility Report and Environmental Assessment document or making a final determination on the need for preparation of an environmental impact statement for the proposed Project. If you have questions about these comments, please contact Jim Larsen PE, Principal Reviewer, at 651-602-1159.

Sincerely,



LisaBeth Barajas, Manager
Local Planning Assistance

CC: Richard Kramer, Metropolitan Council District 13
Scott Yonke, Ramsey County Parks and Recreation
Emmett Mullin, Council Parks and Natural Resources Manager
Patrick Boylan, Council Sector Representative
Judy Sventek, Water Resources Manager
Raya Esmaeili, Reviews Coordinator

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CITY OF SAINT PAUL
Mayor Melvin Carter

400 City Hall Annex
25 West 4th Street
Saint Paul, Minnesota 55102
www.stpaul.gov/parks

Telephone: 651-266-6400
Facsimile: 651-292-7311

District Commander

St. Paul District, U.S. Army Corps of Engineers

ATTN: Regional Planning and Environment Division North

180 Fifth Street East, Suite 700
St. Paul, MN 55101

Comments on DRAFT Environmental Assessment and Finding of No Significant Impact developed pursuant to the National Environmental Policy Act

Project:

Pigs Eye lake restoration project

Project proponent and authority:

St. Paul District, U.S. Army Corps of Engineers (USACOE), in conjunction with the local sponsor, Ramsey County Parks and Recreation. The proposed actions were authorized under Section 204 of the Water Resources Development Act of 1992, as amended.

Summary of the proposed project:

The proposed project would create island and wetland features within Pigs Eye Lake. Construction of project features would primarily use material dredged from the Mississippi River by the Corps of Engineers during routine maintenance of the navigation channel. A complex of seven islands would be constructed; three of these would incorporate wetland creation and plantings in the centers of the islands. Islands would be planted with a mix of native plants that would be appropriate for floodplain soils.

Comments:

The proposed project is intended to address ongoing problems in Pigs Eye Lake, primarily ongoing shoreline erosion and sediment resuspension due to long-term hydrological changes and wind fetch.

Title 32 of the Code of Federal Regulations, Volume 4, Sec. 651.29 describes criteria used by the USACOE in determining whether or not an Environmental Assessment (EA) for a proposed action is sufficient and if the preparation of an Environmental Impact Statement (EIS) is required. This section states that an EIS is required if the proposed action has the potential to "significantly affect... public parks and recreation areas, wildlife refuge or wilderness areas".

Pigs Eye Lake is part of a regional park, located within the Mississippi National River Recreation Area (MNRRA, a unit of the National Park System), and is located in close proximity to a Minnesota Scientific and Natural Area and important heron rookery.

The proposed action is to use dredge spoils consisting of sand and silt to create islands in Pigs Eye Lake, and to seed the islands with appropriate vegetation. The EA contends that the islands will create water depth variation, stabilize the lake bottom, and act as windbreaks. The EA contends that the result will be to provide new terrestrial habitat, increase terrestrial and aquatic habitat quality, and reduce shoreline erosion.



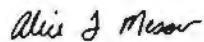
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The City of Saint Paul has concerns regarding the long-term stability of the islands. Success in establishing vegetation on the islands is critical to both creation of habitat and to the stabilization of the dredge materials used to create the islands. However, the EA does little to address how establishment of vegetation will be ensured. While a monitoring plan is proposed, the first monitoring would not occur until 1 year after construction, by which time storms, flooding, and wind may have already severely compromised both the integrity of the islands and the growth prospects of the vegetation. Moreover, the proposed maintenance budget is woefully inadequate, and the EA does not describe any significant adaptive management practices to address these problems, much less evaluate the potential feasibility nor cost of such approaches.

In short, the EA does not adequately evaluate the feasibility of the project, nor the potential impacts should any number of the assumptions used in project design prove to be unreliable.

Sincerely,



Alice Messer
Manager Design and Construction

Cc

Mike Hahn, Director Parks and Recreation
Russ Stark, Mayors Office
Mary deLaittre, Manager Great River Passage
Josh Williams, Planning and Economic Development

4 Initial Interagency Coordination Meeting Notes

The following are the meeting notes from the initial feasibility interagency coordination meeting.

**Pigs Eye Lake Section 204
Interagency Planning & Coordination Meeting
January 20, 2016
9:00 – 11:00**

NOTES

Background: The Corps initiated the feasibility study stage of the CAP 204 Pigs Eye Lake project in summer 2015. The Corps and the local sponsor of the project, Ramsey County Parks and Rec Department, gathered local, state and federal stakeholders together for discussion and coordination during the feasibility study phase of the effort.

Agencies in attendance included US Army Corps of Engineers – St. Paul District (Corps), Ramsey County Parks, Ramsey-Washington Metro Watershed District (RWMWD), Minnesota Pollution Control Agency (MPCA), National Parks Service Mississippi National River and Recreation Area (NPS), Minnesota Department of Natural Resources (MNDNR), Metropolitan Council (Met Council) and the City of St. Paul.

Purpose: Interagency team collaboration meeting is to progress through the planning process in the feasibility study phase for Pigs Eye Lake Section 204.

Attendees:

USACE - Nate Campbell (PM), Sierra Keenan & Angela Deen (Planning), Scott Goodfellow (H&H), Jim Noren (H&H), Zach Kimmel (Operations), Susan Taylor (Cost), Greg Wachman (Geotech), Jack Westman (GIS), Brad Perkl (Cultural), Rod Peterson (Real Estate), Nate Wallerstedt (CAP Program Manager)

Ramsey County Parks – Mike Goodnature

MPCA - Hans Nave, Emily Schnick

NPS – Nancy Duncan, Allie Holdhusen

MN DNR – Joel Stiras, Jen Sorensen

Met Council – Jim Larsen, Mary Gail Scott

City of St. Paul – Don Varney

Ramsey-Washington Metro Watershed District – Bill Bartodziei

Discussion Notes

1. Progress since the July kickoff meeting
 - a. Measures Considered
 - i. Sand Blanket or Sand Benches -
 - Expensive – may require more sand than available.
 - ii. High Islands

- Modified to more natural appearance
- iii. Low Islands
 - Modified to more natural appearance
 - Limited low/seasonally wet island benches to reduce material needs
- iv. Shoreline material placement
 - Limited areas with severe erosion that would benefit from this
- v. Drawdown
 - Team looked at full and partial drawdown, use of inflatable or temporary dams. Challenge to work with Battle Creek flows.
 - Costs would exceed federal cost limit for a Section 204 - Although a drawdown and consolidation of substrate material would benefit the area and improve conditions for construction, it is not feasible within the scope of the Section 204.
- vi. Hydraulic Modifications
 - Water movement in Pigs Eye highly variable and dependent on Pool dynamic
- vii. Carp Enclosures
 - Very large system; difficult to remove carp, challenge to maintain enclosures
- b. Development of "Base Plan"
 - i. CAP Section 204 Authority is for beneficial use of dredged material for ecosystem restoration. Funding covers construction costs that are in excess of the Base Plan (normal dredging costs without the project).
 - ii. Sources of sand to build islands.
 - St. Paul Barge Terminal upper Pool 2 dredge cuts - closest source of material, but quantities vary significantly (30,000 yds is an average).
 - Pine Bend and Boulange temporary placement sites - greater certainty on quantities, but added costs to transport material 14 miles.
- c. Bathymetry
 - i. Shallow lake, only 3' average depth (max depth of 4.5').
- d. Soil Borings
 - i. Goal of exploration was to characterize the subsurface material and identify depth to 'hard bottom,' or the thickness of the compressible sediment.
 - ii. Borings collected at four locations with samples for geotechnical and environmental sampling.
 - iii. Very soft soils. 10-22' thick. Soils made of clay, silt, sand, and peat.
 - iv. Lateral displacement of soft soils in response to material placement ("mud wave"). Likely to occur, but difficult to quantify the extent. Likely that mud will displace above water surface.
 - v. Consolidation settlement of soft soils over time – also difficult to quantify but estimated 1.5-3'

- Soils sampled are too soft to perform full consolidation testing.
 - This is an issue because it impacts accuracy of quantities estimate.
- vi. Potential environmental issues related to soils
- Construction of access channels within contaminated sediments
 - Increased suspension of contaminated soils due to mud wave formation
 - a. Contaminated material refers to lake bottom material, not to Mississippi River navigation channel dredged material
 - Any construction activities are likely to lead to increased suspension of lake soils.
- e. Environmental Samples
- i. Existing survey data:
- 1998-2001 survey of 3 sites in Pigs Eye Lake for 2006 MCEs report
 - The 2007-2008 MPCA sediment chemistry survey of Pigs Eye Lake included 11 locations at multiple depth increments. The sediment samples were tested for metals, PCBs, PAHs and pesticides.
 - If there is other ongoing testing or data available, the study team could use it.
- ii. 2015 USACE Sediment sampling
- Collected a total of six environmental samples for chemical and physical analyses from three of the four boreholes. For each borehole tested, two composite samples were analyzed. The composite samples were collected at roughly two foot intervals starting a couple feet below the sediment surface.
 - Similar to what was seen in previous surveys, the most contaminated site was the northern most borehole, likely as a result of its proximity to the Pigs Eye Landfill.
 - Only samples from one borehole showed any SQT or SRV exceedances for organic pollutants. The only exceedances for metals were for cadmium, lead and mercury. Cadmium, however was above the proposed 2015 recreational SRV limit for two boreholes.
 - In contrast to the surveys done 9-17 years ago, we did not detect any PCBs or have any SQT exceedances for nickel and zinc.
 - a. Discussion:
 - b. Cadmium – not a large exceedance. The MPCA is continuing to review the SRV limit, likely to be finalized by fall 2016.
 - c. Until SRV limit is finalized, unclear if/to what extent Cadmium will be in exceedance.
 - d. The MPCA would like to see the project happen; from the superfund program perspective the project is beneficial.
 - e. The contaminated materials may be problematic not only during dredging for access, also with displacement during

construction. Access dredging could be limited if hydraulic dredging is utilized for material placement.

- f. Mud wave could expose sediments that are contaminated. Would have to be managed and contained during construction.
- g. As materials are disturbed, materials from Pigs Eye Lake would not be allowed to enter the Mississippi River.
- h. Mud wave – would it be ongoing/repeat? Or a onetime occurrence? This would depend on construction schedule, if it was built all at once, or constructed in phases.

2. Alternative Plans

a. Draft Design

- i. Study team presented the latest iteration of the island concept. Last year, the team developed an initial conceptual layout for the Fact Sheet; that has been revised several times through the planning process. At kickoff meeting July, study team got feedback to look for a more natural layout. In September team developed initial crab claw concept and shared with agencies and sponsors. This crab claw concept is based on naturally occurring islands in the upper Mississippi river.
 - Initial crab claw with wide benches would require more material than what is available. Islands were revised to narrow benches and reduced the overall estimate of sand quantities.
 - Alternative planning is an iterative process and will continue to undergo revisions.

b. Habitat Benefits

- i. Terrestrial Habitat
- ii. Sandbar/Littoral Zone Habitat
- iii. Wind Fetch Reduction
- iv. Substrate Stabilization
 - Comments: River otters also benefit from hardwood, have a den near island C1; 3 bald eagle nests in the area should be considered.
 - How long will the islands last with the soft substrate? The Corps has experience building islands in both backwater and main channel of the Mississippi River. Islands will be built out of sand, and stabilized. Design team has confidence the islands will last.

3. Construction options – it is feasible to build islands.

a. Hydraulic dredging – the most likely approach

- i. Can be done for large or small jobs, ideal in shallow locations (3-4'), less expensive for large quantities
- ii. Mechanical dredging would require 7' access channel, can be costly, and may be difficult to maintain in soft soil conditions like Pigs Eye Lake.

4. Discussion:

- a. Section 204 authority is not a remediation or water quality authority. It would not be possible to dredge sediments for removal under this authority. Any in-lake dredging would be site prep and construction only.
 - i. For dredging and removal of contaminated sediments, another agency would have to take the lead and provide funding, as it is outside authority of Section 204.
- b. Contaminated material issues
 - i. Concern that carp are the main source of turbulence in the lake, not wind fetch. This project would not be addressing carp problem.
- c. What is the cost of not doing anything? Is measurable or how is it factored in to the feasibility study?
 - i. This would be addressed as part of the “no action” alternative, the consequences of doing nothing.
- d. What are the ecosystem benefits of the project – what species are being targeted (invertebrates, turtles, birds)? Is there any information on benthic invertebrates? How diverse is the assemblage compared to what we would expect in a backwater lake habitat?
 - i. Ecosystem enhancement & restoration is the primary objective of this project.
 - ii. Not just a dredge material placement effort. The costs of the project must be justified by habitat benefits, this will be quantified in report.
 - iii. The Section 204 project will be incorporated to regional park plans as appropriate.

5. Met Council/MPCA – Pigs Eye Dump Study Update

- a. Minnesota's largest unpermitted dump.
- b. Met Council currently sampling 24-28 locations. Data available in 6-8 weeks.
- c. Purpose of MPCA study: to identify where contaminants are located, how much, and what needs to be done.
 - i. Interested in partnership and coordination to benefit the area.
 - ii. Once MPCA has a proposed action, the Corps can determine if/where within the Section 204 collaboration might be possible.
- d. Could the Section 204 benefit the superfund site?
 - i. Depends on final design. Northern islands might slow spread of pollutants?
 - ii. Corps/Met Council/MPCA will need to continue close coordination
- e. Joel Stiras: Any fish sampling data concerning bioaccumulation of contaminants? Common carp and buffalo in the lake are currently exported for food.

6. Sponsor input Ramsey County Parks & Recreation

- a. Potential phasing of construction and interest in looking at “test islands” to determine settlement. This is just in discussion at this point.
- b. Possibility for additional testing in footprint of final design.
- c. Floodplain boundary and contaminated areas narrow the scope of what we can consider in Pigs Eye.

7. Path Forward
 - a. Schedule
 - b. USACE will document meeting notes
 - c. Draft notes will be distributed for team review and input
 - d. Feasibility Study efforts continue. Draft report available for review fall 2016.
8. Next meetings
 - a. Periodic agency planning meetings
 - b. Public meeting
9. Adjourn

5 Tribal Coordination – Sample Letter

The following is a letter sent to the Shakopee Mdewakanton Sioux tribe. A similar letter was sent to all tribes with ties to the project area.



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

MAR 28 2016

Regional Planning and Environment Division North

Honorable Charles Vig, Chairman
Shakopee Mdewakanton Sioux Community of Minnesota
2330 Sioux Trail NW
Prior Lake, Minnesota 55372

Dear Chairman Vig:

The U.S. Army Corps of Engineers, St. Paul District (Corps) is proposing an ecosystem improvement project on Pig's Eye Lake (project). Pig's Eye Lake is located in the Upper Mississippi River Navigation Pool 2 (River Miles 834-836) southeast of Downtown St. Paul in Ramsey County, Minnesota (Figure 1). Habitat and water quality in the lake are poor due to sedimentation, high turbidity, nutrient loading, wind fetch, and rough fish populations.

The potential plan for the project would be to use dredge material from Pool 2 to create a series of islands of various sizes and locations. The islands would reduce wind and wave action while providing a variety of habitat for fish and wildlife. Dredge material would be obtained from active dredge cuts within the main channel or transported from temporary placement sites. The methods of constructing the islands are still being explored and may include a combination of mechanical and hydraulic placement. Staging areas and access routes have not been identified.

The Corps is aware of a variety of cultural resources situated in the area around Pig's Eye Lake, including the village of Kaposia. Several cultural resource investigations have occurred within the area, principally along the natural levee running between the river's main channel and the lake's western shore. The Corps does not anticipate the project will affect historic properties.

If your band has information regarding properties of cultural significance to the band that may be affected by the project, the Corps would appreciate your assistance in identifying those properties. Should you have such information, please notify us within

-2-

30 days of your receipt of this letter. Our point of contact on this matter is Dr. Bradley Perkl. Please address correspondence to his attention at 180 5th Street East, St. Paul, MN 55101-1678, or he may be reached by telephone at (651) 290-5370.

Sincerely,

A handwritten signature in black ink, appearing to read 'DK', is positioned above the printed name and title.

Daniel C. Koprowski
Colonel, Corps of Engineers
District Commander



Figure 1. Project Location, Pool 2 Upper Mississippi River.

6 Airport Correspondence Letter Chain

The following is the correspondence between the Corps and applicable Airport Agencies.



United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Wildlife Services

St. Paul Downtown
Airport
644 Bayfield Street,
Suite 215
Saint Paul, MN
55107
Ph: 651-224-6027
Fax: 651-224-4271

October 11, 2016

Nathan Campbell
St. Paul District USACE
Civil Works Project Manager
PAS and IIS Program Manager
Office: 651-290-5544
Cell: 651-219-2963

Subject: Proposed Pigs Eye Lake Habitat Enhancement Project

Mr. Campbell-

Based on a brief review of the single page project proposal you provided, USDA-Wildlife Services offers the following response.

The Federal Aviation Administration addresses the general separation criteria for hazardous wildlife attractants on or near airports in Section 1 of Advisory Circular (AC) 150/5200-33B. This AC recommends a separation distance of 5,000 feet between the Air Operations Area (AOA) and hazardous wildlife attractants for airports serving piston-powered aircraft, and 10,000 feet for airports serving turbine-powered aircraft. The nearby St. Paul Downtown Airport, Holman Field (STP) serves both of these classes of aircraft. The FAA also strongly discourages the creation of any new hazardous wildlife attractants within these separation distances. The center of Pigs Eye Lake (location of the proposed Pigs Eye Lake Habitat Enhancement Project area) is situated approximately 7,300 feet from runways 14/32 and 13/31 of the Downtown St. Paul Airport. As a result, the increased presence of avian species that could result from the Pigs Eye project could pose a significant potential threat to aircraft during the approach and departure phases of flights to and from STP which averages approximately 180 aircraft operations per day.

A review of the FAA Strike Database indicates that there have been 70 reported wildlife strikes by aircraft at STP since 1990 which includes 9 bald eagles, 10+ waterfowl, 5 gulls and a variety of other primarily avian species. Large flocking birds, like American white pelicans, Canada geese, swans, gulls, cormorants, and other waterfowl, generally pose a higher risk to aviation due to their size and flocking tendencies. The Pigs Eye project is likely to increase the presence of a number of avian species which would most likely increase the hazardous wildlife strike threat to air operations at STP.

From a wildlife habitat enhancement and protection perspective this project appears to be a good idea. From an airport hazardous wildlife strike perspective, this project does not appear to be in the best interest of air operations at the nearby downtown St. Paul airport due to the potential of increasing the presence of hazardous wildlife species that are likely to be present in the approach and departure paths of daily aircraft operations at STP.

Based on our review of the limited information provided and the reasons stated above, the USDA WS MN program does not support the proposed Pigs Eye Lake project. We also recommend that the project's approving authorities include the FAA and Metropolitan Airports Commission in any ongoing discussions related to this project. If you have questions, please call me at 651-224-6027.

Sincerely,



Alan K. Schumacher
Wildlife Biologist

cc:
G. Nohrenberg, USDA-WS, St. Paul, MN
J. Fitzpatrick, FAA- Dakota-Minnesota/ADO
A. Fenedick, FAA- Great Lakes Regional Office
J. Harris, MAC- STP Airport
J. Ostrom, MAC-MSP Airport
N. Ralston, MAC-MSP Airport
P. Mosites, MAC-MSP Airport



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**United States
Department of
Agriculture**

Animal and
Plant Health
Inspection
Service

Wildlife Services

St. Paul Downtown
Airport
644 Bayfield Street,
Suite 215
Saint Paul, MN
55107
Ph: 651-224-6027
Fax: 651-224-4271

November 10, 2016

Nathan Campbell
St. Paul District USACE
Civil Works Project Manager
PAS and IIS Program Manager
Office: 651-290-5544
Cell: 651-219-2963

Subject: Proposed Pigs Eye Lake Habitat Enhancement Project- Design/Vegetation
Recommendations

Mr. Campbell-

Following our recent meeting regarding the proposed improvements to Pigs Eye Lake, USDA Wildlife Services (WS) was asked to provide a design/vegetation preference to help discourage nesting and loafing of large waterfowl on the proposed islands.

WS recommends the proposed islands be covered with thick, woody scrub brush species. The goal would be to minimize open areas, especially near the water's edge, where large waterfowl nesting generally occurs. Some suggested species would include, but are not limited to, willow, dogwood, and alder.

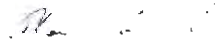
WS also recommends minimizing the amount of shallow water emergent vegetation (i.e. cattails) associated with the project to help prevent muskrats from building huts, simultaneously creating nesting platforms for Canada geese.

WS does not recommend the use of sand benches above or below the water's surface. Due to fluctuating water levels of the lake and river system, the proposed benches may become exposed, creating loafing habitat for large water birds such as Canada geese and American white pelicans.

WS recommends the overall number of proposed islands be reduced to decrease the amount shoreline available to nesting waterfowl. The overall size of islands may be increased to obtain the goals of the project, while limiting shoreline. If possible, islands should be linear and have steep banks.

Implementing the aforementioned recommendations may help reduce the amount of nesting and loafing of large waterfowl that could be hazardous to safe flying operations at nearby STP Downtown Airport.

Sincerely,



Alan K. Schumacher
Wildlife Biologist

cc:

G. Nohrenberg, USDA-WS, St. Paul, MN
J. Fitzpatrick, FAA- Dakota-Minnesota/ADO
N. Nistler, FAA- Dakota-Minnesota/ADO
J. Harris, MAC- STP Airport
J. Ostrom, MAC-MSP Airport
N. Ralston, MAC-MSP Airport
P. Mosites, MAC-MSP Airport



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U.S. Department
of Transportation
**Federal Aviation
Administration**

Dakota-Minnesota Airports District Office
Bismarck Office
2301 University Drive, Building 23B
Bismarck, ND 58504

Dakota-Minnesota Airports District Office
Minneapolis Office
6020 28th Avenue South, Suite 102
Minneapolis, MN 55450

December 12, 2016

Nathan Campbell
Civil Works Project Manager
PAS and IIS Program Manager
St. Paul District
U.S. Army Corps of Engineers
180 5th Street East
St. Paul, Minnesota 55101

Re: Proposed U.S. Army Corps of Engineers (USACE) Pigs Eye Lake Habitat Enhancement Project

Dear Mr. Campbell:

The Federal Aviation Administration (FAA) has reviewed the USACE "Project Summary" for the proposed Pigs Eye Lake Habitat Enhancement project located near the St. Paul Downtown Airport (Airport). The goal of the proposal is to increase bird and nesting habitat, increase recreational opportunities, and improve aquatic habitat.

Wildlife hazards to aviation, particularly bird strikes, have been a long-term high priority for the FAA. The FAA is committed to addressing hazardous wildlife issues and is focused on preventing the creation of new hazards while promoting ways to reduce and/or mitigate the potential for wildlife strikes. Each airport setting is unique, as is the potential for wildlife hazards. In addition, there are areas more susceptible to wildlife strikes including the arrival/departure surfaces and the aircraft operating area (AOA). For these reasons the FAA must review each airport individually to identify hazardous wildlife conditions and develop ways to reduce and prevent wildlife strikes.

The FAA's Advisory Circular (AC) 150/5200-33B, Hazardous Wildlife Attractants On or Near Airports (Wildlife AC), provides separation criteria for the placement of potentially hazardous wildlife attractants near airports (Section 1) and includes a description of land uses with the potential to attract hazardous wildlife (Section 2). Airports that receive Federal grant-in-aid assistance are required to follow the recommendations in the AC. For other government agencies, private property owners and businesses, the AC provides guidance to ensure adequate safety for airports.

Based on our review and utilizing the criteria in AC 150/5200-33B, the FAA is concerned with the initial proposed project given the location, and potential to create a wildlife hazard attractant near the Airport. The proposed project is within approximately 5,000 feet of the Airport approach and departure pathways. This location, in conjunction with the type of habitat enhancement being proposed, has a very high probability to become a hazardous

wildlife attractant. Our agency recognizes and understands the value of the ecological benefits that may occur with these types of habitat enhancement opportunities. Nonetheless, we cannot ignore the potential adverse effect this could have on airport safety.

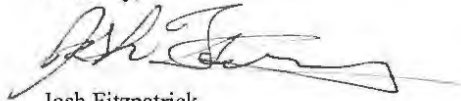
The FAA often defers judgment for hazardous wildlife issues to the U.S. Department of Agriculture Wildlife Services (USDA WS) since their agency is considered a subject matter expert. The FAA supports the design recommendations provided to your office by the USDA WS in a letter dated November 10, 2016. These design recommendations include:

- Planting thick, woody scrub brush species on the proposed islands.
- Minimizing the amount of emergent vegetation in shallow water.
- Eliminating the use of sand benches for the project.
- Reducing the overall number of proposed islands.

Our agency recommends these design considerations be included in the full design of the project and for your agency to continue coordinating with the Airport, USDA WS and the FAA as project planning and design further progresses. We will continue to thoughtfully and carefully review any additional information submitted to us for review by the USACE.

Thank you for the opportunity to review and provide comments and concerns with the initial proposed project. We trust that you will fully utilize our input while making a final decision regarding the proposed project. If you have any questions or comments, please feel free to contact me at (612) 253-4639 or by E-mail at joshua.fitzpatrick@faa.gov.

Sincerely,



Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office

Cc: Alan Schumacher, USDA Wildlife Services
John Ostrom, Metropolitan Airports Commission
Nancy Nistler, FAA



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

REPLY TO
ATTENTION OF

Project Management

January 18, 2017

SUBJECT: Pigs Eye Lake CAP 204 Wildlife Hazard Recommendations

SENT VIA E-MAIL TO:

Alan Schumacher
USDA Wildlife Services
St. Paul Downtown Airport
644 Bayfield Street, Suite 215
Saint Paul, MN 55107

Josh Fitzpatrick
FAA Dakota-Minnesota Airport District Office
Minneapolis Office
6020 28th Avenue South, Suite 102
Minneapolis, MN 55450

Dear Mr. Schumacher and Mr. Fitzpatrick:

Thank you for providing your recommendations in your recent letters to the Corps to help reduce the amount of nesting and loafing of large waterfowl on Pigs Eye Lake as a result of Ramsey County Parks Department and the Army Corps of Engineers potential aquatic restoration project. We understand your concerns regarding wildlife hazards near the airport and appreciate the recommendations to improve our potential project to satisfy your concerns.

Below we have provided responses to your recommendations that include plan changes that can be included to meet your recommendations as well as additional detail on the current plan that we believe would satisfy your recommendation.

1. WS/FAA Recommendation: Recommended that the islands be vegetated in thick, woody scrub brush species to minimize open areas, especially near the water's edge, where large waterfowl nesting generally occurs.

Corps Response: Plans currently involve willow plantings along the water's edge to stabilize the islands and prevent erosion. Normally, willows would be planted in two rows, with a spacing of between 3-5 feet, and would be planted along the outer edges of the islands that would be exposed to wind and waves. Based on this comment, the Corps will plan to incorporate willows around the perimeters of all islands near the water's edge. Photos are attached of the willows at some islands the Corps has constructed for habitat restoration purposes.

2. WS/FAA Recommendation: Recommended that the Corps minimize the amount of shallow water emergent vegetation (i.e. cattails) associated with the project to help prevent muskrats from building huts, which create nesting platforms for geese.

Corps Response: The focus of the proposed aquatic vegetation plantings within the island centers would be rooted floating-leaf species rather than emergent species. Based on this recommendation, the Corps will avoid incorporating emergents into the project that would lend themselves to muskrat huts. (Although it should be noted that muskrats, beavers, and mink are currently prevalent in Pig's Eye Lake and a number of their huts are observable on the existing shores of Pig's Eye Lake).

3. WS/FAA Recommendation: Recommended against using sand benches above or below the water's surface, due to concerns that fluctuating water levels could lead to exposing the sand and creating nesting areas.

Corps Response: As it is currently designed, the proposed project does not include any sand benches that would be subject to becoming exposed by changes in water levels. Water levels in Pig's Eye Lake are highly connected with the main stem of the Mississippi River. The Corps of Engineers manages the water surface elevation in the river in this area to stay at or above 686.8 feet above mean sea level (NAVD 88). The project on a whole was designed with consideration to these 'minimum' water levels. The proposed project does include some "sand blankets" for substrate stabilization, but these areas would remain at greater than 18 inches deep, even at the lowest regulated water levels. The only areas expected to be shallower are the transitional areas between the water and the shoreline.

4. WS/FAA Recommendation: Recommended that the overall number of islands be reduced to decrease the amount of shoreline available to nesting waterfowl. Suggest linear islands with steep banks.

Corps Response: Unfortunately, due to the unconsolidated nature of the substrate in Pig's Eye Lake, the slope of the shoreline from the islands into the water cannot be made significantly steeper without compromising the stability of the islands. Hopefully the willows described in Comment 1 will alleviate this issue.

We analyzed the shoreline length for each of the island alternatives that we considered (below).

Analysis of shoreline length

Alt 4: 15,895 ft

Alt 2: 19,409 ft

Alt 5: 24,982 ft ← Tentatively Selected Plan

Alt 1: 29,768 ft

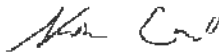
Alt 3: 30,912 ft

The results show that we selected an intermediate alternative. We will consider attempting to reduce this further, but any major changes would be likely to greatly reduce the habitat benefits of the overall project. The alternatives that have less shoreline area are those without the "split" island alternatives, which would not allow for marsh

creation, would not provide heavily sheltered areas from wind and waves, and would greatly reduce the amount of littoral zone habitat created. We would instead propose to incorporate as much dense, brushy vegetation on the islands as possible to deter large waterfowl from nesting there.

We will continue to coordinate with you as project planning progresses. Should you have any immediate questions regarding this letter, or if you would like to discuss the project features further, please contact Nathan Campbell at 651-290-5544 or by email at Nathan.j.campbell@usace.army.mil.

Sincerely,



Nathan Campbell
Project Manager

Enclosures:

1. USDA-WS Letter to the Corps, dated 10 November 2016
2. FAA Letter to the Corps, dated 12 December 2016



Metropolitan Airports Commission

6040 - 28th Avenue South, Minneapolis, MN 55450 • 612-726-8100 • metroairports.org

March 20, 2017

Mr. Nathan Campbell, Project Manager
Department of the Army
St. Paul District, Corps of Engineers
180 Fifth Street East, Suite 700
St. Paul, MN 55101-1678

Mr. Nathan Campbell-

Following the letter dated January 18, 2017 and addressed to the FAA and USDA-Wildlife Services, The Metropolitan Airports Commission (MAC) would like to formally acknowledge our stance as "Not Opposed" to the Pigs Eye Lake Habitat Enhancement Project. The Corps response's to FAA and USDA project construction/design recommendations reasonably address, while still maintaining project goals, the potential wildlife hazards to aviation near the St. Paul Downtown Airport created during and following the project.

Furthermore the MAC requests that stakeholders of the project, work to establish protocols and identify the responsible parties to develop and carryout the following;

1. Post monitoring of the project area for nesting and loafing of large waterfowl
2. A Management Plan to mitigate identified wildlife hazards. Part of the management plan may include but are not limited to;
 - a. Habitat modification
 - b. Exclusion
 - c. Harassment
 - d. Nest and egg destruction/addling
 - e. Lethal control
3. Identify Action Levels when those wildlife management activities are deployed.

If you have any further questions we would be happy to assist, 651-224-4306.

Thank you,

Joe Harris
Manager St. Paul Downtown Airport

Minneapolis-St. Paul International • Airake • Anoka County-Blaine • Crystal • Flying Cloud • Lake Elmo • St. Paul Downtown



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

JULY 27, 2017

Project Management

SUBJECT: Pigs Eye Lake CAP 204 Wildlife Hazard Recommendations

SENT VIA E-MAIL TO:

Alan Schumacher
USDA Wildlife Services
St. Paul Downtown Airport
644 Bayfield Street, Suite 215
St. Paul, MN 55107

Joe Harris
Manager St. Paul Downtown Airport
St. Paul Downtown Airport
644 Bayfield Street, Suite 215
St. Paul, MN 55107

Dear Mr. Schumacher and Mr. Harris:

This is in regard to the Pigs Eye Lake aquatic habitat restoration project. We wanted to inform you of several changes we have made to the Pigs Eye Lake project design. These include a reduced-size set of islands and revised general vegetation planting plans. We have concluded that these changes would not increase the wildlife hazard risk of the proposed project, for the reasons described under the "Proposed Project Changes" heading below. Further, we would like to offer a response regarding a request made in the Metropolitan Airports Commission (MAC) letter to the U.S. Army Corps of Engineers dated March 20, 2017 (enclosed). This is discussed in the section below titled, "Monitoring and Management Considerations."

Proposed Project Changes

First, we have reformulated alternatives since our last correspondence. The new tentatively selected plan has been reduced in size, with 32 percent less shoreline than the previous plan (approximately 17,000 feet compared to the previous 25,000 feet). This change will further reduce the risk for the project to contribute to wildlife hazards.

Since our last correspondence, the Corps met with members of the U.S. Fish and Wildlife Service, Minnesota Department of Natural Resources, National Park Service and Ramsey County (project sponsor) to discuss project planting goals. It was recognized that one of the potential benefits of the project is providing turtle nesting locations, which are relatively rare in this portion of the river. It was suggested that a desirable project feature would be incorporation of some open, sandy areas for this purpose. Since the willows also serve as a stabilization feature, this would only be

possible in select areas. The vast majority of the shoreline would still be planted with willows as previously described, and we don't anticipate this to significantly increase the potential for waterfowl nesting.

The group also discussed the U.S. Department of Agriculture–Wildlife Services recommendation to discourage the growth of emergent vegetation. It was acknowledged that shallow-water emergent vegetation may indeed lead to muskrat huts and thereby nesting platforms for Canada geese. However, softstem and hardstem bulrush are already prevalent along much of the Pigs Eye Lake shoreline. These species provide important fish habitat for cover and spawning. Those at the meeting discussed how dense emergent vegetation like bulrush would likely discourage birds, like geese, from accessing the land, thereby decreasing the risk of nesting geese. Muskrats, beavers and mink already make use of Pigs Eye Lake and the bulrush, with a number of huts observable along the shoreline, and resource managers that frequent the lake have not observed use of these huts by nesting geese. Therefore, we have incorporated bulrush plantings into areas of the planting plan, but we feel that this change will likely decrease the risk of wildlife hazards.

Monitoring and Management Considerations

In the enclosed letter, the MAC also requested incorporating monitoring and management strategies into the project planning. The Corps concurs that monitoring bird use is important, and the proposed project would incorporate 10 years of post-project bird monitoring, which may be useful in determining if there are significant increases in bird populations utilizing Pigs Eye Lake. Monitoring data would be shared with MAC and other agencies as desired. If a potential issue is identified within the interagency team, the Corps will consider modifications or management actions that might be appropriate.

We will continue to coordinate with you as project planning progresses. Should you have any immediate questions regarding this letter, or if you would like to discuss the project features further, please contact Nathan Campbell at 651-290-5544 or by email at nathan.j.campbell@usace.army.mil.

Sincerely,
CAMPBELL.NATHAN.J.13856139
18
2017.07.28 08:11:19 -05'00'
Nathan Campbell
Project Manager

Enclosures

From: [Harris, Joe](#)
To: [Campbell, Nathan J.CIV \(US\)](#)
Cc: [Schumacher, Alan](#)
Subject: [EXTERNAL] Project
Date: Tuesday, September 12, 2017 4:20:41 PM

Hi Nathan,

Sorry for the delayed response. I am okay with the proposed project. I appreciate your willingness to meet with us to listen to our concerns related to aircraft operations.

Regards,
Joe Harris

7 Joint Pool 2 Meeting

As a result of numerous USACE projects occurring in Pool 2. The Corps called a meeting that included all applicable agencies to discuss the projects and address questions and concerns. The following document is the meeting notes from that meeting.

Joint Pool 2 Meeting

October 5, 2016

9:00 – 11:00

NOTES

Background: The Corps is currently leading 4 concurrent projects in Pool 2 of the Upper Mississippi River: the Pool 2 Dredge Material Management Plan, the Lower Pool 2 Channel Management Study, the L/D 2 Embankment study, and the Pigs Eye Lake CAP 204 study. There is an opportunity for the Corps, agencies, and stakeholders to coordinate the upcoming document reviews and team leads to most efficiently complete project report documents.

Purpose: The Joint Pool 2 meeting will review each effort, discuss relationships across studies, and enhance coordination efforts going forward with Pool 2 projects.

Attendees:

USACE – Tom Novak & Nate Campbell (PM), Sierra Keenan & Angela Deen (Planning), Aaron McFarlane & Steve Clark (Environmental), Scott Goodfellow (H&H), Zach Kimmel & Paul Machajewski (Operations), Ramsey County Parks – Scott Yonke
MPCA – Kurt Schroeder, Emily Schnick
MN DNR – Joel Stiras, Jen Sorensen
Met Council – Mary Gail Scott
Ramsey-Washington Metro Watershed District – Bill Bartodziej
Friends of Pool 2 – John Senglaub
Watershed – Barbara Haake
Dakota County – Kurt Chatfield
Upper Mississippi Watershed Association (UMWA) – Greg Genz

Due 31 October:

- Confirm points of contacts for each effort (see below)
- Submit any additional placement site ideas for the DMMP
- Submit any other comments on Pigs Eye tentatively selected plan

Discussion Notes

1. DMMP – Updating 1995 plan
 - a. Identify placement sites for approximately 6.76 million cy of sand over a 40 year period. The Pigs Eye Lake project identifies one location that could take some of the dredged material. Currently working to identify sites in the Upper and Lower parts of the pool that would be the least cost, environmentally acceptable alternative for permanent dredged material placement.
 - b. Compared to other pools, Pool 2 limited by flood stage impacts (Limited opportunities to build islands)
 - c. Discussion:
 - i. Can FEMA re-evaluate flood impacts? (So that islands can be built in Pool 2)
Pool 2 has not had island construction or water level drawdowns due to flood

stage impacts. Conditions are not likely to improve – sedimentation has significantly increased, along with higher flows, increased development (bridges/piers being added), etc. Additionally, options to mitigate (e.g., raising a house) are cost prohibitive.

- ii. The ash ponds were excavated and used as cover on the dump in the 1970s.
- iii. PFCs: Prior to construction of this project, Corps will be testing sand for PFCs for placement in Pigs Eye Lake. 3M and MPCA have tested for PFCs in the sediment, and are found in fish pool-wide. The MPCA has tested Pigs Eye Lake sediments in 2007 and the Corps has tested Pigs Eye Lake sediments in 2016; details are included in the Pigs Eye PFC appendix. Lower Pool 2 high concentrations of PFCs due to plant (also high densities of zebra mussels and sheepshead). The Pigs Eye Feasibility Report will include an attachment to the sediment appendix on PFCs.
- iv. MPCA's status update on PFC standards:
 - Updated levels just published on MPCA's website.
 - PFC levels last published in June 2016. Final in Feb/March 2017.
 - New numbers have gone down slightly.

2. Lower Pool 2 Channel Management Study

- a. Channel widening with Control Structures – improved dredging and safe navigation
 - i. \$8M plan Channel Widening & River Training Structures (versus \$15M realign channel with Boulanger cut)
 - ii. Control structures: 6" above pool with 10' top width. Wider, island-like structures were looked at, however caused flood stage impacts. It is not expected that sediment accretion (islands) will form behind structures. Structures not marked, but may have higher boulders that would be visible when rock line is submerged.
 - iii. Navigation aids: The navigation channel will continue to be buoyed. Wing dams and other rock structures are numerous, and if one structure is marked then all structures must be marked for liability purposes. It is cost prohibitive to mark all rock structures on the Upper Mississippi River. The U.S. Coast Guard marks the navigation channel, and incidentally some of the buoys are set at the point of wing dams adjacent the main channel.

3. L/D 2 Embankments – Recon study.

- a. Embankment protection berm.
- b. Approximately 100,000 cy of sand.
- c. L/D 4 example.

4. Pigs Eye Lake – CAP 204 Study

- a. Fishery: Good fishing spots on south end of Pigs Eye Lake. Native Americans used wood traps along southwestern shoreline to catch Buffalo. Current commercial fishery exports approximately 10,000 lbs of Buffalo and Carp annually from Pigs Eye Lake.
- b. Shoreline Erosion: The stage of the river was considered under the 3 scenarios. Although water surface elevations were not available, other imagery years were examined to ensure the comparison was appropriate. One important indicator is the consistent recession of vegetation, which is unable to re-establish as the consolidated shoreline sediments are eroded and deepened. Comments: Eastern bank is river bulrush, steep, a lot of wave action scouring the bank.
- c. Source of material for islands: Some could come from dredge operations in Upper Pool 2, however since close to 1/2M cy would be required in a short period of time for construction, the majority would come from Lower Pool 2 temporary placement sites where there is more sand available. Currently, there is over 600,000 cy on the temporary placement sites of Pine Bend, Upper Boulanger, and Lower Boulanger.
- d. Floodway area discussion (below the red line): Currently operating in a constrained environment, as previous projects, development, "used up" flood area.
- e. Shallow Depths: Comment: barges once floated up to north side of lake during high water, and then got stuck up there when water went down.
- f. RGU (Responsible Governmental Unit) –Project impacts can trigger a state EAW (Environmental Assessment Worksheet). More than 1 acre of fill in river = EAW process. Scott Y, Nate C., and Aaron M. will meet to discuss details. For Pigs Eye, it makes sense for Ramsey County to serve as RGU. Corps' Feasibility report and combined Environmental Assessment will be formatted to include all necessary documentation for the EAW. As the RGU, Ramsey County would determine (based on EAW) if/that an Environmental Impact Statement is not required.
- g. O&M of islands: The project sponsor is responsible for operation and maintenance of islands post-construction. Typically, islands do not require maintenance. The Pigs Eye Lake islands would be within Battle Creek Regional Park, and O&M, if any, would primarily entail vegetation monitoring/maintenance.

5. Verify stakeholder team members:

DMMP

MN DNR: Jen Sorenson

MPCA: Kurt Schroeder, Hans Neve, Emily Schnick

Met Council: Mary Gail Scott

Pool 2 CMS

RGU: MNDNR – Ronald Wieland

MN DNR: Ronald Wieland, Richard Baker, Randall Doneen

NPS: Nancy Duncan

Dakota County: Kurt Chatfield, Laura Jester, Jane Vanderpoel

Washington County: Wayne Sandberg

MPCA: Jim Brist, Emily Schnick
USFWS: Phil Delphey
Upper Mississippi Waterway Association

L/D 2 Embankments

Pigs Eye Lake
RGU: Ramsey County – Scott Yonke
MN DNR: Jen Sorenson, Joel Stiras
MPCA: Kurt Schroeder, Hans Neve, Emily Schnick
Met Council: Mary Gail Scott
USFWS: Nick Utrup
NPS: Allie Holdhusen

8 Contaminants Sub-Group

The St. Paul District Pigs Eye Islands CAP 204 PDT (Corps), Minnesota Pollution Control Agency (MPCA) and the Metropolitan Council (Met Council) formed a sub-group to discuss contamination from the Pigs Eye Land Fill, the plan for remediation of that site by the Met Council and MPCA, and the effect the remediation efforts may or may not have on the Pigs Eye Lake CAP 204 project and vice-versa. The following documents the correspondences and shared information meeting notes from that sub-group.

From: Campbell, Nathan J MVP
To: McFarlane, Aaron M MVP; Noren, James B MVP; Wachman, Gregory S MVP
Subject: FW: Pig's Eye Lake Sediment Contamination Subgroup
Date: Wednesday, February 24, 2016 3:49:07 PM

-----Original Message-----

From: Schroeder, Kurt (MPCA) [<mailto:kurt.schroeder@state.mn.us>]
Sent: Wednesday, February 24, 2016 3:02 PM
To: Campbell, Nathan J MVP <Nathan.J.Campbell@usace.army.mil>
Cc: Foster, Pamela (MPCA) <Pamela.Foster@state.mn.us>
Subject: [EXTERNAL] FW: Pig's Eye Lake Sediment Contamination Subgroup

Hi Nathan,

The MPCA sediment guidance for Managing In-Water Placement of Dredge Material for Linear Restoration Sites in the St. Louis R. AOC and Bio-Chemical Physical Approach to habitat restoration is in the appendices in the link below

Thanks

Kurt Schroeder

MPCA

From: Foster, Mike (MPCA)
Sent: Wednesday, February 24, 2016 8:52 AM
To: Schroeder, Kurt (MPCA)
Subject: RE: Pig's Eye Lake Sediment Contamination Subgroup

The MPCA guidance in Appendix 1 & 2 of this QAPP is what I provided you. I will leave it up to you to determine if you want to pass them along to the USACE or others. I only have an MPCA web link for the entire QAPP that includes the two appendices.

Blocked<https://www.pca.state.mn.us/sites/default/files/p-cao2-2016.pdf>

Mike Bares P.O.

From: [Campbell, Nathan J MVP](#)
To: [Deen, Angela MVP](#); [Keenan, Sierra MVP](#); [Goodfellow, Scott M MVP](#); [Baker, Scott L MVP](#); [Kimmel, Zachary MVP](#); [Moss, Christine MVP](#); [Perkl, Bradley E MVP](#); [Westman, Jack MVP](#); [Peterson, Rodney MVR @ MVP](#)
Cc: [McFarlane, Aaron M MVP](#); [Noren, James B MVP](#); [Wachman, Gregory S MVP](#); [Wallerstedt, Nathan MVP](#)
Subject: RE: Contaminants Sub Group Update
Date: Thursday, February 25, 2016 9:43:31 AM

Sorry I should clarify # 6. It was the initial gut reaction from the group that that contaminant levels won't be an issue for construction but further result analysis will be needed on MPCA's end to confirm that. Additionally, once we have a plan in place it's possible that intensive testing on the construction footprint may be required.

Thanks

Nate

-----Original Message-----

From: Campbell, Nathan J MVP
Sent: Thursday, February 25, 2016 9:20 AM
To: Deen, Angela MVP <Angela.M.Deen@usace.army.mil>; Keenan, Sierra MVP <Sierra.L.Keenan@usace.army.mil>; Goodfellow, Scott M MVP <Scott.M.Goodfellow@usace.army.mil>; Baker, Scott L MVP <Scott.L.Baker@usace.army.mil>; Kimmel, Zachary MVP <Zachary.R.Kimmel@usace.army.mil>; Moss, Christine MVP <Christine.R.Moss@usace.army.mil>; Perkl, Bradley E MVP <Bradley.E.Perkl@usace.army.mil>; Westman, Jack MVP <Jack.F.Westman@usace.army.mil>; Peterson, Rodney MVR @ MVP <Rodney.R.Peterson@usace.army.mil>
Cc: McFarlane, Aaron M MVP <Aaron.M.McFarlane@usace.army.mil>; Noren, James B MVP <James.B.Noren@usace.army.mil>; Wachman, Gregory S MVP <Gregory.S.Wachman@usace.army.mil>; Wallerstedt, Nathan MVP <Nathan.H.Wallerstedt@usace.army.mil>
Subject: Contaminants Sub Group Update

Pigs Eye PDT,

As you know Aaron, Jim, Greg and myself went over to the PCA yesterday and met with a few members of the PCA and Met Council to discuss contaminant issues and testing of contaminants on Pigs Eye Lake. The meeting was very beneficial. I wanted to provide you all with a few key outcomes from the meeting.

1. We decided that PCA would be the clearing house for all available and future data. The PCA will collect and distribute a spreadsheet containing all testing results on that have been done on the lake and the dump perimeter.
2. Mike Bares, a hydrogeologist in the remediation division with the PCA, shared information on projects in the St. Louis River Watershed (Detroit District) that will likely be very beneficial to the Pigs Eye project. For that region they have developed a Quality Assurance Program Plan with the MnDNR and Detroit District that sets testing and data management for numerous actions occurring in the St. Louis River watershed. That document has been shared with us and I have saved it to the pigs eye network folder (X:\PROJECTS\CAP\CAIP_204_Pigs_Eye_MN-402178\01 Feasibility\EA\02 Feasibility Report_EA\Reports and Documents). Of interest to us is Appendix 1, Managing In-Water Placement of Dredge Material for Habitat Restoration Sites in the St. Louis River Area of Concern and Appendix 2, A Biological, Chemical and Physical Approach to Aquatic Habitat Restoration Decisions in the St. Louis River Area of Concern. I have attached the decision trees from Appendix 1 and 2. I believe that these can be applied pretty readily to the Pigs Eye project. At the very least to provide assurance that our chosen alternative and construction methods are acceptable.
3. Mike Bares also shared construction method info on specific projects where habitat building occurred very soft substrate. We weren't able to get into great detail on this topic but it sounds like they have tackled the mud wave reduction and stabilization to reduce settling issues. We will need to follow up with him. He mentioned the Slyrker Bay project as a specific example.
4. Met Council made it clear that PFCs were a concern to them, particularly the level of PFCs in our dredged

material that would be placed in the lake. Currently MPCA does not require us to test our material for PFCs however we may want to consider it to satisfy the agencies.

5. I mentioned our potential measure of emergent wetland creation in the northern portion of the lake (near the battle creek inflow). MPCA was particularly interested in this alternative and asked if we would be willing and able to add a carbon filter soil layer our placed material if we were to go with that measure. The additional cost associated with this would be covered by MPCA and could potentially be added as a betterment (I discussed this with Mr. Wallerstedt and he thought that it could be possible).

6. The overall consensus from the technical folks in the room was that the level of contamination in the areas we have expressed interest in building in was not at a level that would preclude us from constructing.

Let me know if you have questions and if interested please review the QAPP.

Aaron, Jim or Greg do you guys have anything to add?

Thanks

Nate

Nathan Campbell
St. Paul District 1 SAU "E"
Civil Works Project Manager
PAS and US Program Manager
Office: 651-290-5544
Cell: 651-219-2963

From: [Campbell, Nathan J MVP](#)
To: [Noren, James B MVP](#); [Deen, Angela MVP](#); [Wachman, Gregory S MVP](#); [McFarlane, Aaron M MVP](#)
Subject: FW: Emailing - PigsEye PAHs1.pdf
Date: Tuesday, May 31, 2016 9:08:48 AM
Attachments: [PigsEye PAHs1.pdf](#)

-----Original Message-----

From: Schroeder, Kurt (MPCA) [<mailto:kurt.schroeder@state.mn.us>]
Sent: Friday, May 27, 2016 4:43 PM
To: Campbell, Nathan J MVP <Nathan.J.Campbell@usace.army.mil>
Cc: Foster, Pamela (MPCA) <Pamela.Foster@state.mn.us>; Monson, Phil (MPCA) <phil.monson@state.mn.us>;
Schmick, Emily (MPCA) <Emily.Schmick@state.mn.us>; Bares, Mike (MPCA) <mike.bares@state.mn.us>
Subject: [EXTERNAL] Emailing - PigsEye PAHs1.pdf

Nathan,

Attached is a map of PAH sampling results in Pig's Eye Lake sediment. Besides the elevated cadmium and PCBs (at PEL Mid, PE-8-2, PEL 0-2) in the mid-lake area, there is one sampling point toward the western shore (15-2M) that had a total PAHs concentration of 25.12 mg/kg. This exceeds the level II sediment quality target of 23 mg/kg. This sampling location and parameter group should be considered when additional sampling is done in the mid-lake area. Based on current data, we would probably include this point in a best management practices (BMP) area.

I should also note that we likely would redraw the upper lake BMP area boundary another 200 feet south of the line drawn on the maps we provided you on May 25, 2016, at our meeting. The redrawing would account for elevated PAHs in PE-3 and 15-1M.

Let me know if you have questions

Thanks

Kurt Schroeder

MPCA

Remediation Div

651 757 2703



-----Original Message-----

From: Schroeder, Kurt (MPCA) [<mailto:kurt.schroeder@state.mn.us>]

Sent: Tuesday, June 21, 2016 8:20 AM

To: Campbell, Nathan J MVP <Nathan.J.Campbell@usace.army.mil>

Cc: Neve, Hans (MPCA) <hans.neve@state.mn.us>; Foster, Pamela (MPCA) <Pamela.Foster@state.mn.us>; Scott,

Mary Gail (MaryGail.Scott@metc.state.mn.us) <MaryGail.Scott@metc.state.mn.us>

Subject: [EXTERNAL] FigsEye BMPmaplake.pdf

Nathan,

Here is our revised map of Pig's Eye Lake Sediment Management Areas. We have not delineated the area that needs more sampling but it encompasses the three points where PAHs, PCBs and metals were elevated, i.e. PE7, PE8 and PE10.

We can discuss more at today's meeting if you like.

Thanks

Kurt Schroeder

MPCA

Remediation Div



From: [Schroeder, Kurt \(MPCA\)](#)
To: [Campbell, Nathan J MVP](#); [Schnick, Emily \(MPCA\)](#); [Neve, Hans \(MPCA\)](#); [Scott, Mary Gail \(MaryGail.Scott@metc.state.mn.us\)](#)
Cc: [Deen, Angela MVP](#); [Noren, James B MVP](#); [McFarlane, Aaron M MVP](#)
Subject: [EXTERNAL] RE: Proposed contaminant sampling points
Date: Monday, July 25, 2016 2:34:31 PM

Nathan,

The proposed distribution of sediment sampling locations for PFC analysis looks satisfactory.

Kurt Schroeder
MPCA
Remediation Div

-----Original Message-----

From: [Campbell, Nathan J MVP](#) [<mailto:Nathan.J.Campbell@usace.army.mil>]
Sent: Thursday, July 21, 2016 8:33 AM
To: [Schnick, Emily \(MPCA\)](#); [Neve, Hans \(MPCA\)](#); [Schroeder, Kurt \(MPCA\)](#); [Scott, Mary Gail \(MaryGail.Scott@metc.state.mn.us\)](#)
Cc: [Deen, Angela MVP](#); [Noren, James B MVP](#); [McFarlane, Aaron M MVP](#)
Subject: RE: Proposed contaminant sampling points

Emily, Hans, Kurt, and Mary Gail,

The lab we go through does not do PFC analysis. We found a lab that can do it however we need to take separate samples. Also we have only budgeted for 6 PFC samples. I've attached the same map I sent before but with the proposed locations for PFC testing. Can you take a quick look and let me know if you recommend moving them at all. Please get back to me by Friday if possible.

Thanks

Nate

Nathan Campbell
St. Paul District USACE
Civil Works Project Manager
PAS and IIS Program Manager
Office: 651-290-5544
Cell: 651-219-2963

-----Original Message-----

From: [Campbell, Nathan J MVP](#)
Sent: Wednesday, July 06, 2016 3:19 PM
To: [Schnick, Emily \(MPCA\)](#) <Emily.Schnick@state.mn.us>; [Hans Neve](#) <hans.neve@state.mn.us>; [Schroeder, Kurt \(MPCA\)](#) <kurt.schroeder@state.mn.us>; [Foster, Pamela \(MPCA\)](#) <Pamela.Foster@state.mn.us>; [Bares, Mike \(MPCA\)](#) <mike.bares@state.mn.us>; [Scott, Mary Gail \(MaryGail.Scott@metc.state.mn.us\)](#) <MaryGail.Scott@metc.state.mn.us>
Cc: [Deen, Angela MVP](#) <Angela.M.Deen@usace.army.mil>; [Noren, James B MVP](#) <James.B.Noren@usace.army.mil>; [McFarlane, Aaron M MVP](#) <Aaron.M.McFarlane@usace.army.mil>
Subject: Proposed contaminant sampling points

MPCA and Mary Gail,

I've attached a map with our proposed sampling locations for Pigs Eye Lake. There are 8 locations that exist in the common locations of the various island footprints that we are considering at this time. The proposal is to take composite samples of 3 foot cores at each location. We will be testing for PCBs, PEST, PAHs, metals, grain size and PFC's

We will plan on testing the temporary placement piles that we propose to obtain our material from at a later date.

Please provide any comments or concerns with this plan by the end of the week (July 8).

Thanks

Nate

Nathan Campbell
St. Paul District USACE
Civil Works Project Manager
PAS and IIS Program Manager
Office: 651-290-5544
Cell: 651-219-2963

-----Original Message-----

From: McFarlane, Aaron M MVP
Sent: Tuesday, June 21, 2016 11:13 AM
To: Deen, Angela MVP <Angela.M.Deen@usace.army.mil>; Campbell, Nathan J MVP
<Nathan.J.Campbell@usace.army.mil>
Subject: Proposed contaminant sampling points

As promised, here's my proposed sampling points. The proposed island outlines are shown in differing colors, and the areas where they all intersect are shown in yellow. Not all islands had good intersects, so I took my best shot at them

Also shown are the past sampling points, in case that influences decisions

Aaron

From: [Foster, Pamela \(MPCA\)](#)
To: [Campbell, Nathan J CIV \(US\)](#)
Cc: [Heve, Hans \(MPCA\)](#); [Campbell, Fred \(MPCA\)](#)
Subject: [EXTERNAL] BMP map
Date: Tuesday, September 26, 2017 10:30:22 AM

Hi Nate,

Glad to hear the Pig's Eye Islands FS moving into the final phase! The MPCA Pig's Eye team has reviewed the draft feasibility report you provided and the Appendix E Sediment Report. There will not be any changes to the MPCA's BMP area map (figure 14, pg. 30 of pdf). We are looking forward to seeing the final report.

Please let me know if you have any further questions.

Have a great day!

Pam

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**Minnesota Pollution
Control Agency**

9 Habitat Sub-Group

To improve efficiency of correspondence amongst agencies with an expertise in habitat development and habitats of the Pigs Eye Lake area the Pigs Eye Islands CAP 204 PDT developed an interagency habitat sub-group. The sub-group consisted of staff from the Minnesota DNR, National Park Service, Fish and Wildlife Service and the Corps. The following are the meeting minutes from the Habitat Sub-Group meetings.

PIGS EYE LAKE SECTION 204

28 Mar 2016

Meeting Notes: Habitat Sub Group Meeting #1

Prepared by: Aaron McFarlane

Attendees:

- MNDNR – Joel Stutz
- NPS – Alison Holdhuser
- USFWS – Nick Utrup
- USACE – Nate Campbell, Aaron McFarlane

On preferred habitat types and target species...

- Incorporation of structure – log cribs, downed trees, etc. to promote fisheries
- Additional shoreline and interstitial space will add some level of fisheries benefits
- Shad Production (rock habitat?)
- Protection of existing resources a priority. Otter dens, eagle nests, hardwoods on west shore...
- Incorporation of an overwintering area could be helpful with carp problem
- It would be good to consider mussels. Any way to construct habitat for backwater species? Crayfish, cricket frogs, or mudpuppies?

On target vegetation types

- River bulrush – possible spread by rhizomes and flood-tolerant
- Arrowhead and lotus likely plantable
- pickerelweed, blueflag iris could be desirable
- prairie cordgrass and willows on lower islands desirable
- Trick will be ensuring substrate will be consolidated enough for plants to hold.
- NPS may be able to provide some assistance with planting – volunteers or funding.
- Willows likely to be targeted by beavers, so recommend ensuring diversity
- Cottonwoods

On surrogate species and habitat benefit calculation

- Dabbling duck and black-capped chickadee most promising at present.
- It was also suggested to consider models of species present nearby, such as herons.
- Turtles could be considered. Currently only snapping turtle model available

On existing resources

- Several river otter populations
- Beavers prolific in some areas
- Fishery consists primarily of carp and buffalo, but carp have been decreasing to some degree
- Several active bald eagle nests
- Heavy waterfowl/waterbird use on Pigs Eye and Red Rock Lakes.
- Waterfowl composition weighted toward dabblers in Red Rock and divers in Pigs Eye.

On contaminants

- Universal concern for construction techniques and ensuring that construction does not suspend contaminants.
- Corps planning to date has focused on how to construct on thick layer of flocculent sediment while minimizing mud waves, re-suspension, and sinking. Currently developing construction methods based on those used successfully in other areas with similar sediments and contamination present.
- In regards to attracting wildlife to the area with contaminants present, several points were made:
 - Remediation would be preferable and should occur (although it cannot be a goal of this project based on the Corps authority the project is being funded under).
 - Lots of wildlife currently
 - In the absence of remediation, habitat may still be preferable
 - Not likely to attract enough wildlife to have population impacts on species
 - Because the islands would reduce wind fetch, sediment and contaminant re-suspension would hopefully be reduced, perhaps reducing contaminant exposure.
 - Sand features would reduce the exposed area of existing (contaminated) substrate
- Additional Eagle contaminant data to be reviewed by Corps

Ideas for potential related management options

- Closing off upper Battle Creek inlet area with rock or sand structure to keep contaminants out.
- Drawdown still desirable. Potential for coordination with Lassaré Sams or Clean Water Legacy Council?

PIGS EYE LAKE SECTION 204

Habitat Sub Group Meeting #2 AGENDA

Date & Time: Monday, July 11; 1:00-3:00 p.m.

Location: 1200 Warner Road
St. Paul, MN 55106-6793

Room: Willow Brook Room, Downstairs

(1) Array of Alternatives *(Maps Included in read-ahead)*

- 5 Island alternatives to address problems:

- Loss of emergent aquatic vegetation
- Loss of submergent aquatic vegetation
- Lack of island habitat in Pigs Eye Lake and within Pool 2
- Degradation & loss of shoreline habitat
- Lack of depth diversity
- **Others?**

1. *Improve aquatic habitat.*
2. *Increase terrestrial habitat diversity.*
3. *Maintain or enhance the quantity of shoreline habitat.*

- Additional Formulation Considerations – smaller details, benches, sand blankets, etc.

- **Requesting input on alternative designs and finishing touches:**

Plantings -

Structure incorporation -

Target species -

(2) Dabbling Duck Model

- Discuss Early Results
- Wind Fetch Model Results

(3) Vegetation Survey Results

- Water was high – performed limited ground survey
- Used to develop very coarse idea of communities present
- Still need survey from water to assess near-shore plants

(4) Contaminants Update

- MPCA discussions summary
- USACE Draft PFC Data/Literature Review *(Draft Report included in read-ahead)*
- Path Forward – proposed sampling etc.



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St. Paul District

Appendix B

404(b)(1) Clean Water Act

Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of
Engineers May 2018

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I. Project Description

A. Location and General Description

The US Army Corps of Engineers (Corps), St. Paul District is proposing to restore, protect, and create aquatic and wetland habitats in Pigs Eye Lake, Ramsey County, MN. Pigs Eye Lake is a 628-acre, shallow backwater lake, situated southeast of St. Paul, Minnesota, within Pool 2 of the Mississippi River (Figure 1). Pigs Eye is the largest lake in St. Paul and is located in Pool 2, which extends approximately 33 miles upstream from Lock and Dam 2 at Hastings, Minnesota (river mile 815.2) to Lock and Dam 1 (Ford Dam) at Minneapolis, Minnesota (river mile 847.9).

The proposed fill action being evaluated here would involve placing clean sand and rock with a total footprint of approximately 40 acres. The Corps is proposing to utilize sand that has been dredged during the maintenance of the navigation channel to construct islands and aquatic habitat in Pigs Eye Lake. The proposed alternative includes construction of 7 islands totaling 16.3 acres and creating 17.6 acres of marsh habitat within the island complex. The proposed features would increase the habitat diversity within the lake, reduce shoreline erosion, decrease turbidity, and stabilize some of the loose, shifting sediments within the lake. Additional description of the project features can be found in the Feasibility Study Report and integrated Environmental Assessment.

B. Authority and Purpose

This study is authorized under Section 204 of the Water Resources Development Act of 1992, as amended. Section 204 provides authority for the Corps of Engineers to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized Federal navigation project. Section 204 is one of a number of existing authorities in the Continuing Authorities Program (CAP), which gives USACE authority to plan, design, and construct a project without specific project authorization by Congress.

C. General Description of Dredged or Fill Material

1. General Characteristics

Sand would be sourced from recurring dredge cuts of the main (navigation) channel of the Upper Mississippi River (UMR), or from stockpiled material from past dredging. The exact types and gradations vary by dredge cut and somewhat throughout time. Sediment samples have been periodically collected and tested from active dredge cuts since 1974.

Table 1: Pool 2 Dredge Cut Sediment Quantities and Physical Characteristics

Cut Name	Location (RM)	Annual Avg Qty: '70-'14	Year Last Tested	Avg. % Sand	Avg. % Silt	Avg. % Clay
Above + Below Smith Ave	840-841.3	2,917	2013	45	.6	.5
Abv Wabasha Ave Br	839.5-839.6	25	2014	88	7	4
Small Boat Harbor - St. Paul	839.6	4,237	2013	58	40	2
St. Paul Barge Terminal	836.4-837.8	49,864	2013	92	5	3
Robinson Rocks/Gray Cloud Slough	826.1-828.3	6,170	2013	97	1.0	1.5
Pine Bend Landing	824.3-824.6	5,551	2014	93	1	.2
Boulanger	820.3-821.4	20,315	2013	80	15	5
Boulanger/lower light	819.3-820.3	8,984	2013	35	51	14
Freeborn Light	818.0-819.3	10,110	2014	89	7	3
Upper Appch L/D 2	815.2-816.5	332	2014	61	29	8

Table 1 shows the active dredge cuts in pool 2 and their grain size composition based on the most recent testing. The sample results are taken from two random locations in each cut using a ponar dredge sampler. The depth of each sample is around 10 cm. Overall, in the upper reaches of pool 2 there was very little fine material seen in the navigational channel. But in the St. Paul Small Boat Harbor, lower pool at Boulanger, and Upper Approach L/D 2 cuts, silt fractions are around 20-50%

The groins would be constructed using rockfill (a quarry-run stone with no processing). Rockfill has a wider gradation band than graded riprap, which eliminates the need for processing.

2015-2016 particle size testing of surficial sediment (top 4 feet) in Pigs Eye Lake showed that the vast majority of the material was entirely composed of silt and clay.

2. Quantity of Material

Three general types of material would be used in constructing the islands and marsh, and the approximate quantity of each is listed below:

Sand: 369,900 cubic yards (islands)
28,900 cubic yards (marsh)
Fine material: 14,600 cubic yards (topsoil)
Quarry-run rock riprap: 2,100 cubic yards (groins)

3. Source of Material

The material to construct the project would come from several different sources. The sand and fine material would be sediment dredged from Pool 2 of the main channel of the Mississippi River. The majority of the material will have been dredged at some point over the previous ten years,

and is currently stockpiled at placement sites in the lower portion of the Pool. The Corps places material dredged in Lower Pool 2 on three temporary placement sites – Pine Bend, Upper Boulanger, and Lower Boulanger Islands. Some of the dredging in Pool 2 produces finer-grained sediments, and these are typically stored separately and would be available for use as topsoil.

If timing is appropriate, material dredged during the project construction season(s) could also be transported directly from the dredge cut to the project site. However, the Corps does not typically have the need to dredge as much as is required for the construction of the proposed project in any given dredging season. Direct transport from dredge cuts to Pigs Eye would save double-handling material and would likely be pursued if practical.

Riprap used for the project features would be obtained from local approved quarries.

D. Description of the Proposed Discharge Site

1. Location

Pigs Eye Lake is located in Ramsey County, MN; the shallow backwater is 628 acres in size, with depths averaging only 3-4 feet deep in the deepest areas. Pigs Eye is located southeast of St. Paul, Minnesota, within Pool 2 of the Mississippi River.

2. Site and Habitat Description

Pig's Eye Lake is a contiguous backwater floodplain lake. Pig's Eye Lake is somewhat unique as one of the few backwater areas in this upper portion of the Pool. No comparable backwater areas exist upstream of Pig's Eye Lake in Pool 2, and the next nearest backwater lake is more than six miles downstream. Pig's Eye Lake is dominated by a loose mucky bottom, wind-swept surface, and shallow depths which limit the biological productivity of the lake. Re-suspension of sediments from wind and rough-fish activity limit light penetration and rooting capability of submersed vegetation. The lack of stable substrate and high nutrient levels currently limit the biotic value of the habitat.

E. Description of Disposal Method

It is anticipated that the contractor would use either (1) a hydraulic hopper and spreader barge, or (2) typical mechanical dredging equipment including barges and excavators. Other proposals may be considered. Details would be known when reviewing contractor proposals.

II. Factual Determinations

A. Physical Substrate Determinations

1. Substrate Elevation and Slope

The existing substrate in the island footprints is predominantly flat and between 3-4 feet deep throughout most of the lake. The proposed island construction would increase substrate elevation and slope diversity by creating more transitional shoreline areas with gradual, sandy slopes encircling each of the islands.

2. Substrate Changes

Borings conducted in 2015 generally indicated very soft soils for a depth between 10 ft and 22 ft. The very soft soils were dominated by silty clay with organics (CH) but also included clayey organic silt (OH), clayey peat (Pt), clayey sand (SC), and wood fragments mixed with clay (Pt). The very soft soils were underlain by either bedrock – the St. Peter sandstone in boring 15-3M – or dense sandy and/or gravelly alluvium.

The proposed island and marsh footprints would be overlain with varying depths of clean sand. The island tops would be above the water surface most of the time, and these areas would be covered in topsoil. The base of the islands that would extend into the water around the islands and the marsh areas would be expected to be permanently changed to sand, or a mixture of sand and the existing substrate where sand is placed in thinner layers. The groins would be constructed of clean riprap.

3. Fill Material Movement

The sand fill being used to construct the islands is not expected to move significantly once placed. The top of the islands would have topsoil and vegetation that would be expected to hold the substrate in place. The islands were designed to reduce wind fetch throughout the lake, which would thereby reduce stress on the islands from waves. Groins were also incorporated into the island design for extra protection against erosive forces.

Some localized fill material movement and existing sediment resuspension is expected during project construction, depending on current and wind conditions. These effects would be temporary and would end following construction. Additionally, construction could cause lateral movement of the underlying (existing) substrate, often referred to colloquially as a “mud wave”. Lateral displacement could occur in a semi-liquid fashion, in which the material is simply “squeezed” outwards from beneath the fill like toothpaste, or in a plastic fashion, where soil masses or wedges of material are displaced outwards from the fill. This movement would also only be expected to occur during construction, and would result in a more variable substrate elevation around the islands.

4. Actions Taken to Minimize Impacts

A number of procedures would be used to minimize impacts where needed. All work performed by a contractor will be subject to adherence with a work plan and applicable agency permits. The Work plan shall detail the contractor's proposed methods to perform work described by contract drawings. This plan (and other related plans) shall be submitted to Government Representative (Corps COR) for review and acceptance before any site work commences.

B. Water Circulation, Fluctuation, and Salinity Determination

1. Water

Some minor, short-term decreases in water clarity are expected from the proposed fill action. The long-term effect from the proposed project features would likely be a minor improvement in water clarity in the study area over present conditions due to the reduction in wind-generated waves.

The proposed fill action would have no measureable impact on salinity, water chemistry, color, odor, taste, dissolved oxygen levels, nutrients, eutrophication, or temperature.

2. Current Patterns and Circulation

a. Current Velocity and Patterns

Velocity of water movement in Pig's Eye Lake is currently very low and is comprised from two primary sources. One is the 'bellows' action bringing water into the lake from the Mississippi River. As the river rises, water moves into the bottom end of the lake. The other source of water is from Battle Creek which enters at the north end of the lake. These currents are very small. The island complex will have a small effect on these already small currents. The islands will produce very low velocity areas within the island embayments and correspondingly concentrate the flow in the adjacent channels. The very small velocities could rise (very roughly) by 20-30 percent in the vicinity of the islands.

b. Stratification

The proposed fill activities should have no effect on stratification.

c. Hydrologic Regime

The proposed fill activities should not significantly alter the existing hydrologic regime within the project area.

d. Normal Water Level Fluctuations

The proposed activities should not have an effect on normal water level fluctuations in the project area.

4. Actions Taken to Minimize Impacts

No special actions would be taken to minimize the effects of the proposed project on water circulation, fluctuation, or salinity.

C. Suspended Particulate/Turbidity Determination

1. Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site

Increases in suspended particulates and turbidity levels would occur from the placement of fill material and dredging in the immediate project vicinity. Upon completion of construction activities, suspended particulates and turbidity levels would return to pre-project conditions or may decrease due to reduced sediment resuspension and/or erosion rates.

2. Effects on Chemical and Physical Properties of the Water Column

Project construction would result in localized turbidity plumes. Related short-term effects of this would be decreased light penetration and reduced aesthetic qualities near the construction site. Suspended particulates are not expected to cause a change in dissolved oxygen, toxic metals, organisms, or pathogens in the water column after project completion.

3. Actions Taken to Minimize Impacts

The discharge of dredged material will result in disturbance to the existing substrate, which will likely cause a temporary and localized increase in suspended sediment. As part of the Project's Plans and Specifications, the contractor will develop an Environmental Protection Plan that will include best management practices designed to minimize impacts of the proposed project on suspended particulates or turbidity. Samples will be taken at varying distances from point of discharge to measure this impact and ensure compliance with all applicable agency permits.

D. Contaminant Determinations

The existing substrate within Pig's Eye Lake was tested by the Corps in 2015-16. A total of 13 sediment samples were collected and analyzed; full results of these tests are presented in Appendix F of the main report. To ascertain the possible toxicity of the samples to the benthic environment, the chemical results were compared to the Minnesota Pollution Control Agency's (MPCA) sediment quality targets (SQTs) for the protection of sediment-dwelling organisms in Minnesota and the MPCA's Soil Reference Values (SRVs) that are used for upland placement suitability. More than half of the boreholes exceeded SQT I concentrations for a majority of metals and a number of PAHs. A few boreholes had SQT II exceedances for cadmium plus a number of PAHs and cadmium was frequently above the proposed SRV limit for Recreational/Residential use. Compared to previous surveys that focused their sampling to the area adjacent to the landfill (Wenck and the Bay West surveys), the USACE surveys demonstrate that the contamination in the lake is widespread, but at lower levels than what is found immediately adjacent to the landfill. Testing indicated that the lake has ubiquitous contamination of PFCs, widespread low level

(SQT I) exceedances for heavy metals and PAHs, limited locations with higher exceedances for cadmium and PAHs (SQT II and proposed Recreational/Residential SRVs) and no recent detection of PCBs. The relatively low levels of contamination (SQT I exceedances) present in the existing substrate would not pose a large risk of bioavailability or uptake of contaminants, and placing clean sand on top of the existing sediments to construct the proposed islands would probably benefit the aquatic and benthic environment by capping serving as an additional barrier to contaminant mobility.

The proposed fill material would include rock, sand, and topsoil. The rock would be clean and sourced from a quarry. The sand fill would consist primarily of material generated from dredging in the lower portion of Pool 2. Historically, sediment testing in Pool 2 have shown that some of the siltier dredge cuts in Lower Pool 2 have had issues with contamination. The levels of Pool 2 contamination appear to increase downstream, likely due to decreased granular size seen downstream where the pool becomes more lake-like. However, all of the dredged material currently available on the temporary placement islands where sand would be sourced for the project was dredged after 1999-2000. Sediment testing since 2000 has revealed fewer types and decreased levels of contamination. The only hits noted have been exceedances of SQT Level 1 limits for several PAHs (e.g., acenaphthylene and pyrene), and two pesticides (DDD and DDT). These contaminants were found at relatively low levels that would not negatively impact their use for constructing wildlife habitat, based on MN SQT guidelines. If topsoil needs to be sourced from the lake itself, testing has also shown contamination levels below Minnesota SRV Guidelines and acceptable for this use.

E. Aquatic Ecosystem and Organism Determination

1. Effects on Plankton

During construction, increases in turbidity and suspended solids near the dredged and filled areas would have a localized suppressing effect on phytoplankton productivity. However, these local effects would be short-term and minor. The plankton populations would recover quickly once construction activities have ceased.

2. Effects on Benthos

The proposed project would directly affect approximately 40 acres of benthic habitat in open water areas. Most non-mobile organisms in the filled and dredged areas would be destroyed during construction. However, the area does not currently support a dense or diverse benthic community and the overall long-term project impacts to these organisms would be positive because of the improved habitat conditions. Benthic organisms would quickly recolonize the area following construction. The sand and rock substrate would increase the benthic habitat diversity in the area. The overall conditions for benthic organisms would likely be improved in the project area, mainly because of reductions in sediment resuspension.

3. Effects on Nekton

During construction, increases in turbidity and suspended solids near the dredged and filled areas would have a localized suppressing effect on nekton productivity. However, these effects would

be local, short-term, and minor. The nekton populations would recover quickly once construction activities have ceased.

4. Effects on Aquatic Food Web

The burial and dredging of existing benthos and localized impacts on plankton productivity could cause a temporary minor impact on the local food web. However, benthos and plankton would recover quickly, and there would likely be no long-term negative effects on the aquatic food web. The anticipated increase in aquatic vegetation coverage and diversity would likely improve the aquatic food web.

5. Effects on Special Aquatic Sites

The proposed dredged material placement would not directly affect any special aquatic sites. The proposed project as a whole would be expected to protect wetlands around the perimeter of Pigs Eye Lake.

6. Threatened and Endangered Species

The Corps has determined that there will be no effects to federally-listed threatened and endangered species. Further details can be found in the Feasibility Report and Environmental Assessment.

7. Other Wildlife

The proposed project would likely have a positive long-term effect on other wildlife such as waterfowl, shorebirds, turtles, beavers, muskrats, mink, and other wildlife species that would utilize habitat in the project area.

8. Actions Taken to Minimize Impacts

No special actions are proposed at this time to minimize impacts on aquatic organisms or other wildlife. If bald eagles are found to be nesting in the vicinity of proposed construction actions, measures would be identified to minimize or avoid impacts as necessary, in accordance with the Bald and Golden Eagle protection act.

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination

Dredged material placement would cause a minor increase in turbidity levels in the immediate project vicinity. However, ambient turbidity levels in the lake are already high and no long-term adverse impacts to water quality would likely occur from any of the proposed project features/activities.

2. Determination of Compliance with Applicable Water Quality Standards

It is not anticipated that the proposed project would violate Minnesota water quality standards for toxicity. Rock riprap would be obtained from approved pits and quarries in the project area,

and the sand fill that would be used is clean. Water quality certification would be obtained from Minnesota prior to project construction.

3. Potential Effects on Human Use Characteristics

a. Municipal and Private Water Supply

No municipal or private wells would be affected by the proposed project.

b. Recreational and Commercial Fisheries

Fish could be temporarily displaced from the area during placement events, but these effects would be temporary and minor. The proposed project would likely have a long-term positive impact on the local fishery.

c. Water Related Recreation and Aesthetics

The proposed habitat improvements would likely have a positive impact on recreation in the project area. The proposed islands and resulting improvements to aquatic vegetation would be viewed as aesthetically pleasing to most.

d. Cultural Resources

The proposed fill activities would have no effects on cultural resources or historic properties.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

A number of factors will affect the future environment of the UMR. Some of those factors include the continued operation and maintenance of the navigation system, hydrologic and hydraulic processes in an altered environment, commercial traffic, public use, point and nonpoint source pollution, commercial and residential development, agricultural practices and watershed management, and exotic species. The factors most likely to affect the future of the Pig's Eye Lake area are those related to shoreline erosion, turbidity effects due to wind-generated waves, and potential future site remediation. The proposed project would decrease the erosion rate and increase and enhance the habitat diversity and vegetation within the lake. The project would increase the habitat diversity in upper Pool 2, which would be a positive effect on the ecosystem of the UMR.

H. Determination of Secondary Effects on the Aquatic Ecosystem

No significant secondary effects on the aquatic ecosystem would be expected from the proposed action.

III. Finding of Compliance with Restrictions on Discharge

1. No significant adaptations of the guidelines were made relative to this evaluation.
2. The proposed fill activity would comply with the Section 404(b)(1) guidelines of the Clean Water Act. The placement of fill is required to provide the desired benefits.
3. There are no practical and feasible alternatives to the placement of fill in the proposed sites that would meet the objectives and goals of this project.
4. The proposed fill activity would comply with State water quality standards. The disposal operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
5. The proposed project would not result in take of federally-listed species.
6. The proposed fill activities would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing. The proposed activities would not significantly affect plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife would not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability and on recreational, aesthetic, and economic values would not occur.
7. On the basis of this evaluation, I conclude that the proposed discharge complies with the Section 404(b)(1) Guidelines for the discharge of dredged or fill material.

Date

Samuel L. Calkins
Colonel, Corps of Engineers
District Commander



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St. Paul District

Appendix C: Habitat Evaluation & Quantification Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

PIGS EYE LAKE SECTION 204

Habitat Evaluation Appendix C

1. Introduction

Habitat Evaluation Procedures (HEP) were used to evaluate the potential benefits of alternative habitat improvement features (island construction, wetland creation, etc.) for the Pigs Eye Lake Section 204 Project. Two evaluation models were used: the Migratory Habitat Model for Dabbling Ducks (Devendorf 2001) and the Marsh Wren Habitat Suitability Index Model (Gutzwiller, and Anderson 1987). This appendix describes the data collection and evaluation methods, assumptions, and results of these models in comparing the habitat conditions existing and expected to occur in Pig's Eye Lake following several potential project plans.

2. Methods, Data, and General Assumptions

HABITAT EVALUATION PROCEDURES

The U.S. Fish and Wildlife Service's 1980 version of Habitat Evaluation Procedures (HEP) was used to quantify and evaluate the potential project effects and benefits. The HEP methodology utilizes a Habitat Suitability Index (HSI) to rate habitat quality on a scale of 0 to 1 (1 being optimum). The HSI is multiplied by the number of acres of available habitat to obtain Habitat Units (HU's). One HU is defined as one acre of optimum habitat. By comparing the projected HU's available without a proposed action to projected HU's with a proposed action or alternative, the benefits of different alternatives can be quantified. HSIs and HUs were calculated for the baseline conditions and for Future Without-Project (FWOP) and Future With-Project (FWP) conditions.

EVALUATION SPECIES AND MODEL SELECTION

Selection of evaluation species for a project is an important component of measuring the potential benefits of a project and comparing benefits among different alternatives. The selected evaluation species should reflect the project's objectives and the ecological and/or economic values of the project area. The objectives developed for the project are to (1) Improve aquatic habitat, (2) Improve the quantity and quality of habitat for migratory bird species, and (3) Maintain or enhance the quantity of shoreline habitat. Meeting these objectives would result in an increase of nesting and resting areas, improved visual and wind barriers, and increased aquatic vegetation, all of which would result in greater suitability of the area for waterbirds such as ducks, geese, and swans. A wide variety of HEP models that assess the value of habitat for bird species are available and were reviewed with the project objectives in mind. (A full list of models approved for use in Corps planning projects is available online at the

Ecosystem Restoration Gateway¹) The Migratory Habitat Model for Dabbling Ducks (Devendorf 2001) was selected to evaluate potential benefits of the proposed project for Objectives (1) and (2). This model was developed by the U.S. Army Corps of Engineers with assistance from the resource agencies. The model species represents these project objectives and the model components reflect the majority of the proposed habitat improvements.

A 37.5 acre subset of the project area is being evaluated using the marsh wren HSI model to reflect success in meeting Objective (3). In the absence of a project, this subset of the project area is predicted to be entirely converted from marsh to open water over the course of the 50-year planning period due to the effects of wind-generated waves. The dabbling duck migration model is not sensitive enough to capture the total loss of this area in the context of the much larger 741 acre project area. The use of the marsh wren model for this subset emphasizes the importance of this predicted habitat loss.

DATA SOURCES

Variables in the dabbling duck and marsh wren models required input from several available sources, as well as the collection and extrapolation and interpretation of additional data. Data inputs and their sources are discussed below.

Aerial Imagery and Light Detection and Ranging (LIDAR)

Aerial imagery from multiple sources and years, along with LIDAR data were used for many inputs for habitat modeling. High-quality aerial imagery which included the project area was collected by the Corps in 2015 and was used in conjunction with LIDAR data to delineate the current shoreline of Pigs Eye Lake. Historic Aerial imagery from 1951 was obtained from the online John R. Borchert Map Library², maintained by the University of Minnesota, and used to delineate the historic shoreline of the lake to determine the approximate rate of shoreline erosion. The historic images were georeferenced by Corps personnel for comparison with current conditions. Multiple years of aerial imagery and infrared sensing were examined to infer and map vegetation types, past lake conditions, and surrounding land use practices.

Bathymetry

Bathymetry from the project area was used to categorize water depths in the area of evaluation. Bathymetry data was collected in Pigs Eye Lake by the Corps in October of 2015, and was corrected to the Low Control Pool (LCP) Elevation for the project area (687.2 feet amsl, NAVD 88). Bathymetry data was processed by the Corps. LIDAR and Bathymetry data were used in preparation of the Fall Inundation Levels Maps presented in Plates 4-7.

Vegetation

On-site surveys were conducted to assess vegetation species and communities currently present in the project area. Surveys were conducted on foot by Corps personnel on 22 June 2016 in the northwestern portion of the project area. Surveys noted presence of species and the approximate percentage of

¹ <https://cw-environment.ercd.dren.mil/model-library.cfm?CoP=Restore&Option=View&Id=622>

² <https://www.lib.umn.edu/borchert>

coverage. GPS coordinates of the vegetation were compared with aerial imagery of the project area and extrapolated to delineate vegetation communities. Vegetation data was used to portray existing conditions on the existing and predicted project conditions maps in Plates 8-12.

Wind

Although not a direct component of the model, wind is a large factor of the degraded conditions in Pigs Eye Lake. Therefore, project area was evaluated for wind fetch under the existing conditions and proposed project alternatives using a GIS model developed by the Corps and often used in habitat restoration projects³. The results were incorporated into several aspects of habitat evaluation, including: (1) As justification for Dabbling Duck Model variable 9 to show that the project area would provide thermal protection, (2) To identify which areas are most protected from wind, and thereby may be more likely to support establishment of aquatic vegetation, (3) To determine if any particular island configuration would be significantly better at reducing overall wind fetch, and (4) To compare the protection each alternative provided the Pig's Eye Lake shoreline for the Marsh Wren Model.

SOFTWARE

ArcMap version 10.3.1 for Microsoft Windows was used to examine, evaluate, and present the various layers of spatial information used to develop suitability indexes for a variety of habitat variables. Spreadsheets developed in Microsoft Excel were used in data storage and analysis. These outputs were incorporated in the IWR Planning Suite software to conduct cost effectiveness and incremental cost analysis.

EVALUATION AREA DELINEATION

The boundary of the Evaluation Area used for the Dabbling Duck Migration Model was delineated to reflect the contiguous areas that have potential for or are currently being used by ducks. The entirety of the permanently inundated area of Pigs Eye Lake was included all the way south to the lake's connection with the barge offloading channel. The southern boundary at this connection was traced over the 4-foot-depth contour on the edge of the dredged barge channel. The lake is surrounded with wetland areas that may provide cover, food, and resting locations for ducks, so much of the shoreline was included. A combination of aerial imagery and LIDAR elevation data was used to delineate an area that was likely to support wetland plants for ducks. Areas observed during site visits that contained vegetation reflective of areas often inundated corresponded with an elevation of approximately 689 feet amsl (NAVD 88). Water level data collected from 1972-2012 confirmed that this elevation is frequently inundated. The evaluation area boundary was digitized at this approximate elevation using LIDAR data and aerial imagery. The 37.5 acre area that is expected to erode over the 50-year planning period due to wind-generated waves was evaluated separately using the Marsh Wren HSI model. This area was delineated by identifying the shoreline areas that were most susceptible to erosion, estimating the rate of shoreline loss, and digitizing an area of that size based on professional judgement. Figure 1 shows each model's evaluation area boundary along with the bathymetry and LIDAR.

³ See "Application of Wind Fetch and Wave Models for Habitat Rehabilitation and Enhancement Projects - 2012 Update" http://www.umesc.usgs.gov/management/dss/wind_fetch_wave_models_2012update.html

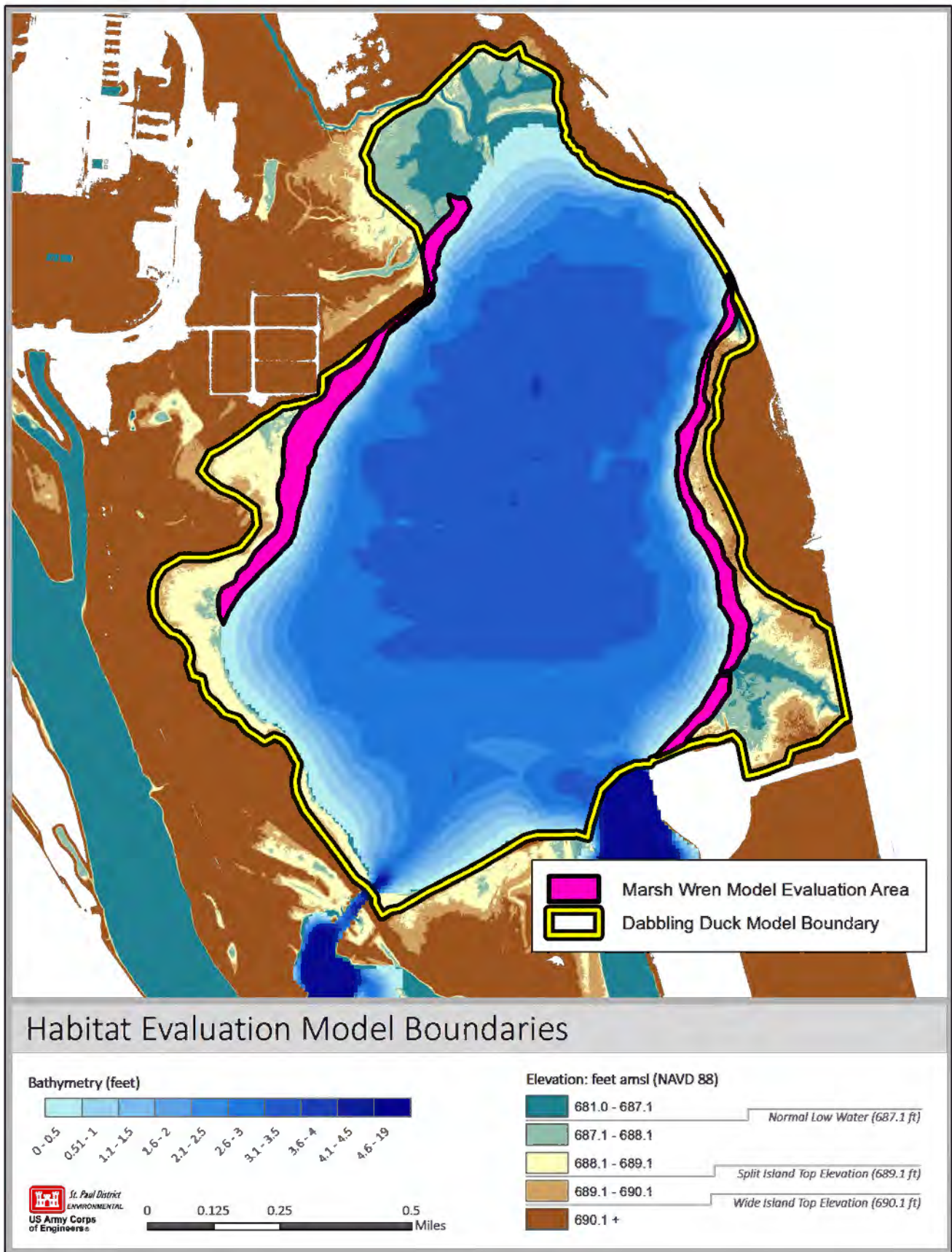


Figure 1 - Habitat Evaluation Model Boundaries

GENERAL ASSUMPTIONS

Predicted FWOP and FWP conditions are used in the planning of all Corps restoration projects. These predictions are used to quantify the expected habitat benefits for use in alternatives evaluation and project justification. Predictions are based on factual information as much as possible; however, by their very nature, predictions require the considerable use of professional expertise and judgment. For this analysis, a number of general assumptions were made as follows:

1. A 50-year planning period is used. Because construction of this project would not begin until at least 2019, the planning period for this project is 2019-2069. An incremental period of 25 years was used in evaluating FWOP conditions to capture the predicted degradation of the project area due to erosion of the existing shorelines under FWOP conditions.
2. The projection of FWOP conditions assumes no habitat restoration measures will occur in the study area and natural forces will continue to change the area in manner similar to what has occurred since the creation of Pool 2 in 1930 due to the construction of Lock and Dam No. 2 in Hastings, MN.
3. Habitat benefits associated with changes in vegetation composition and extent would be realized within 3 years of construction for aquatic areas. Benefits due to aquatic vegetation were applied in the Dabbling Duck Model calculations as an annual linear gain from 0 benefits at year 0 to full benefits at year 3.
4. Benefits of the upland areas of the islands are not fully captured in this model. Use of an another HEP model to capture benefits on the islands themselves to further differentiate alternatives was considered, but rejected because it was assumed that the relatively small area of upland created by the project (as compared to the vast aquatic area that would be improved) would not have a large enough influence on the AAHU gain to alter the plan selection. These benefits are instead discussed in the ancillary benefits section.
5. Each alternative was designed with consideration to reduction in wind fetch. Wind fetch modeling showed significant reduction for each alternative (see Plates 2-3). Alternatives 3, 5, 6m, and 7m that include the “split” island designs provide pockets of substantially higher protection, which are the only areas the team was confident that marsh could be established. (Successful establishment of marsh in these areas may provide a basis for other areas to naturally establish at a later date, but these benefits are not incorporated into the analysis.)
6. No major changes in water control operations which affect water surface elevations at the study area.
7. Under baseline conditions, FWOP conditions, or FWP conditions, rooted floating aquatic or emergent vegetation would not be expected to be able to take and hold root in areas of existing substrate. Therefore, no significant vegetation growth is expected for alternatives that include island construction but don’t include placing sand for substrate consolidation.

3. Migratory Habitat Model for Dabbling Ducks

3.1 ASSUMPTIONS AND PREDICTIONS

The Dabbling Duck Migration Habitat Model (Devendorf 2013) requires information regarding the type and extent of vegetation communities currently present and those predicted to be present in the evaluation area. Predictions were based on a number of assumptions explained below. The Habitat Sub-Group provided assistance in developing assumptions and in making predictions of when and where vegetation might grow in the project area. Predictions were developed for existing conditions, future without project conditions, and for each alternative, and are displayed in Plates 8-12.

Vegetation community grouping was based on criteria provided for Variable #6 of the Dabbling Duck Migration Habitat Model, and include the following categories:

- Woody Terrestrial
- Grasses/Forbs
- Emergents
- Rooted Floating Aquatics
- Rooted Floating Aquatics – Emergents
- Rooted Floating Aquatics – Submergents
- Emergents – Rooted Floating Aquatics – Submergents
- Submergents

EXISTING CONDITIONS

Boundaries were delineated using a combination of on-site observation and interpretation from aerial imagery from multiple years and sources. Areas of emergents, represented by sedges, rushes, cutgrass, smartweeds, arrowhead, and water plantains were interspersed with woody terrestrial communities represented by species such as silver maple, green ash, American elm, cottonwood, box elder, and sandbar willow.

FUTURE WITHOUT PROJECT

Historically, Pigs Eye Lake was a marsh, thorough which Battle Creek flowed prior to joining the Mississippi River. The area was transformed into a shallow backwater lake following the increase in water levels caused by the construction of Lock and Dam No. 2 in 1930. The interior area of the lake is wind-swept and has an unstable substrate that does not allow for aquatic vegetation growth. In the absence of a project, the area would be expected to remain a shallow, open-water area with limited habitat value. The vegetated shoreline would be expected to continue to recede due to wind-generated waves, reducing the overall habitat value.

FUTURE WITH PROJECT

Several Factors would affect the ability of aquatic vegetation to grow in the project area. The following factors were considered in developing predictions of future aquatic vegetation conditions in the project area.

Wind

Vegetation would be more likely to grow in areas that are more protected from wind and wind-generated waves. Each alternative was designed to reduce wind fetch, with the goal of reducing wind-generated waves. Islands are the primary feature that accomplishes this, and are incorporated in each alternative. Plates 2 & 3 display the weighted wind fetch for the entire project area for existing conditions and under each proposed alternative. Alternatives 1, 2, and 4 consist of long, wide islands. Alternatives 3 and 5 are similar to alternatives 2 and 4, respectively, but several of the wide island configurations are “split” into two narrower islands, creating ultra-protected areas between the two split island sides. Alternatives 6m and 7m are smaller island versions that were designed with the “split” island configuration. Wind fetch modeling showed that the “split” areas would in fact offer significantly more protection from wind, and thereby also more protection from wind-generated waves. Under existing conditions, all areas of the lake have a weighted wind fetch of greater than 300 meters. Note how the “split” islands create areas with substantially lower wind fetch than do the alternatives with purely linear islands.

Substrate

The existing substrate throughout the lake is a thick layer (between 10 and 22 feet deep) of very soft, flocculent material. It is the consensus of the interagency team of biologists on the Habitat Sub-Group that aquatic plants would likely have difficulty rooting and staying rooted in the almost fluid-like substrate. Therefore, in the areas of reduced wind and wave exposure, it was predicted that vegetation would still only be likely to thrive in the shallow, sandy littoral zone created by the base of the islands. The island bases extend horizontally 40-50 feet into the water from where the water surface would be under normal low water conditions.

