MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

Meeting: Board of Managers
Meeting date: 6/13/2024
Agenda Item: 11.1
Item type: Action Item

Title:	Authorization to Distribute Minor Plan Amendment and Notice of Public Hearing to Consider Ordering the Calvary Church Project
Resolution number:	24-034
Prepared by:	Name: Kate Moran and Becky Christopher Phone: 952-641-4520 kmoran@minnehahacreek.org
Recommended action:	Authorizing District Administrator to distribute proposed minor plan amendment and directing notice of a Public Hearing for the Board's consideration of ordering of the Calvary Church Project
Schedule:	July 25, 2024: Public Hearings for minor plan amendment and project ordering August 22, 2024: Adoption of minor plan amendment Fall 2024: Project Ordering for Calvary Church Project and approval of funding agreement Winter 2024-25: Construction start by City
Budget considerations:	N/A
Past Board action:	Res #23-073: Adoption of the Land & Water Partnership Program

Summary

Background

The Minnehaha Creek Watershed District (MCWD or District) is focused on the protection and improvement of natural resources in ways that support thriving communities. Since what happens on the land is the primary driver of the health of our natural resources, MCWD's Balanced Urban Ecology Policy (BUE Policy) recognizes that the District can deliver the most value to its communities by working in partnership with those who change the landscape. Since adopting its BUE Policy in 2014, and building its 2017 Watershed Management Plan (WMP) around the same principles, MCWD outlined its intention to remain responsive to opportunities created through land use change.

The District's 2017 WMP broadly framed this responsive approach, and on November 27, 2023 the MCWD Board adopted the Land & Water Partnership (LWP) program to create a framework to identify and advance these partnership opportunities. The LWP program is designed to provide technical and financial resources to support partner-led projects that provide significant, regional water resource benefit. MCWD operates the program in a way that supports its principles of focus and flexibility outlined in its 2017 WMP, by maintaining focus on high-impact projects and ensuring the flexibility to develop creative partnerships.

Unlike a typical cost-share or grant program, the LWP program is designed to promote early coordination and collaborative project development. The program utilizes evaluation criteria to guide staff recommendations for level of support on a project-by-project basis, focused on project need, benefits, cost-effectiveness, and partnership. The program has an orderly process for partners to coordinate during concept development so that prioritized projects can be integrated into MCWD's budgeting process and Capital Improvement Plan (CIP) for funding.

LWP Program: Calvary Church Project

Over the last year, MCWD and the City of Deephaven have worked together to seek opportunities for measurable, regional, and cost-effective water resource improvements within the City of Deephaven (City). As part of the partnership, MCWD provided a concept level, city-wide scan of potential opportunities for the City. The Calvary Church Project (Project) was identified as the most cost-effective opportunity and was prioritized by the City to improve water quality and address localized flooding concerns. The Project ultimately drains to Lake Louise, a wetland which discharges to Lake Minnetonka. The Project's proposed best management practice (BMP) relies primarily on topography and surface drainage to direct water to the proposed underground infiltration system. The largest captured area will be from the Calvary Church site and Montgomerie Avenue, with small portions of residential runoff also potentially reaching the system (See Attachment 1).

Notice of Interest Submittal

The City submitted an application under the LWP Program on February 1, 2024 requesting funding support of $465,750 (75% of the water resource elements). MCWD staff reviewed the submittal and requested additional clarifying information. The City's most recent feasibility analysis, received on March 22, 2024, included revised modeling information, water resource benefits, and cost analysis information (See Attachment 2). Based on this information, the water quality benefit for the project decreased from the initial concept estimate of 8.3 lbs/yr of TP to 5.4 lbs/yr due to a reduction in drainage area that can be routed to the BMP. Similarly, the life-cycle cost/benefit shifted from an estimated $2,200/lb of TP to $5,000/lb.

Evaluation and Recommendation

Under the LWP program, staff have been evaluating partnership requests using the following four criteria categories: resource need, project benefits, cost effectiveness, and strength of the partner's coordination. Staff evaluated the City's request by applying the criteria, and then vetting it through a cross-departmental team to inform the staff recommendation to the Board of Managers. The District Engineer has reviewed the water quality calculations and cost estimates provided by the City and verified that the March 22, 2024 estimates for the Project are reasonable (See Attachment 3).

Staff see value in this partnership as the City engaged MCWD early and coordinated effectively to take an integrated, city-wide approach to identify opportunities to improve water quality. The Project received lower scoring than the initial concept due to the reduction in treatment area and associated water quality benefit and cost-effectiveness. This informed the MCWD staff recommendation to provide LWP funding support of water resource-related elements of a not-to-exceed $125,000 (~20% of the water resource elements).

On April 11, 2024, the MCWD Board of Managers reviewed this staff funding recommendation and expressed comfort with it being brought forward for Board consideration. As of May 6, 2024, the City Council continues to support the Project moving forward while the City seeks additional funding sources. In addition to the potential LWP support, the City has received $49,000 from Hennepin County's 2023 Opportunity Grant.

Requested Action

The District may not commit levy funds to the Project until it has been integrated into its 2017 WMP; provided for a public hearing; considered the views of the District engineer, staff, and public; and formally ordered the project. In addition, District funding would be contingent on the Board's approval of an agreement with the City establishing terms and conditions for use of funds.

Therefore, staff, with input from District Legal Counsel, are requesting that the Board direct the Administrator to (1) distribute the proposed minor plan amendment to MCWD's 2017 WMP (see Attachment 4) for review of agencies and interested parties; and (2) notice a Public Hearing to consider ordering the Calvary Church Project.

Supporting Documents

Attachment 1: Overview Map
Attachment 2: City of Deephaven's "LWP – Calvary Church Feasibility Submittal"
Attachment 3: District Engineer's Technical Review Memo
Attachment 4: Draft Watershed Management Plan minor amendment

MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

RESOLUTION

Resolution number: 24-034

Title: Authorization to Distribute Minor Plan Amendment and Notice of Public Hearing to Consider Ordering the Calvary Church Project

WHEREAS, the Minnehaha Creek Watershed District ("District") Watershed Management Plan (WMP), adopted pursuant to Minnesota Statutes §103B.231, outlines its intention to respond to opportunities created through land use change by means including opportunity-based projects, to target reduction of stormwater volume and nutrient loads to District surface waters;

WHEREAS, to operationalize this commitment, the District developed the Land & Water Partnership (LWP) program, which offers technical and financial resources to partner-led projects based on a set of evaluative criteria and establishes an orderly process for such projects to be integrated into the District's Capital Improvement Plan (CIP);

WHEREAS, on November 27, 2023, by Resolution 23-073, the Board of Managers adopted the LWP program and directed that the program commence on January 1, 2024;

WHEREAS, the City of Deephaven ("City") applied to the program, seeking financial assistance of $465,750 to support implementation of the Calvary Church Project ("Project") to reduce total phosphorus (TP) loads to Lake Louise, a wetland that drains to Lake Minnetonka, and reduce flooding along Montgomery Avenue;

WHEREAS**,** District staff has evaluated the City's request using the LWP program evaluation criteria, and recommends that the District contribute funding of $125,000 for the Project's underground infiltration system (approximately 20 percent of eligible Project cost);

WHEREAS, the District Engineer has reviewed the March 22, 2024 LWP – Calvary Church Feasibility Submittal prepared on behalf of the City, as well as cost estimates provided by the City, and advises that the benefits assessment and cost estimate for the Project are reasonable;

