# 2019 Feasibility Study

*Nonprofit Stormwater Best Management Practices*

March 2019

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March 2019

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# 1.0 Introduction and Project Background

## 1.1 Introduction

This document summarizes and assesses the feasibility of potential projects at six prioritized sites, all on land owned by nonprofit organizations, to improve water quality at downstream water bodies. The project locations and projects were selected through multiple layers of prioritization.

## 1.2 Project Background

An Accelerated Implementation Grant was awarded to the District from the Minnesota Board of Water and Soil Resources (BWSR) through the Clean Water, Land and Legacy Amendment in 2017. The outcome of the grant was to have preliminary design plans and cost estimates prepared for stormwater best management practices (BMPs) on prioritized, nonprofit sites in the Nine Mile Creek Watershed District (NMCWD), so the NMCWD could pursue project installation.

### 1.2.1 Targeting and Prioritization

The 2017 Clean Water Fund Grant allowed the NMCWD to complete an extensive process to identify and prioritize locations for BMPs on lands owned by nonprofits in the watershed. From this grant, six sites were selected for BMP installation. This project includes the targeting efforts resulting from the 2017 Clean Water Fund Grant, which included the following decision-making process:

1. Site Targeting and Prioritization: Properties with nonprofit ownership (e.g., faith-based and other nonprofit organizations) were identified and prioritized based on potential impact to downstream water resources. A GIS analysis was conducted to identify targeted subwatersheds based on recommendations in past NMCWD lake diagnostic studies, the impaired waters list and high priority protection lakes and/or stream segments. The GIS analysis included identification of targeted areas in which runoff currently receives little or no stormwater treatment prior to discharge to downstream water resources.
2. Desktop Site Analysis: A high-level GIS assessment was conducted to evaluate the suitability of BMP installation based on aerial imagery, land availability, soils, topography, and utilities information. 58 sites were selected for a site visit.
3. Site Visits and Prioritization: 58 site visits were conducted over four days in July and August of 2017 by a Barr Engineering Landscape Architect and a NMCWD staff member to better understand site conditions such as available green space, potential utility conflicts, locations of catch basins, and the potential for cost-effective BMP retrofits. These sites were then prioritized based on findings of the site visits and the site targeting GIS analysis. During the site visits, 21 properties were identified as having feasibility for BMP installation. 24 total BMPs were identified. The locations and BMPs were screened using a prioritization tool that considered things such as stormwater quality benefit, constructability, concessions from property owners, and educational value and were given a grade to guide outreach efforts.

### 1.2.2 Outreach and Partner Commitment

Seventeen nonprofits were selected for outreach regarding interest in stormwater BMP installation. Eight meetings were held with organizations that expressed interest to garner support for partnering with the NMCWD. For the meetings, high level concept plans and a handout were provided to explain the goals of the project, responsibilities, and the process moving forward.

Based on the outreach meetings, the District received commitments from six nonprofits to move forward with projects. The six nonprofits and projects are:

1. Bethlehem Lutheran Church (5701 Eden Prairie Rd, Minnetonka, MN 55345): Infiltration Basin
2. Chapel Hills United Church of Christ (6512 Vernon Ave S, Edina, MN 55436): Vegetated Swale
3. Good Samaritan United Methodist Church (5730 Grove St, Edina, MN 55436): Raingarden
4. The Church of St. Edward (9401 Nesbitt Ave S, Bloomington, MN 55437): Two Raingardens
5. Oak Grove Presbyterian Church (2200 W Old Shakopee Rd, Bloomington, MN 55431): Raingarden
6. St. Luke's Lutheran Church (1701 W Old Shakopee Rd, Bloomington, MN 55431): Raingarden

### 1.2.3. Preliminary Design

Following verbal commitments from the organizations, Barr Engineering completed site surveys and utility locates and created preliminary BMP design plans. NMCWD and Barr staff met again with the partner organizations to review the preliminary design plans and discuss responsibilities required for the projects.

### 1.2.4. Attempted Grant Funding

The initial concept to fund the implementation of the projects was through external grant funding with NMCWD providing match on the grants. A Projects and Practices Grant was submitted to BWSR in August 2018 for the implementation of the seven projects at the six nonprofits sites listed above. The NMCWD was notified in December 2018 that it did not receive funding for the implementation of the projects. Additionally, a Hennepin County Opportunity Grant was submitted to the county in December 2018, which the District also did not receive.

## 2.0 Project Goals

The Nine Mile Creek Watershed District will install seven stormwater best management practices on six prioritized nonprofit landowner sites in the watershed. Working in partnership with the nonprofit partners, five raingardens, one swale, and one infiltration basin are planned for installation. One of the primary goals of the NMCWD is to maintain or reduce impacts to downstream waterbodies by reducing stormwater runoff rates, volumes and pollutant loadings, which the BMPs at these six project sites will accomplish (2017 NMCWD Water Management Plan (WMP), Table 5-1, Pg 5-2). It should be noted that Nine Mile Creek is the primary target for water quality restoration. However, there are six locations for BMP installation. One site will drain to Glen Lake, one site to Hawkes Lake, and one site to St. Edwards Pond before the water drains to Nine Mile Creek. It is also worth noting that three of the sites are also

upstream of Normandale Lake, a threatened lake, and the BMPs will provide treatment to water draining to Normandale Lake.

NMCWD is an urbanized watershed, much of which developed before stormwater management standards were in place. To continue the work of the District, retrofitting existing properties to target pollutants of concerns, such as nutrients, is one of a few options to maintain or improve water quality. The BMPs in this project are targeted to prioritize infiltration in key areas throughout watershed. In addition, the BMP retrofits are all on highly impervious nonprofit sites that aren't likely to receive stormwater treatment through the redevelopment process anytime soon. However, future land-disturbing work (i.e. redevelopment) would be subject to applicable NMCWD regulatory requirements.

The cumulative pollutant removal volumes, as calculated using MIDS, for these projects is annually projected to be 3.7 pounds total phosphorus, 712 pounds of total suspended solids, and 3.1 acre-feet of volume reduction, with an average of 64% annual runoff volume reduction.

In addition to water quality benefits, each BMP will be designed to include plantings that promote native pollinator habitat by using native flowering plants with blooms sequenced to last throughout the growing season. Turf reduction in favor of deep-rooted perennial plants, shrubs and trees are being proposed to highlight replicable landscape enhancements that showcase appropriate and manageable planting solutions in the suburban environment. By incorporating as many native trees as possible into the designs, the BMPs will help to enhance the urban tree canopy.

Education and outreach are a critical component of this project. The implementation of this project will lead to a high level of outreach due to the visibility of the sites and the active engagement of organizations involved in the BMP design, installation, and maintenance process. This project will demonstrate practical stormwater quality improvement techniques that can be implemented by local property and business owners. The introduction of the mission of the NMCWD to the broad audience attending these faith-based organizations allows for invaluable broadcasting of programs such as cost share grants and native plant community restorations made available by the NMCWD but sometimes underutilized.

## 3.0 Problem Assessment

One of the primary goals of the NMCWD is to maintain or reduce impacts to downstream waterbodies by reducing stormwater runoff rates, volumes and pollutant loadings (2017 NMCWD Water Management Plan (WMP), Table 5-1, Pg 5-2). In 2004, the NMCWD completed a comprehensive study of Nine Mile Creek which included evaluation of the physical stream conditions and ecological health of the creek. The study highlighted the high sensitivity of Nine Mile Creek to impacts from urbanization and identified the need to reduce the rate and volume of stormwater runoff to the creek to restore the physical stability of the stream channel. The study indicated that reducing stormwater rate and volume will improve 1) the ability of the stream to continue to naturally meander without excessive bank erosion, 2) the ecological characteristics of the stream, and 3) the ability of the stream to convey flood

flows without degradation/erosion. The study specifically identifies use of raingardens or other stormwater BMPs to reduce the rate and volume of runoff to the creek.

One of the project BMP sites is tributary to Glen Lake, a high-quality unimpaired lake in Minnetonka. In 2002, the NMCWD completed a detailed water quality study of Glen Lake, in which it was identified that water quality is especially threatened in wet years and as additional development occurs within the watershed. The primary pollutant of concern for Glen Lake is total phosphorus. The recommended protection and improvement strategy was implementation of stormwater BMPs to reduce watershed phosphorus loading to the lake.

Three of the six project BMP sites are located upstream of (and tributary to) Normandale Lake. While not currently impaired, the lake is considered threatened by NMCWD as the water quality of the lake is often near or poorer than the state standard for shallow lakes. A 2005 study by NMCWD identified the need to reduce sediment and phosphorus loading to Normandale Lake, which was confirmed in a 2017 study.

This overall project will allow the NMCWD to take steps to restore and protect Nine Mile Creek and the lakes associated with the project. The primary benefit of the project is reductions in stormwater volume and pollutant loadings to receiving waterbodies. Due to the targeting of the projects, the efforts are focused on areas tributary to waterbodies of greatest priority in the watershed. By targeting sites with some of the largest areas of impervious surface, such as churches, the BMPs proposed would intercept a significant percentage of stormwater runoff and infiltrate or filter it. The pollutant removal estimates are summarized in **Table 3-1** and were produced using MN MIDS (Minimal Impact Design Standards) Calculator and the preliminary construction plans created for each BMP.