Substrate amendment was suggested as a potential measure to increase the area suitable for plant growth. Amendment would consist of placing a layer of sand 6-12 inches deep over the existing substrate. Amendment areas are planned only in locations that the team was confident enough that adequate protection from wind was provided. It was assumed that only the small, protected areas within the “split” islands in Alternatives 3, 5, 6m, and 7m would provide the necessary protection. The substrate amendment measures are being considered as an incremental addition to these two alternatives, and are denoted by the letter “m” following the alternative (i.e., Alternative “3” is the specific island configuration, and Alternative “3m” is that same island configuration with substrate amendment areas).

Seed Availability and Plant Colonization

In order for vegetation to become established, plants must have a mechanism to colonize the area. Often, this can be an existing seedbank in the substrate, or seeds carried in by water or wind. Studies nearby in Pool 2 have found a very limited seedbank and few species seeds arriving by wind. Further, the study area and hydrologically connected surrounding areas harbor few aquatic plants, meaning few seeds would likely arrive by water. Therefore, little aquatic vegetation is expected to grow under project conditions without initial planting. Because re-establishing aquatic vegetation is one of the objectives of the project, wetland plantings would be incorporated into each alternative in areas that would have acceptable substrate and are adequately protected from wind and waves. An establishment period of 3 years following project construction is assumed, after which full benefits would be realized.

3.2 DABBLING DUCK HSI DETERMINATION

The variables and maximum scores are listed in the table below. The formulas for each model variable can be found in the original model documentation⁴, and are therefore omitted from this report for the sake of brevity.

DABBLING DUCK HEP VARIABLES		
	Variable	Max Score
1	Distance to bottomland hardwoods	5
2	Distance to Cropland	5
3	Water Depth 4-18 Inches in fall	10
4	Water Depths < 4 Inches in fall	10
5	Percent Open Water	10
6	Plant Community Diversity	10
7	Important food plant coverage	10
8	Percent Area w/ Loafing Structures	5
9	Thermal Protection	5
10	Disturbance in the Fall	10
11	Visual Barriers	5
Total		85

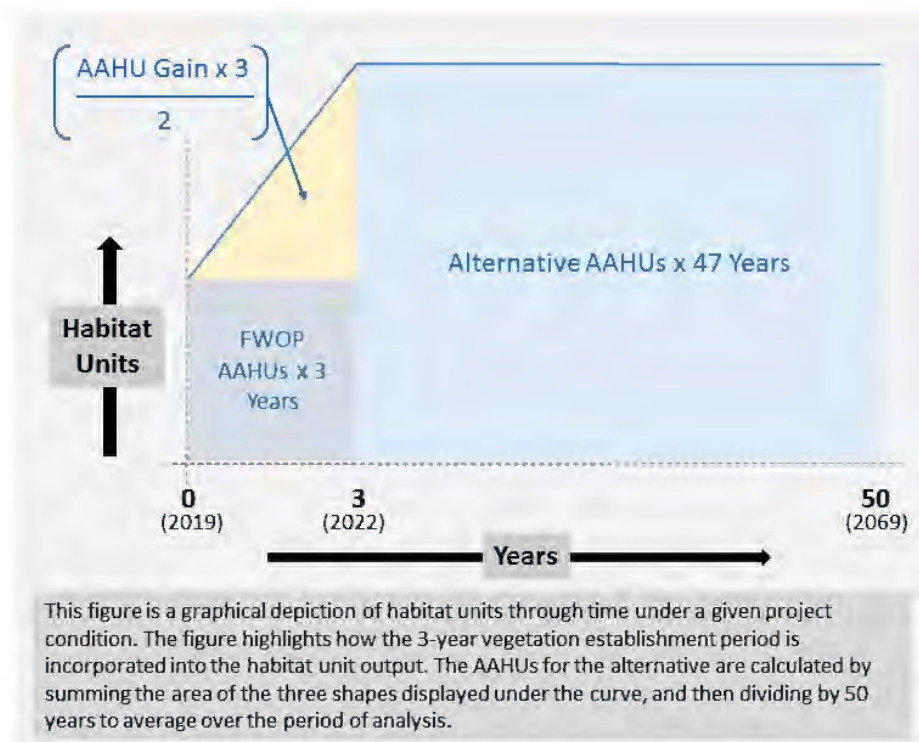
The Corps-Certified spreadsheet was used in calculating and documenting the HSI for each planning condition. Table 1 summarizes the values of each variable for each alternative. The HSI for each alternative is determined by the following equation:

$$\text{HSI} = \frac{V1 + V2 + V3 + V4 + V5 + V6 + V7 + V8 + V9 + V10 + V11}{\text{Max Score (85)}}$$

Average Annual Habitat Units (AAHUs) under full project performance were calculated by multiplying the HSI value by the number of acres being evaluated.

⁴ <https://cw-environment.erdc.dren.mil/model-library.cfm?CoP=Restore&Option=View&Id=622>

The AAHU value was adjusted to incorporate the 3-year establishment period by summing the total number of habitat units provided over the 50-year evaluation period and then dividing by 50 years. The calculation assumes that the AAHUs provided by the project area would initially start at the FWOP level, and a linear rate of increase in AAHU value was assumed between year 0 and year 3. The following figure depicts a generalized project condition, incorporating the 3-year establishment period:



3.3 DABBLING DUCK MODEL RESULTS

The following discussion is a presentation of the potential effects that the various alternatives may have on habitat quality. These results should help to quantify the differences between alternative island designs and assist in identifying which alternative would be the most cost-effective. The discussion of results is organized by how the alternatives affected model variables. Table 1 shows the outputs for each of the model variables and summarizes the differences in HSI value for each of the alternatives.

MODEL VARIABLES IMPROVED EQUALLY BY ALL ALTERNATIVES

(V4) Water Depths less than 4 inches in fall

Shallow sandflat/mudflat areas described by this parameter provide an environment for the development of emergent vegetation characteristic of shallow marsh habitats, add diversity to the food base, and serve as loafing areas. Only 30.9 acres (4%) of the evaluation area currently consists of this type of shallow habitat (Plate 4), and these areas are mostly just the shorelines with little or no visual or thermal

protection. Project construction would add between 11.6 and 20.0 acres of this type of habitat, spread throughout the upper portion of Pigs Eye Lake (Plates 4-7).

MODEL VARIABLES IMPROVED ONLY BY MARSH ALTERNATIVES

(V6) Plant Community Diversity

A highly diverse plant community provides an overall higher quality diet and ensures that as conditions vary from year-to-year, some preferred species are likely to be present. Eight vegetation communities are listed in the model documentation, and can be found in section 4 of this report. Only two plant communities were documented during site visits: woody terrestrial and emergents. For the alternatives without marsh creation measures, one additional plant community would be planted on portions of the proposed islands: grasses/forbs. The suitability index value does not increase from the change of two plant communities present to three. With the addition of marsh creation, an additional plant community is proposed to be created: rooted floating aquatics. The total of four plant communities present increased the habitat suitability index value from four to six.

(V7) Important Food Plant Coverage

This variable measures the presence of preferred food plants for dabbling ducks. The model lists a number of plant varieties that are known to be important food sources. A site visit documented existing vegetation beds full of sedges, with the presence of cutgrass, ragweeds, smartweeds, spikerushes, bur-reed, arrowhead, and wild millet. The shallow marsh areas where these plants occurred around the outside edge of the lake appeared consistent in their composition, and approximately 17.6% of the existing evaluation area consists of these beds. These beds all contained a significant amount of important food plants and a variety of types, which would earn a full suitability index value of '10'. However, because less than 20% of the evaluation area is comprised of these vegetation beds, the model instructs the user to multiply by a value of 0.5, resulting in an existing habitat suitability index of '5'. The alternatives where the team was confident that additional area suitable for important food plant growth are those that include the marsh creation. Alternatives 3m, 5m, 6m, and 7m all increased the area of important food plant coverage up to over 20% of the evaluation area, resulting in a habitat suitability index of '10'.

MODEL VARIABLES IMPROVED INCREMENTALLY ACROSS ALTERNATIVES

(V8) Percent of Area with Loafing Structures

Loafing sites/structures offer the opportunity for dabbling ducks to rest and conserve energy, and include features such as low islands, sandflats, mudflats, etc. Existing conditions provide minimal loafing area, as the lake is entirely open water. The areas around the shoreline that were less than 4 inches deep were used to estimate the existing loafing area, which amounts to 30.9 acres, or 4.1% of the evaluation area. Under project conditions, all islands constructed were considered to be suitable loafing areas, as well as the area less than 4 inches deep in fall. All alternatives evaluated increased the amount of loafing area, but the two largest alternatives increased the loafing area more than the other alternatives, resulting in a higher suitability index for Alternatives 1, 3, and 3m.

(V9) Thermal Protection

Areas of refuge from prevailing winds are important to allow migrating dabbling ducks to conserve energy. These are especially important during periods of severe weather or windy days. As it exists, Pigs Eye Lake provides little or no thermal protection. Ducks may be able to seek refuge within the upland areas surrounding the lake, but the entirety of the lake is open water. Because the islands were designed to reduce wind fetch, they would also increase thermal protection for dabbling ducks. Alternatives 1 through 6m received the highest rating of '5.' This rating was reduced for Alternative 7m because two of the islands that substantially blocked wind from the southern end of the lake were removed in this alternative.

(V11) Visual Barriers

Ducks utilizing a resting or feeding area typically respond to a disturbance by temporarily moving from an area, which causes an expenditure of energy and reduces the quality of an area as migration habitat. Visual barriers can minimize the effect of disturbances. Pigs Eye Lake in its current configuration provides few or no visual barriers, as the entirety of the lake is open water. Each alternative provides multiple lines of visual barriers in the lake; therefore, this variable was improved under all alternatives. Alternatives 1 through 6m received the highest rating of '5.' Alternative 7m received a value of only '3' because two of the islands that substantially blocked view from the southern end of the lake were removed for this alternative.

MODEL VARIABLES NOT INFLUENCED BY PROJECT

The remaining variables were not influenced by any of the evaluated alternatives. Variables such as the distance to hardwoods and distance to cropland practices would be the same because the project would not include plantings of these species. Mast-producing hardwood trees would be beneficial, but it is uncertain whether the islands can be constructed to an elevation that would provide suitable habitat. Trial plantings could be incorporated into any alternative, so it would not be likely to change the alternative selection. However, due to the uncertainty of successful hardwood growth, no habitat benefits are claimed for the sake of being conservative.

Variable number 5 addresses the percentage of open water, in relation to the interspersions of vegetation in open water. Optimum areas have a 50/50 mix of open water and vegetation, while unbroken stands of vegetation and open water areas devoid of vegetation receive the lowest score. The areas within the evaluation area that currently contain aquatic vegetation are limited to dense, unbroken stands around the perimeter of the lake. Only the alternatives that include marsh creation would add habitat described by this variable. Both alternatives would add approximately 20 acres of this type of habitat, which would account for 2.7% of the evaluation area. However, the model is not sensitive enough to account for this increase, so it is only included as an ancillary benefit.

4. Marsh Wren Habitat Suitability Index Model

The marsh wren HSI model consists of four simple variables that assess the habitat value of the type of vegetation and water depth of an area. The 37.5 acres of marsh evaluated using the model are

considered equally suitable for marsh wren use. The HSI calculations are presented below in Section 4.1 and are assumed to be stable through time as long as the area remains marsh.

Under FWOP conditions, the entire 37.5 acre area would be converted to open water by wind-generated wave erosion over the course of the planning period. Following conversion to open water, the habitat value for the marsh wren is reduced to '0'.

Under each FWP alternative plan, varying amounts of this area would be protected and the loss would be reduced. Benefits are reflected in a reduction of acreage lost under each alternative scenario, where the habitat that remains marsh is assumed to maintain a stable HSI value and the habitat converted to open water is reduced to an HSI value of '0'.

Shoreline loss is assumed to occur slowly and evenly over the course of the planning period. Under FWOP conditions, the predicted shoreline loss rate is 0.75 acres/year, which is the rate at which the Pig's Eye Lake shoreline has been lost over the past 24 years. Wind fetch modeling was used to predict the ability of alternative plans to reduce shoreline loss, as described in Section 4.2. The predicted shoreline loss rate for FWOP and each alternative plan were annualized over the 50-year planning period to determine the average annual habitat units provided by each scenario, and is summarized in Section 4.3.

4.1 MARSH WREN MODEL VARIABLES AND HSI CALCULATION

Suitability Index Variable (SIV) 1 – Growth form of emergent hydrophytes

The evaluation area consists of dense stands of bulrushes, cattails, and sedges. The model text describes habitat suitability as maximized in areas consisting of "erect and closely spaced stalks or limbs that together provide the strength and height to support a bulky nest." Therefore, this variable was assigned a value of '1'.

SIV 2 – Percent canopy cover of emergent herbaceous vegetation

Marsh wren habitat suitability is maximized at canopy cover of 80% or greater. The evaluation area is very densely vegetated, and exceeds 80% cover. Therefore, variable 2 was assigned a value of '1'.

SIV 3 – Mean water depth

Marsh wren habitat suitability is assumed to increase linearly as mean depth increases, and optimum conditions are assumed to occur at a minimum mean depth of 15cm. The evaluation area is permanently inundated, and the average depth of standing water exceeds 15cm. Therefore, variable 3 was assigned a value of '1'.

SIV 4 – Percent canopy cover of woody vegetation

Marsh wren habitat suitability is assumed to be decreased by the presence of woody vegetation. The model shows habitat suitability as optimal with no woody canopy cover and suitability decreases linearly as canopy cover increases. The evaluation area contains several groups of trees and shrubs, totaling an estimated 4.8 acres ($4.8/37.5 = 12.8\%$ cover). Therefore, variable 4 was assigned a value of '0.87' ($1.0 - 0.128 = 0.87$).

HSI Determination

The final HSI value is determined by the following equation:

$$HSI = (SIV1 \times SIV2 \times SIV3)^{1/3} \times SIV4$$

Inserting each of the model components into this equation gives an HSI of:

$$(1 \times 1 \times 1)^{1/3} \times 0.87 = 0.87$$

4.2 SHORELINE LOSS ESTIMATION

One of the most significant changes in Pigs Eye Lake that continues to progress is the decrease in vegetation and increase in open water. An examination of aerial imagery shows the progression of the vegetation around the outside of the lake receding and giving way to open water. It is likely that the exposure of the vegetation to wave energy weakened the vegetation over time, destabilizing the substrate, and allowing the shoreline substrate to erode. As the amount of open water in the lake increased, wind fetch also increased, allowing larger, unbroken waves to further erode the vegetation and substrate of the shorelines. In the forty years between 1951 and 1991, approximately 93 acres of vegetated shoreline area was converted to open water. Between 1991 and 2015, an additional 18 acres was lost, particularly along the northwest and eastern shorelines (see Plate 13). The areas where erosion is worst correspond with the predominant wind directions, further suggesting that wind-generated waves are likely causing the ongoing erosion.

Shoreline Loss Assumptions

The following assumptions were made in predicting the changes in shoreline loss under FWOP and FWP conditions:

1. Wind-induced waves are assumed to be the main driver of shoreline loss. This seems very likely since wind-generated waves are accepted as a common cause of shoreline erosion on the UMR, the shorelines with the greatest loss are those with the highest wind-fetch, and no other factors have been identified to account for the shoreline loss that has been observed.
2. Under the FWOP conditions, the erosion rate is assumed to be similar to erosion previously experienced. This is a reasonable assumption because the existing shorelines appear similar to those that eroded over the previous 24 years. Observed shoreline loss has been quantified and is shown in Plate 13. A total of 18 acres of shoreline have been lost over the last 24 years, which equates to a loss of 0.75 acres per year. Applying this rate of erosion to the 50-year evaluation period of the FWOP amounts to a predicted loss of 37.5 acres. A visual representation of the predicted area where erosion and loss of vegetation would be expected to occur is presented in Plate 14.

3. The weighted wind fetch value is assumed to be a good indicator of the overall stress on Pig's Eye Lake's shorelines. This seems reasonable, as the shorelines which have eroded have significantly higher weighted wind fetch values than those that have not.

Predicted Shoreline Loss

Each of the alternative projects would reduce wind fetch in Pig's Eye Lake, leading to less shoreline loss, and thereby preserving the quality marsh habitat present there. The weighted wind fetch model results were used to compare each alternative's shoreline protection benefits with one another.

First, the baseline conditions were examined to assess the associations between current wind fetch levels and shoreline loss. Figure 2 shows the weighted wind fetch of the existing conditions and the areas which have experienced shoreline erosion in the last 24 years. Shorelines exhibiting weighted wind fetch values of less than 400m did not experience significant shoreline loss during this

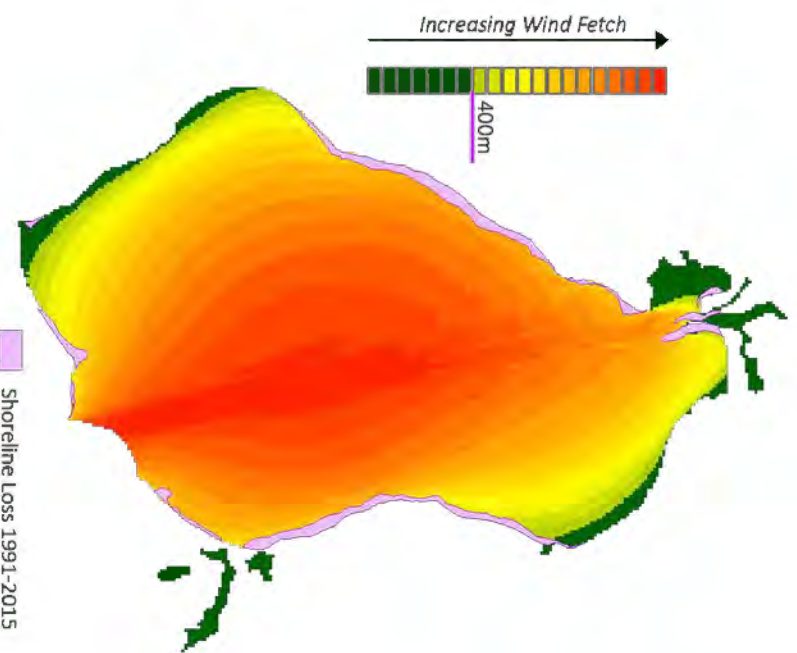


Figure 2 – Existing Conditions. Weighted wind fetch values overlap in areas which have experienced shoreline loss. Note that the weighted wind fetch is greater than 400m in the areas where shoreline loss has occurred.

period (wind fetch values less than 400m are all displayed in the darker green color for simplicity). Based on this observation, 400m was selected as a level that would provide adequate protection of the shoreline from wind-generated waves.

Wind fetch model results for each FWP alternative were evaluated along the two most vulnerable shorelines (along the east and west, shown in Figure 3). Shorelines where weighted wind fetch would be reduced below 400m were considered 'protected'. Shorelines where weighted wind fetch would remain above 400m were considered 'unprotected'. For each alternative, the annual FWOP shoreline loss (0.75 acres/year) was multiplied by the percentage of vulnerable shoreline that would remain 'unprotected,' resulting in the predicted FWP annual shoreline loss. The predicted annual shoreline loss rate was annualized throughout the planning period to calculate the AAHU gain for each alternative under the marsh wren HSI model.

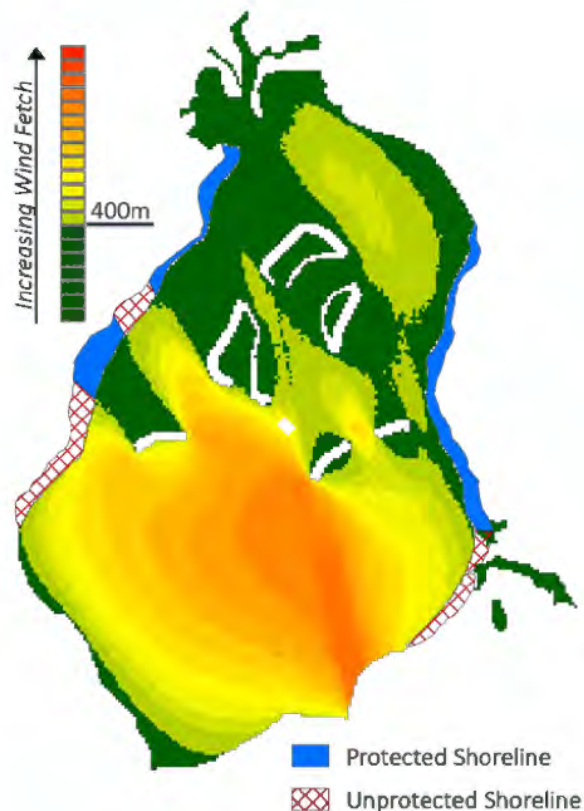
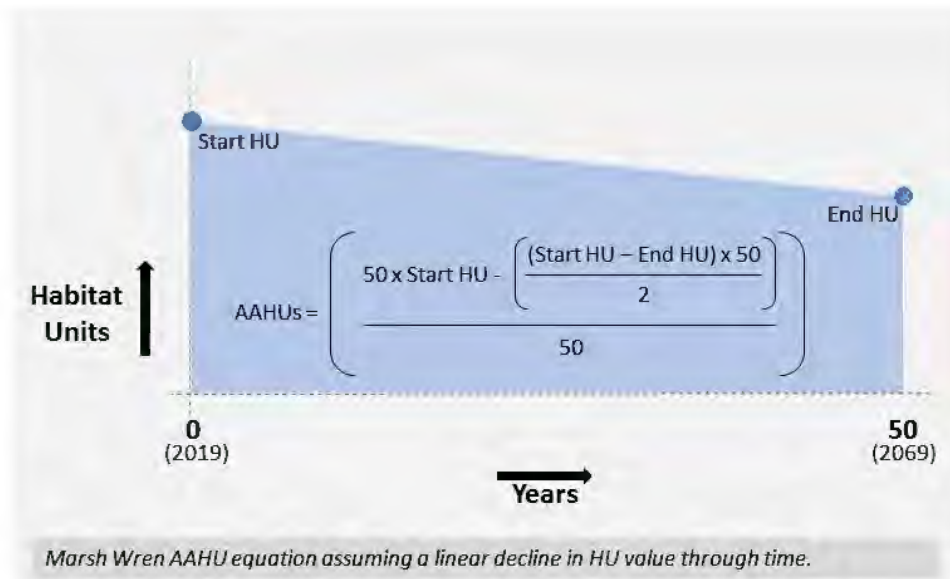


Figure 3 – Shorelines with greater than 400m weighted wind fetch were assumed to be 'unprotected' and would continue to experience erosion under project conditions. Pictured above is Alternative 6m. Proposed islands are shown in white.

4.3 MARSH WREN AAHU CALCULATION

AAHUs for the Marsh Wren model were calculated using the equation displayed in the figure below:



The table below incorporates the HSI value calculations described in 4.1 and the predicted shoreline loss described in 4.2 to show the AAHUs associated with each alternative and the AAHU gain when compared to the Existing and FWOP conditions.

Pig's Eye Lake - Marsh Wren Average Annual Habitat Units (AAHU)

ALTERNATIVE	Existing	Alt 1	Alt 2	Alt 3	Alt 3m	Alt 4	Alt 5	Alt5m	Alt 6m	Alt 7m
HSI	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Acres	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Acres lost per year	0.75	0.10	0.12	0.11	0.16	0.16	0.16	0.16	0.27	0.43
AAHUs	16.3	30.5	29.9	30.3	29.1	29.1	29.1	29.1	26.8	23.3
AAHU Gain	-	14.2	13.6	14.0	12.8	12.8	12.8	12.8	10.5	6.9

5. Ancillary Benefits

A number of benefits have been identified that are not captured by the habitat models. These benefits could potentially be captured and described by other HEP models, but it was determined that it would be unlikely for the results of these analyses to change the final planning decision because (1) the benefits would be similar across each of the different alternatives, or (2) the relative magnitude of the benefits would be small compared to the magnitude of the benefits ascribed through the Dabbling Duck Migration Habitat and Marsh Wren HSI models.

Model Variable Number 5: Open Water

Areas that have a 50/50 mix of open water and aquatic vegetation are considered highly suitable for dabbling ducks. The evaluation area currently provides no habitat that fits this description. Alternatives 3m and 5m would provide approximately 20 acres of this type of habitat, and Alternatives 6m and 7m would be expected to provide approximately 10.3 acres. However, because the model scores this as a percentage of the overall evaluation area, it is not sensitive enough to capture these benefits. Nonetheless, it is believed that adding 10-20 acres of this type of habitat significantly increases the habitat value that these alternatives would provide.

Bottomland Forest and Wet Prairie Benefits

Bottomland forest and wet prairie habitat benefits would be provided by all alternatives. The construction of islands would convert areas of open-water habitat to bottomland forest and wet prairie habitat. Preliminary plans are to plant the islands with a mix of bottomland forest species such as cottonwood and willow and prairie grasses and forbs. The quality of the habitat would be comparable between alternatives, but the amount would differ. Alternative 1 would create approximately 48 acres, Alternatives 2 & 3 would result in approximately 30 acres, Alternatives 4 & 5 result in approximately 23 acres, Alternative 6m would create approximately 16.3 acres, and Alternative 7m would create an estimated 13.5 acres of island habitat. These are substantial gains and should be considered as part of the

habitat value achieved by constructing any of these project alternatives. However, habitat modeling for these benefits was not conducted because the difference between the amounts of island habitat quantities between alternatives would not be large enough to drive the selection of a different alternative.

Water quality

Wind-generated waves can cause frequent resuspension of sediments. One of the benefits of reducing wind fetch is reducing these waves. There are other factors influencing the water quality in Pigs Eye Lake, including the flocculent nature of the sediments and disturbance from rough fish. Although these factors would not be improved, it is assumed that the reduction of wind-generated waves by any alternative would have an overall positive effect on the water quality in Pigs Eye Lake.

6. Summary

Table 1 summarizes the results of the Migratory Habitat Model for Dabbling Ducks, the Marsh Wren HSI Model, the overall habitat unit calculation for each project alternative, and preliminary estimated project costs. Costs displayed were annualized using the Corps' IWR Planning Suite program with Annualizer tool. Ancillary benefits identified and discussed in the previous section will also be taken into account during alternative evaluation.

Construction of any of the alternatives would increase habitat suitability over existing conditions by increasing habitat diversity, increasing the amount of protected areas, and improving other habitat parameters for dabbling ducks. The islands would also serve to protect the existing shoreline vegetation by reducing wind and wave action. The marsh alternatives would provide the added benefit of promoting emergent and floating leaf aquatic vegetation.

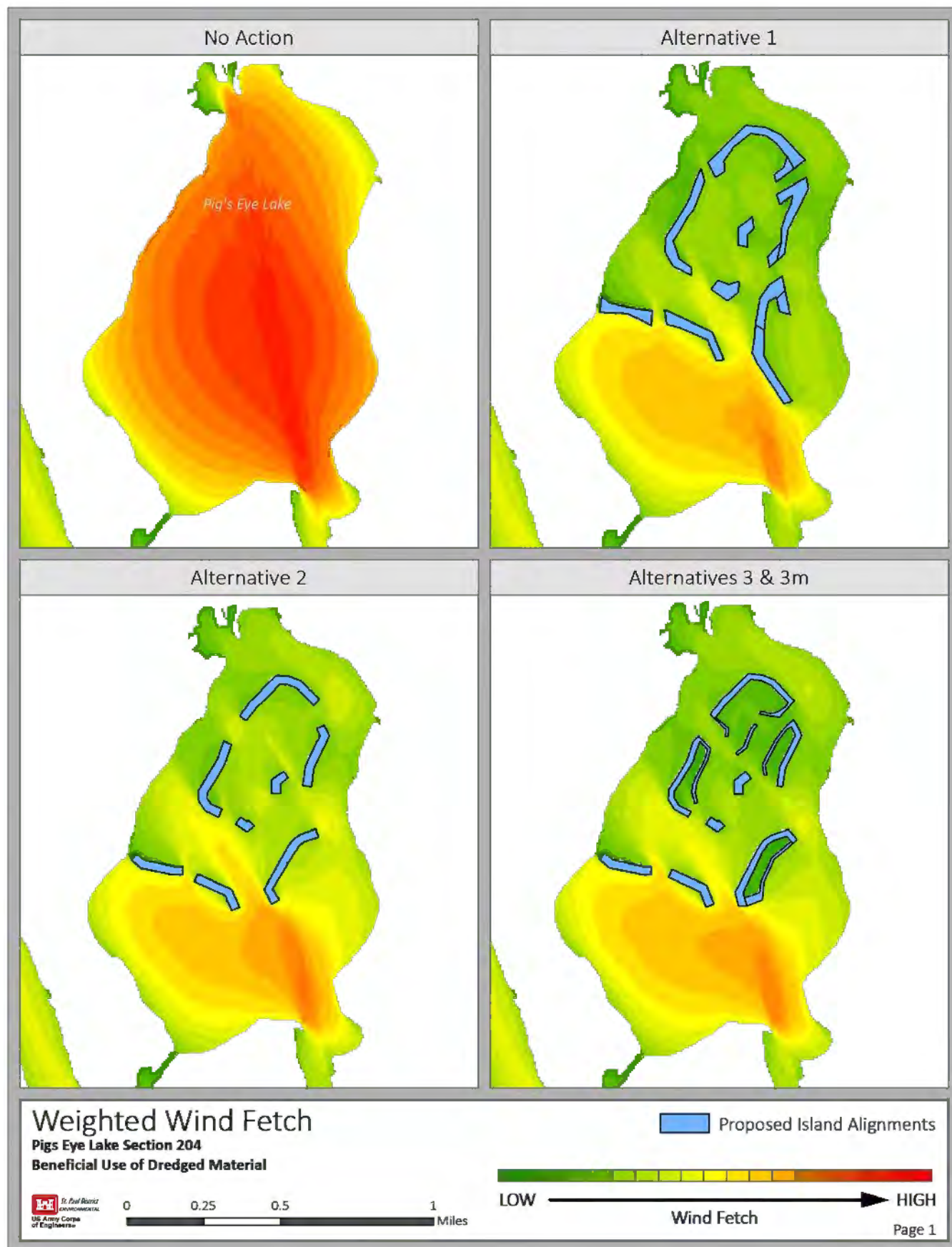
Based on preliminary cost estimates, Alternative 6m appears to have the lowest annual average cost per habitat unit.

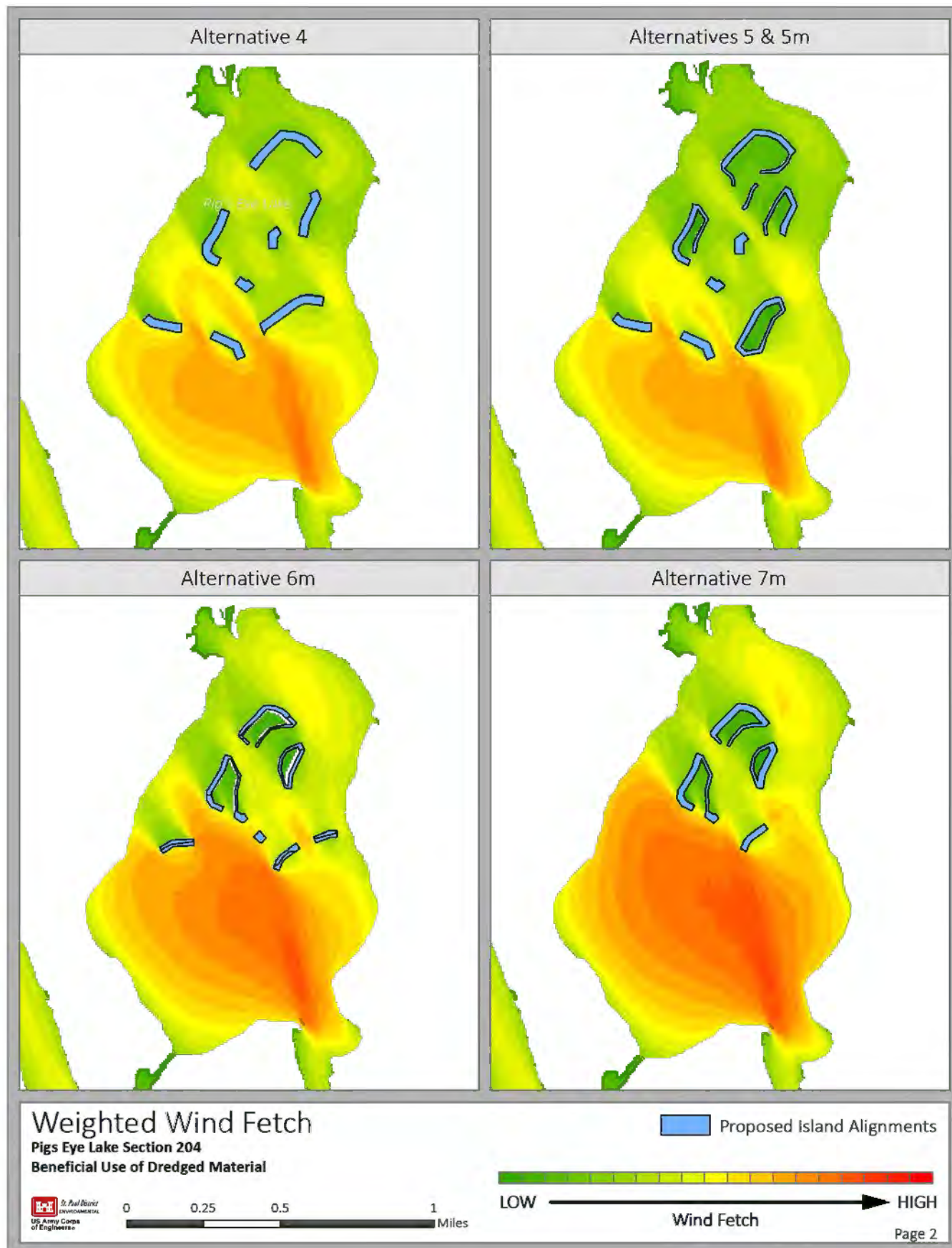
Plate 1

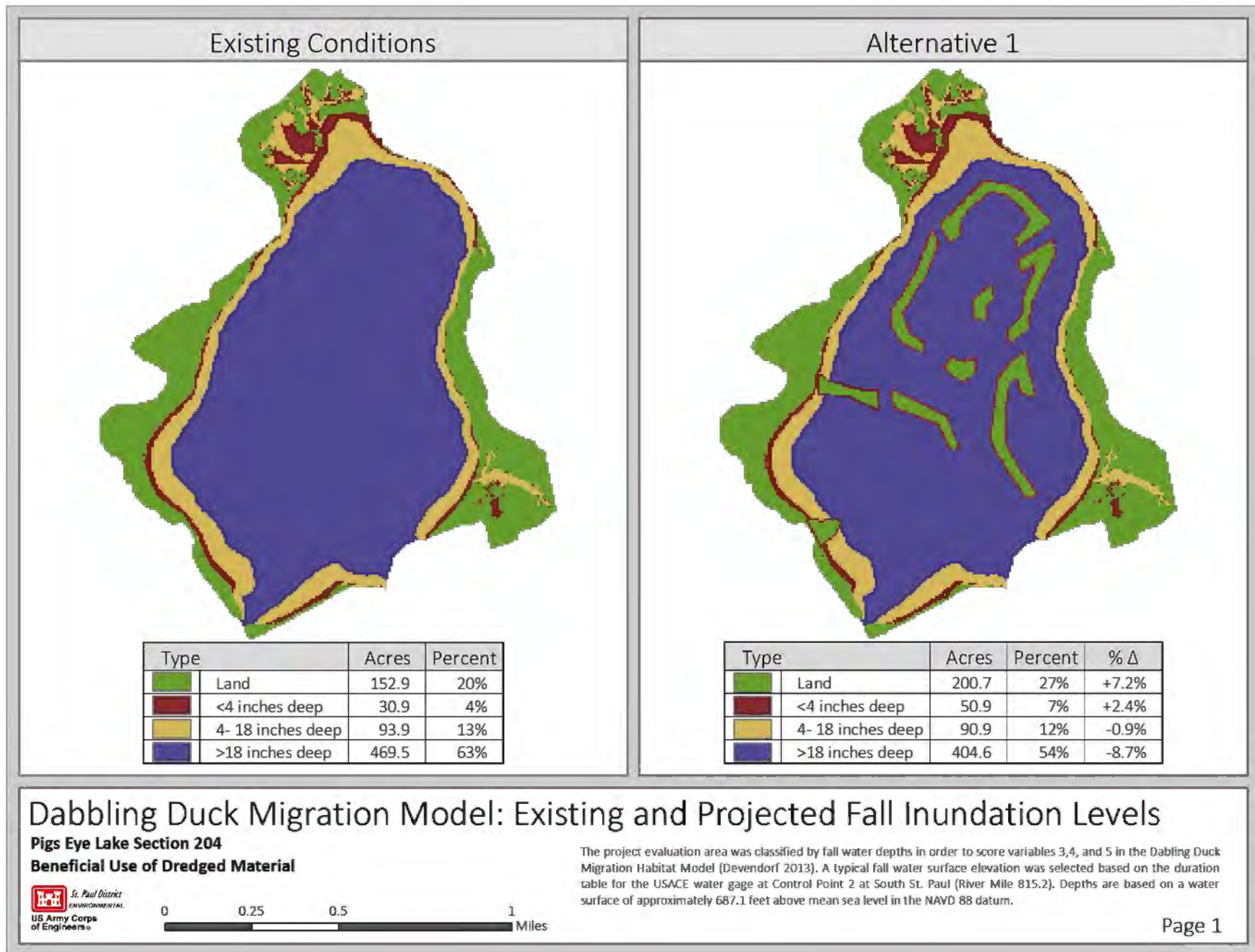
			Alternatives									
			Existing	Alt1	Alt2	Alt3	Alt3m	Alt4	Alt5	Alt5m	Alt6m	Alt7m
Dabbling Duck Model Variables												
1	Distance to bottomland hardwoods	max 5	4	4	4	4	4	4	4	4	4	4
2	Distance to Cropland	max 5	1	1	1	1	1	1	1	1	1	1
3	Water Depth 4-18 Inches in fall	max 10	1	1	1	1	1	1	1	1	1	1
4	Water Depths < 4 Inches in fall	max 10	1	5	5	5	5	5	5	5	5	5
5	Percent Open Water	max 10	1	1	1	1	1	1	1	1	1	1
6	Plant Community Diversity	max 10	4	4	4	4	6	4	4	6	6	6
7	Important food plant coverage	max 10	5	5	5	5	10	5	5	10	10	10
8	Percent Area w/ Loafing Structures	max 5	1	3	2	3	3	2	2	2	2	2
9	Thermal Protection	max 5	1	5	5	5	5	5	5	5	5	4
10	Disturbance in the Fall	max 10	8	8	8	8	8	8	8	8	8	8
11	Visual Barriers	max 5	1	5	5	5	5	5	5	5	5	3
TOTAL			max 85	28	42	41	42	49	41	41	48	45
HSI			total/85	0.33	0.49	0.48	0.49	0.58	0.48	0.48	0.56	0.53
Dabbling Duck Habitat Unit Calculation												
Acres			703.5	703.5	703.5	703.5	703.5	703.5	703.5	703.5	703.5	703.5
Period of Evaluation (years)			50	50	50	50	50	50	50	50	50	50
Average Annual Habitat Units (AAHU)			231.7	347.6	339.3	347.6	405.5	339.3	339.3	397.3	397.3	372.4
AAHU incorporating 3-year establishment			-	344.1	336.1	344.1	400.3	336.1	336.1	392.3	392.3	368.2
AAHU Gain			-	112.4	104.4	112.4	168.6	104.4	104.4	160.6	160.6	136.5
Marsh Wren Habitat Unit Calculation												
HSI			0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Acres			37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Acres lost per year			0.75	0.10	0.12	0.11	0.16	0.16	0.16	0.16	0.27	0.43
Average Annual Habitat Units			16.3	30.5	29.9	30.3	29.1	29.1	29.1	29.1	26.8	23.3
AAHU Gain			-	14.2	13.6	14.0	12.8	12.8	12.8	12.8	10.5	6.9
Cost/Benefit Comparison												
Total AAHUs			-	126.6	118.0	126.4	181.4	117.2	117.2	173.4	171.1	143.4
Total Project Cost (Section 204)			-	\$ 25,106,000	\$ 15,543,000	\$ 16,522,000	\$ 17,291,000	\$ 11,902,000	\$ 13,569,000	\$ 14,454,000	\$ 11,973,000	\$ 10,065,000
Annualized Cost (2.875% discount rate)			-	\$ 953,000	\$ 590,000	\$ 627,000	\$ 656,000	\$ 452,000	\$ 515,000	\$ 549,000	\$ 454,000	\$ 382,000
Cost per Average Annual Habitat Unit			-	\$ 7,526	\$ 5,000	\$ 4,960	\$ 3,617	\$ 3,855	\$ 4,395	\$ 3,164	\$ 2,656	\$ 2,664

Notes

- (1) Dabbling Duck HSI value for each alternative equals the sum of each of the variables divided by the maximum potential score (85).
- (2) Dabbling Duck HSI values shown are rounded to the nearest hundredth. However, rounding is only applied for display purposes, and was not incorporated into the AAHU calculation.
- (3) Although conditions are expected to deteriorate under future without project, no dabbling duck model variables would be expected to change, as existing conditions already reflect the lowest possible score for a majority of the variables.
- (4) A three-year establishment period for project-related vegetation growth and establishment in order to experience full benefit levels. During this period, AAHU benefits for the Dabbling Duck were interpolated as a linear gain from existing conditions to project conditions.
- (5) Total Project Cost and Annualized Cost estimates rounded to the nearest \$1,000.







Alternative 2



Type	Acres	Percent	% Δ
Land	182.5	24%	+4.7%
<4 inches deep	44.4	6%	+1.5%
4- 18 inches deep	93.6	13%	-0.5%
>18 inches deep	426.7	57%	-5.7%

Alternatives 3 & 3m

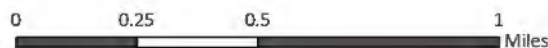


Type	Acres	Percent	% Δ
Land	183.9	25%	+4.9%
<4 inches deep	46.5	6%	+1.8%
4- 18 inches deep	93.6	13%	-0.5%
>18 inches deep	423.2	57%	-6.2%

Dabbling Duck Migration Model: Existing and Projected Fall Inundation Levels

Pigs Eye Lake Section 204





Beneficial Use of Dredged Material



The project evaluation area was classified by fall water depths in order to score variables 3,4, and 5 in the Dabbling Duck Migration Habitat Model (Devendorf 2013). A typical fall water surface elevation was selected based on the duration table for the USACE water gage at Control Point 2 at South St. Paul (River Mile 815.2). Depths are based on a water surface of approximately 687.1 feet above mean sea level in the NAVD 88 datum.





Alternative 4



Type		Acres	Percent	% Δ
	Land	176.1	24%	+3.9%
	<4 inches deep	42.5	6%	+1.3%
	4- 18 inches deep	93.9	13%	-0.5%
	>18 inches deep	434.7	58%	-4.7%

Alternatives 5 & 5m

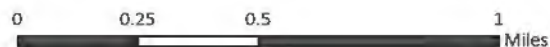


Type		Acres	Percent	% Δ
	Land	176.5	24%	+3.9%
	<4 inches deep	44.2	6%	+1.5%
	4- 18 inches deep	93.9	13%	-0.5%
	>18 inches deep	432.6	58%	-4.9%

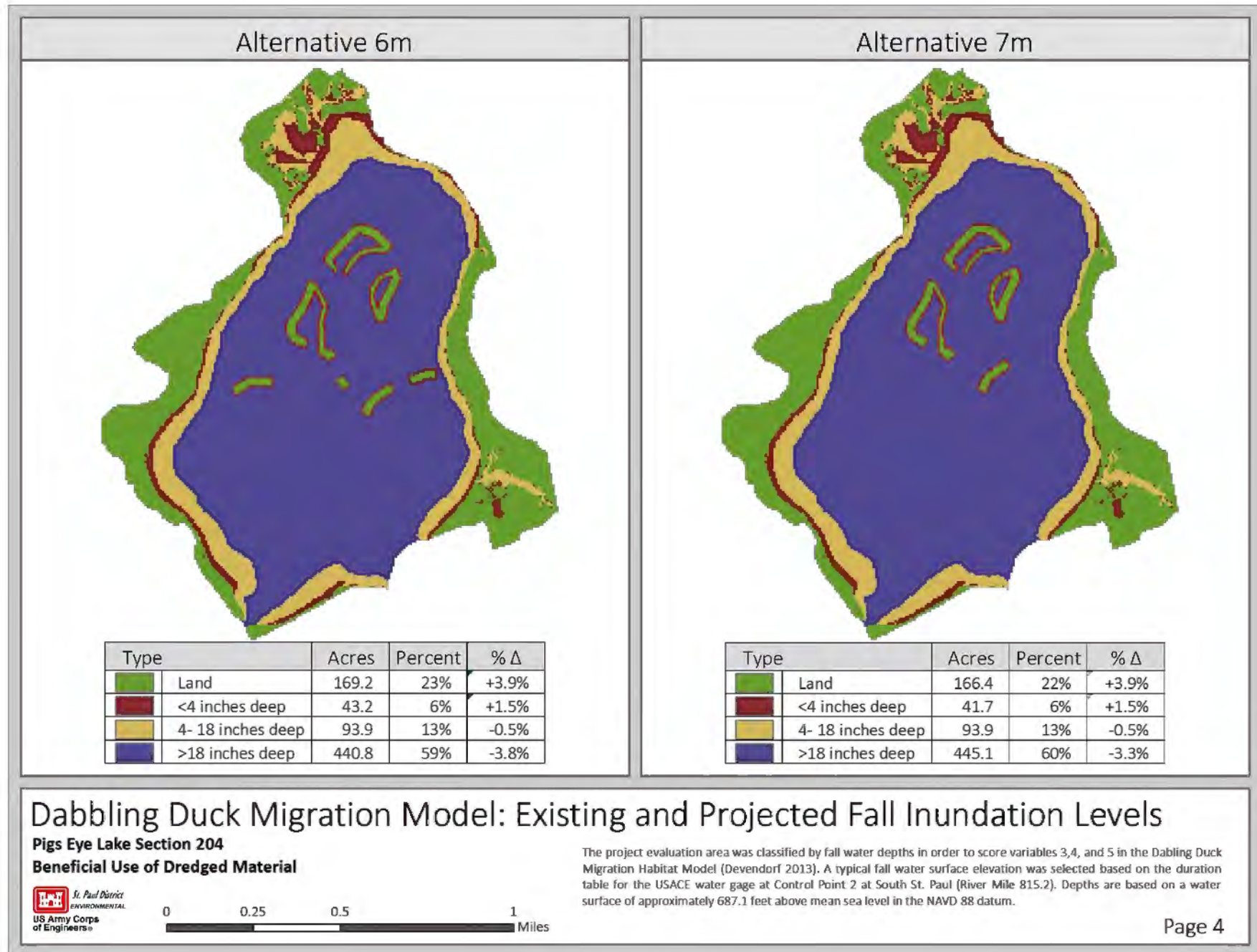
Dabbling Duck Migration Model: Existing and Projected Fall Inundation Levels

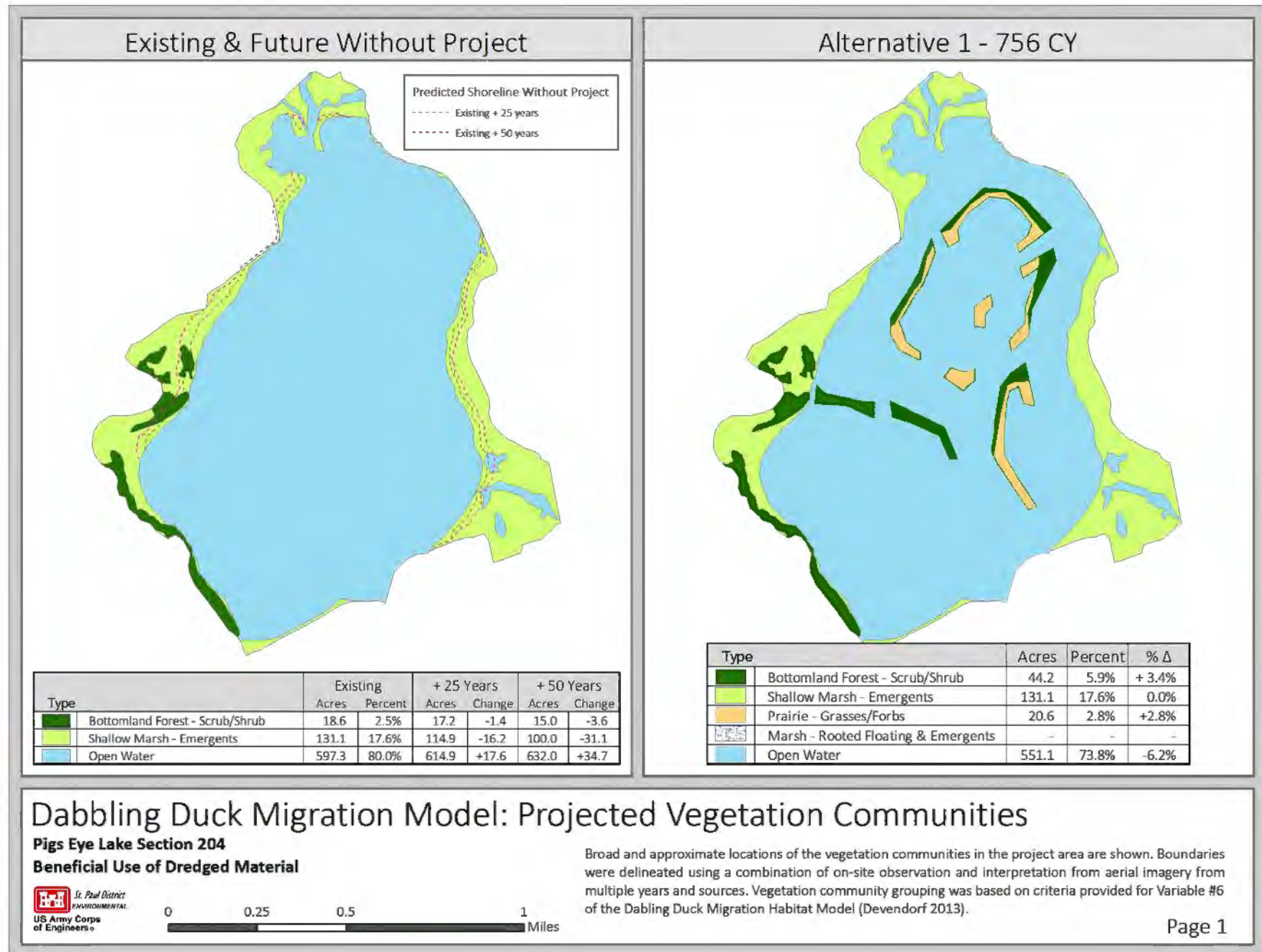
Pigs Eye Lake Section 204

Beneficial Use of Dredged Material



The project evaluation area was classified by fall water depths in order to score variables 3,4, and 5 in the Dabbling Duck Migration Habitat Model (Devendorf 2013). A typical fall water surface elevation was selected based on the duration table for the USACE water gage at Control Point 2 at South St. Paul (River Mile 815.2). Depths are based on a water surface of approximately 687.1 feet above mean sea level in the NAVD 88 datum.



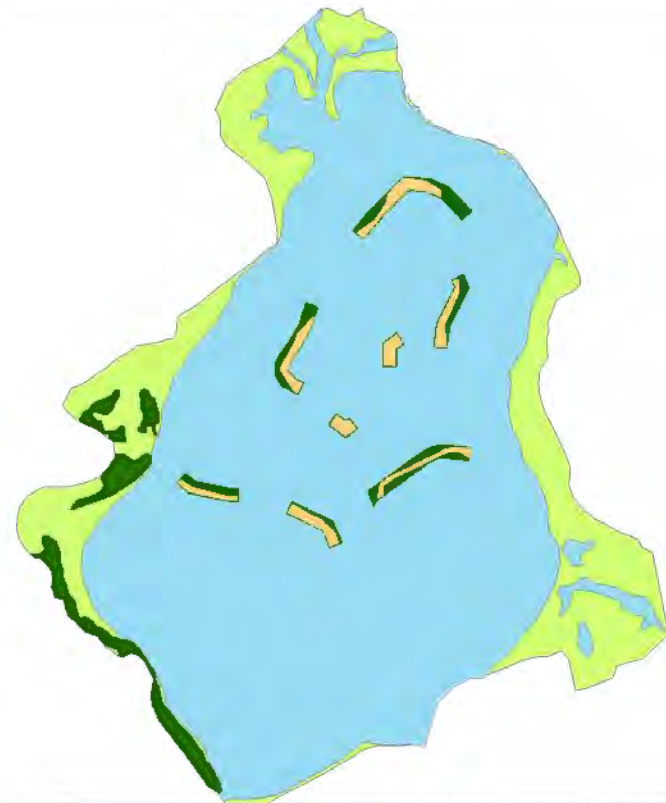


Alternative 2



Type	Acres	Percent	% Δ
Bottomland Forest - Scrub/Shrub	33.9	4.5%	+2.0%
Shallow Marsh - Emergents	131.1	17.6%	0.0%
Prairie - Grasses/Forbs	14.0	1.9%	+1.9%
Marsh - Rooted Floating & Emergents	-	-	-
Open Water	568.0	76.0%	-3.9%

Alternative 4

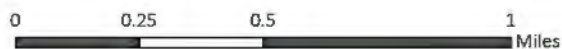


Type	Acres	Percent	% Δ
Bottomland Forest - Scrub/Shrub	30.6	4.1%	+1.6%
Shallow Marsh - Emergents	131.1	17.6%	0.0%
Prairie - Grasses/Forbs	11.3	1.5%	+1.5%
Marsh - Rooted Floating & Emergents	-	-	-
Open Water	574.0	76.8%	-3.1%

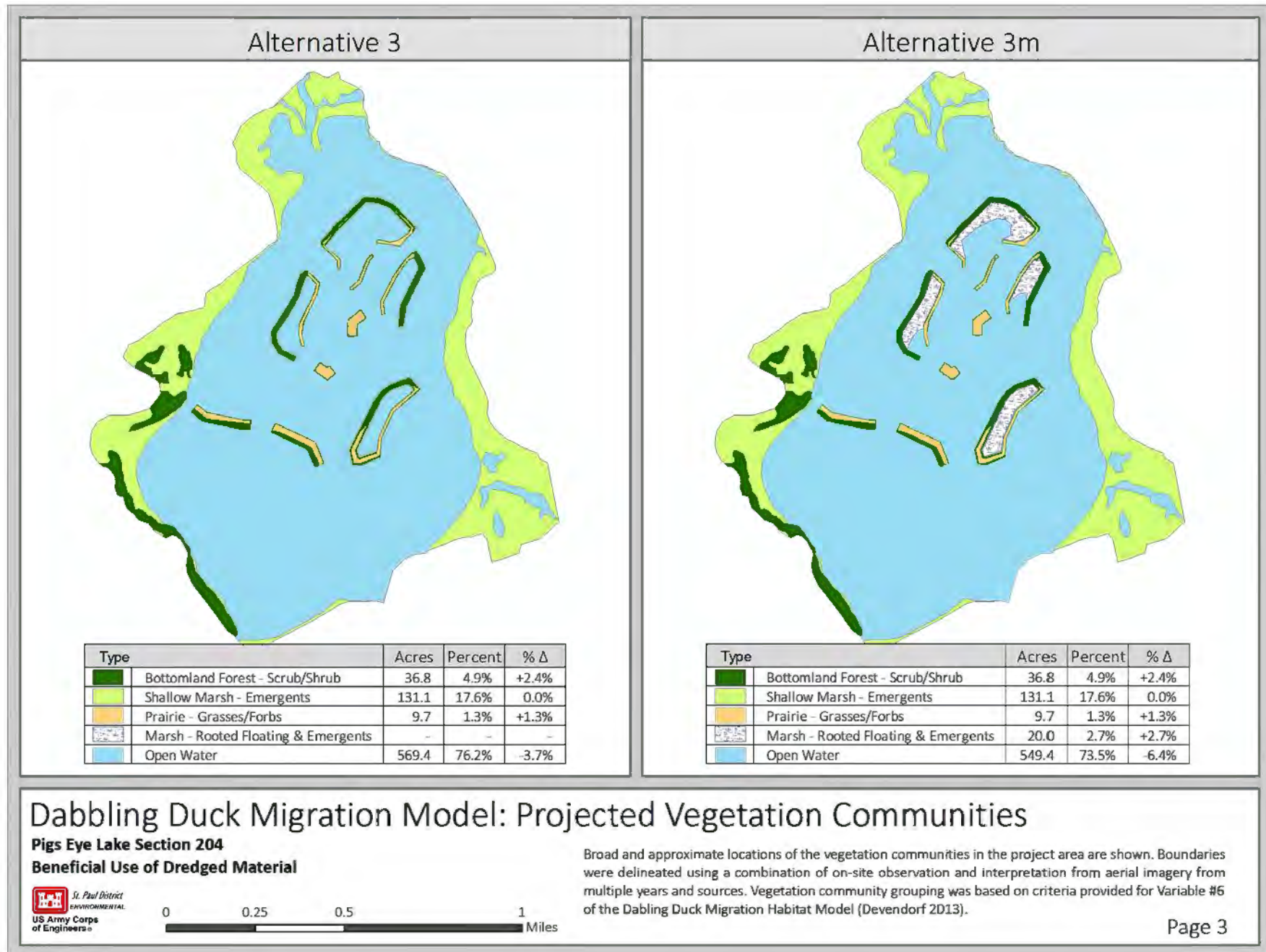
Dabbling Duck Migration Model: Projected Vegetation Communities

Pigs Eye Lake Section 204

Beneficial Use of Dredged Material



Broad and approximate locations of the vegetation communities in the project area are shown. Boundaries were delineated using a combination of on-site observation and interpretation from aerial imagery from multiple years and sources. Vegetation community grouping was based on criteria provided for Variable #6 of the Dabbling Duck Migration Habitat Model (Devendorf 2013).



Alternative 5



Type	Acres	Percent	% Δ
Bottomland Forest - Scrub/Shrub	32.0	4.3%	+1.8%
Shallow Marsh - Emergents	131.1	17.6%	0.0%
Prairie - Grasses/Forbs	8.0	1.1%	+1.1%
Marsh - Rooted Floating & Emergents	-	-	-
Open Water	575.9	77.1%	-2.9%

Alternative 5m



Type	Acres	Percent	% Δ
Bottomland Forest - Scrub/Shrub	32.0	4.3%	+1.8%
Shallow Marsh - Emergents	131.1	17.6%	0.0%
Prairie - Grasses/Forbs	8.0	1.1%	+1.1%
Marsh - Rooted Floating & Emergents	20.0	2.7%	+2.7%
Open Water	555.9	74.4%	-5.5%

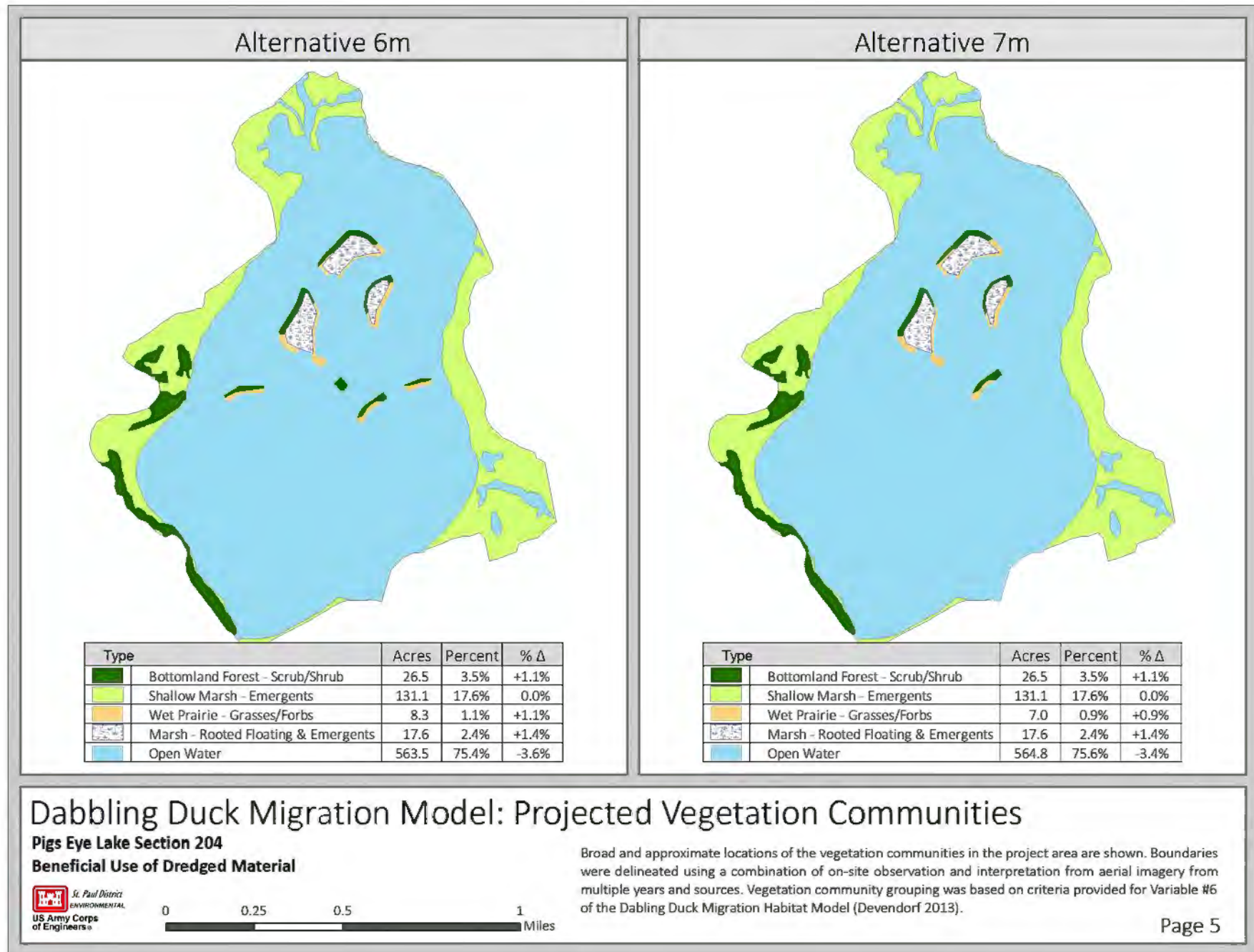
Dabbling Duck Migration Model: Projected Vegetation Communities

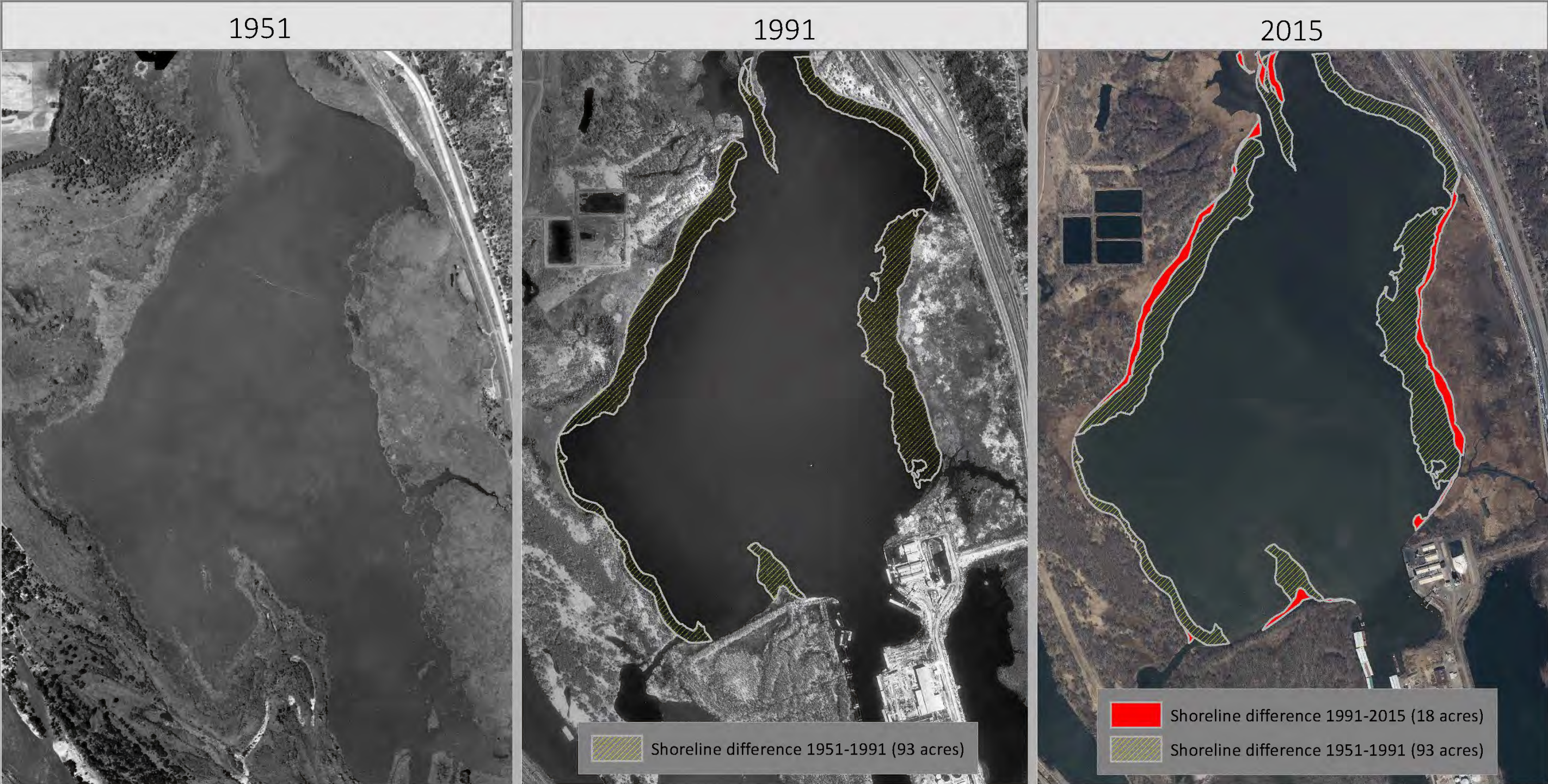
Pigs Eye Lake Section 204
Beneficial Use of Dredged Material



0 0.25 0.5 1
 Miles

Broad and approximate locations of the vegetation communities in the project area are shown. Boundaries were delineated using a combination of on-site observation and interpretation from aerial imagery from multiple years and sources. Vegetation community grouping was based on criteria provided for Variable #6 of the Dabbling Duck Migration Habitat Model (Devendorf 2013).





Shoreline Vegetation Boundary Comparison: 1951-2015

Pigs Eye Lake Section 204
Beneficial Use of Dredged Material



One of the most significant changes in Pig’s Eye Lake that continues to progress is the decrease in vegetation and increase in open water. An examination of aerial imagery shows the progression of the vegetation around the outside of the lake receding and giving way to open water. It is likely that the exposure of the vegetation to wave energy weakened the vegetation over time, destabilizing the substrate, and allowing the shoreline substrate to erode.

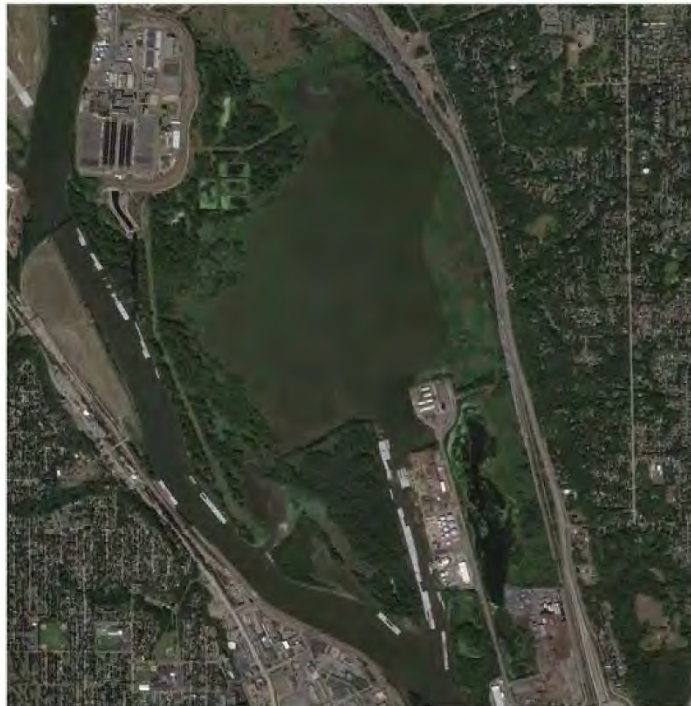




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Appendix D Incremental Cost Analysis Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

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1 Purpose

Corps of Engineers guidance requires a cost effectiveness analysis and an incremental cost analysis (CE/CIA) for recommending environmental restoration plans. A cost effectiveness analysis is conducted to ensure that the least cost solution is identified for each possible level of environmental output. An incremental cost analysis of the solutions is conducted to reveal changes in costs of increasing levels of environmental outputs. In the absence of a common measurement unit for comparing the nonmonetary benefits with the monetary costs of environmental plans, cost effectiveness and incremental cost analysis are valuable tools to assist in decision making. This appendix presents the results of the cost effectiveness and incremental cost analysis of the Pigs Eye Lake Section 204 Feasibility Study.

1.1 Methods

The project was evaluated using guidance documents and software prepared by the Corps of Engineers' Institute of Water Resources (IWR). IWR – Planning Suite Software (Version 2.0) was used to automate steps in the cost effectiveness and incremental cost analysis. CE/ICA is a three step procedure: (1) calculate the environmental outputs of each feature; (2) determine a cost estimate for each feature; and (3) combine the features to evaluate the best overall project alternative based on habitat benefits and cost.

1.1.1 Costs

Section 204 construction costs and relevant Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) costs for features and subsequently for project alternatives were computed by calculating total project costs less the Base Plan cost. The Base Plan is the Federal Standard for the disposal of dredged material associated with construction or maintenance dredging of navigation projects is the least costly, environmentally acceptable plan. The Base Plan costs for this project assume normal excavation and transportation costs based on the current practices in Lower Pool 2. Section 204 costs are incremental costs above the Base Plan (per ER 1105-2-100).

Section 204 costs were annualized by applying the interest and amortization factor of 0.03795 (50 year period of analysis at 2.875% interest rate) to the construction cost (Table 1). The 50 year-period of analysis was selected based on the expected time required to reach maximum environmental outputs from project features and the subsequent accrual of benefits leveling off past 50 years. All plans assume 1 year of construction and reflect October 2017 price levels. Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) and Interest During Construction (IDC) costs were quantified and considered in the analysis but not applied; both were found to be minimal and inclusion would not change the outcome of the CE/ICA analysis. OMRR&R is estimated to be \$2,000 annually (see Main Report – Section 6.4) and IDC is estimated to be \$4,000-6,000 annually.

The incremental analysis of alternatives was accomplished following guidance by Corps' Institute of Water Resources.

Table 1 Section 204 Project Costs and Annualized Costs

Alternative	Total Fill (cy)	Total Project Cost	Base Plan Cost	Section 204 Cost	Annualized Cost (Section 204)
Alt4	419,748	\$ 15,710,000	\$ 3,243,000	\$ 12,467,000	\$ 473,000
Alt5	470,859	\$ 17,664,000	\$ 3,636,000	\$ 14,028,000	\$ 532,000
Alt5m	502,121	\$ 18,781,000	\$ 3,886,000	\$ 14,895,000	\$ 565,000
Alt6m	413,329	\$ 15,569,000	\$ 3,178,000	\$ 12,392,000	\$ 470,000
Alt7m	345,959	\$ 13,102,000	\$ 2,706,000	\$ 10,396,000	\$ 395,000

1.1.2 HEP Analysis

An intensive HEP analysis was conducted on the alternative solutions. Details of the HEP analysis are provided in Appendix C. A summary of outputs from this analysis for each alternative are shown in Table 2. Average annual habitat units (AAHUs) are a quantitative result of annualizing habitat unit (HU) gains or losses across all years in the period of analysis. The net gain is the difference between AAHUs of an alternative in comparison to the no action alternative.

Table 2 Summary of the net gain in AAHUs from HEP analysis

Alternative	Net Gain AAHUs
Alt4	117.2
Alt5	117.2
Alt5m	173.4
Alt6m	171.1
Alt7m	143.4

1.1.3 Cost Effective Incremental Cost Analysis

An analysis of preliminary costs versus quantifiable habitat benefits was conducted to identify the most cost-effective alternative. The net gain in AAHUs was compared to the preliminary average annual cost for each alternative (Table 3). The CE/ICA process resulted in 1 cost effective plan and 3 “Best Buy” plans (including the No Action plan). The full array of alternatives and results of the CE/ICA analysis is displayed in Figure 1.

Table 3 Results of CE/ICA for Alternative Plans

Alternative	Total Fill (cy)	Section 204 Cost	Annualized Cost (2.875% Discount Rate)	AAHU Gain	AACost/ AAHU	Cost Effectiveness
No Action	-	\$ -	\$ -	0	\$ -	Best Buy
Alt4	419,748	\$ 12,467,000	\$ 473,100	117.2	\$ 4,000	No
Alt5	470,859	\$ 14,028,000	\$ 532,300	117.2	\$ 4,500	No
Alt5m	502,121	\$ 14,895,000	\$ 565,200	173.4	\$ 3,300	Best Buy
Alt6m	413,329	\$ 12,392,000	\$ 470,200	171.1	\$ 2,700	Best Buy
Alt7m	345,959	\$ 10,396,000	\$ 395,500	143.4	\$ 2,800	Yes

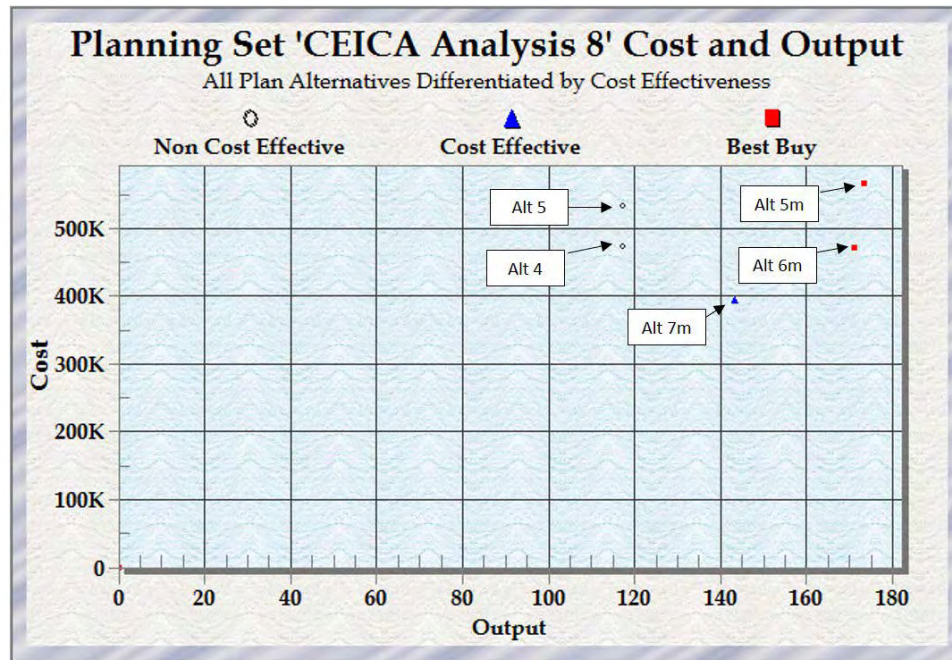


Figure 1 CE/ICA Results – Full Array of Alternatives

When combined with estimated costs of proposed actions, an analysis of both cost effectiveness and incremental costs associated with the identified alternatives can be completed. An evaluation of cost effectiveness and incremental cost analysis was completed using the Institute of Water Resources economic analysis program IWR-Planning Suite. This analysis identifies the cost effective plans that are superior financial investments, called "best buys," through incremental cost analysis. Best buys are the most efficient plans at producing the output variable. In this case, best buys provide the greatest increase in AAHUs for the least increase in cost. The incremental costs of best buy plans are displayed in Table 4. The first best buy is the most efficient plan, producing output at the lowest incremental cost per unit. If a higher level of output is desired than that provided by the first best buy, the second best buy is the most efficient plan for producing additional output, and so on. The Best Buy plans are compared in Figure 2 and Figure 3.

Table 4 Incremental cost of best buy plans

Alternative	Net AAHUs	Annualized Cost	AACost/AAHU	Incremental AACost	Incremental Output (HUs)	Incremental AACost/AAHU
No Action	0	\$ -	\$ -	\$ -	0	\$ -
Alt6m	171.1	\$ 470,200	\$ 2,700	\$ 470,200	171.1	\$ 2,700
Alt5m	173.4	\$ 565,200	\$ 3,300	\$ 95,000	2.3	\$ 41,300

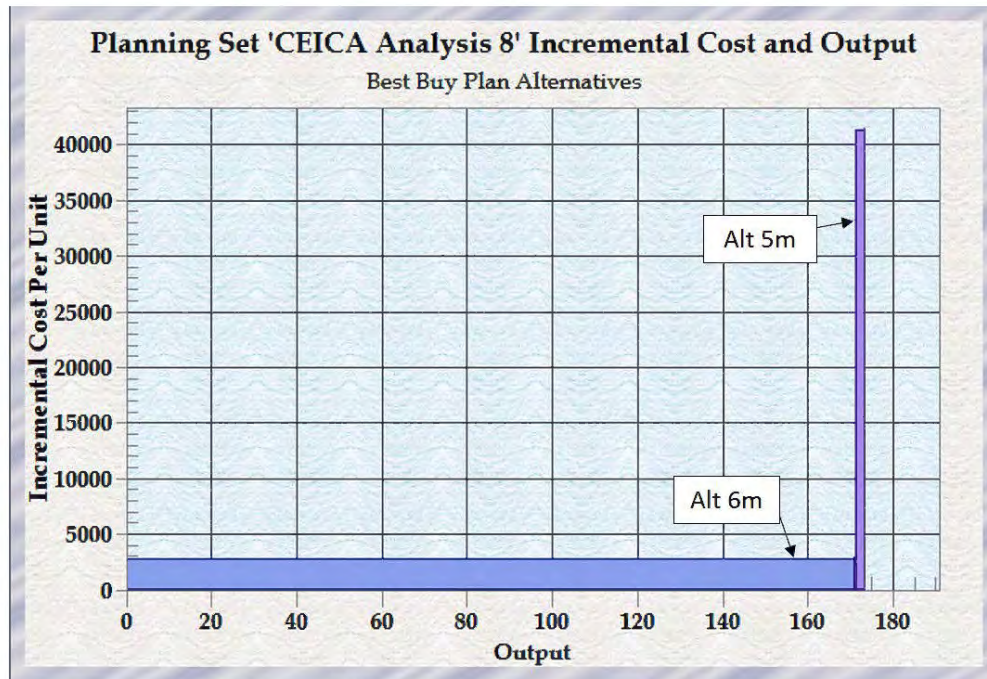


Figure 2 CE/ICA Results – Incremental Cost Per Unit of Best Buy Plans

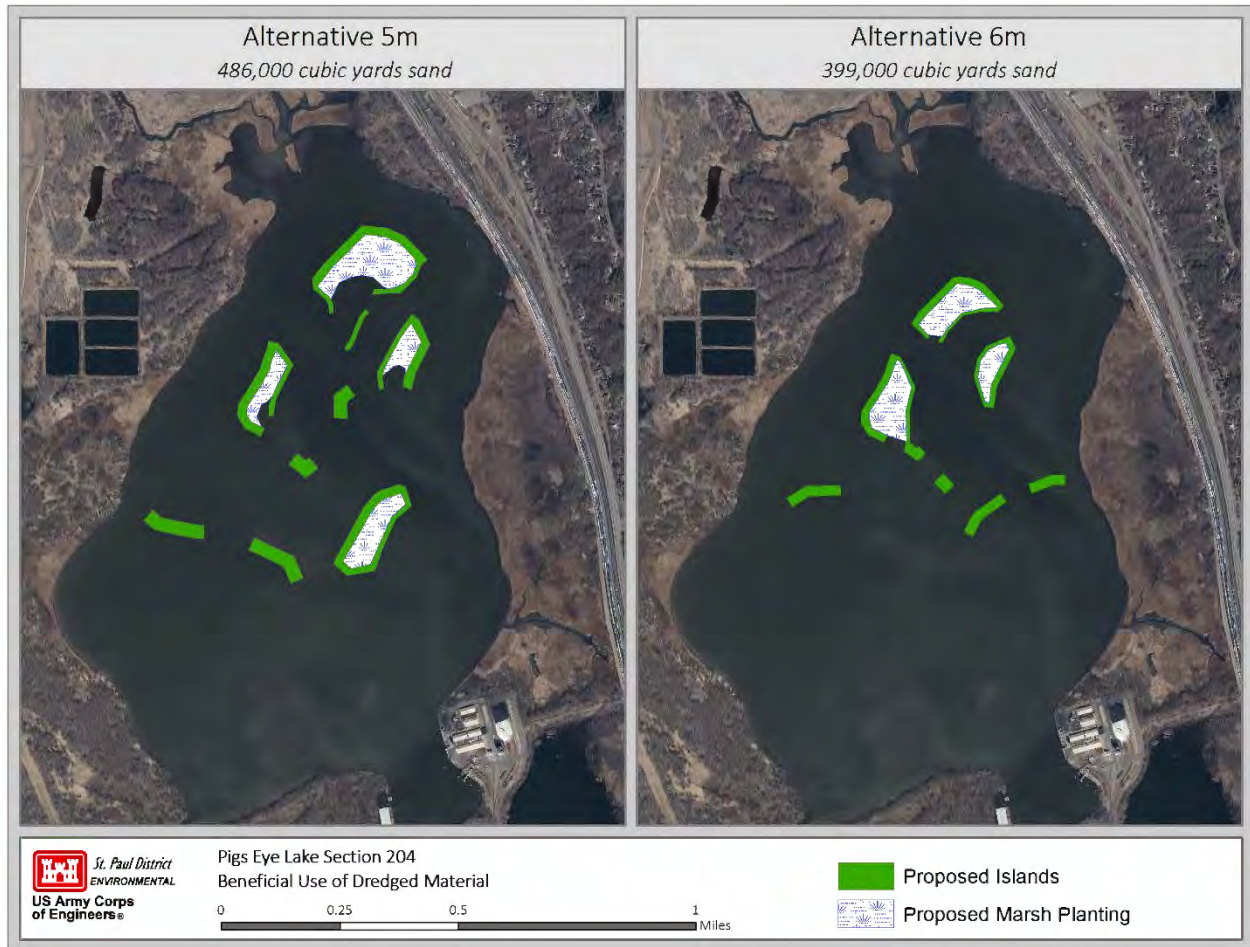


Figure 3 Comparison of Best Buy Plans (Alternative 5m and 6m)

1.2 Discussion

Typically in the evaluation of Best Buy plans, “break points” are identified in either the last column in Table 4, or in the stair-step progression from left to right in Figure 2. Break points are defined as significant increases or jumps in incremental cost per output, such that subsequent levels of output may not be considered “worth it”. Identification of such break points can be subjective. For Pigs Eye Lake, break points were identified between each of the three Best Buy plans (No Action, Alternative 5m, and Alternative 6m). The Cost Effective Plan, Alternative 7m, was also evaluated.

No Action (Best Buy) - This alternative was not chosen because it does not improve or maintain the ecosystem resources within the project area. This alternative would cost \$0. The continued shoreline erosion due to wind and wave activity would reduce the habitat value provided in the project area. The existing project area provides 217.9 AAHUs. Although conditions in the project area would decline under the FWOP, no model variables would be expected to change because existing conditions already reflect the lowest possible score for a majority of the variables. This alternative does not meet any of the project objectives.

Alternative 7m (Cost Effective) – This is the smallest alternative formulated, which would only create 4 islands, and significantly less acreage of floodplain forest and marsh habitat compared to Alternatives 5m and 6m. This results in lower habitat benefits (143 habitat units compared to over 170 in the subsequent Best Buy 5m and 6m plans). This alternative also does not meet the project objective of reducing shoreline erosion, as 3-5 fewer islands respectively, exposes more shoreline to wind and wave erosion. This alternative would not even reduce the current rate of erosion (almost 1 acre per year) by 50%. The Best Buy plans both would reduce rate of erosion by over 70%. For these reasons, Alternative 7m was deemed as not worth it and this alternative was eliminated.

Alternative 5m (Best Buy) –This alternative improves the aquatic ecosystem in Pigs Eye Lake by creating new floodplain forest habitat, reducing wind-wave action, and creating new wetland habitat. This alternative has all the same features as Alternative 6m, with the main difference being 3 additional islands (100,000 additional cy). This alternative would cost approximately \$14.9 million and net 173.4 AAHUs, at an average annual cost per average annual habitat unit of \$3,300. This larger alternative meets the project objectives and provides slightly more AAHUs, however, the incremental average annual cost per average annual habitat unit is \$41,300 and only generates an incremental output of 2.3 additional habitat units. This small increase in habitat units, without providing additional features, and at a much larger cost, was deemed not worth it, and this alternative was eliminated.

Alternative 6m (Best Buy) - This alternative improves the aquatic ecosystem in Pigs Eye Lake by creating new floodplain forest habitat, reducing wind-wave action, and creating new wetland habitat. This alternative would cost approximately \$12.4 million and would result in a net gain of 171.1 AAHUs, at an average annual cost per average annual habitat unit of \$2,700. The incremental output is 171.1 habitat units and the incremental average annual cost per average annual habitat unit is \$2,700. Alternative 6m was considered worth the investment as it met all project objectives and maximizes habitat benefits at a reasonable cost.



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Appendix E Sediment Report Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

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1 Pigs Eye Lake - Sediment Quality

1.1 Corps Involvement

Section 204 of the Water Resources Development Act of 1992 provides authority for the Corps of Engineers to plan, design and build projects to protect, restore and create aquatic and ecologically related habitats in connection with dredging of authorized Federal navigation projects. The proposed plan for Pigs Eye Lake Section 204 is to utilize dredged material from the Pool 2 navigational channel to build islands outside of the floodway in Pigs Eye Lake. As part of the planning process, three suitability determinations related to sediment/water quality need to be answered: 1) are the sources of sand and fines proposed for island construction within Pigs Eye Lake appropriate for aquatic and terrestrial habitats, 2) does the quality of the existing sediment under and around the proposed project islands a cause for concern for benthic organisms and possible bioaccumulation and 3) will the lake's water quality insure a safe environment for a project that promotes a goal to attract larger and more diverse populations of wildlife.

To address these issues, the discussion below utilizes historical and recent findings on the sediment quality found at potential borrow sites in Pool 2 and sediment and water quality information for Pigs Eye Lake, including a site description, pollution sources (Pigs Eye Landfill), and summary of results from previous reports.

1.2 Site Description

Pigs Eye Lake is a 628 acre Contiguous, Floodplain Depression Lake just downstream of downtown St. Paul along the left bank of the Mississippi River in Ramsey County, Minnesota (Figure 1). The lake has a maximum depth of around 4 feet and is fed by Battle Creek from the north and is subject to variable mixing with the Mississippi River (depending on river stage). The sediment found in Pigs Eye Lake is consistently soft for the majority of the boring depths to hard bottom. Composition varies between clay, silt, sand and peat. Depth to hard bottom also varies. In some cases there is stiffer clay underlying the soft materials. Hard bottom is what is considered either bedrock or sandy/gravelly alluvium. The very soft materials range in thickness from 10-22 ft. Based on borings collected by the Saint Paul District in 2015, it may be the case that the very soft deposits are thicker outside the floodway than within it. As detailed in the following sections, sediment surveys have shown considerable contamination within the lake sediment, which has been degraded over the last many decades due to the presence of the Pigs Eye Landfill and urbanization of the Battle Creek Watershed.

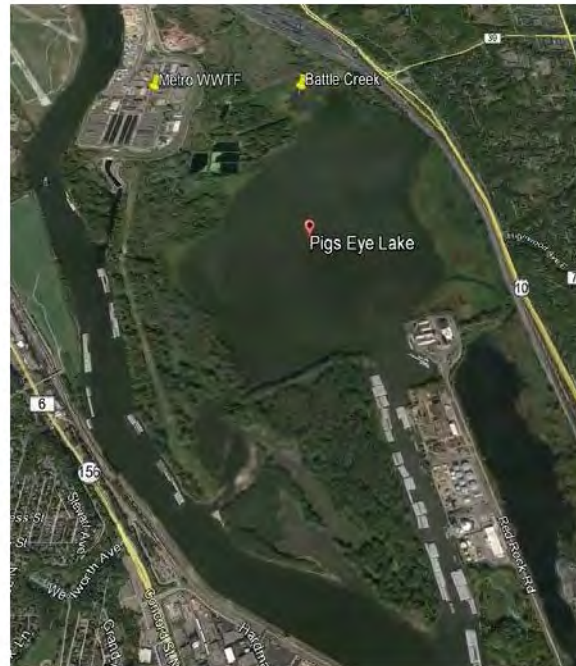


Figure 1. Aerial photo of Pigs Eye Lake (2014)

2 Pigs Eye landfill

2.1 Landfill Background

The Pigs Eye Landfill is listed on the Minnesota Pollution Control Agency's (MPCA) Superfund list. The site is located approximately three miles southeast of downtown St. Paul. It is bordered by the CP Railroad yard to the north and east, and by the Metro WWTP and Pigs Eye Lake to the south. The dump was operated by the City of St. Paul from the mid-1950s to 1972 for the disposal of mixed municipal, commercial and finally closed in 1972, after the Minnesota Pollution Control Agency refused to give Pigs Eye Landfill a permit.

2.2 Landfill contamination concerns

A 2000 Health Consultation report prepared by the Minnesota Department of Health (<http://www.health.state.mn.us/divs/eh/hazardous/sites/ramsey/pigseyedumphc0900.pdf>) states the following concerns based upon sampling of groundwater, surface water, sediments, soil, and landfill seeps conducted in 1998 and 1999:

- 1) Based on elevation data from the Mississippi River that the groundwater has come in contact with the waste material an average of 67 days per year since 1972.

- 2) Battle Creek surface samples detected low concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and heavy metals at levels below applicable MPCA surface water criteria. One pesticide (dicamba) was also detected in several samples. Two VOCs, ethylbenzene and styrene, were detected in all of the surface water samples collected. The levels of these contaminants did not vary greatly between the upstream (where Battle Creek enters the site) and downstream (near where it discharges into the lake) sampling locations.
- 3) Two sediment samples collected in Battle Creek showed elevated levels of heavy metals, namely copper, lead, mercury and zinc. Levels of these metals exceeded the MPCA's ecological sediment screening criteria in the downstream sample taken near where Battle Creek discharges into the lake, but not in a sample collected in the middle portion of the creek. A sediment sample collected in the wetland below the discharge area of the creek also showed elevated levels of heavy metals, above sediment screening criteria. Neither PCBs nor pesticides were detected in sediment samples collected from Battle Creek.
- 4) Soil samples from the battery disposal area located along the east side of the southeast pond is contaminated with lead and cadmium. Levels of lead in soil were as high as 62,000 milligrams per kilogram (mg/kg), while cadmium levels were as high as 80 mg/kg. Levels of lead and cadmium are well in excess of the MPCA recreational land use Soil Reference Values (SRVs) for these two elements of 400 mg/kg and 40 mg/kg respectively. Past sediment samples collected from the southeast pond showed elevated levels of lead, with concentrations of lead ranging from 33 mg/kg to 59,000 mg/kg, with a median value of 100 mg/kg. Further samples confirmed this result, and also showed elevated levels of cadmium, copper, mercury, and zinc. Concentrations of these heavy metals exceeded their respective MPCA ecological sediment screening criteria. Low levels of one PCB compound and one pesticide, 4,4-DDE, were also detected in a sediment sample from the southeast pond. A sediment sample taken south of where the southeast pond discharges into Pig's Eye Lake also showed elevated levels of copper, lead, mercury, and zinc, as well as one pesticide, 4,4-DDD.
- 5) In late 1999, the MPCA coordinated the removal of approximately 25 drums from an area adjacent to Battle Creek and Pigs Eye Lake. Testing of the contents of some of the removed drums revealed PCBs, heavy metals such as cadmium and lead, petroleum products, and VOCs such as benzene and xylene. Some of the drums removed were required to be managed as hazardous waste due primarily to the presence of high concentrations of PCBs in the drummed wastes.
- 6) Vertical flow likely reaches the deeper sand layer, and ultimately discharges to Pigs Eye Lake and/or the Mississippi River. Analysis of groundwater samples from three wells which presumably represent groundwater that discharges directly to Pigs Eye Lake through the lower sand unit showed detectable concentrations of PCBs (Aroclor 1242), polynuclear aromatic hydrocarbons (PAHs), mercury, and VOCs. Levels of PCBs, and some individual PAHs and VOCs, were in excess of MDH Health Risk Limits (HRLs) for groundwater and MPCA surface water criteria.

3 Historical Pigs Eye Sediment Data

Two historic sediment studies that include sampling locations in Pigs Eye Lake:

- 1) 2001 survey of 3 sites in Pigs Eye Lake for 2006 MCES report: Physical, Chemical, and Biological Characteristics of Mississippi, Minnesota, and St. Croix River Bed Sediments in the Twin Cities, MN Area during a 1998-2001 Survey.
- 2) 2007-2008 MPCA sediment chemistry survey of Pigs Eye Lake

The MCES survey found that “much of the variation observed in the concentrations and distributions of the contaminants measured in bulk and fine-grained sediments during the 1998-2001 MCES sediment survey is associated with sediment particle size and TOC concentration. With few exceptions, sites that were composed predominantly (greater than 50%) of fine particle sizes (silts and clays smaller than 53 um) and a TOC content of 1.5% or greater contained substantially higher levels of most contaminants, including trace metals, OC pesticides, and PAHs”. These sites included Pigs Eye Lake (all three sites).

The MCES 1998-2001 survey used MPCA SQT values to evaluate the contaminant concentrations measured in both the bulk and fine-grained sediments. These two types of narrative SQTs were established by the MPCA and its collaborators for the St. Louis River AOC (Crane, et al., 2000); and these narrative objectives are also applicable to other water bodies within Minnesota (MPCA, 2007). Level I SQTs are intended to identify contaminant concentrations below which harmful effects on sediment dwelling organisms (i.e. benthic macroinvertebrates) are unlikely to be observed. Level II SQTs are intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms are likely to be observed.

Level I and Level II SQTs have been established for 8 trace metals, 13 individual PAH compounds, total PAHs, total PCBs, and 10 OC pesticides (MPCA, 2007). Table 1 below summarizes the SQT exceedances found in the 1998-2001 survey for Pigs Eye Lake and results of the biological analysis.

Table 1. Summary of results from the MCES 1998-2001 sediment survey that included 3 sites at Pigs Eye Lake

Trace Metals Analysis	PAH Analysis	Biological Analysis
<p>Bulk Sediment- Level I SQT exceedances:</p> <p>PEL North (Cd)</p>	<p>Level I SQT exceedances:</p> <p>PEL North</p>	<p>Benthic Macroinvertebrate Analysis Contaminant-related impacts</p> <p>PEL Mid (reduced taxa richness and density; dominated by midges)</p>
<p>Fine-grained Sediment- Level I SQT exceedances:</p> <p>PEL North (Cd) PEL Mid (Cd, Cr, Cu, Pb, Hg, Ni, Zn) PEL South (Cd)</p> <p>Level II SQT exceedances:</p> <p>PEL Mid (Cd)</p>	<p>Level II SQT exceedances:</p> <p>PEL North</p>	<p>Highest densities in the survey are found in:</p> <p>Lake Pepin, PEL North and South, and MI 3.5,</p> <p>Possibly due to the greater presence of fine-grained sediments.</p>

The 2007-2008 MPCA sediment chemistry survey of Pigs Eye Lake included 11 locations at multiple depth increments. The sediment samples were tested for metals, PCBs, PAHs and pesticides. In general the results were in-line with the MCES survey. But due to the increased number of locations and depths of the samples a spatial distribution of the contamination was detected. For example, in Figure 2, SQT I exceedances of lead, mercury, nickel and zinc show the exceedances occur below the surficial sediment (yellow bar) and mainly located along the centerline between the creek outlet and the lake outlet. In contrast, PAHs and PCBs seem to be ubiquitous throughout the lake at multiple depths (Figure 3).