WHEREAS, certain matters remain outstanding before the City may determine that it is prepared to construct the Project, including confirming sources of funds sufficient for the Project and securing agreement with Calvary Church sufficient to support construction and perpetual maintenance of the Project on the church property;

WHEREAS, before the Board may commit funds to the Project, it must incorporate the project into the WMP CIP, review project feasibility and cost-effectiveness, and establish the Project by ordering pursuant to Minnesota Statutes §103B.251;

WHEREAS, the Board finds, on the basis of the recommendation and conclusions of District staff and the District Engineer, that it is appropriate to proceed toward consideration of Project ordering while the City progresses in its Project development steps;

WHEREAS, the Board approves the draft proposed WMP amendment presented by the District Administrator that provides for Project incorporation into the CIP;

NOW THEREFORE BE IT RESOLVED that the Minnehaha Creek Watershed District Board of Managers authorizes the District Administrator to distribute the proposed plan amendment, with any further non-substantive changes, as a minor plan amendment for review of agencies and interested parties in accordance with Minnesota Statutes §103B.231, Minnesota Rules 8410 and the WMP;

BE IT FURTHER RESOLVED that the Board directs the District Administrator, in alignment with the plan amendment procedure, to distribute the feasibility plan for the Project and notice a public hearing for the Board's consideration of ordering, in accordance with Minnesota Statutes §103B.251; and

BE IT FINALLY RESOLVED that Board ordering of the Project and approval of LWP funding remains subject to conditions including confirmation of City sources of funding and City acquisition of rights for Project construction and maintenance, and a Project funding agreement between the City and the District.

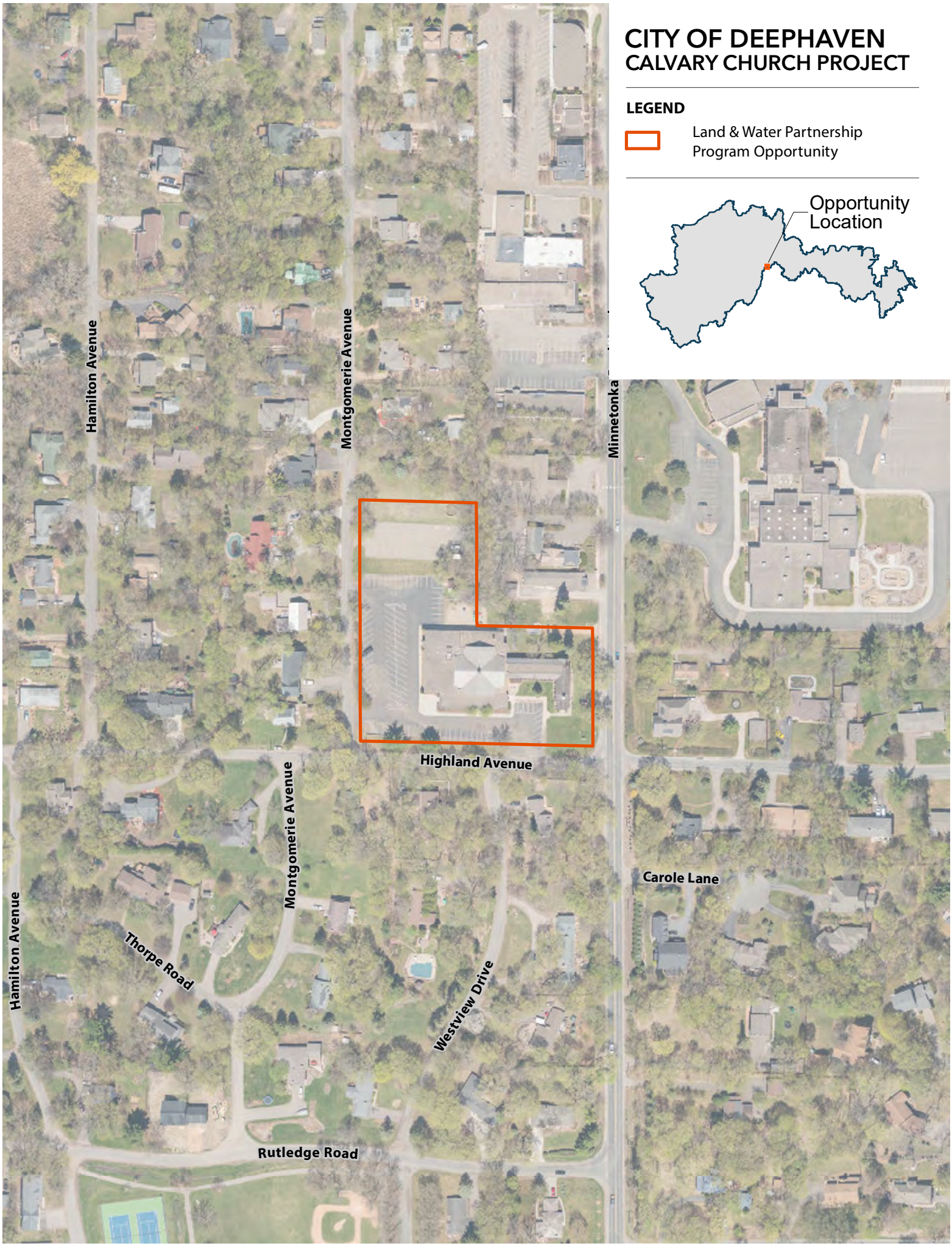
Resolution Number 24-034 was moved by Manager _____, seconded by Manager _____. Motion to adopt the resolution ___ ayes, ___ nays, ___abstentions. Date: 6/13/2024

_____ Date: _____
Secretary

CITY OF DEEPHAVEN
CALVARY CHURCH PROJECT

LEGEND

Land & Water Partnership Program Opportunity



March 22, 2024

Mrs. Kate Moran
Policy Planning Coordinator
Minnehaha Creek Watershed District
15320 Minnetonka Blvd
Minnetonka MN 55345

Re: MCWD Land & Water Partnership (LWP) Program
Calvary Church Feasibility Submittal
WSB Project No.020518

Dear Mrs. Moran:

On behalf of the City of Deephaven, thank you for the opportunity to participate in the pilot phase of the Land and Water Partnership (LWP) Program. Because of this partnership, the City of Deephaven has been able to determine the best stormwater management projects to address water quality issues in the community.

Attached to this letter is the City's request for financial support and continued partnership under the LWP program.

Sincerely,

WSB

Rebecca Haug
Sr. Project Manager – Water Resources

Jim Stremel
City Engineer

cc: Dan Madsen, City Administrator

mj

701 XENIA AVENUE S | SUITE 300 | MINNEAPOLIS, MN | 55416 | 763.541.4800 | WSBENG.COM

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APPENDICES

Item 1. Statement of Intent

The City of Deephaven is proposing to install an underground stormwater best management practice (BMP) beneath the Calvary Church's lower parking lot. The purpose of the BMP is to mitigate sudden, severe flooding in the areas surrounding the church during rainfall events and provide cost effective water quality benefits to downstream waters.

Because the church has a large roof and parking lot, there is not enough area for rain to soak into the ground. To stop this rain from travelling to neighboring properties and causing flooding (like it does now), the BMP will trap the water and release it slowly into the ground beneath.