**Table 3-1 Summary of pollutant removal estimates for proposed BMP projects at nonprofit sites**

| | Pollutant Removal per Year | | | Pollutant Removal over 15 Years | | |
|---|---|---|---|---|---|---|
| **Project Sites** | **lbs TP** | **lbs TSS** | **acre-ft** | **lbs TP** | **lbs TSS** | **acre-ft** |
| Bethlehem Lutheran Church | 0.5 | 105 | 0.7 | 8.0 | 1575 | 9.8 |
| Chapel Hills United Church of Christ | 0.5 | 96 | 0.7 | 8.0 | 1440 | 9.8 |
| Good Samaritan United Methodist Church | 1.0 | 195 | 0.4 | 15.0 | 2925 | 6.2 |
| St. Luke's Lutheran Church | 0.8 | 155 | 0.5 | 12.0 | 2325 | 7.5 |
| The Church of St. Edwards | 0.6 | 118 | 0.6 | 9.3 | 1770 | 9.2 |
| Oak Grove Presbyterian Church | 0.2 | 43 | 0.3 | 3.5 | 645 | 4.1 |
| **Total** | **3.7** | **712** | **3.1** | **55.7** | **10,680** | **46.4** |

In addition, for a highly urbanized watershed like NMCWD, it is difficult to find partners that have resources and willingness to maintain green infrastructure. However, through the District's engagement process, willing partners have been found. These proposed projects would potentially reach thousands of additional residents in the community, as well, inspiring them to take a proactive approach to the water quality impacts from their personal and business properties.

Success will be measured by implementation of the BMPs at the six sites, monitoring of the BMPs for performance, and ongoing water quality monitoring that the District undertakes for long-term trend analysis.

## 4.0 Recommended BMPs & Cost Estimate Summary

The stormwater BMPs proposed as part of this project are part of a watershed-wide approach to improve the water quality of Nine Mile Creek and the lakes associated with the project. The BMPs proposed as part of this project are intended to reduce total phosphorus, total suspended solids, and reduce volume loading to Nine Mile Creek and the lakes associated with the projects. The six project sites are shown in **Figure 4-1**.

The BMPs selected to be included for this project are all raingarden type practices. These BMPs are among the most cost effective in terms of pollutant loading reduction as they do not often require significant traditional infrastructure such as stormwater piping, extensive pavement reconstruction and/or engineered components such as permeable pavements or underground infiltration systems. These types of BMPs also allow for strong volunteer engagement with events such as plant installations and on-going maintenance efforts.

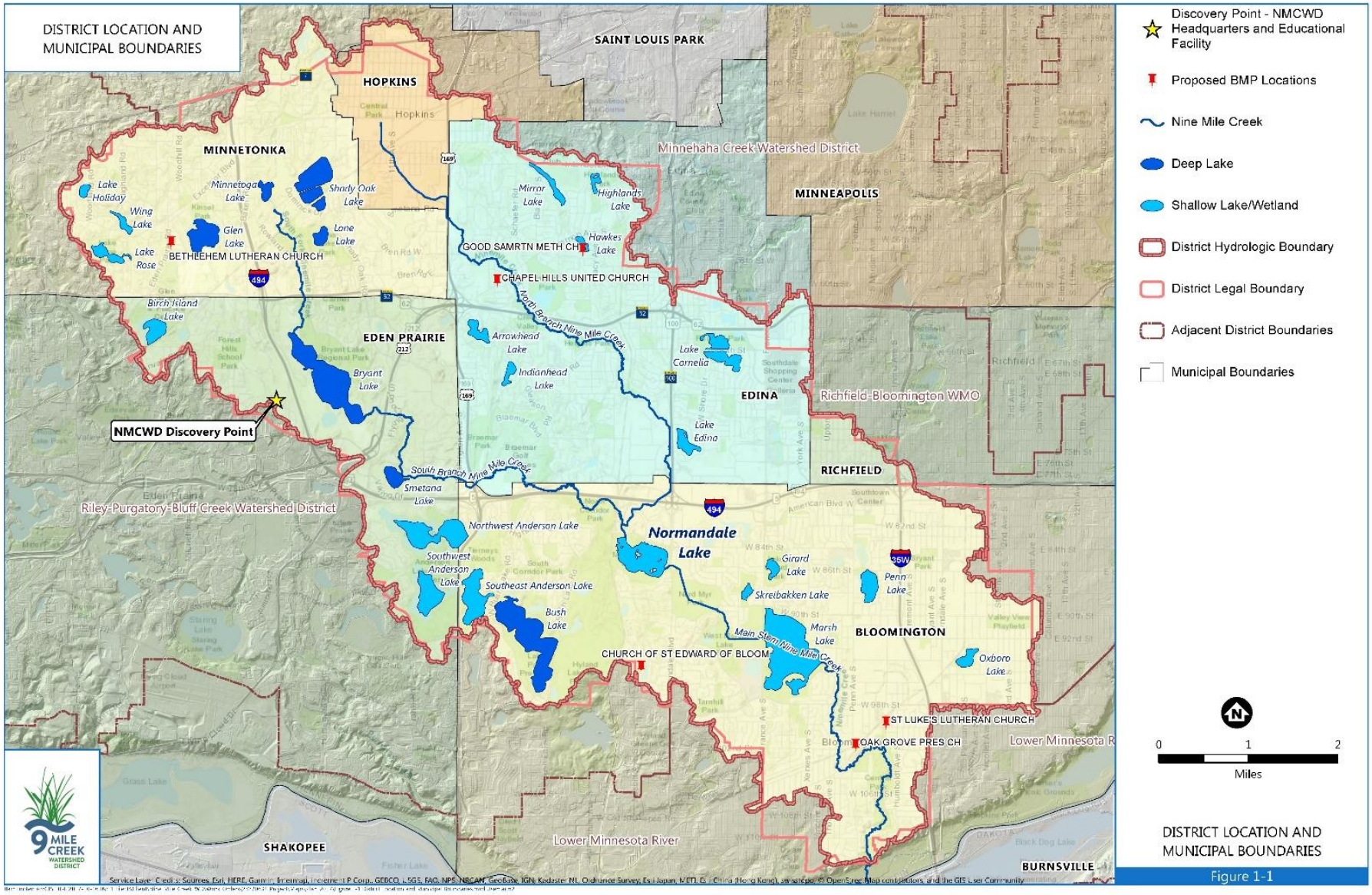
Some local permits may be required on an individual project basis. City grading permits would be the responsibility of the contractor and/or the partnering organizations. Other permits, such as erosion control, would be obtained by the partnering organizations and administered by NMCWD.

Planning-level opinions of cost have been developed for the recommended stormwater best management practices. These opinions of cost are intended to help with planning and should not be assumed as absolute values. The project will be funded through the watershed-wide levy. The proposed stormwater best management practices, proposed timing, and estimated cost of each are summarized in **Table 4-2**.

**Table 4-2 Summary of recommended stormwater management practices, estimated schedule and cost**

| Nonprofit Sites | Recommended Management Practice | Timing | Estimated Cost |
|---|---|---|---|
| Bethlehem Lutheran Church | Infiltration Basin | 2020 | $57,498 |
| Chapel Hills United Church of Christ | Vegetated Swale | 2020 | $21,031 |
| Good Samaritan United Methodist Church | Raingarden | 2019 | $42,048 |
| St. Luke's Lutheran Church | Raingarden | 2020 | $29,084 |
| The Church of St. Edward | Two Raingardens | 2019 | $42,962 |
| Oak Grove Presbyterian Church | Raingarden | 2019 | $26,391 |
| | | **Total** | **$219,014** |

**Figure 4-1. Project sites marked on a NMCWD map**



## 5.0 Maintenance

The NMCWD will require, at a minimum, that the nonprofit organizations enter into a fifteen-year maintenance agreement with the District for the BMPs. The District will maintain the BMPs for the first two years to ensure successful establishments of the vegetation and performance of the BMP. Following the initial two years, the NMCWD will turn the maintenance over to the landowners. During the initial establishment of the BMPs the NMCWD will provide training to the organizations to ensure long-term functioning and success of the BMPs.

## 6.0 References


Evaluation of Management Measures to Improve the Water Quality and Ecology of Normandale Lake (2017): www.ninemilecreek.org/wp-content/uploads/Normandale-Lake-Report-Oct-2017.pdf