Figure 2. Spatial distribution of SGT I exceedances for mercury, lead, nickel and zinc. MPCA 2007-2008 survey (green = below SGT level I, yellow = between level I and level II SGT)

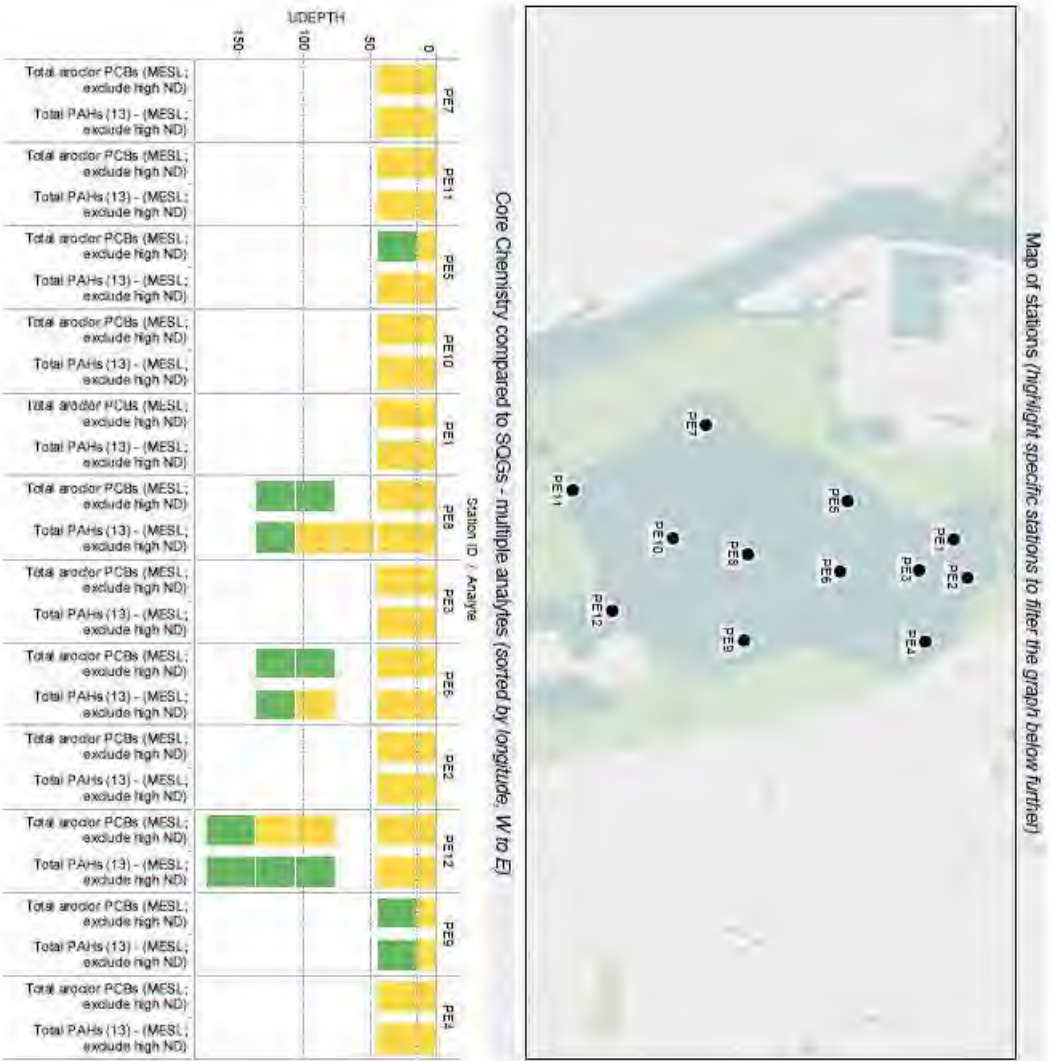


Figure 3. Spatial distribution of SQT I exceedances PAHs and PCBs. MPCA 2007-2008 survey (green = below SQT level I, yellow = between level I and level II SQT).

Two other historical studies include a Pigs Eye Lake Benthic Invertebrates study done by Gary Montz of the Minnesota Department of Natural Resources and a Minnesota DNR study of 7 fish tissues. The invertebrates study showed that Pigs Eye Lake has a benthic community of little diversity and the samples were nearly totally dominated by two groups – Chironomidae (midges) and Oligochaeta (aquatic worms). The fish tissue study showed very little mercury, but some PCB contamination was detected in fish tissue.

4 Recent Pigs Eye Sediment investigations

Two recent investigations that focused primarily on metals and PFCs inside the northern most portion of the lake include the Bay West LLC (Bay West) study in 2014 and Wenck and associates study in 2016.

The Bay West samples were mostly collected on the east side of the northern bay and the Wenck study concentrated on the west side of the bay (Figures 4 and 5).

4.1 Bay West (2014)

The general findings of the Bay west study were:

Cadmium, copper, lead, and zinc are present at concentrations greater than applicable SQTs in sediment samples collected throughout the investigation area, and cadmium is present at concentrations greater than the applicable SSV in several locations (Sediment Screening Values- SSVs were developed by the Minnesota Department of Health for use in a St. Louis River study as a human health risk assessment tool).

- Level 2 SQT exceedances for analyzed metals appear to be concentrated in the areas adjacent to Battle Creek. Generally, A-horizon samples contained greater concentrations of metals than B-horizon samples.
- PCBs were not detected at concentrations greater than laboratory reporting limits in any of the samples collected during this investigation.
- PFOA and PFOS were detected at concentrations exceeding laboratory reporting limits in all of the samples analyzed.
- B-horizon samples were collected from 6 to 15 inches below the sediment surface, on average. Based on the analytical results of B-horizon samples for metal and PFCs, it appears that contamination in sediments may extend deeper than approximately 15 inches below the sediment surface.

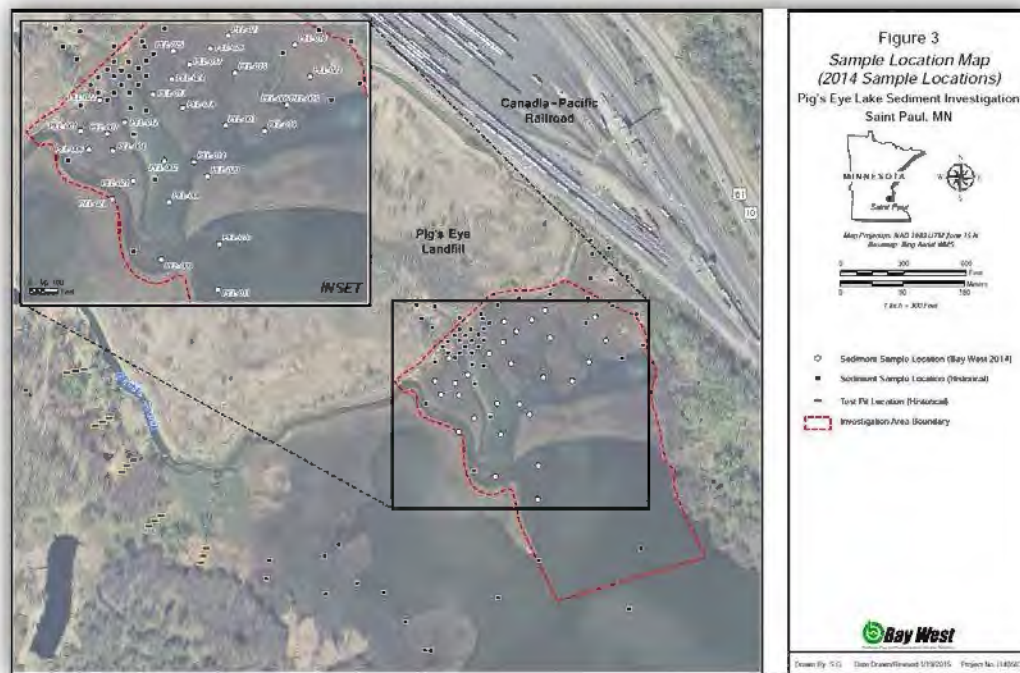


Figure 4. 2014 Bay West Sediment - sample locations.

4.2 Wenck (2016)

The general findings of the Wenck study were:

- With the exception of cadmium, no samples exceeded SSVs.
- With the exception of cadmium, exceedances of SQT 2 were very low: zinc 0%, lead 5% and copper 5%.
- All samples of sediments collected in the northwest bay during this investigation reported lower percentages exceeding the SQT and SSV values than were reported for the 2014 northeast bay investigation conducted by Bay West.
- PFCs highest sample results were lower than values reported for the 2014 northeast bay investigation conducted by Bay West.
- Man-made materials in the sediment indicate Pig's Eye Dump is likely the origin of the contamination.
- AVS-SEM metals data suggest that metal toxicity is low in Pigs Eye Lake since the metals are unavailable to biota.

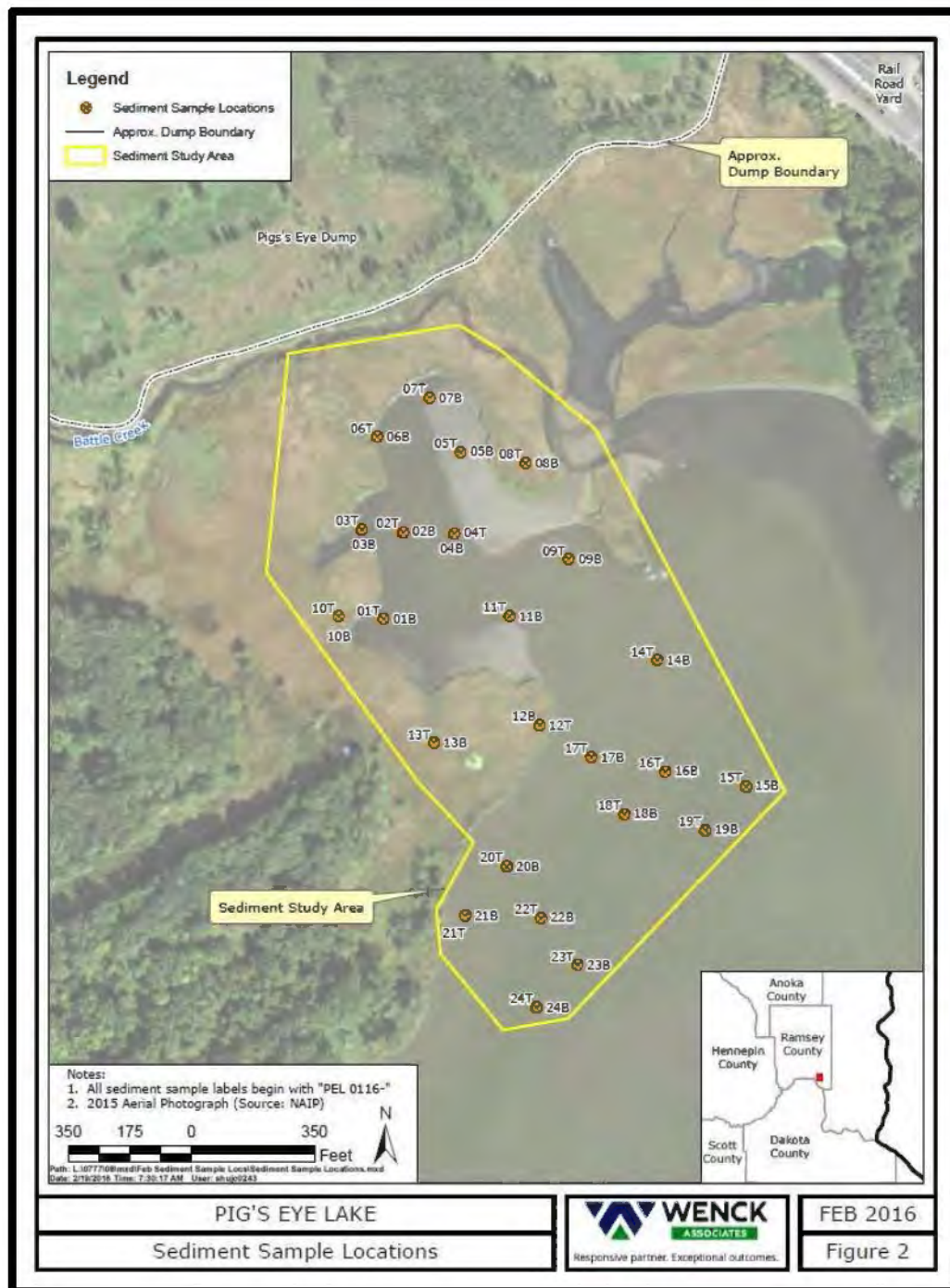


Figure 5. 2016 Wenck sediment survey - sample locations

5 USACE Sediment Surveys

5.1 2015 USACE Pigs Eye Lake Sediment Survey

Sampling:

On October 26th, 2015, district staff drilled four boreholes in Pigs Eye Lake (Figure 6) and collected a total of six environmental samples for chemical and physical analyses from three of the four boreholes (15-1M, 15-2M and 15-3M). For each borehole tested, two composite samples were analyzed. The composite samples were collected at roughly two foot intervals starting a couple feet below the sediment surface (Table 2).

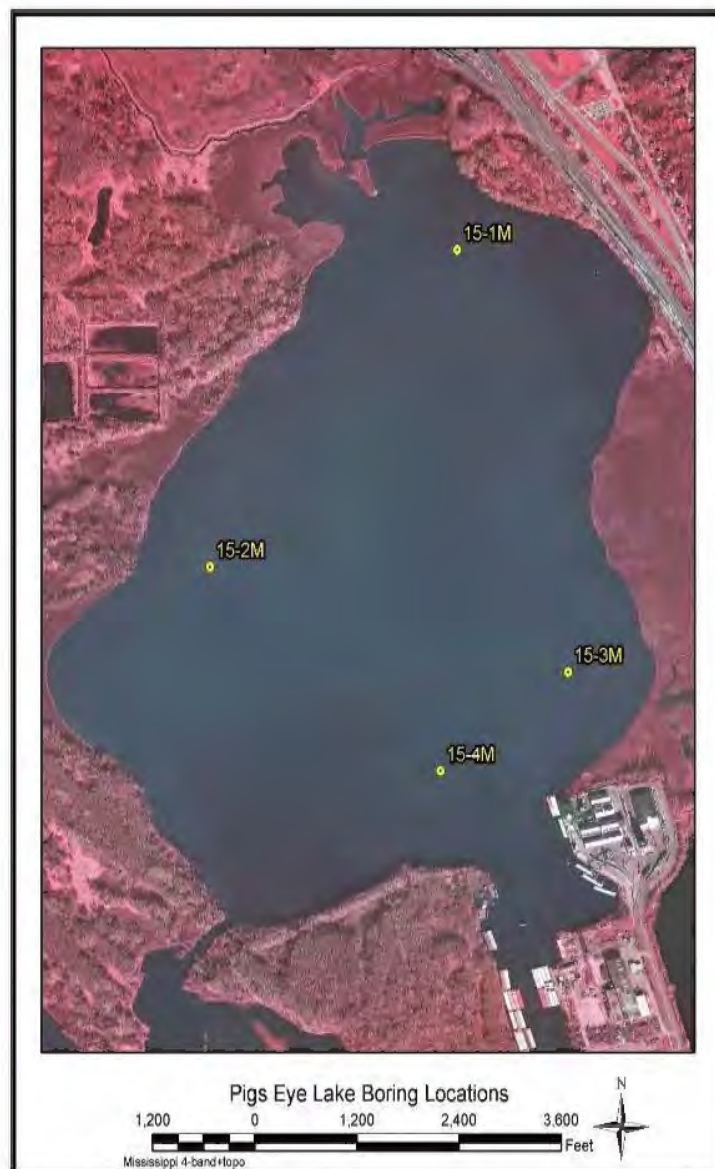


Figure 6. 2015 USACE Sediment Survey - Sampling Locations

Table 2. Depth and Description of Sediment Samples

Boring	Sample	depth from lake bottom (ft)	Description
15-1M	1	2.3	Clayey Silt (OH) - Very soft, loose, saturated, green, 85% organic silt, 15% clay
		4.3	
	2	4.3	
		6.3	
15-2M	1	1.9	Organic-Rich Silty Clay (CH) - Soft, wet, green-gray, 80% clay, 20% silt, scattered roots, etc.
		3.9	
	2	3.9	Gradational transition from CH in sample #1 to Silty Clay (CH) - soft, wet, blue-gray, 80% clay, 20% silt, few organics
		5.9	
15-3M	1	1.6	Clayey Peat (Pt) - soft, spongy, wet, green, 70% wood fragments, 30% clay
		3.6	
	2	3.6	
		5.6	

The six sediment samples were immediately processed after collection and sent on ice to ARDL, Inc., Mt Vernon, IL for physical and chemical analyses to determine grain size and contamination.

Analyses:

Metals, PCBs, pesticides, PAHs, cyanide, total organic carbon, percent moisture, percent solids, percent total volatile solids, selected inorganics and grain-size analyses were performed by ARDL, Inc. for each of the composite samples.

Results and Discussion:

The analytical results (Table 3) showed that the sediment samples were mostly silt/clay, with around 90% of material passing the #200 sieve. Addendum 1 also shows total organic carbon content (TOC) which had a

wide range between 29,000 mg/kg seen in 15-2M #2 to a very high concentration of 120,000 mg/kg in 15-3M #2. The role of sediment in chemical pollution is tied both to the particle size of sediment, and to the amount of particulate organic carbon associated with the sediment. Silt content is important, because finer material has more surface area for binding with contaminants, but as TOC increases, the affinity between the sediment and the contaminants also increases. As a result, greater TOC concentrations reduces the biological availability of many of the persistent, bioaccumulating and toxic organic contaminants, especially chlorinated compounds.

To ascertain the possible toxicity of the samples to the benthic environment, the chemical results were compared to the Minnesota Pollution Control Agency's (MPCA) sediment quality targets (SQTs) for the protection of sediment-dwelling organisms in Minnesota and the MPCA's Soil Reference Values (SRVs) that are used for upland placement suitability.

Metals:

Similar to what was seen in previous surveys, the most contaminated site (15-1M) was the borehole closest to the Pigs Eye Landfill. Cadmium, lead and mercury were above SQT 1 levels in the upper sample in 15-1M and cadmium and mercury concentrations were exceeded in the lower sample. In both layers, however, cadmium was above the proposed Residential/Recreational SRV limit. In boreholes 15-2M and 15-3M, both located in the southern part of the lake, there were not any SQT exceedances for metals except for cadmium, which also equaled the proposed 2016 cadmium Residential/Recreational SRV in the upper sample of 15-2M.

Organics:

Only the samples from borehole 15-1M showed any SQT or SRV exceedances for organic pollutants. Of the two layers tested, the upper layer had more contamination with four contaminants exceeding SQT II guidelines (acenaphthylene, pyrene, benzo(a) anthracene and benzo(a)pyrene), another four exceeding SQT I guidelines (acenaphthene, anthracene, fluoranthene and dieldrin) and benzo(a)pyrene exceeding the proposed 2016 PAH recreational SRV by itself. The lower 15-1M sample had significantly less contamination with only SQT I exceedances for acenaphthylene, acenaphthene, anthracene, pyrene, benzo(a) anthracene and benzo(a)pyrene. PCBs and pesticides were all non-detect for all 6 samples, except for dieldrin in the upper sample of 15-1M.

The recommended action related to sediment quality for this study was to engage the MPCA to determine if the results of the 2015 surveys were acceptable to continue pursuing the construction of islands inside Pigs Eye Lake. It was decided that 10 more samples located within the preferred alternative plan's footprint of the islands would be collected for further analyses.

5.2 2016 USACE Pigs Eye Lake Sediment Survey

Sampling:

On August 8 and 9, 2016, district staff drilled ten boreholes inside the proposed construction area of Pigs Eye Lake (Figure 7) and collected one sample for chemical and physical analyses from each boreholes. Each sample was a 3 foot composite sample that started 0.5-1 foot below the sediment surface.

Table 3. USACE Sediment Analytical and Physical Results from Pigs Eye Lake 2015-1016

2016 draft MPCA Res/Rec Soil Reference Value (SRV)

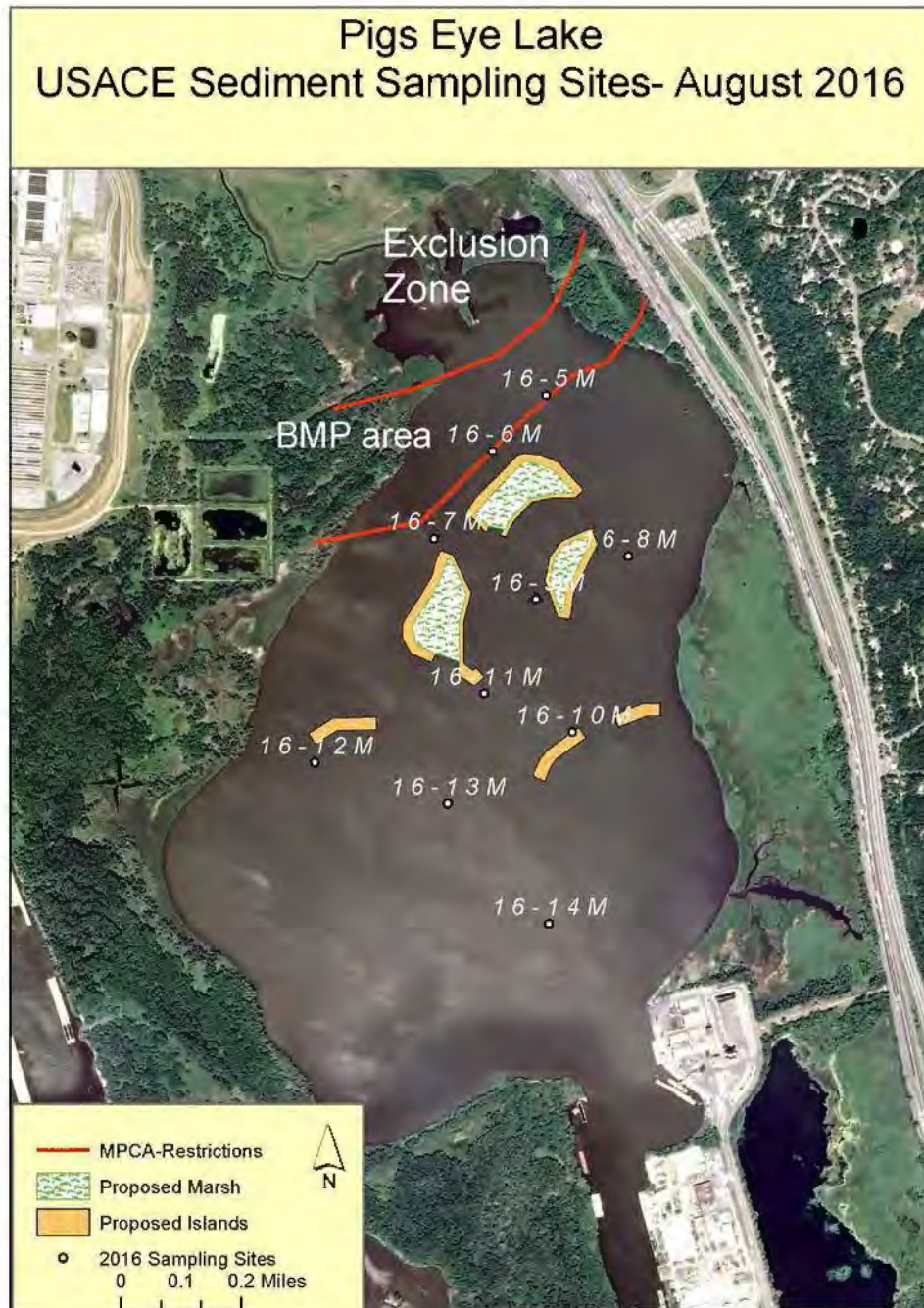


Figure 7. 2016 USACE Sediment Survey - Sampling Locations

The 10 sediment samples were immediately processed after collection and sent on ice to ARDL, Inc., (Mt Vernon, IL) for physical and chemical analyses to determine grain size and contamination. In addition, samples from 6 boreholes were sent to AXYS Analytical Services Ltd. (Sydney, British Columbia) for PFC analysis (see PFC appendix).

Results:

Figures 8-11 shows the number of different metals and PAHs tested that exceeded MPCA's SQTs II and 2016 Rec/Res SRVs. Three of the ten boreholes (16-5M, 16-6M and 16-13M) collected in 2016 showed elevated levels of contamination similar to what was seen in the 2015 borehole, 15-1M. Namely, these 3 boreholes had: numerous SQT I exceedances for many different metals and PAHs, several SQT II exceedances for cadmium and PAHs and a few cadmium and benzo(a)pyrene (using the BaP equivalents approach) results were above proposed SRV limits for Recreational/Residential use. Conversely, two boreholes, 16-7M and 16-8M, had only SQT I exceedances for nickel and were more akin to the relatively clean 2015 boreholes, 15-2M and 15-3M. Why some of the boreholes were more contaminated and others were relatively clean, is not obvious, but similar to the MPCA 2007-2008 survey, the less contaminated boreholes appear to be located along the edges of the lake.



Figure 8. Number of PAHs tested in 2016 that exceeded MPCAs SQT II guidelines.



Figure 9. Number of PAHs tested in 2016 that exceeded MPCAs SRVs (2016 Res/Rec) guidelines.



Figure 10. Number of metals tested in 2016 that exceeded MPCAs SQT II guidelines.



Figure 11. Number of metals tested in 2016 that exceeded MPCAs SRVs (2016 Res/Rec) guidelines.

Compared to Wenck and the Bay West surveys, which focused their sampling to the area immediately downstream of the landfill, the USACE surveys demonstrate that the contamination in the lake is widespread, but at lower levels than what is found immediately adjacent to the landfill. Table 4 shows the percentage of heavy metal samples exceeding SQT and SSV sediment toxicity guidelines for USACE, Wenck and the Bay West surveys. The exceedance percentages are fairly similar for the lake-wide corps samples and the near-landfill, Wenck and the Bay West samples, at the lowest levels (SQT I), but the near-landfill samples had the majority of exceedances at the SQT II levels and all of the SSV exceedances. Similar comparisons cannot be done with PAHs, since the Wenck and the Bay West did not analyze their samples for PAHs, but levels of PFCs from the three surveys show the same heavy metal pattern of wide-spread contamination in the lake sediments, but with hot-spots located only near the landfill (PFC appendix).

Table 4. Comparison of SQT I, SQT II and SSV heavy metal exceedances for the USACE 2015-2016 surveys and the Wenck and Bay West Surveys

Cadmium Comparison Criteria		Wenck NW Bay 0-0.5'	Wenck NW Bay >0.5'	Bay West NE Bay A-Horizon	Bay West NE Bay B-Horizon	USACE 2015 and 2016 Surveys
Level 1 SQT	0.99 mg/kg	59% (8)	26%(5)	89%	54%	81% (13)
Level 2 SQT	5 mg/kg	23% (3)	4% (1)	24%	29%	13% (2)
SSV	10 mg/kg	9% (2)	4% (1)	11%	11%	0%
Copper Comparison Criteria		Wenck NW Bay 0-0.5'	Wenck NW Bay >0.5'	Bay West NE Bay A-Horizon	Bay West NE Bay B-Horizon	USACE 2015 and 2016 Surveys
Level 1 SQT	32 mg/kg	68% (13)	26% (5)	93%	71%	44% (7)
Level 2 SQT	150 mg/kg	5% (1)	0% (0)	7%	4%	0%
SSV	9000 mg/kg	0% (0)	0% (0)	0%	0%	0%
Lead Comparison Criteria		Wenck NW Bay 0-0.5'	Wenck NW Bay >0.5'	BayWest NE Bay A-Horizon	BayWest NE Bay B-Horizon	USACE 2015 and 2016 Surveys
Level 1 SQT	36 mg/kg	73% (13)	52% (10)	93%	71%	50% (8)
Level 2 SQT	130 mg/kg	5% (1)	0% (0)	7%	4%	0%
SSV	300 mg/kg	0% (0)	0% (0)	0%	0%	0%
Zinc Comparison Criteria		Wenck NW Bay 0-0.5'	Wenck NW Bay >0.5'	BayWest NE Bay A-Horizon	BayWest NE Bay B-Horizon	USACE 2015 and 2016 Surveys
Level 1 SQT	120 mg/kg	50% (11)	17% (4)	93%	64%	44% (7)
Level 2 SQT	460 mg/kg	0% (0)	0% (0)	4%	7%	0%
SSV	73,000 mg/kg	0% (0)	0% (0)	0%	0%	0%

Sediment Screening Values- SSVs (developed by the Minnesota Department of Health for use in a St. Louis River study as a human health risk assessment tool).

6 Pool 2 Sediment – Proposed borrow material

Starting in the 1970s, the St. Paul District has completed 15 sediment surveys of the historic dredge cuts in Pool 2 (1974, 1975, 1978, 1981, 1982, 1983, 1984, 1985, 1989, 1992, 1994, 2002, 2008, 2013 and 2014). Sediment testing of historic dredge cuts in Pool 2 Pre-2008 (Addendum 1) have shown that some of the most contaminated sediments that the St Paul District dredges are in Lower Pool 2. The levels of Pool 2 contamination appear to increase downstream, with little or no SQT and SRV exceedances detected in the upper reaches to multiple exceedances detected around Boulanger Bend and the Upper Approach to Lock and Dam 2. The reason for the increased contamination in the lower pool is likely due to the increasing percentage of fines seen downstream where the pool becomes more lake-like. The increased affinity of smaller granular sizes to heavy metals and organic contaminants is probably the key factor influencing higher contamination, but point sources of urban, industrial and agricultural pollution between St. Paul and Lock and Dam 2 may also be significant.

Results from post-2008 testing in pool 2 (Addendum 2), however, shows that the contamination levels throughout the whole pool is much improved. This noticeable reduction in SQT and SRV exceedances over time suggest that the Pool 2 sand, and more importantly, fines from the navigational channel that are available for the construction of islands in Pigs Eye Lake are suitable for wildlife habitat.

7 Results and Discussion

Three suitability determinations:

- 1) Are the sources of sand and fines proposed for island construction within Pigs Eye Lake appropriate for aquatic and terrestrial habitats?

As an outcome of the markedly decreased levels of pollution seen in USACE Pool 2 sediment surveys over time, it is believed that the construction of the proposed islands in Pigs Eye Lake (Figure 7) with sand and fines from USACE placement sites in Pool 2 would not cause significant detrimental effects, in terms of habitat suitability.

- 2) Is the quality of the existing sediment under and around the proposed project islands a cause for concern for benthic organisms and possible bioaccumulation?

Unfortunately, recent sediment surveys of the lake's bottom shows there are varying level of contamination throughout the entire lake. The sediment testing shows that the lake has contamination of PFCs, widespread low level (SQT I) exceedances for heavy metals and PAHs, and limited locations with higher exceedances for cadmium and PAHS (SQT II and proposed Recreational/Residential SRVs). As a result, stakeholders that are part of the planning process formed a Contaminant Sub-Group that included several MPCA, MN DNR, Metropolitan Council, and Corps of Engineers staff members familiar with the contamination issues. One of the final products that came out of this group were maps extrapolating the likely contamination levels of many constituents throughout the lake (Mean Probable Effects Concentration Maps, Figures 12-16). These maps later led to the development of the Exclusion Zone, Best Management Practices (BMP) Zone, and Unrestricted Areas identified on Figure 7. As currently proposed, the island construction plan shown in Figure 7 delineates all of the Islands outside of the Exclusion Zone. Furthermore, it is thought that placing clean sand to construct the proposed islands outside

of the most contaminated areas would probably be a benefit for the lake by capping some of the lesser contaminated underlying sediments. Placement of the sand may cause short-term disturbance and redistribution of the sediment adjacent to the islands during construction, but as long as the possibility of mud waves are managed and the contaminated sediment is not discharged to the Mississippi River, there shouldn't be a long-term concern that the construction of the islands will further contaminate the lake.

- 3) Will the lake's water quality ensure a safe environment for a project that promotes a goal to attract larger and more diverse populations of wildlife?

The answer to this question is still an unknown and obtaining a scientifically defensible conclusion is probably not feasible within the scope and budget of this project. At this point, there is not enough water quality, biological and toxicity data available for the area to clearly demonstrate the risk. But, what is known is that the approximate residence time calculated for July 2015 was a little less than 5 days. This relatively short residence time for the lake suggests that there is probably not enough time for sediment contaminants diffusing into the water column to concentrate up to levels far exceeding what is seen in Pool 2 of the Mississippi River.

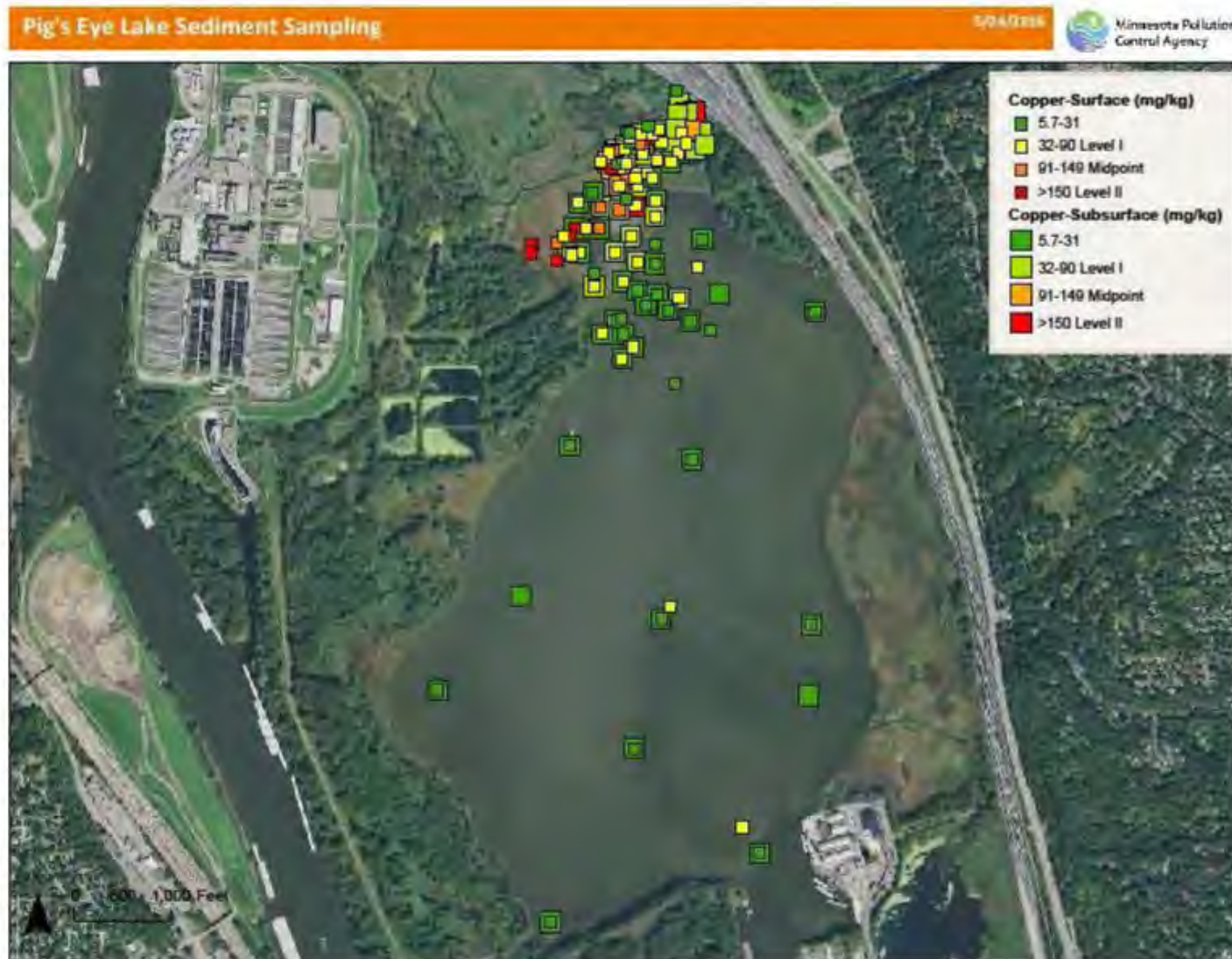


Figure 12. Pigs Eye Sediment - Copper Mean Probable Effects Concentration

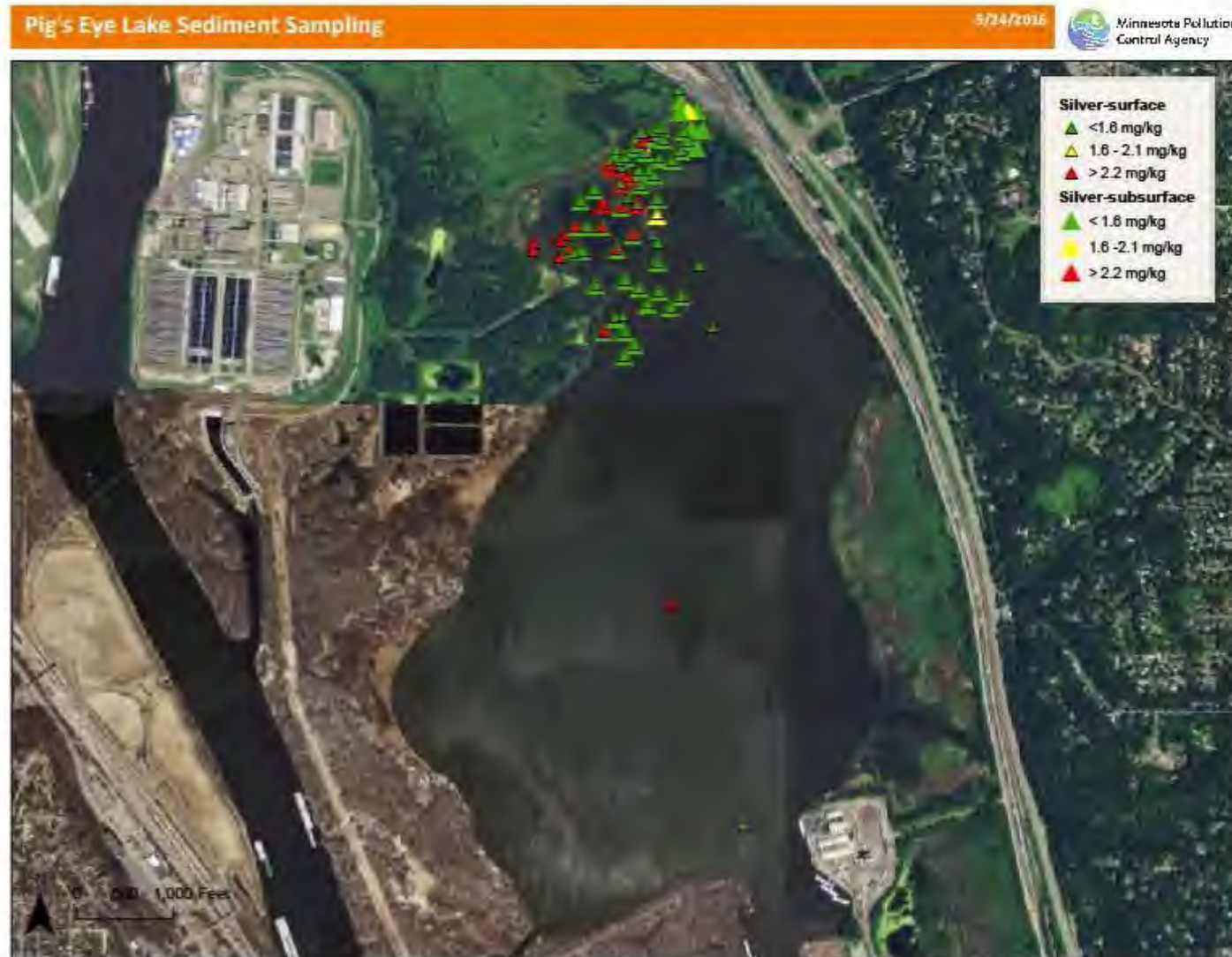


Figure 13. Pigs Eye Sediment - Silver Mean Probable Effects Concentration

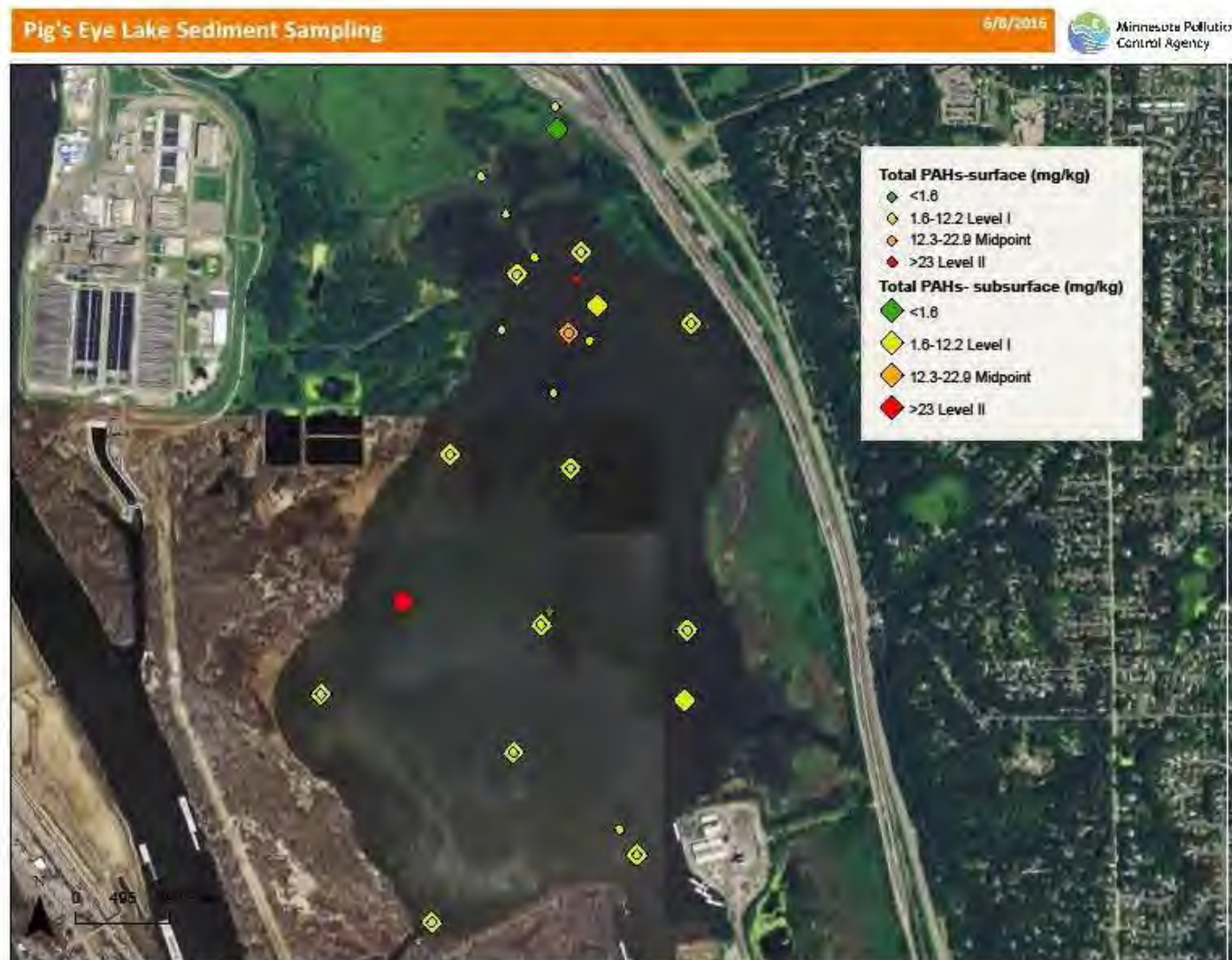


Figure 14. Pigs Eye Sediment – Total PAHs Mean Probable Effects Concentration

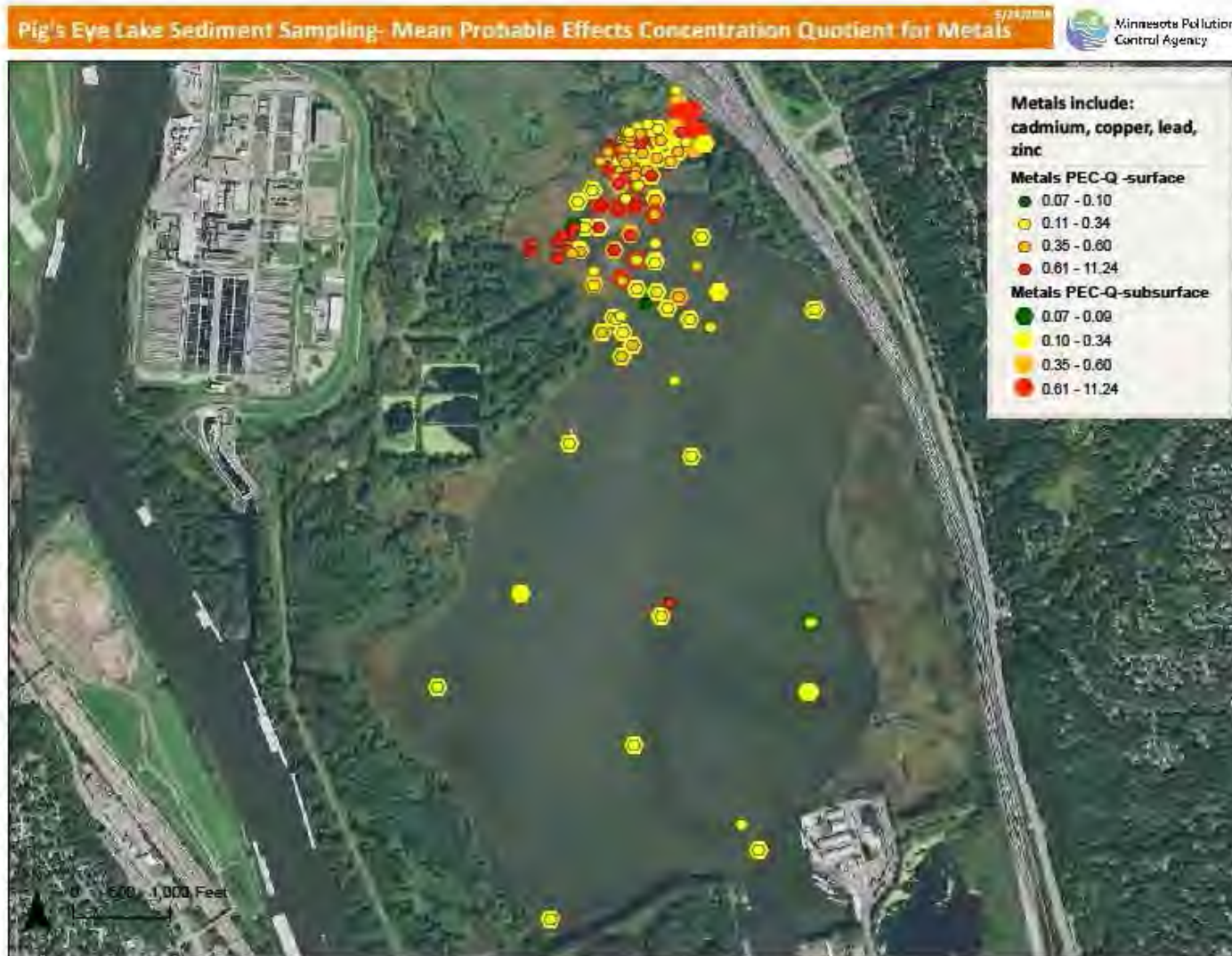


Figure 15. Pigs Eye Sediment - Metals Mean Probable Effects Concentration

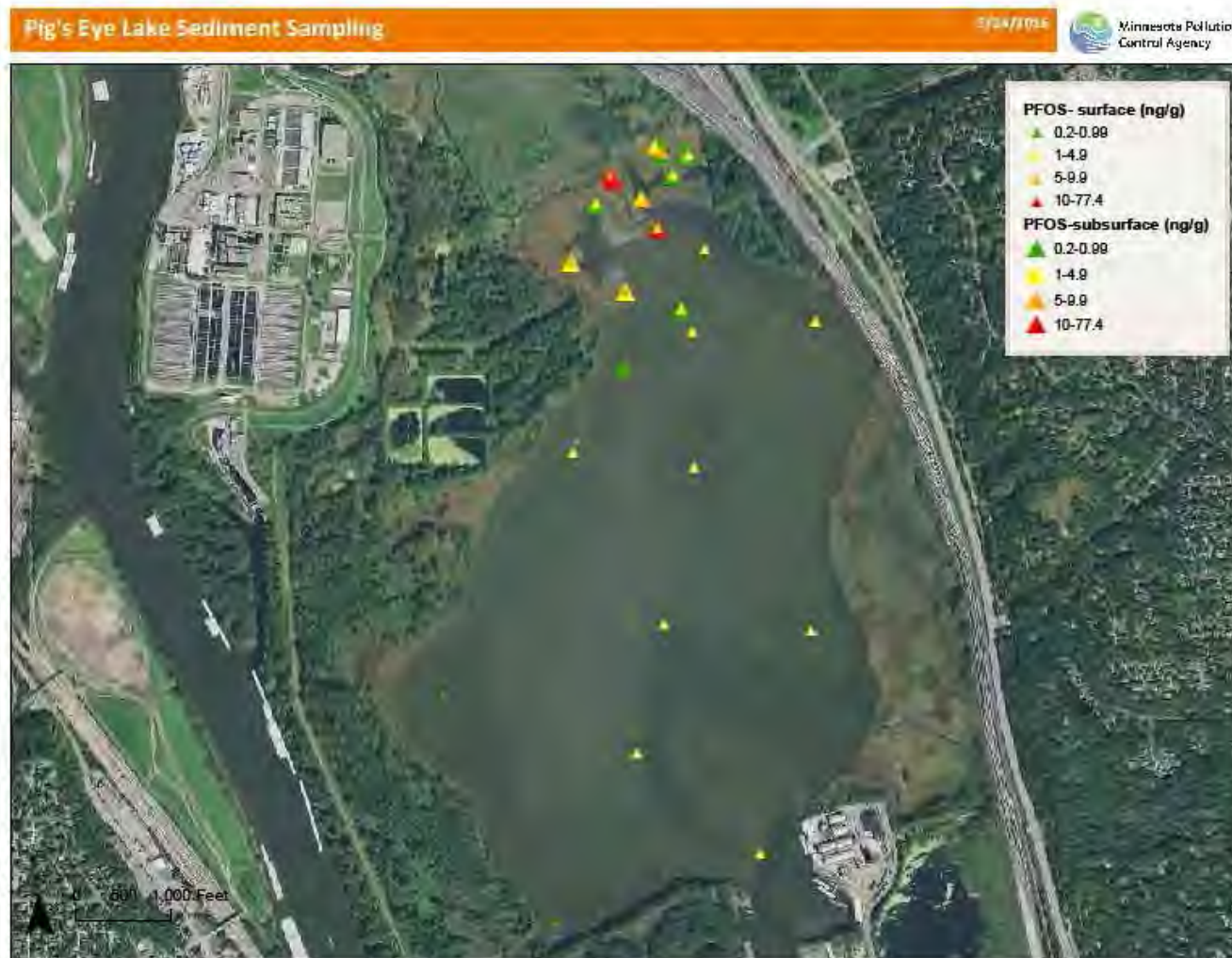


Figure 16. Pigs Eye Sediment - PFOS Mean Probable Effects Concentration

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Pigs Eye Landfill, St. Paul, Ramsey County Minnesota, Cerclis NO. MND980609085
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PIG'S EYE LAKE SECTION 204

Perfluorochemicals (PFCs) in Pig's Eye Lake

Summary

The Corps is currently studying the feasibility of constructing habitat enhancement features in Pig's Eye Lake using material dredged during maintenance of the main channel of the Mississippi River navigation channel, under the authority of Section 204 of the Corps' Continuing Authorities Program. Due to the proximity of Pig's Eye Lake to a former landfill, potential contamination of the area is being considered during project planning. One group of contaminants known to exist near the proposed project location is Perfluorochemicals (PFCs). This paper summarizes the information available regarding PFCs in Pig's Eye Lake and nearby areas in order to (1) Compare the levels of PFCs in the sediment and water of the project area with local and regional levels, (2) Compare levels of PFCs found in local and regional wildlife, and (3) Use this information to make a determination of whether PFCs should be studied further or remediated prior to implementing a project in Pig's Eye Lake.

Data available included numerous peer-reviewed research articles and several studies published by the Minnesota Pollution Control Agency. All reports indicate that PFCs are widespread throughout Mississippi River Pool 2 and downstream of the Minneapolis-St. Paul metro area, and that they are elevated compared to reference sites upstream of the metro area and lakes throughout Minnesota. Several sites in Pool 2 have been identified as point-source contributors of PFCs, including the former Pig's Eye Landfill located north of the proposed project. PFC concentrations in sediments collected in Pig's Eye Lake are slightly elevated compared to the pool-wide concentrations, but significantly lower than the Pig's Eye Dump site, the area directly below the 3M Cottage Grove Plant, and Lower Pool 2 in general. Water, bird, and fish testing all show similar patterns, with the highest PFC levels in Lower Pool 2. Although PFCs are clearly present in Pig's Eye Lake, studies to date indicate that the contamination levels within the lake itself are much lower than sites where PFCs have been introduced.

Based on the available data as summarized in this review, it is concluded that PFCs are not at levels that should preclude construction of habitat enhancement features within Pig's Eye Lake. Best Management Practices will be developed and implemented during project construction to minimize re-suspension and disturbance of sediments to further minimize risk of impacts. Coordination with local resource agencies will continue, and a monitoring plan may be developed to confirm the absence of effects.

Introduction

Perfluorochemicals (PFCs) are a group of chemical compounds that have been used since the 1950s in the production and manufacture of numerous consumer products, most notably fire-fighting foam, stain protection, and non-stick surfaces (MPCA 2013). PFCs were identified as a pollutant relatively recently in 2001, when scientists reported perfluorooctane sulfonate (PFOS) in wildlife throughout the world (Giesy & Kannan 2001). Since then, a number of studies have reported PFCs found in sediments, soils, surface water, groundwater, fish, birds, bird eggs, and humans. A number of sources have been identified for PFCs, including direct releases from manufacturing facilities, certain waste disposal areas, sites of certain firefighting efforts or training, and wastewater treatment plant effluent. The effects of PFCs on humans and wildlife are under investigation. Studies so far have indicated the potential for these compounds to disrupt endocrine system function and enhance cell membrane permeability for other pollutants. However, guidelines and criteria for assessing the potential impacts of PFC concentrations in the environment have not been fully developed.

Pig's Eye Lake is a 668-acre floodplain depression lake that is connected to the Mississippi River on the downstream side of the lake. Directly to the north of the lake is the site of Pig's Eye Landfill, operated from the mid-1950s until 1972 for the disposal of mixed municipal and commercial waste. Some remediation has been completed at the dump site, but monitoring and further remediation is ongoing. PFCs are one of the contaminants that has been found in soils tested at the dump site as recently as 2016. Additionally, PFCs have been found in sediments tested in Pig's Eye Lake.

The habitat in Pig's Eye Lake is currently of low quality. The lake is uniformly 3-4 feet deep with little bathymetric diversity (USACE 2015). Macroinvertebrate investigations of Pig's Eye Lake have reported low diversity and low abundance, and noted that the species present are groups that are considered to be tolerant to pollution and organic enrichment (Durland, Pattock, & Johnson 2006; Montz 2007). Sediments are easily and frequently re-suspended in the water column due to wind/wave action and rough fish leading to very turbid conditions. The high turbidity and unconsolidated sediments prevent growth of aquatic vegetation. The wind fetch across the lake has led to consistent and significant shoreline erosion on the northwest and southeast sides of the lake for at least the last 70 years (USACE 2016). Despite these challenges, there are some areas of high value to wildlife surrounding Pig's Eye Lake, leading to fairly frequent use of the lake by wildlife. This includes Pig's Eye Heron Rookery Scientific and Natural Area to the south of the lake, which is one of the largest nesting sites for colonial waterbirds within Minnesota and one of four places in the state where yellow-crowned night herons are known to nest. The natural high ground separating the main channel of the Mississippi River from Pig's Eye Lake is a tract of bottomland hardwood forest where eagles, otters, and beaver activity has been observed (Holdhusen 2016). There is a dense patch of aquatic vegetation on the southeast of the lake that consists mainly of river bulrush with a few instances of purple loosestrife (Stiras, *pers comm*, 2016).

The juxtaposition of the low-quality habitat available within Pig's Eye Lake with the relatively abundant wildlife documented nearby suggests that an improvement of habitat within the lake could be of significant value to the local ecosystem. The Corps of Engineers is not authorized to conduct site remediation under the Section 204 authority, and therefore is limited to working within the constraints of the area. Because of the lack of clear guidelines regarding PFC levels, this paper summarizes the data available regarding PFCs and discusses the risks related to habitat enhancement in Pig's Eye Lake.

PFC Levels in the Environment and Wildlife

PFCs have been detected in many locations throughout the world. While there are still many aspects of these contaminants that are unknown, data regarding PFC levels in the environment and in wildlife are available for many locations. At a local level, Minnesota is home to several facilities that have historically manufactured PFCs starting in the late 1950s, and some facilities that still do today. Because of the proximity of the proposed project site to these known PFC sources, some data is available in the immediate project area. Studies examining PFCs in the regional environment have been collected and summarized below to compare PFC levels reported in sediment, water, soil, fish, birds, and humans.

Sediment Data

Sediment sampling results for PFOS and PFOA from Pool 2 were summarized geographically on the map shown on Plate 1. PFC concentrations in sediments collected in Pig's Eye Lake are slightly elevated compared to the poolwide concentrations, but significantly lower than sub-areas that are known to be contaminated with PFCs such as the Pig's Eye Dump site, the area directly below the 3M Cottage Grove Plant, and Lower Pool 2 in general. Data was summarized from the following studies:

Sediment References:

MPCA May 2007 Sampling Data (Sites PE1-PE12, tested for various analytes, including PFOA/PFOS)
MPCA 2013. PFCs in Mississippi River Pool 2: 2012 Update
Bay West 2015. Sediment Investigation Results for Pig's Eye Lake, conducted Oct 2014
Wenck 2016. Sediment Investigation Report: Pig's Eye Lake, St. Paul, Minnesota
USACE 2016. Sediment Investigation of Pig's Eye Lake for Section 204 Project

Wildlife - Birds

Four studies were identified that reported PFC levels in birds in the region. Three of the studies analyzed PFCs in great blue heron eggs, and included samples collected from several locations: from the southern side of Lake Michigan in Indiana, Pig's Eye Lake, and from colonies both upstream and downstream of Pig's Eye Lake on the Mississippi River. Eggs from the Pig's Eye colony were tested multiple years, enabling both spatial and temporal comparisons. The archived eggs from the Pig's Eye Lake colony in 1993 had the highest mean total PFC concentrations, but eggs from the colony in 2010 and 2011 tested significantly lower. The upstream Mississippi River site had the lowest PFC levels. Relatively high variation within the sites was apparent, with exceptionally high PFC concentrations (in excess of 1,000 g/ng wet wt., up to 9,546 g/ng) for individual eggs collected from each of the sites except the Mississippi River upstream site.

The fourth study examined PFC concentrations in the blood-plasma of bald eagle nestlings over six years from locations along the Mississippi River in and around the Twin Cities Metro Area, throughout the St. Croix River watershed, and on Lake Superior. PFCs were detected at the highest concentrations in Navigation Pools 3 & 4, downstream of the 3M Cottage Grove facility located in Lower Pool 2. In general,

high PFC concentrations were widespread throughout the Twin Cities Metro area and downstream on the Mississippi River for approximately 60 miles to Wabasha, Minnesota, and approximately 50 miles upstream on the St. Croix River all the way to Taylor's Falls, Minnesota.

Overall, these studies appear to indicate that PFC concentrations are higher in birds in the Minneapolis-St. Paul metro area. Two studies presented evidence that total PFC levels, including PFOS, may be generally decreasing; however, one study found evidence that some congeners may be increasing. It is unknown at what level PFCs would cause effects to great blue heron eggs, but the authors noted that the PFC concentrations found were generally similar to those reported for other North American fish-eating birds. The majority of eagle nestlings tested, even those within the metro area, had blood-plasma PFC concentrations lower than the toxicity reference value. These findings suggest that birds nesting near Pig's eye would be exposed to similar levels of contaminants compared to those nesting in the surrounding Mississippi or St. Croix Rivers.

Bird References:

Custer et al. 2009. PFCs and PBDE in Great Blue Heron Eggs from Indiana Dunes National Lakeshore, Indiana. *Journal of Great Lakes Research* (35): 401-405.

The authors tested archived great blue heron eggs that were collected at the Indiana Dunes National Lakeshore Park in 1993 for PFCs. The authors reported that PFCs were detected in all of the eggs analyzed. One exceptionally high PFOS concentration of 9,450 ng/g wet weight was reported, but the geometric mean for total PFCs was 279 ng/g wet weight (range 55.7 - 9,546). The authors note that the PFC concentrations reported are similar to those reported from other North American fish-eating birds. The authors also note that concentrations of PFOS were below toxicity thresholds estimated for bobwhite quail and mallards (Newsted et al. 2005), but within toxicity thresholds for white leghorn chickens (Molina et al. 2006), but that since no studies have been conducted to determine the sensitivity of great blue herons to PFOS, it is unknown how these levels may be impacting the birds.

Custer et al. 2010. PFCs and PBDEs in Great Blue Heron Eggs from Three Colonies on the Mississippi River, Minnesota. *Waterbirds* 33(1): 86-95.

The authors tested archived great blue heron eggs that were collected from three colonies on the Mississippi River in 1993 – one colony was located on Pig's Eye Island, one colony was located 140 km upstream from Pig's Eye Lake, and one colony located 114 km downstream. The authors reported that PFCs were detected in all of the eggs analyzed, but concentrations of PFCs in eggs from the Pig's Eye Lake colony were significantly higher than those from the other colonies. The Total PFC concentrations in the eggs from the Pig's Eye colony had a mean 1,015 ng/g wet weight (range 617 - 2,031), while the mean for the upstream colony was 68 ng/g wet wt. (range 43 - 161), and the mean total PFCs for the downstream colony was 153 ng/g wet wt. (range 47 - 1,279).

Custer et al. 2013. PFC Concentrations in Great Blue Heron Eggs Near St. Paul, MN, USA, in 1993 and 2010-2011. *Environmental Toxicology* 32:5, pp 1077-1083.

The authors measured PFC concentrations in great blue heron eggs from the Pig's Eye Lake colony in 2010 and 2011 and compared the results to those obtained from the archived eggs tested in 1993 (Custer et al. 2010). Concentrations of total PFCs and PFOS were significantly lower at Pig's Eye in 2010 and 2011 than 1993. However, several other PFCs that constituted a smaller percentage of the total PFCs increased significantly since 1993. Mean total PFCs were 1,015 (95%CI: 649-1,589) ng/g wet weight in 1993, 340 (95%CI: 204-566) in 2010, and 492 (95%CI: 270-896) in 2011. Two exceptionally high PFOS concentrations were noted: 1,878 ng/g in 1993 and 2,506 ng/g in 2011.

Route et al. 2014. Spatial and Temporal Patterns in Concentrations of PFC Compounds in Bald Eagle Nestlings in Upper Midwestern United States. *Environmental Science & Technology* 48:6653-6660.

The authors of this six-year study found evidence of relatively high PFC concentrations in eagle nestling blood plasma in the Twin Cities Metro Area, with the highest mean concentrations downstream of the 3M Cottage Grove facility in Pools 3 & 4. Similar to other studies, PFOS was the most abundant PFC. The authors note that the PFOS levels found in this study were mostly lower than the toxicity reference value (TRV) developed by Newsted et al. (2005) for level IV fish-eating birds (1700 ng PFOS/mL blood-plasma). However, several individual nestlings in Mississippi National River and Recreation Area (5 of 98 nestlings) and in the Lower St. Croix National Scenic Riverway (2 of 21 nestlings) were higher than the protective TRV.

Water

Two studies were identified that reported PFC levels in water in the region. One study tested levels of thirteen PFC congeners throughout the Upper Mississippi River Basin in 2008 including six sites near the study area, while the other study was focused entirely on Pool 2 and reported only PFOS levels for 2009 and 2012. Similar trends were seen in fewer detections and lesser concentrations of PFCs above Pig's Eye Lake, slightly elevated concentrations below Pig's Eye Lake, and significantly higher (doubled or more) concentrations in Lower Pool 2. Nakayama et al. even reported that one station in upper Pool 3 had the highest PFOA detection in the entire study.

Water References:

Nakayama et al. 2010. Determination of PFCs in Upper Mississippi River Basin. *Environmental Science & Technology* 44: 4103-4109.

This study was designed to improve analytical methods for determining PFC concentrations in surface water. In doing so, the authors organized the collection of 177 samples from 88 sites

throughout the Upper Mississippi River Basin and a portion of the Missouri River Basin by five state and federal agencies. Collection occurred in 2008. Six local sampling sites are of particular interest to the proposed Pig's Eye project and span the Mississippi River from above the confluence with the Minnesota River in Minneapolis to below the confluence of the St. Croix River near Red Wing, Minnesota. PFOS was reported below Pig's Eye Lake at 10.2 ng/L and rose to 29.0 ng/L below Lock and Dam Number 2. Similarly, PFBA was detected at 6.26 ng/L below Pig's Eye Lake and rose to 34.2 ng/L below Lock and Dam No. 2. Another sampling point downstream before the confluence of the St. Croix River reported PFOS and PFBA concentrations similar to those below Lock and Dam No. 2, but also was recorded as the site with the highest PFOA detection in the entire study.

The authors concluded that, "measurements in most samples were comparable to low-level 'background' concentrations reported in previous studies (<10 ng/L)," but also noted that, "samples occasionally had elevated levels," citing concentrations of C4 at 458 ng/L, PFOS at 245 ng/L, and C8 at 125 ng/L. To this end, the authors noted many sampling points with localized increases in PFC concentrations that dissipated shortly downstream, suggesting point-source inputs. The authors identified wastewater treatment plants, chemical manufacturing plants, and historical firefighting activity as known point sources, and speculated surface water runoff from cities and farm fields and groundwater input from agricultural areas as potential sources.

MPCA 2013. PFCs in Mississippi River Pool 2: 2012 Update

As part of a long-term plan for monitoring PFCs in Mississippi River Pool 2, the MPCA conducted water sampling and testing for PFOS in 2009 and 2012. *(Because the results from the two years are compared in this most recent report, the 2009 report is not separately summarized.)* Twelve sampling stations were spread throughout Pool 2. In both years, PFOS was below the detection limit of approximately 5 ng/L in all five stations upstream of Pig's Eye Lake. PFOS was at detectable levels in 2009 at the three stations downstream of Pig's Eye Lake at average concentrations of 7.7, 10.3, and 8.5 ng/L, but not detectable in 2012. Stations 11 and 12 are located downstream of the 3M Cottage Grove Center and the East Cove and showed significant increases from 90.1 ng/L to 149 ng/L at Station 11 and from 15.2 ng/L to 24.4 ng/L at Station 12.

Fish and Aquatic Biota

Three studies examining PFCs in fish were reviewed. All three studies sampled fish within Pool 2, and all three reported that fish in Lower Pool 2 had the highest PFC concentrations found. Ye et al. examined common carp in particular, and noted that because common carp are known to generally stay within a smaller home range, the 27km distance between Pig's Eye Lake and Lower Pool 2 is likely to limit the movement of carp between these areas, and therefore, the differences in PFC concentrations between the two areas may be a good indicator of significantly different levels of PFC inputs to the system. Delinsky et al. also reported PFC concentrations in fish from 59 lakes in Minnesota, most of which were significantly lower than those reported in fish from the Mississippi River. The MPCA report compared

PFC concentrations from 2004-2012 and noted that annual median PFOS concentrations in Lower Pool 2 have declined over time, especially in the most recent two years.

Fish and Aquatic Biota References:

Ye, X., H. L. Schoenfuss, N. D. Jahns, A. D. Delinsky, M. J. Strynar, J. V. Varns, S. F. Nakayama, L. Helfant, and A. B. Lindstrom. (2008). Perfluorinated compounds in Common Carp (*Cyprinus carpio*) filets from the Upper Mississippi River. *Environment International* 34: 932-938.

The authors measured PFCs in 30 common carp filets collected from three sites on the UMR including one reference site upstream of the Twin Cities Metro area in St. Cloud, Minnesota, one site in Pig's Eye Lake, and one site in Spring Lake in Lower Pool 2. Median PFOS concentrations increased from 8.1 ng/g wet wt. at the St. Cloud site to 26 ng/g wet wt. at the Pig's Eye Lake site, and to 40 ng/g wet wt. at the Lower Pool 2 site. PFDoA, PFUnA, and PFDA also all showed significant increases as compared to the St. Cloud site. The authors note that although the Lower Pool 2 site and the Pig's Eye Lake site are longitudinally connected by being within the same navigational pool, a 2006 study of carp movement reported that over an observation period of 5 years, less than 20% of tagged common carp moved more than 5 km from their original capture site (Stuart and Jones). Consequently, the 27 km distance between the Pig's Eye Lake site and the downstream Lower Pool 2 site may be enough distance to limit the majority of common carp interchange, and therefore, the differences in PFC concentrations between the two sites may be a good indicator of significantly different levels of PFC inputs to the system in each area.

Delinsky et al. 2010. Geographical Distribution of PFCs in Fish from Minnesota Lakes and Rivers. *Environmental Science & Technology*. (44) 2549-2554.

The authors tested fish collected from 59 lakes throughout Minnesota, and from several areas of the Mississippi River. Species tested were limited to bluegill, black crappie, and pumpkinseed. On the Mississippi River, fish collected from Lower Pool 2 had the highest PFOS concentrations in the study – 144 ng/g in pumpkinseed and 2,000 ng/g in bluegill. (The authors noted that another previous study had also reported higher PFC concentrations in bluegill than in pumpkinseed). All other samples on the Mississippi River were at least 110 miles upstream of Lower Pool 2, and contained significantly lower PFOS concentrations, ranging from 3.06 to 20 ng/g. The majority of lakes tested had significantly lower levels with PFOS concentrations less than 3 ng/g in 88% of lakes sampled. Only two lakes had PFOS concentrations above 40 ng/g.

MPCA 2013. PFCs in Mississippi River Pool 2: 2012 Update

As part of a long-term plan for monitoring PFCs in Mississippi River Pool 2, the MPCA collected and analyzed PFOS data from fish collected from 2004-2012 and from benthic invertebrates in 2012. For fish, bluegill sunfish, common carp, freshwater drum, smallmouth bass, and white bass were targeted. The median PFOS concentrations for each species throughout the pool ranged from 24 ng/g wet wt. in carp to 60 ng/g wet wt. in white bass. The highest PFOS concentration, 6,160 ng/g,

was detected in a carp collected in Lower Pool 2 in 2012. The annual median PFOS concentrations in Lower Pool 2 have declined over time, especially in the most recent two years. Sampling in 2009 and 2012 was conducted throughout Pool 2, and was therefore compared by section and species. There was a decline in PFOS concentrations in all areas of the pool. Fish collected in Lower Pool 2 had higher PFOS concentrations than fish collected in all other areas of the pool for all species in both years.

PFOS concentrations in benthic Invertebrates were positively correlated with PFOS concentrations in sediments. PFOS concentrations ranged from 1.7 ng/g wet wt. to 684 ng/g wet wt., with a median of 11.9 ng/g wet wt. Only two samples had PFOS concentrations greater than 50 ng/g wet wt., and these were both collected immediately downstream of the 3M Cottage Grove Center in Lower Pool 2.

Conclusions and Recommendations

PFCs are clearly ubiquitous within our environment today, and a number of studies have reported levels of PFCs in the Upper Mississippi River. Most studies show increased levels of PFCs in the Twin Cities Metro Area and directly downstream. However, the most significantly elevated levels of PFCs appear to be in Lower Pool 2, approximately 27km downstream of the project area. PFC levels also remain high in sediments at the Pig's Eye Landfill to the north of the project area; however, levels in the lake itself do not appear to be significantly elevated compared to the general region. Levels of most PFC congeners appear to be declining in water, fish, and birds, based on studies that have repeated samples over time.

Because data is limited and PFCs are a relatively new pollutant of concern, new studies should be reviewed as they become available and any conclusions drawn from them incorporated into project planning or adaptive management strategies as applicable. Based on a review of Route et al. (2014a) and personal communications with the corresponding author, it may be prudent to conduct monitoring of eagle nestling blood-plasma PFC levels as a method to see if project construction releases PFCs into the aquatic food web.

Based on the available data as summarized in this review, it is concluded that PFCs are not at levels that should preclude construction of habitat enhancement features within Pig's Eye Lake. Best Management Practices will be developed and implemented during project construction to minimize re-suspension and disturbance of sediments to further minimize risk of impacts. Coordination with local resource agencies will continue, and a monitoring plan may be developed to confirm the absence of effects.

Additional Sources Reviewed

The following sources were identified during the literature search as related to PFCs but were not summarized in this paper because of limited applicability (subject matter, location, etc.) or duplicative content.

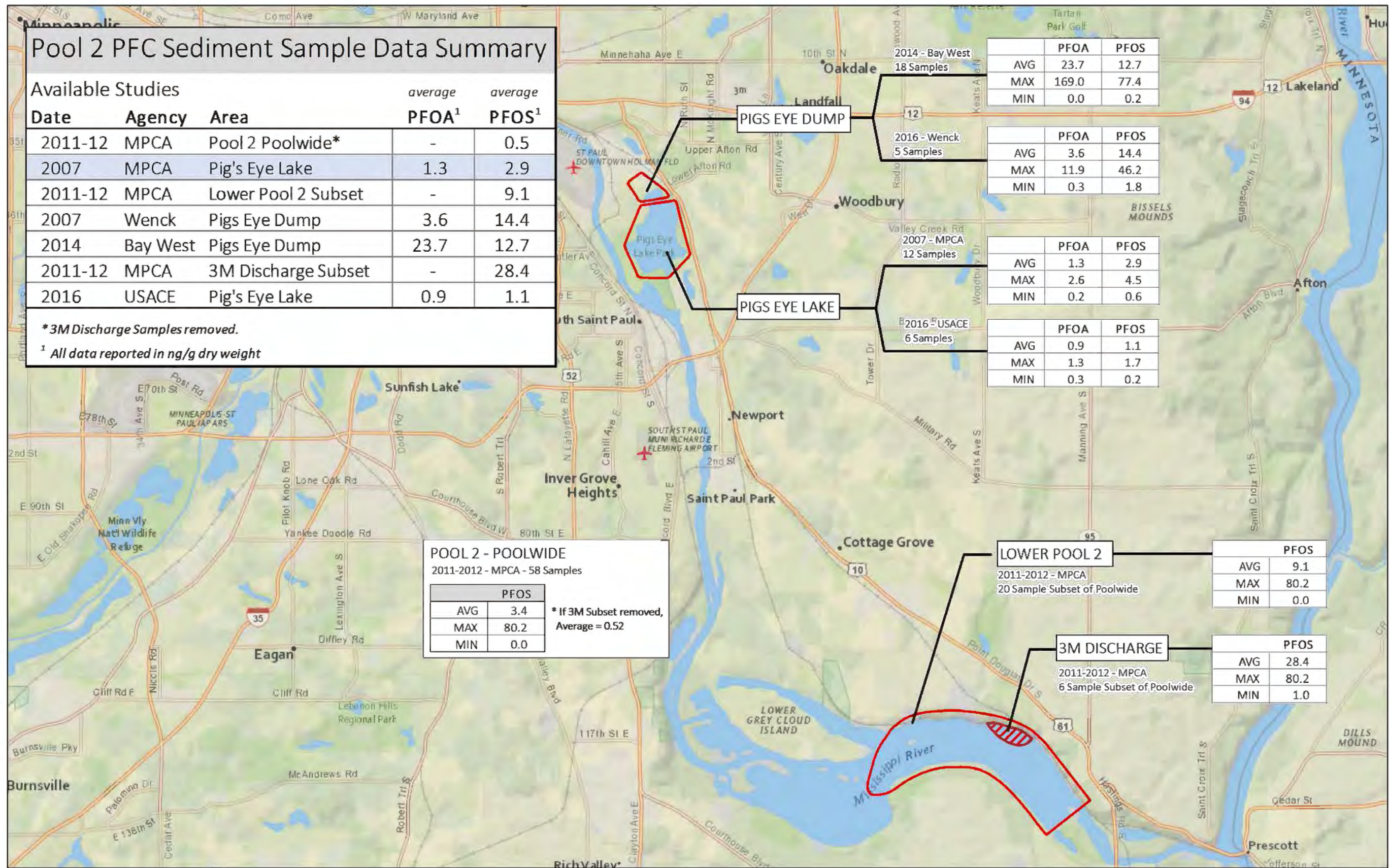
Gebbink, W.A., C. E. Hebert, and R. J. Letcher. 2009. Perfluorinated Carboxylates and Sulfonates and Precursor Compounds in Herring Gull Eggs from Colonies Spanning the Laurentian Great Lakes of North America. *Environmental Science & Technology* 2009 43 (19), 7443-7449.

Houde et al. 2011. Monitoring of PFCs in Aquatic Biota: An Updated Review. *Environmental Science & Technology* (45)7962-7973.

Nakata et al. 2006. PFCs in Sediments and Aquatic Organisms Collected from Shallow Water and Tidal Flat Areas of the Ariake Sea, Japan: Environmental Fate of PFOS on Aquatic Ecosystems. *Environmental Science & Technology* (40): 4916-4921.

Pan et al. 2011. Pilot Investigation of PFCs in River Water, Sediment, Soil, and Fish in Tianjin, China. *Bull. Environmental Contaminant Toxicology* (87):152-157.

Route, et al. 2011. Spatial patterns of persistent contaminants in bald eagle nestlings at three national parks in the upper Midwest: 2006-2009. Natural Resource Technical Report NPS/GLKN/NRTR---2011/431/ National Park Service, Fort Collins, Colorado.



USACE Pool 2 Sediment Samples Collected from Historical Dredge Cuts (top ~10 cm) before 2009	Record #											37	39	407				39	40	417	408	41	418				411	47	48	1C	1T									
	River Mile											840.71	840.7	840.5	840.5	840.5	840.4	840.32	840.2	840	839.7	839.6	839.6	839.6	837.8	837.52	837.51	837.5	837.5											
	Location											AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	SMITH AVE BRIDGE 2	SMITH AVE BRIDGE 1	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	AB&BW SMITH AVE BR	ST. PAUL SMBOAT HRBR	ST. PAUL SMBOAT HRBR	ST. PAUL SMBOAT HRBR	ST. PAUL SMBOAT HRBR	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.	ST. PAUL BARGE TERM.											
	Year											1978	1978	1989	1994	1994	1975	1974	1989	1989	1981	1989	2002	2008	1989	1975	1975	1975	1992	1992										
	System											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1									
	Habitat Type											1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1									
Pool											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2										
Sam. Gear											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1										
Sam. Depth											10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	62-213	0-61										
Lab											COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE	COE										
Data Cit.																																								
CHCS	ug/kg	a-BHC				680				3500																														
	ug/kg	b-BHC				2500				13000																														
	ug/kg	BHC				1100				5900																														
	ug/kg	g-BHC (lindane)	2.4		5	4300				23000																														
	ug/kg	Heptachlor				1600				7700																														
	ug/kg	Aldrin				450				2400																														
	ug/kg	Heptachlorepoxi	2.5		16	280				4100																														
	ug/kg	Endosulfan I				13000				13000																														
	ug/kg	Dieldrin	1.9		62	110				1500																														
	ug/kg	4,4'-DDE	3.2		31	22000				28000																														
	ug/kg	Endrin	2.2		210	4000				54000																														
	ug/kg	Endosulfan II																																						
	ug/kg	4,4'-DDD	4.9		28	19000				100000																														
	ug/kg	Endrinoldehyde																																						
	ug/kg	Sulfan sulfate	4.2		63	7300				86000																														
	ug/kg	4,4'-DDT																																						
ug/kg	Methoxychlor																																							
ug/kg	Endrinolone																																							
ug/kg	Chlordane	3.2		18	9500				11000																															
ug/kg	Oxychlordane																																							
ug/kg	Toxaphene	0.1		32	4000				22000																															
METALS	mg/kg	Ag (silver)				77			1200																															
	mg/kg	Al (aluminum)																																						
	mg/kg	As (arsenic)	9.8		33	9			9	46000																														
	mg/kg	B (boron)				3100			3000	35000																														
	mg/kg	Ba (barium)				3000			35000																															
	mg/kg	Be (beryllium)				31			380																															
	mg/kg	Cd (cadmium)	0.99		5	1.6			23																															
	mg/kg	Cr (chromium) III	43		110	23000			100000																															
	mg/kg	Cu (copper)	32		150	2200			33000																															
	mg/kg	Fe (iron)				100000			100000																															
	mg/kg	Hg (mercury)	0.18		1.1	3.1			3.1																															

USACE Pool 2 Sediment Samples Collected from Historical Dredge Cuts (top ~10 cm) before 2009	Record #											1188	1187	1183	1179	1192	1201	1196	1200	1212	1213	1213	1205	1209	1221	1226	1225	1217	64	65	
	River Mile											827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	826.8	826.4	
	Location											Grey Cloud - mean	Grey Cloud - west	Grey Cloud - mid	Grey Cloud - east	Grey Cloud - east	Grey Cloud - mean	Grey Cloud - mid	Grey Cloud - west	Grey Cloud - west	Grey Cloud - mean-du	Grey Cloud - mean	Grey Cloud - east	Grey Cloud - mid	Grey Cloud - west	Grey Cloud - mean	Grey Cloud - west	Grey Cloud - east	ROBINSO NS ROCKS	ROBINSO NS ROCKS	
	Year											1982	1982	1982	1982	1983	1983	1983	1983	1984	1984	1984	1984	1984	1985	1985	1985	1985	1985	1982	1982
	System											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Habitat Type											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Pool											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Sam. Gear											3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1
	Sam. Depth Lab											10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Data Cit.											MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	COE	COE
CHCS	ug/kg	a-BHC			680	3500	< 5				< 5	< 0.53	< 5	< 5	< 0.32	3.5	3	4.9	< 0.32	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26			
	ug/kg	b-BHC			2500	13000	< 10				< 10	< 1.1	< 10	< 10	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53	< 0.53				
	ug/kg	BHC			1100	5900																									
	ug/kg	g-BHC (lindane)	2.4	5	4300	23000	8				< 7	< 0.53	< 7	< 7	< 0.32	< 0.32	< 0.32	< 0.32	1.2	< 0.32	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26			
	ug/kg	Heptachlor			1600	7700	9				< 5	< 0.53	< 5	< 5	< 0.32	< 0.32	< 0.32	< 0.32	< 0.32	< 0.32	< 0.32	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26			
	ug/kg	Aldrin			450	2400																									
	ug/kg	Heptachloroposid	2.5	16	280	4100																									
	ug/kg	Endosulfan I			13000	13000																									
	ug/kg	Dieldrin	1.9	62	110	1500	< 20				< 20	< 1.6	< 20	< 20	< 0.96	< 0.96	< 0.96	< 0.96	< 0.96	< 0.96	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.1	< 0.1	
	ug/kg	4,4'-DDE	3.2	31	22000	28000	< 7				< 7	< 1.6	< 7	< 7	< 0.96	< 0.96	< 0.96	< 0.96	< 0.96	< 0.96	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.79	< 0.1	< 0.1	
	ug/kg	Endrin	2.2	210	4000	54000	< 10				< 10	< 2.1	< 10	< 10	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 0.1	< 0.1	
	ug/kg	Endosulfan II																													
	ug/kg	4,4'-DDD	4.9	28	19000	100000	< 14				< 14	< 3.2	< 14	< 14	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 0.1	< 0.1	
	ug/kg	Endrinaldehyde																													
	ug/kg	Sulfan sulfate																													
ug/kg	4,4'-DDT	4.2	63	7300	86000	< 20				< 20	< 4.2	< 20	< 20	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 0.1	< 0.1		
ug/kg	Methoxyxycho																														
ug/kg	Endrinketone																														
ug/kg	Chlordane	3.2	18	9500	11000	< 2				< 2	< 11	< 2	< 2	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 6.4	< 5.3	< 5.3	< 5.3	< 5.3	< 5.3	< 5.3	< 1	< 1			
ug/kg	Oxychlordane																														
ug/kg	Toxaphene	0.1	32	4000	22000																										
METALS	mg/kg	Ag (silver)			77	1200				0.28	0.06	0.124	0.144		0.041	0.042	0.136				0.024	0.026	0.011		1.139	0.02					
	mg/kg	Al (aluminum)																													
	mg/kg	As (arsenic)	9.8	33	9	9				3.3	1.71	2.13	2.09		1.15	2.16	1.65				2.9	1.48	1.66		6.34	3.25	1.5	1.3			
	mg/kg	B (boron)			3100	46000																									
	mg/kg	Ba (barium)			3000	35000																									
	mg/kg	Be (beryllium)			30	380																									
	mg/kg	Cd (cadmium)	0.99	5	16	23				0.36	0.119	0.233	0.137		0.107	0.149	0.158				0.159	0.102	0.091		0.235	0.167					
	mg/kg	Cr (chromium) III	43	110	23000	100000				0.341	0.123	0.38	0.202		0.309	0.47	0.355				0.141	0.126	0.052		46.39	0.112	< 0.2	< 0.2			
	mg/kg	Cu (copper)	32	150	2200	33000				19	14.8	18.8	33.5		17.3	38.7	10.8				13.1	7.4	7.5		41.8	14.5	6	6			
	mg/kg	Fe (iron)			100000	100000				10.4	4.3	7.4	6.2		6.2	12.3	5.4				4.3	2.8	1.9		23.4	4.9	3	3			
	mg/kg	Hg (mercury)	0.18	1.1	3.1	3.1				0.08	0.05	0.06	0.05		0.05	0.05	0.06				0.05	0.07	0.05		0.12	0.05		5600	4700		
	mg/kg	Mg (magnesium)																											0.028	0.05	
	mg/kg	Mn (manganese)			2100	21000				539	415.8	923.8						257.9			2090.7	275.8	196.8		478.2	2227.8					
	mg/kg	Mo (molybdenum)																													
	mg/kg	Ni (nickel)	23	49	170	2600																									
mg/kg	Ni (nickel)			300	700				11.5	9.8	13.2	15.8		11.7	16	6.6				9.7	6.7	5.7		13.7	9.5	8	7				
mg/kg	Pb (lead)			6.2	93				10.6	2.2	4.2	4.2		3	11.9	4.8				2.7	2.5	2.2		25.2	3.2	4	4				
mg/kg	Sb (antimony)			77	1200																										
mg/kg	Se (selenium)			4600	70000				0.08	0.05	0.07	0.05		0.05	0.16	0.12				0.12	0.12	0.12		0.12	0.13						
mg/kg	Sn (tin)			9300	100000																										
mg/kg	Sr (strontium)			40000	28000																										
mg/kg	Ti (titanium)			4600	7000				0.7	0.6	0.6	0.6		0.6	0.7	0.6				0.6	0.6	1.9		3.3	5.4						
mg/kg	Zn (zinc)								44.4	19	28.9	27.1		19.3	44.7	23.6				18.5	16.1	11.6		61.6	18.5	15	16				
mg/kg	V (vanadium)																														
PCBS	ug/kg	Aroclor-1008					80						< 20	32	9.8	13	< 3.2	< 3.2	< 3.2	< 3.2	18	30.6	27.9	387	23.1						
	ug/kg	Aroclor-1221																													
	ug/kg	Aroclor-1232																													
	ug/kg	Aroclor-1242																													
	ug/kg	Aroclor-1248																													
	ug/kg	Aroclor-1254																													
	ug/kg	Aroclor-1260																													
ug/kg	Total PCB's	60	680		810	10000	< 20					9.8	8.5	< 20	< 20	12	19		18	12	11	< 5.3	< 5.3	9.3	< 5.3						
PAR T I C L E S I Z E % F I N E R	S I L T S A N D	3 in																													
	C L A Y f i n e m e d i u m c o a r s e	1 1/2																													
		3/4																													
		3/8																													
		4																			</										

USACE Pool 2 Sediment Collected from Historical Dredge Cuts (top ~10 cm) before 2009	Record #					77	78	1359		1229	1233	1236	1272	1298	1291	1254	1310	1316	1326	1324	1338	1330	1334			
	River Mile					819.7	819.1	818.7	818.6	818.5	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0	816.0			
	Location					BOUL BEND LOW LIGHT	BOUL BEND LOW LIGHT	BONLAN GER #2	Boul Bend Low Light 1	BOULAN GER #1	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 west	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mid	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 mean	Ab. L/D 2 east	Ab. L/D 2 mid			
	Year					1981	1981	2008	1994	2008	1981	1981	1981	1982	1982	1982	1982	1982	1983	1983	1983	1984	1984	1984		
	System					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Habitat Type					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Pool					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
Sam. Gear					1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
Sam. Depth					10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10			
Lab					STAT				STAT																	
Data Cit.					COE	COE	COE	COE	COE	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC			
CHC S	ug/kg	a-BHC			680	3500			<2.3	< 0.43	<2.4				< 5			2.4	2,000	9.70	12,000	13		1,600		
	ug/kg	b-BHC			2500	13000			<2.3	1.6	<2.4				< 10			< 1.1	< 1.1	< 1.1	< 1.1	< 0.64		< 0.64		
	ug/kg	BHC			1100	5900			<2.3	< 0.43	<2.4							< 1.1	< 1.1	< 1.1	< 1.1	< 0.64		< 0.64		
	ug/kg	g-BHC (lindane)	2.4	5	4300	23000			<2.3	< 0.43	<2.4				11			< 0.53	< 0.53	< 0.53	< 0.53	4.1		< 0.32		
	ug/kg	Heptachlor			1600	7700			<2.3	< 0.43	<2.4				5			< 0.53	< 0.53	< 0.53	< 0.53	< 0.32		< 0.32		
	ug/kg	Aldrin			450	2400			<2.3		<2.4															
	ug/kg	Heptachlor epoxid	2.5	16	280	4100			<2.3		<2.4															
	ug/kg	Endosulfan I			13000	13000			<2.3		<2.4															
	ug/kg	Dieldrin	1.9	62	110	1500			<2.3	< 0.94	<2.4				< 20			< 1.6	< 1.6	< 1.6	< 1.6	< 0.96		< 0.96		
	ug/kg	4,4'-DDE	3.2	31	22000	28000			< 0.1	2.4	<2.3	< 0.48	<2.4		< 7			< 1.6	< 1.6	< 1.6	< 1.6	< 0.96		< 0.96		
	ug/kg	Endrin	2.2	210	4000	54000			< 0.1	< 0.1	<2.3	< 0.48	<2.4		< 10			< 2.1	< 2.1	< 2.1	< 2.1	< 1.3		< 1.3		
	ug/kg	Endosulfan II							<2.3		<2.4															
	ug/kg	4,4'-DDD	4.9	28	19000	100000			7	6.30	<2.3	< 0.48	<2.4		< 14			< 3.2	< 3.2	< 3.2	< 3.2	< 1.9		< 1.9		
	ug/kg	Endrin aldehyde							<2.3		<2.4															
	ug/kg	Sulfan sulfate																								
	ug/kg	4,4'-DDT	4.2	63	7300	86000			0.8	9.70	<2.3	< 0.48	<2.4		< 20			< 4.2	< 4.2	< 4.2	< 4.2	< 2.5		< 2.5		
	ug/kg	Methoxychlor							<2.3		<2.4															
	ug/kg	Endrin ketone							<2.3		<2.4															
	ug/kg	Chlordane	3.2	18	9500	11000			11	7.00	<47	< 0.43	<49		< 2			< 11	< 11	< 11	< 11	< 6.4		< 6.4		
	ug/kg	Oxychlordane																								
ug/kg	Toxaphene	0.1	32	4000	22000			<47		<49																
METALS	mg/kg	Ag (silver)			77	1200					1.1	1.08	0.69	0.67		0.54	1.07	0.592	0.4885		0.1515		1.374	0.395		
	mg/kg	Al (aluminum)																								
	mg/kg	As (arsenic)	9.8	33	9	9	29	21	3.1	4.7	3.7	6.3	6.14	5.68	5.2		7	15	6.2	7.6		7.4		5.06	2.99	
	mg/kg	B (boron)			3100	46000																				
	mg/kg	Ba (barium)			3000	35000	100	80																		
	mg/kg	Be (beryllium)			31	380						0.641	0.54	0.529	0.43		0.5	0.77	0.281	0.2755		0.298		0.642	0.36	
	mg/kg	Cd (cadmium)	0.99	5	1.6	23	8	4	<0.66	0.93	<0.69	3.159	2.93	2.61	1.4		1	2.23	1.075	0.683		0.4895		3.101	0.875	
	mg/kg	Cr (chromium) III	43	110	23000	100000			30	10	26.2	14	63.6	62.6	58.2	33.8		36.4	58.5	62.4	80.7		92.6		49.2	22.6
	mg/kg	Cu (copper)	32	150	2200	33000	38	18	8.5	21.5	11	33.8	31.5	28.3	17.2		18.8	31.3	17.7	16.5		13.15		26.1	13.4	
	mg/kg	Fe (iron)			100000	71000			13000	7100																
	mg/kg	Hg (mercury)	0.18	1.1	3.1	3.1	< 0.001	< 0.01	<0.033	0.14	0.037	0.25	0.19	0.2	0.15		0.14	0.22	0.05	0.1		0.05		0.05	0.1	
	mg/kg	Mg (magnesium)																								
	mg/kg	Mn (manganese)			2100	21000	1400	700	530	1210	740					698		906	1305				932.6	649.9		
	mg/kg	Mo (molybdenum)																								
	mg/kg	Ni (nickel)	23	49	170	2600	30	30	11	21.3	15	29.2	25.6	28.3	18.3		19.2	28.9	21.4	24.55		25.4		24.3	15.5	
	mg/kg	Pb (lead)			300	700	30	30	7.6	16.5	11	40	37.7	33.5	19.4		18	32.7	18.2	16.85		10.2		32.3	14.2	
	mg/kg	Sb (antimony)			6.2	93																				
	mg/kg	Se (selenium)			77	1200																				
	mg/kg	Sn (tin)			4600	70000						0.22	0.21	0.2	0.06		0.07	0.1	0.05	0.06		0.07		0.12	0.12	
	mg/kg	Sr (strontium)			9300	100000																				
mg/kg	Ti (titanium)			40000	28000											0.8	0.8	0.9	0.3	0.7		0.6		0.6		
mg/kg	Zn (zinc)			4600	70000	130	62	39	82.8	53	152.7	128	113.4	70.6		75.9	153.4	84	70.95		53.55		123.5	57.6		
mg/kg	V (vanadium)																									
PCBS	ug/kg	Aroclor-1008						<110	< 8.6	<120					60			24	40.00	146	195.00	214		25		
	ug/kg	Aroclor-1221							< 8.6																	
	ug/kg	Aroclor-1232							< 8.6																	
	ug/kg	Aroclor-1242							< 8.6																	
	ug/kg	Aroclor-1248						<110	< 8.6	<120																
	ug/kg	Aroclor-1254						<110	16	<120					1100			5.7	16	24	44	52		7.8		
	ug/kg	Aroclor-1260						<110	< 8.6	<120					< 20			< 5.3	6.1	10		21	27	< 3.2		
PAR T I C L E S I Z E % F I N E R	S I L T S A N D c o a r s e	Total PCBs	60	680	810	10000	68	170																		
		3 in																								
		1 1/2																								
		3/4																								
		3/8																								
		4																								
		8																								
		10																								
		16																								
		18																								
		20																								
		30																								

USACE Pool 2 Sediment Samples Collected from Historical Dredge Cuts (top ~10 cm) before 2009	Record #											1337	1130	1357	1357	1356	1352	1342		496	79	80	81	495
	River Mile											816.0	816.0	816.0	816.0	816.0	816.0	816.0	815.8	815.7	815.5	815.4	815.4	
	Location											Ab. L/D 2 west	Ab. L/D 2 east	Ab. L/D 2 mean-dup	Ab. L/D 2 mean	Ab. L/D 2 west	Ab. L/D 2 mid	Ab. L/D 2 east	ABOVE L/D 2	ABOVE L/D 2	ABOVE L/D 2	ABOVE L/D 2	ABOVE L/D 2	ABOVE L/D 2
	Year											1984	1984	1985	1985	1985	1985	1985	2008	1989	1982	1982	1974	1989
	System											1	1	1	1	1	1	1	1	1	1	1	1	1
	Habitat Type											1	1	1	1	1	1	1	1	1	1	1	1	1
	Pool											2	2	2	2	2	2	2	2	2	2	2	2	2
	Station/Gear											3	3	3	3	3	3	3	3	3	3	3	3	3
	Sam. Depth											10	10	10	10	10	10	10	10	10	10	10	10	10
	Lab											MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	MWCC	STAT	COE	COE	COE	COE	COE
Data Cit.											1.2	12.000	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 3.4	< 0.08				< 0.08
CHCS	ug/kg	a-BHC			680	3500																		
	ug/kg	b-BHC			2500	13000																		
	ug/kg	BHC			1100	5900																		
	ug/kg	g-BHC (lindane)	2.4	5	4300	23000																		
	ug/kg	Heptachlor			1600	7700																		
	ug/kg	Aldrin			460	2400																		
	ug/kg	Heptachlor epoxid	2.5	16	280	4100																		
	ug/kg	Endosulfan I			13000																			
	ug/kg	Dieldrin	1.9	62	110	1500																		
	ug/kg	4,4'-DBDE	3.2	31	22000	28000																		
	ug/kg	Endrin	2.2	210	4000	54000																		
	ug/kg	Endosulfan II																						
	ug/kg	4,4'-DDD	4.9	28	19000	100000																		
	ug/kg	Endrin aldehyde																						
ug/kg	Sulfan sulfate																							
ug/kg	4,4'-DDT	4.2	63	7300	86000																			
ug/kg	Methoxychlor																							
ug/kg	Endrin ketone																							
ug/kg	Chlordane	3.2	18	9500	11000																			
ug/kg	Oxychlordane																							
ug/kg	Toxaphene	0.1	32	4000	22000																			
METALS	mg/kg	Ag (silver)			77	1200					0.085				0.297	0.394	1.1							
	mg/kg	Al (aluminum)																						
	mg/kg	As (arsenic)	9.8	33	9	9									6.79	9.92	8.53	5.7	< 1.18	2.8	2.7	1	2.9	
	mg/kg	B (boron)			3100	46000																		
	mg/kg	Ba (barium)			3000	35000																		
	mg/kg	Beryllium			31	380																		
	mg/kg	Cd (cadmium)	0.99	5	1.6	23									0.538	0.48	0.444	0.432	<1.1	< 1.3	0.77	1.2	1.3	< 1.33
	mg/kg	Cr (chromium) III	43	110	23000	100000									0.252	1.244	1.242	1.198						
	mg/kg	Cu (copper)	32	150	2200	33000									31.4	27.3	27.2	27.2	21	12.1	10	12	39	14.6
	mg/kg	Fe (iron)			100000	100000									11.6	15	15.6	18.5	20	5.64	10	13	10	5.4
	mg/kg	Hg (mercury)	0.18	1.1	3.1	3.1									0.05	0.1	0.09	0.24	0.061	< 0.01	0.038	0.02	0.7	< 0.01
	mg/kg	Mg (magnesium)																						
	mg/kg	Mn (manganese)			2100	21000									1052.2	711.7	721.4	693.7	1300	1860				674
	mg/kg	Mo (molybdenum)																						
	mg/kg	Ni (nickel)	23	49	170	2600									22.2									
	mg/kg	Pb (lead)			300	700									8.7	14.8	14.9	23.6	16	4.73	13	18	< 13	5.3
	mg/kg	Sb (antimony)			6.2	93										14	14.2	13.5						
	mg/kg	Se (selenium)			77	1200									0.12	0.13	0.12	0.13		< 0.99				< 1.01
	mg/kg	Sn (tin)			4600	70000																		
mg/kg	Sr (strontium)			9300	100000																			
mg/kg	Ti (titanium)			40000	28000									0.6	5.4	5.4	5.2							
mg/kg	Zn (zinc)			4600	70000									48.9	60.4	62.1	77.3	83	37	46	54	44	43.5	
mg/kg	V (vanadium)																							
PCBS	ug/kg	Aroclor-1006									41	176.00	424	387	171	95	485	<170	< 1.68					< 1.63
	ug/kg	Aroclor-1221																< 1.68						< 1.63
	ug/kg	Aroclor-1232																< 1.68						< 1.63
	ug/kg	Aroclor-1242																< 1.68						< 1.63
	ug/kg	Aroclor-1248																<170	< 1.68					< 1.63
	ug/kg	Aroclor-1254																<170	< 3.5					< 3.4
ug/kg	Aroclor-1260										20	26	< 5.3	< 5.3	< 5.3	< 5.3	< 5.3	<170	< 3.5				< 3.4	
ug/kg	Total PCB's	60	680	810	10000						10	13	7.7	7.2	27.2	31	29.4	<170	< 3.5		0	1460	0	< 3.4
PARTICLE SIZE % FINER	SILT CLAY	3 in																						
	SAND	1 1/2																						
	CLAY	3/4																						
		4																						
		8																						
		10																						
		16																						
		18																						
		20																						
		30																						
		40																						
		50																						
		60																						
		70																						
		80																						
		100																						
		140																						
		170																						
		200																						
		230																						
	270																							
	0.20 mm																							
	0.05 mm																							
MISC	%	Total Organic Carb																120000	1.32					1.23
	mg/kg	Chem Oxy Demand																						
	mg/kg	Kjedahl Nitrogen																1770		19200	35600	14184		
	mg/kg	Total Phosph																85		1100	1200	288		
	mg/kg	Oil and Grease																			1400	980		
	mg/kg	Cyanide, Tota																	<0.55	< 0.68				< 0.71
	mg/l	Ammonia																	85.0	12				9.8
%	Ammonia/Eutriate																							
%	Moisture																	54.8	27				29.9	
%	Total Solids																	45.2	73				70.1	
%	Volatile Solids																	<0.01	2.8					3.9



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Appendix F: Geology & Geotechnical Engineering Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

Appendix F: Geology and Geotechnical Engineering

F.1 Introduction

The Pigs Eye Lake Section 204 project proposes using dredge material in order to improve and create aquatic and terrestrial habitat within the lake. The project includes placement of dredge cut material in shaped bands within the lake in order to create islands with a maximum height of around 3 ft above normal pool (6 ft total height).