Runoff from Calvary Church and surrounding areas collects at a low point on Montgomerie Avenue with one inlet and a 12" pipe crossing the roadway, then travels through a several ditches and yards on private properties, through a 15" HDPE storm sewer pipe running under a driveway, and finally connecting to the City's public storm sewer manhole on Hamilton Avenue. This untreated stormwater ultimately discharges into Lake Louise, which is upstream of Lake Minnetonka.

The current conditions cause large amounts of water to pool in the roadway on Montgomerie Avenue and cause significant flooding concerns for property owners downstream. Montgomerie Avenue storm sewer is non-typical; the inlet appears to be custom-made and is significantly smaller than a standard inlet grate. The pipe under the roadway is also shallower than a typical storm sewer culvert.

The proposed improvement includes an underground infiltration BMP beneath the lower parking surface at Calvary Church. The contributing drainage area to the site is 5.3 acres with approximately 52.5 percent impervious cover. Most of the impervious surfaces in the drainage area are found onsite at Calvary Church. This proposed underground infiltration BMP supports stormwater rate control, volume control, and water quality improvements and was recommended as one of the most cost-effective stormwater improvements for total phosphorus reduction in the City by MCWD's concept level review. In addition, supporting stormwater infrastructure will be installed within City right of way to ensure adequate inlet and pipe capacity.

Hydraulic and hydrologic (H&H) modeling and water quality modeling were done to determine feasibility for the project. It is estimated that the underground infiltration system will be able to remove 5.40 pounds of total phosphorus (TP) and 981 pounds of total suspended solids (TSS) per year. The project also provides rate control and volume control to alleviate flooding concerns.

The partnership efforts of the project so far have strengthened relationships between the City, Calvary Church, the MCWD, and Hennepin County. The City held an open house at the church and received positive feedback and enthusiasm for the project from the congregation and affected neighbors. Through these partnerships, the project's goals have been refined to include lighting improvements for community events and safety and an educational interpretive sign.

The City is requesting financial support in the amount of $465,750 from MCWD to assist with the costs of the underground infiltration system. This amount is 75 percent of the total cost for the water quality portion of the project ($621,000). Hennepin County is an official partner with the City on this project; the County committed $49,000 through grant funding. The total capital cost of all improvements is $704,000, with an expected annual maintenance cost of $2,500. The City Council has shown their support of pursuing financial assistance through the LWP program by unanimously approving Resolution 03-24 and including funds within its 2024 and 2025 Capital Improvement Plan to cover costs beyond the grant funding received **(Appendix G).**

Item 2. Site Description

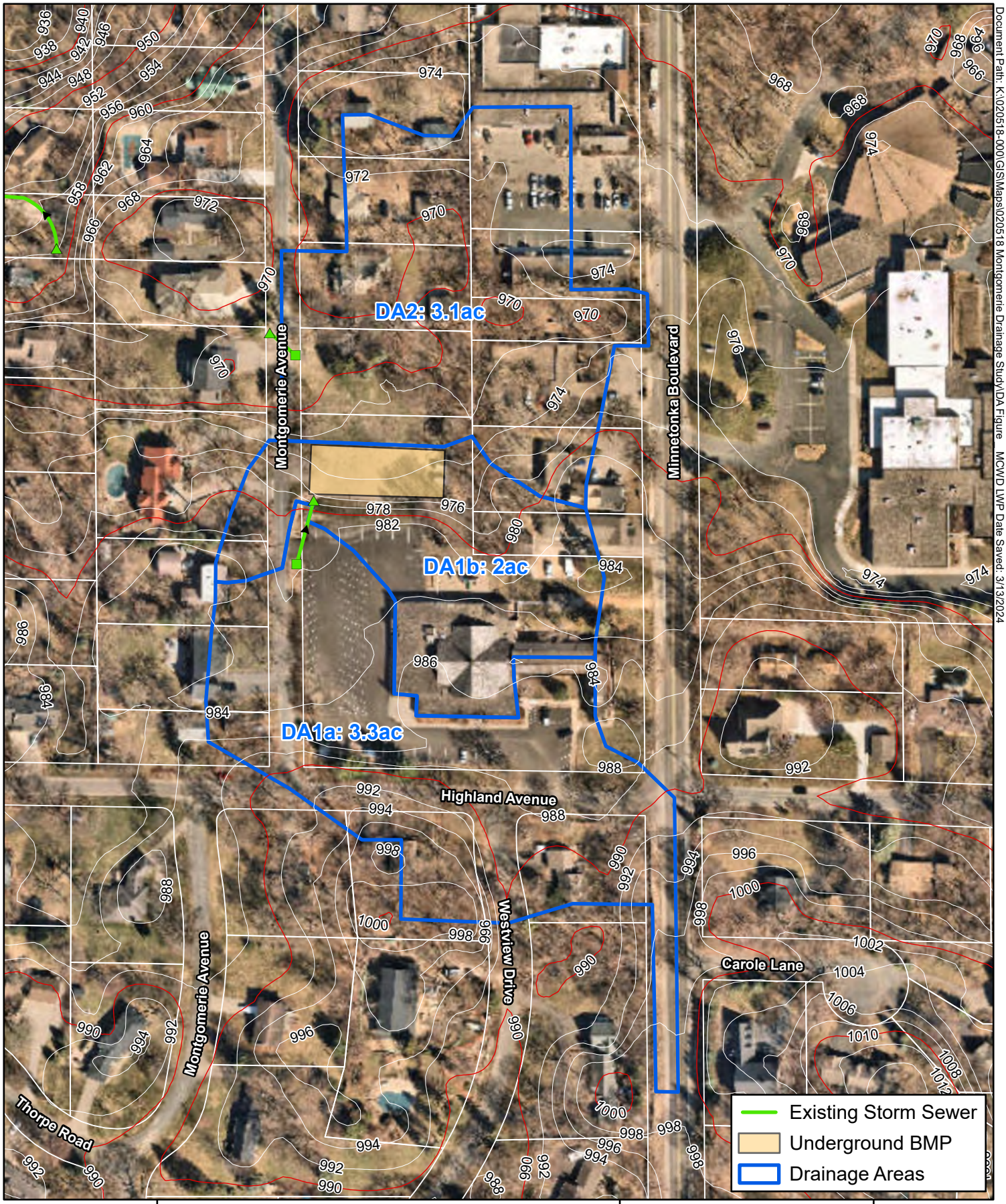
The location of the project is Calvary Church, 18360 Minnetonka Blvd, Deephaven, MN 55391. The underground infiltration BMP is proposed beneath the existing lower (northern) parking lot at the site. Calvary Church owns the parcel (PID 1811722310109); the City is working with Calvary Church to obtain a drainage and utility easement over the proposed parking lot BMP and areas for maintenance access. The easement language will also include operation and maintenance (O&M) requirements for both the City and the church. Agreements are intended to be finalized and executed when the City and the church have formal funding agreements for the project.

Item 3. Drainage Description

This project is located within the Lake Minnetonka subwatershed of the MCWD. The 5.3-acre drainage area to the project location consists of several residential properties, the Calvary Church property, and City streets. The Calvary Church property has approximately 2.0 acres of directly connected impervious surface that currently drain onto the City right of way and adjacent residential properties.