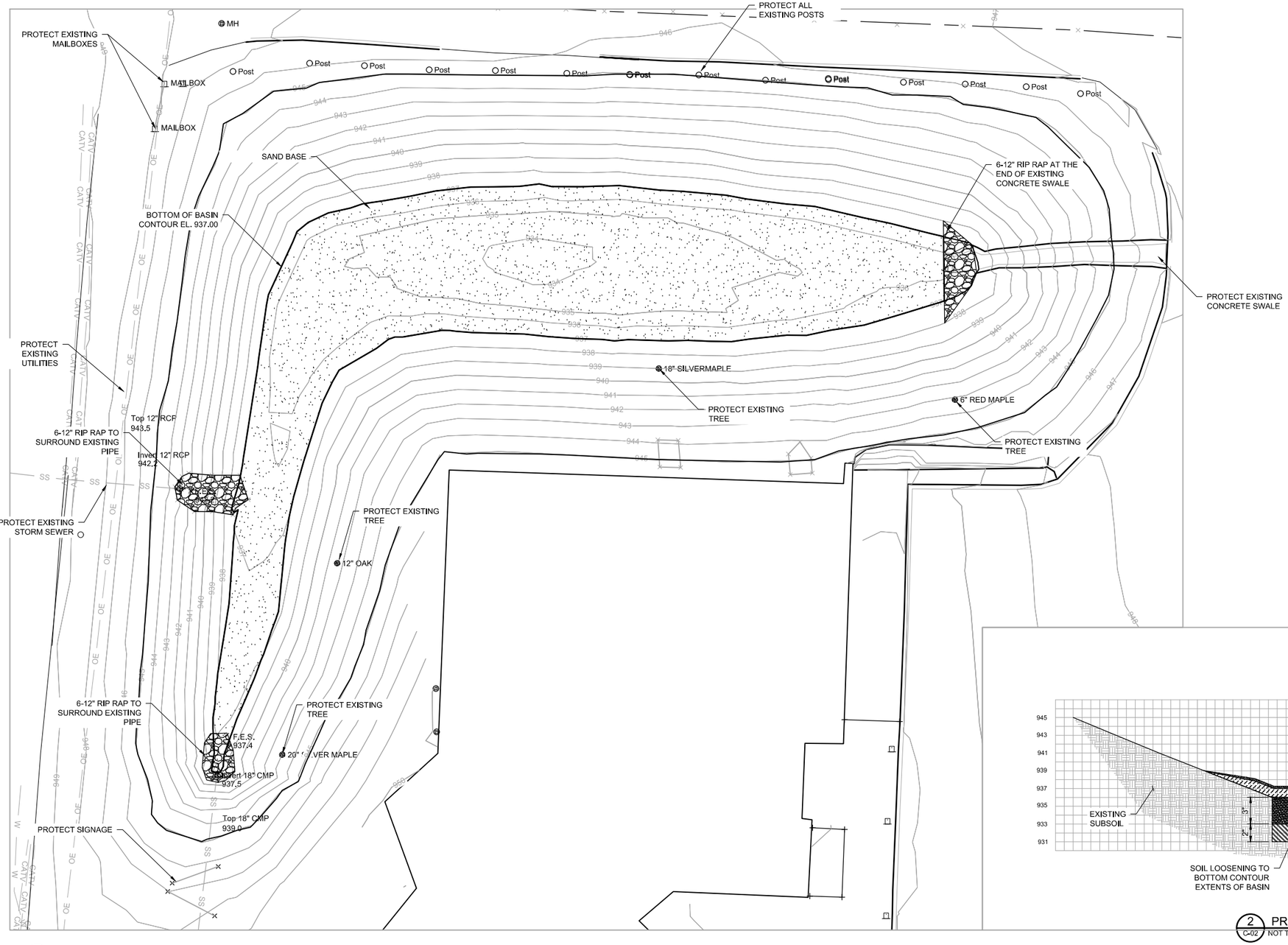
Nine Mile Creek Watershed District Water Management Plan (2017, Amended 2018): www.ninemilecreek.org/wp- content/uploads/2017_Oct_Final_9-Mile_WMP_Amended_April-10-2018-1.pdf

Nine Mile Creek Watershed District Glen Lake Use Attainability Analysis (2000): Hard Copy Available Upon Request

Nine Mile Creek Use Attainability Analysis (2004): www.ninemilecreek.org/wp-content/uploads/Nine-Mile-Creek-Use- Attainability-Analysis-2004.pdf

Nine Mile Creek Watershed District Normandale Lake Use Attainability Analysis (2005): www.ninemilecreek.org/wp-content/uploads/Normandale-Use-Attainability-Analysis-2005.pdf

# Appendix A




SAND BASE
POWER POLE
LIGHT POLE
SIGN POST
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CONIFEROUS TREE
SANITARY MANHOLE
BACK OF CURB LINE
FLOW LINE
GAS LINE
FIBER OPTIC LINE
MAJOR CONTOUR
MINOR CONTOUR
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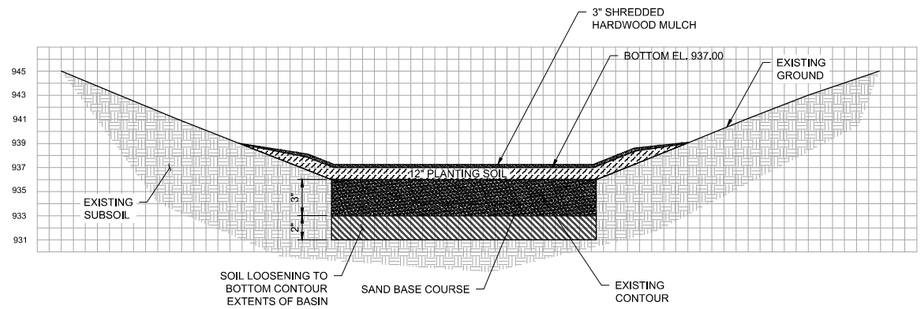
PROPOSED MINOR CONTOUR




1 - PLAN: GRADING, EROSION CONTROL, AND REMOVALS
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2 C-02 PROFILE: RAINWATER GARDEN 1
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NINE MILE CREEK WATERSHED
EDEN PRAIRIE, MINNESOTA

BETHELHEM LUTHERAN
MINNETONKA, MINNESOTA

GRADING, EROSION CONTROL, & REMOVALS

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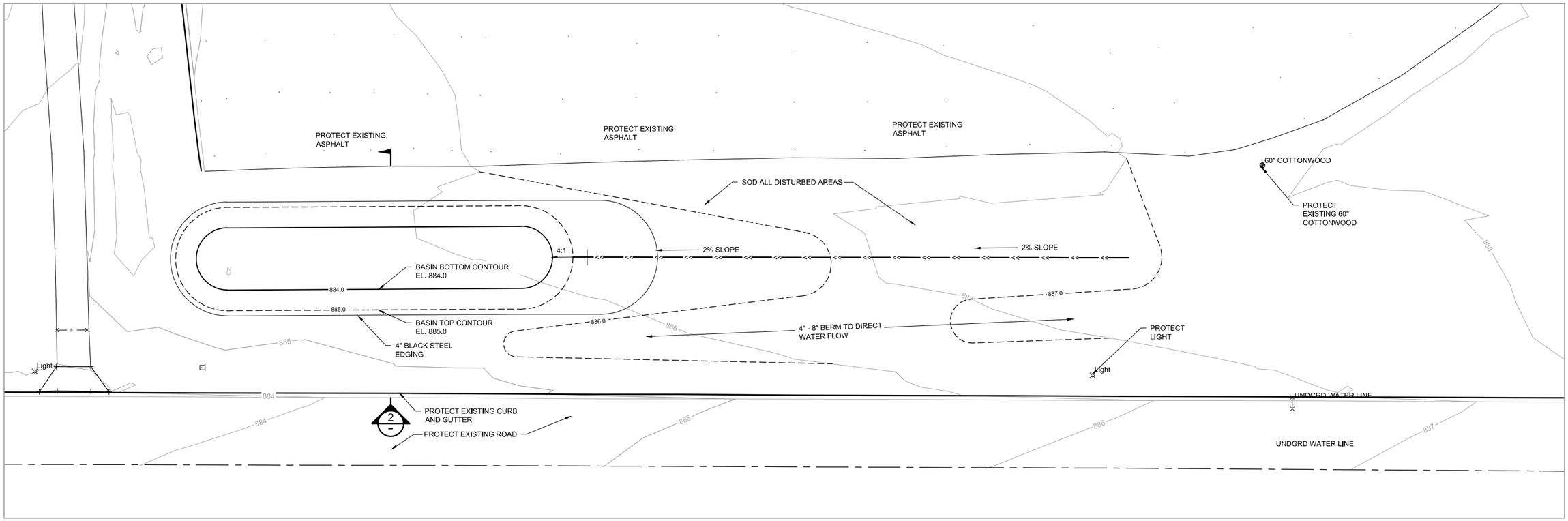
CLIENT PROJECT No.
DWG. No. C-01
REV. No.

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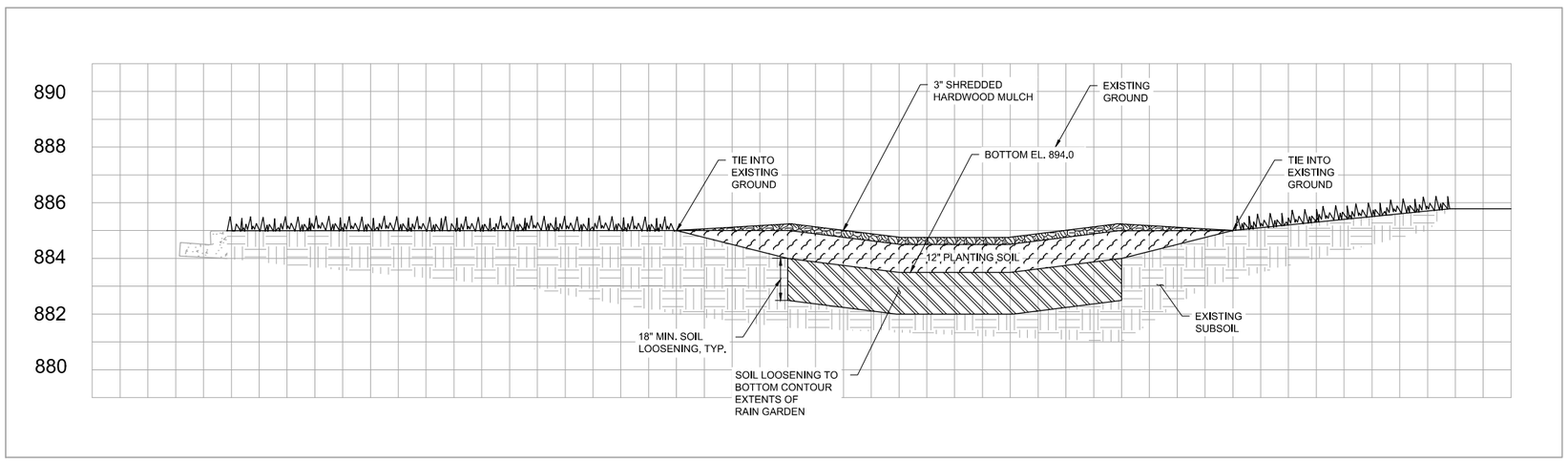


2 - SECTION: RAIN WATER GARDEN
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NOTES:
1. POTHOLE ALL EXISTING UTILITIES LOCATED WITHIN THE PROJECT LIMITS BEFORE EARTHWORK BEGINS.