The geological and geotechnical evaluation of the site focused on characterizing the subsurface materials for susceptibility to lateral and vertical deformation. Recommendations were developed for island geometry (height, slope) as well as construction techniques that could help mitigate undesirable deformation.

F.2 Regional Geology

Pigs Eye Lake is located within a historic river channel cut into Paleozoic sedimentary rock formations during the Pleistocene glacial period 40,000 to 10,000 years ago. The valley was subsequently filled with glacial sediment. The current Mississippi River channel adjacent to Pigs Eye Lake was cut during the draining of Glacial Lake Agassiz via Glacial River Warren 11,700 and 9,400 years ago. During glacial waning periods large amounts of sediments deposited by Mississippi tributaries acted as natural dams, creating a series of lakes upstream and likely leading to the deposition of glacio-lacustrine clays on the western portion of Pigs Eye Lake. Since glacial time the Mississippi River has been a braided stream affecting Pigs Eye Lake only in times of flood.

The construction of the locks and dams upstream and downstream along the Mississippi is not believed to have had a significant effect on the sedimentation patterns of Pigs Eye Lake, which was already a backwater area. On the other hand, development to the north and west of the lake likely did have an impact on sedimentation. Development immediately upstream of the lake, including the adjacent waste water treatment plant, resulted in the abandonment of an upstream channel connecting the lake to the main channel. Additionally, as a result of the rail yard development north of Pigs Eye Lake, Battle Creek channel was re-routed and its flow conditions were likely altered. By further isolating the lake from the main channel, these changes likely resulted in an increased rate of fine particle sedimentation within the lake.

Without construction of a project within Pigs Eye Lake, little change in the lake geomorphology is anticipated during the next 50 years. Continued deposition of fine-grained materials will occur along with occasional flooding that washes some sediments downstream.

F.3 Subsurface Exploration

Four soil borings (15-1M, 15-2M, 15-3M, and 15-4M) were performed during late October 2015 by USACE personnel. The boring locations (Figure 1) were selected in order to characterize conditions throughout the lake, and generally corresponded with the locations of conceptual project features. Additional borings (16-5M through 16-14M) were performed in July 2016 for the purposes of obtaining environmental samples and some bag samples for index testing.



Figure 1 Boring Locations at Pigs Eye Lake (replace with updated map)

Soil borings (Figure 2 through Figure 5) generally indicated very soft soils for a depth between 10 ft and 22 ft below the lake bed. The very soft soils were dominated by silty clay with organics (CH) but also included clayey organic silt (OH) and clayey peat (Pt), and clayey sand (SC) in 15-1M, and wood fragments mixed with clay (Pt) in 15-3M. It is suspected that the 19 ft thick layer of wood fragments represents historical industrial waste from upriver.

Soft soils were not sufficiently competent in order to collect undisturbed samples for laboratory testing. Field personnel reported that much of the clays was likely in a liquid state.



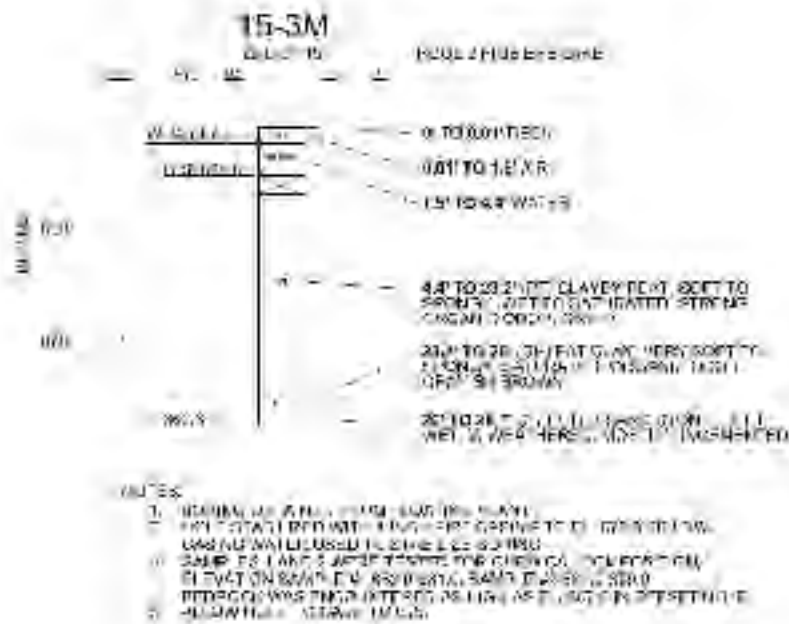


Figure 4 Boring 15-3M

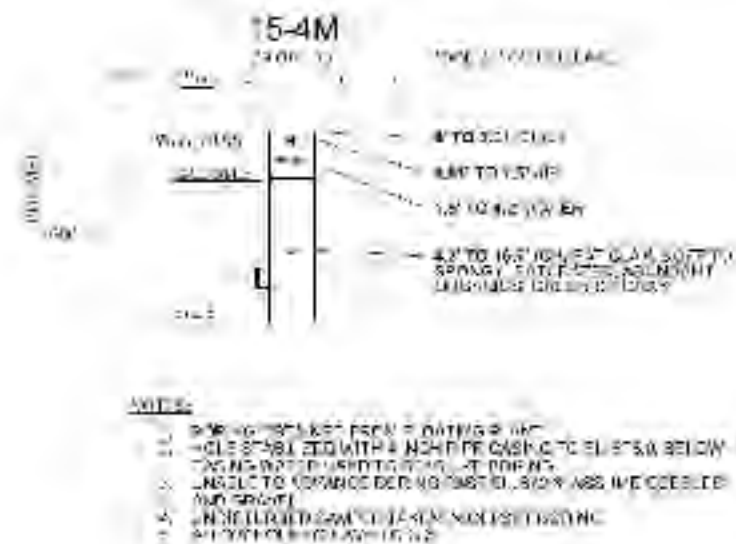


Figure 5 Boring 15-4M

F.4 Soils Testing

Atterberg Limits and Moisture contents were performed on three samples, and an organics content test was ordered on two samples. The samples were taken from the shallow subsurface locations throughout the lake. Testing results are summarized in Table 1.

Testing indicates that the samples have high plasticity with a moisture content above the liquid limit. The samples tested contained between 9-17% organics content.

The sample from boring 16-8M was visually and texturally distinct from the other bag samples obtained in August 2016, resembling a black and spongy topsoil rather than the grayish-black clay found elsewhere. This difference is reflected in the test results, as it shows lower plasticity and higher organic content. The organic clay material from 16-11M and 16-12M is more reflective of the typical shallow subsurface materials at Pigs Eye lake.

Table 1 – Summary of laboratory geotechnical testing

Boring	Sample	Depth (ft from deck)	LL	PL	PI	MC	Organic Content (% of mass)	USCS Classification
16-8M	1	5-8	118.6	63.8	54.8	133.2	16.6	Organic Silt (OH)
16-11M	1	5-8	123.9	37	86.9	144.2	9.1	Organic Clay (OH)
16-12M	1	4.8-7.8	125.5	39.7	85.8	137.7	N/A	Organic Clay (OH)

F.5 Geotechnical Evaluation

F.1.5 Lateral Displacement/Spreading (“mudwave”)

Experience on previous projects has shown that shear stresses resulting from the placement of fill atop very soft clayey strata can result in lateral displacement of the foundation material. Lateral displacement can occur in a semi-liquid fashion, in which the material is simply “squeezed” outwards from beneath the fill like toothpaste, or in a plastic fashion, in which distinct shear zones or planes develop within the soil mass and wedges of material are displaced outwards along those shear zones. Either mechanism is likely to result in uplift of foundation material directly outside the vicinity of loading. This uplifted material is often referred to colloquially as a “mud wave”, as it can protrude above the water surface giving the appearance of a wave. For the Pigs Eye Section 204 project, mud waves are of interest since they can result in increased turbidity as well as suspension of contaminants that might have previously been sequestered beneath the lake bottom. A large mud wave may also be a concern as the lateral loss of foundation material would require additional fill in order to meet the required grade. Based on environmental sampling and testing (see Appendix E – Sediment Report) it has been determined that the soils most likely to be exposed in a mud wave fall within acceptable limits with regards to contamination, however turbidity and fill quantities remain concerns that need to be considered.

Based on the subsurface investigation, it is very likely that rapid fill placement to the planned elevations would result in mud wave formation. Many of the soils encountered during drilling were reported as being in a liquid state, which is consistent with laboratory testing. The mechanics of mud wave formation are complex, and any prediction based on mechanics would require advanced geotechnical testing and modeling. Such an effort is not only considered outside the scope of the project, but is unlikely to provide accurate results without some sort of field calibration. What can be said safely is that the mud waves are likely to be lower in elevation than the adjacent fill placement, and are likely to protrude above the water surface.

F.2.5 Settlement

The placement of fill atop soft, compressible, and relatively low permeability sediments results in excess pore water pressures that dissipate slowly over time as water drains out of the pore spaces. Primary consolidation settlement is the cumulative volume changes that results from the expulsion of water and compression of the soil structure.

Consolidation settlement is typically estimated by obtaining undisturbed samples and performing laboratory consolidation tests on specimens derived from those samples. The parameters obtained from the laboratory tests are used together with estimated changes in stress from fill placement in order to estimate settlement. Settlement estimates are often not very accurate due to variability of naturally occurring soils as well as non-uniform stress distributions that result from fill placement. In the case of Pigs Eye Lake, it was impossible to obtain undisturbed samples due to the loose, liquid nature of the soft soils.

Settlement was estimated using assumed soil parameters from the New Orleans area (Table 2), where shallow marsh conditions are prevalent and shallow soils are mostly normally consolidated. Looking at a range of properties and fill heights, it was judged that 2.5 ft settlement was a reasonable estimate for a 6 ft fill height. In addition to estimating settlement for 6 ft of fill, it was assumed that 3 ft of settlement had occurred for the 6 ft placement, and that 3 ft of additional fill placement would be necessary to reach design grade. In short, the 9 ft analysis is only accounting for the increased density of 3 ft of sand fill in comparison to the in-situ soft clays. It does not account for consolidation of the upper clays as a result of compression during construction.

There is a low degree of confidence associated with this estimate, and it does not account for any lateral displacement of liquid soils.

While a large portion of the consolidation settlement is likely to occur following construction, in very soft soils it is also likely that that significant deformations will occur during construction. These deformations can be due to lateral displacement and initial consolidation. For New Orleans levees over soft foundations the standard practice is to assume a 25% increase in fill material over the neat line quantity in order to account for settlement and lateral spreading that occur during construction. While some lateral spreading is expected for Pig's Eye, the profile of the island features is much flatter than a levee embankment and is expected to lead to a smaller amount of lateral displacement relative to the total fill volume. However the very soft soils will compress during construction and this should be accounted for in the material quantity estimate. For the purposes of the Feasibility Study cost estimate, a 10% increase in fill quantity is assumed. Experience with initial island building will help calibrate estimates for subsequent features.

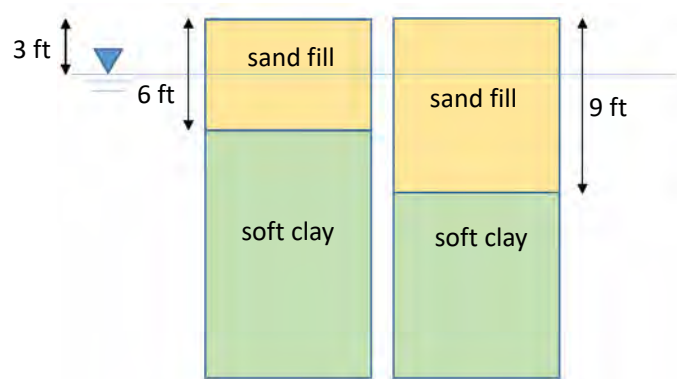


Figure 6 - Diagram illustrating settlement scenarios. On the left 6 ft of fill is placed above existing grade, 3 ft below the water line. On the right, it is assumed that 3 ft of settlement or displacement occurs during construction and additional fill is needed

Table 2 Material properties used to estimate settlement

Material	γ (pcf)	C_c	e_o
very soft silty clay	90	0.5	1.2
dredge sand	115		
water	62.4		

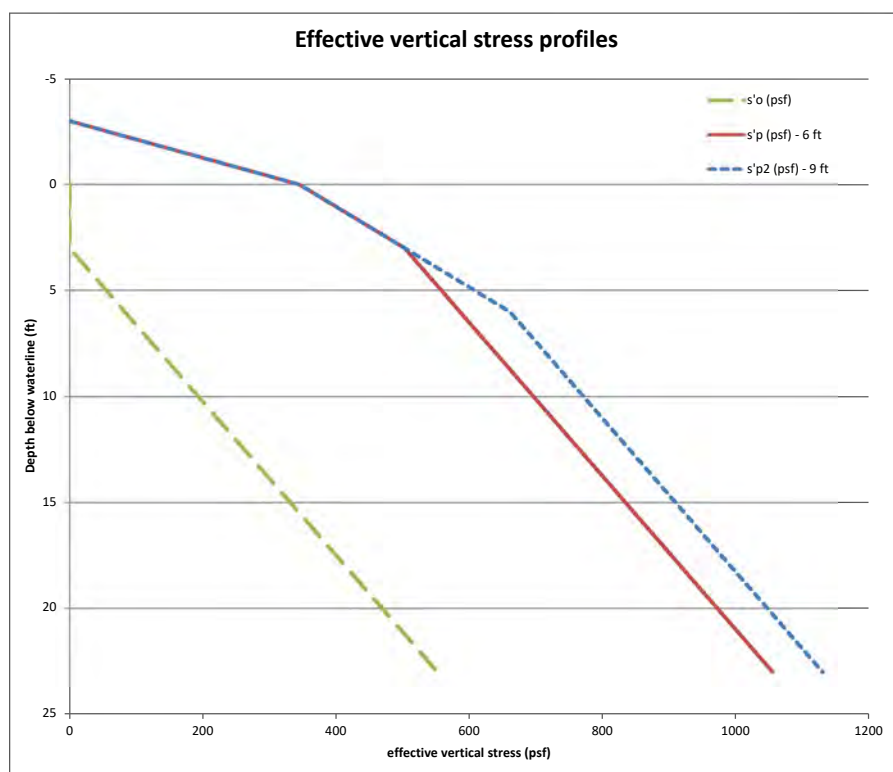


Figure 7 - initial effective vertical stress and profiles for 6 ft and 9 ft of fill

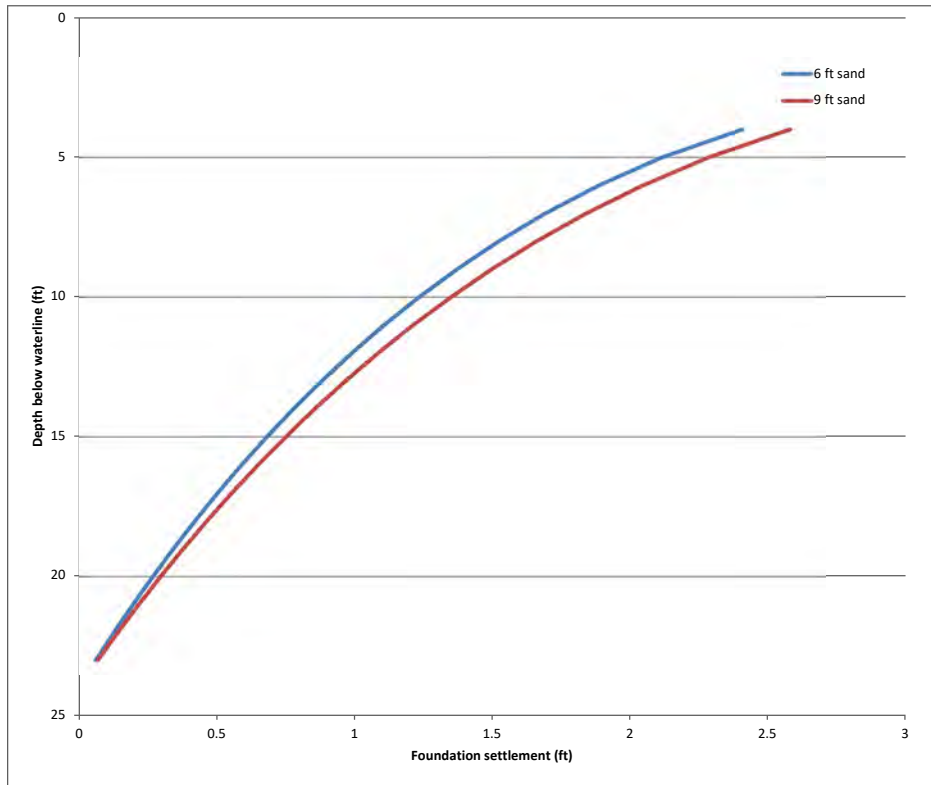


Figure 8 - Plot of predicted settlement for 6 ft and 9 ft of dredge sand fill

F.6 Conclusions and Recommendations.

The shallow soils within Pigs Eye Lake are both very soft and fairly thick, creating ideal conditions for soil displacement in response to fill placement. Field reports and laboratory testing confirm that the material in the upper few feet of the lake bed is in a liquid state.

Vertical displacement occurs over time and is a function of the amount of weight on the soil. Overbuild of the islands will help compensate for eventual settlement, but there is little that can be done to reduce the fill quantities required to bring the project features to the required grade. For estimation of quantities, it was recommended that 2.5 ft settlement be assumed for fill heights above the waterline, and 1.5 ft settlement for fill heights below the waterline.

Lateral displacement of foundation material is more dependent on the slope, construction method, and rate of placement, and can be reduced by allowing for the dissipation of pore water pressures as fill material is placed. In effect this means placing the material in staggered “lifts”. This will reduce liquid behavior of the soil and increase shear strengths in order to resist the shear stresses induced by fill placement. Furthermore, shear stresses within the foundation can be reduced by constructing islands with relatively flat slopes (5H:1V to 10H:1V), which will also minimize the amount of lateral displacement.

The most reliable method for predicting the foundation response would be to complete a test fill section on-site using the planned construction methods. Meticulous documentation and monitoring would be required in order to make an appropriate interpretation of the results.



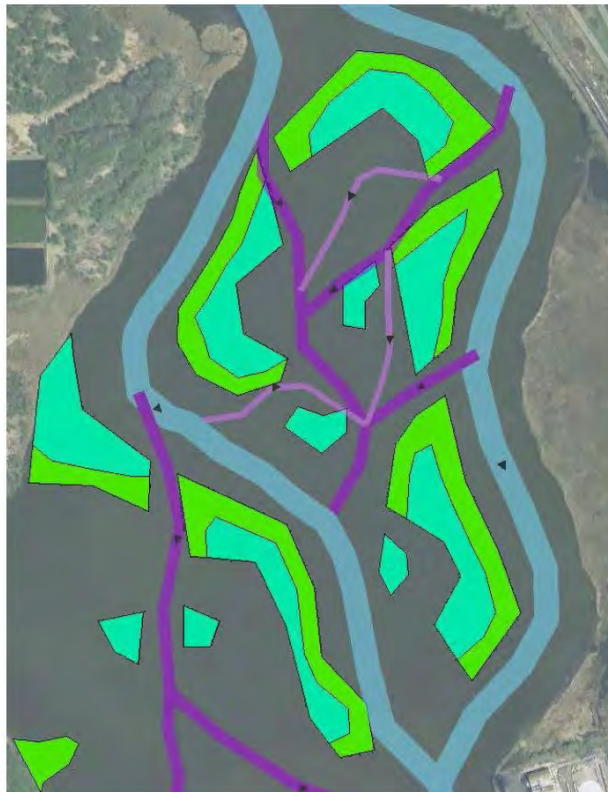
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Appendix G

Hydrology and Hydraulics

Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

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1 Introduction

This document describes some of the considerations that were used to produce alternatives for the Pigs Eye Lake study. The document includes information on existing conditions as well as floodplain regulation considerations. This document also describes some of the thought behind the development of the project alternatives.

1.1 Hydrology and Hydrologic Conditions

1.1.1 River Discharge and Stages

Mississippi River annual chance exceedance of discharge is shown in Figure 1. This discharges-frequency relation was developed by the St. Paul District of the Corps of Engineers. The relation is based on the discharge records at the USGS gage on the Mississippi River at St. Paul Minnesota (1898 to 1998).

Recurrence Interval discharges that could be useful in this study are:

2 Year – 38,500 cfs

5 Year – 63,400 cfs

10 Year – 81,800 cfs

20 Year – 101,000 cfs

50 Year – 127,000 cfs

100 Year – 148,000 cfs

200 Year – 169,000 cfs

500 Year – 200,000 cfs

Figure 1 is a frequency curve for the Mississippi River at Saint Paul Minnesota. The chart can be used to relate discharge with frequency. Figure 2 and Figure 3 include stage-duration and flow-duration tables. These tables show the percentage of time a stage or discharge is above the indicated value.

Figure 4 includes the operating curves for Lock and Dam 2 on the Mississippi River. The curve for the South Saint Paul Control Point (CP) can be used to estimate water elevations in Pigs Eye Lake.

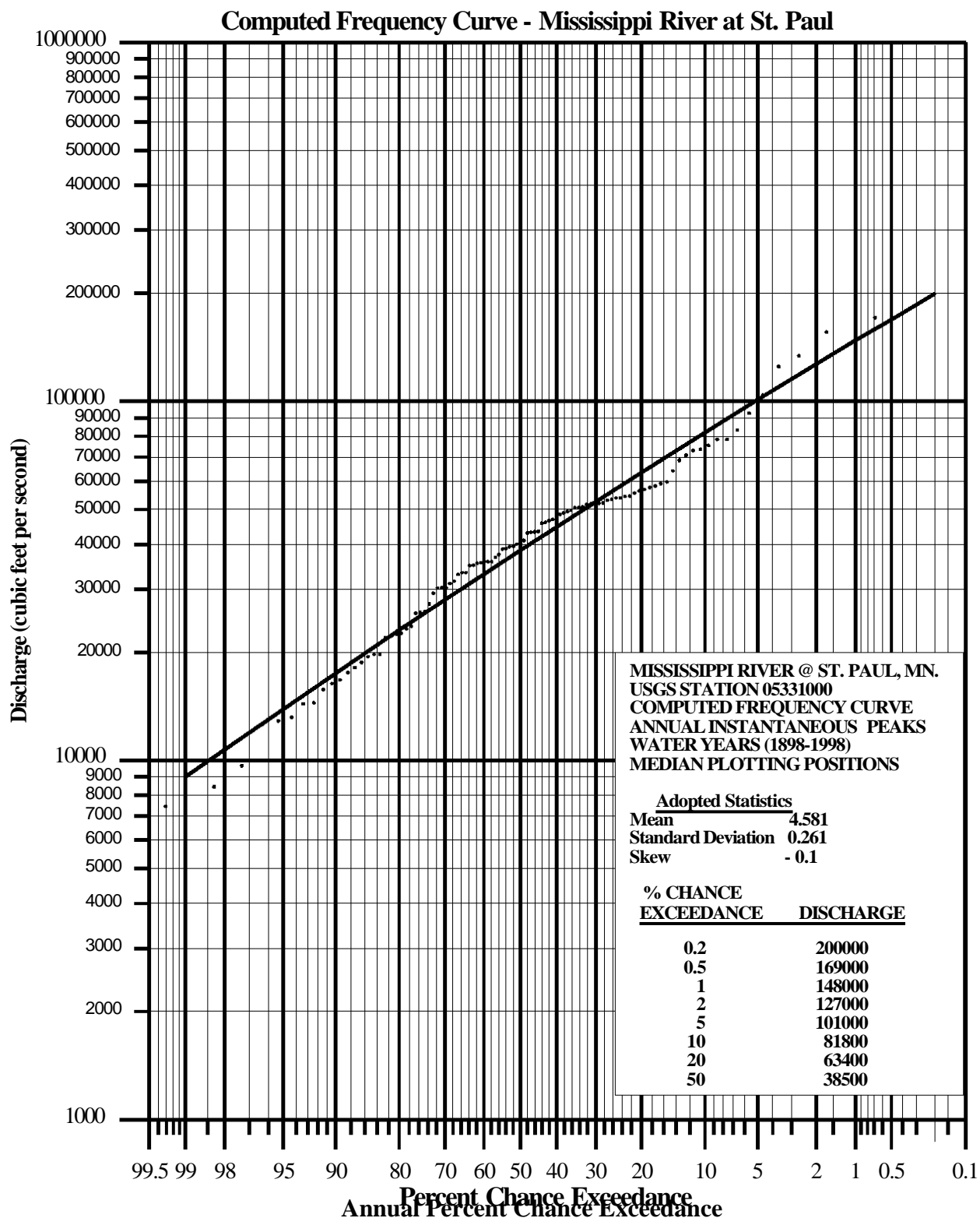


Figure 1 Discharge/ Annual Percent Exceedance Curve

South Saint Paul Gage		Based on South Saint Paul Gage 1981-2016 record (typical years of recent history)										
		Discharge in CFS										
Percent	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.100	25800	37677	84000	140411	131149	99760	86253	51030	58389	72553	38343	38266
0.200	25800	37080	83260	139323	121873	98381	85221	50360	55417	71896	37587	36383
0.500	20400	34113	79194	135289	90806	96254	78125	47172	51419	65708	36397	35124
1.000	19406	24532	71272	124089	72512	91107	74981	42666	46094	53747	32357	26315
2.000	15512	19324	54412	112246	67800	62414	64090	39062	35680	46624	30500	24000
5.000	12300	15870	46300	75545	53500	53570	49100	32500	28595	36615	24495	17515
10.000	11300	10240	36600	55380	49520	45980	41590	23400	24370	29760	20900	14600
15.000	10000	9200	29000	50900	45980	41000	36045	19900	20185	24645	18400	13300
20.000	9260	8600	24840	47380	43500	37540	31360	17360	16060	20700	16500	12300
30.000	8000	7420	17960	41900	38460	32500	25100	13900	11770	14600	14400	10800
40.000	6820	6400	13600	35500	34300	28600	21300	11700	9300	11200	12700	9400
50.000	5800	5800	11100	30400	29500	24100	18150	9400	7400	8900	11100	7850
60.000	5300	5240	8900	25200	23500	20400	15600	7700	5707	7100	9100	6600
70.000	4700	4400	7400	19230	19040	16800	13210	6500	4800	5600	7300	5400
80.000	3900	3500	5700	14400	15200	13800	10400	5100	4000	4690	5700	4500
85.000	3500	3300	5200	10865	13400	11900	8000	4800	3500	4155	5000	4100
90.000	3200	3000	4700	9400	10780	9600	5700	4000	3000	3800	4400	3500
95.000	2800	2630	3600	8155	8000	7000	4200	2900	2600	3200	3700	3000
98.000	2300	2300	2900	7022	6996	3358	1500	2100	2200	2400	3281	2400
99.000	2100	1800	2096	6311	6500	2100	1400	1600	2000	1909	3000	2017
99.500	1737	1462	1759	5756	5974	1800	1300	888	1950	1450	2641	1400
99.800	1550	1200	1000	4789	5119	1619	947	500	1850	1162	2516	1200
99.900	1465	1000	800	4611	5000	1419	900	500	903	135	2500	1068

Figure 2 Discharge-Duration Relation (include period of record)

South Saint Paul Gage		Based on South Saint Paul Gage 1981-2016 record (typical years of recent history)											
	Top of Higher Island	690.1											
	Top of main Berm	689.1 (navd88)											
	Minimum Topsoil=	(689.1-0.5)	688.6 FEET NAVD88										
Duration Percent Exceedance	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
0.100	688.28	688.58	698.57	702.63	702.20	700.83	698.26	692.87	695.13	696.76	689.90	689.03	
0.200	688.22	688.52	698.46	702.58	701.49	700.66	698.06	692.78	694.01	696.67	689.86	688.82	
0.500	688.16	688.38	698.01	702.46	698.56	700.33	697.79	692.44	693.48	695.58	689.73	688.11	
1.000	687.84	688.18	697.06	702.15	696.73	699.59	697.23	691.93	691.76	693.74	689.29	688.00	
2.000	687.63	687.73	693.71	701.07	695.31	695.04	695.63	690.73	690.39	691.69	688.98	687.93	
5.000	687.31	687.34	691.66	696.55	693.23	693.33	692.20	688.73	688.76	689.74	688.29	687.73	
10.000	687.17	687.15	689.84	693.67	692.29	691.60	690.74	687.93	688.08	688.84	687.77	687.49	
15.000	687.12	687.08	688.66	692.65	691.67	690.79	690.00	687.63	687.64	688.19	687.46	687.35	
20.000	687.08	687.05	688.15	691.90	691.12	690.22	689.33	687.37	687.31	687.71	687.36	687.26	
30.000	687.01	686.98	687.44	690.82	690.22	689.43	688.45	687.17	687.10	687.23	687.19	687.15	
40.000	686.96	686.93	687.21	689.85	689.57	688.83	687.92	687.06	687.03	687.10	687.11	687.07	
50.000	686.91	686.87	687.09	688.96	688.82	688.10	687.50	687.00	686.97	687.04	687.04	687.01	
60.000	686.84	686.81	687.01	688.22	688.09	687.63	687.24	686.95	686.94	686.99	686.99	686.96	
70.000	686.78	686.76	686.93	687.53	687.60	687.31	687.07	686.89	686.88	686.93	686.93	686.89	
80.000	686.71	686.69	686.86	687.09	687.24	687.10	686.96	686.83	686.83	686.88	686.88	686.82	
85.000	686.67	686.64	686.81	686.97	687.13	687.03	686.91	686.80	686.80	686.85	686.84	686.75	
90.000	686.61	686.60	686.75	686.89	686.96	686.96	686.86	686.76	686.77	686.81	686.80	686.69	
95.000	686.54	686.52	686.65	686.80	686.84	686.85	686.79	686.70	686.71	686.76	686.72	686.60	
98.000	686.46	686.46	686.55	686.71	686.73	686.73	686.72	686.63	686.64	686.68	686.62	686.48	
99.000	686.41	686.41	686.50	686.67	686.65	686.68	686.69	686.58	686.58	686.65	686.57	686.39	
99.500	686.38	686.36	686.41	686.64	686.59	686.65	686.65	686.54	686.54	686.60	686.49	686.27	
99.800	686.33	686.28	686.36	686.54	686.53	686.57	686.60	686.41	686.46	686.57	686.35	686.18	
99.900	686.28	686.23	686.35	686.48	686.51	686.53	686.59	686.36	686.43	686.51	686.26	686.14	
Elevations in NAVD88													

Figure 3 Elevation - Duration Relation (NAVD88) at South Saint Paul Gage (include period of record)

1.1.2 Mississippi River/Dam 2 Operation

The following figure shows the Operating Curve for Lock and Dam 2 on the Mississippi River. The green curve shows the Control Point in South Saint Paul. This control point is directly across the river from Pigs Eye Lake. The river stage at Pigs Eye Lake is held constant at 686.8 feet NAVD (687.2 (1912 datum) for discharges below 12,500 cfs. At a river discharge of 12,500 cfs, the river stages begin to rise with discharge.

LOCK & DAM NO. 2 OPERATING CURVES (NAVD88 Datum)

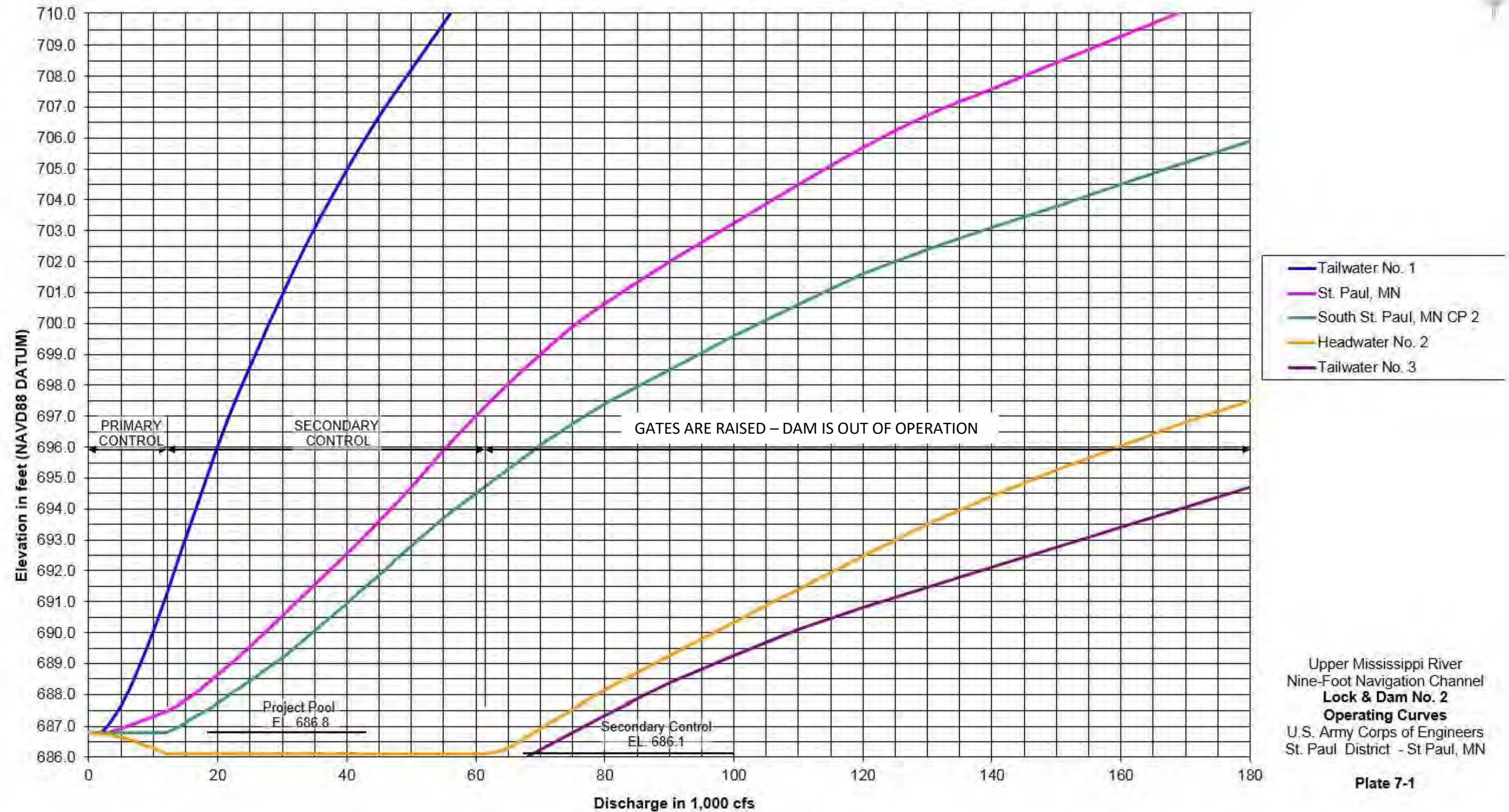


Figure 4 Pool 2 Operating Curve (NAVD88 Datum)

1.1.2.1 Stage Variability

The stage variability with discharge is greater in Pigs Eye Lake than in many the Corp's other Mississippi River project locations. This is because the site is located higher in the pool and that there is a fairly low discharge (12,500 cfs) above which the pool is allowed to rise.

1.1.3 Circulation within Pigs Eye Lake

Pigs Eye Lake has two primary sources of inflow. One source is Battle Creek which enters the lake at its northern end. The other is the Mississippi River. There is a small amount of flow that enters from a small channel entering the lake from the south west. Flow from this channel would pass across the southern end of the lake and exit to the south along the main fleeting channel. This pattern would occur during fairly constant discharge. Figure 5 illustrates some of circulation pattern features described in this section. The yellow lines show flow into the lake which cuts across the south end of the lake and exits thru the harbor channel. Inflow from Battle Creek in the north is also shown in yellow. The figure also shows the location of the South Saint Paul Gage.

When river stages rise rapidly at Pig's Eye Lake (and South Saint Paul Gage) for discharges above 12,000 cfs, water would flow into the lake from both inlets to allow lake stages to match river stages. This would reverse when river stages reverse. Flow would go out of each of the 'inlets' to provide a common water surface between the river and the lake. Gradual rise in stage would have more of a pattern similar to that shown in

This process provides a kind of 'bellows' effect on water exchange between the lake and the river. Aerial photography was used in an attempt to see a pattern of how this 'bellows' action affects circulation in the lake. No clear pattern was evident. In general it seemed like the incoming river water displaces the water in the southern part of the lake. Sometimes a horizontal boundary seemed to be present that demarcated a line between water zones. Other times there was little differentiation that was observable.

It appears that water entering from Battle Creek is a more dominant source of water in the upper lake than in the lower lake.

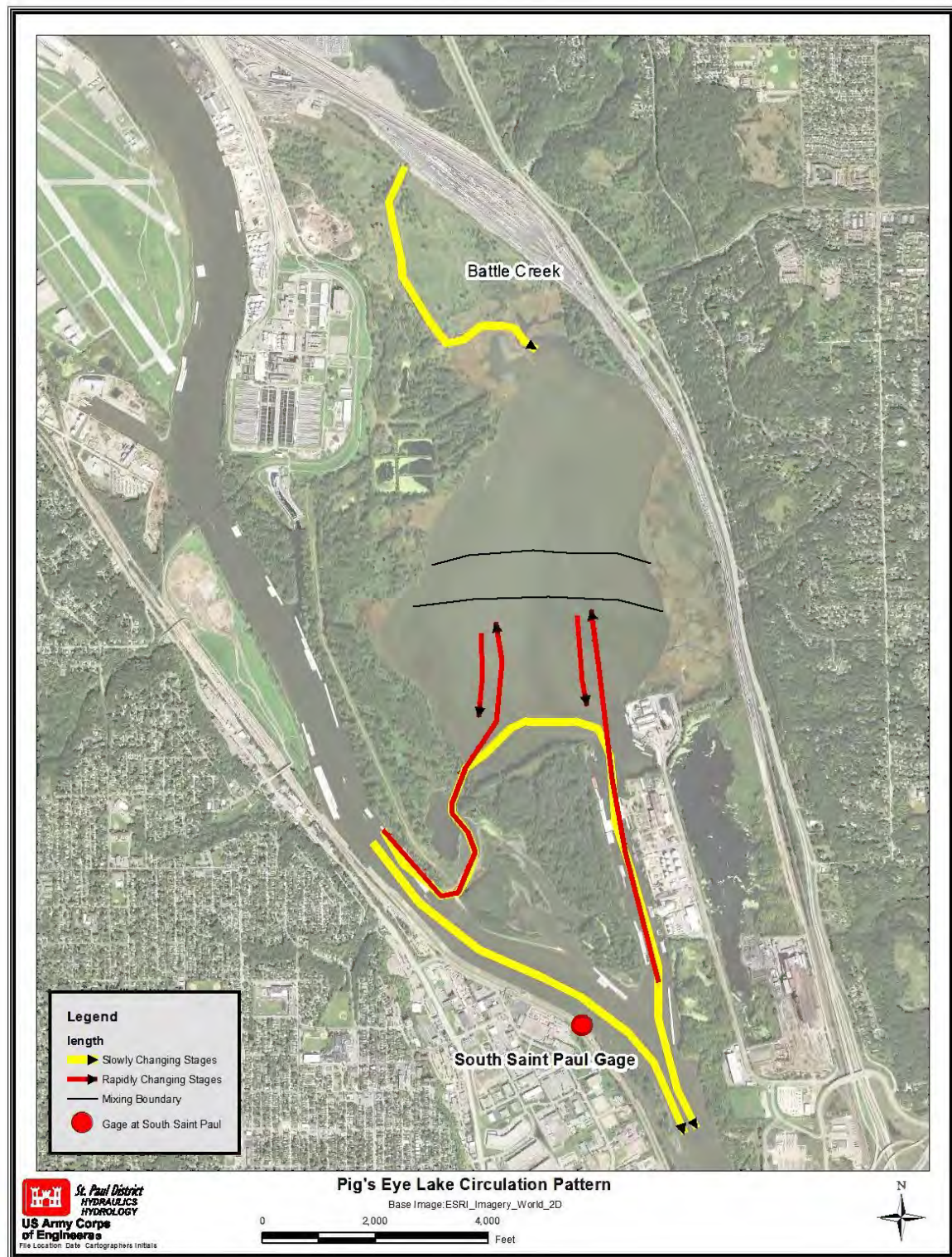


Figure 5 General Lake Circulation and the Relative Location of the South Saint Paul Gage

1.2 Wind and Waves

Wind blowing across Pigs Eye Lake generates waves that cause shoreline erosion and greatly increase the suspension of the very fine lake bottom sediments. Typical wind direction and magnitudes are shown in Figure 6 and Figure 7. The wind data that is nearest to Pigs Eye Lake is at the Holman Field Airport which is about two to three miles northwest of Pigs Eye Lake. The airport is located on a bend in the river valley. Winds typically align themselves with the valley walls of the Mississippi River. This also seems to be affecting the wind orientation at Holman Field Airport. The wind directions are significantly oriented from the northwest and southeast. At the location of Pigs Eye Lake, the orientation of the dominant winds would likely be shifted about 15 degrees (clockwise) to better align with the valley walls in the vicinity of the Pigs Eye Lake. Figure 8 contains a map showing the dominant and secondary wind directions that have been adopted for this project. The secondary wind direction is the most significant wind orientation at the Holman Field gages. The alignment can be used for wind directions in either directions along the arrows since the significant winds are generally along the same axis from both the northwest and southeast. The primary wind direction is generally the direction that best aligns with the eastern valley wall near Pigs Eye Lake.

Month of year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	01	02	03	04	05	06	07	08	09	10	11	12	1-12
Dominant wind direction	↖	↗	↗	↖	↗	↗	↗	↗	↗	↖	↗	↗	↗
Wind probability >= 4 Beaufort (%)	38	33	33	46	37	25	26	19	26	31	38	21	31
Average Wind speed (mph)	12	10	10	13	12	10	10	9	10	10	12	9	10
Average air temp. (°F)	19	19	37	46	60	73	75	73	66	50	37	25	48

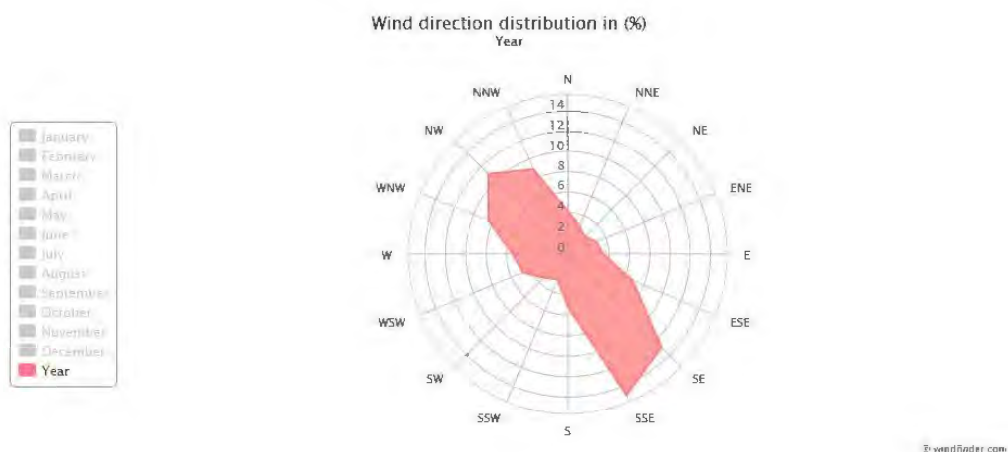


Figure 6 Wind Rose and Other Statistics at Holman Field (graphics from windfinder.com)

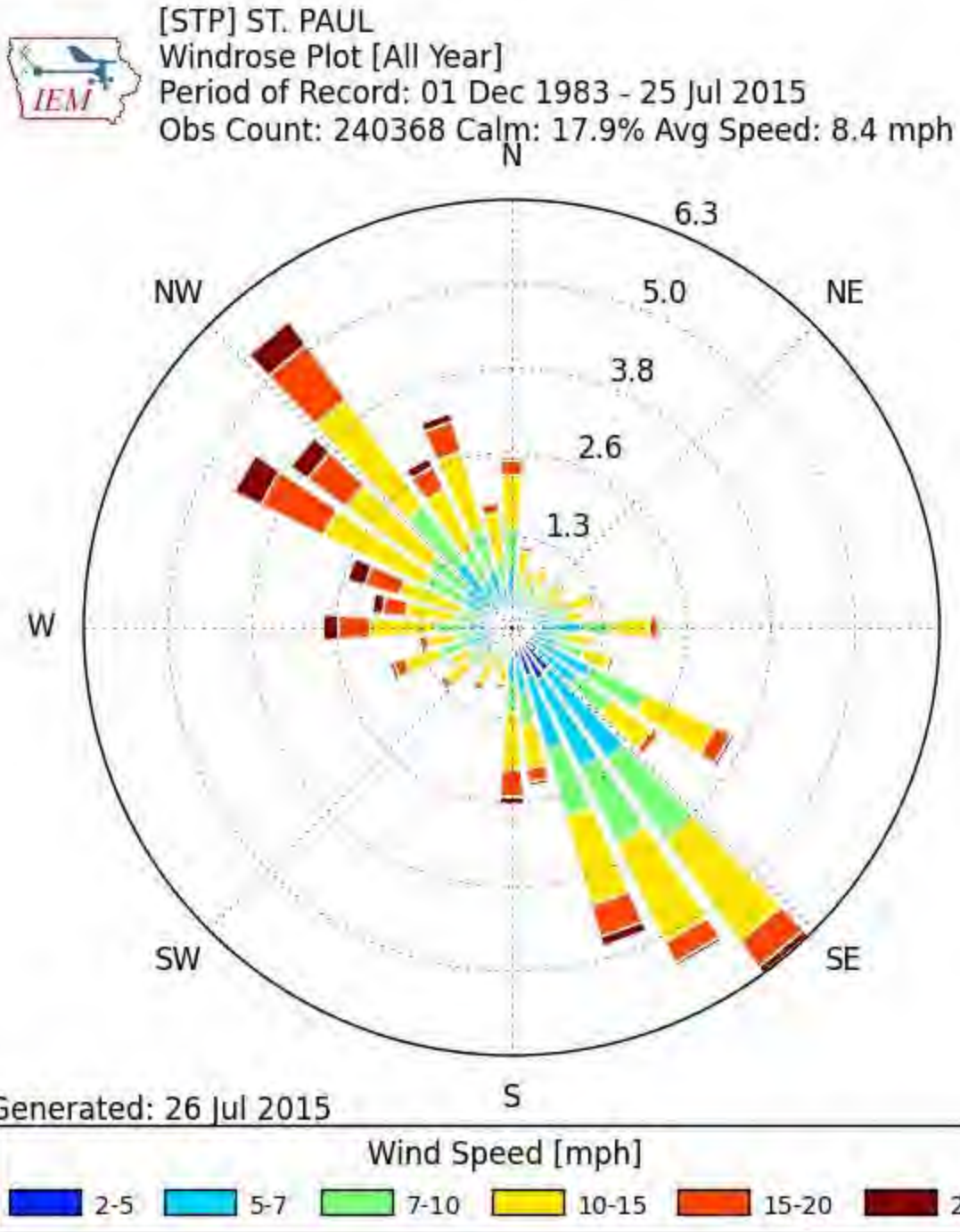


Figure 7 Wind Rose at Holman Field Saint Paul MN (graphics from IEM/Iowa State University)

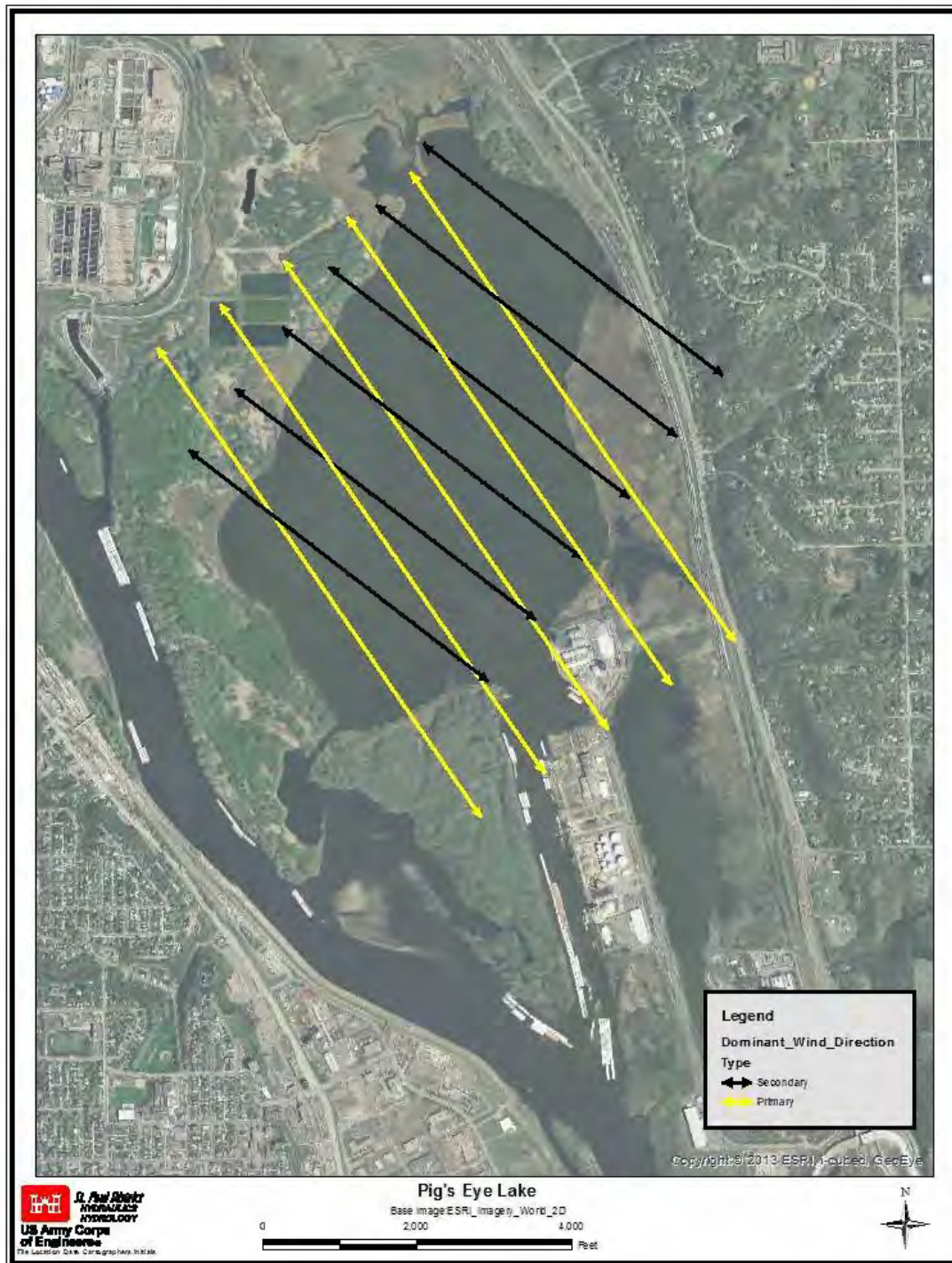


Figure 8 Map showing Primary and Secondary Wind Direction over Pigs Eye Lake

1.3 Shoreline Stability

The long periods where wind generated waves have expended their energy on the shoreline. There is evidence that the shoreline in certain regions of the lake have retreated approximately 80 feet since 1991. The following figures show the shoreline retreat over several time periods.

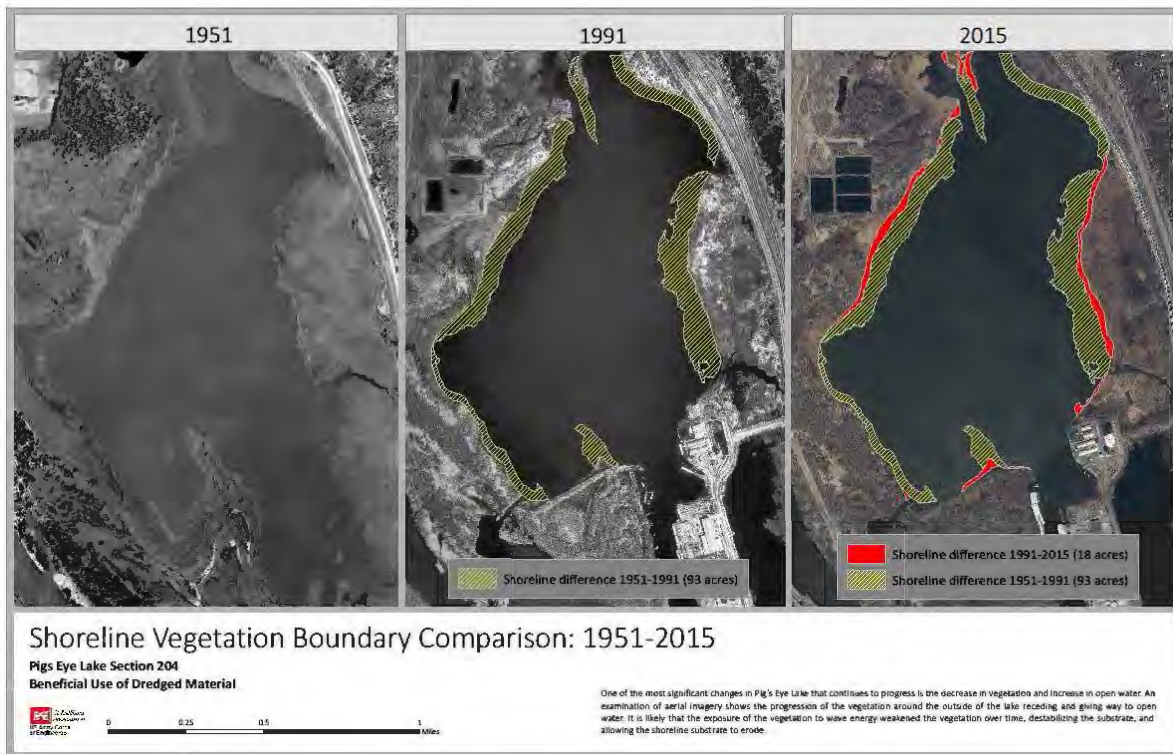


Figure 9 Shoreline Erosion in Pigs Eye Lake from 1951-2015

Shoreline erosion is not thought to be closely related to the impacts of flow from the main channel. The lake is significantly sheltered from direct inflow by the wastewater treatment plant and the high roadway that connects it with high ground. The lower west side of the lake would be exposed to overland flood flows from the main channel. The shoreline in this area is the most stable in the lake. Erosion from wind generated waves seems the most likely explanation for shoreline erosion.

1.4 Sedimentation

1.4.1 Sediment from the Mississippi River

Sediment enters the lake by flowing overland during flood events and also enters the lake through the inlets and outlets along its southern end. Changes in pool elevation cause water to back into Pigs Eye Lake from the main river channel. This sediment would be very fine since it would have to be suspended in the water column under fairly low velocity to enter the lake. During flood events,

overland flow the Mississippi (beginning at approximately 65,000 cfs and an elevation of 695 feet NAVD88) from could bring sediment into the lake from the main river channel. It would be expected that a good portion of this sediment would be channel sand. At present, there is not much evidence of sand within the lake so it is not thought that this is a significant source of sediment.

1.4.2 Sediment from Battle Creek

Battle Creek also carries sediment into Pigs Eye Lake but would tend to drop it near it's delta in the northern end of the lake. Battle Creek's source water is generally collected from urban storm sewered runoff. It is assumed sands and other road sediments constitute a majority of the sediment entering the lake from Battle Creek.

1.4.3 Sediment from Shoreline Erosion

Shoreline erosion over the years has removed sediment from the shorelines and deposited a significant portion of it on the lake bed as fine sediment.

1.4.4 Accumulation and/or Loss of Sediment from Pigs Eye Lake

It is difficult to say definitively how the overall balance of sediment input to the lake should be understood, but generalizations can be made. Some of the fine lakebed sediment could be suspended in the water column by wave action and removed from the lake with outflow. It seems unlikely that this would be significant in relation to the sediment entering the lake from its various sources. The very soft upper layers of the lake sediments would be consistent with the assumption that there is a net accumulation of very fine sediments within the lake. The coarser sediments entering the lake from Battle Creek would most likely fall out in the Battle Creek delta areas and would not move much further into the greater lake.

2 Regulatory Floodway

The following Figure 10 shows both the mapped floodway as well as the limits of effective flow limits currently used by the Minnesota Department of Natural Resources (MnDNR) to regulate floodplain impacts. The mapping was done using HEC-2 (an earlier direct ancestor of HEC-RAS). The current HEC-RAS modeling shows ineffective areas (below elevation 709.0 feet) east of the red line shown in the figure. The most extensive of the island alternative layouts is also shown for visual reference.

There should be no stage impact to the regulatory floodway or to the 1 percent annual chance exceedance flood stages (100 Year) because all of the proposed construction is outside of the effective flow limits shown in the latest modeling.



Figure 10 Mapped Floodway and Effective Flow Area Limits



Figure 11 HEC-RAS Cross Sections (Ineffective Flow Boundary Shown in Red)

3 Island Alternative Design Considerations

3.1 Avoid Stage Impacts

The islands were laid out to avoid the effective flow limit boundary which is the MnDNR's primary focus for preventing stage impacts. The islands were also placed using deference to the mapped floodway which is also shown in the figure.

No islands encroach on the effective limits of the HEC-RAS model. Two islands fall within the mapped floodway boundary but are within the ineffective flow area. These islands (the south western islands in the figure) were aligned roughly parallel to the mapped floodway boundary. This was to make them parallel to any flowlines through this region. This will insure that that any stage impacts would be negligible if water were to move through this region.

3.2 Construction on Soft Substrate

Geotechnical concerns with the soft sediment substrate in the bottom of the lake required that some choices be made in the island design.

Generally the concept has been to build the islands in a few phases. First the base layer would be placed using hydraulic dredging. This would build the islands up to near the water surface. This layer would be allowed to consolidate the underlying sediments for a time before the above water parts of the islands would be constructed. This method allowed for the extension of a submerged berm around the perimeter of the islands. This bench would help function as a constructed beach zone as well as aid in minimizing the mud wave formation.

The height of the islands was also restrained to keep the weight of the islands down to keep settlement issues manageable. Ideally, certain portions of the islands would be given greater height to aid in habitat diversity. These areas would probably be a small percentage of the island acreage proposed in the alternatives. The highest portion of selected alternative has a crest elevation of 690.1 which is only 3 feet above the common water surface elevation. Localized higher features will have to be considered in more detail in the Plans and Specifications phase of this project.

4 Island Cross Section Design

4.1 Typical Section

The Corps has constructed many habitat islands on the Upper Mississippi over the past few decades. Many of the features and recommendation been denoted in the Corps of Engineers Upper Mississippi River Restoration Program - Environmental Design Handbook, December 2012. This document was used to insure island dimensions and design criteria were in general agreement with currently accepted design characteristics.

Several features of the new proposed island layout have varied from more typical sections. This has been done in part to provide a better design for construction on very soft sediments. Changes have also been proposed to improve the island/lake habitat value.

Typically sand islands consist of a sand terrace “berm”. A portion of this berm is sacrificial and in concert with groins or vanes will help establish a beach zone as the island partially erodes with time. The beach zone helps to dissipate wave energy and slow the erosion of higher portions of the islands. A higher central area is typically included that is covered more thickly with topsoil. Willows are often included to aid in reducing wave energy and as insurance if certain segments of the berm are eroded more quickly than anticipated.

4.2 Submerged Berm

One of the main features that differ from the more traditional island design is the ‘submerged berm’. Normally this would be an additional expense. The soft lake bed sediment posed a significant risk of producing ‘mud waves’ associated with island construction. ‘Mud waves’ are essentially the displaced material from under the island footprint that pushes out and up from beneath the island. Geotechnical considerations indicated that a transitional layer that does not significantly rise above the typical water surface may help control the production of mud waves.

Construction of the islands was proposed to occur in two phases. The first would be to hydraulically place sand up to near the water line. This would be allowed to settle for a while before equipment is brought in for the above water parts. This submerged berm would basically be constructed as part of the first layer of island construction.

In essence the submerged berm would function as a significant step toward creation of a beach zone around the islands. The beach zone helps dissipate wave energy as waves approach and break on the islands. This reduces the wave’s erosive action on the higher island portions. Over time the beach material is regularly rearranged by the waves and the bank material becomes more stable.

Groins placed on the berm should take much less rock since they are limited in thickness to about two feet. In deeper water, typical groins gain most of their volume as the base widens with depth.

Most of the elevations in these island design alternatives are based on an assumed water surface elevation of 687.1 (NAVD88). Low Control Pool is 686.8 (NAVD88) at this site. This is also the elevation that the Operating Curve shows the South Saint Paul gage held to until a discharge of 12500 cfs is exceeded (which is fairly common). The stage hydrographs for the South Saint Paul gage were examined and normal summer elevation was commonly at 687.1 (NAVD88).

The submerged berm goes from 687.1 to 686.5. This runs from the edge of the emergent island out to the outer edge of the submerged berm.

4.3 Split Island Alternatives – Sections

A couple of the alternatives have what are being called ‘split’ islands. Conceptually these islands evolved from the full section island. The thought was that if one of the berms was split off of the island and separated from it by a short distance, the island should still have little risk of erosion along the split since the fetch would be very small. This gap between the two sides could be enlarged further as long as the interior remains very sheltered. These islands are generally constructed in pairs where a portion of one section that has the higher island elevation and another island that is similar to an independent split off berm.

4.4 Three Adopted Sections

The alternative plans incorporate three cross section designs. These are the ‘Full’ section which is the most similar to traditional HREP islands with the addition of a perpetually submerged berm. The other two sections reflect the design for the ‘Split’ island concept where the island pairs provide heavily sheltered interior embayments.

4.4.1 Full Section

The first island cross section type is shown as Type “A” in Figure 12. It is very close in its dimensions to examples in the EMP Environmental Design Handbook. The addition of the submerged berms is the primary exception. The 40 foot long berm has an elevation of 689.1 which is 2 feet above the common water elevation. The interior rises another foot to 690.1.

Table 1 shows the duration of inundation as percentages of the non-winter months as well as full year and the April to October period. Although these islands will be subject to repeated inundation, they should have enough time out of the water to develop a healthy vegetative cover. Land at these elevations surrounding Pigs Eye Lake are supporting healthy vegetation.

South Saint Paul Gage (1988 NAVD)	Apr	May	Jun	Jul	Aug	Sep	Oct	All- Year	Apr- Oct
690.1 Top of High Island	39.9	29.7	10.5	9.9	3.9	1.5	1.5	8.9	15.8
689.1 Top of Main Berm	52.6	42.3	23.9	16.5	5.5	2.9	4.8	13.9	21.1
688.6 Bottom of Topsoil Elev.	56.8	49.8	30.8	22.4	6.1	4.6	8.7	16.9	25.5

Table 1 Percentage of Time Elevation in Overtopped (based on South Saint Paul Gage record 1972-2000)

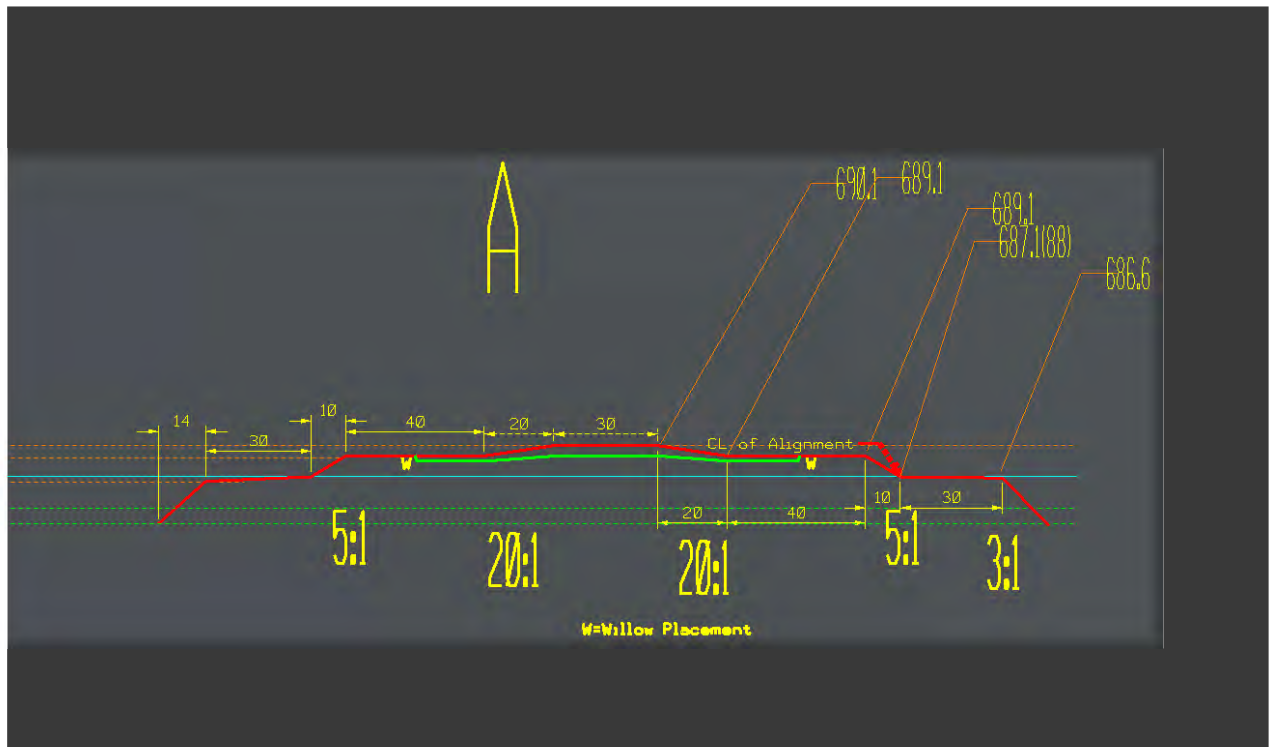


Figure 12 Full Island Section

4.4.2 Split Island Section

Figure 13 shows two sections that represent the 'split' island concept. Island "B" section shows the low, berm only side of the split. Island "C" section shows the section of the 'split' island concept that that retains the higher elevation interior.

These islands have an interior and exterior side. The interior side has only a small submerged berm and regular emergent berm. These minimal dimensions are acceptable because of the extremely sheltered nature of these shorelines. Island "C" has outer berms that have been shortened to 25 feet. These islands are located within a sheltered complex where wind fetch is much smaller than a half mile which is often a criteria for the need for erosion protection. The submerged berm is another factor in support of the smaller berm dimensions. Much of the sand is already in place for the beach zone. Little additional erosion of the berm would be necessary to produce a stable beach.



Figure 13 Split Island Cross Sections

4.5 Topsoil

Topsoil is needed on the islands to produce more diverse vegetation. A half foot of topsoil will be placed on the berms. On exposed sides of the islands half of the berm will receive topsoil. The remaining sand is considered sacrificial and will be allowed go into beach formation. The higher portions of the islands (sections A and C) will receive a thicker layer of one foot of topsoil to improve the prospects of vegetation and provide addition moisture retention in these areas that are further from the water table.

5 Erosion Protection

The EMP Environmental Design Handbook was used when considering if shoreline erosion protection was necessary on the proposed islands. Table 4-2 in the Handbook itemizes several factors and estimates a combined score that is then used to assess the need for bank stabilization methods. The following shows the results:

Table 2 Need for Bank Protection - Assessment

Factor		Value
River Currents	none	0
Wind Fetch	0.6 miles	0
Navigation Effects	none	0
Ice Action	minimal	3
Shoreline Geometry	skewed to wind axis	2
Nearshore Depths	<2 considering constructed submerged berm	0
Nearshore Vegetation	none	3
Bank Conditions	sand and silt	3
Local Sediment Source	none	1
Total		12

The value of 12 indicates the boundary between “Bank Stabilization Not Needed” and “Further Analysis Needed”. It has been decided to use groins along all outer surfaces of the islands. Consideration may be made for the more protected areas at a future date when detailed plans are available.

The use of 25 foot long groins are recommended along the outer shorelines of the islands. This is more important for the islands facing the large basin in the south of the lake. If all of the islands are constructed in a single an action, it may be possible to reduce the number of groins on the more protected islands where wind fetches would be less than one half mile. The groin spacing of 100 feet is recommend (4 times groin length) since the groin length is shorter than usual. The 25 foot length is based on the 30 foot length of the submerged berms. The groins would be placed on top of the submerged berms need to be shorter to insure the outer slope falls on the berm. The elevation of the groins would be equal to (regular) berm at 689.1 (1988 NAVD). Side slopes of the groins will be 1.5 horizontal to 1 vertical. A 5 foot tie in will be added to the groin (1 foot thick).

Ice is not expected to be a significant issue affecting the long term functionality of the groins. The most southern of the proposed islands would have a fetch of about 1 mile. The south facing ends of some of the groins could be given a flatter slope to make expanding ice ramp over the groin ends. The thickness in rock in the groins is about 2-2.5 feet. The thin rock layer would make it more difficult to put a slope (e.g. 5H:1V) on the groin ends. It may make more sense to leave the groin crest elevation constant and let the ice re-work the groin. Over time the groins would become more stable.

Figure 14 shows the proposed end treatment for islands. The groin fields transition to a series of three 25 foot riprap segments with 25 foot tie back (1 foot thick and 3 foot wide). The sand berm is extended another 25 feet to allow for the placement of the riprap segments.

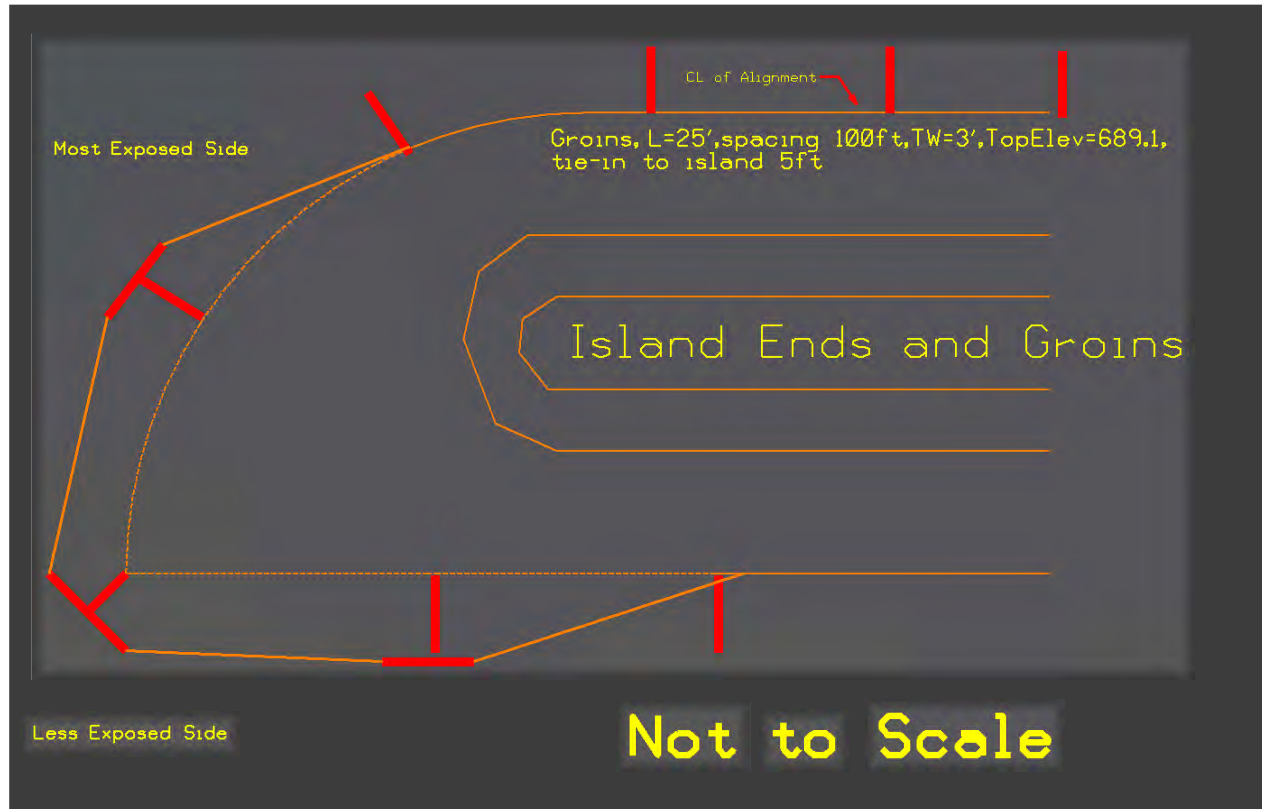


Figure 14 Typical Treatment of Island Tips

6 Island Alternatives

The production of island alternatives was structured around a basic pattern that would be 'naturalistic'. This can be very subjective but an understanding of basic geomorphic principals can help produce island archipelago geometry that would be similar to other areas on the Mississippi River that were created by the river. Pigs Eye Lake was never island studded body of water. As well as we know it has been a lake for many thousands of years.

The patterning of islands within Pigs Eye Lake was produced after making a few assumptions. The first assumption was that the old pre-historic river channels entering the lake from the north were still active. The question is asked. How would sediment from these channels be distributed if it entered Pigs Eye Lake?

Considerations include:

- Uses existing shoreline as shoreline for primary channels

- Consider the primary wind directions and try to provide a wave sheltering pattern that minimizes wind fetch along the dominant wind directions.
- Provide a naturalistic deltaic/anastomosing planform. Asymmetrical branching where deposition along a greater channel will extend further than along a lesser channel.
- Scale of island width and length is based on the curvature of the existing lake shoreline.
- Self similar patterning – Repeating patterns at decreasing scale (e.g. crab claw within crab claw etc.)
- Insure that assumed flow patterns are acceptable and would allow water circulation within the island complex.
- Island layout indicates the direction of the assumed flow pattern. Island segments terminate at the downstream end based on assumed flow paths.
- Provide multiple ‘embayment’ sizes for a varied habitat with different degrees of sheltering.
- Provide substrate for vegetation

A ‘crab claw’ type island complex typical of anastomosing river (where multiple channels divide and recombine) would be a reasonable island type for this region. Several of these types of island patterns can be seen on the Mississippi extending from Pool 2 for hundreds of miles.

Figure 15 and Figure 16 show an idealized form of an island complex for an anastomosing river system. At this point cost and other practicalities have not been included in the plan. The primary constraint in the plan is to keep cost acceptable to stakeholders and to keep the total sand volume in the same range as expected sand availability.

Several island alternatives have been devised that attempt to provide as much of the character and habitat value of a natural island complex but are more economically viable while continuing to maximize habitat value.

Constraints on sand volume and cost required thinner islands. This optimized the wave reduction in relation to island cost. The length of the islands was also reduced to try to bring costs and sand volumes into acceptable ranges. Reduction of the lengths of the islands does have an effect on the wave sheltering ability of the island complex. The larger gaps between islands and the greater size of inter-island corridors means that larger waves would be present but should still be significantly reduced from existing conditions. It is difficult to determine the significance in sediment re-suspension between the island alternatives. We can say that quieter water should provide better water quality. Figure 17 through Figure 20 show plan views of the island alternatives.

Alternatives 1, 2, and 4 have a wider 'Full' island cross section. Alternatives 3 and 5 are alternate versions of Alternative 2 and 4 respectively. These two alternatives replace the single wider island section (Section "A") with the 'split' island cross sections ("B" and "C") for several of the primary islands. These two alternatives provide the very quiet sheltered bays.

Alternative 5m adds a sand layer (approximate 1 foot thickness) to the interior of the embayments of Alternative 5 (The "m" in the alternative name stands for "marsh"). Alternatives 6m and 7m are similar layouts that were reduced in size to lower project costs while retaining as much of the function of the larger alternatives as was possible. The selected alternative is Alternative 6m (Figure 21).

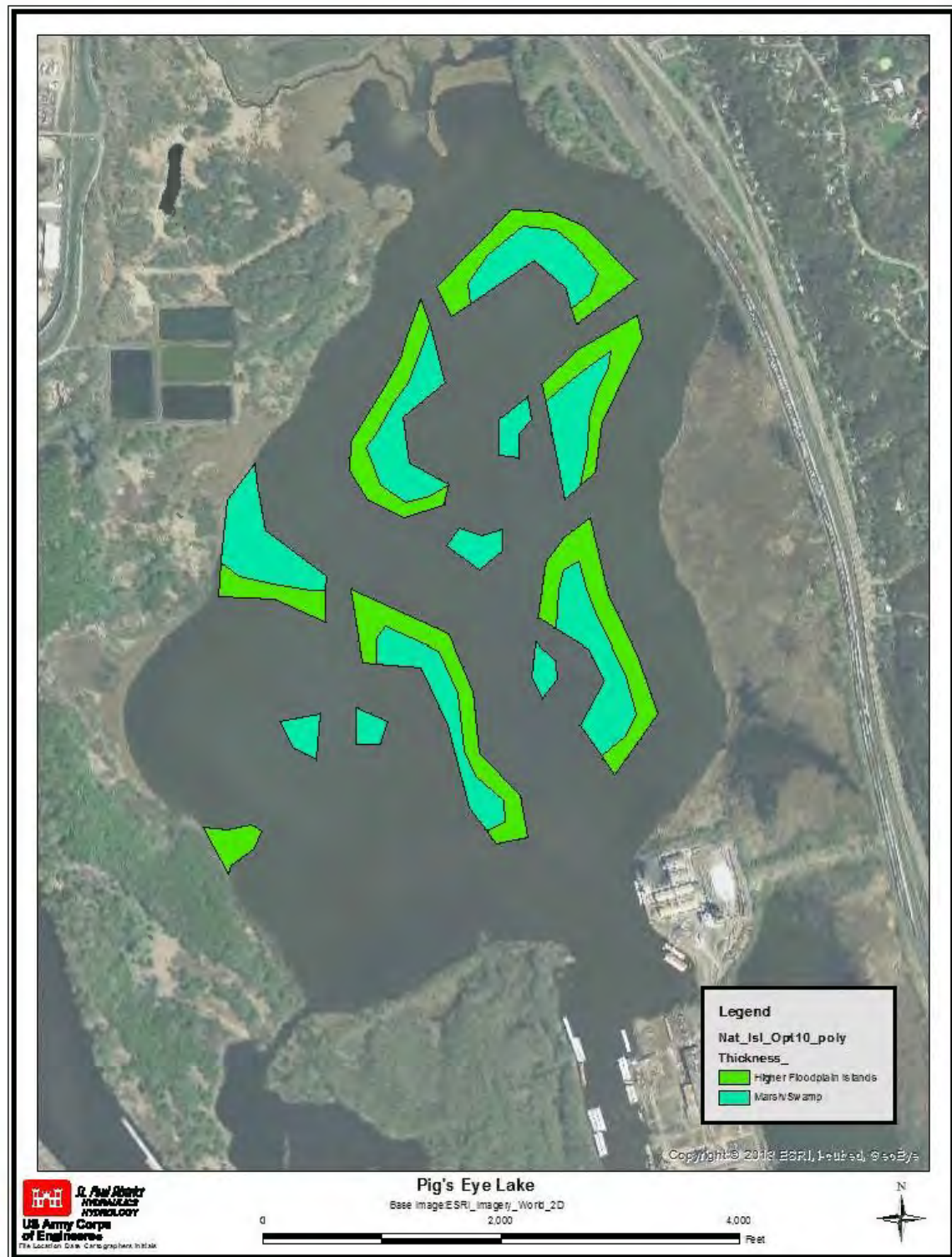


Figure 15 Idealized Island Layout

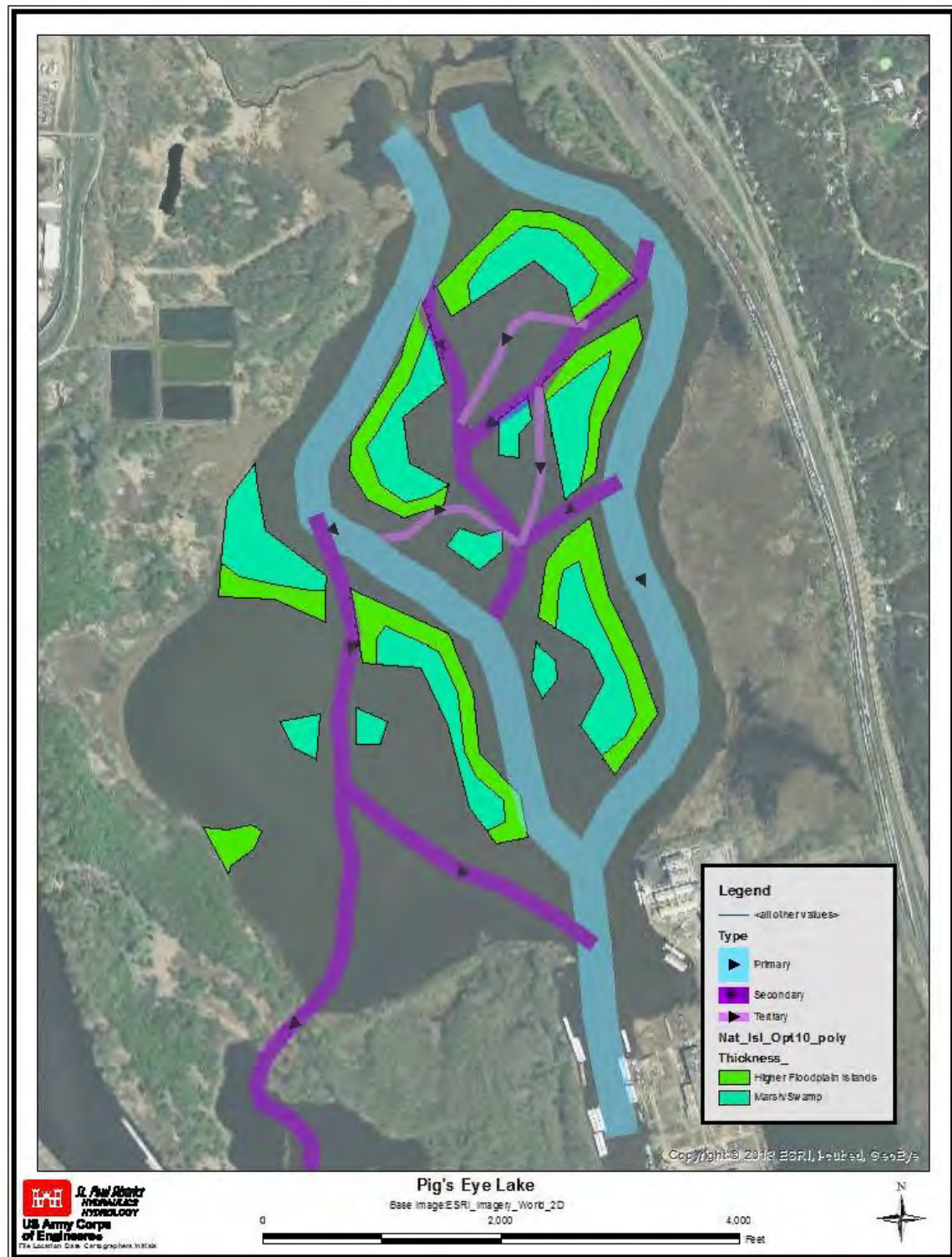


Figure 16 Idealized Island Layout showing Flow Paths



Figure 17 Island Alternatives (Part 1)



Figure 18 Island Alternatives (Part 2)

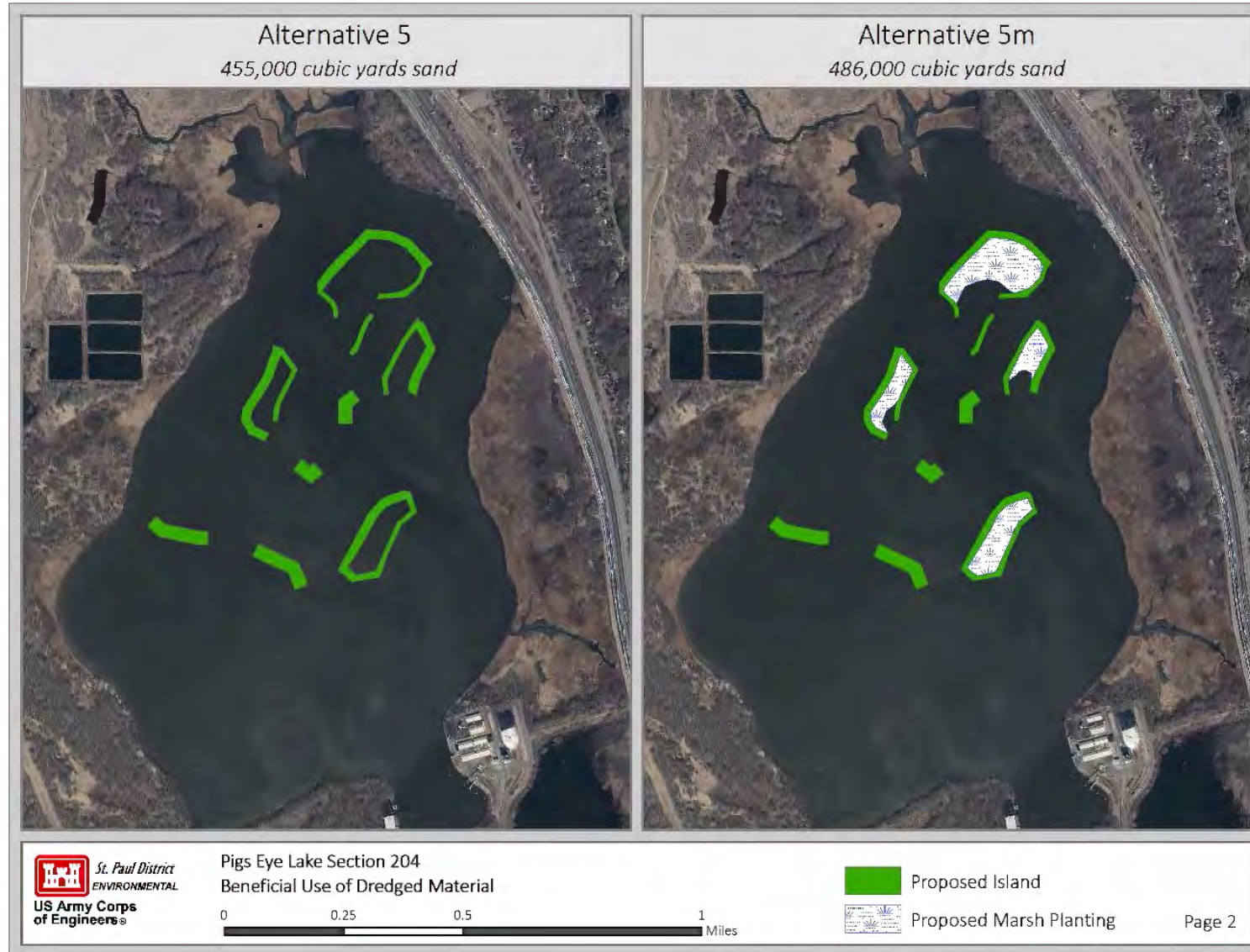


Figure 19 Island Alternatives (Part 3)



Figure 20 Island Alternatives (Part 4)



Figure 21 Selected Alternative (Alternative 6M)

7 Effects of Climate Change on the Project

A study was done looking at climate change and trends to river flows on the Mississippi and Minnesota Rivers. This document is attached (Appendix G - Attachment 1). The Mississippi River average annual discharge has risen about 40 percent at Saint Paul (comparing the periods 1948-1980 and 1981-2015).

Figure 4 shows the Operating Curves for Pool 2. Stages are controlled by dam operation. They are held constant (686.8 feet NAVD88) at the South Saint Paul gage (green line in the figure) for river discharges at or below 15,000 cfs. Figure 2 currently shows April-October inundation of about 50 percent (30 percent for the entire year). These stages at the South Saint Paul gage would be very similar for Pigs Eye Lake since it is directly across the channel from the gage. Water rises for higher discharges and will completely inundate the higher parts of the islands (elevation 689.1) at a discharge of around 30,000 cfs. This complete overtopping would occur about 20% of the time during the growing season (April-October) and 14% of the time over all twelve months.

The primary effect of generally increasing discharges will be the increased duration of island inundation. No changes are expected to project water elevations for discharges below 15,000 cfs. However higher discharges will become more common if typical discharges continue to increase. Rising stages would increase the potential for erosion to the islands. Higher stages could increase erosion on the lower island areas in particular. Vegetation is an important component of erosion protection and increased flooding could impact vegetative quality and species.

Existing condition shoreline erosion would also be greater due to more common higher stages.

No additional features have been changed in the project design as a result of anticipated climate change.



**US Army Corps
of Engineers®**
St. Paul District

Appendix H: Minnesota EAW Supplement and ROD Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

Minnesota EAW Item Identification

A supplement prepared for Ramsey County to identify locations of EAW Items within the Feasibility Study Report and Integrated Environmental Assessment.

1. Project Title: Pig's Eye Lake Ramsey County, MN Section 204

2. Proposer – U.S. Army Corps of Engineers

Contact Person: Aaron McFarlane
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3. RGU – Ramsey County

Contact Person: Scott Yonke, PLA
Director of Planning and Development
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Maplewood, MN 55109-3796
Telephone: 651-363-3786
Email: scott.yonke@co.ramsey.mn.us

4. Reason for EAW Preparation – Mandatory EAW

5. Project Location

See Chapter 1.3, Figure 1, and attached Topo Map (Exhibit 1)

County: Ramsey County, Minnesota

City: St. Paul

Watershed: HUC-8 = 07010206

Approximate GPS Coordinates of project extent (NAD83, UTM Zone 15N, meters):

Northern-most island	498014E	4974535N
Western-most island	497220E	4973523N
Southern-most island	497746E	4973311N
Eastern-most island	498206E	4974125N

PLSS Sections within footprint: Ramsey Co. T28 R22W, Sections 10, 11, 14, and 15

6. Project Description

- a. EQB Monitor Summary** – The US Army Corps of Engineers, St. Paul District and Ramsey County are proposing to restore, protect, and create aquatic and wetland habitats by constructing islands and marsh in Pigs Eye Lake. The project would be constructed using material dredged to maintain the Upper Mississippi River 9-Foot Navigation Channel Project.
- b. Full summary** – Ch. 6
- c. Project Magnitude** – Total Acreage Directly Impacted: 63 Acres
- d. Project Purpose** – Chapter 1.3, with additional details in Chapter 3.2
- e. Future Stages** – None planned.
- f. Is this a subsequent stage** – No.

- 7. Cover Types** – Type of existing habitat converted: 63 Acres of shallow, open water; loose, mucky, and silty substrate; void of vegetation

Types of habitat created:

Islands -	23 acres
Marsh -	20 acres
Shallow littoral sandy-	20 acres

- 8. Permits and Approvals Required** – Chapter 6.3.3

9. Land Use

- a. Describe:**
 - i. Existing Land Use** – Ch. 2.1
 - ii. Planned Land use** – Ch. 6.1.5
 - iii. Zoning** – Ch. 6.1.5
- b. Compatibility with nearby land uses** – Ch. 6.1.5
- c. Identify land use compatibility mitigation** – Since no land use incompatibilities were identified, no mitigation is necessary or proposed.