There is an existing riprap BMP located on the Calvary Church property. It was designed to collect runoff from the site, allow suspended sediment to settle, and direct conveyance away from existing side yards. It is seen modeled in both HydroCAD models as ‘Riprap BMP (existing)’. It is not a volume reduction BMP and has a small footprint, so its ability to significantly address flooding and water quality issues downstream has been minimal.

The following figure shows existing drainage conditions at the site.



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Deephaven EST. 1900

Drainage Area Map

Calvary Church Underground BMP
WSB Project No: 020518-000

N

0 150 Feet

1 inch = 150 feet

wsb

Item 4. Water Resource Improvement(s)

In the City's 2022 Montgomerie Avenue Drainage Study **(Appendix A)**, four options were considered to improve drainage and water quality at the site. Projects that were considered included adding inlets and swale improvements, building a stormwater pond on a vacant lot (no longer vacant in 2024), adding piping along the shared property line where the existing drainage swale is, and an underground stormwater storage system. The drainage study ultimately recommended the underground stormwater storage system due to its expected significant improvement to downstream drainage conditions.

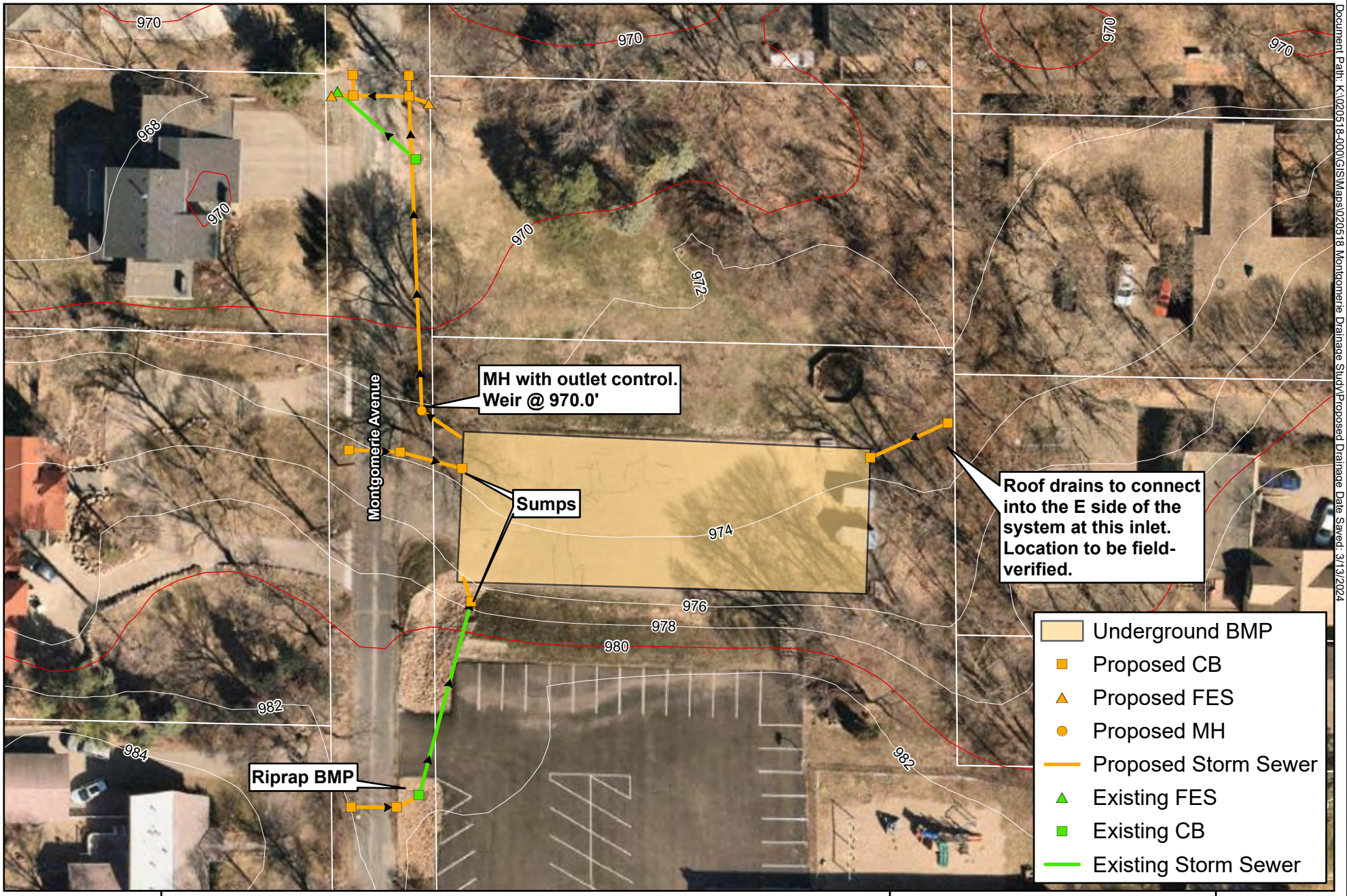
Also, in July 2023, the MCWD worked with the City of Deephaven and prepared a concept-level review of regional stormwater opportunities **(Appendix B)**. Within this review, an underground infiltration system at Calvary Church was evaluated for conceptual feasibility. This report concluded that the project should advance further in discussions between the MCWD and the City; the project had the highest expected annual TP removal rate of all projects considered within the City.

The benefit of an underground system is that it would help control the rate at which drainage would travel downstream, provide water quality treatment, and allow for continued functional use of the space above it. The system would reduce the pooling of the water in the roadway and swale during the 10-year and smaller events. By providing underground storage, the downstream pipes are less likely to be overwhelmed with water and the existing ditch system would have shallower pooling depths, which would reduce flood risk for nearby properties.

The region's rainfall patterns are shifting to more intense cycles between periods of extreme rainfall and drought. With the watershed's wettest decade on record between 2009-2019 and following periods of drought in 2021 and 2022, the City hopes to advance its climate adaptation efforts through the successful implementation of this project. The system utilizes 18,674 cubic feet of volume abstraction and is able to store and infiltrate the Atlas 14 1-year 24-hour rain event of 2.48" over its contributing watershed. This volume abstraction and rate control will significantly reduce the downstream flood risk that historic rain events have been known to cause.

In the preliminary design phase, the City worked with the congregation at Calvary Church to further improve the design. Construction management and phasing will be implemented to accommodate timing of parking needs during peak times of the year. The Calvary Church congregation hoped to see lighting improvements in the parking lot for safety and community events; the design includes plans for lighting improvements to accommodate this need.

A schematic of the proposed design is shown in the following figure.