2. MAKE ARRANGEMENTS FOR THE OWNER'S REPRESENTATIVE TO BE ONSITE WHILE SAND TRENCHES ARE EXCAVATED AND SUBGRADE SOILS ARE LOOSENED.

3. NO RUBBER TIRED EQUIPMENT IN BASIN AFTER LOOSENING. LOW GROUND PRESSURE TRACKED EQUIPMENT ONLY.

4. ANY COMPACTION OF PREVIOUSLY LOOSENED SOIL MUST BE RELOOSENED.

5. USE EXCAVATED SOIL TO CREATE NEW BERM.

5. SAVE STRIPPED SOD EITHER ROLLED OR FOLDED ON A PALLET IN THE SHADE, WATERING DAILY. REUSE SOD TO SOD NEWLY CONSTRUCTED BERM.

6. THE CONTRACTOR SHALL HAVE ACCESS TO STREET SWEEPING EQUIPMENT AT ALL TIMES. THE CONTRACTOR SHOULD BE AWARE OF WEATHER CONDITIONS AND SWEEP ANY STREETS WITH DEBRIS PRIOR TO ANY RAINFALL EVENT. STOCKPILING ON THE STREET DURING ANY RAINFALL EVENT SHALL NOT BE ALLOWED.

7. COORDINATE WITH OWNER TO ENSURE ACCEPTABLE TRAFFIC CONTROL REQUIREMENTS.

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Fax: (952) 832-2601
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| Date | 10/10/2018 |
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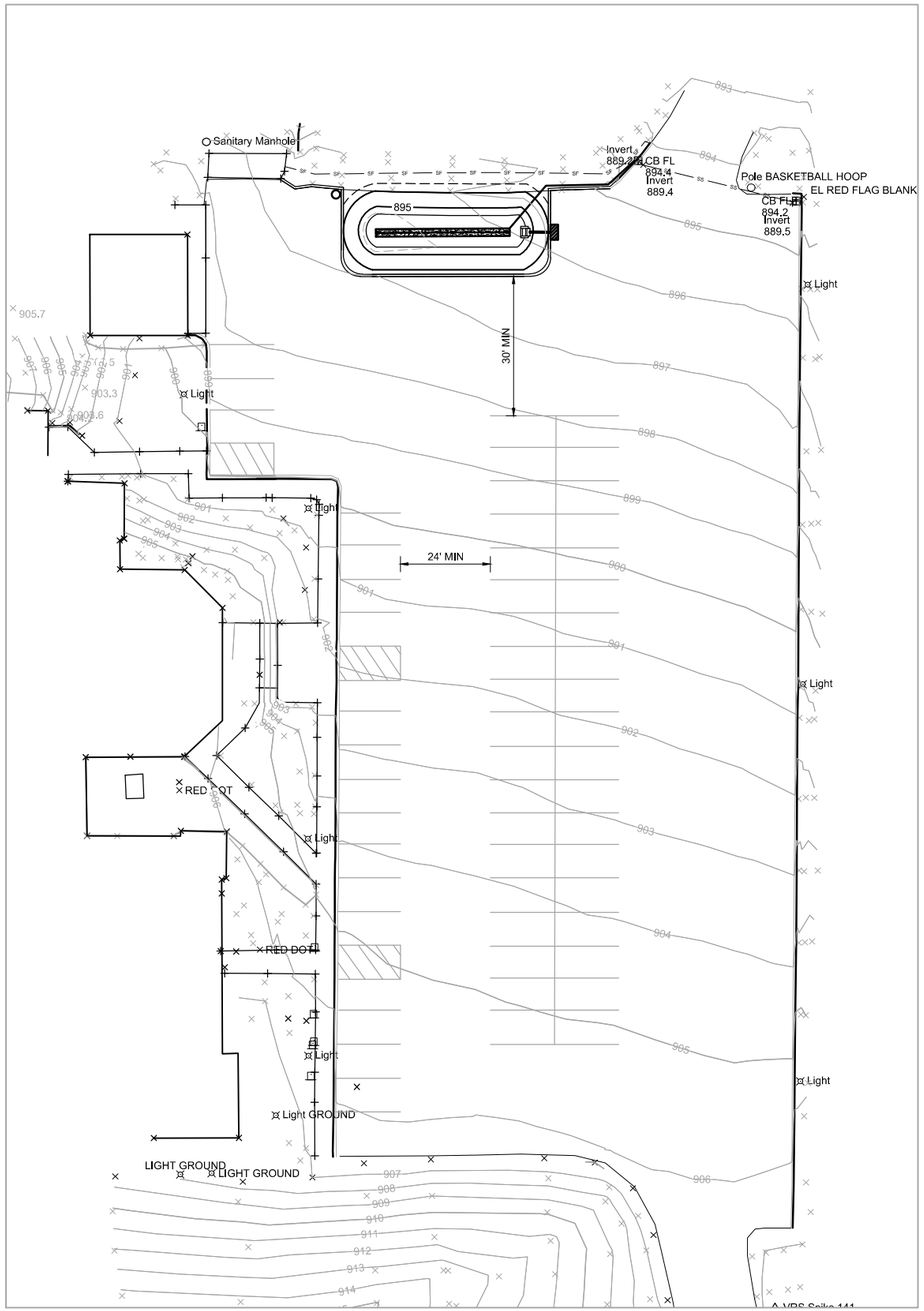
| Approved | |

NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

CHAPEL HILLS UNITED CHURCH
EDINA, MN

GRADING, EROSION CONTROL, & REMOVALS

BARR PROJECT No. 23270634.00
CLIENT PROJECT No.
DWG. No. C-01
REV. No. 0




1 - PLAN: RAIN GARDEN LOCATION AND PARKING STALLS
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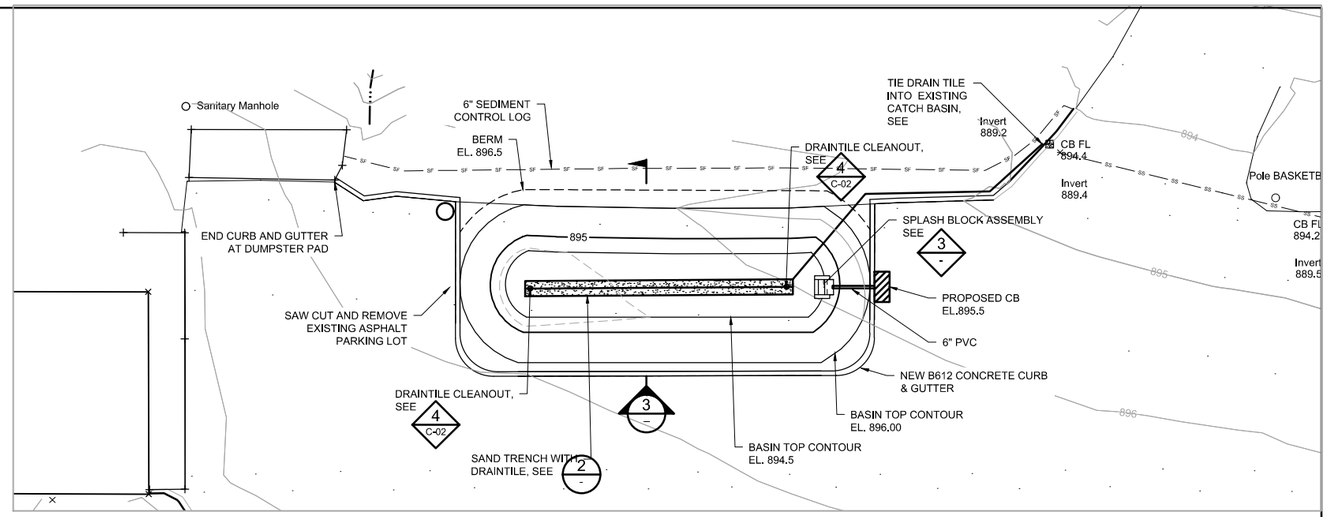


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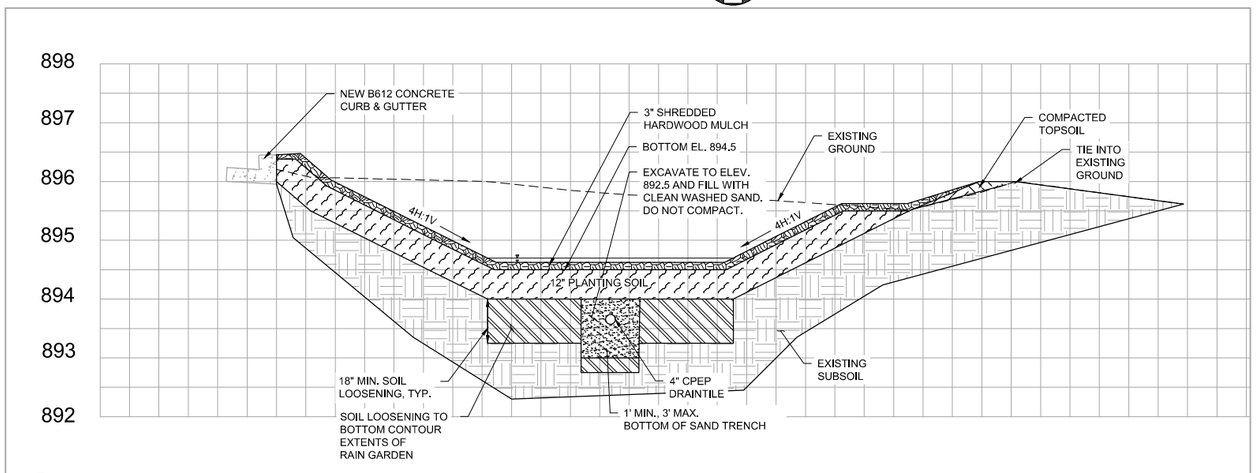


3 - SECTION: RAINWATER GARDEN
NOT TO SCALE

NOTES:

1. POTHOLE ALL EXISTING UTILITIES LOCATED WITHIN THE PROJECT LIMITS BEFORE EARTHWORK BEGINS.

2. SAWCUT FULL DEPTH BITUMINOUS PAVEMENT IN AREA SHOWN ON PLAN. PROTECT EXISTING BITUMINOUS PAVEMENT. IF DAMAGED DURING WORK, PATCH BITUMINOUS PAVEMENT. ASPHALT PATCHING IS INCIDENTAL TO THE BID ITEM PRICE.