10. Geology, soils, and topography/landforms

- a. Geology** – 2.3.1, Appendix F – Geotechnical Considerations
- b. Soil and topography** – Appendix F – Geotechnical Considerations

11. Water Resources

a. Features

- i. **Surface Water** – The proposed project would take place in Pig’s Eye Lake (Public Water Inventory: “Pigs Eye 62-4 P”), within Navigation Pool 2 of the Mississippi River (Exhibit 2). The lake is directly connected with the Mississippi River, and the river segment is listed by the MPCA as having an approved TMDL plan for: mercury in fish tissue and mercury in water column, and additional impairments of: PCB in fish tissue; perfluorooctane sulfonate (PFOS) in fish tissue; and turbidity. Battle Creek also flows into Pig’s Eye Lake, which is listed by the MPCA as impaired for chloride. The area is part of the MNRRA. The project area is not a designated wild, scenic, or recreational river segment. There are no designated Wildlife Lakes in Ramsey County, no designated trout lakes or streams are in the project vicinity, and no calcareous fens identified in project vicinity.

Additional descriptions of the surface water features directly impacted by the proposed project can be found in the report, in Sections 2.4, 2.5, 2.6, and 7.2.7.

- ii. **Groundwater** – No groundwater impacts are expected. The following considerations contributed to this determination:
 1. Depth to groundwater at the proposed placement site would be 0-feet as material will be placed into open water.
 2. The project and area is not within a WHPA (wellhead protection area) as of the most recent MN Department of Health WHPA map update (October 3, 2017).

b. Effects from project activities

- i. **Wastewater** – N/A – No wastewater is associated with the project.
- ii. **Stormwater** – N/A – No stormwater impacts are expected with the project.
- iii. **Water Appropriation** – N/A – The project will not involve water use.
- iv. **Surface Waters**
 - a) **Wetland alterations** – No wetlands have been identified in the project footprint. Therefore, no mitigation is necessary or proposed.
See report sections: Existing: 2.8.2; Effects: 7.2.3
 - b) **Other Surface Waters** – This project would involve the placement of fill in public waters. Ch. 6 describes the proposed project features and some of the best management practices that would be implemented. Environmental effects of the proposed actions are discussed in Chapter 7, organized by resource. Effects on Aquatic Habitat are discussed in 7.2.4. Effects on Water quality are addressed in 7.2.7. These effects are also discussed in the Clean Water Act 404(b)(1) analysis in Appendix B.

12. Contamination/Hazardous Materials/Wastes

- a. Pre-project conditions** – Ch. 2.3, 7.1.6, and Appendices E, F, and K
- b. Project-related generation of solid wastes** – The only solid waste that would be potentially generated by the project would be sediments dredged from within Pig's Eye Lake to create an access channel for barges to transport construction materials and equipment to the island locations. Any material generated in this manner would be incorporated into the proposed project as topsoil. Sediment testing shows this material to be suitable for this use (Appendix E).
- c. Project-related use/storage of hazardous materials**

The only expected hazardous materials to be used during construction would be fuels and oils for construction equipment. As part of the Corps' contracting procedure, any contractor would be required to prepare and submit for approval a spill prevention and control plan for these materials prior to construction.
- d. Project-related generation/storage of hazardous wastes** – No hazardous waste expected to be stored or generated during project construction or operation.

13. Fish, wildlife, plant communities, and rare features

- a. Fish, wildlife, habitat, and vegetation** – Ch. 2.6, 2.8, 2.9, 7.2
- b. Rare features** – Ch. 2.9.4, 7.2.9

Heritage Database License Agreement Number: LA-768

Information in the report regarding species listed by the State of Minnesota as endangered, threatened, or special concern was compiled using the Minnesota Natural Heritage Information System (NHIS) dataset. The following steps were conducted to locate potentially-affected rare species within the project area using the newest available NHIS layer (July 14, 2017 NHIS file update, accessed 20 February 2018) in ESRI ArcMAP:

- (1) A shapefile delineating a one-mile buffer around the proposed project area was created.
- (2) The "Select by Location" tool was used to select all polygons within the NHIS shapefile which intersected the buffered project area shapefile.
- (3) A list of unique species listed as endangered, threatened, or special concern with recorded Element Occurrences selected by this operation was recorded in Chapter 2.2.5 of the main report.
- (4) The metadata for records was examined and the results compared with the results of all available recent surveys of Lower Pool 2 to determine which species are likely to be extant within Lower Pool 2, and therefore potentially within the project footprint. Recent propagation efforts for freshwater mussels were also considered.

- c. **Effects** – Ch. 7.2.9
- d. **Avoidance, minimization, and mitigation of effects** – Negligible adverse impacts to fish, wildlife, habitat, or vegetation were identified. Construction disturbance would have the potential to temporarily disturb birds using the area. For the most part, construction would not occur in areas that would be expected to have high use during the construction season. Access is planned to occur through the heavily-used barge channel adjacent to the Red Rock Terminal. Avoidance and minimization practices would be applied to local bald eagles and birds if project activities are proposed by the contractor that could cause disturbance.

14. Historic properties – 2.10, 7.3

15. Visual – 7.1.2

16. Air

- a. **Stationary source emissions** - N/A
- b. **Vehicle emissions** – 2.7, 7.2.1
- c. **Dust and Odors** - 2.7, 7.2.1

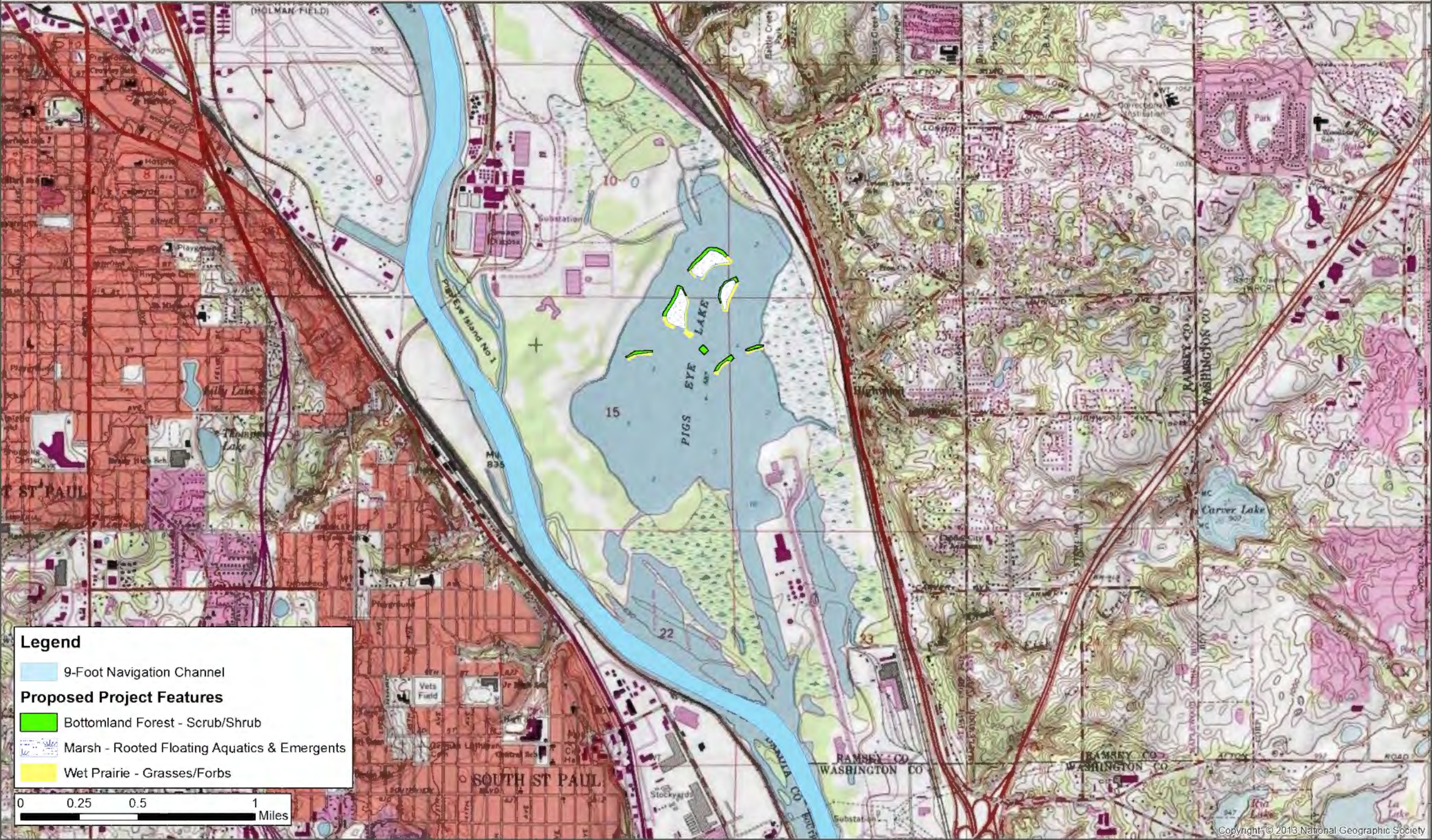
17. Noise – 7.1.1

18. Transportation – No transportation impacts are expected during construction or operation of the proposed project.

19. Cumulative potential effects – Ch. 7.4

20. Other potential environmental effects - N/A

Project Area Overview - 1:24,000 scale Topographic Map



**RAMSEY COUNTY
RECORD OF DECISION**

**In the Matter of the Determination of the
Need for an Environmental Impact Statement
for the Pigs Eye Islands Project in
Ramsey County, Minnesota**

**FINDINGS OF FACT
AND CONCLUSIONS**

FINDINGS OF FACT

1. The U.S. Army Corps of Engineers, in partnership with Ramsey County Parks & Recreation Department (Ramsey County) proposes to enhance and restore backwater habitat by creating island and wetland features within Pigs Eye Lake in St. Paul, Minnesota. Construction of project features would primarily use material dredged from the Mississippi River by the Corps of Engineers during routine maintenance of the navigation channel. A complex of seven islands would be constructed; three of these would incorporate wetland creation and plantings in the centers of the islands. Islands would be planted with a mix of native plants that would be appropriate for floodplain soils. The project would benefit the area by: (1) Serving as wind barriers within the lake to reduce sediment resuspension and shoreline erosion; (2) Improving habitat for migratory birds; (3) Stabilizing the lake bottom; and (4) Providing a positive and productive use of dredged material.
2. The U.S. Army Corps of Engineers, in partnership with Ramsey County prepared an environmental assessment worksheet (EAW) for the proposed project according to Minnesota Administrative Rules (Minn. R.) 4410.1400 and 4410.1500. The document was prepared as a mandatory EAW pursuant to Minnesota Rules, part 4410.4300, subpart 27A, Wetlands and Public Waters. As allowed by Minn R. part 4410.1300, the Federal Environmental Assessment (EA) that was prepared for the project was circulated in place of the Environmental Assessment Worksheet (EAW) form. The EA was appended by a document, Appendix H, which identified how the EA addressed each of the environmental effects identified in the EAW form.
3. The EAW was filed with the Minnesota Environmental Quality Board (EQB) and a notice of its availability was published in the EQB monitor on March 12, 2018. A copy of the EAW was sent to all persons on the EQB Distribution List and to those persons known by the Corps or Ramsey County to be interested in the proposed project. The EAW was made available to the public via posting on the Corps' website.
4. Pursuant to Minn. R. 4410.1600, the 30-day EAW public review and comment period began March 12, 2018 and ended at 4:30 p.m. on April 12, 2018. The public was provided the opportunity to submit written comments by the U.S. Postal Service or email, as well as by telephone.
5. The EAW is incorporated by reference into this Record of Decision on the determination of need for an environmental impact statement (EIS).
6. During the 30-day public review and comment period, correspondence was received from the individuals and agencies listed below. The comment letters are included in the Coordination and Correspondence Appendix of the main report. Discussion on comments received and responses are provided in Finding of Fact Number 7.

1. Telephone call from Mr. Daniel Richardson, Newport; *14 March 2018*
2. Telephone call from BioCleaner company, Monterey Park, CA; *21 March 2018*
3. Email from Minnesota Pollution Control Agency Remediation Division; *2 Apr 2018*
4. Minnesota Pollution Control Agency; *5 April 2018*
5. Friends of the Mississippi River; *5 April 2018*
6. Minnesota Department of Transportation, Metro District; *5 April 2018*
7. Minnesota Department of Natural Resources; *12 April 2018*
8. National Park Service; *12 April 2018*
9. Metropolitan Council; *12 April 2018*
10. City of St. Paul, Minnesota; *12 April 2018*

7. Each comment is summarized below with Ramsey County's Response following each comment.

Comment 1: The commenter indicated that a side channel near Newport, MN may contain sediments suitable for project construction. (*Mr. Daniel Richardson*)

Response: As discussed on the phone with the commenter, this opportunity is acknowledged and would be considered for potential future needs. The purpose of the current project is to utilize material dredged in support of the congressionally-authorized navigation channel for ecosystem restoration and because dredging the identified area near Newport would not support the authorized navigation channel, it cannot not be pursued as part of the proposed project.

Comment 2: The commenter solicited the sale of products and services to clean up organic wastes. (*BioCleaner*)

Response: No comments regarding the project were offered, and therefore, no response is provided.

Comment 3: The commenter indicates support for the project. Commenter notes that there is an area of contamination outside of the project footprint in the northern part of Pig's Eye Lake that will need to be addressed by other entities. (*MPCA Remediation Division*)

Response: Comment acknowledged.

Comment 4: The commenter provided several editorial comments. (*MPCA Remediation Division*)

Response: Comment acknowledged and typographical errors have been fixed in the final document.

Comment 5: Regarding EAW Item 17, commenter encourages project contractors to appropriately manage project construction noise and recommends limiting construction activities to the hours of 7 a.m. to 10 p.m. (*MPCA*)

Response: Comment acknowledged. Contractors will be obligated to comply with local noise regulations.

Comment 6: Commenter suggests partnering with local organizations to develop planting plans for the islands that would allow experimentation or study of responses to climate change and environmental stressors. (*Friends of the Mississippi River*)

Response: Comment acknowledged. Planting plans will be completed during the Design and Implementation phase of the project, and input will be sought at that time.

Comment 7: The Minnesota Department of Transportation has reviewed the project and provides no comments. (MNDOT)

Response: Noted.

Comment 8: Commenter requests additional explanation why direct shoreline stabilization was not carried forward in planning analyses and how benefits of creating habitat along the shoreline would compare to the proposed habitat creation. (MNDNR)

Response: Direct shoreline stabilization was considered but did not appear to provide as much benefit as the proposed plan. Using rock groins similar to what is proposed for the islands appeared to be technically feasible. However, this measure remained uncompetitive with the currently proposed alternative because it would only provide benefits in the form of protecting existing habitat, rather than enhancing and restoring additional habitat as the proposed project would. Placing a blanket of sand around the perimeter of the lake instead of rock groins was also considered. This would likely have more habitat value than the rock groins, but the cost to benefit ratio would again be higher than the selected alternative which both restores a substantial quantity of habitat and provides some protection for the shoreline. These measures could be considered in the future as additional projects.

Comment 9: Commenter questions how the setting of the proposed project compares with other island building projects completed in the past, and whether additional risks and uncertainties were identified for the proposed project. (MNDNR)

Response: The Corps has constructed islands for habitat restoration and enhancement purposes throughout the Upper Mississippi River, under widely varied conditions. Often, they are areas of the floodplain that were likely once ephemeral marshes that were permanently inundated following hydrologic alterations. Many of these areas have faced similar problems to Pigs Eye Lake with large expanses of open water and loose, silty sediments. The largest uncertainty identified is the extent of settlement, and these risks have been incorporated into project design through adding contingencies.

Comment 10: Commenter requests quantification of the excavation that may be required to gain access to the lake for island construction, what the disposition of any dredged material would be, and asserts that additional environmental review may be necessary. (MNDNR)

Response: The necessity of or amount of dredging for access into Pigs Eye Lake are both uncertainties at this time. The goal of this stage in planning is to verify that the construction would be feasible, with the intent to continue coordination as project designs progress. A variety of construction methods were considered during planning to broadly assess whether they were generally feasible, including methods that would not require access dredging. Preliminary testing of the lake sediments revealed a number of areas that could provide suitable topsoil and would potentially benefit the lake by creating bathymetric variability. If construction methods are selected which require additional environmental review, reviews would be conducted as needed.

Comment 11: Commenter requests clarification of if and how the project construction schedule may overlap with the sensitive nesting period of April 1 – July 15. (MNDNR)

Response: The project schedule is dependent on many unknown factors at this time, including funding. The Corps and Ramsey County will continue coordination on the topic of construction timing and best practices or restrictions to limit disturbance to sensitive wildlife as project design advances.

Comment 12: The commenter has provided editorial comments and supplemental information that is suggested for inclusion within the report related to species present in the project area, project coordination needs, and fish movement studies. (*MNDNR*)

Response: Supplemental information has been incorporated into the report as appropriate.

Comment 13: The commenter states they have no objections to the project and support the proposed work. (*National Park Service – Mississippi National River and Recreation Area*)

Response: Noted.

Comment 14: The commenter would like Pigs Eye Lake to be referenced a wetland throughout the document as they believe the area functions as a wetland and is classified as a wetland on Minnesota state wetland mapping. (*Metropolitan Council*)

Response: The open water area of Pigs Eye Lake does not meet the definition of a wetland. Although the area is inundated at sufficient frequency by surface water to create the hydrologic and soil conditions to meet the legal definition of a wetland, the area does not support “a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR §328.3(b)). As such, the area is referred to as a contiguous, shallow, backwater floodplain lake. The reference in Chapter 6.5 of the report is a typographical error and will be changed to reflect this fact.

Comment 15: The commenter believes that the Corps should collect water quality samples prior to progressing on the project as a means of certifying that improved habitat conditions could be realized following a project. (*Metropolitan Council*)

Response: The Corps goal within the feasibility planning process is to collect the data necessary to make decisions of how to design or whether to proceed with a project. Improving water quality is not an objective of the project, and is not an objective of the CAP authority under which the project is being planned. Therefore, the only reason additional water quality data would be needed is if water quality was identified as a constraining factor. Considering the ability for wetland plants to grow around the edge of the lake and the documented use of the lake by fish, birds, and mammals, there is no apparent reason to collect additional water quality data. The approximate residence time of water in the lake is a little less than 5 days. This relatively short residence time suggests that there is probably not enough time for sediment contaminants diffusing into the water column to concentrate up to levels far exceeding what is seen in Pool 2 of the Mississippi River. No further action or change to the plan is required as a result of this comment.

Comment 16: The commenter expresses concern that the eroding shoreline may be a result of water fluctuation and plants dying due to toxic water quality and thus the project would not improve the habitat conditions of Pigs Eye Lake. (*Metropolitan Council*)

Response: The comment is acknowledged. The Corps and Ramsey County are not aware of any evidence that would suggest contaminants are a cause of vegetation loss in Pigs Eye Lake. Contamination concerns have been closely coordinated with the Minnesota Pollution Control Agency - the state experts and regulatory authority. The plan has been designed to avoid impacting areas where higher levels of contamination are present. Historic sediment studies were collected and substantial additional sediment testing within the lake was conducted with input from the MPCA and Metropolitan Council, as presented in the main feasibility report and Appendix E. Healthy plant communities exist behind the eroding shoreline at similar elevations, suggesting that upon reduction of wind fetch a healthy plant community will reestablish. No further action or change to the plan is required as a result of this comment.

Comment 17: The commenter expresses concerns about the suitability of establishing woody plants on the islands and requests additional study be completed on what species may be more adept at establishing in the project setting. (*Metropolitan Council*)

Response: A detailed planting plan will be developed during the design and implementation phase, which will more closely consider the appropriate species for the site conditions. This will be developed in consultation with applicable resource agencies and the monitoring and adaptive management will provide the ability to adjust as necessary.

Comment 18: The commenter is concerned about the settlement of the islands during construction and wants to know what would occur if settlement in excess of what is expected takes place during and post construction. (*Metropolitan Council*)

Response: The settlement estimate was developed utilizing knowledge obtained from experience constructing islands on the river. The amount of material estimated to be required for construction was developed with large contingencies to account for the uncertainties regarding settlement. The successful completion of the project will hinge on meeting standards outlined in the Plans and Specifications developed in the design phase of the project. The roles and responsibilities of the operation and maintenance of the project post construction will be outline in the Project Partnership Agreement as well as in the operation and maintenance manual that is developed prior to completion of the project. No further action or change to the plan is required as a result of this comment.

Comment 19: The commenter is questioning who will have monitoring and maintenance responsibility following the construction of the project. They also request additional details regarding the monitoring and adaptive management plan, specifically when the project Sponsor would obtain sole responsibility and what that means from a funding perspective. (*Metropolitan Council*)

Response: The monitoring and adaptive management responsibilities will be further detailed during the Project Partnership Agreement development and the design and implementation phase of the project. Additional details are not typical at the feasibility phase of the project. Ultimately the Corps will ensure that the project is completed to design specifications before closing out the project and moving the project to Sponsor responsibility.

Comment 20: The commenter claims that it is unlikely that neither hardstem nor softstem bulrush will spread sufficiently to prevent shoreline erosion due to the “frequency and extent of bounce in the basin”. (*Metropolitan Council*)

Response: The comment is acknowledged, and will be considered during planting plan development. Bulrush is present around the perimeter of the lake, growing at similar elevations to what is proposed. No further action or change to the plan is required at this time as a result of this comment.

Comment 21: The commenter is concerned with the use of benthic material from the basin for the purposes of topsoil on the constructed islands. (*Metropolitan Council*)

Response: It is not anticipated at this time that the project would utilize benthic muds for topsoil. If preparation of project plans and specifications leads to a proposal to utilize material from Pigs Eye Lake for topsoil, existing contaminant data would be examined and additional testing may be required to ensure the material is acceptable for this use. MPCA, the regulatory authority and regional experts on contamination have been closely consulted with during the development of the feasibility study. No further action or change to the plan is required as a result of this comment.

Comment 22: The commenter is concerned about the project “promoting unrestricted public access for recreation.” Specifically, the commenter is worried about drawing the public into the dump site as well as the lack of a safe public access to the area. (*Metropolitan Council*)

Response: The authority in which this project is proposed is specifically to restore, protect, and create aquatic and wetland habitats. The promotion of recreation is not a project objective. The project area is presently under public ownership; the project would not alter access or land ownership. It is noted that the Regional Park and five-year Capital Improvement Plan will need to be updated by the project Sponsor. No further action or change to the plan is required as a result of this comment.

Comment 23: The commenter is concerned about the likelihood of significant quantities of benthic material discharging into the Mississippi River during construction. The commenter requests the Corps clarify their position on the likelihood of this situation occurring and how it expects the potential mud wave to dissipate without mixing into the water column. (*Metropolitan Council*)

Response: As stated in the feasibility report (pg. 63), construction techniques to reduce the risk of mud waves would be used. Several potential specific measures were discussed during project planning meetings, but were not discussed in detail within the report because: (1) The appropriateness of these measures would be dependent on the construction methods selected by the contractor, and (2) The necessary measures may change as more detailed plans and specifications are developed. Contractors would be required to meet all permit conditions including those identified in the Clean Water Act Section 401 Water Quality Certification provided by the MPCA as well as the Public Waters Work Permit provided by the DNR. Contractors’ plans for environmental protection would be reviewed for acceptability by the Corps as part of the contracting process and quality control would be performed by the Corps during construction. This allows for potential innovative construction techniques, while at the same time requiring that unacceptable impacts are avoided.

Comment 24: The commenter questions the presence of reptiles and amphibians in the project area and is concerned about creating habitat that could attract reptiles and amphibians to an area with contaminated benthic material. (*Metropolitan Council*)

Response: The study teams collaborated closely with local wildlife experts from key state and federal agencies. The plan has been designed to avoid impacting areas where high levels of contamination are present. Historical sediment studies were reviewed and substantial additional sediment testing within the lake was conducted with input from the MPCA and Metropolitan Council, as presented in the main feasibility report (Sec. 7.1.6) and Appendix E. No further action or change to the plan is required as a result of this comment.

Comment 25: The commenter suggests that Battle Creek flows be entirely isolated from the rest of the basin with a floating silt curtain during construction to ensure that disturbed contaminated benthic material isn’t carried into the Mississippi River. For the same reason the commenter requests that all barge movement also occurs behind a silt curtain. (*Metropolitan Council*)

Response: This comment suggests that benthic material in the construction area is contaminated to a level that would require special precautions take place. It is important to note that Corps projects are required to avoid being constructed on Hazardous, Toxic and Radioactive Waste (HTRW). Therefore, substantial investigation and coordination went into determining if the benthic material did or did not reach the levels of HTRW or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) level material. Analysis and coordination of HTRW testing results indicated that: (1) CERCLA materials in the project area are at acceptable levels for construction of the proposed project

features, and (2) Constructing the proposed ecosystem restoration features within the lake would have positive incidental benefits to the lake and surrounding areas. As a result of these facts, no further action or change to the plan is required as a result of this comment. Construction of the project will be required to meet the conditions of the Clean Water Act Section 401 Water Quality certification provided by the MPCA as well as the Public Waters Works permit provided by the DNR. Compliance with these conditions would assure that water quality downstream is not significantly adversely impacted by project construction.

Comment 26: The commenter is concerned about utilizing data obtained from the New Orleans area to estimate consolidation values and suggested that we obtain a local sample to estimate the consolidation value. (*Metropolitan Council*)

Response: In the feasibility phase of the project the estimation utilizing available data was sufficient to determine that the project will be feasible. Additional testing, if required, will occur during the design and implementation phase of the project. No further action or change to the plan is required as a result of this comment.

Comment 27: The commenter recommends that the Monitoring and Adaptive Management plan annually review the number of reported bird strike by month following the construction of the project and prepare a mitigation plan if an observed change occurs. (*Metropolitan Council*)

Response: The project was closely coordinated with the Metropolitan Airport Commission (MAC) and the Federal Aviation Administration (FAA). The results of that coordination were changes to the project plans as outlined in the report that appeased the concerns of the MAC and FAA. The monitoring of bird strikes will not be a responsibility of the Corps or Sponsor.

Comment 28: The commenter has concerns regarding the long-term stability the project. Specifically, the commenter is concerned about the success of vegetation establishment as it is a critical aspect of habitat creation and island stability. (*City of St. Paul*)

Response: The concerns of the commenter are noted; however, there is no evidence to suggest that vegetation will not establish. There are strong plant communities throughout the basin and with the reduction of wind-generated wave erosion, vegetation is expected to establish. If problems are discovered during the 10-year monitoring and adaptive management period, measures will be taken to correct the problem. No further action or change to the plan is required as a result of this comment.

Comment 29: The commenter asserts that the proposed maintenance budget is “woefully inadequate” and that there is not enough detail on adaptive management practices that could be utilized to address the problems. (*City of St. Paul*)

Response: The monitoring and adaptive management plan presented as Appendix J in the feasibility study was developed to address the largest uncertainties of project performance identified during project planning. Monitoring commences upon construction completion and is continued up to 10 years, or until ecological restoration success is documented. The budget for monitoring and adaptive management presented in the report was developed based on cost estimates from those who have completed the proposed tasks in the past, and is consistent with congressional authorizations for monitoring and adaptive management. Similar ecosystem restoration projects planned and constructed by the Corps have required very minimal adaptive management to meet similar success criteria. The detail put forth in the study is adequate for feasibility phase purposes; further detail on adaptive management will be developed in the design and implementation phase of the project. No further action or change to the plan is required as a result of this comment.

8. Based upon the information contained in the EAW, Ramsey County has identified the following topics of potential environmental effects associated with the proposed project:
 - a. Water Resources
 - b. Wildlife and Habitat
 - c. Visual Effects
 - d. Air
 - e. Noise
 - f. Cumulative Potential Effects

The environmental effects identified are briefly summarized below, with reference to further discussion on each topic in the project's feasibility report.

- a. Water Resources

This topic was addressed in the EAW under item 11, and in the EA Chapters 2.4, 2.5, 2.6, and 7.2.7, and in the Clean Water Act Section 404(b)(1) analysis in Appendix B.

The proposed project would take place in Pig's Eye Lake (Public Water Inventory: "Pigs Eye 62-4 P"), within Navigation Pool 2 of the Mississippi River (Exhibit 2). The lake is directly connected with the Mississippi River, and the river segment is listed by the MPCA as having an approved TMDL plan for: mercury in fish tissue and mercury in water column, and additional impairments of: PCB in fish tissue; perfluorooctane sulfonate (PFOS) in fish tissue; and turbidity. Battle Creek also flows into Pig's Eye Lake, which is listed by the MPCA as impaired for chloride. The area is part of the MNRRA. The project area is not a designated wild, scenic, or recreational river segment. There are no designated Wildlife Lakes in Ramsey County, no designated trout lakes or streams are in the project vicinity, and no calcareous fens identified in project vicinity.

There would be a temporary, minor adverse effect on water quality in the project area during construction. Localized increases in suspended sediment and turbidity are likely. Sediment testing showed that the lake sediments within the proposed island footprints have some levels of contamination by PFCs, low level (SQT I) exceedances for heavy metals and PAHs, limited locations with higher exceedances for cadmium and PAHs (SQT II and proposed Recreational/Residential SRVs) and no recent detection of PCBs. The relatively low levels of contamination (SQT I exceedances) present in the existing substrate would not pose a large risk of bioavailability or uptake of contaminants, and placing clean sand on top of the existing sediments to construct the proposed islands would probably benefit the aquatic and benthic environment by capping serving as an additional barrier to contaminant mobility. Local and regional resource agencies have been coordinated with and are supportive of this determination, and coordination will continue into the next project phase to develop strategies for further minimizing risks. BMPs based on the construction techniques would be coordinated with the MPCA and incorporated into the project to minimize effects. In the long term, the project is expected to have a beneficial effect to local water quality in Pigs Eye Lake due to reduction in wind-generated waves and establishment of additional aquatic vegetation.

- b. Wildlife and Habitat

This topic was addressed in the EAW under Item number 13, in the EA in chapters 2.6, 2.8, 2.9, and 7.2.

In summary, only negligible adverse impacts to fish, wildlife, habitat, or vegetation were identified. These would be temporary due to the disturbances from construction activities. Construction disturbance would have the potential to temporarily disturb birds using the area. For the most part, construction would not occur in areas that would be expected to have high wildlife use during the construction season. Access is planned to occur through the heavily-used barge channel adjacent to the Red Rock Terminal. Avoidance and minimization practices would be applied to local bald eagles and birds if project activities are proposed by the contractor that could cause disturbance. The localized and minor increases in turbidity would likely cause aquatic organisms to avoid the area during construction, but these organisms would return following project completion.

In the long-term, the proposed project would have substantial beneficial effects to terrestrial habitat, wetlands, aquatic habitat, and habitat diversity and interspersed by creating new areas of terrestrial and aquatic habitat and protecting existing areas.

c. Visual Effects

This topic was addressed in the EAW under Item number 15 and in the EA in chapter 7.1.2.

The proposed project would cause temporary, minor, adverse impacts on aesthetics during construction. The aesthetic value of the areas would be reduced as a result of the activity and disturbance associated with construction and the presence of construction equipment.

The proposed project would also have long-term beneficial impacts. Impacted entities would be residences on the bluffs to the east of Pigs Eye Lake that currently overlook the project area and recreationists. Construction of the proposed project would change some views of the area from vast expanse of open water to interspersed, vegetated islands. Although aesthetic values are somewhat subjective, the islands would likely be considered aesthetically pleasing to most.

d. Air

This topic was addressed in the EAW under Item 16, and in the EA in chapters 2.7 and 7.2.1.

During project construction, the project would have a temporary, minor, and localized adverse effect on air quality due to emissions produced by construction equipment. Air quality impacts generated by the project would be indistinguishable from the adjacent railroad tracks, Highway 10/61, a barge shipping facility, and wastewater treatment plant, and would not be expected to individually or cumulatively significantly change air quality in the area. This would be short-lived and would disappear upon project completion. Construction activities are expected to produce very little dust because the materials to be handled would be either wet (dredged material) or larger materials than are generally mobilized by wind (large rocks for training structure construction).

e. Noise

This topic was addressed in the EAW under Item 17 and in the EA in chapter 7.1.1.

The proposed project would cause temporary, minor, adverse impacts on local noise levels during construction. The project area is relatively isolated, and any nearby noise receptors already experience noise generated by the adjacent railroad tracks, Highway 10/61, a barge shipping

facility, and wastewater treatment plant. The increased noise levels would be temporary and would disappear upon project completion.

f. Cumulative Potential Effects

This topic was addressed in the EAW under item 19 and in the EA in chapter 7.4.

Anticipated environmental effects of the project include water resources effects, wildlife and habitat effects, and visual effects. Additionally, short-term air and noise effects would be anticipated during project construction. All environmental effects would be expected to be limited to an area immediately surrounding the project site. Construction-related air and noise effects would be expected to be short-term, and would conclude at the completion of construction.

Short-term air and noise effects associated with the construction of the project are expected to have limited potential for cumulative effects due to the minor incremental increases of these effects during the project activities. Potential cumulative effects to water resources, wildlife and habitat, and visual effects from the project in combination with the other reasonably foreseeable future projects are discussed in chapter 7.4 of the EA

9. Ramsey County requested and was granted by the Minnesota Environmental Quality Board (MEQB) a 15-day extension for making a decision on the need for an EIS for the proposed project, consistent with Minn. R. 4410.1700, subp. 2b.
10. The following permits and approvals are needed for the project, and will be applied for during the next phase of project planning – design and implementation:

Unit of Government	Type of Application
DNR	Public Waters Work Permit
MPCA	CWA 401 Water Quality Certification

CONCLUSIONS

1. The following standards and criteria are applied by the RGU to determine whether the proposed project has the potential for significant environmental effects and requires the preparation of an EIS:

In deciding whether a project has the potential for significant environmental effects, the following factors shall be considered:

- a. *type, extent, and reversibility of environmental effects;*
- b. *cumulative potential effects;*
- c. *extent to which the environmental effects are subject to mitigation by on-going regulatory authority; and*
- d. *the extent to which environmental effects can be anticipated and controlled as a result of other environmental studies undertaken by agencies or the project proposer, including other EISs.*

2. *Type, extent, and reversibility of environmental effects*

Based on the Findings of Fact above, Ramsey County concludes that the following potential environmental effects, as described in Finding of Fact No. 8, will be limited in extent, temporary, or reversible:

- Water Resources
- Wildlife and Habitat
- Air
- Noise
- Visual
- Cumulative Potential Effects

3. *Cumulative potential effects*

Based on the Finding of Fact above, Ramsey County concludes that the following potential effects do not have the potential to be significant environmental effects:

- Water Resources
- Wildlife and Habitat
- Air
- Noise
- Visual

The proposed project's contribution to cumulative potential effects to water resources, wildlife and habitat, air, noise, and visual are limited when viewed in connection with other contributions.

4. *Extent to which environmental effects are subject to mitigation by ongoing public regulatory authority*

The following environmental effects are subject to mitigation by DNR regulatory authority:

- Water Resources
- Wildlife and Habitat

The following environmental effects are subject to mitigation by MPCA regulatory authority:

- Water Resources
- Air
- Noise

5. *Extent to which environmental effects can be anticipated and controlled as a result of other environmental studies undertaken by agencies or the project proposer, including other EISs:*

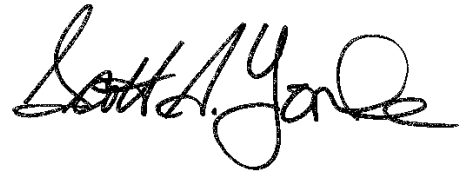
The following environmental studies and documents assist in the anticipation and controlling of potential environmental effects:

Upper Mississippi River Environmental Design Handbook, August 2006. This document provides design guidance for habitat projects involving items such as water level management, floodplain restoration and other features. It is a documentation of lessons learned and innovations in the Environmental Management Program (EMP).

Identifying, Planning and Financing Beneficial Use Projects using Dredged Material is a guidance document that was published jointly by the Corps and the U.S. Environmental Protection Agency (USEPA) in October 2007. In this document Habitat Development is identified as one of the most common and most important beneficial uses of dredged material.

Channel Maintenance Management Plan (CMMP) and Environmental Impact Statement (EIS)
The CMMP and accompanying Environmental Impact Statement (EIS) is the St. Paul District, U.S. Army Corps of Engineers' plan for channel maintenance and dredged material management for the UMR. The report was published in 1996. Much of the plan is devoted to the designation and design of dredged material placement sites. Included in this report is a discussion of the District's program for channel management.

6. Ramsey County has fulfilled all the procedural requirements of law and rule applicable to determining the need for an environmental impact statement on the proposed Pigs Eye Islands project.
7. Based on considerations of the criteria and factors specified in Minn R. 4410.170, subp. 6 and 7 to determine whether a project has the potential for significant environmental effects, and on the Findings and Record in this matter, Ramsey County determines that the proposed Pigs Eye Islands project does not have the potential for significant environmental effects.



Scott Yonke, Director of Planning and Development
Ramsey County Parks & Recreation Department

5/24/18

Date



**US Army Corps
of Engineers®**
St. Paul District

Appendix I

Cost Engineering

Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

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1 Introduction

As part of the integrated Pigs Eye Lake CAP Section 204 the Corps of Engineers has prepared a project cost estimate for the design and construction of aquatic and wetland habitats. This estimate is at the feasibility level of design detail, and costs are based on quantities developed from a preliminary design and layout. The estimate includes; lands and damages; construction; post construction monitoring; planning, engineering and design (PED); and construction management (CM) costs.

Guidance for the preparation of the estimate and attachments was obtained from ER-1110-2-1150 Engineering and Design Civil Work Projects; ER 1110-2-1302 Civil Works Cost Engineering; ETL 1110-2-573 Construction Cost Estimating Guide for Civil Works; ECB 2007-17 Application of Cost Risk Analysis Methods to Develop Contingencies for Civil Work Total Project Costs; and EM 1110-2-1304 Civil Works Construction Cost Index System (WCWWIS). The estimate was prepared using Micro-Computer Aided Cost Estimating System (MCACES Second Generation v4.3).

The quantity take-offs and MCACES inputs were peer reviewed, an executive summary of the MII can be found in Attachment 1.

2 Project Description

Pigs Eye Lake is a 628-acre, shallow backwater lake, situated southeast of St. Paul, Minnesota, within Pool 2 of the Mississippi River. The objectives of the project are to:

- *Improve aquatic habitat* – Create depth and habitat diversity in Pigs Eye Lake. Increase acreage of aquatic vegetation. Incorporate structural habitat features to promote fisheries.
- *Improve the quantity and quality of habitat for migratory bird species* – Create suitable habitat for migratory birds such as dabbling ducks within Pigs Eye Lake.
- *Maintain or enhance the quantity of shoreline habitat* – Protect existing floodplain forest and marsh habitat along the shoreline of Pigs Eye Lake from wind and wave erosion.

3 Description of Tentatively Selected Plan

The Tentatively Selected Plan, would restore backwater habitat by creating six islands with sand benches. Three of the islands would utilize a “split” design that would establish a sheltered area in the center, allowing for the inclusion of approximately 17.6 acres of marsh plantings. The recommended plan addresses all project objectives. The plan would cost approximately \$12.3 million and result in a net gain of 171 average annual habitat benefits at a cost of \$2,700 per average annual habitat unit.

4 USACE Civil Works Work Breakdown Structure (CWWBS)

4.1 CWWBS 01 Lands and Damages

This cost account includes the costs for both permanent and temporary acquisitions as well as administrative costs. These costs were provided by the St Paul District Operation and Maintenance Division.

4.2 CWWBS 06 Fish and Wildlife Facilities

This cost account includes the costs to construct islands and marsh wetland habitat utilizing permanent placement of dredged materials, rock groins, wetland planting, and seeding features.

4.3 CWWBS 30 Planning, Engineering and Design

This cost account includes project management, project planning, preliminary design, final design, geotechnical and HTRW investigations, preparation of plans and specification, engineering during construction, contract advertisement, opening of bids and contract award. The cost for this account was assumed to be 7.5% of the Fish and Wildlife Facilities cost account. This is assumed to be reasonable as the design is relatively straightforward (description of work) and is essentially the same design for all structures/features.

4.4 CWWBS 31 Construction Management

This cost account includes contract supervision, construction administration, technical management activities, and District office supervision and administration costs. The cost for this account has been estimated to be 7.0% of the Fish and Wildlife Facilities cost account since the construction is not assumed to be difficult utilizing methodology used in recent projects within the District.

5 Measures and Alternatives

The study team identified a variety of measures that could be taken to achieve project objectives, including full and split island designs, sand benches, and creation of wetland (marsh) habitat. The measures were combined in various logical combinations to form alternative project plans.

5.1 Measures

- No Action
- Sand Blanket
- Islands
- Sand Benches
- Marsh Creation/Enhancement
- Shoreline Stabilization
- Water Level Management
- Hydraulic Modifications
- Carp Enclosures

- Habitat Dredging

5.1.1 Preliminary Measures Eliminated from Further Consideration

- Sand Blanket
- Shoreline Stabilization
- Water Level Management
- Hydraulic Modifications
- Carp Enclosures
- Habitat Dredging

5.1.2 Measures Retained for Further Consideration

- No Action
- Islands
- Sand Benches
- Marsh Creation/Enhancement

5.1.3 No Action

The no action measure is defined as no implementation of a project to modify habitat conditions in the project area. Under future without-project conditions, habitat conditions in the project area would generally stay about the same or decline at a slow rate.

5.1.4 Islands

Benefits of islands include providing floodplain habitat, protection to shallow areas from wind and wave action and erosion, protecting existing aquatic vegetation, improving conditions for the growth of aquatic vegetation and increasing habitat diversity. Islands would be designed at an elevation of 687-690 feet above mean sea level. Higher islands provide increased terrestrial habitat and are not subject to seasonal submersion with fluctuating water levels.

5.1.5 Sand Benches

Benefits of sand benches include providing seasonal sandbar habitat under low water level conditions, improving substrate conditions through stabilization, and reduction of turbidity by reducing sediment resuspension.

5.1.6 Marsh Creation/Enhancement

Benefits of Marsh Creation/Enhancement include creating areas protected from wind, stabilizing substrate, increasing the amount of wetland habitat, and establishing emergent marsh and isolated wetland marsh important for fish and wildlife.

5.2 Alternatives

5.2.1 No Action Alternative

The No Action Alternative is the plan in which none of the measures or combinations thereof would be constructed, and there are no costs associated with the No Action Alternative.

5.2.2 Alternatives 4 – 7m

The alternative plans all contain the retained measures of islands and sand benches. The difference across alternatives is the quantity of dredged material required and inclusion/exclusion of marsh habitat. Three plans contain modified islands which allow for marsh habitat to be placed within areas further sheltered from wind and wave action, and are referred to as “split islands” as compared to the other “full” islands.

6 Cost Methodology

6.1 Price Level

The Pigs Eye Lake cost estimate is based on October 2017 prices, unless noted otherwise. Estimated costs are considered fair and reasonable for a prudent and capable Contractor and include overhead, profit, and bond. Based on the location of the project in Saint Paul, Minnesota, it assumed that no per diem will be required to be included in the estimate. Labor rates used were from published Davis-Bacon wage rates or Minnesota Department of Labor wage rates current as of August 2017. Equipment rates are from the MII 2014 equipment manual for region 4. Fuel costs were updated to reflect 2017 pricing. The 2015 MII cost book was used. Work was assumed to be divided among a prime contractor and multiple subcontractors. The prime contractor was assumed to be responsible for rock, earthwork, scour protection, and care of water. A marine contractor was assumed to be responsible for the temporary placement site unloading, transportation, and material offloading at the project site. A seeding contractor was used for completing seeding and planting operations.

6.2 Updated Prices

6.2.1 Labor Rates

Labor rates were revised on 14 August 2017. These wage rates for the most part reflect Davis Bacon rates for Ramsey County, Minnesota for heavy construction current at the time the estimate was updated. For labor categories that were not included or were not current in the Davis Bacon wage rate publication, the current Minnesota Department of Labor wage rates for heavy construction for region 4 were used.

6.2.2 Fuel Rates

Fuel Rates were updated using 14 August 2017 price levels published by the U. S. Energy Information Administration for the Midwest region. Off road diesel fuel was priced by subtracting estimated state and federal tax from retail diesel prices.

6.2.3 Material Quotes

Prices for large quantity items such as road aggregate, gravel bedding, riprap and boulders were updated based on quotes from local suppliers. Most of the material pricing reflect delivery cost to the site. For materials whose pricing does not include delivery costs to the site, transportation costs assume that material sources would be within 25 to 40 miles radius from the project. This was based on discussions with the material suppliers. Minnesota Sales Tax of 6.875% was applied to materials.

6.3 Mark-Ups

Cost Estimate Guidance for this study is based on “UFC 3-740-05 – HANDBOOK: CONSTRUCTION COST ESTIMATING (8 November 2010; change 1, June 2011).

6.3.1 Overtime

Overtime was based on a 5-day, 12-hour per day, work week with a multiplier of 1.5 for Monday through Saturday and 2.0 for Sunday.

6.3.2 Job Office Overhead

Job Office Overhead (JOOH) are those indirect cost a Contractor incurs as a result of a particular project and hence are charged directly to the project. Typical JOOH costs include, office trailers, Contractor’s surveys, work plans, safety plans, scheduling, safety officers, QA/QC officers, superintendent (including pickups and boats for their use), marine insurance, stormwater management, permits, small tools, and a Project Sign. 10.0% of the project cost was used and was applied as a running percentage.

6.3.3 Home Office Overhead

Home Office Overhead (HOOH) are those expenses incurred by the contractor in the overall operation of the business which are not associated with a particular project. A certain percentage of these expenses are charged to each project. HOOH includes such items as office rental or ownership costs, utilities, office equipment, office staff, insurance etc... The range of home office overhead can be quite broad and depends largely on the contractor’s annual volume of work and the type of work that is generally performed by the contractor. 5.8% of the project cost was used and was applied as a running percentage.

6.3.4 Mobilization/Demobilization

Mobilization costs for equipment include the cost of loading at the Contractor's yard, transportation cost from the yard to the construction site, including permits, unloading at the site, necessary assembly and testing, and standby costs during mobilization and demobilization. All labor, equipment, and supply costs required to mobilize the equipment should also be included in the mobilization cost.

Demobilization costs include that portion of the equipment that would be expected to be returned to the contractor's storage yard and may be expressed as a percentage of mobilization costs. All labor, equipment, and supply costs required for cleaning/prepping the equipment so that it is in the same condition as it was when it arrived at the site should also be included in the demobilization cost. Transporting rates should be obtained periodically from qualified firms normally engaged in that type work.

6.3.5 Profit

Profit was calculated using the seven part weighted guideline method in ETL 1110-2-573.

6.3.5.1 Prime Contractor Profit

Parameters for this method as applied to the Prime Contractor are as follows:

6.3.5.1.1 Relative Difficulty of Work

Relative difficulty of work is assumed to be above average level due to the majority of the construction being done in the wet during typical river construction seasons, and the unusual aspect of coordinating with another Contractor under separate contract to deliver the material necessary to construct the islands.

6.3.5.1.2 Size of Project

The estimated size of the project using the total construction cost is approximately \$10.5M.

6.3.5.1.3 Period of Performance

Time required to complete the project is approximately 2 years.

6.3.5.1.4 Contractor Investment

The Prime Contractor is assumed to do 40% of the work with the remaining to be done by a marine subcontractor.

6.3.5.1.5 Assistance by Government

Government assistance is above average with the Channel and Harbors temporary placement site being used as the material source.

6.3.5.1.6 Subcontracting

Subcontracting is based on the percentage of work be Subcontractors assumed to total 60% with the need for the marine subcontractor to support the equipment and transportation.

6.3.5.1.7 Degree of Risk

Degree of Risk takes into consideration all the factors above and is determined by taking the average of the weighted factors.

6.3.5.2 Subcontractor Profit

The profit estimated for the Wetland and Marine Subcontractors were calculated in the same manner as the Prime Contractor Profit with less risk and time, and no Government or additional subcontractor assistance.

6.3.6 Bonds

The Prime Contractor's bond was developed using bond tables for Class B bonds.

6.3.7 Owner Mark-ups

Owner mark-ups of 7.5% of the construction contract cost for planning, engineering, and design, and 7% for construction management costs are general estimates provided by St Paul District based on past project experience.

7 Construction Methodology

7.1 Staging Area and Site Access

General access to the project for delivery of equipment, materials, and personnel, will be by river and temporary construction docking. Marine transportation of gravel material between the temporary placement sites and the construction site is within the same pool and will not require locking.

Primary staging and storage areas will be located on work barges, the size required for storing materials and construction equipment when not being used depends on the number of excavators, backhoes, and dozers needed for production. Smaller staging area may be located adjacent to the project site off of Pigs Eye Lake Access Road to provide a location for office trailers, and parking for workers.

7.2 Material Sources and Disposal Sites

Gravel and fine material will come from Operation and Maintenance temporary storage islands, paid for under a separate funding source. All other material sources to be used will be based on the lowest price for materials of acceptable quality. Local commercial rock and wetland plantings sources are assumed to be within 20 to 40 miles of the project, based on discussions with local suppliers. Availability, demand, and pricing for materials are subject to change by the time the work is conducted.

7.3 Crews

Crews were created for work items not adequately provided in the MII Cost Book. These include island unloading and loading, and riprap placement. The makeup of the crews is based on industry market research regarding equipment load capacities and production rates, crew sizing, and current methodology information provided by the St. Paul District for similar projects.

7.4 Dewatering

It is intended that all work will be done by marine access in the wet.

7.5 Preparatory Work

It is assumed that access dredging will not be required for marine plant operation.

7.6 Main Project Feature

Work of this project is standard heavy civil works type construction that includes marine based plants, excavation, fill, riprap, plantings, topsoil and seeding. Standard marine and construction industry practices will be used for all work items.

8 Project Schedule

Anticipated construction schedule is during navigation season, typically May through November, using marine equipment. External factors such as potential spring flooding or adverse winter weather conditions could impact the project construction schedule. Other external factors such as breaks in the funding stream could impact schedule and costs. Based on current and expected CAP and O&M budgets

and project priorities within the St. Paul District, it is estimated that construction of the project would begin in 2018 and be completed in 2020. The optimum approach would be to construct the project under one construction contract.

Requirement	Scheduled Date
Submit final Feasibility Report and Environmental Assessment to Mississippi Valley Division, U.S. Army Corps of Engineers	November 2017
Execute Project Partnership Agreement with Ramsey County Parks & Recreation	December 2017
Obtain construction approval by Mississippi Valley Division U.S. Army Corps of Engineers	January 2018
Begin Plans and Specifications	January 2018
Complete Plans and Specifications	March 2018
Advertise for Bids	August 2018
Award Contract (FY19)	October 2018
Complete island construction	November 2019
Complete capping islands and floodplain forest plantings	November 2020

It is possible the proposed project could have some adverse effects to eagles, though such effects would likely be limited to disturbance during construction. The primary concern would be the disturbance of eagles during the nesting season, which generally occurs from mid-January to mid-June.

9 Cost Risk Analysis

The objective for developing a cost risk analysis (CRA) for a project is to identify and quantify uncertainties related to the project that could adversely impact costs or schedules. The end result of CRA discussion is the development of contingencies that are then applied to the individual CWWBS features. Since the total project costs are under the \$40 million threshold for implementation of a formal cost and schedule risk analysis, an abbreviated risk analysis was completed for this project. The risk based cost analysis spreadsheet used in the analysis was provided by the Cost Center of Expertise in the Walla Walla District. The developed cost risk analysis (CRA) for the Tentatively Selected Plan (TSP) is found in Attachment 2.

9.1 Contingency Discussion

The CRA discussion broke each measure out for discussion and after review of the project documents and discussion with the design team, contingencies were developed which reflect the uncertainties associated with the CWWBS features and applied to the individual alternatives represented for comparison. These contingencies are based on uncertainties in quantities, unit pricing, and items of work not defined or recognized at the time of feasibility design. Quantity and design uncertainties were assigned with input from designers while the Cost Engineers assigned the unit price uncertainties. The

levels of uncertainty for the estimate will generally be 10 to 15 percent for unit price items, and 10 to 25 percent for quantities and unanticipated items of work.

9.1.1 (01) Lands and Damages

Contingencies are 25.00%. The Operation and Maintenance Division of the St. Paul District Army Corps of Engineers provided the contingency and real estate estimate based on previous land leasing Pool 2.

9.1.2 (06) Fish and Wildlife Facilities

Contingencies are 21.99%. The design is at the conceptual stage. Additional features and details are likely to be added.

9.1.3 (30 12) Management Plan

Contingencies are 8.62%. The design is at the conceptual stage. Additional features and details are likely to be added.

9.1.4 (30) Planning, Engineering and Design

The estimate for this is based on a percentage of the construction cost with a contingency of 10.73%.

9.1.5 (31) Construction Management

The estimate for this is based on a percentage of the construction cost with a contingency of 12.70%.

10 Total Project Cost Summary

A total project cost summary (TPCS) has been developed for the estimated construction costs of the TSP, see Attachment 3. The TPCS spreadsheet used in the summary was provided by the Cost Center of Expertise in the Walla Walla District, and incorporates the cost for all feature accounts developed in MII, contingencies, and escalation to the midpoint of design (3 quarter FY 2018) and construction (4 quarter FY 2019). The estimated fully funded cost of the recommended project alternative is approximately \$16,486,000. Federal/non-Federal cost shares under Section 204 for this project are 65/35. The Federal cost share, including feasibility cost, is \$8,650,000, and does not include the Channels and Harbors contribution of \$4,658,000.

11 Monitoring and Adaptive Management

The Corps is responsible for determining ecological success for the ecosystem restoration projects it constructs. Cost-shared monitoring and adaptive management are assumed to extend for 10 years following project implementation. Monitoring tasks and project evaluation reports will be Corps responsibilities. The Monitoring and Adaptive Management Plan will observe and monitor the Pig's Eye Lake project for water quality, vegetation planting process, settlement rates, shoreline erosion, presence and introduction of invasive species, and migratory bird use rates.

11.1 Monitoring Costs

Pig's Eye Lake monitoring costs include the water quality sampling, bird counts, vegetation surveys, elevation surveys, and GIS analysis of the lake's shoreline.

11.1.1 Fall Waterbird Counts

The National Park Service would conduct fall bird counts at an estimated cost of \$7,000 per year for the 10 year monitoring period.

11.1.2 Vegetation Monitoring

Survey events would be conducted at years 1, 3, 6, and 10 following project implementation at an estimated cost of \$5,000 per event for the 10 year monitoring period.

11.1.3 Island Elevation Surveys

Two post-construction elevation surveys of the islands at an estimated cost of \$6,000 per event.

11.1.4 Water Quality Monitoring

Water quality sampling would be performed annually between the 5th and 10th year post project implementation at an estimated cost of \$7,000 per event.

11.1.5 Shoreline Erosion Analysis

Two aerial imagery events are to occur during the monitoring period. Analysis of the aerial imagery is estimated to cost \$2,000 per event.

Component	Cost Per Event	Total Cost
Fall Waterbird Counts	\$ 7,000	\$ 70,000
Vegetation Monitoring	\$ 5,000	\$ 20,000
Island Elevation Surveys	\$ 6,000	\$ 12,000
Water Quality Monitoring	\$ 7,000	\$ 35,000
Shoreline Erosion Analysis	\$ 2,000	\$ 2,000
Total		\$ 139,000

11.2 Adaptive Management Costs

Active adaptive management actions for the project may include tree, wet prairie, or marsh replanting and herbivory and weed control. Specific adaptive management replanting strategies have not been developed, but would follow the development of the detailed planting plan. Based on preliminary project cost estimates, adaptive management for vegetation are estimated to be as much as \$120,000 in

the event of an extreme failure. Actual vegetation adaptive management costs are likely to be much lower than that.

The passive adaptive management actions identified for water quality and shoreline erosion targets would not require additional funding in this project.



**US Army Corps
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St. Paul District

Appendix J Monitoring and Adaptive Management Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers May
2018

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1 Introduction

The St. Paul District, Army Corps of Engineers, in conjunction with Ramsey County, has prepared a plan for constructing islands in Pig's Eye Lake using dredged material from the Upper Mississippi River 9-foot Navigation Channel. The project is being studied under Section 204 of the Corps' Continuing Authorities Program, which provides authority for the Corps of Engineers to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized Federal navigation project. Section 2039 of WRDA 2007 directs the Secretary of the Army to ensure, when conducting a Feasibility Study for ecosystem restoration, that the recommended project includes a plan for monitoring the success of the ecosystem restoration. The implementation guidance for Section 2039, in the form of a CECW-PB Memo dated 31 August 2009, also requires that an Adaptive Management Plan be developed for all ecosystem restoration projects.

At the programmatic level, knowledge gained from monitoring one project can be applied to other projects. Opportunities for this type of adaptive management are common within Corps restoration projects. Lessons learned in designing, constructing, and operating similar restoration projects within the UMRS have been incorporated into the planning and design of this project to ensure that the proposed plan represents the most effective design and operation to achieve the project goal and objectives.

The adaptive management plan for the Pig's Eye Lake Section 204 project describes and justifies whether adaptive management is needed in relation to the proposed project management alternatives identified in the project feasibility study. This appendix outlines how the results of the project specific monitoring plan would be used to adaptively manage the project, including monitoring targets which demonstrate project success in meeting objectives. The intent of the project delivery team (PDT) was to develop monitoring and adaptive management actions appropriate for the project's goal and objectives.

Adaptive management provides a process for making decisions in the face of uncertainty. The primary incentive for implementing an adaptive management plan is to increase the likelihood of achieving desired project outcomes given the identified uncertainties, which can include incomplete description and understanding of relevant ecosystem structure and function; imprecise relationships among project management actions and corresponding outcomes; engineering challenges in implementing project alternatives; and ambiguous management and decision-making processes. Additional uncertainties (i.e., scientific and technological) relating to the proposed project that were identified by the PDT included:

- Vegetation Planting Success
- Settlement Rates
- Migratory Bird Use Rates
- Presence and introduction of invasive species
- Water quality

Adaptive management may be achieved through either active or passive adaptive management techniques. Active adaptive management in the Pigs Eye Lake Section 204 project would involve iterative management decisions influenced by the results achieved by project features. Actions of active adaptive management for the project may include the physical modification of project features and documentation of the changing conditions.

Passive adaptive management uses the best available information to achieve management objectives, involves updating resource understanding through analysis of the monitoring data, and the incorporation of the updated understanding into future best management practices. For this project, passive adaptive management would include an assessment of feature functionality through observation and the documentation of lessons learned.

All monitoring and adaptive management plans discussed below will be reviewed following preparation of detailed project plans and specifications to ensure each performance indicator is adequately addressed. Modifications and adjustments will be made to the plan as necessary.

2 Project Objectives

The objectives of the project are to:

1. *Improve aquatic habitat* – Create depth and habitat diversity in Pigs Eye Lake. Increase acreage of aquatic vegetation. Incorporate structural habitat features to promote fisheries.
2. *Increase available nesting and resting habitat* – Create suitable nesting and resting habitat for birds and shoreline species within Pigs Eye Lake.
3. *Maintain or enhance the quantity of shoreline habitat* – Protect existing floodplain forest and marsh habitat along the shoreline of Pigs Eye Lake from wind and wave erosion.

3 Performance Indicators

Performance indicators for the above objectives were developed with the best available knowledge. They were developed to be specific, measureable, attainable, realistic, and timely. The conceptual monitoring schedule and estimated costs are discussed in the following sections.

Each project objective was assessed by at least one performance indicator. For each performance indicator, the rationale behind the indicator and the methodology used are discussed. In addition, the monitoring targets (the desired outcomes) and action criteria (the adaptive management triggers) are listed. The action criteria are used to determine if and when adaptive management actions should be implemented.

3.1 Objective 1 - Improve aquatic habitat

Performance Indicator 1A: Water Quality (Turbidity or TSS)

Rationale

A reduction in turbidity throughout Pig's Eye Lake should be realized immediately due to the effect of the islands on wind fetch lengths. Water quality in Pig's Eye Lake has several stressors, but it is thought that wind-generated waves are a large contributor to turbidity problems. Documenting the change in conditions through time will help managers to understand how much of an impact wind fetch reduction can have on water quality parameters in this type of setting.

Methodology:

Measure turbidity or total suspended solids (TSS) in at least one location towards the protected northern area of the lake within the island complex, and one location in the southern part of the lake, outside of the project area. Samples should be taken at multiple times over the open-water growing season, and may be best taken using remote sensing units.

Monitoring Targets (Desired Outcomes):

Water quality data records are not available for Pig's Eye Lake, but the turbidity problem is clearly apparent. Because the baseline is not known, the first goal of the monitoring would be to establish a pre-project baseline. The target condition would be a consistent and measurable reduction in turbidity or TSS following construction of the project, relative to the baseline. Because it is believed that waves generated by wind are influential in creating the turbidity, trends in both the existing conditions and post-project data should be compared to wind conditions at the time water quality is measured to verify if there is a correlation.

Adaptive Management:

Passive adaptive management would be applied to this indicator. Water quality monitoring data would be incorporated into project evaluation reports (PER). Suggestions made in the PERs may lead to updates in best management practices that can be applied to future projects.

3.2 Objective 2 – Improve the quantity and quality of habitat for migratory bird species

Performance Indicator 2A: Migratory Bird Use Rates

Rationale:

Migratory bird counts are commonly used to assess habitat use. Bird counts have been used as an effective sampling method in the past and can help to verify a biological response to the physical changes brought on by the project. Bird use data has been collected during the fall migration season in

this area for the past several years, providing a valuable baseline with which to compare post-project use rates. Changes in data collected during bird counts would be a strong indicator of the availability of nesting and resting habitat for birds.

Methodology:

Waterbirds would be counted at least weekly for 5 weeks during the peak of fall waterfowl/waterbird migration. Five survey points have been used for surveys of existing conditions. Survey points may need to be modified following construction of new features, and GIS software would be used to determine the minimum number of points needed to view at least 70% of the lake's surface. The new survey points would be accessed by paddling a small watercraft such as a canoe or kayak through the area to minimize disturbance to the birds. Start/stop times, coordinates, and waterbird species and numbers would be recorded.

Monitoring Targets (Desired Outcomes):

The desired response would be increases in bird use by year 5 following project construction. An increase of at least 10% in total bird numbers or any increase in species richness would be considered successful.

Adaptive Management:

Due to the many factors that can influence biological response, adaptive management for birds would be focused on maintaining the physical characteristics described in Performance Indicators 2B and 2C.

Performance Indicator 2B: Vegetation – 1-year planted seedling survival and growth

Rationale:

Successful vegetation survival and establishment is integral to providing the habitat benefits projected. Woody vegetation will provide thermal protection and function as a visual barrier for migratory birds.

The first year following planting is a critical period to determine whether tree seedlings and vegetative plantings will become established. Low seedling survival combined with low growth rates for surviving seedlings may indicate deficiencies in planting procedures or seedling stock, the presence of significant site related stressors, or seedling-site incompatibility. Regeneration surveys monitoring seedling survival and growth are standard in most large-scale planting programs, both within the Corps and in many public and private organizations throughout the country. Results from 1-year survival and growth surveys will allow for modifications in planting plans to account for agents responsible for low seedling survival and growth as well as for mitigation measures to account for these stressors.

Methodology:

1-year survival and growth surveys will be conducted on areas that were planted in the previous year. Monitoring will be conducted using methodology described in "*Habitat Rehabilitation and Enhancement Project Monitoring Design Handbook Section 1: Vegetation*," Draft Final Version 31 March 2014.

Monitoring Targets (Desired Outcomes):

The monitoring target for initial monitoring is 75% survivorship of trees and evidence of a positive level of production and survivorship.

Adaptive Management:

If 1-year seedling survival is below 75%, supplemental planting may be required to replace lost seedlings. However, if it is determined that mortality was due to factors that cannot be easily controlled (e.g. inundated microsite, deer or beaver herbivory), re-planting in some locations may not be implemented. No action will be taken if first year condition codes do not meet targets, unless it can be clearly determined that herbivory is limiting seedling growth. If herbivory is the limiting factor, targeted animal repellent treatments may need to be considered. If natural regeneration targets are not met, supplemental seeding may be implemented on constructed features.

Performance Indicator 2C: Vegetation – Long-term seedling survival and growth

Rationale:

Successful vegetation survival and establishment is integral to providing the habitat benefits projected. Woody vegetation will provide thermal protection and function as a visual barrier for migratory birds.

1-year seedling survival is critical, but seedlings cannot be considered to be successfully established on a site generally until they reach 4.5 feet in height and are considered to be generally free from competition for light. Long-term seedling survival and growth will be critical for determining whether the restoration effort was successful or not in establishing self-sustaining levels of forest regeneration and forest cover.

Methodology:

The methodology for 1-year seedling survival and growth described above will also be used to assess long-term seedling survival and growth, though the timing will differ. For long-term seedling survival and growth, three surveys will be implemented. Surveys will be conducted 3 years, 6 years and 10 years following project completion.

Monitoring Targets (Desired Outcomes):

In year 3, the same targets are desirable for all areas as in year 1, that is, planted seedling survival >75% of sampled seedlings and evidence of a positive level of production and survivorship.

By year 6, planted seedling survival of 60% of sampled seedlings will be acceptable with >60% of seedlings and evidence of a positive level of production and survivorship.

By year 10, planted seedling survival of 50% of sampled seedlings will be acceptable with >75% of seedlings and evidence of a positive level of production and survivorship.

Adaptive Management:

If longer term monitoring targets are not met then additional management strategies may be required to reduce browsing or competition, and may include, but not limited to, fencing, herbicide application, or mowing.

Performance Indicator 2D: Vegetation – Marsh and Wet Prairie Establishment Success

Rationale:

Successful vegetation survival and establishment is integral to providing the habitat benefits projected. Success of the non-forest plantings proposed for the project, including the wet prairie and marsh plantings, are critical to increasing the habitat value for migratory birds and will serve as a food source, provide thermal protection, and function as a visual barrier for migratory birds.

Methodology:

Monitoring will be conducted using the Standardized HREP Non-Forested Monitoring Protocol described in “*Habitat Rehabilitation and Enhancement Project Monitoring Design Handbook Section 1: Vegetation*,” Draft Final Version 31 March 2014. Monitoring would be conducted in Years 1, 3, 6, and 10 following project construction.

Monitoring Targets (Desired Outcomes):

Monitoring targets would be evaluated separately for each plant community (i.e., wet prairie and marsh). The targets for species composition and quality include the following:

- a. Density Threshold: A canopy cover of at least 50% in wet prairie and at least 10% in marsh
- b. Species Richness Threshold: Greater than 8 species per sampling unit
- c. Quality Threshold: Combined food value of top 4 dominant species greater than or equal to 3.5

Adaptive Management:

Adaptive management actions should be implemented if any of the monitoring targets are not met. Adaptive management strategies could include, but not limited to, physical disturbance (e.g., mowing, disking, rolling, prescribed fire), chemical control, or focused re-planting. The exact management action implemented will be decided by the site manager.

Performance Indicator 2E: Island Settlement

Rationale:

The elevation of the proposed islands have been designed to provide conditions suitable for growth of floodplain vegetation species. If material settlement of the islands is significantly greater than anticipated, the islands would be lower in elevation than expected which would lead to wetter

conditions on the islands. If they are significantly different, the islands may not support the desired vegetation.

Methodology:

Each of the islands would be surveyed at 2 and 5-years post construction. The top elevation of each island would be compared to the design elevation to determine how much settlement has occurred.

Monitoring Targets (Desired Outcomes):

The desired condition would be that the top of each of the islands are at or very close to the design elevation.

Adaptive Management:

Passive adaptive management would be applied to this indicator. Settlement monitoring data would be incorporated into project evaluation reports (PERs). Suggestions made in the PERs may lead to updates in best management practices that can be applied to future projects. If settlement leads to vegetation establishment problems, the monitoring data could be used to help tailor adaptive management plantings to the changing conditions.

3.3 Maintain or enhance the quantity of shoreline habitat

Performance Indicator 3A: Shoreline erosion rates

Rationale:

Examination of aerial imagery has indicated that the shoreline areas around Pig's Eye Lake have experienced significant and recurring erosion. The proposed islands have been designed to reduce wind-generated waves in the lake and are expected to protect the existing habitat on Pig's Eye Lake's shorelines.

Methodology:

Aerial imagery will be examined approximately 5 and 10-years post project to determine if any change can be detected. (Dates are approximate because aerial imagery would not be collected for this project in particular, but would be assessed as available from county, city, or other data source.)

Monitoring Targets (Desired Outcomes):

It has been estimated that the shoreline of Pig's Eye Lake has retreated at a rate of approximately 0.75 acres/year since 1991. The difference in shoreline area at 5 and 10 years post-project would be compared to the pre-project conditions. Success for this target would be achieved if the actual retreat of shoreline is less than the pre-project loss rate of 0.75 acres/year.

Adaptive Management:

Passive adaptive management would be applied to this indicator. Monitoring results would be incorporated into project evaluation reports (PER). Suggestions made in the PERs may lead to updates in

best management practices that can be applied to future projects. Structural solutions could be designed and implemented on the shorelines themselves if desired by the local landowner, but are considered outside the scope of this project.

4 Monitoring Costs

Water quality sampling, bird counts, vegetation surveys, elevation surveys, and GIS analysis of the lake's shoreline were included in the monitoring budget for the project.

The National Park Service would conduct fall bird counts at an estimated cost of \$7,000 per year for the 10 year monitoring period. This would cost a total of \$70,000.

An estimated cost for each survey event is \$5,000, and surveys would be conducted 1, 3, 6, and 10 years following project implementation. Total cost for post-project monitoring surveys would be approximately \$20,000.

Each post-construction elevation survey of the islands is estimated to cost approximately \$6,000, for a total of \$12,000 total.

Water quality sampling would be performed using two remote sensing buoys, at an estimated cost of \$7,000 annually. After 5 years of monitoring this would total \$35,000.

Analysis of aerial imagery for shoreline change would cost an estimated \$2,000.

Monitoring components and costs are summarized in the table below.

Component	Cost Per Event	Total Cost
Fall Waterbird Counts	\$ 7,000	\$ 70,000
Vegetation Monitoring	\$ 5,000	\$ 20,000
Island Elevation Surveys	\$ 6,000	\$ 12,000
Water Quality Monitoring	\$ 7,000	\$ 35,000
Shoreline Erosion Analysis	\$ 2,000	\$ 2,000
Total		\$ 139,000

5 Adaptive Management Budget

Active adaptive management actions for the project may include tree, wet prairie, or marsh replanting and herbivory and weed control. Specific adaptive management replanting strategies have not been developed, but would follow the development of the detailed planting plan. Based on preliminary project cost estimates, adaptive management for vegetation are estimated to be as much as \$120,000 in the event of an extreme failure. Actual vegetation adaptive management costs are likely to be much lower than that.

The passive adaptive management actions identified for water quality and shoreline erosion targets would not require additional funding in this project.

6 Monitoring Roles and Responsibilities

The Corps is responsible for determining ecological success for the ecosystem restoration projects it constructs. Cost-shared monitoring and adaptive management may extend for up to 10 years following project completion. Monitoring tasks and project evaluation reports will be Corps responsibilities.

7 Project Close Out

Close-out of the project would occur when the level of success of the project is determined adequate or when the maximum 10-year monitoring period has been reached. The level of success would be based on the extent to which the project objectives have been or will be met based upon the trends for the site conditions and processes.

Additionally, project close-out will include technology transfer. This includes the dissemination of project monitoring results, analyses performed, management decisions made (Adaptive Management features or adjustments), and lessons learned. Technology transfer will occur via publications, presentations, and discussions with LTRM, River Teams, EMP-CC, and stakeholders, among others.

US ARMY CORPS OF ENGINEERS – ST. PAUL DISTRICT
GEOTECHNICAL & GEOLOGY BRANCH
180 5TH STREET EAST
ST. PAUL, MN 55101

HTRW PHASE I

Pigs Eye Lake, MN

6/1/2016

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Figure 1: General Site Location Map

Figure 2: Site Map with River Miles

APPENDICES

Appendix A: EDR Radius Map with GeoCheck® (Data-base Search Results)

Appendix B: Topographic Maps

Appendix C: Sanborn Report

Appendix D: Aerial Photographs

SUMMARY

The St. Paul District, Corps of Engineers, is entertaining a proposal to develop islands using dredge sands in an area known as Pigs Eye Lake. The Corps of Engineers has conducted a Phase I HTRW Site Assessment as part of a feasibility study for the proposed project.

In accordance with ER-1165-2-132 - *Water Resource Policies and Authorities HTRW Guidance for Civil Works Projects*, early identification of potential HTRW concerns are achieved through a non-intrusive investigation known as a Phase I Environmental Site Assessment (ESA) following a prescribed process by qualified environmental professionals under ASTM 1527-05. The Phase I ESA (formally known by the Corps as an Initial Hazard Assessment) is a non-intrusive investigation composed of site visits, historic records searches, interviews, etc. to identify potential past or present HTRW issues termed Recognized Environmental Conditions (RECs).

The term “Recognized Environmental Condition” (REC) is defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de-minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

The adjunct purpose of the assessment is to exact due diligence in the discovery and avoidance of contamination during the acquisition of land for these projects and to qualify for the Innocent Landowner Defense under the Environmental Protection Agency’s Comprehensive Environmental Response, and Cleanup Liability Act of 1980 (CERCLA), as amended.

The proposed project area is located in Pool #2 of the Mississippi River at approximate river mile 835 in Ramsey County, MN. The city of South St. Paul borders the area on the west and MN Highway 61 and a CP railroad yard borders on the east. Immediately north of Pigs Eye Lake lies an area known as Pigs Eye Dump. This 350 acre site was operated as an unregulated disposal area by the City of St. Paul and the Metropolitan Waste Control Commission from the mid-1950’s to 1985. Various types of waste were disposed of at this site which has not been properly closed or adequately covered. Pigs Eye Dump is listed on the Minnesota Pollution Control Agencies Permanent List of Priorities (state Superfund Site). The dump is also upstream of the proposed project site so that any water borne contaminants could potentially travel downstream (southward) towards the site.

Several studies have been conducted previously at the Pig's Eye Dump site. These studies have included soil and water sampling regimes. Water and soil standards are exceeded for polychlorinated biphenyl's (PCB's), lead, cadmium, boron, cobalt, aluminum, zinc, ammonia, chloride, and mercury. Sampling conducted by the Corps of Engineers in the areas of proposed island building revealed some exceedances for hydro and fluoro-carbons, cadmium, and lead in the far northern corner of Pig's Eye Lake.

Another potential site for soil/water contamination, identified in the national data-base search, is the Pig's Eye Wastewater Treatment Plant for the Twin Cities operated by Metropolitan Council Environmental Services in the Minneapolis-St Paul metro area. The treatment plant is located approximately 1 mile northwest of Pig's Eye Lake and has been in operation for more than 70 years. Primary risks associated with water treatment include discharges of contaminated effluent due to inadequate treatment, accidental releases from treatment or storage tanks, and the leaching of contaminants from sludge.

It may be difficult to differentiate the source of any contaminants discovered at the proposed project location, however both sites are defined as a source for potential REC's for the purposes of this investigation.

It is recognized that sampling conducted prior to the development of a Phase 1 HTRW Assessment is not a typical procedure. Based on the above findings further assessment at the proposed project site may be warranted.

SCOPE OF INVESTIGATION

The purpose of this Phase I Environmental Site Assessment (ESA) is to identify "Recognized Environmental Conditions" (RECs), and/or HTRW materials that may be encountered during construction of the proposed project. A REC is defined as the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

This ESA was conducted in general accordance with American Society for Testing and Materials (ASTM) E1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and ER 1165-2-132 Hazardous, Toxic, and Radioactive

Waste (HTRW) Guidance for Civil Works Projects. According to ASTM E1527-05, a Phase I Environmental Site Assessment shall have four components, described as follows:

- ☐ *Records Review* - The purpose of the records review is to obtain and review available records that will help identify recognized environmental conditions in connection with the property.
- ☐ *Report* - The purpose of the report is to document the activities performed during the assessment, provide information supporting the analysis opinions and conclusions found in the report and summarize the findings of the assessment.

The following activities, among others, are excluded from the scope of work for a Phase I ESA as described in ASTM E1527-05:

- ☐ Testing or sampling of materials (e.g. soil, water, air, or building materials).
- ☐ Evaluation for asbestos, radon, lead-based paint, lead in drinking water, and wetlands.

LIMITATIONS and EXCEPTIONS

This report relies on the accuracy of this information provided by customers, contractors, and interviewees for the preparation of this report. There is an assumption of no liability or responsibility for the accuracy, precision, misrepresentation, or withholding of information by the customers, contractors, and/or property owner/operator or for items not visible, accessible, or present on-site at the time of investigation. All recommendations and/or advice presented in this document are the environmental professionals' opinions of probable project conditions. Project conditions are based on the information and data sources that are readily available, input by the owner's representative, and other reliable sources, all of which are believed to be accurate. Our recommendations and/or advice are made on the basis of our experience and opinions. We have no control over new and/or non-public information and changed conditions. Therefore, we do not guarantee that actual conditions will not vary from those presented in this report. This report is intended only for the use of the Corps of Engineers.

SITE DESCRIPTION

The proposed project area is Pigs Eye Lake which is a 668 acre floodplain depression lake that is connected to the Mississippi River in Pool #2 of the river at approximate river mile 835 in Ramsey County, MN. The city of South St. Paul borders the area on the west and MN Highway 61 and a CP railroad yard borders on the east. Immediately north of Pigs Eye Lake lies an area known as Pigs Eye Dump. This 350 acre site was operated as an unregulated disposal area by the City of St. Paul and the Metropolitan Waste Control Commission from the mid-1950's to

1985. Various types of waste were disposed of at this site which has not been properly closed or adequately covered.

As mentioned in the report summary, the Pig's Eye Wastewater Treatment Plant for the Twin Cities is located approximately 1 mile northwest of Pig's Eye Lake and has been in operation for more than 70 years.

The bottom of Pig's Eye Lake is primarily composed of unconsolidated materials consisting of a thin inconsistent layer of silts and organic material deposited by the Mississippi River overlying a thicker layer of coarser sands and gravels. Bedrock is likely composed of Prairie du Chien Group or Jordan Sandstone.

Information available in literature indicates that the depth to shallow groundwater will essentially mirror the river surface elevation at the project site.

SPECIALIZED KNOWLEDGE / INTERVIEWS

No interviews were conducted and no personalized knowledge was collected for this report.

RECORDS REVIEW

Summaries of available environmental regulatory agency database information and other types of Information for the site area were collected by Environmental Data Resources (EDR), Inc.; a firm that specializes in environmental/historical records review. A records search was conducted using a 2-mile radius from the project center in 2016, which meets or exceeds search radii requirements set forth in the ASTM standard. For a complete listing of all database records searched see APPENDIX A.

DATA-BASE SEARCH (APPENDIX A)

In summary, the regulatory database search yielded the following findings for locations either on or within the surrounding vicinity of the site regarding involvement in federal, state, and tribal environmental programs, as detailed below:

- ☐ Two sites within the project area or search area were listing on the Federal databases.
- ☐ No sites were identified on the Tribal databases.

TOPOGRAPHIC MAPS (APPENDIX B)

Topographic maps of the site and adjacent properties were gathered from the United States

Geologic Survey website and reviewed. These maps were evaluated for evidence of past use and activities which might be of concern. The maps evaluated to examine the historical use of this property included 7.5 minute USGS quad sheets for Pigs Eye Lake dated 2013, 1993, 1980, 1972, 1967, 1958, 1951, 1950, 1949, and 1896. The maps show the site as flood plain and wetlands with adjacent commercial and residential development.

SANBORN FIRE INSURANCE MAPS (APPENDIX C)

A search for reproductions of Sanborn Fire Insurance maps conducted by EDR determined there was no coverage likely due to the relatively low density of development and setting.

AERIAL PHOTOGRAPHS (APPENDIX D)

A search for historical aerial photographs was performed by EDR. Aerial photos were reviewed for the years of 2010, 2009, 2008, 2005, 1997, 1991, 1987, 1978, 1974, 1966, 1953, 1951, 1947, and 1937. Due to the scale and quality of the aerial photos readily available for review, specific site features could not be accurately ascertained. However, in general, no evidence of surface staining, dumping, industrial land use, etc. that might indicate an REC was observed in the photos.

SITE RECONNAISSANCE

A site reconnaissance was conducted in the fall of 2016 as part of this report. No REC's were identified but soil samples obtained were tested and revealed some exceedances for lake bottom sediment.

OPINIONS and CONCLUSIONS

Based on the information summarized in this report, and the information gathered in other agency reports, it is the opinion of the environmental professional that significant RECs could be encountered at the project location. While some soil and water sampling has already been accomplished at or near the proposed project location additional Phase II investigations may be necessary in order for the proposed project to proceed.

SIGNATURE

The following person is responsible for the preparation of this report:

Prepared by: _____ Date: 1 June 2016

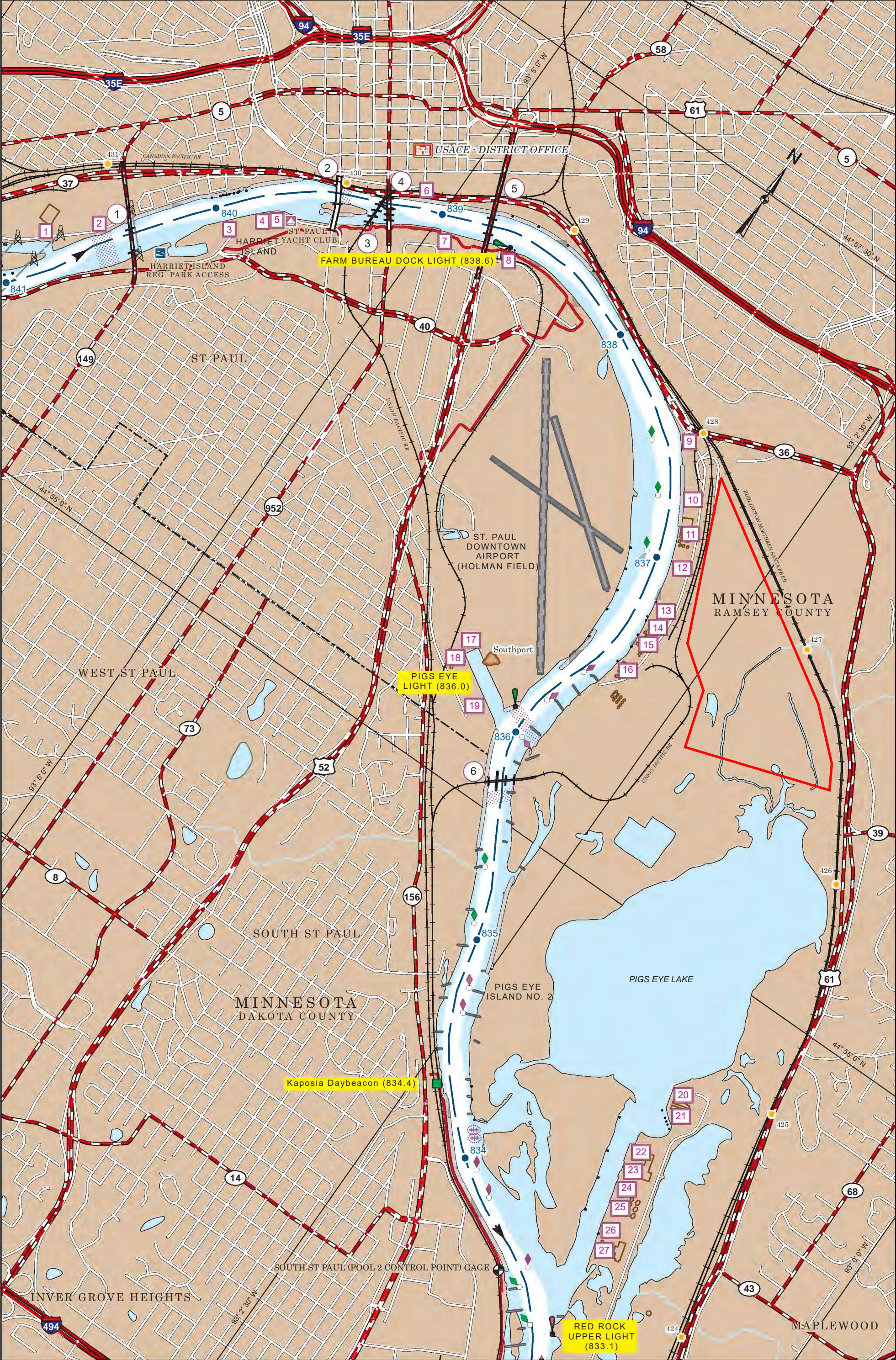
Grant Riddick, PG, Geotechnical & Geology Section, CEMVP-EC-G

Mr. Riddick has over 25 years' experience in drilling, sampling, environmental and geotechnical engineering support.



**Pigs Eye Lake -
St Paul, MN**

FIGURE 1

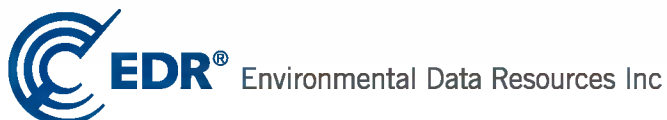


Pigs Eye Lake

Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119

Inquiry Number: 4595821.2s
May 05, 2016

The EDR Radius Map™ Report with GeoCheck®



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

PIGS EYE LAKE RD / CHILDS RD
SAINT PAUL, MN 55119

COORDINATES

Latitude (North):	44.9149670 - 44° 54' 53.88"
Longitude (West):	93.0294020 - 93° 1' 45.84"
Universal Transverse Mercator:	Zone 15
UTM X (Meters):	497679.2
UTM Y (Meters):	4973287.5
Elevation:	687 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5964255 SAINT PAUL EAST, MN
Version Date:	2013
East Map:	5964045 LAKE ELMO, MN
Version Date:	2013

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20100912
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
PIGS EYE LAKE RD / CHILDS RD
SAINT PAUL, MN 55119

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	MCES METROPOLITAN WA	2450 CHILDS ROAD	SHWS, SRS, WIMN	Higher	5626, 1.066, WNW
2	PIGS EYE LANDFILL	SEE LOCATION DESCRIP	SHWS, SRS, MN LS, WIMN	Higher	6893, 1.305, NNW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing
SEMS..... Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System
US ENG CONTROLS..... Engineering Controls Sites List

EXECUTIVE SUMMARY

US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

MN PLP..... Permanent List of Priorities

State and tribal landfill and/or solid waste disposal site lists

UNPERM LF..... Unpermitted Facilities

SWF/LF..... Permitted Solid Waste Disposal Facilities

LCP..... Closed Landfills Priority List

State and tribal leaking storage tank lists

LAST..... Leaking Aboveground Storage Tanks

LUST..... Leak Sites

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing

UST..... Underground Storage Tank Database

AST..... Aboveground Storage Tanks

INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL..... Site Remediation Section Database

State and tribal voluntary cleanup sites

VIC..... Voluntary Investigation and Cleanup Program

INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS..... Petroleum Brownfields Program Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY..... Recycling Facilities

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations

ODI..... Open Dump Inventory

EXECUTIVE SUMMARY

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... Delisted National Clandestine Laboratory Register
SRS..... Site Remediation Section Database
CDL..... Clandestine Drug Labs
MN DEL PLP..... Delisted Permanent List of Priorities
US CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS..... Environmental Liens
LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
SPILLS..... Spills Database
AGSPILLS..... Department of Agriculture Spills
SPILLS 90..... SPILLS 90 data from FirstSearch
SPILLS 80..... SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR..... RCRA - Non Generators / No Longer Regulated
FUDS..... Formerly Used Defense Sites
DOD..... Department of Defense Sites
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR..... Financial Assurance Information
EPA WATCH LIST..... EPA WATCH LIST
2020 COR ACTION..... 2020 Corrective Action Program List
TSCA..... Toxic Substances Control Act
TRIS..... Toxic Chemical Release Inventory System
SSTS..... Section 7 Tracking Systems
ROD..... Records Of Decision
RMP..... Risk Management Plans
RAATS..... RCRA Administrative Action Tracking System
PRP..... Potentially Responsible Parties
PADS..... PCB Activity Database System
ICIS..... Integrated Compliance Information System
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS..... Material Licensing Tracking System
COAL ASH DOE..... Steam-Electric Plant Operation Data
COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER..... PCB Transformer Registration Database
RADINFO..... Radiation Information Database
HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS..... Incident and Accident Data
CONSENT..... Superfund (CERCLA) Consent Decrees
INDIAN RESERV..... Indian Reservations
FUSRAP..... Formerly Utilized Sites Remedial Action Program
UMTRA..... Uranium Mill Tailings Sites
LEAD SMELTERS..... Lead Smelter Sites
US AIRS..... Aerometric Information Retrieval System Facility Subsystem

EXECUTIVE SUMMARY

US MINES.....	Mines Master Index File
FINDS.....	Facility Index System/Facility Registry System
AGVIC.....	Agricultural Voluntary Investigation & Cleanup Listing
AIRS.....	Permit Contact List
BULK.....	Bulk Facilities Database
COAL ASH.....	Coal Ash Disposal Site Listing
DRYCLEANERS.....	Registered Drycleaning Facilities
ENF.....	Generators Associated with Enforcement Logs
Financial Assurance.....	Financial Assurance Information Listing
MN HWS Permit.....	Active TSD Facilities
MANIFEST.....	Hazardous Waste Manifest Data
MDA LIS.....	Licensing Information System Database Listing
MN LS.....	List of Sites
TIER 2.....	Tier 2 Facility Listing
WIMN.....	What's In My Neighborhood
FUELS PROGRAM.....	EPA Fuels Program Registered Listing
ECHO.....	Enforcement & Compliance History Information

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP.....	EDR Proprietary Manufactured Gas Plants
EDR Hist Auto.....	EDR Exclusive Historic Gas Stations
EDR Hist Cleaner.....	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS.....	Recovered Government Archive State Hazardous Waste Facilities List
RGA LF.....	Recovered Government Archive Solid Waste Facilities List
RGA LUST.....	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property. Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

EXECUTIVE SUMMARY

SHWS: The Superfund Site Information Listing records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Minnesota Pollution Control's Superfund Permanent List of Priorities.

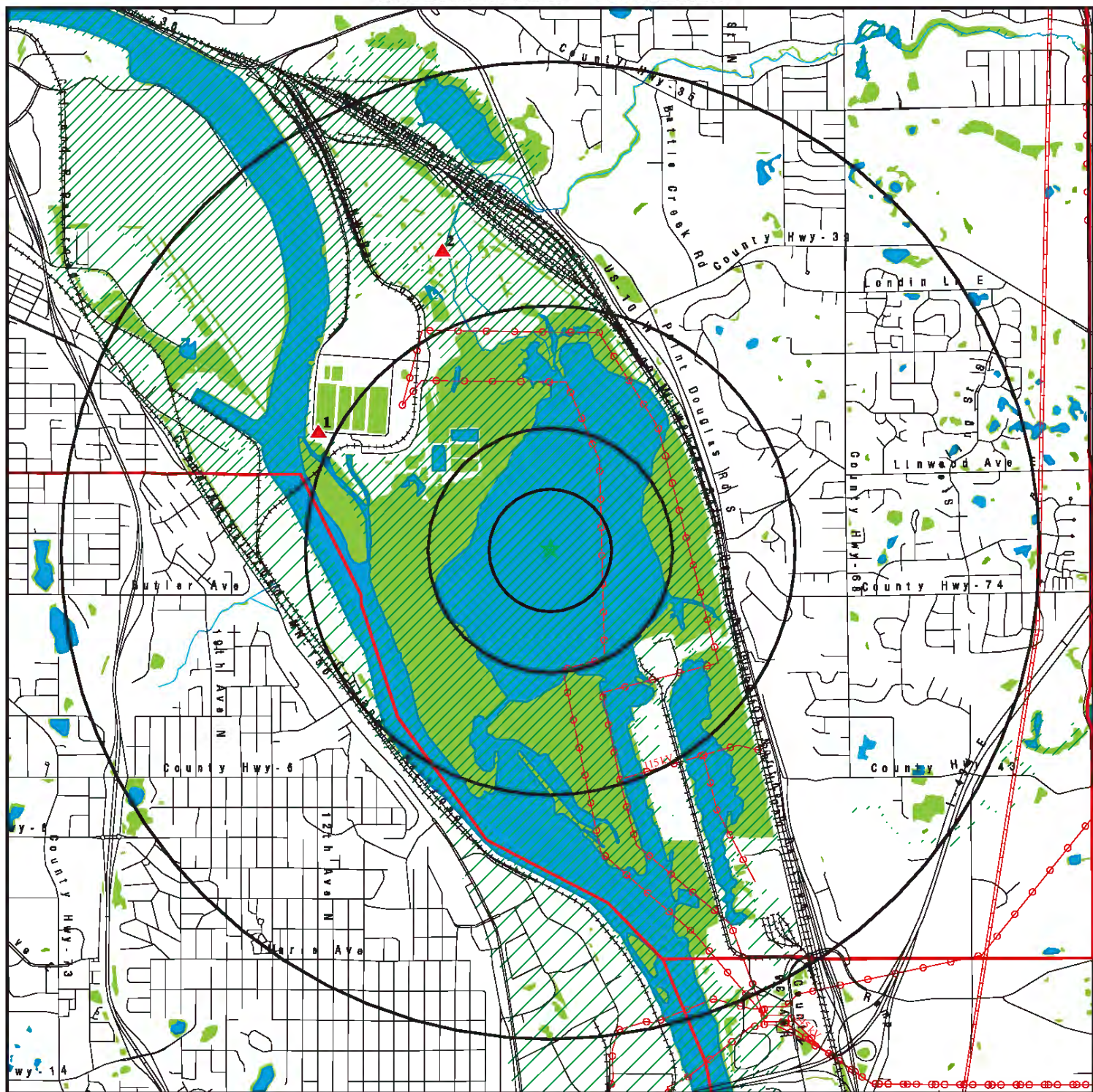
A review of the SHWS list, as provided by EDR, and dated 02/16/2016 has revealed that there are 2 SHWS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MCES METROPOLITAN WA Facility Id: SR247	2450 CHILDS ROAD	WNW 1 - 2 (1.066 mi.)	1	8
PIGS EYE LANDFILL Facility Id: SR117	SEE LOCATION DESCRIP	NNW 1 - 2 (1.305 mi.)	2	14

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 4595821.2S



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

- Indian Reservations BIA
- County Boundary
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

0 1/2 1 2 Miles

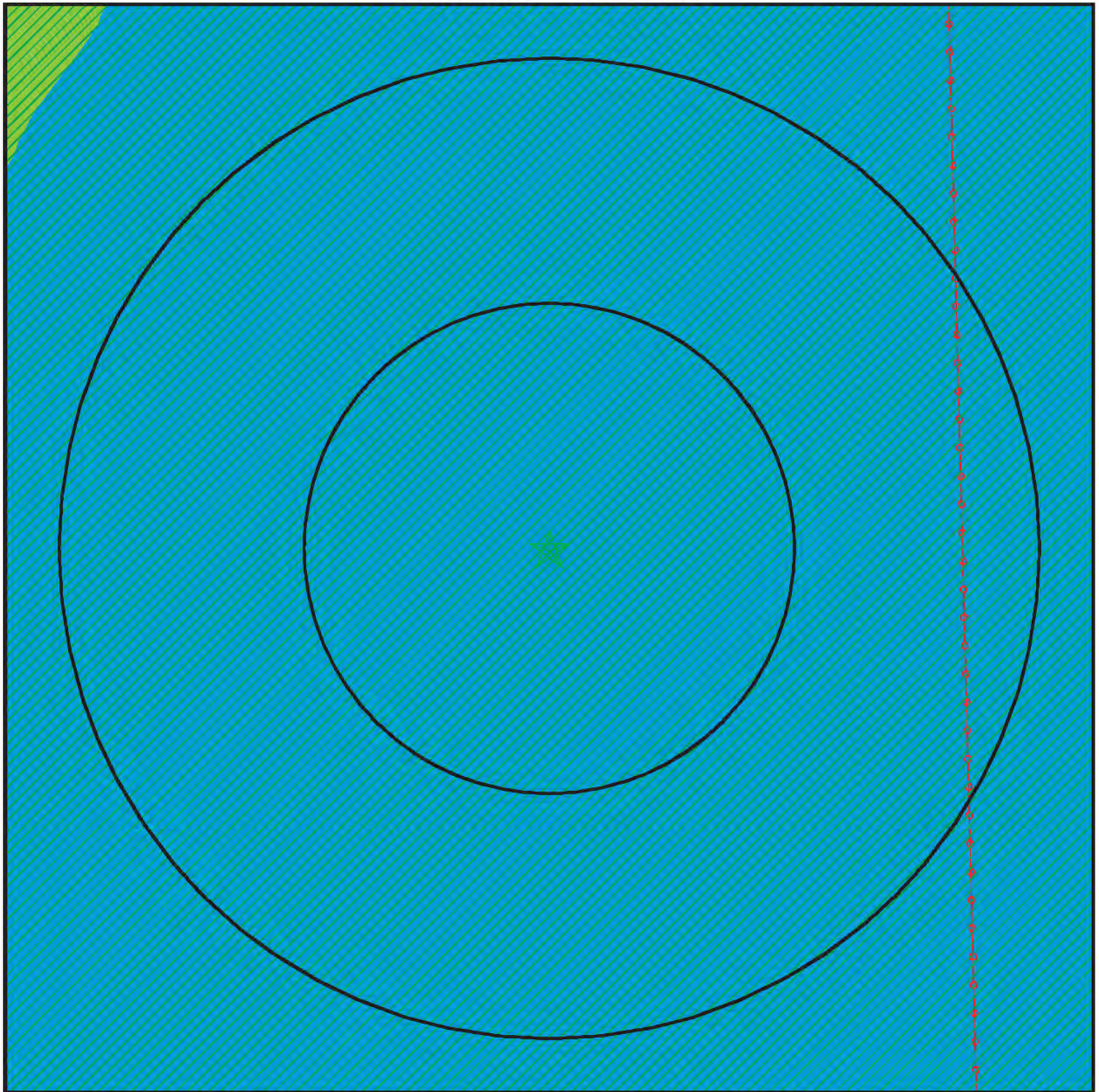


This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul MN 55119
LAT/LONG: 44.914967 / 93.029402

CLIENT: Army Corp of Engineers
CONTACT: Grant Riddick
INQUIRY #: 4595821.2s
DATE: May 05, 2016 3:17 pm

DETAIL MAP - 4595821.2S



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- 🚒 National Priority List Sites
- 🏠 Dept. Defense Sites

- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul MN 55119
LAT/LONG: 44.914967 / 93.029402

CLIENT: Army Corp of Engineers
CONTACT: Grant Riddick
INQUIRY #: 4595821.2s
DATE: May 05, 2016 3:18 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site list</i>								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	TP		NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
MN PLP	1.000		0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
SHWS	1.500		0	0	0	0	2	2
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
UNPERM LF	0.500		0	0	0	NR	NR	0
SWF/LF	0.500		0	0	0	NR	NR	0
LCP	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VIC	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
SRS	0.500		0	0	0	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
MN DEL PLP	1.000		0	0	0	0	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
AGSPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
AGVIC	0.500		0	0	0	NR	NR	0
AIRS	TP		NR	NR	NR	NR	NR	0
BULK	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
MN HWS Permit	1.000		0	0	0	0	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0
MDA LIS	0.250		0	0	NR	NR	NR	0
MN LS	0.500		0	0	0	NR	NR	0
TIER 2	TP		NR	NR	NR	NR	NR	0
WIMN	0.500		0	0	0	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
<u>EDR RECOVERED GOVERNMENT ARCHIVES</u>								
<i>Exclusive Recovered Govt. Archives</i>								
RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	2	2

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

1
WNW
> 1
1.066 mi.
5626 ft.

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE
2450 CHILDS ROAD
ST. PAUL, MN 55106

SHWS
SRS
WIMN

S112191063
N/A

Relative:
Higher

SHWS:

Actual:
700 ft.