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Proposed Parking Lot BMP - Conceptual Design

Montgomerie Avenue Drainage Study
Deephaven, MN

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0 50 Feet

1 inch = 50 feet

Item 5. O&M Statement

The City and Calvary Church will enter into a maintenance agreement for the system; the City will be responsible for long-term maintenance of the system. The City understands the importance of maintaining this system for its lifetime and has developed a schedule for maintenance and will include any maintenance needs in their budget. The following provides the proposed Operation and Maintenance (O&M) schedule the City will follow to maintain the underground infiltration system:

Underground Infiltration Chamber Maintenance Activity	Schedule
• Inspect inlet and outlet for signs of clogging, erosion, or sedimentation. • Infiltration must occur within 48 hours. If standing water is present after 48 hours further examination of the system must be completed to resolve the issue.	After significant rain events (10-year event, 4.26" over 24 hours).
• Ensure that contributing areas, facility, inlets and outlets are clear of debris. • Ensure that the contributing area is stabilized and mowed, with clippings removed. • Remove trash and debris. • Ensure that activities in the drainage area minimize oil/grease and sediment entry to the system. • Inspect drainage system for debris and sediment accumulation in cleanout.	Monthly, when facility is in use (typically March-October).
• Check structural components, inspect for failures, cracks, and debris. • Inspect inlets, outlets, and overflow spillway to ensure good condition and no evidence of erosion. • Repair or replace any damaged structural parts. • Stabilize any eroded areas upstream from the infiltration device. • Ensure that flow is not bypassing the facility. • Check for accumulated sedimentation. • Inspect pre-treatment systems including sumps and remove sediment once it reaches 50% capacity.	At least once annually. An annual inspection should be scheduled in the spring. Additional inspections should be scheduled to be spaced evenly throughout the facility's period of use (typically March-October).
• Jet or Vac system to clean out sediment and debris. • Follow XX Manufacturer's recommended Operation and Maintenance Guidelines for the XX.	Annually, or as needed based on inspection.

Item 6. H&H Modeling

HydroCAD was used for feasibility-level Hydraulic and Hydrologic (H&H) modeling of the project. The HydroCAD report is included in (**Appendix C)**. As more detailed information becomes available during the final design of the project, the HydroCAD model will be updated accordingly. Updated modeling calculations will be sent to the MCWD as the design is refined and through the progression of the LWP program.

There is an existing riprap BMP located on the Calvary Church property. It was designed to collect runoff from the site, allow suspended sediment to settle, and direct conveyance away from existing side yard . It is seen modeled in both HydroCAD models as 'Riprap BMP (existing)'. It is not a volume reduction BMP and has a small footprint, so its ability to significantly address flooding and water quality issues downstream has been minimal.

A pipe gallery beneath the existing footprint of the northern parking lot at Calvary Church was modeled in HydroCAD. Existing grade and infiltration capacity (see Item 9. Soils) at the site are anticipated to accommodate an underground infiltration system that consists of a gallery of 30" diameter pipes in a bed of aggregate. The outlet elevation of the system (970.0') is controlled by a 48" weir within the first downstream manhole connected to the system, as seen in the schematic presented in Item 4. For a 30" diameter chamber system with 6" aggregate below and above the gallery, the bottom of the system is set at 966.5', 3.5 feet below the outlet elevation.

A summary of existing versus proposed offsite rates is presented in the table below. The reported rates are at the point of discharge to the west of Montgomerie Avenue.

Offsite Rate Control Summary

	2-year	10-year	100-year
Existing Rate (CFS)	11.88	17.75	34.28
Proposed Rate (CFS)	2.54	5.94	21.32

The existing inlet and 12" pipe beneath Montgomerie Avenue are undersized for the 10-year event. As part of the project, the pipe beneath Montgomerie Avenue will be sized appropriately (12" → 15"), curb/gutter and inlets will be added, and downstream improvements will be made to the pipe outlet and drainage swale to improve hydraulics and reduce risk of eroding soils.

Item 7. Water Quality Modeling

Water quality modeling was done via the MIDS Calculator; a report of results is shown in (**Appendix D)**. The MIDS Calculator was selected for water quality modeling in this project due to its ability to conveniently summarize removals on an annual basis, its applicability to the site's watershed's size and complexity, and its intended use for low impact development techniques such as this project's infiltration system. This TP reduction does not seek to meet any regulatory requirement by the MCWD Stormwater Management Rule.

The following table summarizes the water quality results from MIDS of the proposed infiltration system.

Load Reduction Estimates

	Load from watershed (lbs/yr)	Load retained in BMP (lbs/yr)	Outflow load (lbs/yr)	Retained %
TP	**5.47**	**5.40**	**0.07**	**99%**
Dissolved P	2.46	2.43	0.03	99%
Particulate P	3.01	2.97	0.04	99%
TSS	**993.5**	**980.7**	**12.8**	**99%**

When comparing this removal estimate among the other projects identified in the concept level review of stormwater opportunities in Deephaven **(Appendix B)**, this project has the highest pollutant load reduction potential within the City.

Item 8. Volume Abstraction

A pipe gallery beneath the existing footprint of the northern parking lot at Calvary Church was modeled in HydroCAD **(Appendix C)**. Existing grade and infiltration capacity (see Item 9. Soils) at the site will accommodate an underground infiltration system that consists of a gallery of 30" diameter pipes in a bed of aggregate. At this stage in the project, a recommended manufacturer for a specific proprietary infiltration system has not been selected. In HydroCAD, a chamber wizard was used to calculate total volume abstraction of the system. The total volume of abstraction provided by the system (below the outlet, 970.0') is 18,674 cubic feet. This calculation is supported by the HydroCAD stage-storage table for node 4P in (**Appendix C)**.

This quantity of water abstracted does not seek to meet any regulatory requirement by the MCWD Stormwater Management Rule. See Item 12 for more details.

The infiltration system's footprint is 8,627 square feet; the volume of water that is abstracted is expected to infiltrate within 48 hours (assuming infiltration rate of 0.8 in/hr, see Item 9. Soils).

Item 9. Soils

Infiltration is proposed at the site. Due to scheduling constraints, soil borings are not presented in this feasibility submittal. The City understands that soil borings need to be completed in order to finalize formal funding agreements with the MCWD. The City anticipates a final soil boring report by April 2024. When available, the City will send the soil boring report to the MCWD, formally indicating whether stormwater infiltration is feasible at the site.

A preliminary high-level desktop review of soils was conducted to gauge feasibility of infiltration. This review was conducted through analysis of Natural Resources Conservation Science (NRCS) soils data and well log reports from nearby properties (obtained through the Minnesota Department of Health).

Analysis of the NRCS soils data at the site shows Hydrologic Soil Group (HSG) A soils present at the site. Well log reports from three nearby properties were analyzed, all of which show sandy strata at the anticipated elevation of the infiltration BMP. The NRCS soils and well log maps, as well as the respective reports for each, are included in (**Appendix E)**.

Distance to the limiting condition (seasonally saturated soils, bedrock) beneath the bottom of the proposed infiltration system was analyzed with NRCS soils report, well log reports, and analysis