3. MAKE ARRANGEMENTS FOR THE OWNER'S REPRESENTATIVE TO BE ONSITE WHILE SAND TRENCHES ARE EXCAVATED AND SUBGRADE SOILS ARE LOOSENED.

4. USE REMOVED EXISTING SOILS TO CREATE BERM. SUPPLEMENT AS NEEDED.

5. NO RUBBER TIRED EQUIPMENT IN BASIN AFTER LOOSENING. LOW GROUND PRESSURE TRACKED EQUIPMENT ONLY.

6. ANY COMPACTION OF PREVIOUSLY LOOSENED SOIL MUST BE RELOOSENED.

7. THE CONTRACTOR SHALL HAVE ACCESS TO STREET SWEEPING EQUIPMENT AT ALL TIMES. THE CONTRACTOR SHOULD BE AWARE OF WEATHER CONDITIONS AND SWEEP ANY STREETS WITH DEBRIS PRIOR TO ANY RAINFALL EVENT. STOCKPILING ON THE STREET DURING ANY RAINFALL EVENT SHALL NOT BE ALLOWED.

8. COORDINATE WITH OWNER TO ENSURE ACCEPTABLE TRAFFIC CONTROL REQUIREMENTS.

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EDINA, MN

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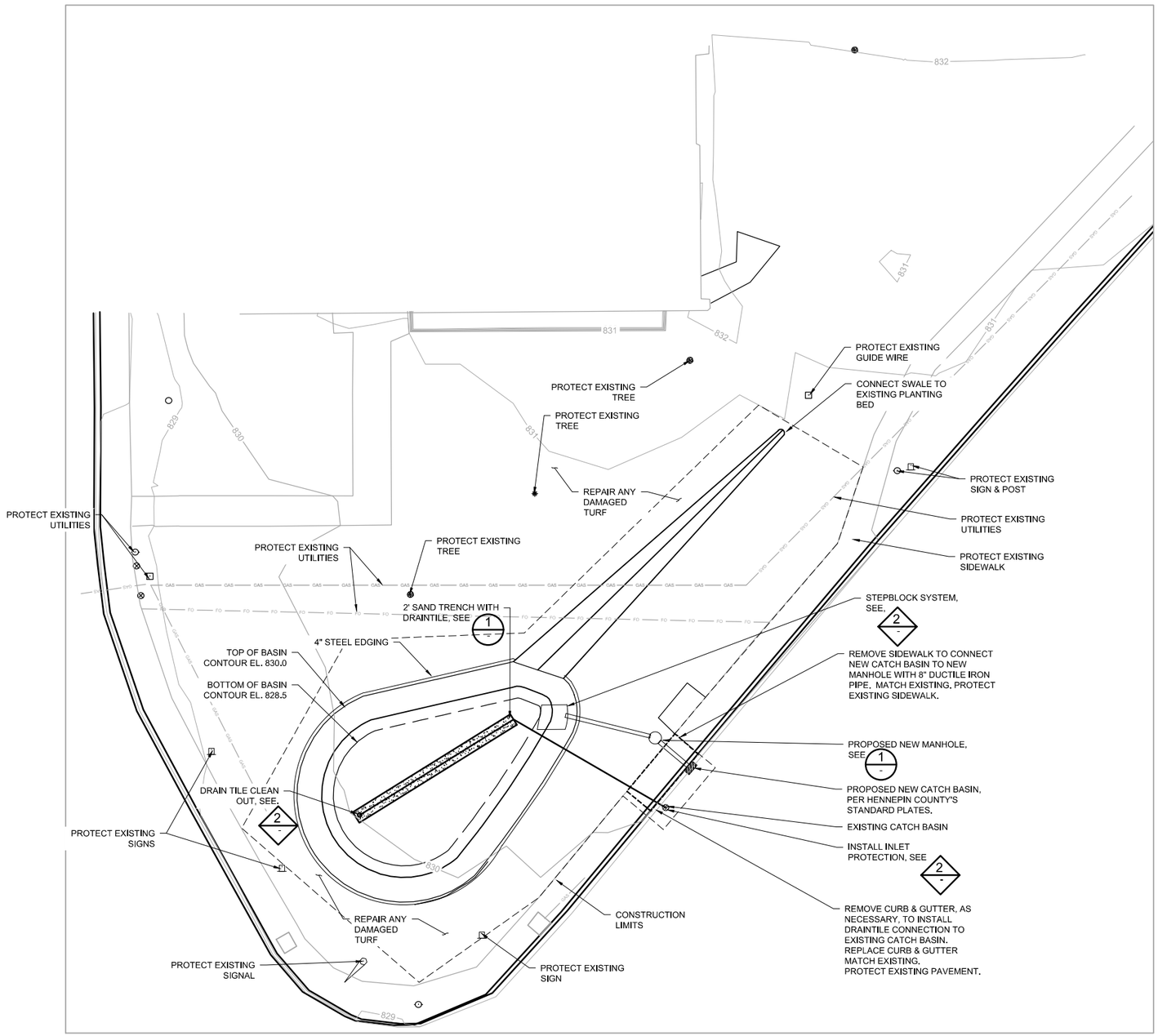


1 PLAN: GRADING, EROSION CONTROL, AND REMOVALS

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SAND TRENCH
POWER POLE
LIGHT POLE
SIGN POST
DECIDUOUS TREE
CONIFEROUS TREE
SANITARY MANHOLE
BACK OF CURB LINE
FLOW LINE
GAS LINE
FIBER OPTIC LINE
900 MAJOR CONTOUR
901 MINOR CONTOUR
900 PROPOSED MAJOR CONTOUR
901 PROPOSED MINOR CONTOUR

NOTES:

1. NO WORK SHALL OCCUR WHILE CHILDREN ARE PRESENT
2. POTHOLE ALL EXISTING UTILITIES LOCATED WITHIN THE PROJECT LIMITS BEFORE EARTHWORK BEGINS.
3. MAKE ARRANGEMENTS FOR THE OWNER'S REPRESENTATIVE TO BE ONSITE WHILE SAND TRENCHES ARE EXCAVATED AND SUBGRADE SOILS ARE LOOSENED.
4. NO RUBBER TIRED EQUIPMENT IN BASIN AFTER LOOSENING. LOW GROUND PRESSURE TRACKED EQUIPMENT ONLY.
5. ANY COMPACTION OF PREVIOUSLY LOOSENED SOIL MUST BE RELOOSENED.
6. THE CONTRACTOR SHALL HAVE ACCESS TO STREET SWEEPING EQUIPMENT AT ALL TIMES. THE CONTRACTOR SHOULD BE AWARE OF WEATHER CONDITIONS AND SWEEP ANY STREETS WITH DEBRIS PRIOR TO ANY RAINFALL EVENT. STOCKPILING ON THE STREET DURING ANY RAINFALL EVENT SHALL NOT BE ALLOWED.
7. COORDINATE WITH OWNER TO ENSURE ACCEPTABLE TRAFFIC CONTROL REQUIREMENTS.
8. SOD DISTURBANCE SHALL BE CONFINED TO THE CONSTRUCTION LIMITS, AND ANYTHING OUTSIDE THE CONSTRUCTION LIMITS WILL BE REPAIRED BY THE CONTRACTOR.