Facility Id: SR247
Core Program Interest Id: 63735481
Facility Address 2: Not reported
Link Id: 7270
Site Type: Dump (Unpermitted)
Active?: True
MPCA Region: Metro
Site Size: 50
Score: Not reported
Enforcement Lead Agency: MPCA
Federal Deferral Pilot?: False
Site Classification A Emergency: False
Site Classification B O and m: False
Site Classification C Rd/ra: False
Site Classification D Ri/fs: False
Fund Financed: False
Plp: False
District: Not reported
Program Site Was Referred From: Not reported
Program Interest: SF
Physical Location: Not reported
Natural Resource Damage: False
Cleanup Cost: Not reported
Indian Reservation Land?: False
Reservation Name: Not reported
MPCA-owned Wells At Site?: False
Created By: A. Nichols
Created Date: 08/31/2012
Last Update Date: 01/17/2013
Federal Facility?: False
Petroleum Brownfields Prog?: False
Primary Funding Source: Not reported
EPA Id: Not reported
MPCA Id: Not reported
Basin code: 2
Major water: 20
Minor water: 20088
File Location: Staff Member's Desk
VIC Application GIS: False
Notes: Not reported
Contact Type: Staff TA (Technical Analyst)
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: kurt.schroeder@state.mn.us

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

Contact Cell Phone: Not reported
Contact Information Last Updated: 2012-09-04 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contact Type: Staff PL/PM (Project Leader/Project Manager)s
Company Name: MPCA
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2014-09-22 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contaminant Id: Not reported
Contaminated Media: Not reported
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: Not reported
Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: Not reported
Date Info Last Updated: Not reported

Facid: SR247
Event: VIC Program Participation Dates (Start/End)
Additional Information: None Entered
Start Date: 2012-08-31 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2015-04-17 00:00:00
Record Number: 40653

Facid: SR247
GW Receipts Prot by Rem Actn: Not reported
Ecological receptors present: False
Type of ecological receptors: Not reported
Acres of contaminated soil: Not reported
Volume of contaminated soil: Not reported
Acres of surface water impacted: Not reported
Acres of wetland impacted: Not reported
Acres of sediment impacted: Not reported
GW Plume Area Acres: Not reported
Cleanup Conducted: False
Acres of Contam Soil remediate: Not reported
Volume of Soil Cleaned: Not reported
Municipal wells contamd: Not reported
Dom wells contam: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

# People Impct SW intake contam:	Not reported
# Drums Revolved from site:	Not reported
Yr Soil Remediated:	Not reported
Acres of Soil w/ Restrict Access:	Not reported
Yr IC remedy complete:	Not reported
Yr GW remedy completed:	Not reported
Year GWIC completed:	Not reported
Acres of wetland of sediment remediated:	Not reported
Public financing:	False
Assurance help:	False
Land use Classfn At Site:	Not reported
Land use Vicinity Of Site:	Not reported
Deed notif Present On Site:	False
Restrictive Covenant Present:	False
Restrictions:	Not reported
GW Pump and Treat Used at site:	False
Quaternary Perched:	False
Quaternary Water Table:	False
Quaternary Confined:	False
Cretaceous:	False
Plattville:	False
St. peter:	False
Prairie Duchien:	False
Jordan:	False
Ironton/Galesville:	False
Mt Simon Hinckley:	False
Precambrian Undifferentiated:	False
Other/Unknown Aquifer:	False
Date Info Last Updated:	2015-08-18 12:45:00
Inst Control Info Updated:	Not reported
Inst Control Filed Location:	Not reported
SW Classification (Primary):	Not reported
SW Classification (Secondary):	Not reported
Miscellaneous:	Not reported
SW Comments:	Not reported

MN SRS:

Facility ID:	SR247
SEC Address:	Not reported
Link Id:	7270
Facility Type:	Dump (Unpermitted)
Active:	True
Pay Complete:	False
MPCA Region:	Metro
Size Acres:	50
HRS Score:	Not reported
Enforcement Lead Agency:	MPCA
Federal Defferal Plot:	False
Petroleum Brownfields Prog?:	False
Emergency:	False
Site Classification:	False
RD/RA:	False
RL/FS:	False
Fund financed:	False
Npl:	False
Plp:	False

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

District:	Not reported
Program Referred from:	Not reported
Program Interest:	SF
Physical Location:	Not reported
Natural Source damage:	False
Clean up Cost:	Not reported
Indian Reservation:	False
Reserve Name:	Not reported
MPCA Owned Wells at site:	False
Created By:	A. Nichols
Date Created:	08/31/2012
Date Last Updated:	01/17/2013
Federal Facility:	False
Primary Funding Source:	Not reported
EPA Id:	Not reported
MPCA Id:	Not reported
Alpha Sort:	Not reported
Legal Distt:	67B
Congressional Distt:	4
Public Land Survey Method:	Not reported
Map Scale For PLS Locational Data:	Not reported
Township 2:	Not reported
Range:	Not reported
PLS Township Suffix:	Not reported
section:	Not reported
PLS Qtr Section (160 Acres):	Not reported
PLS Qtr-Qtr Section (40 Acres):	Not reported
Pls Qtr-Qtr-Qtr Section (10 Acres):	Not reported
Pls Qtr-Qtr-Qtr-Qtr Secion (2.5 Acres):	Not reported
Quad:	Not reported
NAD Number:	83
Desc Of UTM Coord Pt:	Not reported
UTM Coord Pt Data Source:	Not reported
Org Providing UTM Coord Point Data:	Not reported
mpcapgmac:	Not reported
Utm Coord Pt Data Collection Method:	Not reported
Date Of Utm Coord Pt Data Collection:	Not reported
COL Date Qual:	Not reported
Map Scale:	Not reported
verifmeth:	Not reported
horizref:	Not reported
Utm Source:	Not reported
Utm Method:	Not reported
Utm Scale:	Not reported
Utm Accuracy:	Not reported
Utm East:	497084
Utm North:	4974829
Utm Zone:	15
Basin Code:	2
Major Watershed:	20
Minor Watershed:	20088
Public Land Survey Method 2:	Not reported
Map Scale For PLS Locational Data 2:	Not reported
Township 2:	Not reported
Range 2:	Not reported
PLS Township Suffix 2:	Not reported
Section 2:	Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

PLS Qtr Section (160 Acres) 2: Not reported
PLS Qtr-Qtr Section (40 Acres) 2: Not reported
PLS Qtr-Qtr Section (10 Acres) 2: Not reported
PLS Qtr-Qtr Section (2.5 Acres) 2: Not reported
Quad 2: Not reported
File Location: Staff Member's Desk
VIC Application GIS: False
Notes: Not reported

Contact Type: Staff TA (Technical Analyst)
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: kurt.schroeder@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2012-09-04 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contact Type: Staff PL/PM (Project Leader/Project Manager)s
Company Name: MPCA
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2014-09-22 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contaminant Id: Not reported
Contaminated Media: Not reported
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: Not reported
Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: Not reported
Date Info Last Updated: Not reported

Facid: SR247
Event: VIC Program Participation Dates (Start/End)
Additional Information: None Entered
Start Date: 2012-08-31 00:00:00
End Date: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

Planned Start Date:	Not reported
Planned End Date:	Not reported
Date Info Last Updated:	2015-04-17 00:00:00
Record Number:	40653
Facid:	SR247
GW Receipts Prot by Rem Actn:	Not reported
Ecological receptors present:	False
Type of ecological receptors:	Not reported
Acres of contaminated soil:	Not reported
Volume of contaminated soil:	Not reported
Acres of surface water impacted:	Not reported
Acres of wetland impacted:	Not reported
Acres of sediment impacted:	Not reported
GW Plume Area Acres:	Not reported
Cleanup Conducted:	False
Acres of Contam Soil remediate:	Not reported
Volume of Soil Cleaned:	Not reported
# Municipal wells contamd:	Not reported
# Dom wells contam:	Not reported
# People Impct SW intake contam:	Not reported
# Drums Revolved from site:	Not reported
Yr Soil Remediated:	Not reported
Acres of Soil w/ Restrict Access:	Not reported
Yr IC remedy complete:	Not reported
Yr GW remedy completed:	Not reported
Year GWIC completed:	Not reported
Acres of wetland of sediment remediated:	Not reported
Public financing:	False
Assurance help:	False
Land use Classfn At Site:	Not reported
Land use Vicinity Of Site:	Not reported
Deed notif Present On Site:	False
Restrictive Covenant Present:	False
Restrictions:	Not reported
GW Pump and Treat Used at site:	False
Quaternary Perched:	False
Quaternary Water Table:	False
Quaternary Confined:	False
Cretaceous:	False
Plattville:	False
St. peter:	False
Prairie Duchien:	False
Jordan:	False
Ironton/Galesville:	False
Mt Simon Hinckley:	False
Precambrian Undifferentiated:	False
Other/Unknown Aquifer:	False
Date Info Last Updated:	2015-08-18 12:45:00
Inst Control Info Updated:	Not reported
Inst Control Filed Location:	Not reported
SW Classification (Primary):	Not reported
SW Classification (Secondary):	Not reported
Miscellaneous:	Not reported
SW Comments:	Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

MCES METROPOLITAN WASTEWATER PLANT SEDIMENT SITE (Continued)

S112191063

WIMN:

Legislative District: 67B
Status: Active
Latitude: 44.92388414
Longitude: -93.04900105
Coordinate Collection Method: Address Matching House Number
Activity: Voluntary Investigation & Cleanup (VIC)
MPCA Id: SR247
Major Watershed: Mississippi River - Twin Cities

[Click here to access Minnesota Pollution Control Agency:](#)

2
NNW
> 1
1.305 mi.
6893 ft.

PIGS EYE LANDFILL
SEE LOCATION DESCRIPTION
ST. PAUL, MN 55106

SHWS **S100713181**
SRS **N/A**
MN LS
WIMN

Relative:
Higher

SHWS:

Actual:
693 ft.

Facility Id: SR117
Core Program Interest Id: 337817
Facility Address 2: Not reported
Link Id: 844
Site Type: Dump (Unpermitted)
Active?: True
MPCA Region: Metro
Site Size: 230
Score: 43
Enforcement Lead Agency: MPCA
Federal Deferral Pilot?: False
Site Classification A Emergency: True
Site Classification B O and m: False
Site Classification C Rd/ra: True
Site Classification D Ri/fs: True
Fund Financed: True
Plp: True
District: Metro
Program Site Was Referred From: SA
Program Interest: SF
Physical Location: East of Pigs Eye Lake Rd. South of the CP Rail St. Paul Yard.
Natural Resource Damage: False
Cleanup Cost: 5800000
Indian Reservation Land?: False
Reservation Name: Not reported
MPCA-owned Wells At Site?: True
Created By: Bill VanRyswyk
Created Date: 01/01/1998
Last Update Date: 02/25/2013
Federal Facility?: False
Petroleum Brownfields Prog?: False
Primary Funding Source: 11
EPA Id: MND980609085
MPCA Id: Not reported
Basin code: 2
Major water: 20
Minor water: Not reported
File Location: Archival Storage

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

VIC Application GIS: False
Notes: Although called a landfill, the site is largely a dump that operated from 1956 to 1972. A VIC Site (St. Paul Yard Expansion Site) is located on top of the northernmost portion of the dump. The fill area of the landfill is 230 acres. Sediment contamination of the lake is approximately 30 acres.
Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-05-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3442

Contact Type: Voluntary Party
Company Name: CP Rail
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6123478255
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Staff AG (Attorney General)
Company Name: MN Attorney General's Office
Contact Address: 445 Minnesota Street
Contact Address 2: Suite 900 NCL Tower
Contact City,St,Zip: St. Paul, MN 55101
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512967200
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-05-15 00:00:00
Misc Contact Info: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: (651) 757-8471
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: richard.baxter@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-05-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 2474

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: 6122978676
Contact E-mail: Dale.Tripler@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-02-15 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3429

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155-4194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: (651) 757-8379
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: dan.card@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2006-07-31 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 2447

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Type: Former Staff TA
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6122971806
Contact Phone Ext: Not reported
Contact Fax: 6122969707
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 1998-10-08 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: -9

Contact Type: Former Staff OSI
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: (651) 296-9707
Contact E-mail: Hans.Neve@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 1999-01-28 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3357

Contact Type: Potentially Responsible Party
Company Name: CMC Hartland
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 3122940440
Contact Phone Ext: Not reported
Contact Fax: 3126639397
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Owner
Company Name: City of St.Paul/Div of Parks and Recreation/Shredd
Contact Address: North Lexington Parkway

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55103
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6516232413
Contact Phone Ext: Press 2
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-01-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Potentially Responsible Party
Company Name: Met Council
Contact Address: East Fifth Street
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55101
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6126021105
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Staff PL/PM (Project Leader/Project Manager)s
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155-4194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2008-12-19 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contact Type: City Government Office
Company Name: St. Paul Parks & Rec
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6516322412
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2008-12-19 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Citizen/Interested Party
Company Name: Green the Great River Park
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512245463
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: County Government Office
Company Name: Ramsey County Parks
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: City of St. Paul
Contact Address: City Hall
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668537

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Phone Ext: Not reported
Contact Fax: 6512668513
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: Ramsey Co. Parks/Recreation
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517482500
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: LCMR - Phyto remed. Project
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512962406
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Consultant
Company Name: AECOM Environment
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Cell Phone: Not reported
Contact Information Last Updated: 2012-08-30 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Owner
Company Name: City of St Paul
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668854
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2013-02-07 00:00:00
Misc Contact Info: Not reported
Receive Invoice: T
Staff Id Num: 0

Contact Type: City Government Office
Company Name: Not reported
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668740
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Local Representative
Company Name: Not reported
Contact Address: 203 Howard St. So
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55119
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512985571
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported

Map ID
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MAP FINDINGS

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Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Receive Invoice: F
Staff Id Num: 0

Contact Type: Other
Company Name: DNR Greenways
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517727952
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Owner
Company Name: St. Paul - Public Works
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668860
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: T
Staff Id Num: 0

Contact Type: Staff TA (Technical Analyst)
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: 651-296-9707
Contact E-mail: kurt.schroeder@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Map ID
Direction
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contaminant Id:	Chlorobenzene; (monochlorobenzene
Contaminated Media:	Ground Water
Req Cleanup Concluded:	20
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	80
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Chromium (total); (Chromium VI
Contaminated Media:	Ground Water
Req Cleanup Concluded:	100
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	MCL (Maximum Contaminant Level)
Max Residual Contamination:	269
Date Info Last Updated:	1998-10-30 00:00:00
Contaminant Id:	Cyanide, free
Contaminated Media:	Ground Water
Req Cleanup Concluded:	5.1999998
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	70
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Lead
Contaminated Media:	Ground Water
Req Cleanup Concluded:	9
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	776
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Mercury
Contaminated Media:	Ground Water
Req Cleanup Concluded:	7.0000002E
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	6.4000001
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Cobalt
Contaminated Media:	Ground Water
Req Cleanup Concluded:	5
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	155
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Vanadium
Contaminated Media:	Ground Water
Req Cleanup Concluded:	24
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	429
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	p,p-Dichlorodiphenyltrichloroethane; (4,4-DDT

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contaminated Media:	Sediment
Req Cleanup Concluded:	8
Cleanup Lvl Measure Units:	ug/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	45
Date Info Last Updated:	1999-04-21 00:00:00
Contaminant Id:	Lead
Contaminated Media:	Sediment
Req Cleanup Concluded:	64
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	59000
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Silver
Contaminated Media:	Sediment
Req Cleanup Concluded:	1
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	45
Date Info Last Updated:	1999-06-24 00:00:00
Contaminant Id:	Cadmium
Contaminated Media:	Sediment
Req Cleanup Concluded:	2.5
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	77
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Polychlorinated biphenyls; (PCBs
Contaminated Media:	Sediment
Req Cleanup Concluded:	340
Cleanup Lvl Measure Units:	ug/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	21000
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Mercury
Contaminated Media:	Surface Water
Req Cleanup Concluded:	7.0000002E
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	0.2
Date Info Last Updated:	1999-06-28 00:00:00
Contaminant Id:	Copper
Contaminated Media:	Sediment
Req Cleanup Concluded:	75
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	1430
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Zinc
Contaminated Media:	Sediment

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Req Cleanup Concluded: 230
Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: EBV (Eco-Based Value)
Max Residual Contamination: 2140
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Antimony
Contaminated Media: Sediment
Req Cleanup Concluded: 2
Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: EBV (Eco-Based Value)
Max Residual Contamination: 51.900002
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Lead
Contaminated Media: Surface Water
Req Cleanup Concluded: 9
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 42
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Cobalt
Contaminated Media: Surface Water
Req Cleanup Concluded: 5
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 22
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Cadmium
Contaminated Media: Surface Water
Req Cleanup Concluded: 2.3
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 52.599998
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Zinc
Contaminated Media: Surface Water
Req Cleanup Concluded: 220
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 9710
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Ammonia Nitrogen
Contaminated Media: Surface Water
Req Cleanup Concluded: 0.60000002
Cleanup Lvl Measure Units: mg/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 70
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Lead
Contaminated Media: Soil
Req Cleanup Concluded: 700

Map ID
Direction
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: SRV (Soil Reference Value)
Max Residual Contamination: 62000
Date Info Last Updated: 2000-04-05 00:00:00

Contaminant Id: Cadmium
Contaminated Media: Soil
Req Cleanup Concluded: 10
Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: SLV (Soil Leaching Value)
Max Residual Contamination: 88
Date Info Last Updated: 2000-04-05 00:00:00

Contaminant Id: Barium
Contaminated Media: Ground Water
Req Cleanup Concluded: 683
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 2300
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Ethyl benzene
Contaminated Media: Ground Water
Req Cleanup Concluded: 68
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 83
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Xylenes (mixture of o,m,p
Contaminated Media: Ground Water
Req Cleanup Concluded: 166
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 349
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Phenanthrene
Contaminated Media: Ground Water
Req Cleanup Concluded: 3.5999999
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 12
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Polychlorinated biphenyls; (PCBs
Contaminated Media: Ground Water
Req Cleanup Concluded: 2.8999999E
Cleanup Lvl Measure Units: ng/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 1
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: EDF-508
Contaminated Media: Ground Water
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: ug/L

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: 23
Date Info Last Updated: 2009-04-02 00:00:00

Contaminant Id: 335-67-1
Contaminated Media: Ground Water
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: 118
Date Info Last Updated: 2009-04-02 00:00:00

Facid: SR117
Event: Public Comment Period
Additional Information: None Entered
Start Date: 2000-04-03 00:00:00
End Date: 2000-05-03 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-12-14 00:00:00
Record Number: 9962

Facid: SR117
Event: Hazard Ranking System (SRS) Package
Additional Information: None Entered
Start Date: Not reported
End Date: 1993-08-01 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6063

Facid: SR117
Event: 130
Additional Information: None Entered
Start Date: Not reported
End Date: 1993-12-14 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6066

Facid: SR117
Event: 130
Additional Information: None Entered
Start Date: Not reported
End Date: 1997-02-20 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6067

Facid: SR117
Event: 135
Additional Information: None
Start Date: Not reported
End Date: 1989-10-11 00:00:00

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 2238

Facid: SR117
Event: 142
Additional Information: Pace
Start Date: 2008-05-03 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2008-10-07 00:00:00
Record Number: 29476

Facid: SR117
Event: 145
Additional Information: MPCA Removal Action 7 drums removed from subsurface near battery bay.
- Phase 1
Start Date: 2000-06-17 00:00:00
End Date: 2000-06-30 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-07-25 00:00:00
Record Number: 9279

Facid: SR117
Event: 145
Additional Information: In November of 2000 208 additional drums were removed. Many drums were full or partially filled with waste. Contaminants included PCBs; solvents; paints; tar; metals. Wastes need to be hauled off site. - Phase 1
Start Date: 2000-11-01 00:00:00
End Date: 2001-03-01 00:00:00
Planned Start Date: Not reported
Planned End Date: 2001-01-30 00:00:00
Date Info Last Updated: 2000-12-12 00:00:00
Record Number: 9959

Facid: SR117
Event: 145
Additional Information: Approximately 25 - 30 barrels removed. Most barrels were hazardous due to TCLP or PCBs. - Phase 1
Start Date: 1999-12-01 00:00:00
End Date: 1999-12-31 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-02-11 00:00:00
Record Number: 6064

Facid: SR117
Event: 145
Additional Information: Drum removal - Phase 1
Start Date: 2001-09-25 00:00:00
End Date: 2001-12-15 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Date Info Last Updated: 2002-08-13 00:00:00
Record Number: 15048

Facid: SR117
Event: 148
Additional Information: Proposed Response Action Plan
Start Date: 2000-04-25 00:00:00
End Date: 2000-04-25 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-12-12 00:00:00
Record Number: 9961

Facid: SR117
Event: 150
Additional Information: None Entered
Start Date: 1989-12-30 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: 2003-04-01 00:00:00
Date Info Last Updated: 2004-07-15 00:00:00
Record Number: 21684

Facid: SR117
Event: Remedial Investigation
Additional Information: Southwest Pond Investigation
Start Date: Not reported
End Date: 2002-12-30 00:00:00
Planned Start Date: 2002-05-20 00:00:00
Planned End Date: 2002-08-31 00:00:00
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14136

Facid: SR117
Event: Feasibility Study
Additional Information: Battle Creek Reroute- Baywest
Start Date: 2000-12-01 00:00:00
End Date: 2001-02-15 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14128

Facid: SR117
Event: Remedial Action
Additional Information: For Phase 1 construction activity. Phase 2 construction is dependent on availability of funds
Start Date: 2001-09-25 00:00:00
End Date: Not reported
Planned Start Date: 2001-06-01 00:00:00
Planned End Date: 2002-06-30 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 8837

Facid: SR117
Event: Remedial Action
Additional Information: Phase 2

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Start Date: 2003-07-28 00:00:00
End Date: 2005-09-01 00:00:00
Planned Start Date: 2003-07-28 00:00:00
Planned End Date: 2004-05-24 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12889

Facid: SR117
Event: Remedial Design
Additional Information: Phase 2
Start Date: 2002-07-29 00:00:00
End Date: 2003-04-30 00:00:00
Planned Start Date: 2002-04-20 00:00:00
Planned End Date: 2002-09-13 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12890

Facid: SR117
Event: Remedial Design
Additional Information: 100% design report approved - Phase 1
Start Date: 2001-04-01 00:00:00
End Date: 2001-07-30 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2001-09-05 00:00:00
Record Number: 11914

Facid: SR117
Event: Operation and Maintenance
Additional Information: Phase 1 - Performance Monitoring
Start Date: 2005-11-01 00:00:00
End Date: Not reported
Planned Start Date: 2003-09-01 00:00:00
Planned End Date: Not reported
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12891

Facid: SR117
Event: VIC Program Participation Dates (Start/End)
Additional Information: None Entered
Start Date: 1984-10-30 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2015-04-17 00:00:00
Record Number: 40740

Facid: SR117
Event: Baseline Evaluation
Additional Information: Battle Creek - Phase 1
Start Date: 2001-04-01 00:00:00
End Date: 2001-09-01 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14127

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Facid: SR117
Event: Baseline Risk Assessment
Additional Information: Risk Based Site Evaluation by KC Schroeder, PCA Hydro
Start Date: 2000-06-01 00:00:00
End Date: 2000-08-17 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14134

Facid: SR117
GW Receipts Prot by Rem Actn: Not reported
Ecological receptors present: True
Type of ecological receptors: Not reported
Acres of contaminated soil: 230
Volume of contaminated soil: 8230000
Acres of surface water impacted: 30
Acres of wetland impacted: 2
Acres of sediment impacted: 4
GW Plume Area Acres: Not reported
Cleanup Conducted: True
Acres of Contam Soil remediate: 23
Volume of Soil Cleaned: Not reported
Municipal wells contamd: Not reported
Dom wells contam: Not reported
People Impct SW intake contam: Not reported
Drums Revolved from site: 314
Yr Soil Remediated: Not reported
Acres of Soil w/ Restrict Access: Not reported
Yr IC remedy complete: Not reported
Yr GW remedy completed: Not reported
Year GWIC completed: Not reported
Acres of wetland of sediment remediated: 2
Public financing: True
Assurance help: False
Land use Classfn At Site: Recreational
Land use Vicinity Of Site: Industrial
Deed notif Present On Site: False
Restrictive Covenant Present: False
Restrictions: Not reported
GW Pump and Treat Used at site: False
Quaternary Perched: False
Quaternary Water Table: True
Quaternary Confined: False
Cretaceous: False
Plattville: False
St. peter: False
Prairie Duchien: False
Jordan: False
Ironton/Galesville: False
Mt Simon Hinckley: False
Precambrian Undifferentiated: False
Other/Unknown Aquifer: False
Date Info Last Updated: 2012-07-24 00:00:00
Inst Control Info Updated: 2012-07-24 00:00:00
Inst Control Filed Location: Not reported
SW Classification (Primary): Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

SW Classification (Secondary): Not reported
Miscellaneous: 27 barrels removed in Dec 99 plus 7 barrels in June '00: 208 more
barrels removed in 11/2000. 72 more barrels were removed in 2001.
Cleanup conducted includes pulling back 30 feet of garbage from the
shoreline and backfilling w/select fill buffer.
SW Comments: Not reported

MN SRS:

Facility ID: SR117
SEC Address: Not reported
Link Id: 844
Facility Type: Dump (Unpermitted)
Active: True
Pay Complete: False
MPCA Region: Metro
Size Acres: 230
HRS Score: 43
Enforcement Lead Agency: MPCA
Federal Defferal Plot: False
Petroleum Brownfields Prog?: False
Emergency: True
Site Classification: False
RD/RA: True
RL/FS: True
Fund financed: True
Npl: False
Plp: True
District: Metro
Program Referred from: SA
Program Interest: SF
Physical Location: East of Pigs Eye Lake Rd. South of the CP Rail St. Paul Yard.
Natural Source damage: False
Clean up Cost: 5800000
Indian Reservation: False
Reserve Name: Not reported
MPCA Owned Wells at site: True
Created By: Bill VanRyswyk
Date Created: 01/01/1998
Date Last Updated: 02/25/2013
Federal Facility: False
Primary Funding Source: 11
EPA Id: MND980609085
MPCA Id: Not reported
Alpha Sort: Not reported
Legal Distt: 67B
Congressional Distt: 4
Public Land Survey Method: M
Map Scale For PLS Locational Data: A
Township 2: 28
Range: 22
PLS Township Suffix: W
section: 10
PLS Qtr Section (160 Acres): ne
PLS Qtr-Qtr Section (40 Acres): Not reported
Pls Qtr-Qtr-Qtr Section (10 Acres): Not reported
Pls Qtr-Qtr-Qtr-Qtr Secion (2.5 Acres): Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Quad: 1293
NAD Number: 83
Desc Of UTM Coord Pt: Not reported
UTM Coord Pt Data Source: Not reported
Org Providing UTM Coord Point Data: Not reported
mpcapgmac: Not reported
Utm Coord Pt Data Collection Method: Not reported
Date Of Utm Coord Pt Data Collection: Not reported
COL Date Qual: Not reported
Map Scale: Not reported
verifmeth: Not reported
horizref: Not reported
Utm Source: 2
Utm Method: 11
Utm Scale: A
Utm Accuracy: Not reported
Utm East: 496971.1185599997
Utm North: 4975482.44331
Utm Zone: 15
Basin Code: 2
Major Watershed: 20
Minor Watershed: Not reported
Public Land Survey Method 2: Not reported
Map Scale For PLS Locational Data 2: Not reported
Township 2: Not reported
Range 2: Not reported
PLS Township Suffix 2: Not reported
Section 2: Not reported
PLS Qtr Section (160 Acres) 2: Not reported
PLS Qtr-Qtr Section (40 Acres) 2: Not reported
PLS Qtr-Qtr Section (10 Acres) 2: Not reported
PLS Qtr-Qtr Section (2.5 Acres) 2: Not reported
Quad 2: Not reported
File Location: Archival Storage
VIC Application GIS: False
Notes: Although called a landfill, the site is largely a dump that operated from 1956 to 1972. A VIC Site (St. Paul Yard Expansion Site) is located on top of the northernmost portion of the dump. The fill area of the landfill is 230 acres. Sediment contamination of the lake is approximately 30 acres.
Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-05-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3442

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Type: Voluntary Party
Company Name: CP Rail
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6123478255
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Staff AG (Attorney General)
Company Name: MN Attorney General's Office
Contact Address: 445 Minnesota Street
Contact Address 2: Suite 900 NCL Tower
Contact City,St,Zip: St. Paul, MN 55101
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512967200
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-05-15 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: (651) 757-8471
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: richard.baxter@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-05-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 2474

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: 6122978676
Contact E-mail: Dale.Trippler@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-02-15 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3429

Contact Type: Former Staff Project Leader/Project Manager
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155-4194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: (651) 757-8379
Contact Phone Ext: Not reported
Contact Fax: 6512969707
Contact E-mail: dan.card@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2006-07-31 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 2447

Contact Type: Former Staff TA
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6122971806
Contact Phone Ext: Not reported
Contact Fax: 6122969707
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 1998-10-08 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: -9

Contact Type: Former Staff OSI
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155
Contact Province: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: (651) 296-9707
Contact E-mail: Hans.Neve@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 1999-01-28 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 3357

Contact Type: Potentially Responsible Party
Company Name: CMC Hartland
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 3122940440
Contact Phone Ext: Not reported
Contact Fax: 3126639397
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Owner
Company Name: City of St.Paul/Div of Parks and Recreation/Shredd
Contact Address: North Lexington Parkway
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55103
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6516232413
Contact Phone Ext: Press 2
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2001-01-16 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Potentially Responsible Party
Company Name: Met Council
Contact Address: East Fifth Street
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55101
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6126021105

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Staff PL/PM (Project Leader/Project Manager)s
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55155-4194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2008-12-19 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contact Type: City Government Office
Company Name: St. Paul Parks & Rec
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6516322412
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2008-12-19 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Citizen/Interested Party
Company Name: Green the Great River Park
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512245463
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: County Government Office
Company Name: Ramsey County Parks
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: City of St. Paul
Contact Address: City Hall
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668537
Contact Phone Ext: Not reported
Contact Fax: 6512668513
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: Ramsey Co. Parks/Recreation
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517482500
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Receive Invoice: F
Staff Id Num: 0

Contact Type: City Government Office
Company Name: LCMR - Phyto remed. Project
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512962406
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Consultant
Company Name: AECOM Environment
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: Not reported
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2012-08-30 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Owner
Company Name: City of St Paul
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668854
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2013-02-07 00:00:00
Misc Contact Info: Not reported
Receive Invoice: T
Staff Id Num: 0

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Type: City Government Office
Company Name: Not reported
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668740
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Local Representative
Company Name: Not reported
Contact Address: 203 Howard St. So
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 55119
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512985571
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Other
Company Name: DNR Greenways
Contact Address: Not reported
Contact Address 2: Not reported
Contact City,St,Zip: MN
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517727952
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 0

Contact Type: Former Owner
Company Name: St. Paul - Public Works
Contact Address: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contact Address 2: Not reported
Contact City,St,Zip: Not reported
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6512668860
Contact Phone Ext: Not reported
Contact Fax: Not reported
Contact E-mail: Not reported
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-02-11 00:00:00
Misc Contact Info: Not reported
Receive Invoice: T
Staff Id Num: 0

Contact Type: Staff TA (Technical Analyst)
Company Name: MPCA
Contact Address: 520 Lafayette Rd N
Contact Address 2: Not reported
Contact City,St,Zip: St. Paul, MN 551554194
Contact Province: Not reported
Contact Country: Not reported
Contact Postal code: Not reported
Contact Phone: 6517572703
Contact Phone Ext: Not reported
Contact Fax: 651-296-9707
Contact E-mail: kurt.schroeder@state.mn.us
Contact Cell Phone: Not reported
Contact Information Last Updated: 2000-12-12 00:00:00
Misc Contact Info: Not reported
Receive Invoice: F
Staff Id Num: 247

Contaminant Id: Chlorobenzene; (monochlorobenzene
Contaminated Media: Ground Water
Req Cleanup Concluded: 20
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 80
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Chromium (total); (Chromium VI
Contaminated Media: Ground Water
Req Cleanup Concluded: 100
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: MCL (Maximum Contaminant Level)
Max Residual Contamination: 269
Date Info Last Updated: 1998-10-30 00:00:00

Contaminant Id: Cyanide, free
Contaminated Media: Ground Water
Req Cleanup Concluded: 5.1999998
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 70
Date Info Last Updated: 2000-08-24 00:00:00

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contaminant Id:	Lead
Contaminated Media:	Ground Water
Req Cleanup Concluded:	9
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	776
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Mercury
Contaminated Media:	Ground Water
Req Cleanup Concluded:	7.0000002E
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	6.4000001
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Cobalt
Contaminated Media:	Ground Water
Req Cleanup Concluded:	5
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	155
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Vanadium
Contaminated Media:	Ground Water
Req Cleanup Concluded:	24
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	429
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	p,p-Dichlorodiphenyltrichloroethane; (4,4-DDT
Contaminated Media:	Sediment
Req Cleanup Concluded:	8
Cleanup Lvl Measure Units:	ug/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	45
Date Info Last Updated:	1999-04-21 00:00:00
Contaminant Id:	Lead
Contaminated Media:	Sediment
Req Cleanup Concluded:	64
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	59000
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Silver
Contaminated Media:	Sediment
Req Cleanup Concluded:	1
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	45
Date Info Last Updated:	1999-06-24 00:00:00
Contaminant Id:	Cadmium

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Contaminated Media:	Sediment
Req Cleanup Concluded:	2.5
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	77
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Polychlorinated biphenyls; (PCBs
Contaminated Media:	Sediment
Req Cleanup Concluded:	340
Cleanup Lvl Measure Units:	ug/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	21000
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Mercury
Contaminated Media:	Surface Water
Req Cleanup Concluded:	7.0000002E
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	0.2
Date Info Last Updated:	1999-06-28 00:00:00
Contaminant Id:	Copper
Contaminated Media:	Sediment
Req Cleanup Concluded:	75
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	1430
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Zinc
Contaminated Media:	Sediment
Req Cleanup Concluded:	230
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	2140
Date Info Last Updated:	2000-08-24 00:00:00
Contaminant Id:	Antimony
Contaminated Media:	Sediment
Req Cleanup Concluded:	2
Cleanup Lvl Measure Units:	mg/Kg
Basis For Req Cleanup Lvl:	EBV (Eco-Based Value)
Max Residual Contamination:	51.900002
Date Info Last Updated:	1999-06-28 00:00:00
Contaminant Id:	Lead
Contaminated Media:	Surface Water
Req Cleanup Concluded:	9
Cleanup Lvl Measure Units:	ug/L
Basis For Req Cleanup Lvl:	ALS (Aquatic Life Standard)
Max Residual Contamination:	42
Date Info Last Updated:	1999-06-28 00:00:00
Contaminant Id:	Cobalt
Contaminated Media:	Surface Water

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Req Cleanup Concluded: 5
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 22
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Cadmium
Contaminated Media: Surface Water
Req Cleanup Concluded: 2.3
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 52.599998
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Zinc
Contaminated Media: Surface Water
Req Cleanup Concluded: 220
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 9710
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Ammonia Nitrogen
Contaminated Media: Surface Water
Req Cleanup Concluded: 0.60000002
Cleanup Lvl Measure Units: mg/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 70
Date Info Last Updated: 1999-06-28 00:00:00

Contaminant Id: Lead
Contaminated Media: Soil
Req Cleanup Concluded: 700
Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: SRV (Soil Reference Value)
Max Residual Contamination: 62000
Date Info Last Updated: 2000-04-05 00:00:00

Contaminant Id: Cadmium
Contaminated Media: Soil
Req Cleanup Concluded: 10
Cleanup Lvl Measure Units: mg/Kg
Basis For Req Cleanup Lvl: SLV (Soil Leaching Value)
Max Residual Contamination: 88
Date Info Last Updated: 2000-04-05 00:00:00

Contaminant Id: Barium
Contaminated Media: Ground Water
Req Cleanup Concluded: 683
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 2300
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Ethyl benzene
Contaminated Media: Ground Water
Req Cleanup Concluded: 68

Map ID
Direction
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Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 83
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Xylenes (mixture of o,m,p
Contaminated Media: Ground Water
Req Cleanup Concluded: 166
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 349
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Phenanthrene
Contaminated Media: Ground Water
Req Cleanup Concluded: 3.5999999
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 12
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: Polychlorinated biphenyls; (PCBs
Contaminated Media: Ground Water
Req Cleanup Concluded: 2.8999999E
Cleanup Lvl Measure Units: ng/L
Basis For Req Cleanup Lvl: ALS (Aquatic Life Standard)
Max Residual Contamination: 1
Date Info Last Updated: 2000-08-24 00:00:00

Contaminant Id: EDF-508
Contaminated Media: Ground Water
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: 23
Date Info Last Updated: 2009-04-02 00:00:00

Contaminant Id: 335-67-1
Contaminated Media: Ground Water
Req Cleanup Concluded: Not reported
Cleanup Lvl Measure Units: ug/L
Basis For Req Cleanup Lvl: Not reported
Max Residual Contamination: 118
Date Info Last Updated: 2009-04-02 00:00:00

Facid: SR117
Event: Public Comment Period
Additional Information: None Entered
Start Date: 2000-04-03 00:00:00
End Date: 2000-05-03 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-12-14 00:00:00
Record Number: 9962

Facid: SR117
Event: Hazard Ranking System (SRS) Package

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Additional Information: None Entered
Start Date: Not reported
End Date: 1993-08-01 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6063

Facid: SR117
Event: 130
Additional Information: None Entered
Start Date: Not reported
End Date: 1993-12-14 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6066

Facid: SR117
Event: 130
Additional Information: None Entered
Start Date: Not reported
End Date: 1997-02-20 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 6067

Facid: SR117
Event: 135
Additional Information: None
Start Date: Not reported
End Date: 1989-10-11 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 1998-10-30 00:00:00
Record Number: 2238

Facid: SR117
Event: 142
Additional Information: Pace
Start Date: 2008-05-03 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2008-10-07 00:00:00
Record Number: 29476

Facid: SR117
Event: 145
Additional Information: MPCA Removal Action 7 drums removed from subsurface near battery bay.
- Phase 1
Start Date: 2000-06-17 00:00:00
End Date: 2000-06-30 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-07-25 00:00:00

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Record Number: 9279

Facid: SR117
Event: 145
Additional Information: In November of 2000 208 additional drums were removed. Many drums were full or partially filled with waste. Contaminants included PCBs; solvents; paints; tar; metals. Wastes need to be hauled off site. - Phase 1
Start Date: 2000-11-01 00:00:00
End Date: 2001-03-01 00:00:00
Planned Start Date: Not reported
Planned End Date: 2001-01-30 00:00:00
Date Info Last Updated: 2000-12-12 00:00:00
Record Number: 9959

Facid: SR117
Event: 145
Additional Information: Approximately 25 - 30 barrels removed. Most barrels were hazardous due to TCLP or PCBs. - Phase 1
Start Date: 1999-12-01 00:00:00
End Date: 1999-12-31 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-02-11 00:00:00
Record Number: 6064

Facid: SR117
Event: 145
Additional Information: Drum removal - Phase 1
Start Date: 2001-09-25 00:00:00
End Date: 2001-12-15 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-08-13 00:00:00
Record Number: 15048

Facid: SR117
Event: 148
Additional Information: Proposed Response Action Plan
Start Date: 2000-04-25 00:00:00
End Date: 2000-04-25 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2000-12-12 00:00:00
Record Number: 9961

Facid: SR117
Event: 150
Additional Information: None Entered
Start Date: 1989-12-30 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: 2003-04-01 00:00:00
Date Info Last Updated: 2004-07-15 00:00:00
Record Number: 21684

Facid: SR117

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Event: Remedial Investigation
Additional Information: Southwest Pond Investigation
Start Date: Not reported
End Date: 2002-12-30 00:00:00
Planned Start Date: 2002-05-20 00:00:00
Planned End Date: 2002-08-31 00:00:00
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14136

Facid: SR117
Event: Feasibility Study
Additional Information: Battle Creek Reroute- Baywest
Start Date: 2000-12-01 00:00:00
End Date: 2001-02-15 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14128

Facid: SR117
Event: Remedial Action
Additional Information: For Phase 1 construction activity. Phase 2 construction is dependent on availability of funds
Start Date: 2001-09-25 00:00:00
End Date: Not reported
Planned Start Date: 2001-06-01 00:00:00
Planned End Date: 2002-06-30 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 8837

Facid: SR117
Event: Remedial Action
Additional Information: Phase 2
Start Date: 2003-07-28 00:00:00
End Date: 2005-09-01 00:00:00
Planned Start Date: 2003-07-28 00:00:00
Planned End Date: 2004-05-24 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12889

Facid: SR117
Event: Remedial Design
Additional Information: Phase 2
Start Date: 2002-07-29 00:00:00
End Date: 2003-04-30 00:00:00
Planned Start Date: 2002-04-20 00:00:00
Planned End Date: 2002-09-13 00:00:00
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12890

Facid: SR117
Event: Remedial Design
Additional Information: 100% design report approved - Phase 1
Start Date: 2001-04-01 00:00:00
End Date: 2001-07-30 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported

Map ID
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Date Info Last Updated: 2001-09-05 00:00:00
Record Number: 11914

Facid: SR117
Event: Operation and Maintenance
Additional Information: Phase 1 - Performance Monitoring
Start Date: 2005-11-01 00:00:00
End Date: Not reported
Planned Start Date: 2003-09-01 00:00:00
Planned End Date: Not reported
Date Info Last Updated: 2002-01-22 00:00:00
Record Number: 12891

Facid: SR117
Event: VIC Program Participation Dates (Start/End)
Additional Information: None Entered
Start Date: 1984-10-30 00:00:00
End Date: Not reported
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2015-04-17 00:00:00
Record Number: 40740

Facid: SR117
Event: Baseline Evaluation
Additional Information: Battle Creek - Phase 1
Start Date: 2001-04-01 00:00:00
End Date: 2001-09-01 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14127

Facid: SR117
Event: Baseline Risk Assessment
Additional Information: Risk Based Site Evaluation by KC Schroeder, PCA Hydro
Start Date: 2000-06-01 00:00:00
End Date: 2000-08-17 00:00:00
Planned Start Date: Not reported
Planned End Date: Not reported
Date Info Last Updated: 2002-06-13 00:00:00
Record Number: 14134

Facid: SR117
GW Receipts Prot by Rem Actn: Not reported
Ecological receptors present: True
Type of ecological receptors: Not reported
Acres of contaminated soil: 230
Volume of contaminated soil: 8230000
Acres of surface water impacted: 30
Acres of wetland impacted: 2
Acres of sediment impacted: 4
GW Plume Area Acres: Not reported
Cleanup Conducted: True
Acres of Contam Soil remediate: 23
Volume of Soil Cleaned: Not reported
Municipal wells contamd: Not reported

Map ID
Direction
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MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

# Dom wells contam:	Not reported
# People Impct SW intake contam:	Not reported
# Drums Revolved from site:	314
Yr Soil Remediated:	Not reported
Acres of Soil w/ Restrict Access:	Not reported
Yr IC remedy complete:	Not reported
Yr GW remedy completed:	Not reported
Year GWIC completed:	Not reported
Acres of wetland of sediment remediated:	2
Public financing:	True
Assurance help:	False
Land use Classfn At Site:	Recreational
Land use Vicinity Of Site:	Industrial
Deed notif Present On Site:	False
Restrictive Covenant Present:	False
Restrictions:	Not reported
GW Pump and Treat Used at site:	False
Quaternary Perched:	False
Quaternary Water Table:	True
Quaternary Confined:	False
Cretaceous:	False
Plattville:	False
St. peter:	False
Prairie Duchien:	False
Jordan:	False
Ironton/Galesville:	False
Mt Simon Hinckley:	False
Precambrian Undifferentiated:	False
Other/Unknown Aquifier:	False
Date Info Last Updated:	2012-07-24 00:00:00
Inst Control Info Updated:	2012-07-24 00:00:00
Inst Control Filed Location:	Not reported
SW Classification (Primary):	Not reported
SW Classification (Secondary):	Not reported
Miscellaneous:	27 barrels removed in Dec 99 plus 7 barrels in June '00: 208 more barrels removed in 11/2000. 72 more barrels were removed in 2001. Cleanup conducted includes pulling back 30 feet of garbage from the shoreline and backfilling w/select fill buffer.
SW Comments:	Not reported

MN LS:

Link ID:	844
EPA ID:	MND980609085
MPCA ID:	SR117
Method:	I1
CERCLIS:	Yes
National Priorities List:	No
PLP:	Yes
Voluntary Cleanup & Investigation:	No
RCRA Treatment Storage & Disposal:	No
RCRA Generator:	No
Solid Waste Permit:	No
Dumps:	Yes
No Further Remedial Action Planned:	No
Delisted From PLP By MPCA:	No
LCP:	No

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

PIGS EYE LANDFILL (Continued)

S100713181

Brownfield: No
Entity Type: PLP

WIMN:

Legislative District: 67B
Status: Active
Latitude: 44.93276595
Longitude: -93.03838347
Coordinate Collection Method: Digitized-DRG
Activity: Multiple Activities
MPCA Id: Multiple Activities
Major Watershed: Mississippi River - Twin Cities

[Click here to access Minnesota Pollution Control Agency:](#)

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
NO SITES FOUND					

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 08/15/2011
Number of Days to Update: 56	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 04/08/2015	Telephone: 703-603-8704
Date Made Active in Reports: 06/11/2015	Last EDR Contact: 04/08/2016
Number of Days to Update: 64	Next Scheduled EDR Contact: 07/18/2016
	Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly known as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 08/01/2016
	Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 08/01/2016
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/09/2015	Source: EPA
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 312-886-6186
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 312-886-6186
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 312-886-6186
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 312-886-6186
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015	Source: Department of the Navy
Date Data Arrived at EDR: 05/29/2015	Telephone: 843-820-7326
Date Made Active in Reports: 06/11/2015	Last EDR Contact: 02/16/2016
Number of Days to Update: 13	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/10/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/11/2015	Telephone: 703-603-0695
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/29/2016
Number of Days to Update: 53	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/10/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/11/2015	Telephone: 703-603-0695
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/29/2016
Number of Days to Update: 53	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

State- and tribal - equivalent NPL

MN PLP: Permanent List of Priorities

The list identifies hazardous waste sites where investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues.

Date of Government Version: 08/01/2014
Date Data Arrived at EDR: 10/02/2014
Date Made Active in Reports: 01/20/2015
Number of Days to Update: 110

Source: Pollution Control Agency
Telephone: 651-296-6139
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Superfund Site Information Listing

The SRS database includes all sites that the State Superfund Program is dealing with or has dealt with. The Superfund Program identifies, investigates and determines appropriate cleanup plans for abandoned or uncontrolled hazardous waste sites where a release or potential release of a hazardous substance poses a risk to human health or the environment.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 03/09/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Annually

State and tribal landfill and/or solid waste disposal site lists

UNPERM LF: Unpermitted Facilities

These are facilities that have solid waste disposal yet are not permitted.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Pollution Control Agency
Telephone: 651-757-2665
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

SWF/LF: Permitted Solid Waste Disposal Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7276
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LCP: Closed Landfills Priority List

The Minnesota Legislature enacted a law to manage and clean up the state's closed Mixed Municipal Solid Waste Landfills. Under that law, the MPCA is required to create and periodically revise a priority list of qualified landfills, based on the relative health and environmental risks they present. The MPCA established the first such priority list in December, 1994.

Date of Government Version: 01/14/2016
Date Data Arrived at EDR: 02/23/2016
Date Made Active in Reports: 04/14/2016
Number of Days to Update: 51

Source: Minnesota Pollution Control Agency
Telephone: 651-296-9543
Source: Pollution Control Agency, GIS Section
Telephone: 651-296-7266
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LUST: Leak Sites

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Semi-Annually

LAST: Leaking Aboveground Storage Tanks

A listing of leaking aboveground storage tanks.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land

A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/24/2015	Source: EPA Region 4
Date Data Arrived at EDR: 12/01/2015	Telephone: 404-562-8677
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/26/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Semi-Annually

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 08/20/2015	Source: EPA Region 6
Date Data Arrived at EDR: 10/30/2015	Telephone: 214-665-6597
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 111	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/30/2015	Source: EPA Region 7
Date Data Arrived at EDR: 04/28/2015	Telephone: 913-551-7003
Date Made Active in Reports: 06/22/2015	Last EDR Contact: 04/29/2016
Number of Days to Update: 55	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/08/2015	Telephone: 415-972-3372
Date Made Active in Reports: 02/09/2015	Last EDR Contact: 04/27/2016
Number of Days to Update: 32	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015	Source: EPA Region 8
Date Data Arrived at EDR: 10/23/2015	Telephone: 303-312-6271
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/27/2016
Number of Days to Update: 118	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010	Source: FEMA
Date Data Arrived at EDR: 02/16/2010	Telephone: 202-646-5797
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/11/2016
Number of Days to Update: 55	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Minnesota Pollution Control Agency
Telephone: 651-649-5451
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

AST: Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Minnesota Pollution Control Agency
Telephone: 651-296-0930
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/24/2015
Date Data Arrived at EDR: 12/01/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 34

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/26/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 08/20/2015
Date Data Arrived at EDR: 10/30/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 111

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/29/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Semi-Annually

State and tribal institutional control / engineering control registries

INST CONTROL: Site Remediation Section Database

Sites that have an Institutional Control event.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Pollution Control Agency
Telephone: 512-296-6300
Last EDR Contact: 03/09/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 04/01/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VIC: Voluntary Investigation and Cleanup Program
Voluntary Investigation and Cleanup (VIC) Program List.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7291
Last EDR Contact: 03/09/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

State and tribal Brownfields sites

BROWNFIELDS: Petroleum Brownfields Program Sites

Purchasing, selling, or developing property can present a special set of obstacles if the property is contaminated with chemicals. The Petroleum Brownfields Program is one of several programs within the Minnesota Pollution Control Agency (MPCA) designed to help people address these obstacles. The purpose of the Petroleum Brownfields Program is to provide the technical assistance and liability assurance needed to expedite and facilitate the development, transfer, investigation and/or cleanup of property that is contaminated with petroleum.

Date of Government Version: 09/30/2015
Date Data Arrived at EDR: 12/01/2015
Date Made Active in Reports: 12/22/2015
Number of Days to Update: 21

Source: Pollution Control Agency
Telephone: 651-296-7999
Last EDR Contact: 02/16/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/22/2015
Date Data Arrived at EDR: 12/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/22/2016
Next Scheduled EDR Contact: 07/04/2016
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Recycling Facilities

A listing of companies that accept commercial quantities of recyclable materials.

Date of Government Version: 03/16/2016
Date Data Arrived at EDR: 03/18/2016
Date Made Active in Reports: 04/19/2016
Number of Days to Update: 32

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 02/09/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/15/2016
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/21/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: No Update Planned

SRS: Site Remediation Section Database

The database contains site information for sites monitored by the Site Remediation Section.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Pollution Control Agency
Telephone: 651-282-5988
Last EDR Contact: 03/09/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

This data was passively gathered. That is, the DOH asks law enforcement and other agencies to notify them of Clandestine Drug Labs (CDLs). They do not require reporting of events. Therefore the data represents only a subset of all CDLs. This data has not been verified. The DOH has made no attempt to verify that reported CDLs actually occurred. They have no knowledge if the CDL was involved in cooking or just consisted of chemicals associated with Meth production. The reports they receive are that a suspected CDL was seized.

Date of Government Version: 01/11/2016
Date Data Arrived at EDR: 01/12/2016
Date Made Active in Reports: 03/14/2016
Number of Days to Update: 62

Source: Department of Health
Telephone: 651-215-5800
Last EDR Contact: 04/04/2016
Next Scheduled EDR Contact: 07/18/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

MN DEL PLP: Delisted Permanent List of Priorities

This generally means that either no more cleanup at a site is needed or that no state superfund funding is needed for long term monitoring activities.

Date of Government Version: 08/01/2014
Date Data Arrived at EDR: 10/02/2014
Date Made Active in Reports: 01/20/2015
Number of Days to Update: 110

Source: Pollution Control Agency
Telephone: 651-296-6139
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Annually

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Quarterly

Local Land Records

LIENS: Environmental Liens

Sites included in the Site Remediation System Database that have Environmental Liens.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Pollution Control Agency
Telephone: 602-282-5988
Last EDR Contact: 03/09/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/26/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

SPILLS: Spills Database

Spills reported to the Pollution Control Agency.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Minnesota Pollution Control Agency
Telephone: 651-649-5451
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

AG SPILLS: Department of Agriculture Spills

This data is a list of pesticide/fertilizer incidents reported to have occurred in Minnesota.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Department of Agriculture
Telephone: 651-297-3997
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Semi-Annually

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 11/01/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 11/20/2001
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/09/2015
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/11/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/15/2016
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/15/2016
Number of Days to Update: 339	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/09/2011	Telephone: 615-532-8599
Date Made Active in Reports: 05/02/2011	Last EDR Contact: 02/19/2016
Number of Days to Update: 54	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/01/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/03/2015	Telephone: 202-566-1917
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/16/2016
Number of Days to Update: 61	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/21/2014	Telephone: 617-520-3000
Date Made Active in Reports: 06/17/2014	Last EDR Contact: 02/09/2016
Number of Days to Update: 88	Next Scheduled EDR Contact: 05/23/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/03/2015	Telephone: 703-308-4044
Date Made Active in Reports: 03/09/2015	Last EDR Contact: 02/12/2016
Number of Days to Update: 6	Next Scheduled EDR Contact: 05/23/2016
	Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012	Source: EPA
Date Data Arrived at EDR: 01/15/2015	Telephone: 202-260-5521
Date Made Active in Reports: 01/29/2015	Last EDR Contact: 03/24/2016
Number of Days to Update: 14	Next Scheduled EDR Contact: 07/04/2016
	Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014	Source: EPA
Date Data Arrived at EDR: 11/24/2015	Telephone: 202-566-0250
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 02/24/2016
Number of Days to Update: 133	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009	Source: EPA
Date Data Arrived at EDR: 12/10/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/25/2011	Last EDR Contact: 04/25/2016
Number of Days to Update: 77	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013	Source: EPA
Date Data Arrived at EDR: 12/12/2013	Telephone: 703-416-0223
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 03/08/2016
Number of Days to Update: 74	Next Scheduled EDR Contact: 06/20/2016
	Data Release Frequency: Annually

RMP: Risk Management Plans

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/26/2015	Telephone: 202-564-8600
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 04/25/2016
Number of Days to Update: 69	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 10/17/2014	Telephone: 202-564-6023
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 02/12/2016
Number of Days to Update: 3	Next Scheduled EDR Contact: 05/23/2016
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014	Source: EPA
Date Data Arrived at EDR: 10/15/2014	Telephone: 202-566-0500
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 04/12/2016
Number of Days to Update: 33	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/06/2015	Telephone: 202-564-5088
Date Made Active in Reports: 03/09/2015	Last EDR Contact: 04/08/2016
Number of Days to Update: 31	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/07/2016
Date Data Arrived at EDR: 03/18/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 28

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 04/15/2016
Next Scheduled EDR Contact: 07/25/2016
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/11/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/26/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 07/07/2015
Date Data Arrived at EDR: 07/09/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/08/2016
Next Scheduled EDR Contact: 07/18/2016
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transportation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/04/2016
Next Scheduled EDR Contact: 08/15/2016
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Biennially

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/15/2016
Next Scheduled EDR Contact: 07/25/2016
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 11/23/2015
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 86

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 03/28/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/07/2016
Next Scheduled EDR Contact: 07/18/2016
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931 and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/09/2016
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 44

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/02/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/20/2015
Date Data Arrived at EDR: 09/09/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 55

Source: EPA
Telephone: (312) 353-2000
Last EDR Contact: 03/08/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AGVIC: Agricultural Voluntary Investigation & Cleanup Listing

A listing of agricultural voluntary investigation & cleanup site locations.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Department of Agriculture
Telephone: 651-201-6400
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

AIRS: Permit Contact List

A listing of permitted AIRS facilities.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/20/2015
Date Made Active in Reports: 03/11/2015
Number of Days to Update: 19

Source: Pollution Control Agency
Telephone: 651-296-7351
Last EDR Contact: 04/08/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Varies

BULK: Bulk Facilities Database

Facilities that use bulk pesticides and fertilizers

Date of Government Version: 02/09/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Department of Agriculture
Telephone: 651-297-3997
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Semi-Annually

COAL ASH: Coal Ash Disposal Site Listing

A listing of coal ash disposal site locations.

Date of Government Version: 09/22/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 12/22/2015
Number of Days to Update: 39

Source: Pollution Control Agency
Telephone: 651-757-2740
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

DRYCLEANERS: Registered Drycleaning Facilities

A listing of coin-operated laundries and drycleaning; drycleaning plants, except rug cleaning; and industrial laundrers.

Date of Government Version: 09/21/2015
Date Data Arrived at EDR: 09/22/2015
Date Made Active in Reports: 12/02/2015
Number of Days to Update: 71

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 03/29/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Varies

ENFORCEMENT: Generators Associated with Enforcement Logs

Regulatory Compliance, Hazardous Waste Enforcement Log and Hazardous Waste Permit Unit Project Identification List.

Date of Government Version: 05/07/2014
Date Data Arrived at EDR: 05/23/2014
Date Made Active in Reports: 06/18/2014
Number of Days to Update: 26

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8332
Last EDR Contact: 03/28/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Quarterly

Financial Assurance 1: Financial Assurance Information Listing

Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Pollution Control Agency
Telephone: 651-297-8220
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information listing

A listing of financial assurance information for solid waste facilities.

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Pollution Control Agency
Telephone: 651-296-6066
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

Financial Assurance 3: Financial Assurance Information Listing

A listing of financial assurance information for hazardous waste facilities.

Date of Government Version: 10/01/2015
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 03/24/2016
Number of Days to Update: 76

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 03/14/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Varies

MN HWS PERMIT: Active TSD Facilities

Active TSD Facilities.

Date of Government Version: 03/01/2015
Date Data Arrived at EDR: 03/17/2015
Date Made Active in Reports: 03/30/2015
Number of Days to Update: 13

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8470
Last EDR Contact: 03/14/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Annually

MANIFEST: Hazardous Waste Manifest Data

Hazardous waste manifest data.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/07/2015
Date Made Active in Reports: 07/17/2015
Number of Days to Update: 10

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 03/14/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Annually

MDA LIS: Licensing Information System Database Listing

Information provided lists all individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. Additionally, the LIS lists all companies who must register products with the Department before being used or sold in commercial channels within our state.

Date of Government Version: 02/09/2016
Date Data Arrived at EDR: 02/11/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 55

Source: Department of Agriculture
Telephone: 651-201-6000
Last EDR Contact: 02/11/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

LS: List of Sites

The List of Sites includes: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), No Further Remedial Action Planned (NFRAP), National Priorities List (NPL), Permanent List of Priorities (PLP), sites delisted from the Permanent List of Priorities (DPLP), Hazardous Waste Permit Unit Project Facilities (HW PERM), List of Permitted Solid Waste Facilities (SW PERM), 1980 Metropolitan Area Waste Disposal Site Inventory (METRO), 1980 Statewide Outstate Dump Inventory (ODI), Voluntary and Investigation Program (VIC), and Closed Landfill Sites Undergoing Cleanup (LCP).

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 04/22/2009
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/24/2009
Number of Days to Update: 10

Source: Minnesota Pollution Control Agency
Telephone: 651-297-2731
Source: Pollution Control Agency, GIS Section
Telephone: 651-297-2731
Last EDR Contact: 12/21/2011
Next Scheduled EDR Contact: 04/09/2012
Data Release Frequency: Semi-Annually

TIER 2: Tier 2 Facility Listing

A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/03/2015
Date Made Active in Reports: 11/05/2015
Number of Days to Update: 63

Source: Department of Public Safety
Telephone: 651-296-2233
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

WIMN: What's In My Neighborhood

Since 2003, the PCA's "What's in My Neighborhood?" database provides information about air quality, hazardous waste, remediation, solid waste, tanks and leaks, and water quality around Minnesota.

Date of Government Version: 06/08/2015
Date Data Arrived at EDR: 07/15/2015
Date Made Active in Reports: 08/12/2015
Number of Days to Update: 28

Source: Pollution Control Agency
Telephone: 651-757-2593
Last EDR Contact: 04/15/2016
Next Scheduled EDR Contact: 07/25/2016
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/23/2015
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 86

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/20/2015
Date Data Arrived at EDR: 09/23/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 103

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 03/23/2016
Next Scheduled EDR Contact: 07/04/2016
Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A

Date Data Arrived at EDR: 07/01/2013

Date Made Active in Reports: 12/24/2013

Number of Days to Update: 176

Source: Minnesota Pollution Control Agency

Telephone: N/A

Last EDR Contact: 06/01/2012

Next Scheduled EDR Contact: N/A

Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013

Date Data Arrived at EDR: 08/19/2013

Date Made Active in Reports: 10/03/2013

Number of Days to Update: 45

Source: Department of Energy & Environmental Protection

Telephone: 860-424-3375

Last EDR Contact: 02/18/2016

Next Scheduled EDR Contact: 05/30/2016

Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2013

Date Data Arrived at EDR: 07/17/2015

Date Made Active in Reports: 08/12/2015

Number of Days to Update: 26

Source: Department of Environmental Protection

Telephone: N/A

Last EDR Contact: 04/12/2016

Next Scheduled EDR Contact: 07/25/2016

Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 02/01/2016

Date Data Arrived at EDR: 02/03/2016

Date Made Active in Reports: 03/22/2016

Number of Days to Update: 48

Source: Department of Environmental Conservation

Telephone: 518-402-8651

Last EDR Contact: 02/03/2016

Next Scheduled EDR Contact: 05/16/2016

Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2014

Date Data Arrived at EDR: 07/24/2015

Date Made Active in Reports: 08/18/2015

Number of Days to Update: 25

Source: Department of Environmental Protection

Telephone: 717-783-8990

Last EDR Contact: 04/18/2016

Next Scheduled EDR Contact: 08/01/2016

Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 03/21/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/14/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation

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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health
Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics
Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Centers

Source: Department of Human Services
Telephone: 651-296-3971

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Land Management Information Center
Telephone: 617-297-3281

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

PIGS EYE LAKE
PIGS EYE LAKE RD / CHILDS RD
SAINT PAUL, MN 55119

TARGET PROPERTY COORDINATES

Latitude (North):	44.914967 - 44° 54' 53.88"
Longitude (West):	93.029402 - 93° 1' 45.85"
Universal Transverse Mercator:	Zone 15
UTM X (Meters):	497679.2
UTM Y (Meters):	4973287.5
Elevation:	687 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5964255 SAINT PAUL EAST, MN
Version Date:	2013
East Map:	5964045 LAKE ELMO, MN
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

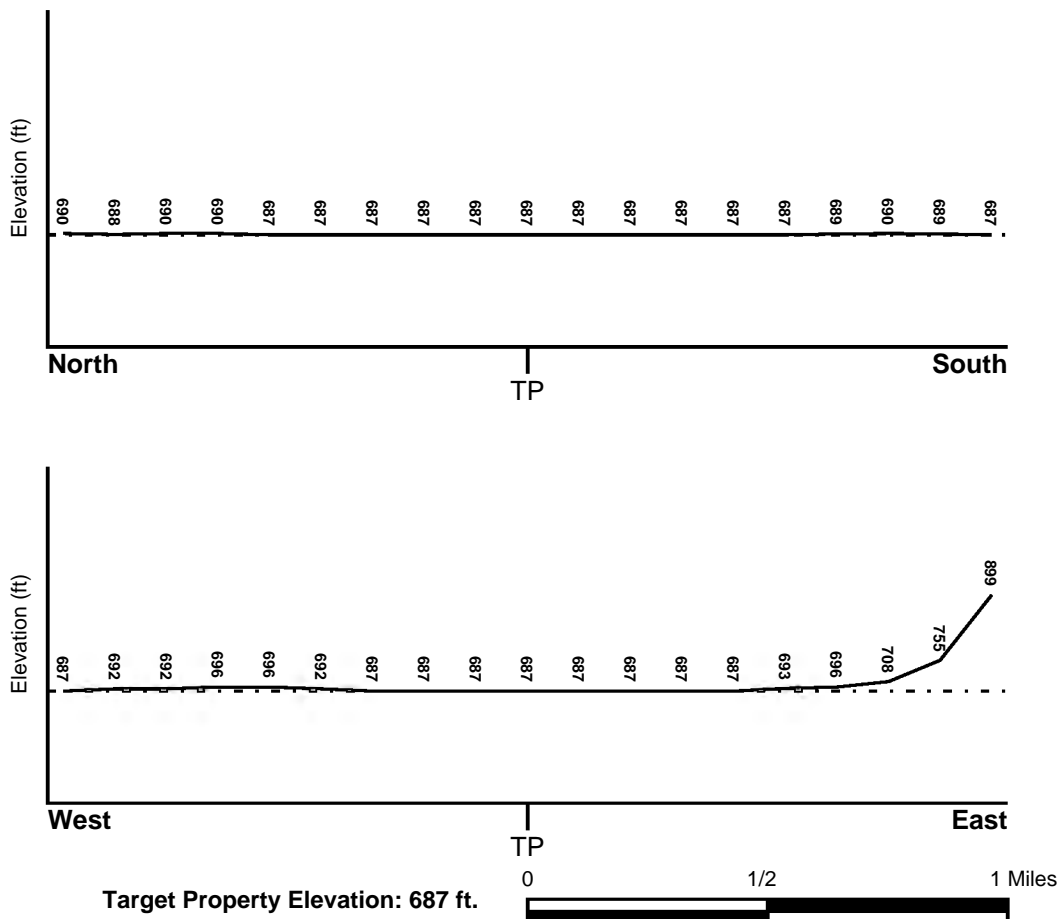
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: Undeterminable

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County
RAMSEY, MN

FEMA Flood
Electronic Data
YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property:

27123C - FEMA DFIRM Flood data

Additional Panels in search area:

27163C - FEMA DFIRM Flood data
00000000000 - FEMA Q3 Flood data
2701140005B - FEMA Q3 Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property
SAINT PAUL EAST

NWI Electronic
Data Coverage
YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

<u>MAP ID</u>	<u>LOCATION</u> <u>FROM TP</u>	<u>GENERAL DIRECTION</u> <u>GROUNDWATER FLOW</u>
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era: Paleozoic
System: Ordovician
Series: Lower Ordovician (Canadian)
Code: O1 *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name: CHASKA
Soil Surface Texture: silt loam
Hydrologic Group: Class B/D - Drained/undrained hydrology class of soils that can be drained and are classified.
Soil Drainage Class: Somewhat poorly. Soils commonly have a layer with low hydraulic conductivity, wet state high in profile, etc. Depth to water table is 1 to 3 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: HIGH

Depth to Bedrock Min: > 60 inches

Depth to Bedrock Max: > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Permeability Rate (in/hr)	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	8 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Organic Clay or Organic Silt.	Max: 2.00 Min: 0.60	Max: 7.80 Min: 6.60
2	8 inches	38 inches	stratified	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 2.00 Min: 0.60	Max: 7.80 Min: 7.40
3	38 inches	60 inches	stratified	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 8.40 Min: 7.40

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: silty clay loam
fine sandy loam
loamy fine sand
loam

Surficial Soil Types: silty clay loam
fine sandy loam
loamy fine sand
loam

Shallow Soil Types: No Other Soil Types

Deeper Soil Types: silty clay loam
coarse sand
loamy sand
loam
clay loam
sand

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A2	USGS40000509465	1/2 - 1 Mile NNW
F15	USGS40000588654	1/2 - 1 Mile ENE
G18	USGS40000509124	1/2 - 1 Mile ENE
F19	USGS40000509221	1/2 - 1 Mile ENE
J28	USGS40000508852	1/2 - 1 Mile East
L31	USGS40000509197	1/2 - 1 Mile ENE
I33	USGS40000509464	1/2 - 1 Mile NE
M35	USGS40000509381	1/2 - 1 Mile NE
O41	USGS40000509519	1/2 - 1 Mile NE
P42	USGS40000508695	1/2 - 1 Mile ESE
45	USGS40000588714	1/2 - 1 Mile NNW
P47	USGS40000508735	1/2 - 1 Mile ESE
48	USGS40000588718	1/2 - 1 Mile North
Q51	USGS40000509590	1/2 - 1 Mile NNE
P52	USGS40000508694	1/2 - 1 Mile ESE
R53	USGS40000509344	1/2 - 1 Mile ENE
Q55	USGS40000509603	1/2 - 1 Mile NNE
R59	USGS40000509308	1/2 - 1 Mile ENE
T61	USGS40000508693	1/2 - 1 Mile ESE
65	USGS40000508098	1/2 - 1 Mile SSW
T66	USGS40000508679	1/2 - 1 Mile ESE
T72	USGS40000508669	1/2 - 1 Mile ESE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

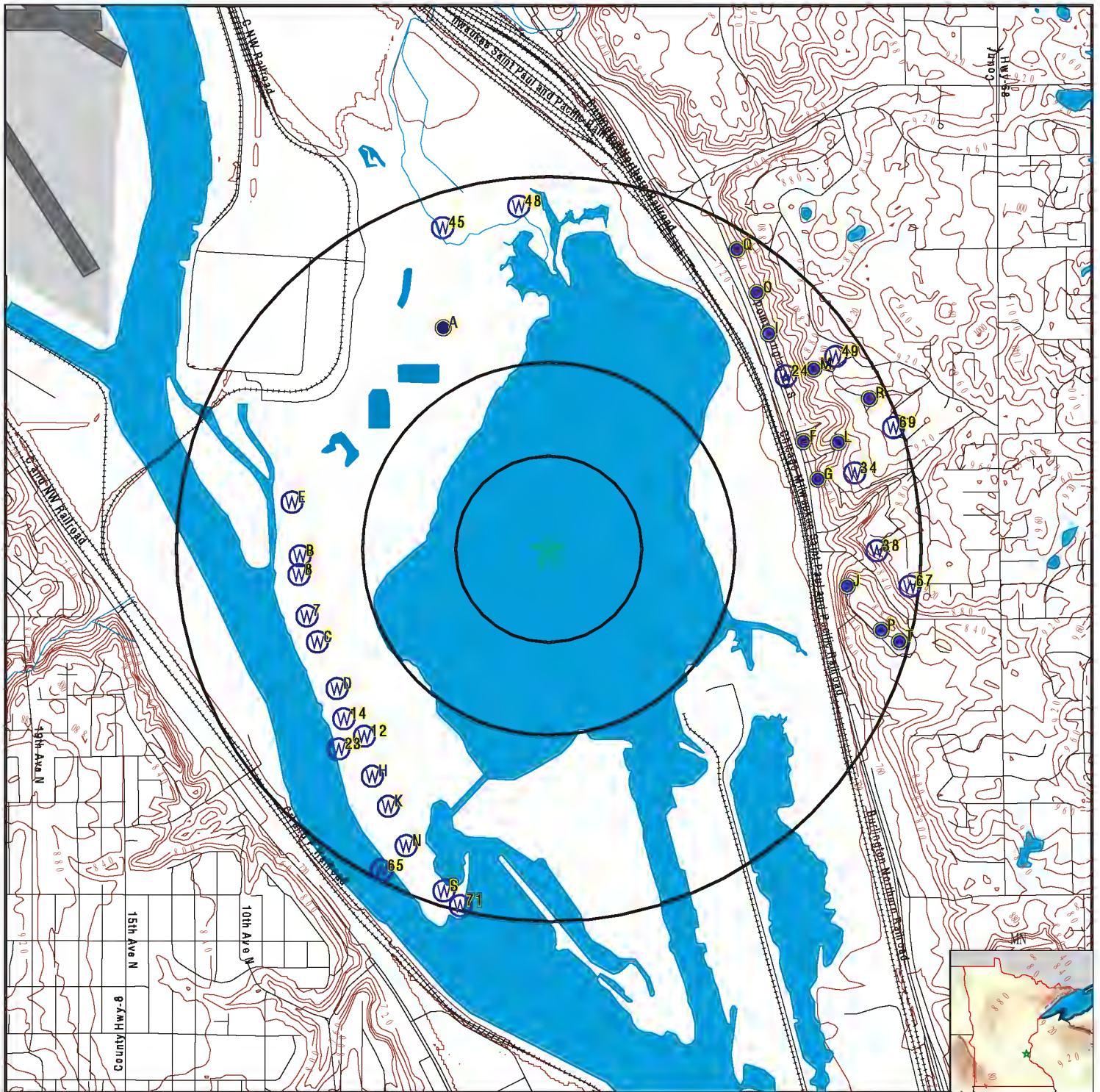
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	MN5000000078063	1/2 - 1 Mile NNW
B3	MN5000000247635	1/2 - 1 Mile West
C4	MN5000000247207	1/2 - 1 Mile WSW
C5	MN5000000247206	1/2 - 1 Mile WSW
B6	MN5000000247636	1/2 - 1 Mile West
7	MN5000000248835	1/2 - 1 Mile WSW
8	MN5000000248836	1/2 - 1 Mile West
D9	MN5000000247208	1/2 - 1 Mile WSW
D10	MN5000000247209	1/2 - 1 Mile SW
E11	MN5000000247223	1/2 - 1 Mile West
12	MN5000000247211	1/2 - 1 Mile SW
E13	MN5000000247224	1/2 - 1 Mile WNW
14	MN5000000247210	1/2 - 1 Mile SW
F16	MN5000000204419	1/2 - 1 Mile ENE
G17	MN5000000137681	1/2 - 1 Mile ENE
F20	MN5000000124827	1/2 - 1 Mile ENE
H21	MN5000000247213	1/2 - 1 Mile SW
H22	MN5000000247214	1/2 - 1 Mile SW
23	MN5000000247212	1/2 - 1 Mile SW
24	MN5000000197930	1/2 - 1 Mile NE
I25	MN5000000204418	1/2 - 1 Mile NE
J26	MN5000000068824	1/2 - 1 Mile East
K27	MN5000000247215	1/2 - 1 Mile SSW
K29	MN5000000247216	1/2 - 1 Mile SSW
L30	MN5000000041639	1/2 - 1 Mile ENE
I32	MN5000000128223	1/2 - 1 Mile NE
34	MN5000000196782	1/2 - 1 Mile ENE
M36	MN5000000043939	1/2 - 1 Mile NE
N37	MN5000000247217	1/2 - 1 Mile SSW
38	MN5000000204936	1/2 - 1 Mile East
N39	MN5000000247218	1/2 - 1 Mile SSW
O40	MN5000000109874	1/2 - 1 Mile NE
P43	MN5000000183804	1/2 - 1 Mile ESE
N44	MN5000000247219	1/2 - 1 Mile SSW
P46	MN5000000082265	1/2 - 1 Mile ESE
49	MN5000000084492	1/2 - 1 Mile NE
Q50	MN5000000133496	1/2 - 1 Mile NNE
P54	MN5000000004883	1/2 - 1 Mile ESE
S56	MN5000000247220	1/2 - 1 Mile SSW
R57	MN5000000199590	1/2 - 1 Mile ENE
Q58	MN5000000012610	1/2 - 1 Mile NNE
R60	MN5000000018032	1/2 - 1 Mile ENE
T62	MN5000000045271	1/2 - 1 Mile ESE
Q63	MN5000000195393	1/2 - 1 Mile NNE
S64	MN5000000247221	1/2 - 1 Mile SSW
67	MN5000000150082	1/2 - 1 Mile East
T68	MN5000000181770	1/2 - 1 Mile ESE
69	MN5000000170447	1/2 - 1 Mile ENE
T70	MN5000000132757	1/2 - 1 Mile ESE
71	MN5000000247222	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 4595821.2s



- County Boundary
- Major Roads
- Contour Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data

SITE NAME: Pigs Eye Lake
 ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul MN 55119
 LAT/LONG: 44.914967 / 93.029402

CLIENT: Army Corp of Engineers
 CONTACT: Grant Riddick
 INQUIRY #: 4595821.2s
 DATE: May 05, 2016 3:18 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

A1
NNW
1/2 - 1 Mile
Higher

MN WELLS MN5000000078063

Relateid:	0000501659	County c:	Ramsey
Unique no:	00501659	Wellname:	PIGSEYE LANDFILL MW-3
Township:	28	Range:	22
Range dir:	W	Section:	10
Subsection:	DBCCCC	Mgsquad c:	St Paul East
Elevation:	690		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Sealed		
Use c:	Abandoned	Loc mc:	Other, note in remarks
Loc src:	Minnesota Geological Survey	Data src:	Braun Eng Testing
Depth drill:	12		
Depth comp:	12		
Date drill:	19881219		
Case diam:	2		
Case depth:	7		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	20110804		
Strat src:	Minnesota Geological Survey	Strat geol:	Not Reported
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Recent Deposit
Ohtopunit:	RUUB	Ohbotunit:	RUUG
Aquifer:	QWTA	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910520		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497227		
Utmn:	4974461		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	501659	Swlcount:	1
Swldate:	19891214		
Swlavgmeas:	8		
Swlavgelev:	682		
Site id:	MN5000000078063		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000501659
Addtype c: Both
Street: Not Reported
Road dir: Not Reported
State: MN
Entry date: 19910520
Updt date: 19911209
Other: Not Reported

Name: PIGSEYE LANDFILL MW-3
House no: Not Reported
Road type: Not Reported
City: ST PAUL
Zipcode: Not Reported

Construction 1 Information:

Relateid: 0000501659
Drill flud: Not Reported
Hffrom: Not Reported
Hfto: Not Reported
Case mat: Stainless Steel
Case top: 3.6
Drive shoe: N
Screen: Y
Ohtopfeet: Not Reported
Ohbotfeet: Not Reported
Screen mfg: JOHNSON
Ptlss mfg: Not Reported
Bsmt offst: Not Reported
Csg at grd: Not Reported
Disinfectd: Not Reported
Pump date: Not Reported
Pump mfg: Not Reported
Pump hp: 0
Pump volts: Not Reported
Dropp len: Not Reported
Dropp mat: Not Reported
Pump cpcty: Not Reported
Pump type: Not Reported
Drllr name: DOLAN, V.
Entry date: 19910520
Updt date: 19911209

Drill meth: Power Auger
Hydrofrac: Not Reported

Case joint: Not Reported
Case type: Single casing

Screen typ: stainless steel
Ptlss mdl: Not Reported
Csg top ok: Y
Plstc prot: Y
Pump inst: Not Reported

Pump model: Not Reported

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000501659
Meas date: 19891214
Meas time: Not Reported
M pt code: Land surface
Meas point: 0
Measuremt: 8
Meas elev: 682
Data src: Braun Eng Testing
Entry date: 19910520
Updt date: 0

Meas type: Well installation

Program: CWI

Remarks Information:

Relateid: 0000501659
Seq no: 1
Remarks: WELL SEALED 11-04-2004 BY 62012

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000501659
Seq no: 2
Remarks: ORIGINAL USE MW - MONITOR WELL

A2 NNW 1/2 - 1 Mile Higher

FED USGS USGS40000509465

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445525093020601		
Monloc name:	028N22W10DBCCCC01	0000501659	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.923577
Longitude:	-93.0352163	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	690
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Glacial Surficial Sand and/or Gravel		
Aquifer type:	Unconfined single aquifer		
Construction date:	19881219	Welldepth:	12
Welldepth units:	ft	Wellholedepth:	12
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

B3 West 1/2 - 1 Mile Higher

MN WELLS MN5000000247635

Relateid:	0000785320	County c:	Ramsey
Unique no:	00785320	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	BCBADD	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111026		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496605		
Utmn:	4973527		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	785320	Swlcount:	1
Swldate:	20111026		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000247635		

Address Information:

Relateid:	0000785320	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000785320	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000785320
 Meas date: 20111026
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000785320
 Pumptestid: 1
 Test date: 20111026
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000785320
 Seq no: 1
 Remarks: #2

C4
WSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247207

Relateid:	0000788754	County c:	Ramsey
Unique no:	00788754	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CBACDB	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20120326		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496696		
Utmn:	4973063		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788754	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000247207		

Address Information:

Relateid:	0000788754	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788754	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788754
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20120326
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788754
 Pumptestid: 1
 Test date: 20111027
 Start meas: 10
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788754
 Seq no: 1
 Remarks: #8

C5
WSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247206

Relateid:	0000788753	County c:	Ramsey
Unique no:	00788753	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CBABCA	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496663		
Utmn:	4973147		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788753	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000247206		

Address Information:

Relateid:	0000788753	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788753	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788753
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788753
 Pumptestid: 1
 Test date: 20111027
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788753
 Seq no: 1
 Remarks: #7

B6
West
1/2 - 1 Mile
Higher

MN WELLS MN5000000247636

Relateid:	0000785321	County c:	Ramsey
Unique no:	00785321	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	BCBDDC	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111026		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496603		
Utmn:	4973425		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	785321	Swlcount:	1
Swldate:	20111026		
Swlavgmeas:	7		
Swlavglev:	695		
Site id:	MN5000000247636		

Address Information:

Relateid:	0000785321	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000785321	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000785321
 Meas date: 20111026
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 7
 Meas elev: 695
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000785321
 Pumptestid: 1
 Test date: 20111026
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000785321
 Seq no: 1
 Remarks: #3

7
WSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000248835

Relateid:	0000788752	County c:	Ramsey
Unique no:	00788752	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	BCDCCC	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111026		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120309		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120309		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496634		
Utmn:	4973217		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788752	Swlcount:	1
Swldate:	20111026		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000248835		

Address Information:

Relateid:	0000788752	Name:	MET COUNCIL
Addtype c:	Well address	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120309		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788752	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120309
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788752
 Meas date: 20111026
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20120309
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788752
 Pumptestid: 1
 Test date: 20111026
 Start meas: 10
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

8
West
1/2 - 1 Mile
Higher

MN WELLS

MN5000000248836

Relateid: 0000785316
 Unique no: 00785316
 Township: 28
 Range dir: W
 Subsection: BCCAAB
 Elevation: 702
 Elev mc: 7.5 minute topographic map (+/- 5 feet)
 Status c: Active
 Use c: Piezometer
 Loc src: Minnesota Geological Survey
 Depth drll: 25
 Depth comp: 24.8999996185303
 Date drll: 20111026
 Case diam: 2
 Case depth: 20
 Grout: Not Reported
 Pollut dir: Not Reported
 Strat date: 20120326
 Strat upd: 20130206
 Strat src: Not Reported
 Strat mc: Not Reported

County c: Ramsey
 Wellname: MET COUNCIL
 Range: 22
 Section: 15
 Mgsquad c: St Paul East

Loc mc: G
 Data src: 1860

Pollut dst: 0
 Pollut typ: Not Reported

Strat geol: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496600		
Utmn:	4973395		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	785316	Swlcount:	1
Swldate:	20111026		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000248836		

Address Information:

Relateid:	0000785316	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000785316	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000785316
 Meas date: 20111026
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000785316
 Pumptestid: 1
 Test date: 20111026
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000785316
 Seq no: 1
 Remarks: #4

D9
WSW
1/2 - 1 Mile
Higher

MN WELLS

MN5000000247208

Relateid:	0000788756	County c:	Ramsey
Unique no:	00788756	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CBDACB	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496743		
Utmn:	4972941		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788756	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	12		
Swlavglev:	690		
Site id:	MN5000000247208		

Address Information:

Relateid:	0000788756	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788756	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788756
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 12
 Meas elev: 690
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788756
 Pumptestid: 1
 Test date: 20111027
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788756
 Seq no: 1
 Remarks: #10

D10
SW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247209

Relateid:	0000788757	County c:	Ramsey
Unique no:	00788757	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CBDDBD	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	U	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120217		
Strat upd:	20120217		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120217		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496785		
Utmn:	4972865		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788757	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	10		
Swlavglev:	692		
Site id:	MN5000000247209		

Address Information:

Relateid:	0000788757	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120217		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788757	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	Not Reported	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120217
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788757
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 10
 Meas elev: 692
 Data src: 1860
 Entry date: 20120217
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788757
 Pumptestid: 1
 Test date: 20111027
 Start meas: 10
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788757
 Seq no: 1
 Remarks: #11

E11
West
1/2 - 1 Mile
Higher

MN WELLS MN5000000247223

Relateid:	0000788772	County c:	Ramsey
Unique no:	00788772	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	BBCDBD	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20120326		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130614		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496571		
Utmn:	4973667		
Geoc entry:	619037		
Geoc date:	20130614		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788772	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavglev:	0		
Site id:	MN5000000247223		

Address Information:

Relateid:	0000788772	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788772	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	N
Drllr name:	LASKE, M.		
Entry date:	20120326		
Updt date:	Not Reported		

Pump Test Information:

Relateid:	0000788772
Pumptestid:	1
Test date:	20111028
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000788772
Seq no:	1
Remarks:	#26

**12
SW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000247211

Relateid:	0000788759	County c:	Ramsey
Unique no:	00788759	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CDBCBA	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20120326		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20130613
 Geoc type: MW
 Geoc src: MGS
 Utme: 496881
 Utmn: 4972697
 Geoc entry: 619037
 Geoc date: 20130613
 Geocupd en: 0
 Geocupd da: 0
 Rcvd date: 20111110
 Well label: 788759
 Swldate: 20111027
 Swlavgmeas: 11
 Swlavglev: 691
 Site id: MN5000000247211

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000788759
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788759
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported

Case joint: G
 Case type: Single casing

Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N

Pump model: Not Reported

Variance: N

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000788759	Meas type:	Well installation
Meas date:	20111027		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	11		
Meas elev:	691		
Data src:	1860	Program:	WELLLOG
Entry date:	20130410		
Updt date:	20130613		

Pump Test Information:

Relateid:	0000788759
Pumptestid:	1
Test date:	20111027
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000788759
Seq no:	1
Remarks:	#13

E13 WNW 1/2 - 1 Mile Higher

MN WELLS MN5000000247224

Relateid:	0000788773	County c:	Ramsey
Unique no:	00788773	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	BBCACA	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20130614
 Geoc type: MW
 Geoc src: MGS
 Utme: 496569
 Utmn: 4973749
 Geoc entry: 619037
 Geoc date: 20130614
 Geocupd en: 0
 Geocupd da: 0
 Rcvd date: 20111110
 Well label: 788773
 Swldate: 20111028
 Swlavgmeas: 13
 Swlavglev: 689
 Site id: MN5000000247224

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000788773
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788773
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: N
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported

Case joint: G
 Case type: Single casing

Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N

Pump model: Not Reported

Variance: N

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000788773	Meas type:	Well installation
Meas date:	20111028		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	13		
Meas elev:	689		
Data src:	1860	Program:	WELLLOG
Entry date:	20130410		
Updt date:	20130614		

Pump Test Information:

Relateid:	0000788773
Pumptestid:	1
Test date:	20111028
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000788773
Seq no:	1
Remarks:	#27

**14
SW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000247210

Relateid:	0000788758	County c:	Ramsey
Unique no:	00788758	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CCAAAC	Mgsquad c:	St Paul East
Elevation:	702		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20130613
 Geoc type: MW
 Geoc src: MGS
 Utme: 496793
 Utmn: 4972773
 Geoc entry: 619037
 Geoc date: 20130613
 Geocupd en: 0
 Geocupd da: 0
 Rcvd date: 20111110
 Well label: 788758
 Swldate: 20111027
 Swlavgmeas: 9
 Swlavglev: 693
 Site id: MN5000000247210

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000788758
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788758
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: N
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported

Case joint: G
 Case type: Single casing

Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N

Pump model: Not Reported

Variance: N

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000788758	Meas type:	Well installation
Meas date:	20111027		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	9		
Meas elev:	693		
Data src:	1860	Program:	WELLLOG
Entry date:	20130410		
Updt date:	20130613		

Pump Test Information:

Relateid:	0000788758
Pumptestid:	1
Test date:	20111027
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000788758
Seq no:	1
Remarks:	#12

F15
ENE
1/2 - 1 Mile
Higher

FED USGS USGS40000588654

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	USGS-445508093005601		
Monloc name:	28N22W14BAAACB01	0000767633	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	Not Reported	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9188972
Longitude:	-93.0157111	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Unknown		
Horiz coord refs:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refs:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	20090828	Welldepth:	49
Welldepth units:	ft	Wellholedepth:	49
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

F16
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000204419

Relateid:	0000767633	County c:	Ramsey
Unique no:	00767633	Wellname:	MW-2
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	BAAACA	Mgsquad c:	St Paul East
Elevation:	739		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Monitor well	Loc mc:	G
Loc src:	Minnesota Department of Health	Data src:	1323
Depth drill:	49		
Depth comp:	49		
Date drill:	20090828		
Case diam:	2		
Case depth:	44		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	0		
Strat upd:	20110909		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	15		
First bdrk:	OSTP	Last strat:	St.Peter
Ohtopunit:	OSTP	Ohbotunit:	OSTP
Aquifer:	OSTP	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20091217		
Updt date:	20130612		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MDH	Geoc prg:	WM
Utme:	498760		
Utmn:	4973941		
Geoc entry:	2182004		
Geoc date:	20090827		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	767633	Swlcount:	1
Swldate:	20090828		
Swlavgmeas:	39		
Swlavglev:	700		
Site id:	MN5000000204419		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000767633	Name:	MW-2
Addtype c:	Well address	House no:	Not Reported
Street:	POINT DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55119
Entry date:	20110826		
Updt date:	20110909		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000767633	Drill meth:	Auger (non-specified)
Drill flud:	Not Reported	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	Not Reported	Screen typ:	stainless steel
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	N
Drllr name:	POWERS, C.		
Entry date:	20110826		
Updt date:	Not Reported		

Historic Water Level Information:

Relateid:	0000767633	Meas type:	Well installation
Meas date:	20090828		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	39		
Meas elev:	700		
Data src:	1323	Program:	WELLLOG
Entry date:	20110826		
Updt date:	20130612		

G17
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000137681

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000138101	County c:	Ramsey
Unique no:	00138101	Wellname:	KRIEGLMEIER, MARK
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	BAADDD	Mgsquad c:	St Paul East
Elevation:	746		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mccullough & Sons
Depth drll:	97		
Depth comp:	97		
Date drll:	19770912		
Case diam:	4		
Case depth:	82		
Grout:	Well known to be not grouted	Pollut dst:	100
Pollut dir:	E	Pollut typ:	SDF
Strat date:	19911212		
Strat upd:	19911212		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	10		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498842		
Utmn:	4973801		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	138101	Swlcount:	1
Swldate:	19770912		
Swlavgmeas:	30		
Swlavgelev:	716		
Site id:	MN5000000137681		
Address Information:			
Relateid:	0000138101	Name:	KRIEGLMEIER, MARK
Addtype c:	Both	House no:	790
Street:	PT. DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911212		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000138101	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	82		
Ohbotfeet:	97		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19770922		
Pump mfg:	TAIT COMMANDER	Pump model:	C7EC310
Pump hp:	.75		
Pump volts:	220		
Dropp len:	55		
Dropp mat:	S		
Pump cpcty:	15		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	ENGLER, K		
Entry date:	19910814		
Updt date:	19911212		

Historic Water Level Information:

Relateid:	0000138101	Meas type:	Well installation
Meas date:	19770912		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	30		
Meas elev:	716		
Data src:	Mccullough & Sons	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000138101
Pumptestid:	1
Test date:	19770912
Start meas:	30
Flow rate:	30
Duration:	Not Reported
Pump meas:	55

G18
ENE
1/2 - 1 Mile
Higher

FED USGS USGS40000509124

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445504093005201		
Monloc name:	028N22W14BAADDD01	0000138101	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9177438
Longitude:	-93.0146599	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	746
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19770912	Welldepth:	97
Welldepth units:	ft	Wellholedepth:	97
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

F19
ENE
1/2 - 1 Mile
Higher

FED USGS

USGS40000509221

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445510093005401		
Monloc name:	028N22W14BAAAAB01	0000511738	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9194104
Longitude:	-93.0152155	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	710
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19900706	Welldepth:	119
Welldepth units:	ft	Wellholedepth:	119
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

F20
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000124827

Relateid:	0000511738	County c:	Ramsey
Unique no:	00511738	Wellname:	ANDERSON, CINDY
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	BAAAAB	Mgsquad c:	St Paul East
Elevation:	710		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drill:	119		
Depth comp:	119		
Date drill:	19900706		
Case diam:	4		
Case depth:	104		
Grout:	Well grouted, type unknown	Pollut dst:	60
Pollut dir:	W	Pollut typ:	SDF
Strat date:	19911211		
Strat upd:	19911211		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	11		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910520		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498800		
Utmn:	4973998		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	511738	Swlcount:	1
Swldate:	19900706		
Swlavgmeas:	55		
Swlavgelev:	655		
Site id:	MN5000000124827		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000511738	Name:	ANDERSON, CINDY
Addtype c:	Both	House no:	766
Street:	PT. DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910520		
Updt date:	19911211		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000511738	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	104		
Ohbotfeet:	119		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19900710		
Pump mfg:	TRICO	Pump model:	9D9P
Pump hp:	.5		
Pump volts:	230		
Dropp len:	73		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	COLE, M.		
Entry date:	19910520		
Updt date:	19911211		

Historic Water Level Information:

Relateid:	0000511738	Meas type:	Well installation
Meas date:	19900706		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	55		
Meas elev:	655		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19910520		
Updt date:	0		

Pump Test Information:

Relateid:	0000511738
Pumptestid:	1
Test date:	19900706
Start meas:	55
Flow rate:	20
Duration:	Not Reported
Pump meas:	73

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

**H21
SW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000247213

Relateid:	0000788761	County c:	Ramsey
Unique no:	00788761	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CDCBDB	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drill:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drill:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496897		
Utmn:	4972549		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788761	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	11		
Swlavglev:	690		
Site id:	MN5000000247213		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788761
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788761
 Drill flud: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N
 Pump model: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788761
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 11
 Meas elev: 690
 Data src: 1860
 Entry date: 20120326
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788761
 Pumptestid: 1
 Test date: 20111027
 Start meas: 11
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000788761
Seq no: 1
Remarks: #15

H22
SW
1/2 - 1 Mile
Higher

MN WELLS

MN5000000247214

Relateid:	0000788762	County c:	Ramsey
Unique no:	00788762	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CDCCAA	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496935		
Utmn:	4972499		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788762	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	11		
Swlavgelev:	690		
Site id:	MN5000000247214		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788762
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788762
 Drill flud: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: N
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASIK, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N
 Pump model: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788762
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 11
 Meas elev: 690
 Data src: 1860
 Entry date: 20120326
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788762
 Pumptestid: 1
 Test date: 20111027
 Start meas: 11
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000788762
Seq no: 1
Remarks: #16

23
SW
1/2 - 1 Mile
Higher

MN WELLS

MN5000000247212

Relateid:	0000788760	County c:	Ramsey
Unique no:	00788760	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CCADCA	Mgsquad c:	St Paul East
Elevation:	700		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111027		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496771		
Utmn:	4972642		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788760	Swlcount:	1
Swldate:	20111027		
Swlavgmeas:	11		
Swlavgelev:	689		
Site id:	MN5000000247212		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788760
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788760
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: N
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N
 Pump model: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788760
 Meas date: 20111027
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 11
 Meas elev: 689
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788760
 Pumptestid: 1
 Test date: 20111027
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000788760
 Seq no: 1
 Remarks: #14

24
 NE
 1/2 - 1 Mile
 Higher

MN WELLS MN5000000197930

Relateid:	0000479696	County c:	Ramsey
Unique no:	00479696	Wellname:	GORZ, ELANOR
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CDACDA	Mgsquad c:	St Paul East
Elevation:	760		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	173		
Depth comp:	173		
Date drll:	19920707		
Case diam:	4		
Case depth:	168		
Grout:	Well grouted, type unknown	Pollut dst:	53
Pollut dir:	W	Pollut typ:	SDF
Strat date:	0		
Strat upd:	20090407		
Strat src:	Minnesota Geological Survey	Strat geol:	JRS
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	22		
First bdrk:	OSTP	Last strat:	Prairie Du Chien-Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	N		
Entry date:	19930610		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498703		
Utmn:	4974252		
Geoc entry:	619008		
Geoc date:	20080731		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	479696	Swlcount:	1
Swldate:	19920707		
Swlavgmeas:	50		
Swlavgelev:	710		
Site id:	MN5000000197930		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000479696	Name:	Not Reported
Addtype c:	Well address	House no:	654
Street:	POINT DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55119
Entry date:	19930610		
Updt date:	20080808		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000479696	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	168		
Ohbotfeet:	173		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	MAAS	Ptlss mdl:	4J1
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	19920708		
Pump mfg:	TRICO (OWNER'S)	Pump model:	Not Reported
Pump hp:	.5		
Pump volts:	230		
Dropp len:	94		
Dropp mat:	Not Reported		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	SANDERS, G.		
Entry date:	Not Reported		
Updt date:	20030327		

Historic Water Level Information:

Relateid:	0000479696	Meas type:	Well installation
Meas date:	19920707		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	50		
Meas elev:	710		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19930610		
Updt date:	20080731		

Pump Test Information:

Relateid:	0000479696
Pumptestid:	1
Test date:	19920707
Start meas:	50
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	94

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000479696
 Seq no: 1
 Remarks: 34' E., 12' N -- NE CORNER OF HOUSE.