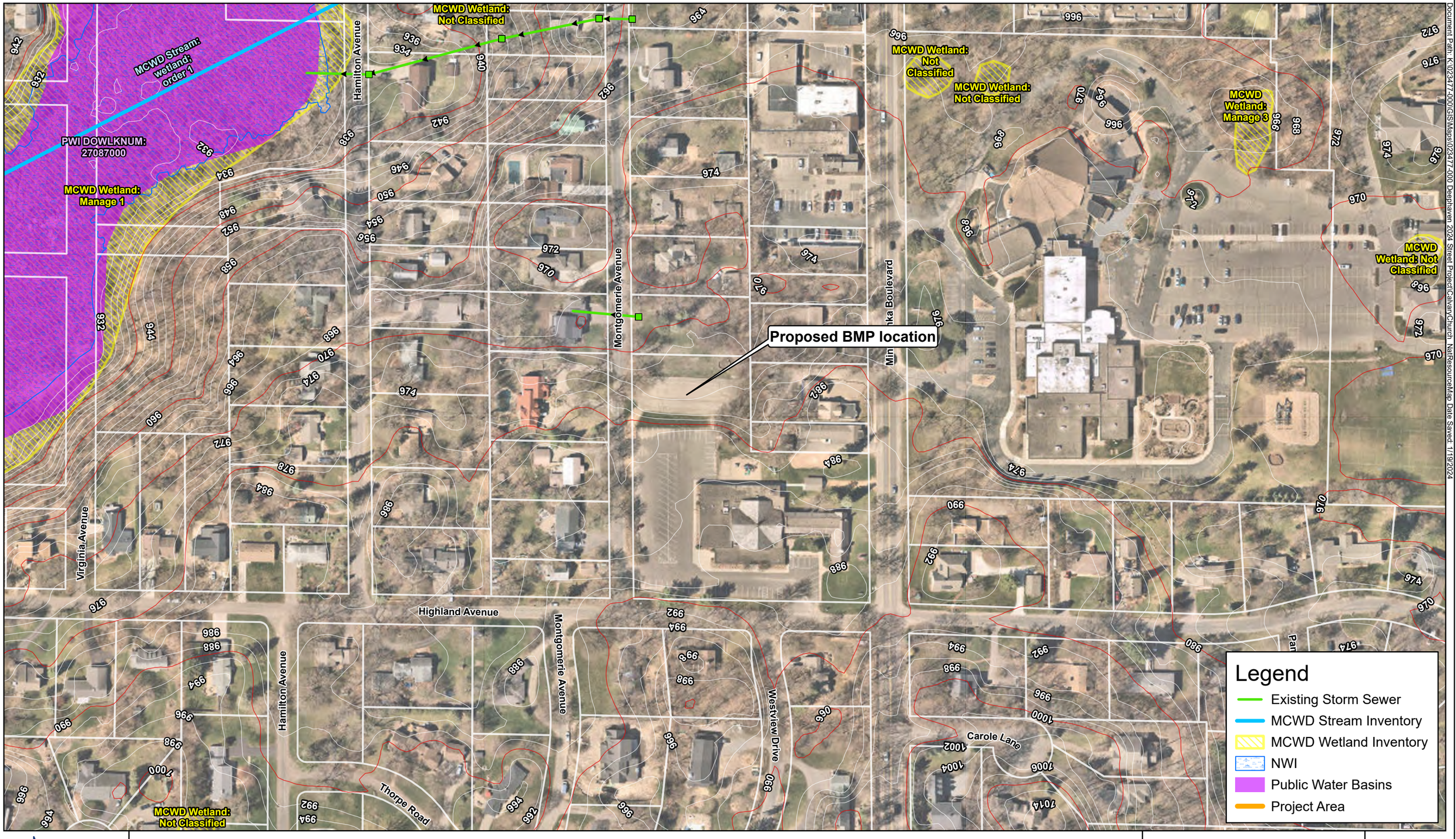
of nearby surface water resources. It is not anticipated that a limiting soil condition will be found within three feet of the bottom of the infiltration system.

Through this desktop review, it is expected that the on-site soils are suitable for stormwater infiltration. No known contaminants are expected to be present within the soils on site. The project team understands that soil data obtained through this desktop review is generalized and may not capture the nuances of the soils on site and is prepared to make necessary updates to this feasibility submittal when soil boring reports are complete.

Item 10. Wetland Identification

No wetlands are adjacent to this project; no impacts to wetlands are expected. Data from the National Wetlands Inventory, the MCWD Functional Assessments of Wetlands, and the Public Waters Inventory are shown on the following natural resources map.

The downstream Public Water Wetland (Lake Louise) currently receives untreated drainage via surface flow from the project area. The proposed BMP will provide volume abstraction, rate control, and will reduce TSS/TP loading downstream and to this wetland.



Deephaven EST. 1900

Natural Resources Map

Calvary Church
City of Deephaven

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0 150 Feet
1 inch = 150 feet

wsb

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Item 11. Project Schedule

The anticipated project schedule is as follows:

- WSB engineering team completes the final design of system and coordinates bidding of the project.
  - February 1, 2024: Completed NOI & feasibility for MCWD
  - March/April 2024: Complete soil borings and geotechnical evaluation
  - May/June 2024: MCWD decision of approval
  - June 2024: Topographic survey of site and remaining field work
  - July – October 2024: Final design and public engagement
  - August-November 2024: Permitting and agreements for both MCWD/Calvary
  - Early 2025: Bidding
  - Summer 2025: Construction
- The MCWD staff coordinates with the MCWD Board of Managers.
  - March/April 2024: MCWD staff brings the project to the MCWD Board of Managers for preliminary review in Committee.
  - May/June 2024: MCWD Board's formal decision to provide funding and integrate the project into MCWD's Capital Improvement Plan (CIP).
- WSB develops a communications plan to keep the stakeholders informed of the project through final design and construction.
  - November 2024 – Summer 2025: Communications plan
- The City enters into necessary agreements with Calvary Church, Hennepin County, and the MCWD.
  - October/November 2024: Final Agreements

Item 12. Permitting Requirements and Status

The project was screened for applicability under the permits listed below. In accordance with the project timeline in Item 11 of this feasibility submittal, permitting will be initiated in August 2024. The project team plans to submit a pre-application during final design for MCWD permitting.

- MCWD
  - Erosion control permit. Applies to the proposed rule to be adopted April 2024.
    - The project will trigger this rule by proposing a land disturbance greater than 5,000 square feet in area.
  - Stormwater management permit. Applies to the proposed rule to be adopted April 2024.
    - The project will trigger this rule by affecting the peak rate, volume, and water quality of runoff. The site size is ≥1 acre, will create and fully reconstruct <1 acre of impervious area, will disturb <40 percent of the site, and will have a 0 percent change in impervious surface coverage. Under these assumptions, best management practices are required and will be incorporated into the project's design. It is understood that there are regulatory implications under this rule (volume control from net added impervious surface and rate control) should there be a net increase (> 0 – < 50 percent increase) in impervious surface.
- City of Deephaven
  - Hardcover conditional use permit (CUP). Calvary Church lies within the R-3 Residential District in Deephaven. This project will be considered a non-conforming site improvement, as long as the site does not see a net increase in

impervious surface. Should there be a net increase in impervious surface as a result of the project, the proposed infiltration system will meet all the stormwater mitigation requirements of the CUP process.

- National Pollutant Discharge Elimination System (NPDES)
  - Construction Stormwater Permit. The proposed disturbance is assumed to be less than 1 acre, so coverage under the NPDES Construction Stormwater Permit will not be required. The site design will incorporate erosion control and pollution prevention best management practices consistent with standards of the City of Deephaven and the MCWD.

Item 13. O&M Needs and Cost

The City and Calvary Church will enter into a maintenance agreement for the system; the City will be responsible for long-term maintenance of the system (see Item 5.O & M Statement).

The City is prepared to add this stormwater system to its list of sites to inspect regularly. For annual maintenance requirements and less-frequent major maintenance, the City will comply with best management practices from the selected manufacturer of the infiltration system. In instances where the City does not own equipment to clean out sediment and debris from the system, it will work with its engineering staff, municipal partners, and contractors. The City understands that performing maintenance activities is critical to ensuring successful system functioning and reducing cost long-term.

In accordance with the expected annual maintenance estimate provided by the MCWD's concept level review memo **(Appendix B)** and in consultation with the City Engineer, annual maintenance costs are estimated to be approximately $2,500 per year. The City plans to utilize funds from its stormwater funds to complete necessary maintenance over the system's lifecycle.