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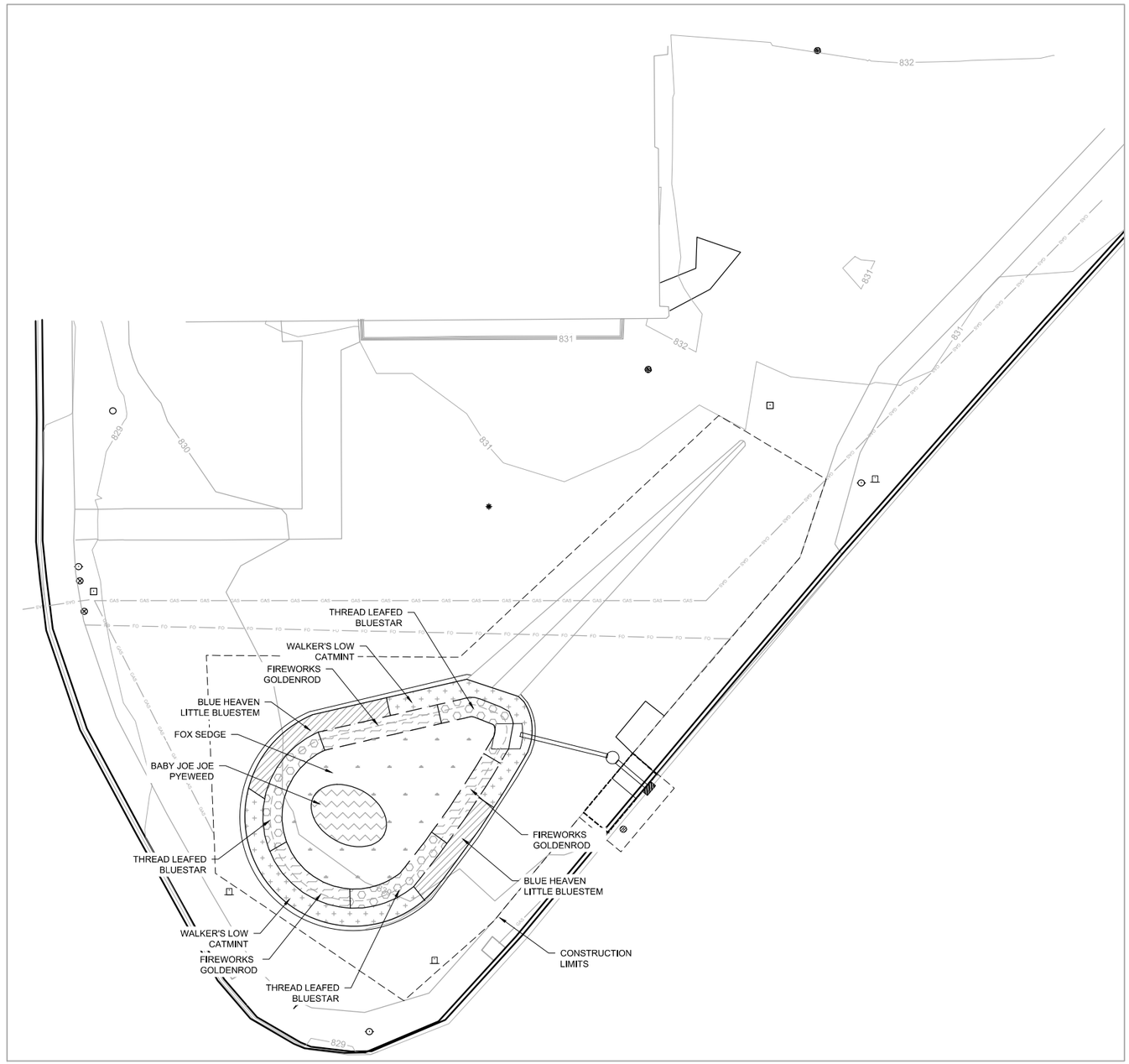
EDEN PRAIRIE, MN

OAK GROVE PRESBYTERIAN CHURCH
BLOOMINGTON, MN

GRADING, EROSION CONTROL, & REMOVALS

BARR PROJECT No. 2327634.00
CLIENT PROJECT No.
DWG. No. C-01
REV. No. 0




1 - PLAN: RAIN GARDEN PLANTING

0 10 20
SCALE IN FEET

N

SAND TRENCH
POWER POLE
LIGHT POLE
SIGN POST
DECIDUOUS TREE
CONIFEROUS TREE
SANITARY MANHOLE
BACK OF CURB LINE
FLOW LINE
GAS LINE
FIBER OPTIC LINE
MAJOR CONTOUR
MINOR CONTOUR
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR

## PLANTING NOTES:

1. POTHOLE ALL EXISTING UTILITIES WITHIN THE PROJECT LIMITS BEFORE EARTHWORK BEGINS.
2. INFORM THE LANDSCAPE ARCHITECT OF PLANTING TWO DAYS PRIOR TO PLANT DELIVERY.
3. CONTRACTOR SHALL COORDINATE LAYOUT OF ALL PLANTS WITH DIRECTION OF LANDSCAPE ARCHITECT IN THE FIELD.
4. PLACE SHREDDED HARDWOOD MULCH (MN/DOT SPEC 3882.2 TYPE 6 - WEED SEED FREE SHREDDED HARDWOOD.) TO A DEPTH OF 3" WITHIN ALL PLANTING AREAS ONCE PLANT INSTALLATION IS COMPLETE.
5. INSTALL THE STEEL LANDSCAPE EDGING PER MANUFACTURER RECOMMENDATION INCLUDING STAKING SPACING AND QUANTITY.
6. CONTRACTOR WILL BE RESPONSIBLE FOR WATERING PLANTS (REGARDLESS OF NOTIFICATION) DURING ENTIRE WARRANTY PERIOD. WATERING WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
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9. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. IN THE CASE OF ANY DISCREPANCIES BETWEEN THIS DETAIL, PLANS, OR SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN.

*PRELIMINARY DRAFT*

| NO. | BY | CHK. | APP. | DATE | REVISION DESCRIPTION |
|---|---|---|---|---|---|

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME _____

SIGNATURE _____

DATE _____ LICENSE # _____

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| CLIENT | |
| BID | |
| CONSTRUCTION | |
| RELEASED TO/FOR | |

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BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
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MINNEAPOLIS, MN 55435
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Fax: (952) 832-2601
www.barr.com

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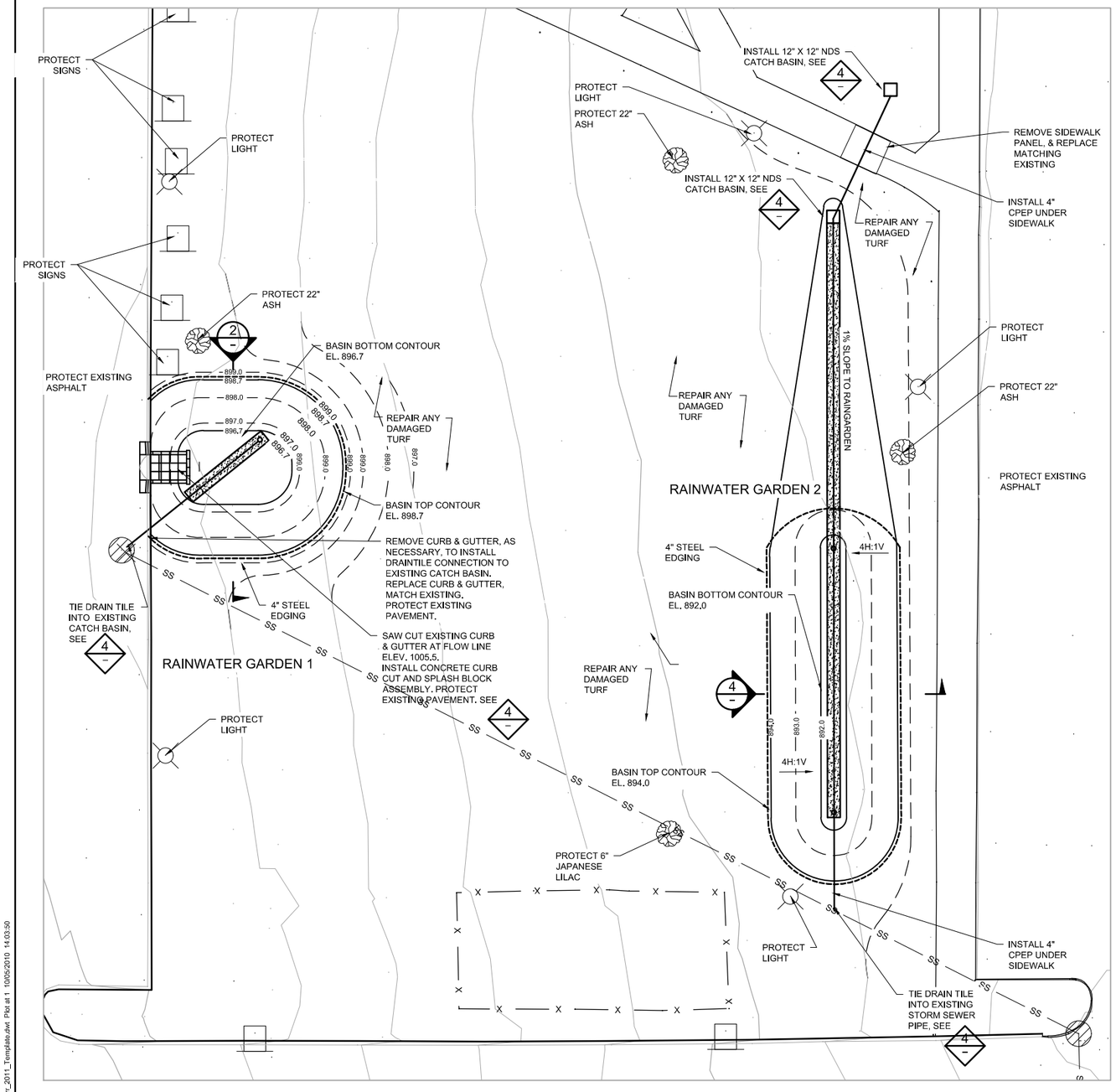
| Scale | AS SHOWN |
| Date | 9/28/2018 |
| Drawn | WMB |
| Checked | |
| Designed | WMB |
| Approved | |

NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

OAK GROVE PRESBYTERIAN CHURCH
BLOOMINGTON, MN

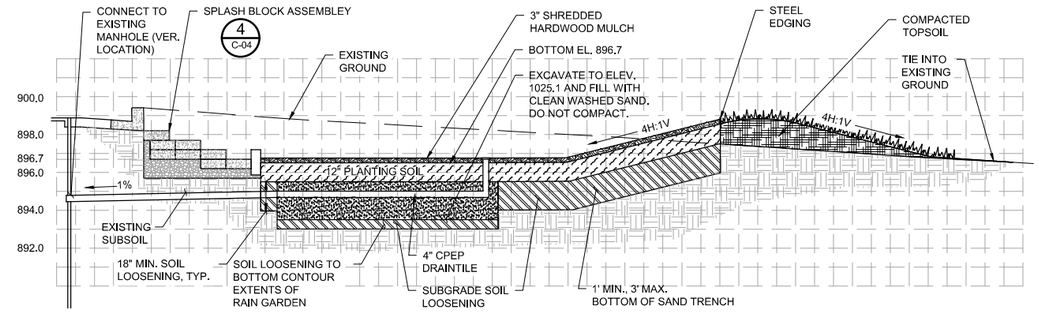
LANDSCAPE PLANTING PLAN

BARR PROJECT No. 2327634.00
CLIENT PROJECT No.
DWG. No. C-01
REV. No. 0

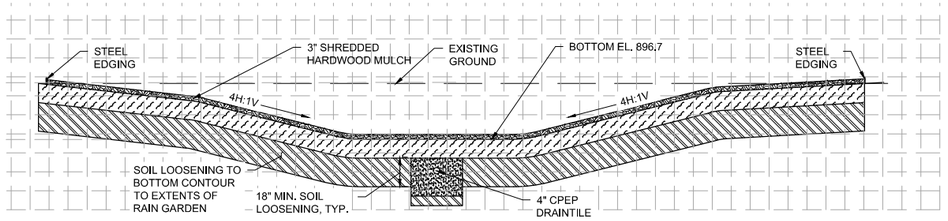



1 - PLAN: GRADING, EROSION CONTROL, AND REMOVALS

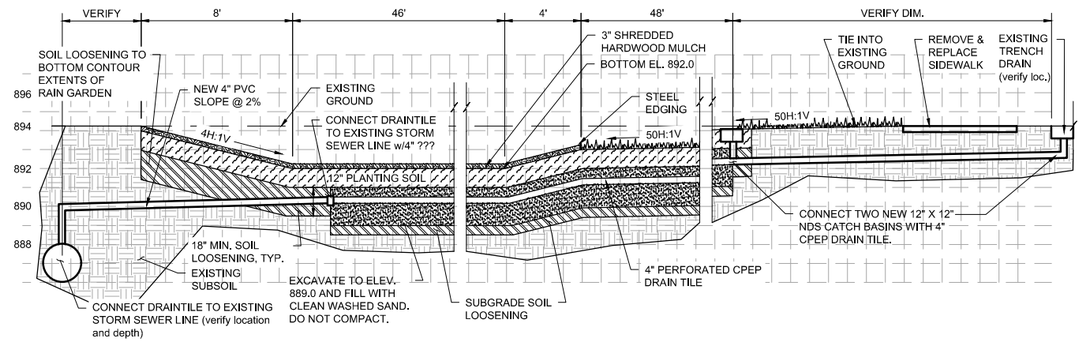
0 10 20
SCALE IN FEET



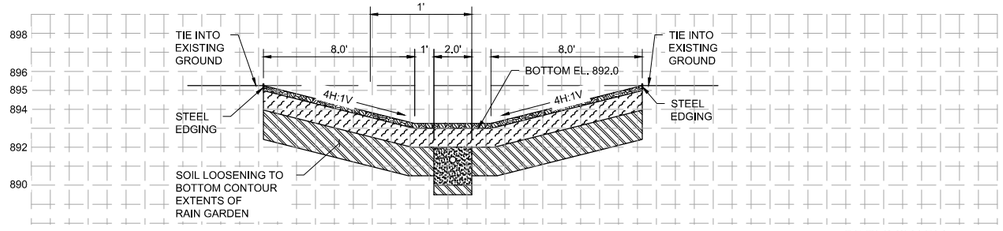

2 C-02 PROFILE: RAINWATER GARDEN 1
NOT TO SCALE




3 C-02 SECTION: RAINWATER GARDEN 1
NOT TO SCALE




4 C-02 PROFILE: RAINWATER GARDEN 2
NOT TO SCALE




5 C-02 SECTION: RAINWATER GARDEN 2
NOT TO SCALE

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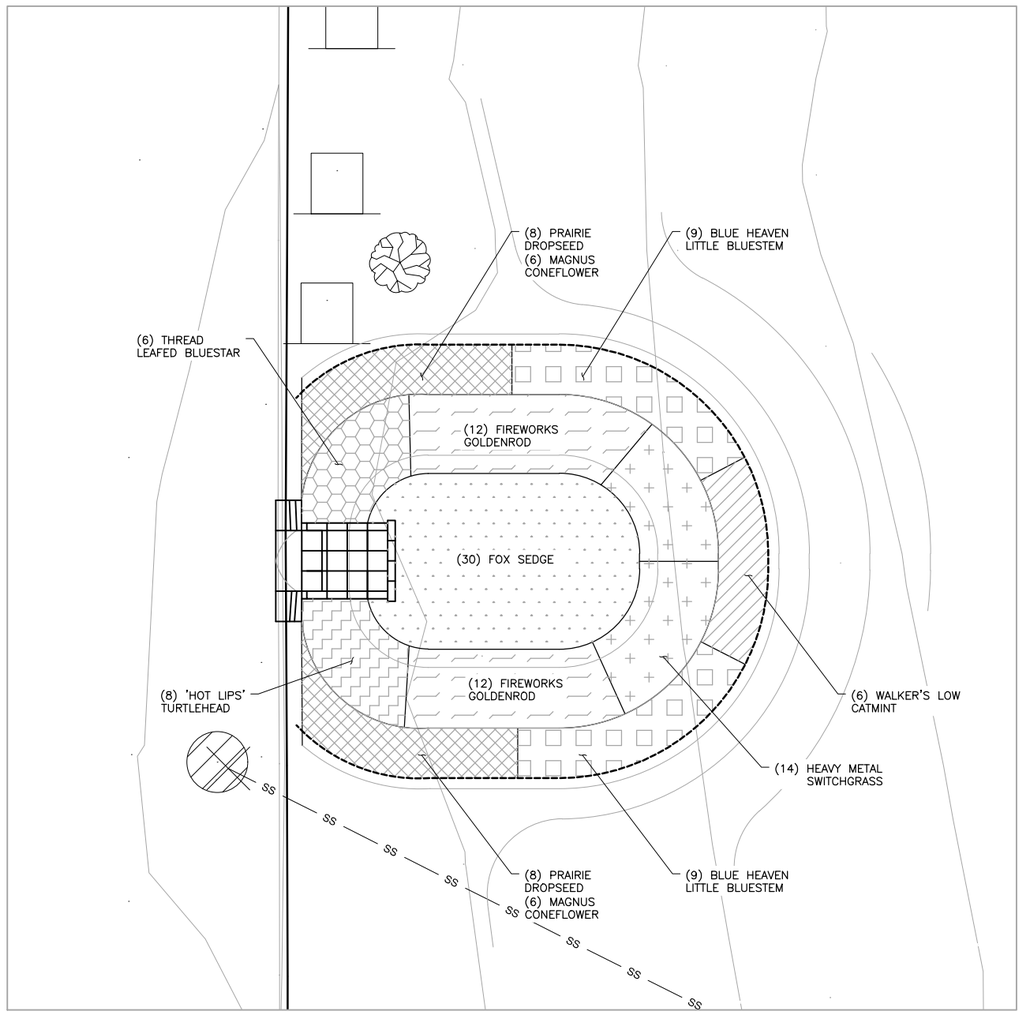
| Approved | |

NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

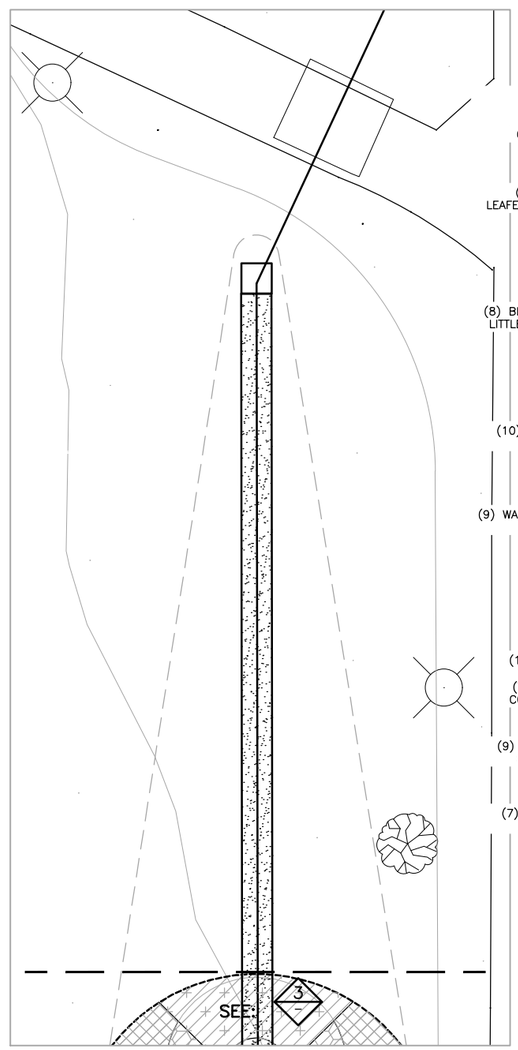
ST EDWARD'S CATHOLIC CHURCH
MINNEAPOLIS, MN