I25
NE
1/2 - 1 Mile
Higher

MN WELLS

MN5000000204418

Relateid:	0000767634	County c:	Ramsey
Unique no:	00767634	Wellname:	MW-3
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CDBAAA	Mgsquad c:	St Paul East
Elevation:	733		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Monitor well	Loc mc:	G
Loc src:	Minnesota Department of Health	Data src:	1323
Depth drll:	40		
Depth comp:	40		
Date drll:	20090827		
Case diam:	1		
Case depth:	34		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	0		
Strat upd:	20110909		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Sand
Ohtopunit:	QFUB	Ohbotunit:	QFUB
Aquifer:	QWTA	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20091217		
Updt date:	20110909		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MDH	Geoc prg:	WM
Utme:	498608		
Utmn:	4974381		
Geoc entry:	2182004		
Geoc date:	20090827		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	767634	Swlcount:	1
Swldate:	20090827		
Swlavgmeas:	29		
Swlavgelev:	704		
Site id:	MN5000000204418		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000767634	Name:	MW-3
Addtype c:	Well address	House no:	Not Reported
Street:	POINT DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55119
Entry date:	20110826		
Updt date:	20110909		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000767634	Drill meth:	Auger (non-specified)
Drill flud:	Not Reported	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	T
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	N
Drllr name:	POWERS, C.		
Entry date:	20110826		
Updt date:	Not Reported		

Historic Water Level Information:

Relateid:	0000767634	Meas type:	Well installation
Meas date:	20090827		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	29		
Meas elev:	704		
Data src:	1323	Program:	WELLLOG
Entry date:	20110826		
Updt date:	Not Reported		

Pump Test Information:

Relateid:	0000767634
Pumptestid:	1
Test date:	20090827
Start meas:	29
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

J26
East
1/2 - 1 Mile
Higher

MN WELLS MN5000000068824

Relateid:	0000136758	County c:	Ramsey
Unique no:	00136758	Wellname:	STROM, A.J.
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	ACCACC	Mgsquad c:	St Paul East
Elevation:	855		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mccullough & Sons
Depth drll:	290		
Depth comp:	290		
Date drll:	19770520		
Case diam:	4		
Case depth:	231		
Grout:	Well grouted, type unknown	Pollut dst:	90
Pollut dir:	NE	Pollut typ:	SDF
Strat date:	19911211		
Strat upd:	19911211		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	8		
First bdrk:	OPVL	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498964		
Utmn:	4973340		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	136758	Swlcount:	1
Swldate:	19770520		
Swlavgmeas:	170		
Swlavgelev:	685		
Site id:	MN5000000068824		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000136758	Name:	STROM, A.J.
Addtype c:	Contact address	House no:	6487
Street:	49	Road type:	Street
Road dir:	North	City:	OAKDALE
State:	MN	Zipcode:	Not Reported
Entry date:	20040123		
Updt date:	Not Reported		
Other:	Not Reported		

Address Information:

Relateid:	0000136758	Name:	STROM, A.J.
Addtype c:	Well address	House no:	2082
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	20040122		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000136758	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	1	Case type:	Single casing
Drive shoe:	Y		
Screen:	N		
Ohftopfeet:	231		
Ohbotfeet:	290		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19770607		
Pump mfg:	STA-RITE	Pump model:	Not Reported
Pump hp:	1		
Pump volts:	220		
Dropp len:	200		
Dropp mat:	S		
Pump cpcty:	15		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	MCCULLOUGH, L		
Entry date:	19910814		
Updt date:	19911211		

Historic Water Level Information:

Relateid:	0000136758	Meas type:	Well installation
Meas date:	19770520		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	170		
Meas elev:	685		
Data src:	Mccullough & Sons	Program:	CWI
Entry date:	19910814		
Updt date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000136758
 Pumptestid: 1
 Test date: 19770520
 Start meas: 170
 Flow rate: 30
 Duration: Not Reported
 Pump meas: 200

K27
SSW
1/2 - 1 Mile
Higher

MN WELLS

MN5000000247215

Relateid:	0000788763	County c:	Ramsey
Unique no:	00788763	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	15
Subsection:	CDCDCC	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	496962		
Utmn:	4972426		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 788763
Swldate: 20111027
Swlavgmeas: 10
Swlavglev: 691
Site id: MN5000000247215

Swlcount: 1

Address Information:

Relateid: 0000788763
Addtype c: Both
Street: CHILDS
Road dir: Not Reported
State: MN
Entry date: 20120326
Updt date: Not Reported
Other: Not Reported

Name: MET COUNCIL
House no: 2500
Road type: Road
City: ST PAUL
Zipcode: 55106

Construction 1 Information:

Relateid: 0000788763
Drill fluid: Not Reported
Hffrom: Not Reported
Hfto: Not Reported
Case mat: Plastic
Case top: Not Reported
Drive shoe: Not Reported
Screen: Y
Ohtopfeet: Not Reported
Ohbotfeet: Not Reported
Screen mfg: JOHNSON
Ptlss mfg: Not Reported
Bsmt offst: Not Reported
Csg at grd: Not Reported
Disinfectd: N
Pump date: Not Reported
Pump mfg: Not Reported
Pump hp: Not Reported
Pump volts: Not Reported
Dropp len: Not Reported
Dropp mat: Not Reported
Pump cpcty: Not Reported
Pump type: Not Reported
Drllr name: LASKE, M.
Entry date: 20120326
Updt date: Not Reported

Drill meth: Auger (non-specified)
Hydrofrac: Not Reported

Case joint: G
Case type: Single casing

Screen typ: plastic
Ptlss mdl: Not Reported
Csg top ok: Y
Plstc prot: Y
Pump inst: N

Pump model: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788763
Meas date: 20111027
Meas time: Not Reported
M pt code: Land surface
Meas point: Not Reported
Measuremt: 10
Meas elev: 691
Data src: 1860
Entry date: 20130410
Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000788763
Seq no: 1
Remarks: #17

J28
East
1/2 - 1 Mile
Higher

FED USGS

USGS40000508852

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445449093004601		
Monloc name:	028N22W14ACCACC01	0000136758	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9135771
Longitude:	-93.0129931	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	855
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19770520	Welldepth:	290
Welldepth units:	ft	Wellholedepth:	290
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

K29
SSW
1/2 - 1 Mile
Higher

MN WELLS

MN5000000247216

Relateid:	0000788764	County c:	Ramsey
Unique no:	00788764	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	BABADB	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497009		
Utmn:	4972363		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788764	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	9		
Swlavglev:	692		
Site id:	MN5000000247216		

Address Information:

Relateid:	0000788764	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788764	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788764
 Meas date: 20111028
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 9
 Meas elev: 692
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788764
 Pumptestid: 1
 Test date: 20111028
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788764
 Seq no: 1
 Remarks: #18

L30
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000041639

Relateid:	0000156389	County c:	Ramsey
Unique no:	00156389	Wellname:	COLESTOCK, KEVIN
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	ADDDAC	Mgsquad c:	St Paul East
Elevation:	830		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	173		
Depth comp:	173		
Date drll:	19781026		
Case diam:	4		
Case depth:	161		
Grout:	Well grouted, type unknown	Pollut dst:	60
Pollut dir:	SW	Pollut typ:	SDF
Strat date:	19911211		
Strat upd:	19911211		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	19	Last strat:	Prairie Du Chien Group
First bdrk:	OSTP	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Y
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498931		
Utmn:	4973965		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	156389	Swlcount:	1
Swldate:	19781026		
Swlavgmeas:	120		
Swlavglev:	710		
Site id:	MN5000000041639		

Address Information:

Relateid:	0000156389	Name:	COLESTOCK, KEVIN
Addtype c:	Both	House no:	2051
Street:	HOWARD	Road type:	Street
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911211		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000156389	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	161		
Ohbotfeet:	173		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19781030		
Pump mfg:	REDA PUMP CO.	Pump model:	12D9P071
Pump hp:	.75		
Pump volts:	230		
Dropp len:	135		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	G		
Pump cpcty:	12		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	MANTYLA, ED		
Entry date:	19910814		
Updt date:	19911211		

Historic Water Level Information:			
Relateid:	0000156389	Meas type:	Well installation
Meas date:	19781026		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	120		
Meas elev:	710		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:	
Relateid:	0000156389
Pumptestid:	1
Test date:	19781026
Start meas:	120
Flow rate:	20
Duration:	Not Reported
Pump meas:	123

L31
ENE
1/2 - 1 Mile
Higher

FED USGS USGS40000509197

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445509093004801		
Monloc name:	028N22W14ADDDAC01	0000156389	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9191327
Longitude:	-93.0135488	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	830
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19781026	Welldepth:	173
Welldepth units:	ft	Wellholedepth:	173
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

I32
NE
1/2 - 1 Mile
Higher

MN WELLS MN5000000128223

Relateid:	0000131990	County c:	Ramsey
Unique no:	00131990	Wellname:	PROPERTY INVESTMENT CO.
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CADCBC	Mgsquad c:	St Paul East
Elevation:	750		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Johnson Bros. Well
Depth drll:	230		
Depth comp:	230		
Date drll:	19780624		
Case diam:	4		
Case depth:	213		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	20		
First bdrk:	OSTP	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498635		
Utmn:	4974464		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	131990	Swlcount:	1
Swldate:	19780624		
Swlavgmeas:	18		
Swlavglev:	732		
Site id:	MN5000000128223		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000131990	Name:	PROPERTY INVESTMENT CO.
Addtype c:	Well address	House no:	590
Street:	POINT DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55119
Entry date:	19910814		
Updt date:	20090305		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000131990	Drill meth:	Cable Tool
Drill flud:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	0		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	213		
Ohbotfeet:	230		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19780627		
Pump mfg:	REDA	Pump model:	9D9P051
Pump hp:	.5		
Pump volts:	Not Reported		
Dropp len:	52		
Dropp mat:	S		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	JOHNSON, G.		
Entry date:	19910814		
Updt date:	19911209		

Historic Water Level Information:

Relateid:	0000131990	Meas type:	Well installation
Meas date:	19780624		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	18		
Meas elev:	732		
Data src:	Johnson Bros. Well	Program:	CWI
Entry date:	19910814		
Updt date:	0		

I33
NE
1/2 - 1 Mile
Higher

FED USGS USGS40000509464

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445525093010101		
Monloc name:	028N22W11CADCBC01	0000131990	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9235771
Longitude:	-93.01716	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	750
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19780624	Welldepth:	230
Welldepth units:	ft	Wellholedepth:	230
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

34
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000196782

Relateid:	0000251956	County c:	Ramsey
Unique no:	00251956	Wellname:	NATURE CONSERVATORY
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	ABBDDA	Mgsquad c:	St Paul East
Elevation:	888		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Not Reported		
Use c:	Domestic	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	MGS
Depth drill:	226		
Depth comp:	226		
Date drill:	0		
Case diam:	5		
Case depth:	187		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19980925		
Strat upd:	19981012		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	50		
First bdrk:	OSTP	Last strat:	St.Peter
Ohtopunit:	OSTP	Ohbotunit:	OSTP
Aquifer:	OSTP	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Y
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19980925		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20140214
 Geoc type: WW
 Geoc src: MGS
 Utme: 499001
 Utmn: 4973833
 Geoc entry: 619022
 Geoc date: 20020308
 Geocupd en: 619022
 Geocupd da: 20020308
 Rcvd date: 0
 Well label: 251956
 Swldate: 19980925
 Swlavgmeas: 194
 Swlavglev: 694
 Site id: MN5000000196782

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000251956
 Addtype c: Both
 Street: BROOKLINE
 Road dir: Not Reported
 State: MN
 Entry date: 19980925
 Updt date: 19980925
 Other: Not Reported

Name: NATURE CONSERVATORY
 House no: 748
 Road type: Avenue
 City: ST PAUL
 Zipcode: Not Reported

Construction 1 Information:

Relateid: 0000251956
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 0
 Drive shoe: Not Reported
 Screen: N
 Ohtopfeet: 187
 Ohbotfeet: 226
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: 0
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: Not Reported
 Entry date: 19980925
 Updt date: 19980925

Drill meth: Not Reported
 Hydrofrac: Not Reported
 Case joint: Not Reported
 Case type: Single casing
 Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Not Reported

Pump model: Not Reported

Variance: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000251956	Meas type:	Well installation
Meas date:	19980925		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	194		
Meas elev:	694		
Data src:	MGS	Program:	CWI
Entry date:	19980925		
Updt date:	0		

Pump Test Information:

Relateid:	0000251956
Pumptestid:	1
Test date:	Not Reported
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000251956
Seq no:	1
Remarks:	GAMMA LOGGED 9-25-1998.

M35
NE
1/2 - 1 Mile
Higher

FED USGS USGS40000509381

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445519093005301		
Monloc name:	028N22W11CDADAA01	0000142347	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9219104
Longitude:	-93.0149378	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	872
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19780223	Welldepth:	224
Welldepth units:	ft	Wellholedepth:	224
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

M36
NE
1/2 - 1 Mile
Higher

MN WELLS MN5000000043939

Relateid:	0000142347	County c:	Ramsey
Unique no:	00142347	Wellname:	BAKER, TERRY
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CDADAA	Mgsquad c:	St Paul East
Elevation:	872		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	224		
Depth comp:	224		
Date drll:	19780223		
Case diam:	4		
Case depth:	215		
Grout:	Well grouted, type unknown	Pollut dst:	75
Pollut dir:	NE	Pollut typ:	SDF
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	107		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Y
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498828		
Utmn:	4974289		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	142347	Swlcount:	1
Swldate:	19780223		
Swlavgmeas:	186		
Swlavgelev:	686		
Site id:	MN5000000043939		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000142347	Name:	BAKER, TERRY
Addtype c:	Both	House no:	2004
Street:	OAKRIDGE	Road type:	Street
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911209		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000142347	Drill meth:	Non-specified Rotary
Drill flud:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	215		
Ohbotfeet:	224		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19780302		
Pump mfg:	REDA PUMP CO.	Pump model:	17D9D101
Pump hp:	1		
Pump volts:	230		
Dropp len:	200		
Dropp mat:	G		
Pump cpcty:	12		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	MANTYLA, ED		
Entry date:	19910814		
Updt date:	19911209		

Historic Water Level Information:

Relateid:	0000142347	Meas type:	Well installation
Meas date:	19780223		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	186		
Meas elev:	686		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000142347
Pumptestid:	1
Test date:	19780200
Start meas:	186
Flow rate:	20
Duration:	Not Reported
Pump meas:	188

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

N37
SSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247217

Relateid:	0000788765	County c:	Ramsey
Unique no:	00788765	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	BABDAD	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Sealed		
Use c:	Abandoned	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drill:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drill:	20111022		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20120326		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20140131		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497041		
Utmn:	4972264		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788765	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	9		
Swlavgelev:	692		
Site id:	MN5000000247217		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788765
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788765
 Drill flud: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: N
 Pump model: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788765
 Meas date: 20111028
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 9
 Meas elev: 692
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Id Information:

Relateid: 0000788765
 Id type: MDH

Identifier: H300808
 Id prog: WMWSR

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000788765
 Pumptestid: 1
 Test date: 20111022
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788765
 Seq no: 1
 Remarks: #19

Remarks Information:

Relateid: 0000788765
 Seq no: 2
 Remarks: SEALED 1-13-2012 BY 1860; PREVIOUS USE: PZ

38
East
1/2 - 1 Mile
Higher

MN WELLS MN5000000204936

Relateid:	0000270301	County c:	Ramsey
Unique no:	00270301	Wellname:	Not Reported
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	ACACAB	Mgsquad c:	St Paul East
Elevation:	895		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Inactive		
Use c:	Domestic	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	MGS
Depth drill:	228		
Depth comp:	228		
Date drill:	0		
Case diam:	4		
Case depth:	213		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	0		
Strat upd:	20091120		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Inferred from geophysical log		
Depth2bdrk:	32		
First bdrk:	OPVL	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Y
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	20091118		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20111219
 Geoc type: WW
 Geoc src: MGS
 Utme: 499097
 Utmn: 4973497
 Geoc entry: 619007
 Geoc date: 20091118
 Geocupd en: 619007
 Geocupd da: 20091118
 Rcvd date: 0
 Well label: 270301
 Swldate: 20091118
 Swlavgmeas: 193
 Swlavglev: 702
 Site id: MN5000000204936

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 1

Address Information:

Relateid: 0000270301
 Addtype c: Well address
 Street: LENOX
 Road dir: Not Reported
 State: MN
 Entry date: 20091120
 Updt date: Not Reported
 Other: Not Reported

Name: Not Reported
 House no: 859
 Road type: Avenue
 City: ST PAUL
 Zipcode: 55119

Construction 1 Information:

Relateid: 0000270301
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: N
 Ohtopfeet: 213
 Ohbotfeet: 228
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: Not Reported
 Entry date: 20091120
 Updt date: Not Reported

Drill meth: Not Reported
 Hydrofrac: Not Reported

Case joint: Not Reported
 Case type: Telescoping

Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Not Reported

Pump model: Not Reported

Variance: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Historic Water Level Information:

Relateid:	0000270301	Meas type:	Well installation
Meas date:	20091118		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	193		
Meas elev:	Not Reported		
Data src:	MGS	Program:	WELLLOG
Entry date:	20091120		
Updt date:	Not Reported		

Remarks Information:

Relateid:	0000270301
Seq no:	1
Remarks:	GAMMA LOGGED 11-18-2009. LOGGED FOR TOM GALLAGHER.

Remarks Information:

Relateid:	0000270301
Seq no:	2
Remarks:	THIS WELL HAS 5 IN. CASING AT THE TOP. WITH 4 IN. FROM ABOUT 68-69 FT. TO 213 FT

**N39
SSW
1/2 - 1 Mile
Higher**

MN WELLS MN5000000247218

Relateid:	0000788766	County c:	Ramsey
Unique no:	00788766	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	BABDDD	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Updt date: 20130613
 Geoc type: MW
 Geoc src: MGS
 Utme: 497045
 Utmn: 4972236
 Geoc entry: 619037
 Geoc date: 20130613
 Geocupd en: 0
 Geocupd da: 0
 Rcvd date: 20111110
 Well label: 788766
 Swldate: 0
 Swlavgmeas: 0
 Swlavgelev: 0
 Site id: MN5000000247218

Gcm code: DS1
 Geoc prg: CWI

Swlcount: 0

Address Information:

Relateid: 0000788766
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788766
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported

Case joint: G
 Case type: Single casing

Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N

Pump model: Not Reported

Variance: N

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000788766
 Pumptestid: 1
 Test date: 20111028
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788766
 Seq no: 1
 Remarks: #28

O40
NE
1/2 - 1 Mile
Higher

MN WELLS

MN5000000109874

Relateid:	0000107018	County c:	Ramsey
Unique no:	00107018	Wellname:	CHOBIN REALTY
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CABDCD	Mgsquad c:	St Paul East
Elevation:	750		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Johnson Bros. Well
Depth drll:	117		
Depth comp:	117		
Date drll:	19751024		
Case diam:	4		
Case depth:	102		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	Not Reported
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	25		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498577		
Utmn:	4974610		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 107018
 Swldate: 19751024
 Swlavgmeas: 30
 Swlavgelev: 720
 Site id: MN5000000109874

Swlcount: 1

Address Information:

Relateid: 0000107018
 Addtype c: Both
 Street: PT. DOUGLAS
 Road dir: South
 State: MN
 Entry date: 19910814
 Updt date: 20010727
 Other: Not Reported

Name: CHOBIN REALTY
 House no: 488
 Road type: Road
 City: ST PAUL
 Zipcode: Not Reported

Construction 1 Information:

Relateid: 0000107018
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 0
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 102
 Ohbotfeet: 117
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Not Reported
 Pump date: 19751110
 Pump mfg: REDA
 Pump hp: .5
 Pump volts: 240
 Dropp len: 70
 Dropp mat: G
 Pump cpcty: Not Reported
 Pump type: Submersible
 Drllr name: JOHNSON, G.
 Entry date: 19910814
 Updt date: 20010727

Drill meth: Non-specified Rotary
 Hydrofrac: Not Reported

Case joint: W
 Case type: Single casing

Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Not Reported
 Pump inst: Y

Pump model: Not Reported

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000107018
 Meas date: 19751024
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 30
 Meas elev: 720
 Data src: Johnson Bros. Well
 Entry date: 19910814
 Updt date: 0

Meas type: Well installation

Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

O41
NE
1/2 - 1 Mile
Higher

FED USGS USGS40000509519

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445530093010401		
Monloc name:	028N22W11CABDCD01	0000107018	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.924966
Longitude:	-93.0179935	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	750
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19751024	Welldepth:	117
Welldepth units:	ft	Wellholedepth:	117
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

P42
ESE
1/2 - 1 Mile
Higher

FED USGS USGS40000508695

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445442093004201		
Monloc name:	028N22W14DBABCA01	0000106295	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9116327
Longitude:	-93.0118819	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	878
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Aquifer type:	Not Reported	Welldepth:	216
Construction date:	19760816	Wellholeddepth:	216
Welldepth units:	ft		
Wellholeddepth units:	ft		

Ground-water levels, Number of Measurements: 0

**P43
ESE
1/2 - 1 Mile
Higher**

MN WELLS MN5000000183804

Relateid:	0000106295	County c:	Ramsey
Unique no:	00106295	Wellname:	ALBRECKT, MARVIN
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBABCA	Mgsquad c:	St Paul East
Elevation:	878		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	216		
Depth comp:	216		
Date drll:	19760816		
Case diam:	4		
Case depth:	200		
Grout:	Well grouted, type unknown	Pollut dst:	80
Pollut dir:	NW	Pollut typ:	SDF
Strat date:	19950824		
Strat upd:	19950824		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	25		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499073		
Utmn:	4973141		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	106295	Swlcount:	1
Swldate:	19760816		
Swlavgmeas:	175		
Swlavgelev:	703		
Site id:	MN5000000183804		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000106295	Name:	ALBRECKT, MARVIN
Addtype c:	Both	House no:	2100
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19950824		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000106295	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	200		
Ohbotfeet:	216		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19760823		
Pump mfg:	REDA PUMP CO.	Pump model:	17DP101
Pump hp:	1		
Pump volts:	230		
Dropp len:	190		
Dropp mat:	G		
Pump cpcty:	12		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	SANDERS, G.		
Entry date:	19910814		
Updt date:	19950824		

Historic Water Level Information:

Relateid:	0000106295	Meas type:	Well installation
Meas date:	19760816		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	175		
Meas elev:	703		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000106295
Pumptestid:	1
Test date:	19760816
Start meas:	175
Flow rate:	15
Duration:	Not Reported
Pump meas:	177

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

N44
SSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247219

Relateid:	0000788767	County c:	Ramsey
Unique no:	00788767	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	BADBAC	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drill:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drill:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120430		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	Not Reported		
Entry date:	20120430		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497100		
Utmn:	4972173		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20120327		
Well label:	788767	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	7		
Swlavgelev:	694		
Site id:	MN5000000247219		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788767
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120430
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Road
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788767
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120430
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N
 Pump model: Not Reported

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000788767
 Meas date: 20111028
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 7
 Meas elev: 694
 Data src: 1860
 Entry date: 20120430
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788767
 Pumptestid: 1
 Test date: 20111028
 Start meas: 7
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

45
NNW
1/2 - 1 Mile
Higher

FED USGS USGS40000588714

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	USGS-445539093020601		
Monloc name:	MW-15 028N22W10BDDD		
Monloc type:	Well		
Monloc desc:	Observation well in Pig's Eye Landfill		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9274659
Longitude:	-93.0352163	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	700.4
Vert measure units:	feet	Vertacc measure val:	.02
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Pleistocene Series		
Aquifer type:	Unconfined single aquifer		
Construction date:	19940825	Welldepth:	50.5
Welldepth units:	ft	Wellholedepth:	52
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

P46
ESE
1/2 - 1 Mile
Higher

MN WELLS MN5000000082265

Relateid:	0000110536	County c:	Ramsey
Unique no:	00110536	Wellname:	WENDERSKI, DAVE
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBABAC	Mgsquad c:	St Paul East
Elevation:	905		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Zuercher Well Co.
Depth drll:	298		
Depth comp:	298		
Date drll:	19760204		
Case diam:	4		
Case depth:	244		
Grout:	Well grouted, type unknown	Pollut dst:	75
Pollut dir:	NW	Pollut typ:	SDF
Strat date:	19911212		
Strat upd:	19911212		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	44	Last strat:	Prairie Du Chien Group
First bdrk:	OPVL	Ohbotunit:	OPDC
Ohtopunit:	OPDC	Cuttings:	Not Reported
Aquifer:	OPDC	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499123		
Utmn:	4973180		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	110536	Swlcount:	1
Swldate:	19760204		
Swlavgmeas:	205		
Swlavglev:	700		
Site id:	MN5000000082265		

Address Information:

Relateid:	0000110536	Name:	WENDERSKI, DAVE
Addtype c:	Both	House no:	2099
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911212		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000110536	Drill meth:	Cable Tool
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	244		
Ohbotfeet:	298		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19760212		
Pump mfg:	STA-RITE	Pump model:	GP14E2-2
Pump hp:	1		
Pump volts:	220		
Dropp len:	21		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	G		
Pump cpcty:	8		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	DAY, BUNNY		
Entry date:	19910814		
Updt date:	19911212		

Historic Water Level Information:

Relateid:	0000110536	Meas type:	Well installation
Meas date:	19760204		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	205		
Meas elev:	700		
Data src:	Zuercher Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000110536
Pumptestid:	1
Test date:	19760204
Start meas:	205
Flow rate:	20
Duration:	Not Reported
Pump meas:	220

P47
ESE
1/2 - 1 Mile
Higher

FED USGS USGS40000508735

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445444093003901		
Monloc name:	028N22W14DBABAC01	0000110536	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9121883
Longitude:	-93.0110486	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	905
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19760204	Welldepth:	298
Welldepth units:	ft	Wellholedepth:	298
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

48
North
1/2 - 1 Mile
Higher

FED USGS USGS40000588718

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	USGS-445542093015101		
Monloc name:	MW-14 028N22W10ACDA		
Monloc type:	Well		
Monloc desc:	Pig's eye landfill		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9282992
Longitude:	-93.0310495	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	680
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Pleistocene Series		
Aquifer type:	Unconfined single aquifer		
Construction date:	19940823	Welldepth:	27.6
Welldepth units:	ft	Wellholedepth:	27.6
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

49
NE
1/2 - 1 Mile
Higher

MN WELLS MN5000000084492

Relateid:	0000233590	County c:	Ramsey
Unique no:	00233590	Wellname:	BOOKS
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	DCBBAC	Mgsquad c:	St Paul East
Elevation:	890		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Not Reported	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mccullough & Sons
Depth drll:	102		
Depth comp:	102		
Date drll:	0		
Case diam:	0		
Case depth:	0		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Boulder or boulders
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	QUUU	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Not Reported
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	19911209		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498919		
Utmn:	4974336		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	233590	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavglev:	0		
Site id:	MN5000000084492		
Address Information:			
Relateid:	0000233590	Name:	BOOKS
Addtype c:	Both	House no:	561
Street:	BURLINGTON	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911209		
Other:	Not Reported		

Q50
NNE
1/2 - 1 Mile
Higher

MN WELLS

MN5000000133496

Relateid:	0000225688	County c:	Ramsey
Unique no:	00225688	Wellname:	Not Reported
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CABBA	Mgsquad c:	St Paul East
Elevation:	750		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Johnson Bros. Well
Depth drll:	280		
Depth comp:	280		
Date drll:	19741016		
Case diam:	4		
Case depth:	242		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	Not Reported
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	10	Last strat:	Jordan
First bdrk:	OSTP	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498506		
Utmn:	4974772		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	225688	Swlcount:	1
Swldate:	19741016		
Swlavgmeas:	25		
Swlavglev:	725		
Site id:	MN5000000133496		
Address Information:			
Relateid:	0000225688	Name:	CLOBAN
Addtype c:	Well address	House no:	496
Street:	POINT DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	5519
Entry date:	19910814		
Updt date:	20090305		
Other:	Not Reported		
Construction 1 Information:			
Relateid:	0000225688	Drill meth:	Not Reported
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Not Reported	Case joint:	Not Reported
Case top:	0		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	N		
Ohtopfeet:	242		
Ohbotfeet:	280		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19741018		
Pump mfg:	STA-RITE	Pump model:	Not Reported
Pump hp:	.75		
Pump volts:	Not Reported		
Dropp len:	42		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	Not Reported
Drllr name:	Not Reported		
Entry date:	19910814		
Updt date:	20010727		

Historic Water Level Information:			
Relateid:	0000225688	Meas type:	Well installation
Meas date:	19741016		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	25		
Meas elev:	725		
Data src:	Johnson Bros. Well	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Q51
NNE
1/2 - 1 Mile
Higher

FED USGS USGS40000509590

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445535093010701		
Monloc name:	028N22W11CABBA 01	0000225688	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9263548
Longitude:	-93.0188269	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	750
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19741016	Welldepth:	280
Welldepth units:	ft	Wellholedepth:	280
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

P52
ESE
1/2 - 1 Mile
Higher

FED USGS USGS40000508694

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445442093003801		
Monloc name:	028N22W14DBABDA01	0000156434	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9116327
Longitude:	-93.0107708	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	888
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	St Peter Sandstone		
Aquifer type:	Not Reported		
Construction date:	19790315	Welldepth:	215
Welldepth units:	ft	Wellholedepth:	215
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

R53
ENE
1/2 - 1 Mile
Higher

FED USGS USGS40000509344

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445516093004301		
Monloc name:	028N22W11DCDBBB01	0000413568	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9210771
Longitude:	-93.0121599	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	911
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19851223	Welldepth:	293
Welldepth units:	ft	Wellholedepth:	293
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

P54
ESE
1/2 - 1 Mile
Higher

MN WELLS MN5000000004883

Relateid:	0000156434	County c:	Ramsey
Unique no:	00156434	Wellname:	BANKS, JOE
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBABDA	Mgsquad c:	St Paul East
Elevation:	888		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	215		
Depth comp:	215		
Date drll:	19790315		
Case diam:	4		
Case depth:	190		
Grout:	Well grouted, type unknown	Pollut dst:	52
Pollut dir:	SW	Pollut typ:	SDF
Strat date:	19911212		
Strat upd:	19911212		
Strat src:	Minnesota Geological Survey	Strat geol:	Mark Jirsa
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	85		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OSTP	Ohbotunit:	OSTP
Aquifer:	OSTP	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499158		
Utmn:	4973142		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	156434	Swlcount:	1
Swldate:	19790315		
Swlavgmeas:	170		
Swlavgelev:	718		
Site id:	MN5000000004883		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000156434	Name:	BANKS, JOE
Addtype c:	Both	House no:	2107
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911212		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000156434	Drill meth:	Non-specified Rotary
Drill flud:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	190		
Ohbotfeet:	215		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19730319		
Pump mfg:	REDA PUMP CO.	Pump model:	17D9P101
Pump hp:	1		
Pump volts:	230		
Dropp len:	Not Reported		
Dropp mat:	G		
Pump cpcty:	12		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	SANDERS, G.		
Entry date:	19910814		
Updt date:	19911212		

Historic Water Level Information:

Relateid:	0000156434	Meas type:	Well installation
Meas date:	19790315		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	170		
Meas elev:	718		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000156434
Pumptestid:	1
Test date:	19730315
Start meas:	170
Flow rate:	15
Duration:	Not Reported
Pump meas:	173

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

Q55
NNE
1/2 - 1 Mile
Higher

FED USGS USGS40000509603

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445536093010801		
Monloc name:	028N22W11CABBAB01	0000225687	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9266326
Longitude:	-93.0191047	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	750
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Jordan Sandstone		
Aquifer type:	Not Reported		
Construction date:	19740909	Welldepth:	260
Welldepth units:	ft	Wellholedepth:	260
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

S56
SSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247220

Relateid:	0000788769	County c:	Ramsey
Unique no:	00788769	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	BADDCA	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130410		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	0	Last strat:	Not Reported
First bdrk:	Not Reported	Ohbotunit:	Not Reported
Ohtopunit:	Not Reported	Cuttings:	Not Reported
Aquifer:	Not Reported	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Department of Health
Igwis:	Not Reported		
Unused:	N		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497195		
Utmn:	4972053		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788769	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	7		
Swlavglev:	694		
Site id:	MN5000000247220		

Address Information:

Relateid:	0000788769	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000788769	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Variance: N

Historic Water Level Information:

Relateid: 0000788769
 Meas date: 20111028
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 7
 Meas elev: 694
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788769
 Pumptestid: 1
 Test date: 20111028
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

Remarks Information:

Relateid: 0000788769
 Seq no: 1
 Remarks: #23

R57
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000199590

Relateid:	0000413568	County c:	Ramsey
Unique no:	00413568	Wellname:	FARINELLA, DEAN
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	DCDBBB	Mgsquad c:	St Paul East
Elevation:	911		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Miggler Well Co.
Depth drll:	293		
Depth comp:	293		
Date drll:	19851223		
Case diam:	4		
Case depth:	244		
Grout:	Well grouted, type unknown	Pollut dst:	40
Pollut dir:	W	Pollut typ:	SDF
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	90	Last strat:	Prairie Du Chien Group
First bdrk:	OSTP	Ohbotunit:	OPDC
Ohtopunit:	OPDC	Cuttings:	Not Reported
Aquifer:	OPDC	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910520		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499049		
Utmn:	4974189		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	413568	Swlcount:	1
Swldate:	19851223		
Swlavgmeas:	210		
Swlavgelev:	701		
Site id:	MN5000000199590		

Address Information:

Relateid:	0000413568	Name:	FARINELLA, DEAN
Addtype c:	Both	House no:	2101
Street:	OAKRIDGE	Road type:	Street
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910520		
Updt date:	19911209		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000413568	Drill meth:	Cable Tool
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	244		
Ohbotfeet:	293		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19851225		
Pump mfg:	STA-RITE	Pump model:	8P4E025
Pump hp:	1		
Pump volts:	220		
Dropp len:	230		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	G		
Pump cpcty:	13		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	MIGGLER, L.		
Entry date:	19910520		
Updt date:	19911209		

Historic Water Level Information:

Relateid:	0000413568	Meas type:	Well installation
Meas date:	19851223		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	210		
Meas elev:	701		
Data src:	Miggler Well Co.	Program:	CWI
Entry date:	19910520		
Updt date:	0		

Pump Test Information:

Relateid:	0000413568
Pumptestid:	1
Test date:	19851223
Start meas:	210
Flow rate:	25
Duration:	Not Reported
Pump meas:	230

Q58
NNE
1/2 - 1 Mile
Higher

MN WELLS MN5000000012610

Relateid:	0000225687	County c:	Ramsey
Unique no:	00225687	Wellname:	CHABAN
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	CABBAB	Mgsquad c:	St Paul East
Elevation:	750		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Johnson Bros. Well
Depth drll:	260		
Depth comp:	260		
Date drll:	19740909		
Case diam:	4		
Case depth:	230		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	Not Reported
Strat mc:	Geologic study 1:24k to 1:100k		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Depth2bdrk:	12	Last strat:	Jordan
First bdrk:	OSTP	Ohbotunit:	CJDN
Ohtopunit:	CJDN	Cuttings:	Not Reported
Aquifer:	CJDN	Bhgeophys:	Not Reported
Core:	Not Reported	Waterchem:	Not Reported
Geochem:	Not Reported	Swl:	Y
Obwell:	Not Reported	Input src:	Minnesota Geological Survey
Igwis:	Not Reported		
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	498501		
Utmn:	4974797		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	225687	Swlcount:	1
Swldate:	19740909		
Swlavgmeas:	30		
Swlavglev:	720		
Site id:	MN5000000012610		
Address Information:			
Relateid:	0000225687	Name:	CHABAN
Addtype c:	Both	House no:	492
Street:	PT. DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911209		
Other:	Not Reported		
Construction 1 Information:			
Relateid:	0000225687	Drill meth:	Not Reported
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Not Reported	Case joint:	Not Reported
Case top:	0		
Drive shoe:	Not Reported	Case type:	Step down
Screen:	N		
Ohtopfeet:	230		
Ohbotfeet:	260		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptss mfg:	Not Reported	Ptss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19741018		
Pump mfg:	STA-RITE	Pump model:	Not Reported
Pump hp:	.75		
Pump volts:	Not Reported		
Dropp len:	42		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	Not Reported
Drllr name:	JERRY, C. P.		
Entry date:	19910814		
Updt date:	19911209		

Historic Water Level Information:			
Relateid:	0000225687	Meas type:	Well installation
Meas date:	19740909		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	30		
Meas elev:	720		
Data src:	Johnson Bros. Well	Program:	CWI
Entry date:	19910814		
Updt date:	0		

R59
ENE
1/2 - 1 Mile
Higher

FED USGS USGS40000509308

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445514093004101		
Monloc name:	028N22W11DCDBDC01	0000107141	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9205215
Longitude:	-93.0116043	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	921
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19761214	Welldepth:	296
Welldepth units:	ft	Wellholedepth:	296
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

R60
ENE
1/2 - 1 Mile
Higher

MN WELLS MN5000000018032

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000107141	County c:	Ramsey
Unique no:	00107141	Wellname:	SCHULSTAD, ROGER
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	DCDBDC	Mgsquad c:	St Paul East
Elevation:	921		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Johnson Bros. Well
Depth drll:	296		
Depth comp:	296		
Date drll:	19761214		
Case diam:	4		
Case depth:	265		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911209		
Strat upd:	19911209		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	63		
First bdrk:	OPVL	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Not Reported
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	19911209		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499085		
Utmn:	4974126		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	107141	Swlcount:	0
Swldate:	0		
Swlavgmeas:	0		
Swlavgelev:	0		
Site id:	MN5000000018032		
Address Information:			
Relateid:	0000107141	Name:	SCHULSTAD, ROGER
Addtype c:	Both	House no:	683
Street:	FIR	Road type:	Street
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911209		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000107141	Drill meth:	Non-specified Rotary
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	T
Case top:	0		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	265		
Ohbotfeet:	296		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19770104		
Pump mfg:	REDA	Pump model:	17D9101
Pump hp:	3		
Pump volts:	Not Reported		
Dropp len:	252		
Dropp mat:	S		
Pump cpcty:	Not Reported		
Pump type:	Submersible	Variance:	Not Reported
Drlr name:	Not Reported		
Entry date:	19910814		
Updt date:	19911209		

T61
ESE
1/2 - 1 Mile
Higher

FED USGS USGS40000508693

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445442093003701		
Monloc name:	028N22W14DBAACB01	0000164685	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9116327
Longitude:	-93.010493	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	898
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		
Aquifer type:	Not Reported		
Construction date:	19801000	Welldepth:	252
Welldepth units:	ft	Wellholedepth:	252
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

T62
ESE
1/2 - 1 Mile
Higher

MN WELLS MN5000000045271

Relateid:	0000164685	County c:	Ramsey
Unique no:	00164685	Wellname:	THIESSEN, MARK
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBAACB	Mgsquad c:	St Paul East
Elevation:	898		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Salverda Well Co.
Depth drll:	252		
Depth comp:	252		
Date drll:	19801000		
Case diam:	4		
Case depth:	212		
Grout:	Well grouted, type unknown	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19911212		
Strat upd:	19911212		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	28		
First bdrk:	OPVL	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Y
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499182		
Utmn:	4973141		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	164685	Swlcount:	1
Swldate:	19801000		
Swlavgmeas:	195		
Swlavglev:	703		
Site id:	MN5000000045271		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000164685	Name:	THIESSEN, MARK
Addtype c:	Both	House no:	2111
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19910814		
Updt date:	19911212		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000164685	Drill meth:	Trench (sidewall)
Drill flud:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	212		
Ohbotfeet:	252		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19801000		
Pump mfg:	DEMING	Pump model:	5ALN
Pump hp:	1		
Pump volts:	230		
Dropp len:	112		
Dropp mat:	G		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	JOHNSON, G.		
Entry date:	19910814		
Updt date:	19911212		

Historic Water Level Information:

Relateid:	0000164685	Meas type:	Well installation
Meas date:	19801000		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	195		
Meas elev:	703		
Data src:	Salverda Well Co.	Program:	CWI
Entry date:	19910814		
Updt date:	0		

Pump Test Information:

Relateid:	0000164685
Pumptestid:	1
Test date:	19801000
Start meas:	195
Flow rate:	10
Duration:	Not Reported
Pump meas:	195

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

Q63
NNE
1/2 - 1 Mile
Higher

MN WELLS MN5000000195393

Relateid:	0000658979	County c:	Ramsey
Unique no:	00658979	Wellname:	BEHR, JOE
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	BDCCCB	Mgsquad c:	St Paul East
Elevation:	740		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Not Reported
Loc src:	Minnesota Department of Health	Data src:	Kimmes-bauer
Depth drill:	300		
Depth comp:	300		
Date drill:	20010830		
Case diam:	4		
Case depth:	254		
Grout:	Well grouted, type unknown	Pollut dst:	53
Pollut dir:	W	Pollut typ:	SDF
Strat date:	20011220		
Strat upd:	20080808		
Strat src:	Minnesota Geological Survey	Strat geol:	JRS
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	70		
First bdrk:	OPDC	Last strat:	Jordan
Ohtopunit:	CJDN	Ohbotunit:	CJDN
Aquifer:	CJDN	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20011220		
Updt date:	20080808		
Geoc type:	WW	Gcm code:	G6O
Geoc src:	MDH	Geoc prg:	WM
Utme:	498449		
Utmn:	4974853		
Geoc entry:	2182004		
Geoc date:	20010815		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	658979	Swlcount:	1
Swldate:	20010815		
Swlavgmeas:	14		
Swlavglev:	726		
Site id:	MN5000000195393		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000658979	Name:	BEHR, JOE
Addtype c:	Well address	House no:	468
Street:	PT. DOUGLAS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	20011220		
Updt date:	Not Reported		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000658979	Drill meth:	Non-specified Rotary
Drill fluid:	Foam	Hydrofrac:	N
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	Not Reported		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	254		
Ohbotfeet:	300		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	WHITEWATER	Ptlss mdl:	SU4X5.5
Bsmt offst:	Not Reported	Csg top ok:	U
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Y	Pump inst:	Not Reported
Pump date:	20010830		
Pump mfg:	STA RITE	Pump model:	10P4C02J
Pump hp:	.5		
Pump volts:	230		
Dropp len:	84		
Dropp mat:	Not Reported		
Pump cpcty:	10		
Pump type:	Submersible	Variance:	N
Drllr name:	MILLER, M.		
Entry date:	20011220		
Updt date:	20020315		

Historic Water Level Information:

Relateid:	0000658979	Meas type:	Well installation
Meas date:	20010815		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	14		
Meas elev:	726		
Data src:	Kimmes-bauer	Program:	WELLLOG
Entry date:	20011220		
Updt date:	20080612		

Pump Test Information:

Relateid:	0000658979
Pumptestid:	1
Test date:	20010815
Start meas:	14
Flow rate:	30
Duration:	2
Pump meas:	80

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database EDR ID Number

S64
SSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247221

Relateid:	0000788770	County c:	Ramsey
Unique no:	00788770	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	ACBBBB	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drill:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drill:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20130613		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	Not Reported		
Entry date:	20120326		
Updt date:	20130613		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497256		
Utmn:	4972006		
Geoc entry:	619037		
Geoc date:	20130613		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788770	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	7		
Swlavgelev:	694		
Site id:	MN5000000247221		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid: 0000788770
 Addtype c: Both
 Street: CHILDS
 Road dir: Not Reported
 State: MN
 Entry date: 20120326
 Updt date: Not Reported
 Other: Not Reported

Name: MET COUNCIL
 House no: 2500
 Road type: Way
 City: ST PAUL
 Zipcode: 55106

Construction 1 Information:

Relateid: 0000788770
 Drill flud: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Plastic
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: Y
 Ohtopfeet: Not Reported
 Ohbotfeet: Not Reported
 Screen mfg: JOHNSON
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: N
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: LASKE, M.
 Entry date: 20120326
 Updt date: Not Reported

Drill meth: Auger (non-specified)
 Hydrofrac: Not Reported
 Case joint: G
 Case type: Single casing
 Screen typ: plastic
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Y
 Pump inst: N
 Pump model: Not Reported

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000788770
 Meas date: 20111028
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 7
 Meas elev: 694
 Data src: 1860
 Entry date: 20130410
 Updt date: 20130613

Meas type: Well installation

Program: WELLLOG

Pump Test Information:

Relateid: 0000788770
 Pumptestid: 1
 Test date: 20111028
 Start meas: Not Reported
 Flow rate: Not Reported
 Duration: Not Reported
 Pump meas: Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000788770
Seq no: 1
Remarks: #24

65
SSW
1/2 - 1 Mile
Higher

FED USGS

USGS40000508098

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445409093021801		
Monloc name:	028N22W22BAC 01	0000496451	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.902466
Longitude:	-93.0385494	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refs:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19910906	Welldepth:	39
Welldepth units:	ft	Wellholedepth:	40
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

T66
ESE
1/2 - 1 Mile
Higher

FED USGS

USGS40000508679

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445441093003601		
Monloc name:	028N22W14DBADAC01	0000110443	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9113549
Longitude:	-93.0102152	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refs:	NAD83	Vert measure val:	880
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refs:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Prairie Du Chien Group		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Aquifer type:	Not Reported	Welldepth:	222
Construction date:	19750911	Wellholeddepth:	222
Welldepth units:	ft		
Wellholeddepth units:	ft		

Ground-water levels, Number of Measurements: 0

67
East
1/2 - 1 Mile
Higher

MN WELLS MN5000000150082

Relateid:	0000251596	County c:	Ramsey
Unique no:	00251596	Wellname:	904 WINTHROP ST.
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	ADCBCB	Mgsquad c:	St Paul East
Elevation:	916		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Sealed		
Use c:	Abandoned	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	MGS
Depth drll:	257		
Depth comp:	257		
Date drll:	0		
Case diam:	4		
Case depth:	233		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19980429		
Strat upd:	19980429		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	54		
First bdrk:	OPVL	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Y
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19980429		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499240		
Utmn:	4973344		
Geoc entry:	0		
Geoc date:	20000602		
Geocupd en:	619020		
Geocupd da:	20040803		
Rcvd date:	0		
Well label:	251596	Swlcount:	1
Swldate:	19980429		
Swlavgmeas:	214		
Swlavgelev:	702		
Site id:	MN5000000150082		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000251596	Name:	904 WINTHROP ST.
Addtype c:	Both	House no:	904
Street:	WINTHROP	Road type:	Street
Road dir:	Not Reported	City:	MAPLEWOOD
State:	MN	Zipcode:	Not Reported
Entry date:	19980429		
Updt date:	19980429		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000251596	Drill meth:	Cable Tool
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	Not Reported
Case top:	Not Reported		
Drive shoe:	Not Reported	Case type:	Single casing
Screen:	N		
Ohtopfeet:	233		
Ohbotfeet:	257		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Not Reported
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	Not Reported
Drllr name:	Not Reported		
Entry date:	19980429		
Updt date:	19980429		

Historic Water Level Information:

Relateid:	0000251596	Meas type:	Well installation
Meas date:	19980429		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	214		
Meas elev:	702		
Data src:	MGS	Program:	CWI
Entry date:	19980429		
Updt date:	0		

Remarks Information:

Relateid:	0000251596
Seq no:	1
Remarks:	GAMMA LOGGED 4-29-1998.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000251596
 Seq no: 2
 Remarks: WELL SEALED 05-01-1998 BY 62555

Remarks Information:

Relateid: 0000251596
 Seq no: 3
 Remarks: ORIGINAL USE DO - DOMESTIC

T68
ESE
1/2 - 1 Mile
Higher

MN WELLS

MN5000000181770

Relateid:	0000110443	County c:	Ramsey
Unique no:	00110443	Wellname:	DIMOND, TOM
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBADAC	Mgsquad c:	St Paul East
Elevation:	880		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	222		
Depth comp:	222		
Date drll:	19750911		
Case diam:	6		
Case depth:	203		
Grout:	Well known to be not grouted	Pollut dst:	80
Pollut dir:	SW	Pollut typ:	SDF
Strat date:	19911213		
Strat upd:	19911213		
Strat src:	Minnesota Geological Survey	Strat geol:	John Mossler
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	35		
First bdrk:	OSTP	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19910814		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499198		
Utmn:	4973102		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 110443
 Swldate: 19750911
 Swlavgmeas: 182
 Swlavglev: 698
 Site id: MN5000000181770

Swlcount: 1

Address Information:

Relateid: 0000110443
 Addtype c: Both
 Street: SKYWAY
 Road dir: Not Reported
 State: MN
 Entry date: 19910814
 Updt date: 20050311
 Other: Not Reported

Name: DIMOND, TOM
 House no: 2119
 Road type: Drive
 City: ST PAUL
 Zipcode: 55119

Construction 1 Information:

Relateid: 0000110443
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: 1
 Drive shoe: Y
 Screen: N
 Ohtopfeet: 203
 Ohbotfeet: 222
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfectd: Y
 Pump date: 19750817
 Pump mfg: REDA PUMP CO.
 Pump hp: 1
 Pump volts: 230
 Dropp len: 185
 Dropp mat: G
 Pump cpcty: 12
 Pump type: Submersible
 Drllr name: MANTYLA, E.
 Entry date: 19910814
 Updt date: 19991129

Drill meth: Cable Tool
 Hydrofrac: Not Reported

Case joint: T
 Case type: Single casing

Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Y
 Plstc prot: Not Reported
 Pump inst: Y

Pump model: 17D9D101

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000110443
 Meas date: 19750911
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: Not Reported
 Measuremt: 182
 Meas elev: 698
 Data src: Mantyla Well Co.
 Entry date: 19910814
 Updt date: 20011026

Meas type: Well installation

Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Pump Test Information:

Relateid: 0000110443
 Pumptestid: 1
 Test date: 19750811
 Start meas: 182
 Flow rate: 15
 Duration: 2
 Pump meas: 185

69
ENE
1/2 - 1 Mile
Higher

MN WELLS

MN5000000170447

Relateid:	0000251951	County c:	Ramsey
Unique no:	00251951	Wellname:	O'NEIL, BOB
Township:	28	Range:	22
Range dir:	W	Section:	11
Subsection:	DCDDCA	Mgsquad c:	St Paul East
Elevation:	933		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Not Reported		
Use c:	Domestic	Loc mc:	Information from owner
Loc src:	Minnesota Geological Survey	Data src:	MGS
Depth drll:	277		
Depth comp:	277		
Date drll:	0		
Case diam:	4		
Case depth:	248		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	19980915		
Strat upd:	19980915		
Strat src:	Minnesota Geological Survey	Strat geol:	Bruce Bloomgren
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	75		
First bdrk:	OGWD	Last strat:	Prairie Du Chien Group
Ohtopunit:	OPDC	Ohbotunit:	OPDC
Aquifer:	OPDC	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Y
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19980915		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499168		
Utmn:	4974029		
Geoc entry:	0		
Geoc date:	20000602		
Geocupd en:	619020		
Geocupd da:	20040803		
Rcvd date:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Well label: 251951
 Swldate: 19980915
 Swlavgmeas: 215
 Swlavgelev: 718
 Site id: MN5000000170447

Swlcount: 1

Address Information:

Relateid: 0000251951
 Addtype c: Both
 Street: HOWARD
 Road dir: Not Reported
 State: MN
 Entry date: 19980915
 Updt date: 19980915
 Other: Not Reported

Name: O'NEIL, BOB
 House no: 2130
 Road type: Street
 City: ST PAUL
 Zipcode: Not Reported

Construction 1 Information:

Relateid: 0000251951
 Drill fluid: Not Reported
 Hffrom: Not Reported
 Hfto: Not Reported
 Case mat: Steel (black or low carbon)
 Case top: Not Reported
 Drive shoe: Not Reported
 Screen: N
 Ohtopfeet: 248
 Ohbotfeet: 277
 Screen mfg: Not Reported
 Ptlss mfg: Not Reported
 Bsmt offst: Not Reported
 Csg at grd: Not Reported
 Disinfctd: Not Reported
 Pump date: Not Reported
 Pump mfg: Not Reported
 Pump hp: Not Reported
 Pump volts: Not Reported
 Dropp len: Not Reported
 Dropp mat: Not Reported
 Pump cpcty: Not Reported
 Pump type: Not Reported
 Drllr name: Not Reported
 Entry date: 19980915
 Updt date: 19980915

Drill meth: Not Reported
 Hydrofrac: Not Reported
 Case joint: Not Reported
 Case type: Single casing
 Screen typ: Not Reported
 Ptlss mdl: Not Reported
 Csg top ok: Not Reported
 Plstc prot: Not Reported
 Pump inst: Not Reported
 Pump model: Not Reported

Variance: Not Reported

Historic Water Level Information:

Relateid: 0000251951
 Meas date: 19980915
 Meas time: Not Reported
 M pt code: Land surface
 Meas point: 0
 Measuremt: 215
 Meas elev: 718
 Data src: MGS
 Entry date: 19980915
 Updt date: 19981009

Meas type: Well installation

Program: CWI

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Remarks Information:

Relateid: 0000251951
 Seq no: 1
 Remarks: GAMMA LOGGED 9-15-1998.

**T70
 ESE
 1/2 - 1 Mile
 Higher**

MN WELLS MN5000000132757

Relateid:	0000156427	County c:	Ramsey
Unique no:	00156427	Wellname:	KOZA, RANDY
Township:	28	Range:	22
Range dir:	W	Section:	14
Subsection:	DBADBA	Mgsquad c:	St Paul East
Elevation:	876		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Domestic	Loc mc:	Address verification
Loc src:	Minnesota Geological Survey	Data src:	Mantyla Well Co.
Depth drll:	210		
Depth comp:	210		
Date drll:	19790227		
Case diam:	4		
Case depth:	188		
Grout:	Well grouted, type unknown	Pollut dst:	65
Pollut dir:	W	Pollut typ:	SDF
Strat date:	19911213		
Strat upd:	20130530		
Strat src:	Minnesota Geological Survey	Strat geol:	Jane Cleland
Strat mc:	Geologic study 1:24k to 1:100k		
Depth2bdrk:	85		
First bdrk:	OSTP	Last strat:	No Record
Ohtopunit:	OSTP	Ohbotunit:	OSTP
Aquifer:	OSTP	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Geological Survey
Unused:	Not Reported		
Entry date:	19911213		
Updt date:	20140214		
Geoc type:	WW	Gcm code:	A
Geoc src:	MGS	Geoc prg:	CWI
Utme:	499207		
Utmn:	4973078		
Geoc entry:	0		
Geoc date:	19900101		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	0		
Well label:	156427	Swlcount:	1
Swldate:	19790227		
Swlavgmeas:	170		
Swlavgelev:	706		
Site id:	MN5000000132757		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Address Information:

Relateid:	0000156427	Name:	KOZA, RANDY
Addtype c:	Both	House no:	2121
Street:	SKYWAY	Road type:	Drive
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	Not Reported
Entry date:	19911213		
Updt date:	19911213		
Other:	Not Reported		

Construction 1 Information:

Relateid:	0000156427	Drill meth:	Non-specified Rotary
Drill flud:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Steel (black or low carbon)	Case joint:	W
Case top:	1		
Drive shoe:	Y	Case type:	Single casing
Screen:	N		
Ohtopfeet:	188		
Ohbotfeet:	210		
Screen mfg:	Not Reported	Screen typ:	Not Reported
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Not Reported
Csg at grd:	Not Reported	Plstc prot:	Not Reported
Disinfectd:	Not Reported	Pump inst:	Y
Pump date:	19790312		
Pump mfg:	REDA PUMP CO.	Pump model:	17D9P101
Pump hp:	1		
Pump volts:	230		
Dropp len:	180		
Dropp mat:	G		
Pump cpcty:	12		
Pump type:	Submersible	Variance:	Not Reported
Drllr name:	MANTYLA, ED		
Entry date:	19911213		
Updt date:	19911213		

Historic Water Level Information:

Relateid:	0000156427	Meas type:	Well installation
Meas date:	19790227		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	0		
Measuremt:	170		
Meas elev:	706		
Data src:	Mantyla Well Co.	Program:	CWI
Entry date:	19911213		
Updt date:	0		

71
SSW
1/2 - 1 Mile
Higher

MN WELLS MN5000000247222

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Relateid:	0000788771	County c:	Ramsey
Unique no:	00788771	Wellname:	MET COUNCIL
Township:	28	Range:	22
Range dir:	W	Section:	22
Subsection:	ACBBBD	Mgsquad c:	St Paul East
Elevation:	701		
Elev mc:	7.5 minute topographic map (+/- 5 feet)		
Status c:	Active		
Use c:	Piezometer	Loc mc:	G
Loc src:	Minnesota Geological Survey	Data src:	1860
Depth drll:	24.8999996185303		
Depth comp:	24.8999996185303		
Date drll:	20111028		
Case diam:	2		
Case depth:	20		
Grout:	Not Reported	Pollut dst:	0
Pollut dir:	Not Reported	Pollut typ:	Not Reported
Strat date:	20120326		
Strat upd:	20120326		
Strat src:	Not Reported	Strat geol:	Not Reported
Strat mc:	Not Reported		
Depth2bdrk:	0		
First bdrk:	Not Reported	Last strat:	Not Reported
Ohtopunit:	Not Reported	Ohbotunit:	Not Reported
Aquifer:	Not Reported	Cuttings:	Not Reported
Core:	Not Reported	Bhgeophys:	Not Reported
Geochem:	Not Reported	Waterchem:	Not Reported
Obwell:	Not Reported	Swl:	Y
Igwis:	Not Reported	Input src:	Minnesota Department of Health
Unused:	N		
Entry date:	20120326		
Updt date:	20130614		
Geoc type:	MW	Gcm code:	DS1
Geoc src:	MGS	Geoc prg:	CWI
Utme:	497296		
Utmn:	4971965		
Geoc entry:	619037		
Geoc date:	20130614		
Geocupd en:	0		
Geocupd da:	0		
Rcvd date:	20111110		
Well label:	788771	Swlcount:	1
Swldate:	20111028		
Swlavgmeas:	7		
Swlavgelev:	694		
Site id:	MN5000000247222		
Address Information:			
Relateid:	0000788771	Name:	MET COUNCIL
Addtype c:	Both	House no:	2500
Street:	CHILDS	Road type:	Road
Road dir:	Not Reported	City:	ST PAUL
State:	MN	Zipcode:	55106
Entry date:	20120326		
Updt date:	Not Reported		
Other:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Construction 1 Information:

Relateid:	0000788771	Drill meth:	Auger (non-specified)
Drill fluid:	Not Reported	Hydrofrac:	Not Reported
Hffrom:	Not Reported		
Hfto:	Not Reported		
Case mat:	Plastic	Case joint:	G
Case top:	Not Reported		
Drive shoe:	N	Case type:	Single casing
Screen:	Y		
Ohtopfeet:	Not Reported		
Ohbotfeet:	Not Reported		
Screen mfg:	JOHNSON	Screen typ:	plastic
Ptlss mfg:	Not Reported	Ptlss mdl:	Not Reported
Bsmt offst:	Not Reported	Csg top ok:	Y
Csg at grd:	Not Reported	Plstc prot:	Y
Disinfectd:	N	Pump inst:	N
Pump date:	Not Reported		
Pump mfg:	Not Reported	Pump model:	Not Reported
Pump hp:	Not Reported		
Pump volts:	Not Reported		
Dropp len:	Not Reported		
Dropp mat:	Not Reported		
Pump cpcty:	Not Reported		
Pump type:	Not Reported	Variance:	N
Drllr name:	LASKE, M.		
Entry date:	20120326		
Updt date:	Not Reported		

Historic Water Level Information:

Relateid:	0000788771	Meas type:	Well installation
Meas date:	20111028		
Meas time:	Not Reported		
M pt code:	Land surface		
Meas point:	Not Reported		
Measuremt:	7		
Meas elev:	694		
Data src:	1860	Program:	WELLLOG
Entry date:	20130410		
Updt date:	20130614		

Pump Test Information:

Relateid:	0000788771
Pumptestid:	1
Test date:	20111028
Start meas:	Not Reported
Flow rate:	Not Reported
Duration:	Not Reported
Pump meas:	Not Reported

Remarks Information:

Relateid:	0000788771
Seq no:	1
Remarks:	#25

T72
ESE
1/2 - 1 Mile
Higher

FED USGS USGS40000508669

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Org. Identifier:	USGS-MN		
Formal name:	USGS Minnesota Water Science Center		
Monloc Identifier:	MN040-445440093003501		
Monloc name:	028N22W14DBADBA01	0000156427	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	07010206	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	44.9110772
Longitude:	-93.0099374	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsyz:	NAD83	Vert measure val:	876
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsyz:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	St Peter Sandstone		
Aquifer type:	Not Reported		
Construction date:	19790227	Welldepth:	210
Welldepth units:	ft	Wellholedepth:	210
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

RADON

AREA RADON INFORMATION

State Database: MN Radon

Radon Test Results

Zipcode	Num Tests	Minimum	Maximum	Average	# > 4 pCi/L	# < 4 pCi/L
55119	789	0.0	20.8	3.0	176	613

Federal EPA Radon Zone for RAMSEY County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 55119

Number of sites tested: 8

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	2.950 pCi/L	88%	12%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map

Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory

Source: Land Management Information Center

Telephone: 617-297-3281

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Minnesota Groundwater Database

Source: Minnesota Geological Survey County Water Well Index (CWI)

Telephone: 612-627-4780

OTHER STATE DATABASE INFORMATION

RADON

State Database: MN Radon

Source: Department of Health

Telephone: 651-215-0909

Radon Test Results

Area Radon Information

Source: USGS

Telephone: 703-356-4020

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-356-4020

Sections 307 & 309 of IRRA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Pigs Eye Lake

Pigs Eye Lake Rd / Childs Rd

Saint Paul, MN 55119

Inquiry Number: 4595821.4

April 19, 2016

EDR Historical Topo Map Report

with QuadMatch™



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

04/19/16

Site Name:

Pigs Eye Lake
Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
EDR Inquiry # 4595821.4

Client Name:

Army Corp of Engineers
180 5th Street Suite 700
Saint Paul, MN 55101-0000
Contact: Grant Riddick



EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Army Corp of Engineers were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDR's Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:**Coordinates:**

P.O.#	NA	Latitude:	44.914967 44° 54' 54" North
Project:	Pigs Eye Lake_ St Paul, MN	Longitude:	-93.029402 -93° 1' 46" West
		UTM Zone:	Zone 15 North
		UTM X Meters:	497679.25
		UTM Y Meters:	4973504.80
		Elevation:	687.00' above sea level

Maps Provided:

2013	1896
1993	
1980	
1972	
1967	
1958	
1950, 1951	
1949, 1951	

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2013 Source Sheets

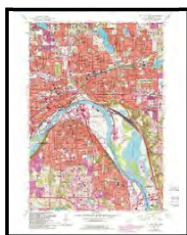


Lake Elmo
2013
7.5-minute, 24000

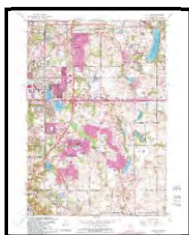


Saint Paul East
2013
7.5-minute, 24000

1993 Source Sheets

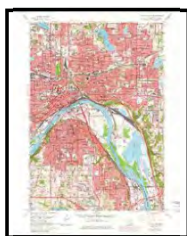


St Paul East
1993
7.5-minute, 24000
Photo Revised 1993
Aerial Photo Revised 1991



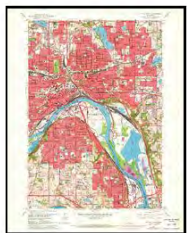
Lake Elmo
1993
7.5-minute, 24000
Photo Revised 1993
Aerial Photo Revised 1991

1980 Source Sheets

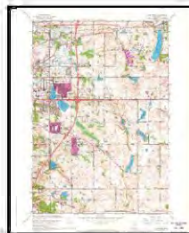


St. Paul East
1980
7.5-minute, 24000
Photo Revised 1980
Aerial Photo Revised 1977

1972 Source Sheets



St. Paul East
1972
7.5-minute, 24000
Photo Revised 1972
Aerial Photo Revised 1972

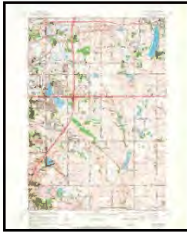


Lake Elmo
1972
7.5-minute, 24000
Photo Revised 1972
Aerial Photo Revised 1972

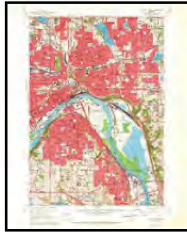
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1967 Source Sheets



Lake Elmo
1967
7.5-minute, 24000
Aerial Photo Revised 1947



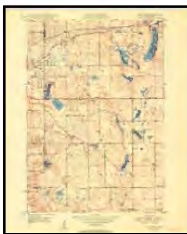
St. Paul East
1967
7.5-minute, 24000
Aerial Photo Revised 1947

1958 Source Sheets



St. Paul
1958
15-minute, 62500
Aerial Photo Revised 1947
Edited 1958

1950, 1951 Source Sheets



Lake Elmo
1950
7.5-minute, 24000
Aerial Photo Revised 1947



St. Paul East
1951
7.5-minute, 24000
Aerial Photo Revised 1947

1949, 1951 Source Sheets



Hudson
1949
15-minute, 62500
Aerial Photo Revised 1944



St. Paul
1951
15-minute, 62500
Aerial Photo Revised 1947

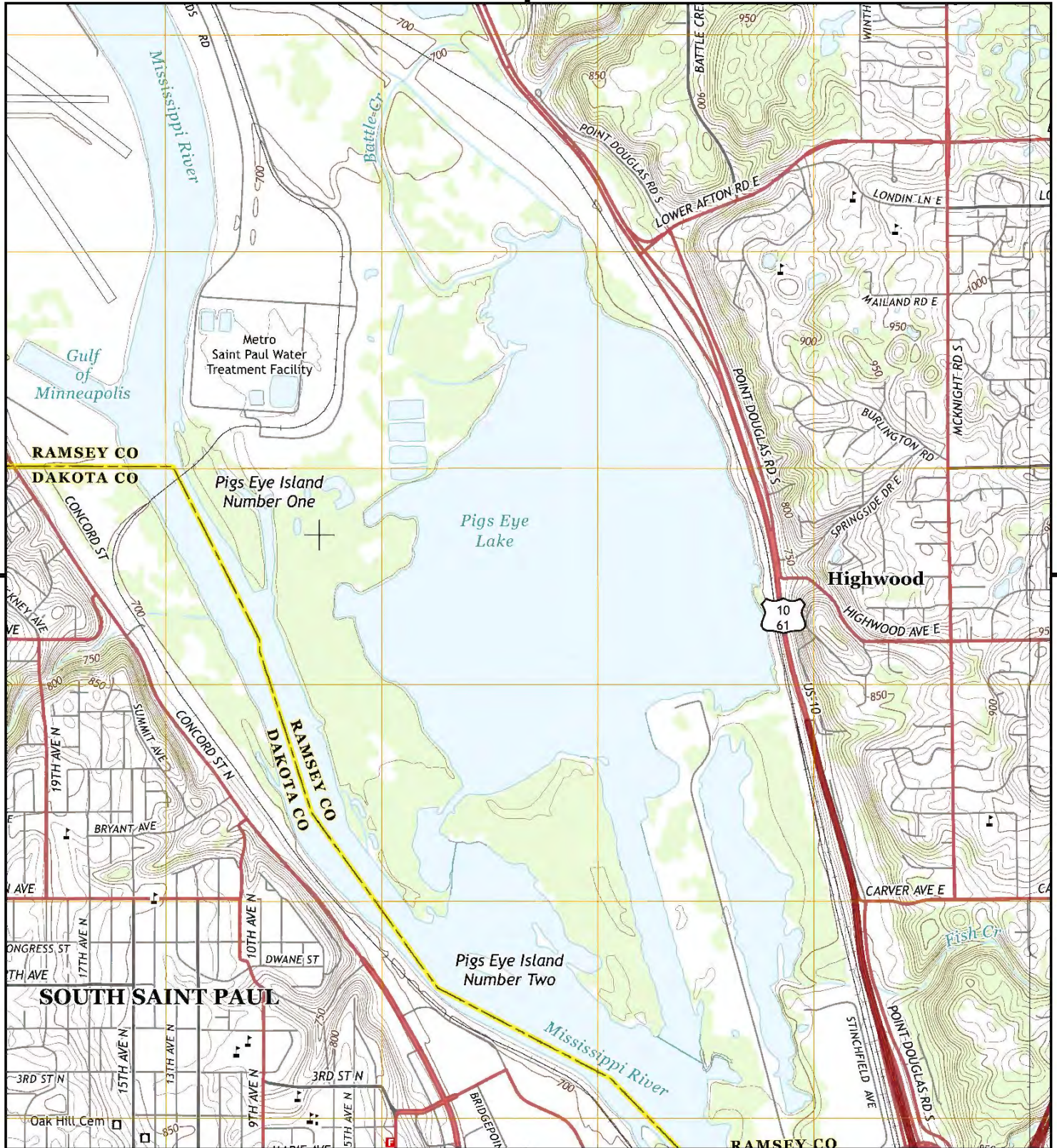
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

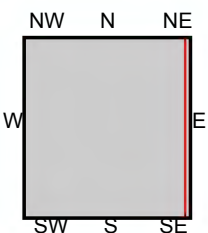
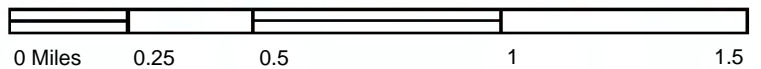
1896 Source Sheets



St. Paul
1896
15-minute, 62500



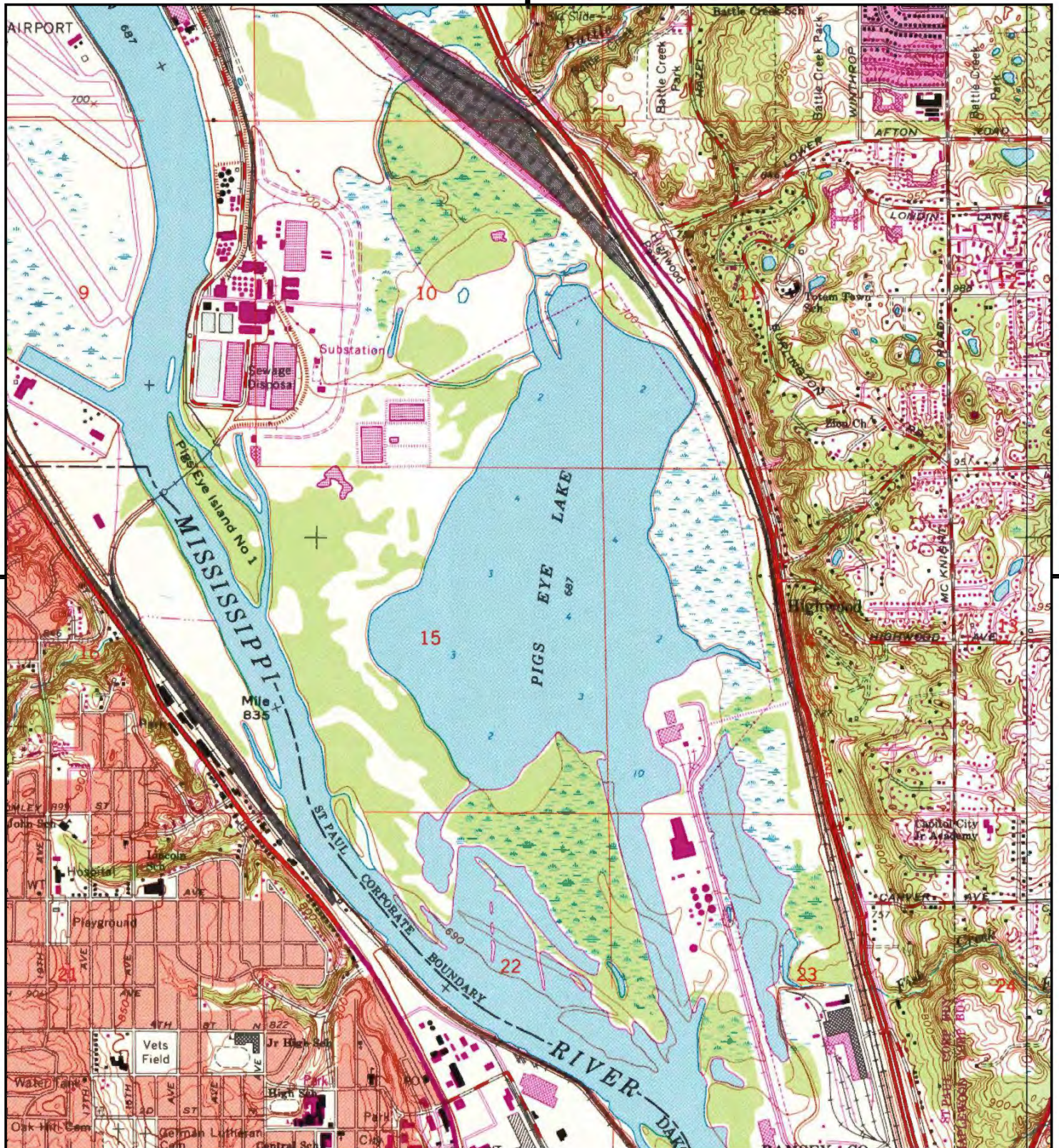
This report includes information from the following map sheet(s).



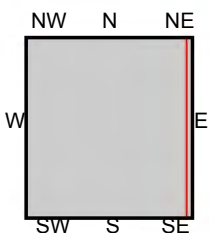
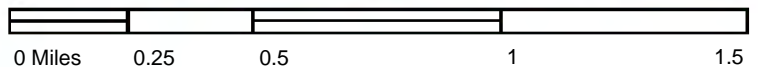
TP, Saint Paul East, 2013, 7.5-minute
E, Lake Elmo, 2013, 7.5-minute

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
CLIENT: Army Corp of Engineers





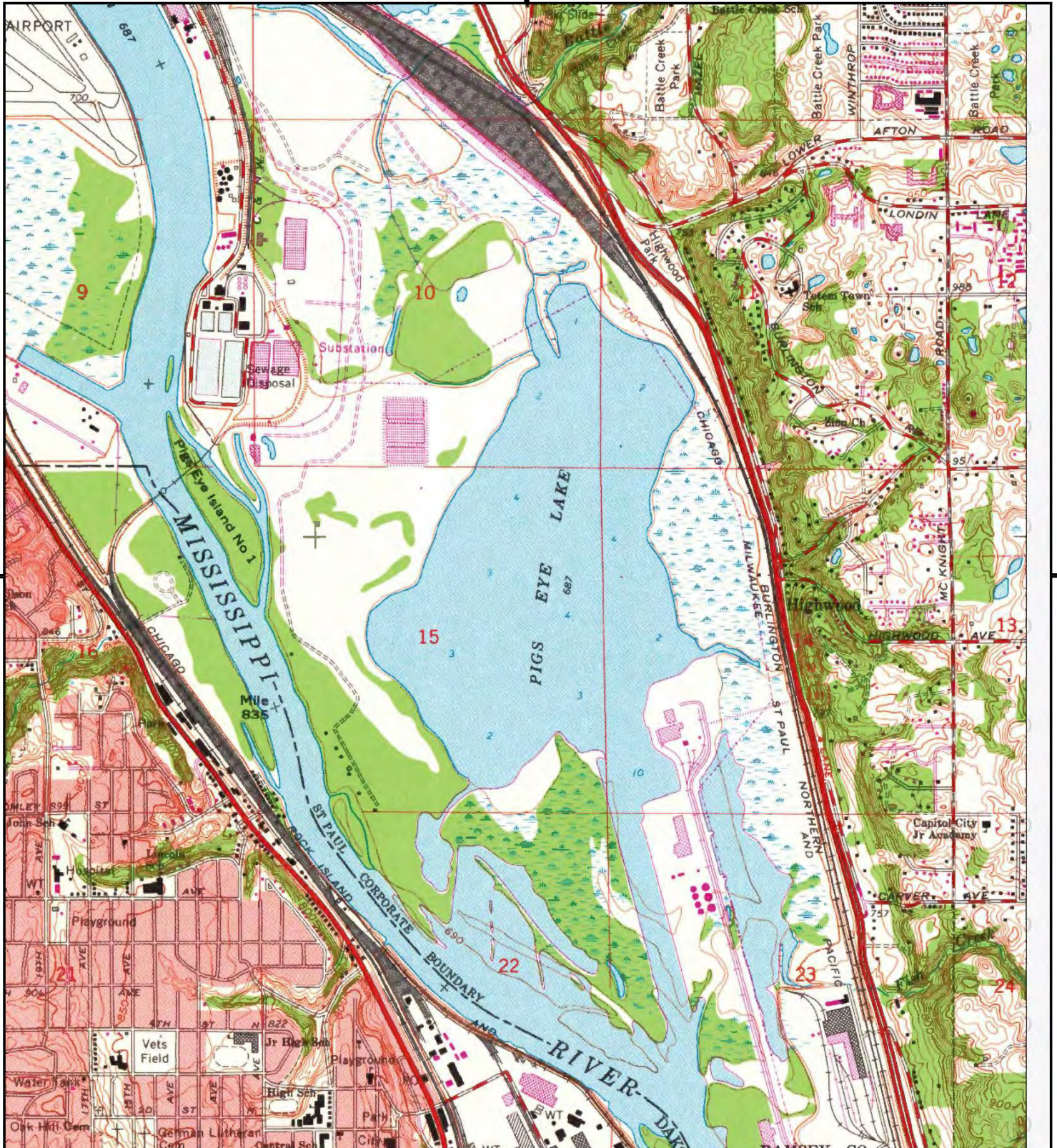
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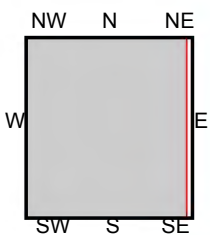
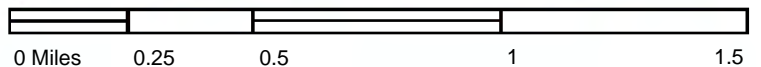
TP, St Paul East, 1993, 7.5-minute
E, Lake Elmo, 1993, 7.5-minute

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
CLIENT: Army Corp of Engineers





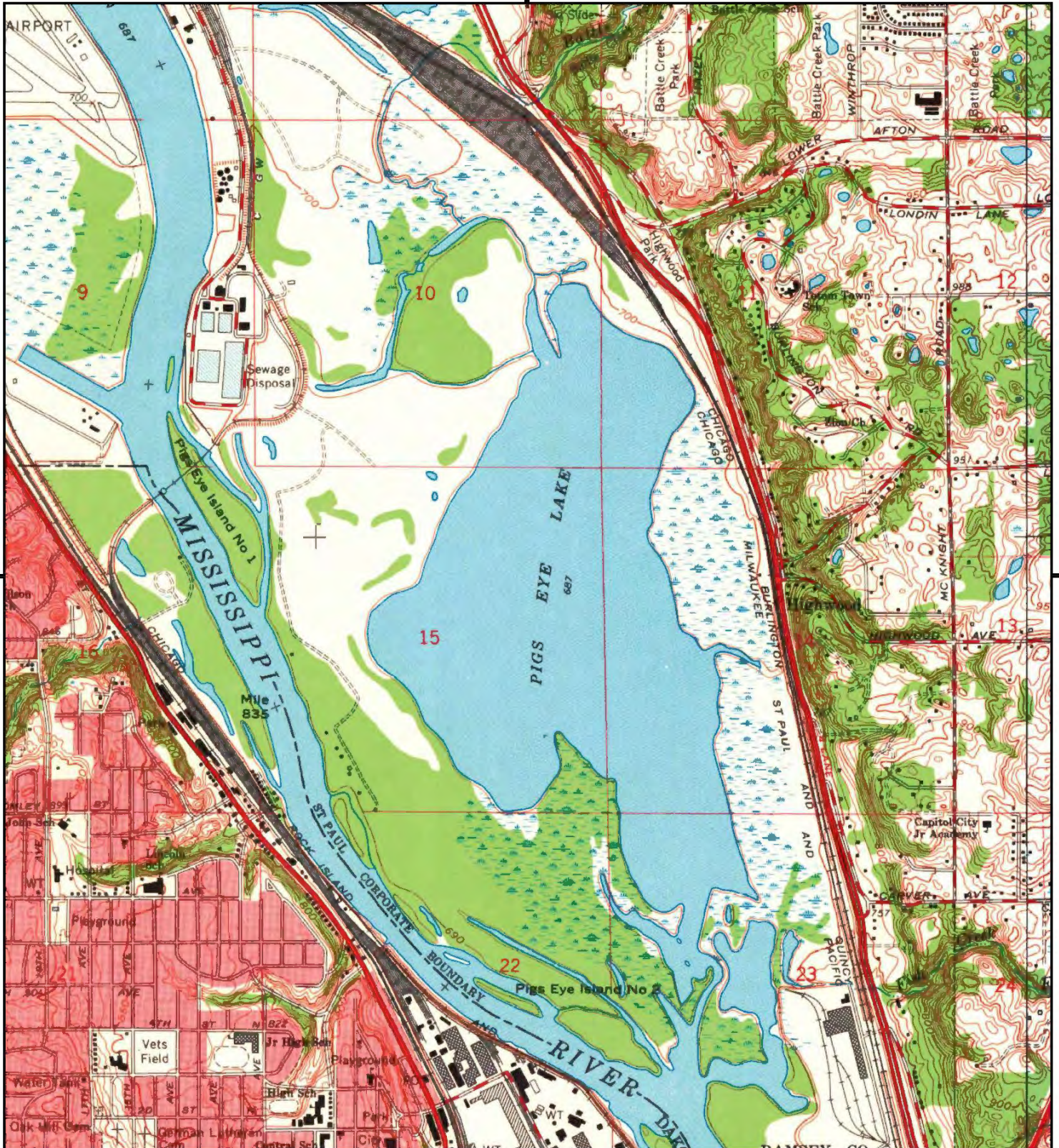
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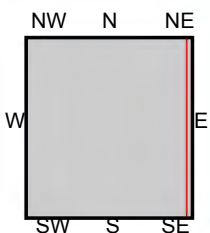
TP, St. Paul East, 1980, 7.5-minute

SITE NAME: Pigs Eye Lake
 ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul, MN 55119
 CLIENT: Army Corp of Engineers





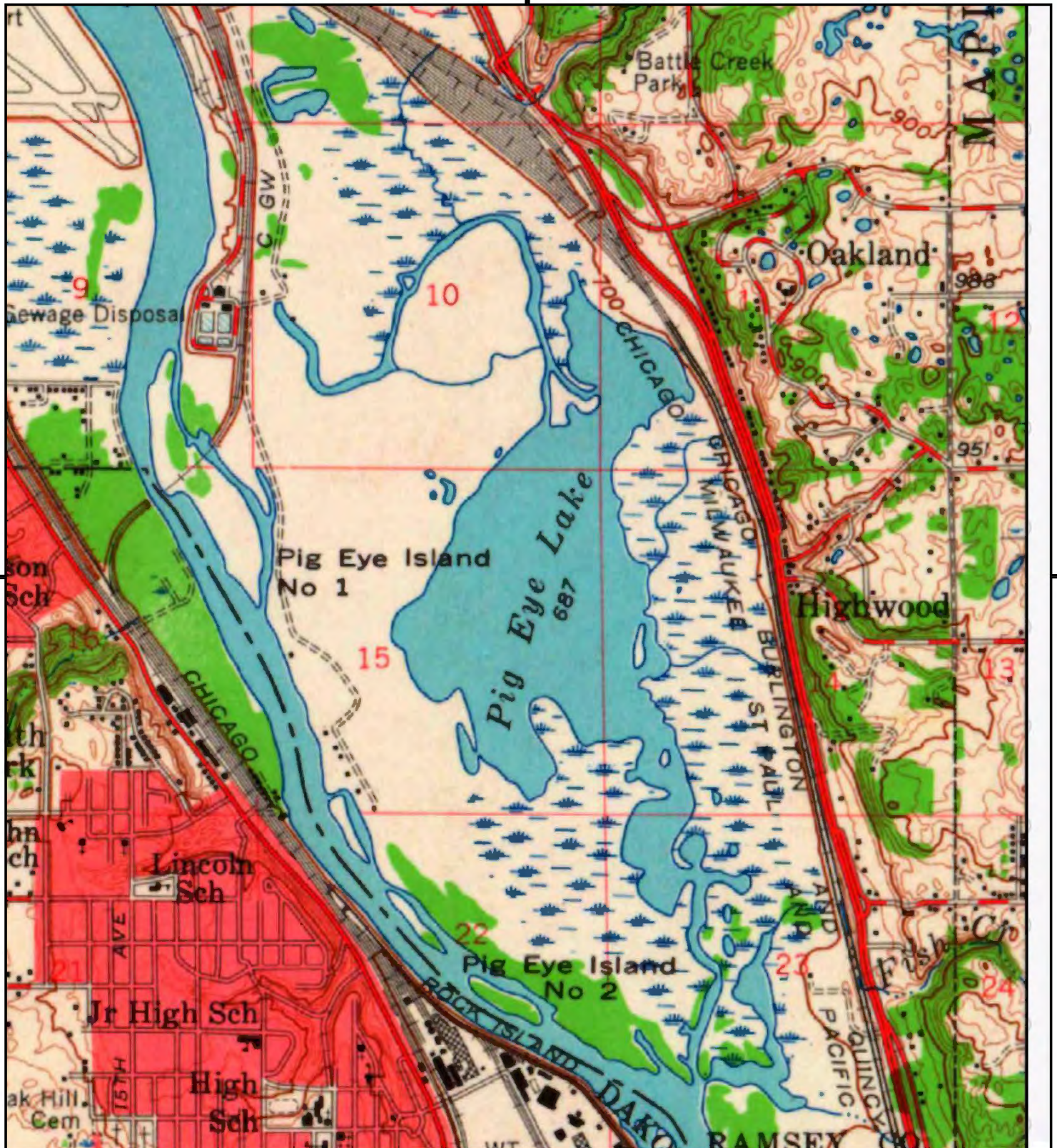
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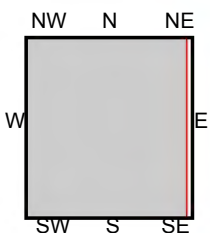
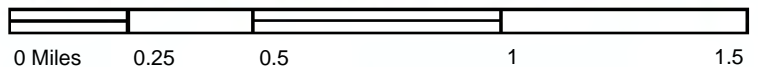
TP, St. Paul East, 1967, 7.5-minute
E, Lake Elmo, 1967, 7.5-minute

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
CLIENT: Army Corp of Engineers





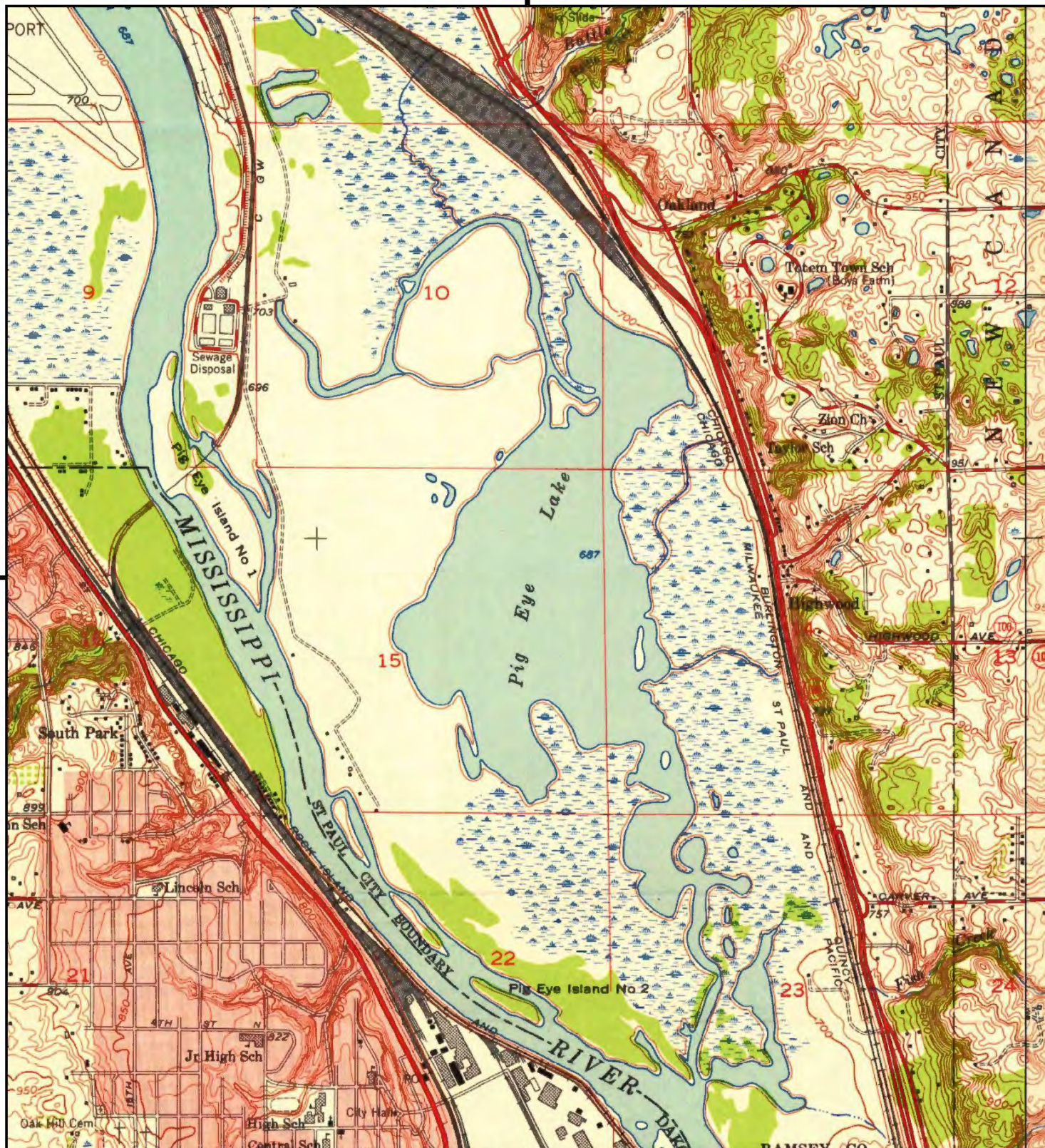
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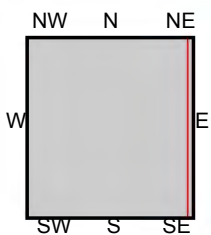
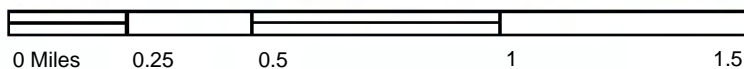
TP, St. Paul, 1958, 15-minute

SITE NAME: Pigs Eye Lake
 ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul, MN 55119
 CLIENT: Army Corp of Engineers





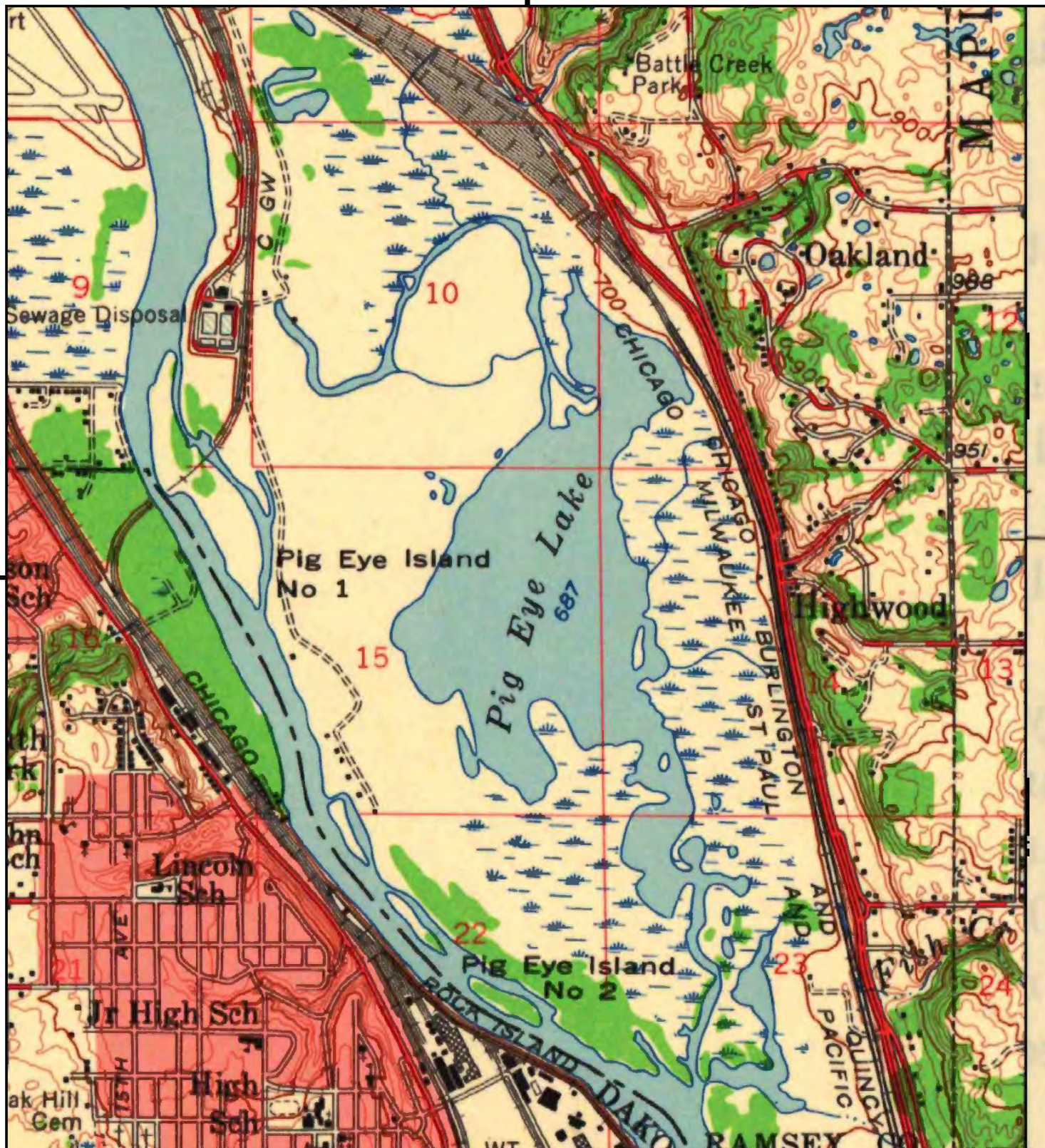
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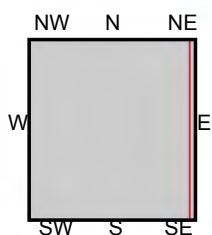
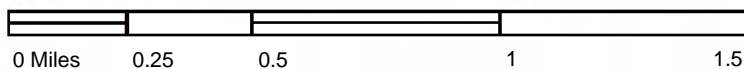
TP, St. Paul East, 1951, 7.5-minute
E, Lake Elmo, 1950, 7.5-minute

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
CLIENT: Army Corp of Engineers





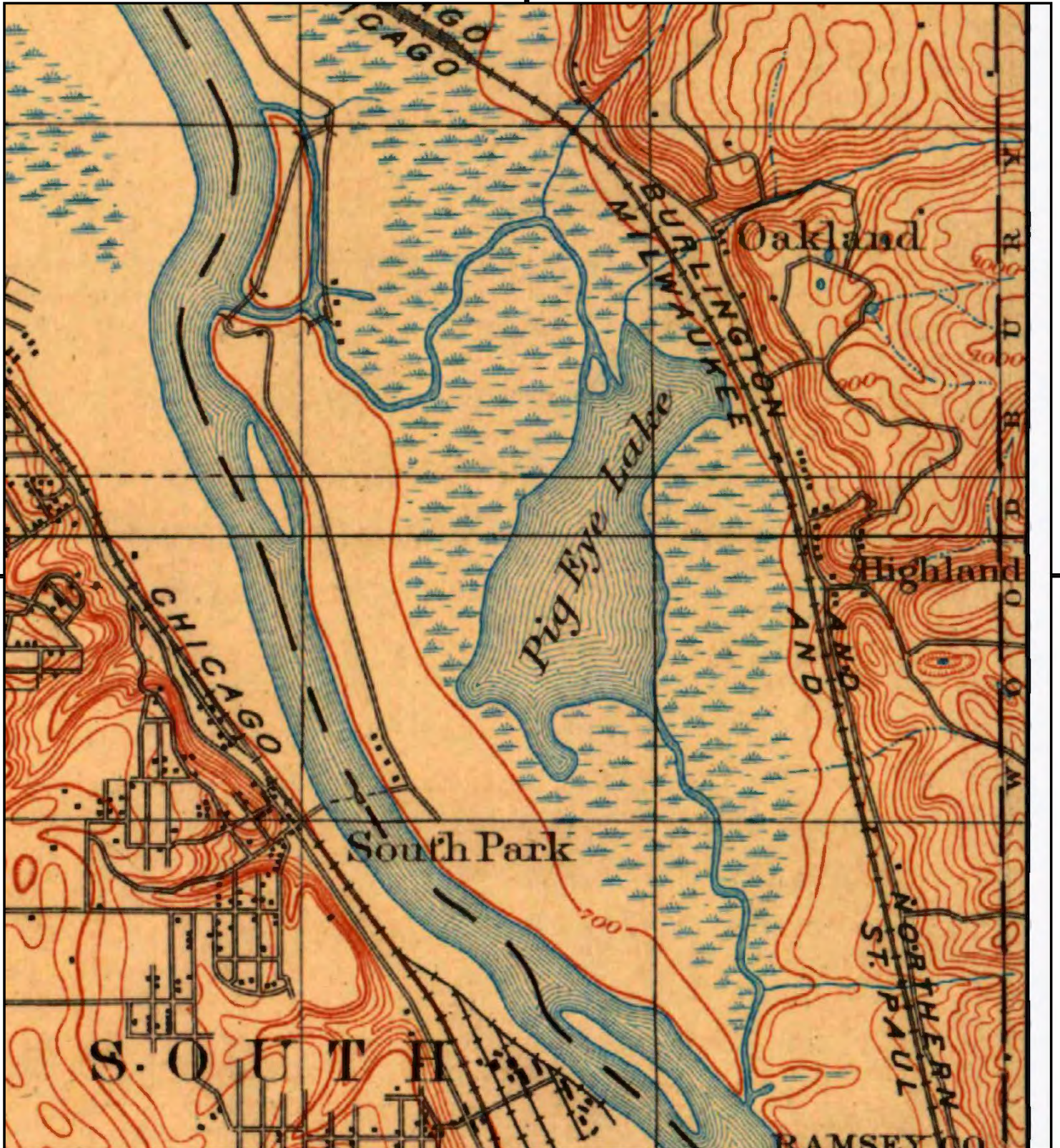
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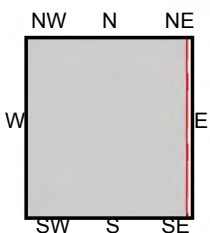
TP, St. Paul, 1951, 15-minute
E, Hudson, 1949, 15-minute

SITE NAME: Pigs Eye Lake
ADDRESS: Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
CLIENT: Army Corp of Engineers





This report includes information from the following map sheet(s).