Item 14. Cost Analysis

Capital Costs

The total capital cost for this project is estimated to be $704,000. This total includes the infiltration system, addition of inlets and storm sewer, improvements to the drainage swale, surface lot improvements, lighting, and interpretive signage. Per the MCWD's LWP Partner Guidance, construction contingency, permitting and legal costs, and indirect costs are included in the project total as a percentage of the estimated construction cost. These costs are presented in the summary table below; a detailed Opinion of Probable Cost (OPC) with major project components is provided in **(Appendix F)**. Costs are broken down by project component: A. Add inlets and clean up existing swale, B. Miscellaneous improvements, and C. Water quality components.

Cost Summary

			A. Add inlets and clean up existing swale	B. Miscellaneous improvements	C. Water quality components
Construction Cost			$31,855	$16,000	$365,150
Contingency	MCWD Standards	30%	$9,557	$4,800	$109,545
Indirect		30%	$9,557	$4,800	$109,545
Permitting and Legal		10%	$3,186	$1,600	$36,515
Total: $704,000			**$55,000**	**$28,000**	**$621,000**

As seen in the OPC and summary table above, the water quality components capital cost total is $621,000. Water quality components were identified to be critical components of the design that will support the function of the underground infiltration system (including respective construction contingency, permitting and legal, and indirect costs). Items not considered to be water quality components include the lighting, interpretive sign, existing inlet maintenance, and downstream drainage swale improvements.

Lifecycle Costs

In accordance with the expected annual maintenance estimate provided by the MCWD's concept level review memo **(Appendix B)** and in consultation with the City Engineer, annual maintenance costs are estimated to be approximately $2,500 per year.

Per the MCWD's LWP Partner Guidance, components of the project that are not directly related to or required to successfully implement the project have been itemized and excluded from the capital cost total that is used in the lifecycle cost calculation. Only the Section C total in the OPC ($621,000) is used in this calculation. Using an annual inflation rate of 2.3 percent and an annual discount rate of 3.5 percent, the total present worth of costs within the 25-year lifecycle of the system is $675,000. This calculation is detailed in the following table. It is assumed that no maintenance will be needed in the first year.

Lifecycle Cost Analysis

Lifecycle Cost Calculator				
Water Quality Components		Age	Year	Present worth
Inputs		0	2025	$621,000
Start Year	2025	1	2026	$2,471
Annual Inflation	2.30%	2	2027	$2,442
Annual Discount Rate	3.50%	3	2028	$2,414
Capital Cost (year 0)	$621,000	4	2029	$2,386
Annual Cost	$2,500	5	2030	$2,358
Equations		6	2031	$2,331
		7	2032	$2,304
		8	2033	$2,277
$PW = F_{PW} * C_0$		9	2034	$2,251
		10	2035	$2,225
		11	2036	$2,199
$F_{PW} = \frac{(1+i_{INF})^n}{(1+d)^n}$		12	2037	$2,174
		13	2038	$2,148
		14	2039	$2,123
		15	2040	$2,099
Terms		16	2041	$2,074
PW = Present Worth		17	2042	$2,050
F_{PW} = Present Worth Factor		18	2043	$2,027
C_0 = Cost		19	2044	$2,003
i_{INF} = inflation rate		20	2045	$1,980
d = discount rate		21	2046	$1,957
n = number of years (age)		22	2047	$1,934
Total present worth (2025 dollars)		23	2048	$1,912
$ 675,000		24	2049	$1,890
		25	2050	$1,868

The project is estimated to remove 5.40 lb TP/yr over an assumed lifecycle of 25 years. The lifecycle cost is $675,000; therefore, the cost/benefit is $5,000/lb TP over the project's lifecycle. Among the other cost/benefit analyses of potential projects in Deephaven **(Appendix B)**, this project's cost/benefit is below the mean and the median cost/benefits of all regional stormwater opportunities considered in the City.

Item 15 – Item 20. Permitting Considerations

Item 15: 100-year high water level (HWL) and ordinary high-water level (OHWL) of any adjacent or on-site waterbodies, and preliminary modeling, as applicable, to show that the 100-year HWL will not increase as a result of the project.

- Lake Louise is downstream of the project. The volume and rate controls provided with the proposed design will not increase the 100-year HWL.

Item 16: Identification of any utilities (including culverts and outlet structures) proposed to contact the bed or bank of a waterbody.

- Not applicable to the project.

Item 17: Anticipated changes to peak runoff rates and peak water levels of upstream and downstream waterbodies & wetlands during the 2-, 10-, and 100-year events.

- Lake Louise is downstream of the project. A summary of existing versus proposed offsite rates is presented in the table below. The reported rates are at the point of discharge to the west of Montgomerie Avenue.

Offsite Rate Control Summary

	2-year	10-year	100-year
Existing Rate (CFS)	11.88	17.75	34.28
Proposed Rate (CFS)	2.54	5.94	21.32

Item 18: Identification of site size, percentage of site to be disturbed, disturbance area, percentage increase or decrease in impervious area, existing impervious area, and proposed impervious area.

- Site size, percentage of site to be disturbed, disturbance area, and precise existing and proposed impervious areas will be finalized during the final design stage of the project. It is expected that the project will disturb less than one acre and create no increase in net impervious surface. It is expected that an erosion control permit from the MCWD will be needed due to a land disturbance greater than 5,000 sqft.

Item 19: Identification of if project will dredge in the beds, banks, or shores of any public water or public water wetland.

- Not applicable to the project.

Item 20: Identification of desired path forward through Wetland Conservation Act (WCA), as applicable.

- Not applicable to the project.

Stantec

Memo

To:	Kate Moran	From:	Rena Weis Chris Meehan
Project/File:	MCWD #: 02-2008 – 4340	Date:	May 31, 2024

Reference: Technical Review | City of Deephaven, Calvary Church Project | Land and Water Partnership (LWP) Program's Notice of Interest Submittals

Introduction and Project Understanding

Minnehaha Creek Watershed District (MCWD) and the City of Deephaven (City) have been coordinating over the past year to identify water resource projects for potential funding partnership. The City provided its Capital Improvement Plan (CIP), technical studies, and indicated areas of interest and concern. Stantec, on behalf of MCWD, provided technical support by developing a concept level screening for water resources opportunities, utilizing data contained in materials provided by the City. Initial assessment sought to evaluate identified opportunities relative to each other, in terms of cost and total phosphorus (TP) load removal potential. Of the approximately 13 opportunities identified, implementation of an underground infiltration gallery beneath a parking lot at Calvary Church was identified as the opportunity with the best cost-benefit.

The City and its engineer worked to develop concept / feasibility level design on an underground infiltration system at Calvary Church, and their analysis was reviewed by MCWD and Stantec. Through feasibility design, cost estimates and TP load estimates have been iteratively refined by the City. The primary purpose of the Calvary Church project is phosphorus load removal, but the City has stated that ancillary flood reduction benefits may also be achieved. Findings of the technical review are documented in this memorandum.