TP, St. Paul, 1896, 15-minute

SITE NAME: Pigs Eye Lake
 ADDRESS: Pigs Eye Lake Rd / Childs Rd
 Saint Paul, MN 55119
 CLIENT: Army Corp of Engineers





Pigs Eye Lake

Pigs Eye Lake Rd / Childs Rd

Saint Paul, MN 55119

Inquiry Number: 4595821.3

April 19, 2016

Certified Sanborn® Map Report



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

04/19/16

Site Name:

Pigs Eye Lake
Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
EDR Inquiry # 4595821.3

Client Name:

Army Corp of Engineers
180 5th Street Suite 700
Saint Paul, MN 55101-0000
Contact: Grant Riddick



The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Army Corp of Engineers were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 02E3-4CC1-BA00

PO # NA

Project Pigs Eye Lake_ St Paul, MN

UNMAPPED PROPERTY

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Sanborn® Library search results

Certification #: 02E3-4CC1-BA00

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Pigs Eye Lake

Pigs Eye Lake Rd / Childs Rd

Saint Paul, MN 55119

Inquiry Number: 4595821.5

April 19, 2016

The EDR Aerial Photo Decade Package



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

04/19/16

Site Name:

Pigs Eye Lake
Pigs Eye Lake Rd / Childs Rd
Saint Paul, MN 55119
EDR Inquiry # 4595821.5

Client Name:

Army Corp of Engineers
180 5th Street Suite 700
Saint Paul, MN 55101-0000
Contact: Grant Riddick



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Search Results:

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2008	1"=500'	Flight Year: 2008	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1997	1"=500'	Flight Date: January, 01 1997	State\MN_1997
1991	1"=500'	Acquisition Date: April, 17 1991	USGS/DOQQ
1987	1"=500'	Flight Date: April, 07 1987	USGS
1978	1"=500'	Flight Date: April, 14 1978	USGS
1974	1"=500'	Flight Date: April, 18 1974	USGS
1966	1"=500'	Flight Date: November, 02 1966	USGS
1953	1"=500'	Flight Date: November, 03 1953	USGS
1951	1"=500'	Flight Date: July, 25 1951	USGS
1947	1"=500'	Flight Date: May, 08 1947	USGS
1937	1"=500'	Flight Date: July, 24 1937	USGS

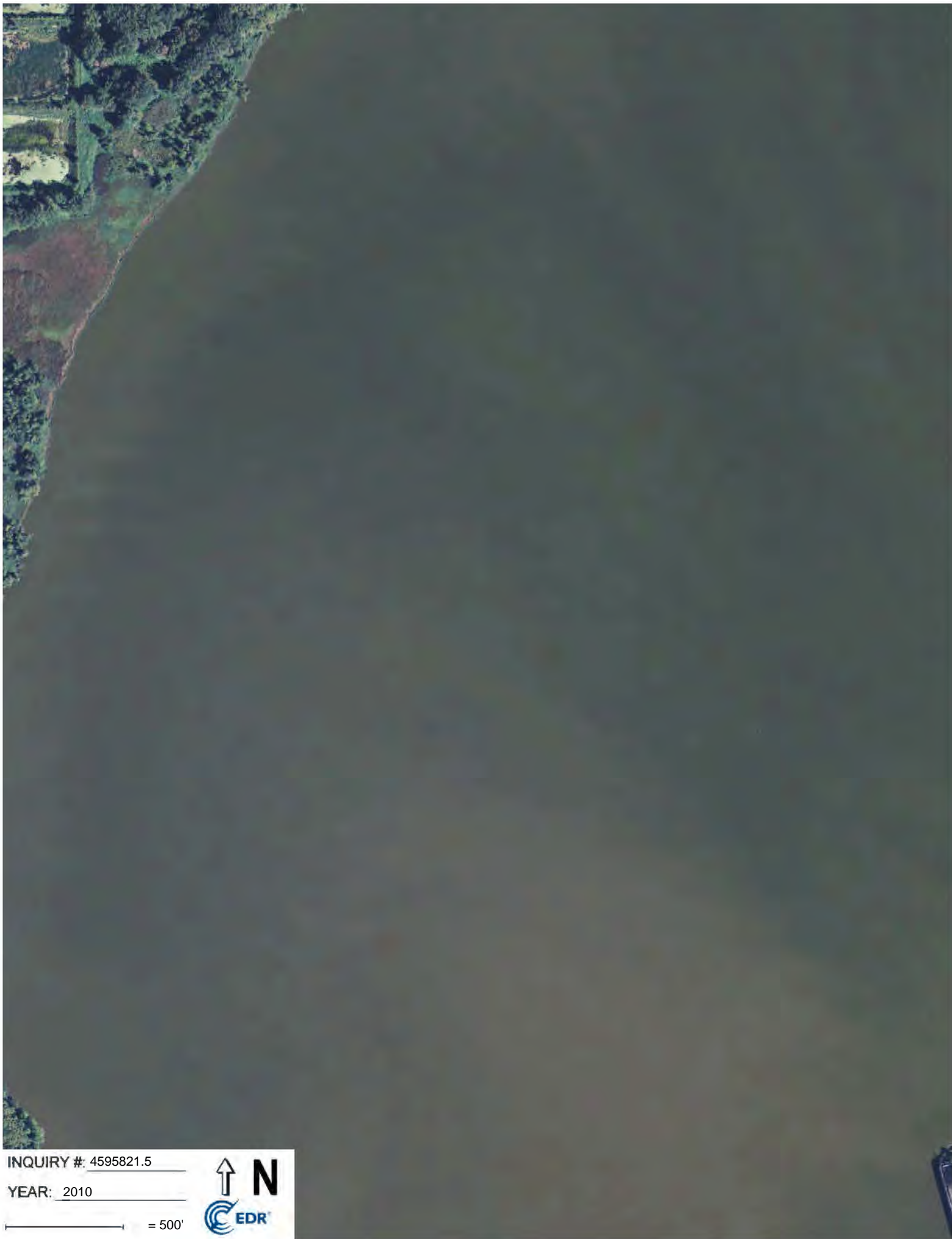
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INQUIRY #: 4595821.5

YEAR: 2010

— = 500'





INQUIRY #: 4595821.5

YEAR: 2009

— = 500'







INQUIRY #: 4595821.5

YEAR: 2005

— = 500'





INQUIRY #: 4595821.5

YEAR: 1997

————— = 500'





INQUIRY #: 4595821.5

YEAR: 1991

— = 500'





INQUIRY #: 4595821.5

YEAR: 1987

— = 500'





INQUIRY #: 4595821.5

YEAR: 1978

— = 500'





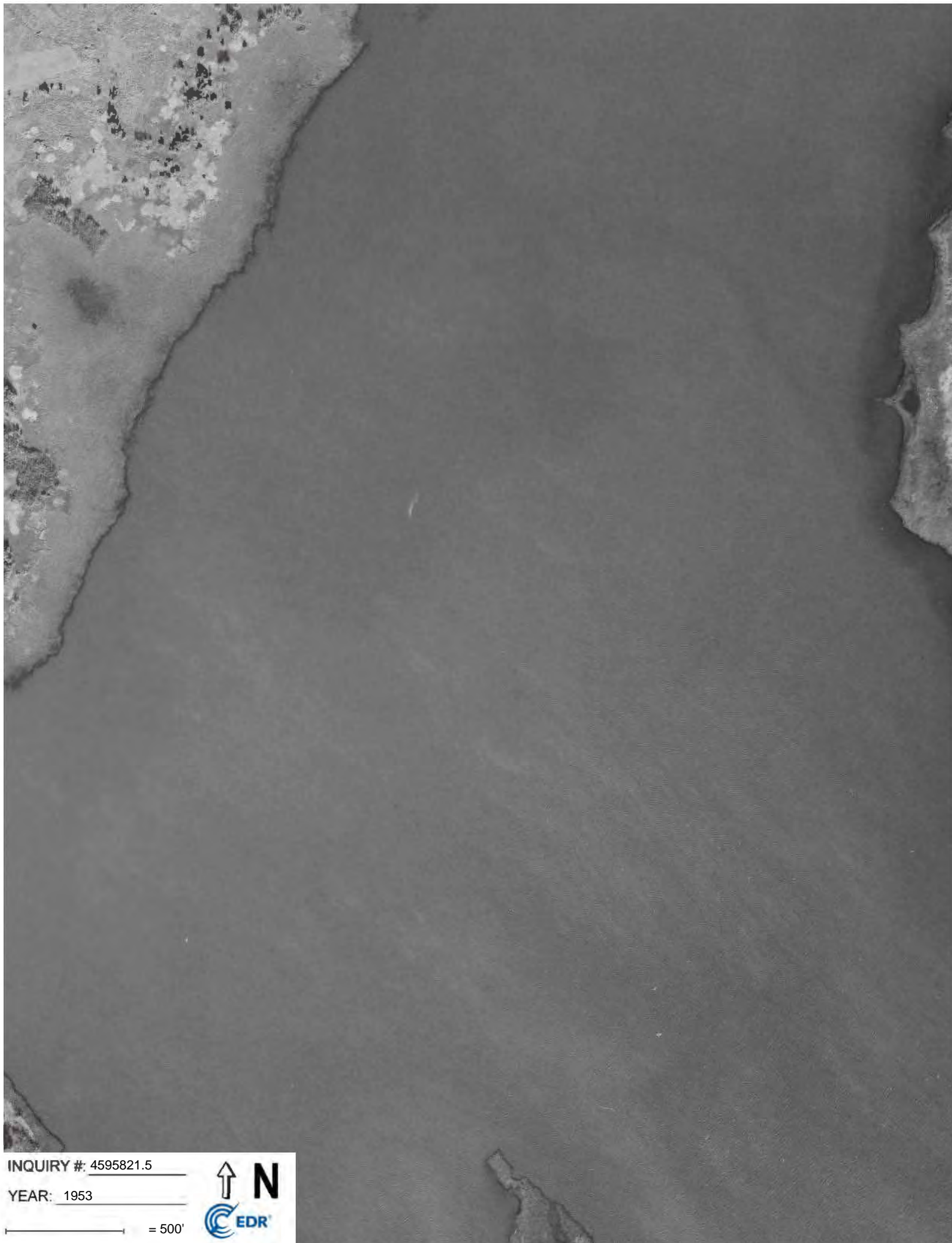
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YEAR: 1974

— = 500'







INQUIRY #: 4595821.5

YEAR: 1953

— = 500'



INQUIRY #: 4595821.5

YEAR: 1951

← = 500'



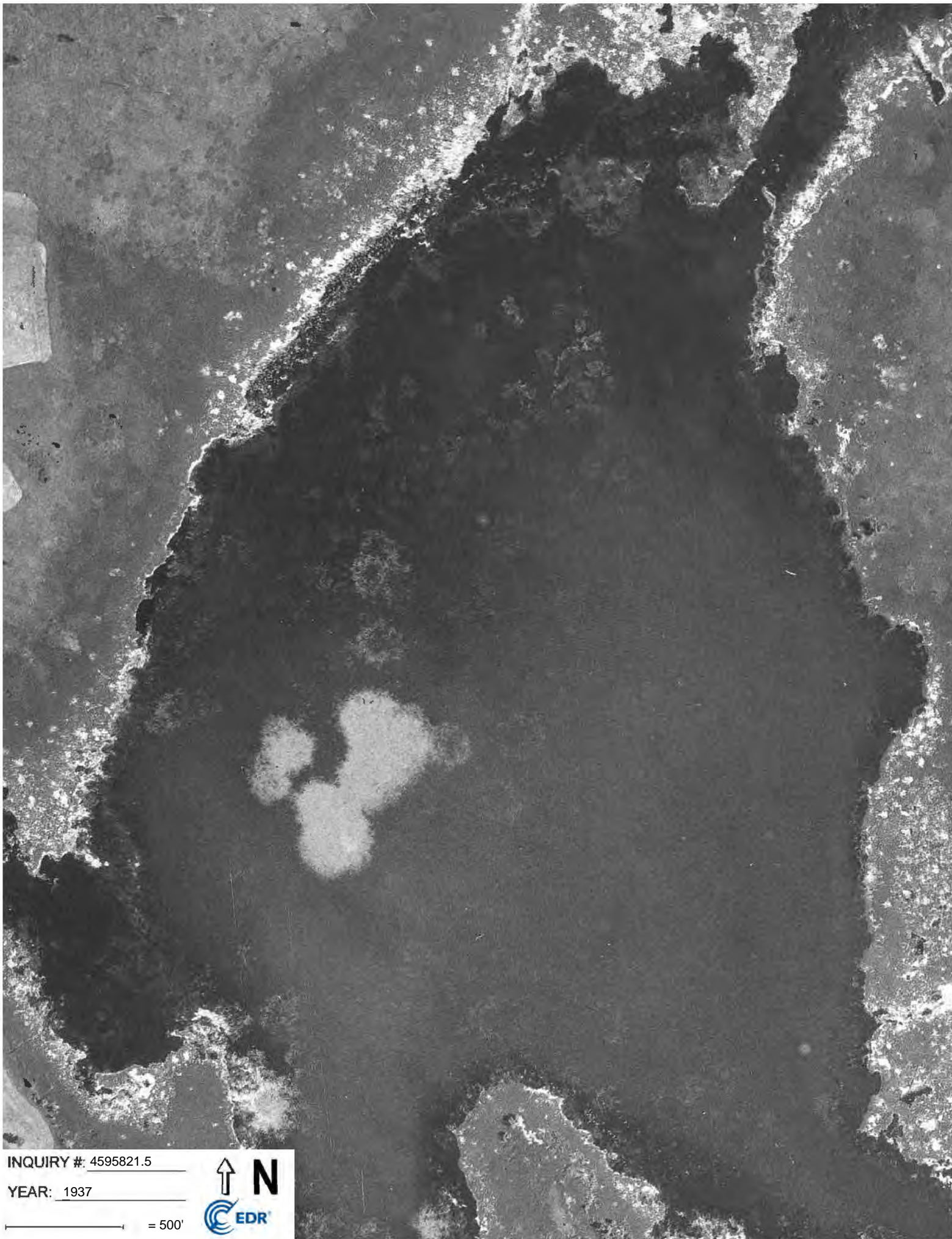


INQUIRY #: 4595821.5

YEAR: 1947

— = 500'





INQUIRY #: 4595821.5

YEAR: 1937

— = 500'





PIG'S EYE ISLANDS - FEASIBILITY
MISSISSIPPI RIVER
LOCKS & DAMS - POOL 2
ST. PAUL, MN

Solicitation:
Contract:
AUGUST 2017

THIS PROJECT WAS DESIGNED BY THE ST. PAUL DISTRICT CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 1110-1-8152. SIGNATURES INDICATE OFFICIAL RECOMMENDATION OF ALL DRAWINGS IN THIS SET.

APPROVED BY:

CHIEF ENGR & CONST DIVISION

APPROVAL RECOMMENDED BY:

CHIEF	EC-D	BRANCH
-------	------	--------

CHIEF	EC-G	BRANCH
-------	------	--------

CHIEF	EC-H	BRANCH
-------	------	--------

PROJECT MANAGER



**3 Army Corps
Engineers²**

[illegible]

ST. PAUL DISTRICT ST. PAUL, MINNESOTA	OWN BY:	CRD BY:	SOLICITATION NO.:
	CRM		
	SUBMITTED BY:	CONTRACT NO.:	
	T. SULLY		
	PLOT SCALE:	PLOT DATE:	FILE NUMBER:
		1/2" = 1'	
	SIZE:	FILE NAME:	
		PAPER: 9x40" (CON) 40"	

MISSISSIPPI RIVER
CKS & DAMS - POOL 2
ST. PAUL, MN
COVER SHEET

Sheet
ID
G-001

DCBA

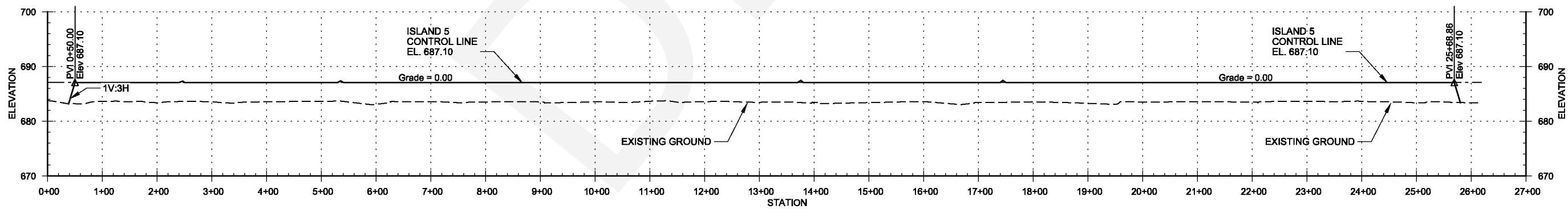
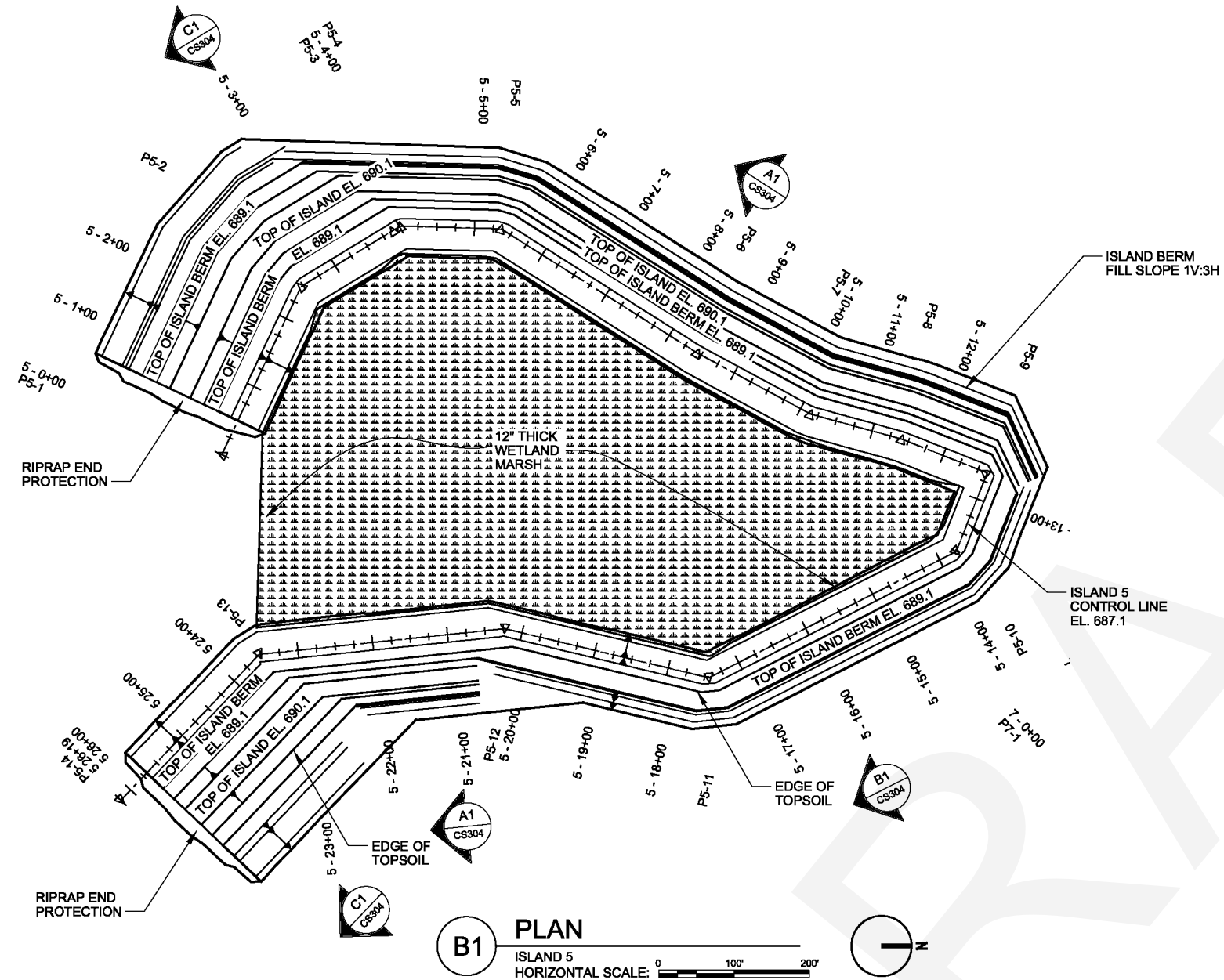
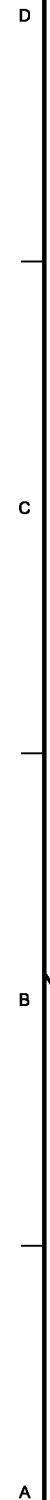
GENERAL PROJECT NOTES:

1. TIE DIAGRAMS AND DETAILED DESCRIPTIONS OF HORIZONTAL AND VERTICAL CONTROL POINTS ARE AVAILABLE BY REQUEST TO THE CONTRACTING OFFICER UPON CONTRACT AWARD.
2. ORIGINAL HORIZONTAL CONTROL DATA COMPILED DGPS NAD 83 US FOOT. COORDINATES BASED ON MINNESOTA STATE PLANE SOUTH.
3. ALL PROJECT ELEVATIONS REFER TO NAVD88.
4. ORIGINAL SOUNDING /BATHYMETRY DATA FROM USACE SURVEY PERFORMED ON OCTOBER 22, 2015 FOR RIVER MILES 834.4-836.3 AND ADJUSTED TO LOW CONTROL POOL (L.C.P.) ELEVATION 687.2. WATER SURFACE ELEVATION AT TIME OF SURVEY ELEVATION 687.4.
5. THE INFORMATION ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UTILITIES MAY NOT BE ACCURATE OR ALL INCLUSIVE. THE MAINTENANCE AND REPAIR (M&R) CREW IS RESPONSIBLE FOR MAKING THE DETERMINATION AS TO THE TYPE AND LOCATION OF UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE TO THESE UTILITIES.

[illegible]

ELEVATION DATUM (VERTICAL CONTROL):	COORDINATE SYSTEM (HORIZONTAL CONTROL):
NAD 83 (2011)	
NAD 86	
GEOID12B	
	MIN SPCS, SOUTH ZONE-U.S. SURVEY FT.
	COMBINED FACTOR (CF): 0.999919018

ELEVATION DATUM (VERTICAL CONTROL):	COORDINATE SYSTEM (HORIZONTAL CONTROL):
NAD 83 (2011)	
NAD 86	
GEOID12B	
	MIN SPCS, SOUTH ZONE-U.S. SURVEY FT.
	COMBINED FACTOR (CF): 0.999919018



A1 **PROFILE**

ISLAND 5

HORIZONTAL SCALE: 0 100' 200'

VERTICAL SCALE: 0 10' 20'

ELEVATION DATUM (VERTICAL CONTROL):
NAVD 88
COORDINATE SYSTEM (HORIZONTAL CONTROL):
NAD 83 (2011)
MN SPCS, SOUTH ZONE-U.S. SURVEY FT.
COMBINED FACTOR (CF): 0.9999919018

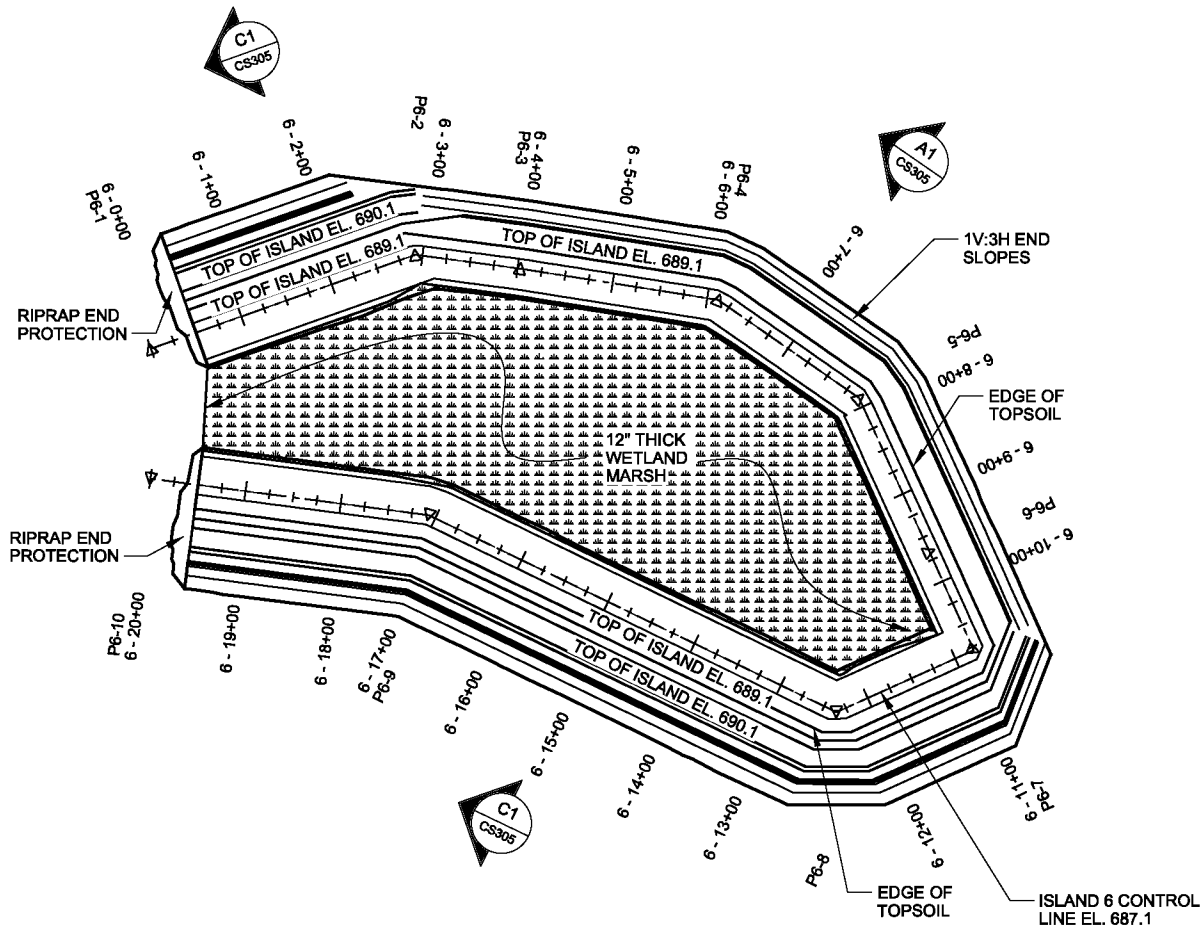
[illegible]

U.S. ARMY CORPS OF ENGINEERS ST. PAUL DISTRICT ST. PAUL, MINNESOTA	DESIGNED BY:	DATE:
	BY: CSM	SOLICITATION NO.:
	OWN BY: CSM	CONTRACT NO.:
	SUBMITTED BY: T. SULLY	FILE NUMBER:
	PLOT SCALE: 8/6/2017	FILE NAME:
	SIZE:	PERIOD: 08100-4.dgn

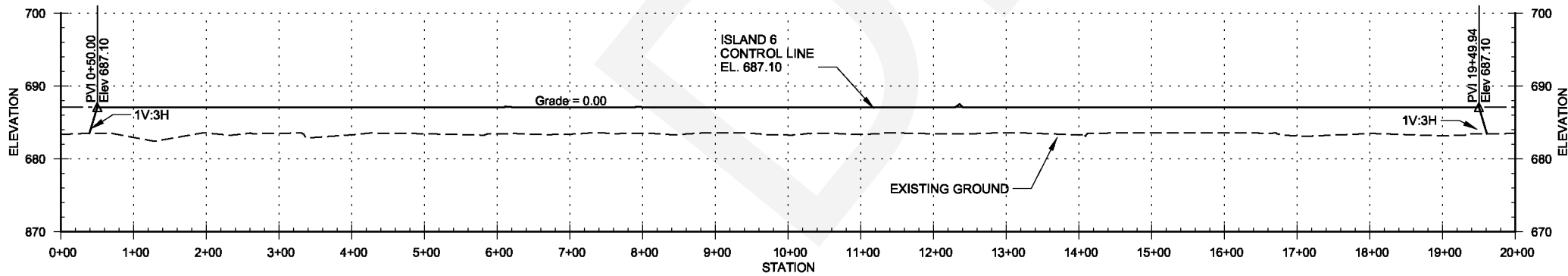
PIG'S EYE ISLANDS - FEASIBILITY
MISSISSIPPI RIVER
LOCKS & DAMS - POOL 2
ST. PAUL, MN
ISLAND 5
PLAN AND PROFILE

Sheet
ID
CS103

D
C
B
A



B1 PLAN
ISLAND 6
HORIZONTAL SCALE: 0 100' 200'



A1 PROFILE
ISLAND 6
HORIZONTAL SCALE: 0 100' 200'
VERTICAL SCALE: 0 10' 20'



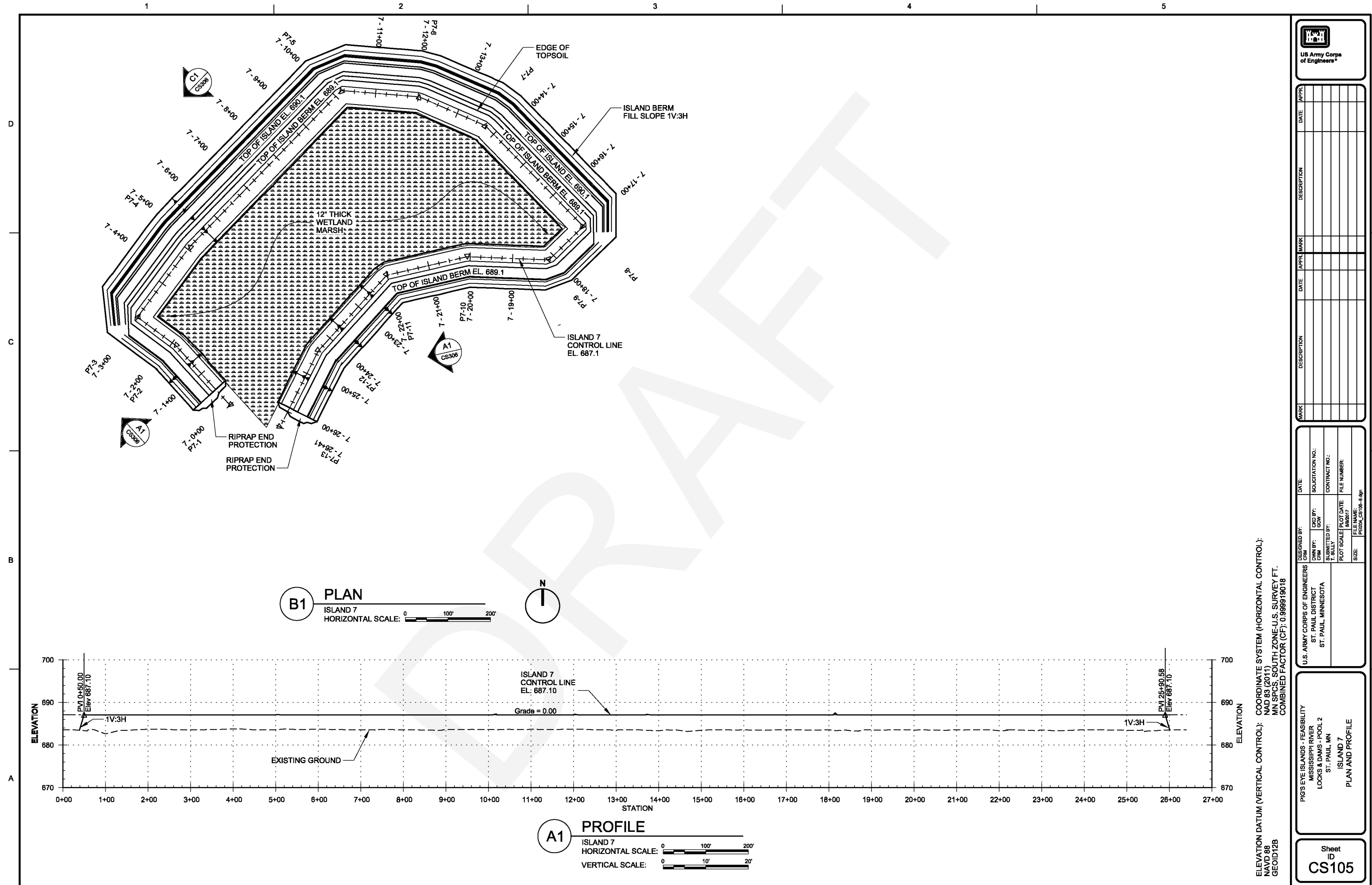
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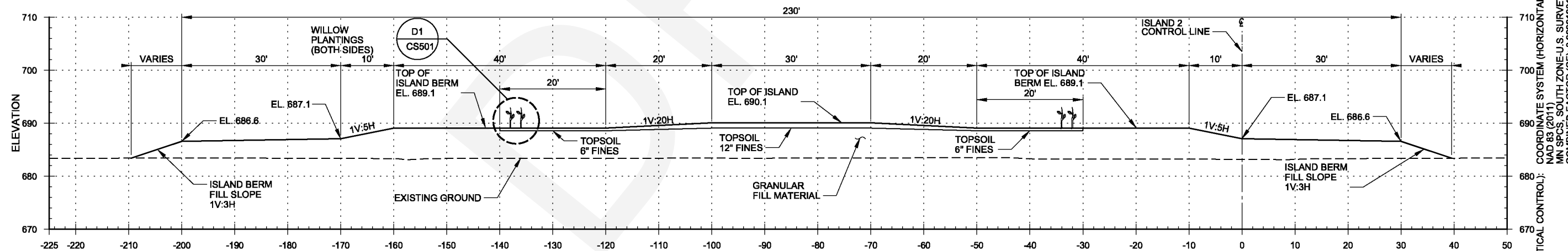
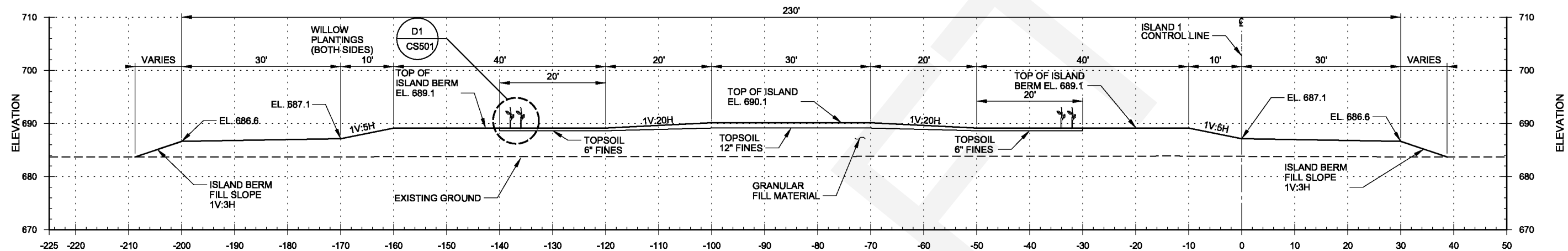
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DRAWN BY: CWA CWA	DATE:	CONTRACT NO.:
SUBMITTED BY: T. BULLY	DATE:	FILE NUMBER:
FILE NAME: PEIS04_CS104-8.dgn	DATE:	FILE NUMBER:

FIG'S EYE ISLANDS - FEASIBILITY
MISSISSIPPI RIVER
LOCKS & DAMS - POOL 2
ST. PAUL, MN
ISLAND 6
PLAN AND PROFILE

Sheet
ID
CS104

ELEVATION DATUM (VERTICAL CONTROL): COORDINATE SYSTEM (HORIZONTAL CONTROL):
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GEOD12B MN SPCS, SOUTH ZONE-U.S. SURVEY FT.
COMBINED FACTOR (CF): 0.999919018

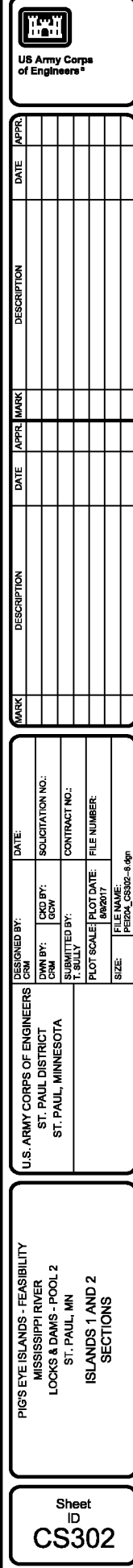




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NAVD 88
GEOID12B

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MN SPCS
SOUTH ZONE-U.S. SURVEY FT.
COMBINED FACTOR (CF): 0.999919018

COORDINATE SYSTEM (HORIZONTAL CONTROL):
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MN SPCS, SOUTH ZONE-U.S. SURVEY FT.
COMBINED FACTOR (CF): 0.999919018

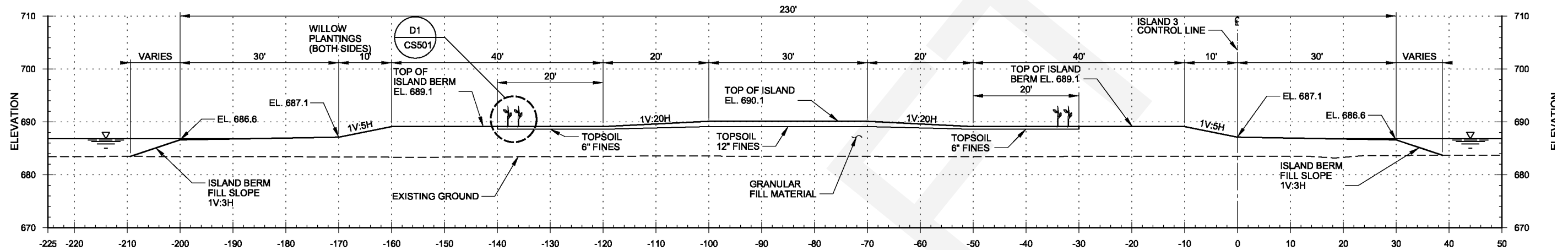
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MISSISSIPPI RIVER													
LOCKS & DAMS - POOL 2													
ST. PAUL, MN													
ISLANDS 1 AND 2													
SECTIONS													

DESIGNED BY:		DATE:	MARK		DESCRIPTION		DATE	APPR.	MARK	DESCRIPTION		DATE	APPR.
U.S. ARMY CORPS OF ENGINEERS													
MISSISSIPPI RIVER													
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ST. PAUL, MN													
ISLANDS 1 AND 2													
SECTIONS													

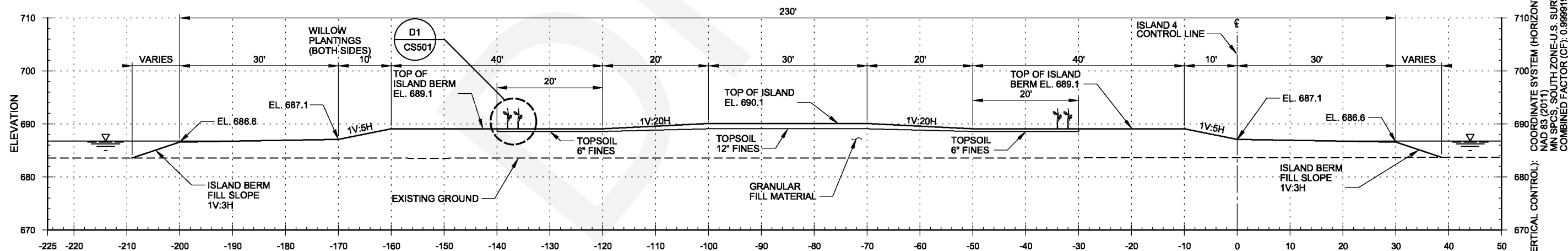
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LOCKS & DAMS - POOL 2													
ST. PAUL, MN													
ISLANDS 1 AND 2													
SECTIONS													

DESIGNED BY:		DATE:	MARK		DESCRIPTION		DATE	APPR.	MARK	DESCRIPTION		DATE	APPR.
U.S. ARMY CORPS OF ENGINEERS													
MISSISSIPPI RIVER													
LOCKS & DAMS - POOL 2													
ST. PAUL, MN													
ISLANDS 1 AND 2													
SECTIONS													



C1 **SECTION**
ISLAND 3 - STA. 4+0

ISLAND 3 - STA. 4+00
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 VERTICAL SCALE:



A1 SECTION
ISLAND 4 - STA 2+0

ISLAND 4 - STA. 2+00
"A" TYPICAL SECTION STA. 0+50 - STA. 4+36.11
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VERTICAL SCALE:

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 GZEID128
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 MN SPCS, SOUTH ZONE-U.S. SURVEY FT.
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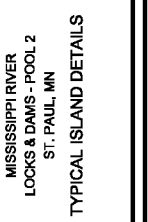
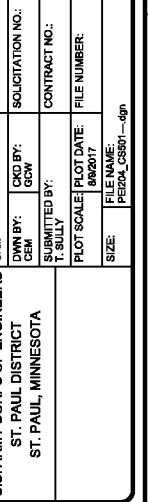
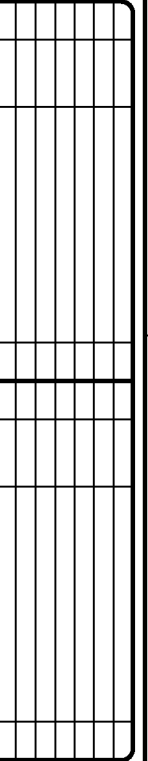
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	SIZE:	FILE NAME: PEI20A_CS302-6.dgn	

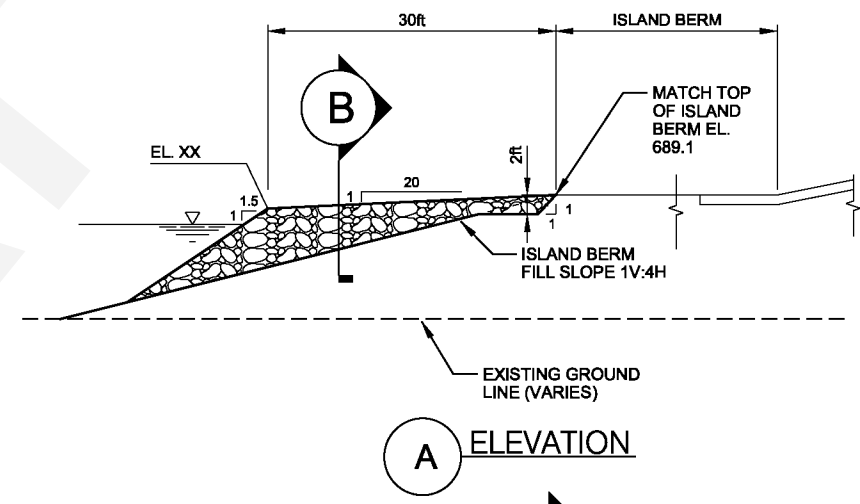
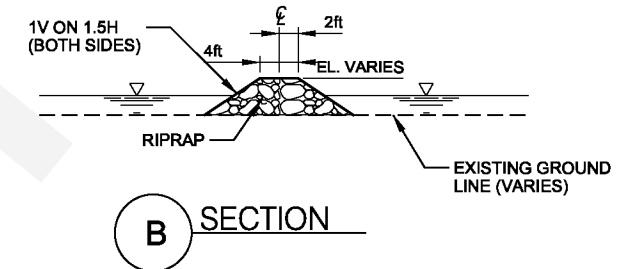
MISSISSIPPI RIVER
LOCKS & DAMS - POOL 2
ST. PAUL, MN
ISLANDS 3 AND 4
SECTIONS

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1. ALL PROJECT ELEVATIONS REFER TO NAVD88.
2. WATER LEVEL SHOWN IS REPRESENTATIVE OF LOW CONTROL POOL (LCP) EL. 686.8 (NAVD 88).
3. ROCK VANES SHALL BE PLACED 100ft ON CENTER ALONG THE EDGE OF THE ISLAND BERM AS INDICATED ON THE CONTRACT DRAWINGS UNLESS OTHERWISE INDICATED OR DIRECTED BY THE CONTRACTING OFFICER.



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CS501



ELEVATION DATUM (VERTICAL CONTROL): NAVD 88 GEOID12B	COORDINATE SYSTEM (HORIZONTAL CONTROL): NAD 83 (2011) MN SPCS, SOUTH ZONE-U.S. SURVEY FT. COMBINED FACTOR (CF): 0.999919078
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POINT ID	BEARING	DISTANCE (FEET)	NORTHING (Y)	EASTING (X)				DELTA	R	L	T
					PC	PI	PT				
P5-1			1028571.81	2876016.15		0+00.00					
	N 64°42'52.32" W	247.03 *									
P5-2			1028877.32	2875792.79		2+47.03					
	N 31°18'10.08" W	142.71 *									
P5-3			1028799.26	2875718.64		3+89.73					
	N 31°18'10.08" W	11.78 *									
P5-4			1028809.32	2875712.52		4+01.52					
	N 1°30'48.76" E	133.68 *									
P5-5			1028942.96	2875716.05		5+35.20					
	N 32°18'21.05" E	308.83 *									
P5-6			1029203.98	2875881.1		8+44.02					
	N 28°18'54.82" E	170.73 *									
P5-7			1029354.29	2875962.08		10+14.76					
	N 15°25'19.78" E	125.79 *									
P5-8			1029475.54	2875995.53		11+40.54					
	N 21°30'45.53" E	122.35 *									
P5-9			1029589.37	2876040.4		12+62.90					
	S 68°29'14.47" E	112.50 *									
P5-10			1029548.12	2876145.06		13+75.40					
	S 27°01'13.87" E	369.07 *									
P5-11			1029219.34	2876312.73		17+44.46					
	S 13°29'44.64" W	278.97 *									
P5-12			1028948.07	2876247.63		20+23.43					
	S 5°58'23.19" E	328.20 *									
P5-13			1028821.65	2876281.78		23+51.63					
	S 46°30'17.95" E	267.23 *									
P5-14			1028437.73	2876475.64		26+18.86					

CONTROL LINE DATA - ISLAND 7											
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					PC	PI	PT				
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	N 42°20'28.61" W	189.19 ' 1									
P7-2			1029853.91	2876338.34		1+89.19					
	N 53°19'26.64" W	112.50 ' 1									
P7-3			1029921.1	2876248.11		3+01.69					
	N 36°40'33.36" E	206.70 ' 1									
P7-4			1030066.88	2876371.57		5+08.40					
	N 44°07'47.38" E	510.38 ' 1									
P7-5			1030453.2	2876726.93		10+18.75					
	S 85°22'12.78" E	183.65 ' 1									
P7-6			1030438.37	2876909.98		12+02.41					
	S 66°30'05.16" E	169.07 ' 1									
P7-7			1030370.96	2877065.03		13+71.48					
	S 44°12'54.63" E	330.67 ' 1									
P7-8			1030133.96	2877295.63		17+02.15					
	S 45°47'05.37" W	112.50 ' 1									
P7-9			1030055.61	2877214.99		18+14.65					
	N 87°49'51.70" W	192.15 ' 1									
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P7-12			1029842.39	2876673.58		24+39.68					
	S 26°43'54.90" W	200.90 ' 1									
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A1 HORIZONTAL CONTROL TABLE
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GEOID128

COORDINATE SYSTEM (HORIZONTAL CONTROL):
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MN SPCS, SOUTH ZONE U.S. SURVEY FT.
COMBINED FACTOR (CF: 0.989819018

PIGMY EYE ISLANDS - FEASIBILITY
MISSISSIPPI RIVER
LOCKS & DAMS - POOL 2
ST. PAUL, MN

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Appendix M
REAL ESTATE PLAN
PIGS EYE LAKE
FEASIBILITY REPORT
AND INTEGRATED ENVIRONMENTAL ASSESSMENT

CAP SECTION 204
RAMSEY COUNTY, MINNESOTA

1. GENERAL DESCRIPTION

Pigs Eye Lake is a 628-acre, shallow backwater lake, situated southeast of St. Paul, Minnesota, within Pool 2 of the Mississippi River (Figure 1). Pool 2 extends approximately 33 miles upstream from Lock and Dam 2 at Hastings, Minnesota (river mile 815.2) to Lock and Dam 1 (Ford Dam) at Minneapolis, Minnesota. The Minnesota River joins the Mississippi River at the upper end of Pool 2. The project lies within the Mississippi National River and Recreation Area, established by Congress to protect, preserve, and enhance the nationally significant resources of this reach of the Mississippi River. The project area is directly adjacent to one of the largest nesting sites for colonial water birds within the state. Several species of herons, egrets, and cormorants nest in the rookery. Battle Creek flows into the north end of Pigs Eye Lake.

Pigs Eye Lake is a valuable regional wildlife resource that has experienced significant habitat degradation. Historically, the area was a large floodplain marsh, but has become a shallow, turbid lake with limited aquatic vegetation. A number of factors may have influenced this change. Directly adjacent to and upstream of Pigs Eye Lake is the site of an unpermitted dump used from the mid-1950s until 1972, and again for incinerator ash from 1977 to 1985. Major remediation of the dump site occurred between 2002 and 2005. Wind-driven waves appear to have eroded several of the shorelines, causing further declines in vegetation and increasing sedimentation in the lake. With little vegetation throughout the lake to stabilize the substrate, the waves also are a source of continual sediment re-suspension, creating a feedback loop that limits growth of new aquatic vegetation. Nutrient loading may also be a problem, with data from the Minnesota Pollution Control Agency indicating high phosphorus levels, and classifying the lake as hypereutrophic.



Figure 1: Location of Pigs Eye Lake

2. PROJECT AUTHORIZATION.

This study is authorized under Section 204 of the Water Resources Development Act of 1992, as amended. Section 204 provides authority for the Corps of Engineers to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized Federal navigation project. Section 204 is one of a number of existing authorities in the Continuing Authorities Program (CAP), which gives USACE authority to plan, design, and construct a project without specific project authorization by Congress. The Federal cost for individual Section 204 projects is limited by statute to \$10 million.

3. PROJECT DESCRIPTION.

Pigs Eye Lake is a 628-acre, shallow backwater lake, situated southeast of St. Paul, Minnesota, within Pool 2 of the Mississippi River. The habitat concerns within the project area primarily include high levels of turbidity, wind-induced shoreline erosion, lack of depth diversity, and lack of shoreline habitat for birds and aquatic plants.

The planning process focused on addressing three objectives: (1) improving aquatic habitat, (2) improving the quantity and quality of habitat for migratory bird species, and (3) protecting shoreline habitat where possible.

The study team identified a variety of measures that could be taken to achieve project objectives, including full and split island designs, sand benches, and creation of wetland (marsh) habitat. The measures were combined in various logical combinations to form alternative project plans. To construct the islands, sand and fines would be transported from Lower Pool 2 temporary placement sites (Upper and Lower Boulanger and Pine Bend).

The final array consisted of six alternatives, including the No Action Alternative, that were evaluated in detail for the Pigs Eye Lake CAP 204 project. The U.S. Fish and Wildlife Service's 1980 version of Habitat Evaluation Procedures (HEP) was used to quantify and evaluate the potential project effects and benefits. In addition to the No Action Alternative, 2 action alternatives were considered "Best Buy" alternatives in evaluation of cost effectiveness and incremental cost, using the Institute of Water Resources economic analysis program called IWR-Plan. Based on the incremental analysis and other factors, Alternative 6M (split island design with marsh habitat), is the Tentatively Selected Plan for implementation (Figure 2).

The Tentatively Selected Plan would restore backwater habitat by creating seven islands with sand benches that would create 16.3 acres of island habitat and floodplain forest. Three of the islands would utilize a "split" design that would establish a sheltered area in the center, allowing for the inclusion of approximately 17.6 acres of marsh plantings. The aquatic ecosystem improvements are all in Pigs Eye Lake. This alternative meets the project objectives and reasonably maximizes habitat benefits at a reasonable cost.

Project construction would take approximately 2 years to complete.

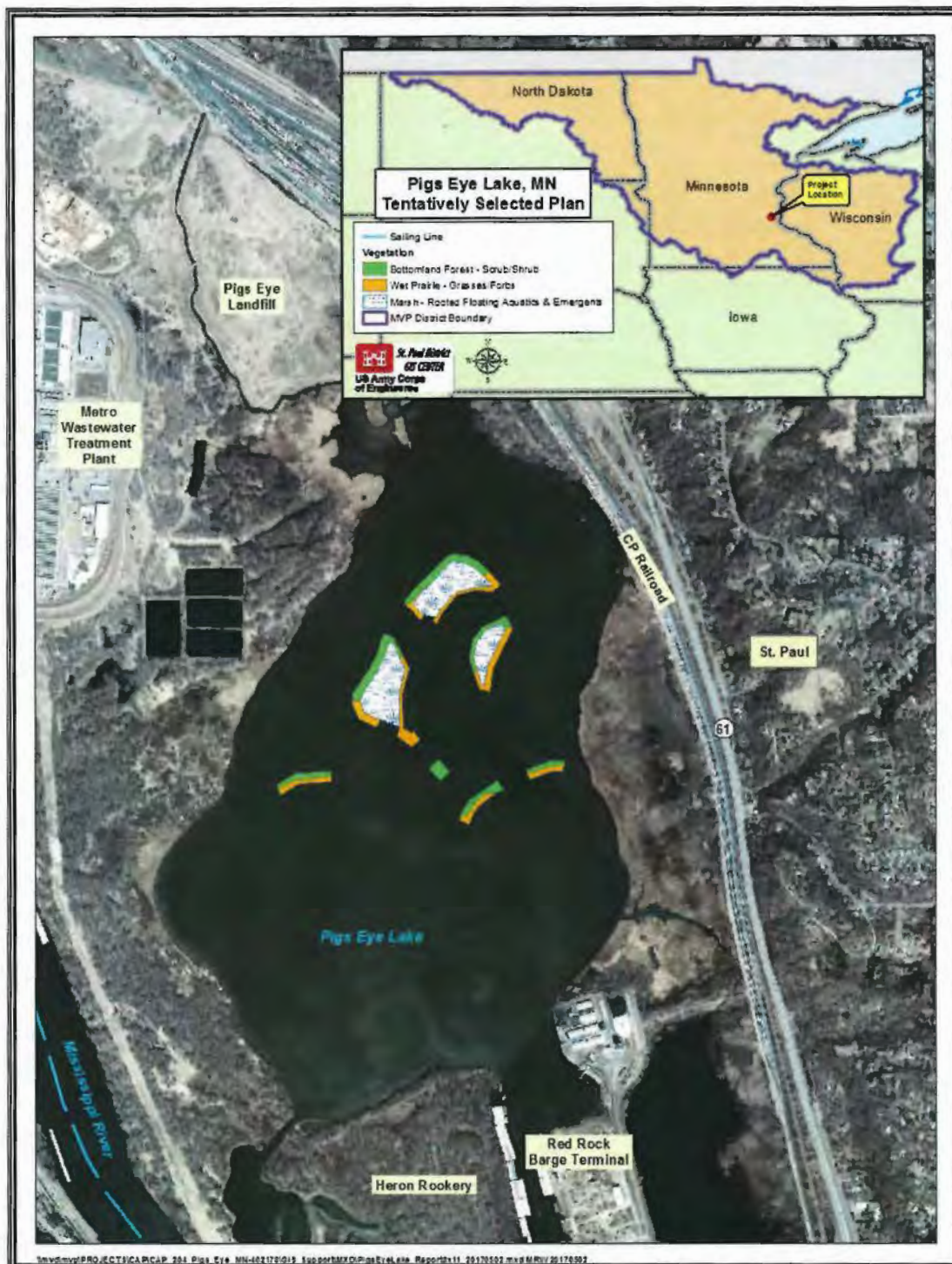


Figure 2: Tentatively Selected Plan for Pigs Eye Lake

4. SPONSOR-OWNED LANDS EASEMENTS, AND RIGHT-OF-WAY (LER)

The Ramsey County Parks and Recreation (RCPR) is the local sponsor for the Pigs Eye Lake Section 204 Project. The north end of the lake and adjacent riparian land is owned by the City of St. Paul (See Figure 3). The majority of the lake and riparian area is owned by Ramsey County. The land area northwest of the lake contains inactive waste water treatment ponds and is owned by the Metropolitan Waste Control. The Port Authority owns portions of the lake and riparian land on the southern tip of the lake around the outlet of Pigs Eye Lake into the Mississippi River. The Port Authority land is currently being utilized for barge loading/offloading.

No additional land interest is required for the project. The project will be constructed in waters owned and managed by the non-federal sponsor (Ramsey County). Although called a lake, Pigs Eye Lake is a large riverine wetland; the sponsor owns the bed of this wetland. The project will have a positive long-term impact over the Pigs Eye Lake project area. Ramsey County will be responsible for 100% of the operation and maintenance of the project features. A detailed OMRR&R Manual will be provided after construction is completed.

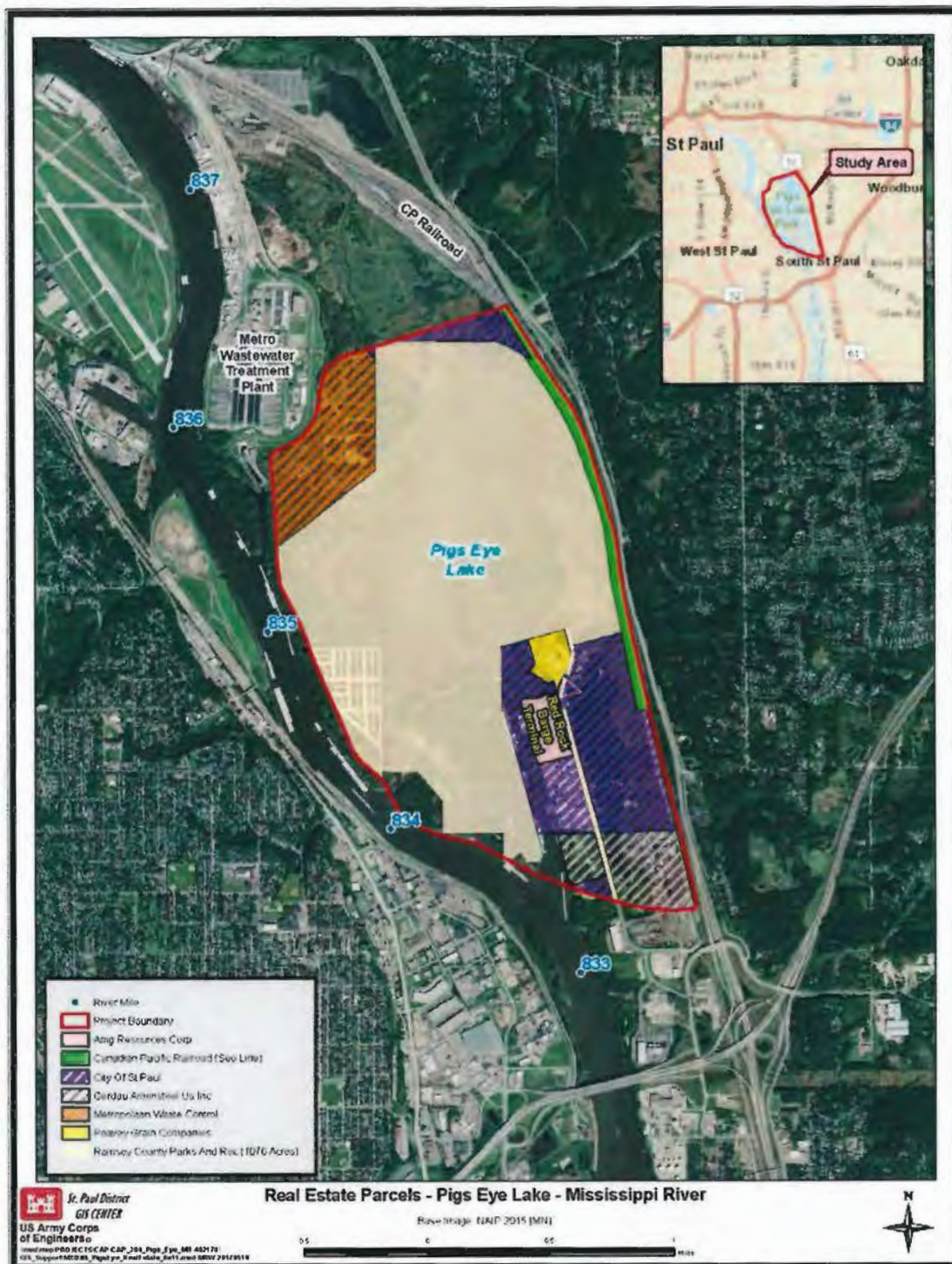


Figure 3: Project Real Estate

5. ESTATES

Because the non-federal sponsor has existing adequate interest in the real estate needed for the project, no additional estates need to be acquired.

6. EXISTING FEDERAL PROJECT

The project lies fully within Pigs Eye Lake in Upper Pool 2 of the Mississippi River. Lock and Dam 2 is located 20 river miles below the project area and Lock and Dam 1 is located 13 river miles above the project area.

7. EXISTING FEDERALLY-OWNED LAND REQUIRED FOR THE PROJECT

There is no federally owned land required for the project.

8. NAVIGATION SERVITUDE

Navigation servitude is not available for this project, and therefore will not be utilized.

9. MAP See Figures 1 and 3.

10. INDUCED FLOODING Not Applicable.

11. BASELINE COST ESTIMATE

A baseline cost estimate for real estate has not been developed because no land is required for the project. Real Estate administrative costs are estimated to be \$5,000. Crediting to the sponsor will be for the value of the lands it owns, as of the date the sponsor grants right of entry for construction.

12. PL 91-646 RESIDENCE/BUSINESS RELOCATIONS

The project will not require any relocations of any sort as defined by CFR Part 24. Therefore, there are no anticipated Relocation Assistance costs due to the project and PL 91-646 will not apply.

13. MINERAL ACTIVITY/TIMBER HARVESTING IN PROJECT AREA

No mineral activity is known to exist in the area of the project. There is no known timber harvesting in the project area that may affect the project.

14. NON-FEDERAL SPONSOR ABILITY TO ACQUIRE LER

An "Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability" checklist (Exhibit A) has been completed on the NFS and the Sponsor is deemed capable and acceptable for real estate acquisition purposes. Specifically, the Sponsor has the legal authority and ample qualified personnel on staff to acquire any necessary LER for the project, however, no additional lands will be required for construction of this project.

15. ZONING

The project will not require any changes to existing zoning classifications or ordinances.

16. ACQUISITION SCHEDULE

No land acquisition schedule is deemed necessary since the non-federal sponsor already owns the necessary real estate. Based on current and expected CAP and O&M budgets and project priorities within the St. Paul District, it is estimated that construction of the project would begin in 2018 and be completed in 2020.

17. FACILITY/UTILITY RELOCATIONS

No facility or utility relocations necessary for this project.

18. ENVIRONMENTAL CLEARANCE

The Environmental Analysis has been completed and a Finding of No Significant Impact (FONSI), if appropriate, is currently in the process of being developed. In addition, no known cultural resource sites have been identified within the project area and the Corps has determined that no historical or cultural resources would be affected by the project.

Because there are known sources of hazardous, toxic, and radioactive wastes (HTRW) in the project area, a Phase I and II HTRW analysis was conducted, as well as 2 USACE sediment surveys in the proposed project area. It is the conclusion of this work that the TSP would not cause significant negative environmental effects as the project avoids the former landfill area (the Exclusion Zone, Appendix K – HTRW, Appendix E – Sediment Report).

19. LANDOWNER SUPPORT OR OPPOSITION TO THE PROJECT

Many Federal, State, and local agencies have been involved in discussions relating to the potential restoration of Pigs Eye Lake for many years. The Corps has coordinated with the Minnesota Pollution Control Agency, Metropolitan Council Environmental Services, the National Parks Service, the Minnesota Department of Natural Resources, the Ramsey Washington Metro Watershed District, the Minneapolis Saint Paul Metropolitan Airports Commission (MAC), the Federal Aviation Administration,), the U.S. Department of Agriculture Wildlife Services (USDA-WS), and the non-federal sponsor throughout the planning process. The agencies are in support of the proposed Pigs Eye Lake restoration project. MAC owns and operates the downtown St. Paul airport, which is located 5500 - 6000 feet northwest of the project. MAC, FAA, and USDA-WS had concerns that the initial project design had the potential to become a hazardous wildlife attractant for aviation. The Corps incorporated design modifications recommended by FAA and USDA-WS to discourage use by large waterfowl. With these modifications, MAC acknowledged its stance as "Not Opposed" to the project."

20. OTHER REAL ESTATE ISSUES RELEVANT TO THE PROJECT

Granular (sand) and fines (topsoil) needed to construct the islands would be obtained by mechanically offloading dredged material from Corps-owned temporary placement sites in Lower Pool 2 (Pine Bend, Upper Boulanger, Lower Boulanger). To transport dredged material from temporary placements sites, barges could travel from the main channel through a slip by Red Rock Barge Terminal to a staging location in Pigs Eye Lake. This channel is a public water, owned by the City of St. Paul, and will not require a permit to traverse during construction.

The source of rock material will be Contractor supplied.

Prepared by:

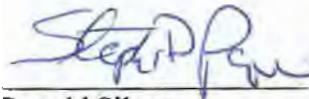
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Date: 2017.09.20 08:24:33 -0500

Date: _____

Stephanie T. Dupey
Realty Specialist

Reviewed/Approved By:



Date: 21 SEP 2017

Ronald Silver
Chief, Planning & Acquisition Branch
Regional Real Estate Division North

ASSESSMENT OF NON-FEDERAL SPONSOR'S

REAL ESTATE CAPABILITY

Appendix 12E (ER 405-1-12)

PIGS EYE SEC. 204 DEVELOPMENT AREA

I. Legal Authority

- a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? Yes.
- b. Does the sponsor have the power of eminent domain for this project? Yes, however this will not be required.
- c. Does sponsor have "quick take" authority for this project? N/A
- d. Are any of the land/interests in land required for the project located outside the sponsor's political boundary? No
- e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? N/A.

II. Human Resource Requirements

- a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of federal projects including P.L. 91-646, as amended? No.
- b. If the answer to II.a is "yes", has a reasonable plan been developed to provide such training? N/A
- c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? N/A.
- d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? Yes
- e. Can the sponsor obtain contractor support, if required in a timely fashion? N/A.
- f. Will the sponsor likely request USACE assistance in acquiring real estate? (If "yes", provide description). No.

III. Other Project Variables

- a. Will the sponsor's staff be located within reasonable proximity to the project site? Yes
- b. Has the sponsor approved the project/real estate schedule/milestones? N/A.

IV. Overall Assessment

- a. Has the sponsor performed satisfactory on other USACE projects? Yes
- b. With regard to this project, the sponsor is anticipated to be: highly capable/fully capable/moderately capable/marginally capable/insufficiently capable. (If sponsor is believed to be "insufficiently capable", provide explanation. Highly Capable

V. Coordination

- a. Has this assessment been coordinated with the sponsor? No
- b. Does the sponsor concur with this assessment? (If "no", provide explanation). N/A.

DUPEY.STEPHAN
IE.T.1231209480

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DUPEY.STEPHANIE.T.1231209480
DN: c=US, o=U.S. Government,
ou=DoD, ou=PKI, ou=USA,
cn=DUPEY.STEPHANIE.T.1231209480
Date: 2017.09.20 08:25:37 -05'00'

Stephanie Dupey
Realty Specialist

Dupey, Stephanie T CIV USARMY CEMVR (US)

From: Balch, Donald L CIV USARMY CEMVD (US)
Sent: Thursday, September 21, 2017 8:26 AM
To: Pope, Stephen D CIV USARMY CEMVR (US)
Cc: Dupey, Stephanie T CIV USARMY CEMVR (US); Briggs, James I Jr CIV USARMY CEMVD (US)
Subject: Pigs Eye REP

Stephen

The REP is okay to move on

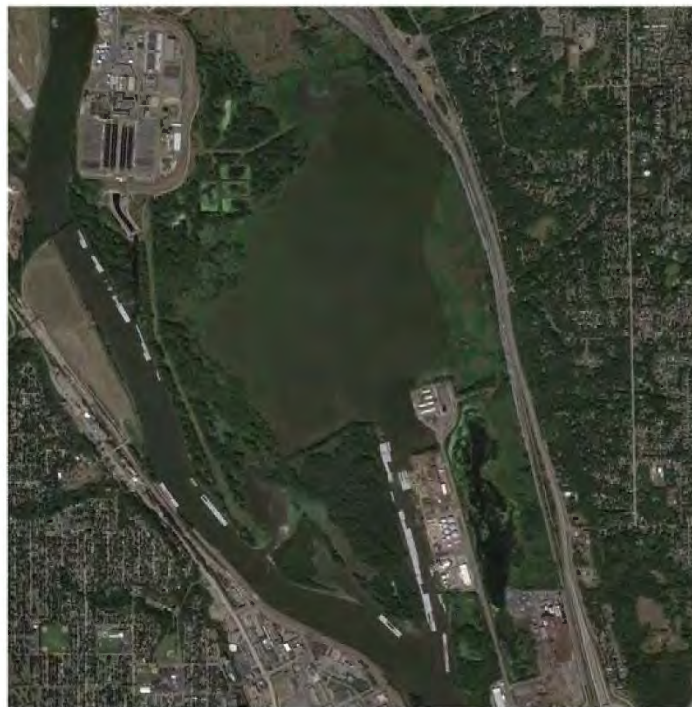
Don



**US Army Corps
of Engineers®**
St. Paul District

Appendix N Plan Formulation Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018

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1	Purpose	1
1.1	Problems and Opportunities.....	1
1.2	Project Objectives	2
1.3	Constraints	2
1.4	Initial Array of Alternative Plans	3
1.4.1	No Action Alternative.....	4
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Table 2. Summary of Final Pigs Eye Lake Alternatives	7

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1 Purpose

Plan formulation for Pigs Eye Lake Section 204 has been conducted in accordance with the six-step planning process described in *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (1983) and the *Planning Guidance Notebook* (ER 1105-2-100, dated April 2000). The six steps in the iterative plan formulation process are:

1. Specify the water and related land resources problems and opportunities of the project area;
2. Inventory and forecast existing conditions;
3. Formulate alternative plans;
4. Evaluate alternative plans;
5. Compare alternative plans; and
6. Select the recommended plan.

The purpose of this appendix is to document the initial Plan Formulation process for Pigs Eye Lake as well as the additional formulation that resulted in the final array of alternatives. During formulation, alternative plans are combinations of measures that would contribute to attaining the planning objectives. A measure may stand alone as an alternative plan that can be implemented independently of other measures, resulting in some achievement of the planning objectives. Measures can also be combined to form an alternative plan. Measures identified and described in the Main Report that were deemed feasible were carried forward for consideration in the development of alternatives. The measures carried forward were: islands, sand benches, and marsh creation/enhancement.

Some of the important factors that led to the development of the final array of alternatives for this project are described below. Alternative development is a complex, iterative process with many inputs. Several of the constraints and objectives can be identified as the most influential in producing the alternatives that were considered, and are therefore the focus of the discussion.

1.1 Problems and Opportunities

Problem Statements

- Loss of emergent aquatic vegetation
- Loss of submergent aquatic vegetation
- Lack of habitat diversity in Pigs Eye Lake and within Pool 2
- Degradation & loss of shoreline habitat
- Lack of depth diversity
- Exotic fish (common carp) present in lake and throughout Mississippi River

Opportunities

- Increase beneficial use of dredged material
- Increase fish spawning habitat
- Increase bird feeding and nesting habitat
- Increase recreational opportunities where compatible with overall project goals and objectives

1.2 Project Objectives

Based on the project's problems and opportunities, specific objectives were established and are listed below.

Objectives:

1. *Improve aquatic habitat* – Create depth and habitat diversity in Pigs Eye Lake. Increase acreage of aquatic vegetation. Incorporate structural habitat features to promote fisheries.
2. *Improve the quantity and quality of habitat for migratory bird species* – Create suitable habitat for migratory birds such as dabbling ducks within Pigs Eye Lake.
3. *Maintain or enhance the quantity of shoreline habitat* – Protect existing floodplain forest and marsh habitat along the shoreline of Pigs Eye Lake from wind and wave erosion.

1.3 Constraints

Two of the project constraints highly limited the acceptable geographical placement of measures. First was avoiding disturbance to the contamination in the northern part of the lake, adjacent to the former landfill. Available contaminant testing data was collected, reviewed, and assessed, and additional sampling needs were identified and collected (see Appendix E – Sediment Report). The data and analysis were coordinated with internal and external stakeholders through a specially-formed group of members of the interagency project team, formed to analyze contaminant concerns related to the project. The consensus of the group was to avoid disturbance to the area in the northernmost part of the lake (shown in Figure 1).

A second factor that limited the geographical placement of measures is the constraint to avoid impacting flood stages. Hydraulic modeling was used to identify the effective flow limit boundary within the lake, as shown in Figure 1. By keeping project features to the north of this boundary, they are kept within the ineffective flow area and do not have an effect on flood stages. The Minnesota DNR's regulatory floodway boundary (also shown in Figure 1) extends further into the lake, so islands within this zone were aligned roughly parallel to the expected flowlines in order to ensure that stage impacts would be negligible if flood waters were to move through this region.

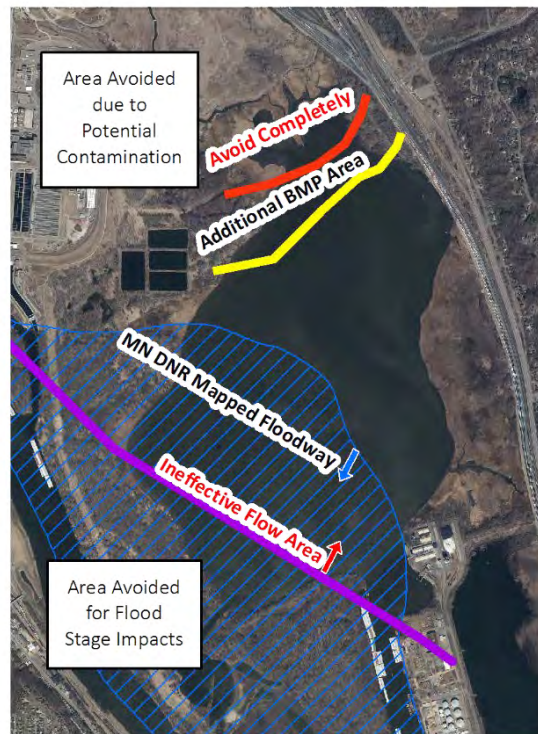


Figure 1. Planning Constraints in Pigs Eye Lake – Contaminants and Flood Stage

1.4 Initial Array of Alternative Plans

Meeting objective number 3 - *Maintain or enhance the quantity of shoreline habitat* - had a significant influence on alternative design. The future of the shoreline habitat around the lake was determined to be heavily affected by wind fetch and related wave action. Therefore, in order to meet this objective, measures needed to be used in a way that would maximize the reduction of wind fetch across Pigs Eye Lake. Islands are the primary measure carried forward that would reduce wind fetch, and initial island concepts did not meet this objective well. The hydraulic engineer working on the project designed a group of islands specifically aimed at reducing wind fetch, which became Alternative 1.

Preliminary dredged material quantity estimates for constructing Alternative 1 turned out to be very high, so the PDT desired to design a smaller alternative. Wind fetch modeling determined that Alternative 1 did a good job of reducing wind fetch, so the general island concept was maintained with the size of the islands reduced. This resulted in Alternative 2.

Alternative 3 was developed to better fulfil Objectives 1 and 2 to *improve aquatic habitat* and *increase available nesting and resting habitat*, respectively. Although Alternatives 1 and 2 provided significant reduction in wind fetch, the proposed islands were spaced far enough apart that the shoreline habitat around the islands wouldn't necessarily be sheltered. Therefore, the 'split island' concept was developed to create pockets of very sheltered aquatic habitat, while minimizing the additional sand

needed for construction. The concept was that if one of the berms was split off of the island and separated from it by a short distance, the island should still have little risk of erosion along the split since the fetch would be very small. This gap between the two sides would create a very sheltered pocket that would provide protection for birds and animals and increased stability for aquatic vegetation.

Alternatives 4 and 5 were designed to further reduce the quantity of sand needed for construction, while attempting to maintain the wind fetch reduction benefits of Alternatives 2 and 3. The idea was to reduce the islands to the smallest size possible while maximizing wind fetch benefits.

Alternatives 3m and 5m incorporate the marsh creation measure. The sheltered areas within the split island interiors in Alternatives 3 and 5 provided areas where aquatic vegetation may be able to grow, but it was felt that the existing substrate may still be too loose for aquatic plants to take root. The PDT felt it was desirable to improve the likelihood of these areas to support aquatic vegetation. A layer of sand placed over the existing substrate in these split island centers would be expected to consolidate the existing sediments and incorporating some wetland plantings in these areas would increase the habitat value immediately.

More information on determination of the island size and layout can be found in Appendix C - Habitat Evaluation and Quantification and Appendix G - Hydrology and Hydraulics.

1.4.1 No Action Alternative

The No Action Alternative is the plan in which none of the measures or combinations thereof would be constructed. There would be no cost to the No Action Alternative.

Under future without-project conditions, habitat conditions in the project area would generally stay about the same or decline at a slow rate. Pigs Eye Lake would continue to provide marginal habitat for birds, fish, and other aquatic biota, and in general it is expected that conditions there will not change markedly over the project life. Pigs Eye Lake will continue to be affected by wind and wave action and turbidity, and aquatic vegetation will continue to be limited. Wind-induced waves would continue to erode the shoreline and further widen the lake. The HEP analysis for Pigs Eye Lake (Appendix C - Habitat Evaluation and Quantification) resulted in an estimated 2,500 Average Annual Habitat Units (AAHUs) for the 628-acre lake over the next 50 years.

1.4.2 Alternatives 1-5m

The alternative plans all contain the retained measures of islands, sand benches, and wetland/marsh creation. The difference across alternatives is primarily the island size (quantity of dredged material required). Two plans contain modified islands which allow for marsh habitat to be placed within areas further sheltered from wind and wave action, and are referred to as “split islands” as compared to the other “full” islands. Only the split island designs provide areas that are protected enough to allow for marsh habitat to be established (Alternatives 3m and 5m only). The marsh habitat in both alternatives

consists of 20 acres and would each require approximately 43,000 cy of additional dredged material (sand). A summary of each alternative can be found in Table 1 and Figure 2.

Table 1. Summary of Initial Pigs Eye Lake Alternatives

Alternative	Island Design	Marsh	Sand Quantity (cy)
No Action	-	-	-
1	Full	No	863,606
2	Full	No	527,654
3	Split	No	561,410
3m	Split	Yes	593,677
4	Full	No	399,389
5	Split	No	457,222
5m	Split	Yes	489,489

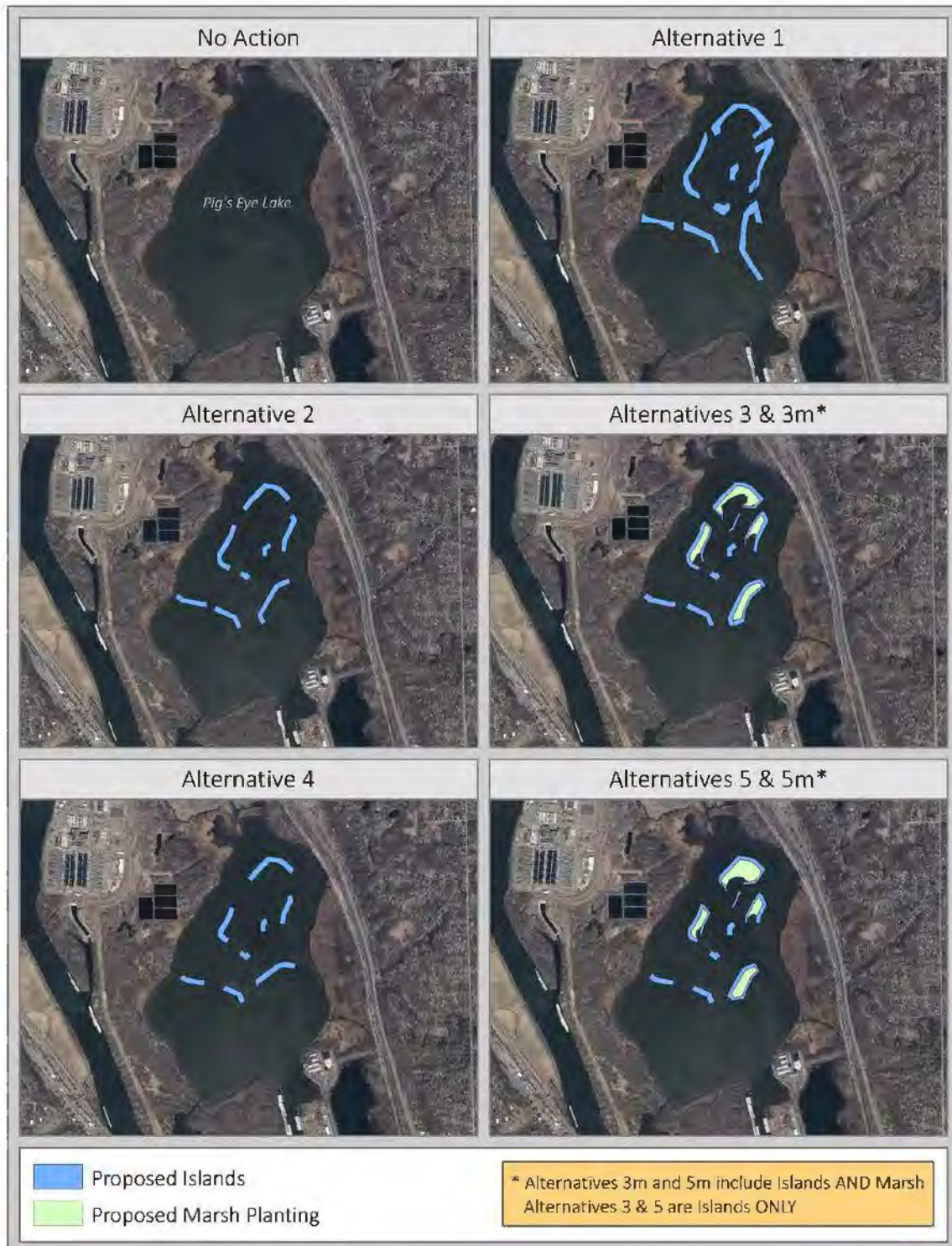


Figure 2. Initial Array of Alternatives (1-5m)

Preliminary dredged material quantity estimates for constructing the initial alternative plans exceeded the amount of available sand material on placement sites. In addition, the cost estimate for initial iterations of alternatives significantly exceeded the non-federal cost share threshold and some alternatives exceeded the federal cost limit for a Section 204 study of \$10 million (Appendix I – Cost Engineering). Therefore, alternatives 1, 2, 3, and 3m were then screened from further consideration, and the PDT reformulated to design smaller alternatives aimed to reduce the quantity of sand needed for construction, while attempting to maintain wind fetch reduction benefits.

1.5 Final Array of Alternative (4-7m)

The final iteration of alternatives were designed to further reduce the quantity of material for construction to reduce project costs while also maximizing habitat benefits (Table 2 and Figure 3). The final iterations of design resulted in two additional alternatives, one that reduced the number of islands to 7 (Alternative 6m) and another that reduced the number of islands to 4 (Alternative 7m). Both Alternative 6m and Alternative 7m maintained 3 split islands, and retained the marsh feature.

More information on determination of the island size and layout can be found in Appendix C - Habitat Evaluation and Quantification and Appendix G - Hydrology and Hydraulics.

The Tentatively Selected Plan, and supporting analysis are fully discussed in the Main Report and Appendix D – Incremental Cost Analysis.

Table 2. Summary of Final Pigs Eye Lake Alternatives

Alternative	Island Design	Marsh	Sand Quantity (cy)
No Action	-	-	-
4	Full	No	400,000
5	Split	No	455,000
5m	Split	Yes	487,000
6m	Split	Yes	399,000
7m	Split	Yes	334,000

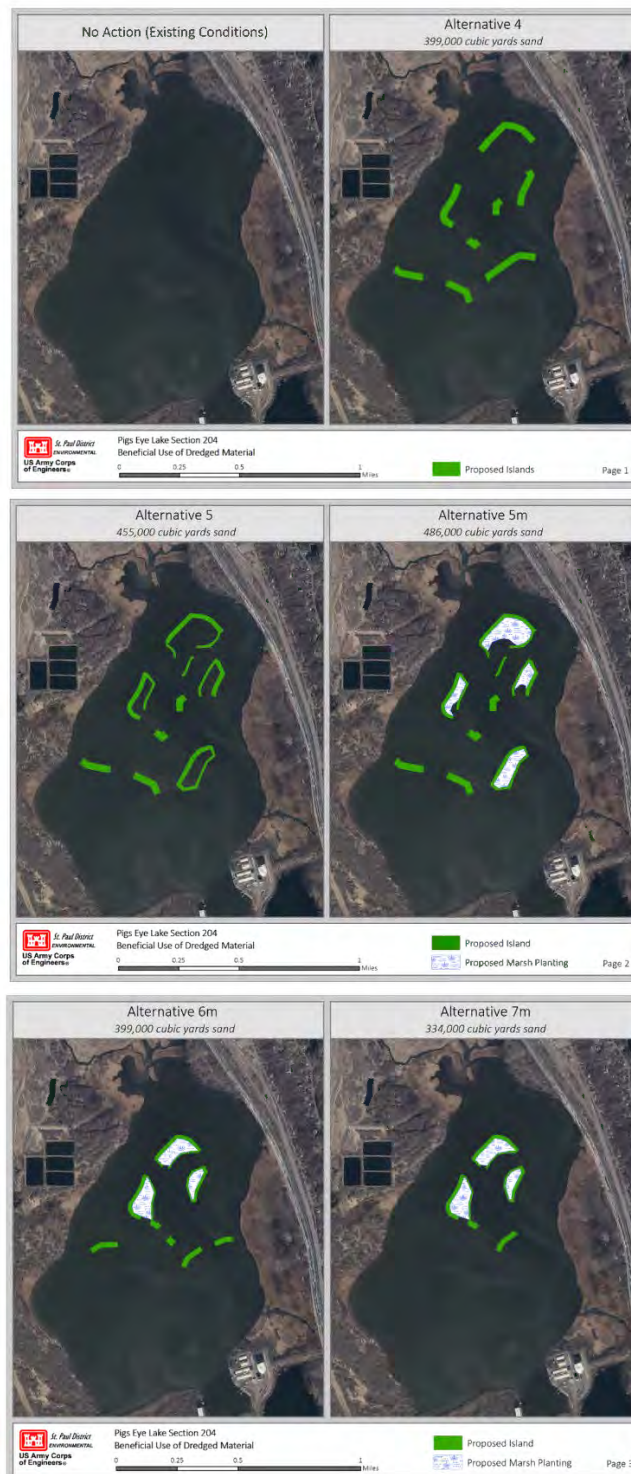


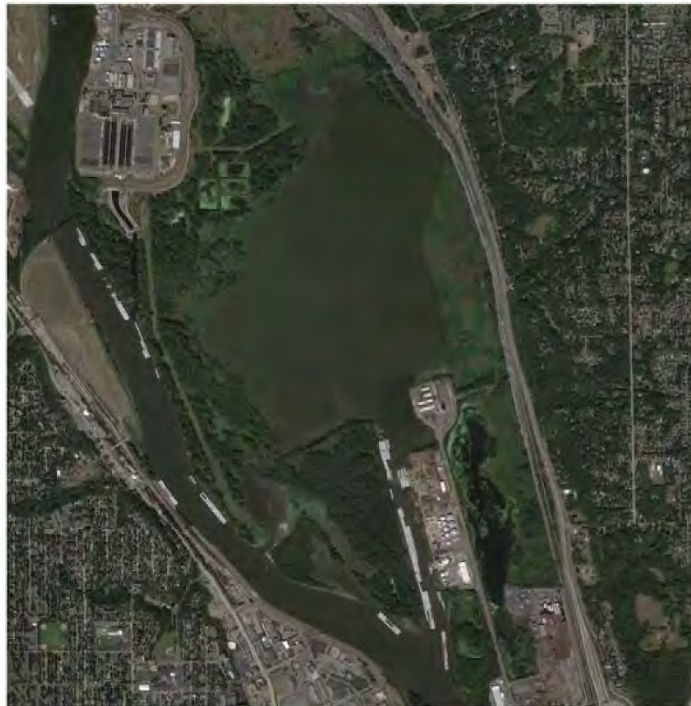
Figure 3. Final Array of Alternatives (4-7m)



**US Army Corps
of Engineers®**
St. Paul District

Appendix O: Draft Finding of No Significant Impact (FONSI) Pigs Eye Lake Ramsey County, MN Section 204

Feasibility Study Report with Integrated
Environmental Assessment



St. Paul District U.S. Army Corps of Engineers
May 2018



DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
SAINT PAUL, MN, 55001

Regional Planning and Environment Division North
Environmental and GIS Branch

DRAFT FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, the Corps of Engineers, St. Paul District, has assessed the environmental impacts of the following project:

PIGS EYE LAKE: CONTINUING AUTHORITIES PROGRAM SECTION 204 PROJECT

The purpose of the project is to enhance and restore backwater habitat by creating island and wetland features within Pigs Eye Lake using material dredged from the Mississippi River by the Corps of Engineers during routine maintenance of the navigation channel. The project area is located in Pool 2, just downstream of St. Paul, Minnesota. The recommended plan is to construct a complex of seven islands; three of which that would incorporate wetland creation and plantings in the centers of the islands. The project would benefit the area by: (1) Serving as wind barriers within the lake to reduce sediment resuspension and shoreline erosion; (2) Improving habitat for migratory birds; (3) Stabilizing the lake bottom; and (4) Providing a positive and productive use of dredged material.

This Finding of No Significant Impact is based on the following factors, as discussed in the environmental assessment: the project would have temporary minor adverse impacts on noise levels, aesthetic values, recreational opportunities, air quality, terrestrial habitat, aquatic habitat, biological productivity, and surface water quality; the project would have substantial beneficial effects on terrestrial habitat, wetlands, aquatic habitat, and habitat diversity and interspersions; the project would have additional minor beneficial effects on aesthetic values, recreational opportunities, commercial navigation, biological productivity, and surface water quality; and the project would have temporary, minor beneficial effects on employment.

Our environmental review indicates that the proposed actions do not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement will not be prepared.

Date

Samuel L. Calkins
Colonel, Corps of Engineers
District Commander