Reviewed Materials

- "MCWD LWP Feasibility Submittal_Calvary Church_final;" dated January 31, 2024; by WSB
- "2024-03-22 MCWD request_final_full;" dated March 22, 2024; by WSB
- "Soil Boring Request – Calvary Church Lower Parking Lot – Deephaven, MN;" dated January 3, 3034; by WSB
- "Calvary Church – boring log;" dated May 2, 2024; by WSB

LWP Program Considerations

Project Cost-Benefit

We understand that the project would remove 5.4 lb TP/yr, over an assumed lifecycle of 25 years. The lifecycle cost presented is $675,000, therefore the cost-benefit is $5,000 per lb TP over the project's

lifecycle. Phosphorus removals were estimated by the City's engineer using the MIDS calculator and cost estimates were prepared by the City's engineer.

Drainage Area & Regional Impact Potential

The submittal indicates that the proposed stormwater system will receive runoff from an 5.3-acre drainage area. The submittal indicates that of the 5.3-acre drainage area, approximately 2.7 acres are impervious. Of the 2.7 acres of impervious area, 2 acres are directly associated with Calvary Church, the proposed site of the stormwater system. The runoff from Calvary Church is currently untreated and drains to the City right-of-way and adjacent properties. The site ultimately drains to Lake Louise. Lake Louise discharges to Lake Minnetonka.

The system relies primarily on topography and surface drainage, not a pipe network, to direct water to the underground system. Most captured area will be from the Calvary Church site and Montgomerie Avenue, with small portions of residential runoff also potentially reaching the system.

Drivers of Cost

Since this BMP is proposed beneath a privately owned parking lot, its construction requires removal and replacement of the parking lot. This cost has been included in the "water quality" portion of the cost that the City seeks cost-share for. The other primary contributor to project cost is the underground infiltration system, which is a proprietary manufactured product that consists of either plastic or metal chambers/pipes.

The City is not seeking cost-share for proposed lighting improvements or for work required to add inlets and maintain the existing swale west of Montgomerie Avenue.

Project Longevity

Operations & Maintenance recommendations were provided to MCWD for consideration in separate correspondence. It is recommended that O&M activities and frequencies be consistent with system manufacturer guidance and the MN Stormwater Manual.

Design Considerations

As the design of the system is progressed, it is recommended that the following items be incorporated and/or considered:

- Ensure pretreatment is included in final design.
- Submittals indicate that appropriate resources have been reviewed to inform suitability of soils for infiltration. The proposed system will achieve load removals solely by infiltration into native soils. Post-construction effluent water quality monitoring is not feasible for these types of systems because water either infiltrates into native soils or directly bypasses treatment. Therefore, it is critical that site soils be conducive to infiltration. The City completed soil borings at the site in May. The soil borings indicate that infiltration into native soils is feasible starting between 7 and 10 feet below the existing grade. The concept designs provided by the City prior to collecting soil boring data show that the invert of the system is proposed approximately 6.5 to 8.5 ft below existing grade. Stantec recommends that funding be contingent on revised design that demonstrates the system

will have an effective interface with native soils that have sufficient infiltrative capacity. The design could be modified to either lower the invert of the system or to keep the system elevations as shown and remove clayey soils and amend with infiltrative soils. It is also recommended that infiltrometer testing be completed during construction to provide further verification of infiltration capacity.

- Preliminary hydrologic & hydraulic (H&H) modeling has been developed for the proposed underground infiltration system. The modeling should be refined through the design process to ensure the outlet structure of the underground infiltration system is designed and reflected in the H&H model consistently with the amount of infiltration that water quality calculations assume will occur.

Regulatory Considerations

This section outlines current understanding of MCWD Rule triggers and provides high-level commentary based on the feasibility study.

Calvary Church is located on a parcel that is 3.04 acres in size (Hennepin County PID 1811722310109). This regulatory screening is based on the MCWD rules adopted April 11, 2024 and effective April 29, 2024 and is organized by rule.

Stormwater Management

This project involves a site greater than 1 acre, proposes less than 1 acre of new and fully reconstructed impervious surface, and proposes less than 40% site disturbance. The treatment requirements for this project will depend on whether there is a net increase or decrease in impervious surface area associated with the project (parking lot reconstruction). The submittal indicates that no net increase in impervious surface is planned, though we recommend communicating the regulatory implications of adding net impervious surface (if the plans change, or the site owner requests increases), to mitigate potential friction in the future.

- If a net decrease of impervious surface area is proposed or if the existing surface area is maintained, then a BMP needs to be installed. Treatment scope requirements are not defined. MCWD should evaluate whether it is appropriate for the proposed stormwater management system to double as a "BMP" that satisfies this regulatory requirement.

- **I**f a net increase in impervious surface area is proposed, then volume control is required for the net added impervious surface. We recommend that if this is the case, that the treatment required to satisfy regulatory requirements be subtracted from the cost-share agreement.

Erosion Control

Compliance with the Erosion Control Rule will need to be demonstrated via erosion and sediment control plans.

Other Rules

Reference: Technical Review | City of Deephaven, **Calvary Church Project |Land and Water Partnership (LWP) Program's Notice of Interest Submittals**

No waterbodies or wetlands are located in the vicinity of the site and no floodplain is mapped at the site. Therefore, it is not expected that the MCWD Floodplain Alteration, Waterbody Crossings and Structures, Dredging, Wetland Protection, or Shoreline & Streambank Stabilization Rules will apply.

Procedural requirements will apply to the project, but financial assurances will not be required if the project is advanced by the City, as public entities are exempt from financial assurances and fees.

Conclusion

Based on available data, implementation of an underground infiltration system at Calvary Church is feasible. Although the proposed project is designed to primarily treat runoff from Calvary Church, the City has demonstrated that the project has a favorable cost-benefit compared to other project opportunities within the City and the cost-benefit is generally within an acceptable range based on Stantec's experience. As system design and construction progress, it is recommended that the following be incorporated, to further confirm the system's viability and increase project success:

- Include pretreatment system(s) in the design.
- Implement agreements for system operations and maintenance expectations.
- Revise design as necessary to provide confidence that infiltrated water will have direct connectivity to infiltrative soils.
- Perform infiltrometer tests during construction.
- Refine H&H modeling to clarify the design water quality volume (i.e. infiltrated volume) of the system.
- Refine H&H modeling to better represent potential flood risk reductions; if desired by City and/or MCWD to demonstrate project benefits beyond water quality benefits.

Table 3.8. Lake Minnetonka Subwatershed CIP

Project	Stormwater Volume and Pollutant Load Reduction
Description	Implementation of opportunities to reduce stormwater volumes and nutrient loading to Lake Minnetonka, including but not limited to construction of infiltration or filtration basins and devices, reforestation, revegetation, and stormwater detention or redirection.
Need	Four bays (Halsted, Jennings, West Arm, Stubbs) and Forest Lake are listed on the State's Impaired Waters List due to excess nutrients. A TMDL identified a need to reduce external phosphorus loading by 60% (116 pounds) to Forest Lake, 73% (2087 lbs) to Halsted Bay, 72% (1563 lbs) to Jennings Bay, and 51% (142 lbs) to Stubbs Bay. Opportunities to reduce stormwater volume and pollutant loading to non-impaired bays will also be considered to protect and improve water quality throughout Lake Minnetonka.
Outcome	Reduction of pollutant loading to Lake Minnetonka; reduction of stormwater runoff volume and rate and associated impacts; protection and enhancement of groundwater recharge, stream base flow, and wetland hydrology.
Estimated Cost	Capital costs: $1,000,000, excluding land, in 2017 dollars.
Potential Funding Sources	District levy, partner contributions, grants
Schedule	2018-2027