GRADING, EROSION CONTROL and REMOVALS PLAN

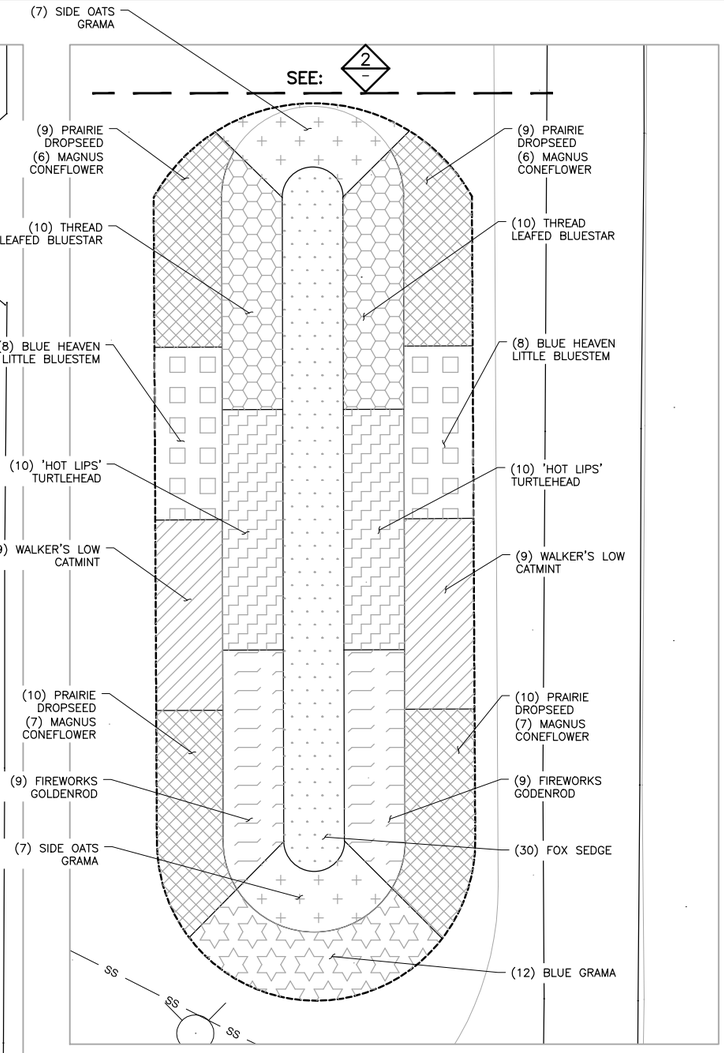
BARR PROJECT No. 23270634.00
CLIENT PROJECT No.
DWG. No. C-01
REV. No. 0




1 – PLAN: PLANTING PLAN RAIN GARDEN 1
NOT TO SCALE




2 – PLAN: GRASS SWALE
NOT TO SCALE




3 – PLAN: PLANTING PLAN RAIN GARDEN 2
NOT TO SCALE

## PLANT SCHEDULE: RAIN GARDEN 1

| Common Name | Scientific Name | Quant. | Spacing | Size |
|---|---|---|---|---|
| **Perennials** | | | | |
| Thread Leafed Bluestar | *Amsonia x hubrichtii* | 6 | 2.5' o.c. | # 1 Pot |
| Butterfly Milkweed | *Asclepias tuberosa* | 23 | 2.5' o.c. | # 1 Pot |
| Hot Lips Turtlehead | *Chelone lyonii 'Hot Lips'* | 8 | 2.5' o.c. | # 1 Pot |
| Magnus Coneflower | *Echinacea purpurea 'Magnus'* | 11 | 2.5' o.c. | # 1 Pot |
| Walker's Low Catmint | *Nepeta faassenii 'Walker's Low'* | 6 | 2.5' o.c. | # 1 Pot |
| | | | | |
| **Grasses** | | | | |
| Fox Sedge | *Carex vulpinoidea* | 29 | 2.5' o.c. | # 1 Pot |
| Heavy Metal Switchgrass | *Panicum virgatum 'Heavy Metal'* | 13 | 2.5' o.c. | # 1 Pot |
| Blue Heaven Little Bluestem | *Schizachyrium scoparium 'MinnblueA'* | 17 | 2.5' o.c. | # 1 Pot |
| Prairie Dropseed | *Sporobolus heterolepis* | 16 | 2.5' o.c. | # 1 Pot |

## PLANTING NOTES:

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## PLANT SCHEDULE: RAIN GARDEN 2

| Common Name | Scientific Name | Quant. | Spacing | Size |
|---|---|---|---|---|
| **Perennials** | | | | |
| Thread Leafed Bluestar | *Amsonia x hubrichtii* | 20 | 2.5' o.c. | # 1 Pot |
| Butterfly Milkweed | *Asclepias tuberosa* | 18 | 2.5' o.c. | # 1 Pot |
| Hot Lips Turtlehead | *Chelone lyonii 'Hot Lips'* | 20 | 2.5' o.c. | # 1 Pot |
| Magnus Coneflower | *Echinacea purpurea 'Magnus'* | 26 | 2.5' o.c. | # 1 Pot |
| Walker's Low Catmint | *Nepeta faassenii 'Walker's Low'* | 18 | 2.5' o.c. | # 1 Pot |
| | | | | |
| **Grasses** | | | | |
| Blue Grama | *Bouteloua gracilis* | 11 | 2.5' o.c. | # 1 Pot |
| Fox Sedge | *Carex vulpinoidea* | 29 | 2.5' o.c. | # 1 Pot |
| Heavy Metal Switchgrass | *Panicum virgatum 'Heavy Metal'* | 13 | 2.5' o.c. | # 1 Pot |
| Blue Heaven Little Bluestem | *Schizachyrium scoparium 'MinnblueA'* | 16 | 2.5' o.c. | # 1 Pot |
| Prairie Dropseed | *Sporobolus heterolepis* | 38 | 2.5' o.c. | # 1 Pot |

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PRINTED NAME Matthew E. Kumka
SIGNATURE
DATE LICENSE # 53974

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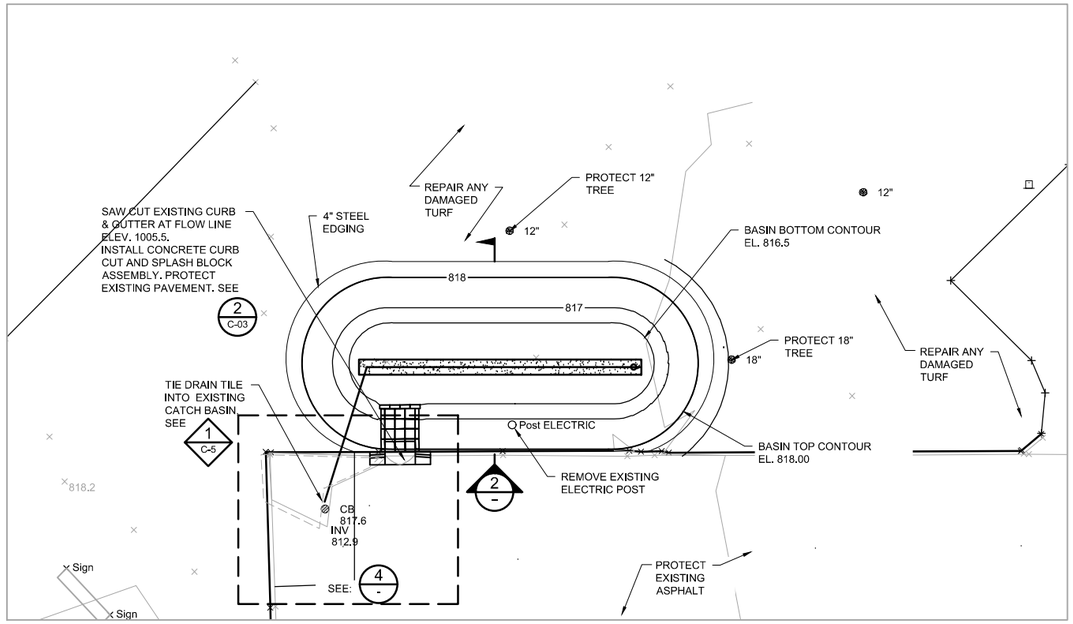
| Checked | MEK2 |
| Designed | WMB |
| Approved | MEK2 |

NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

ST. EDWARDS CATHOLIC CHURCH
MINNEAPOLIS, MN

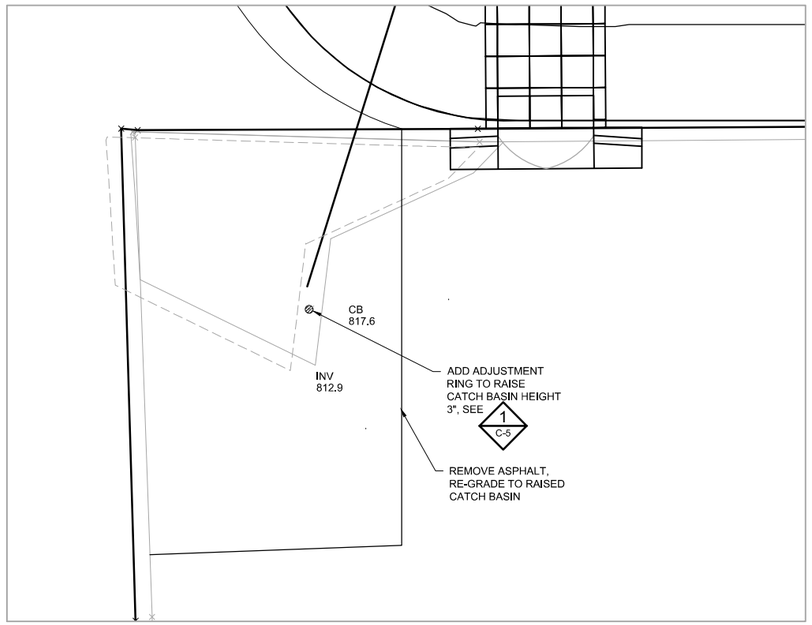
LANDSCAPE PLANTING PLAN

BARR PROJECT No. 23270634.00
CLIENT PROJECT No.
DWG. No. L-01
REV. No. 0

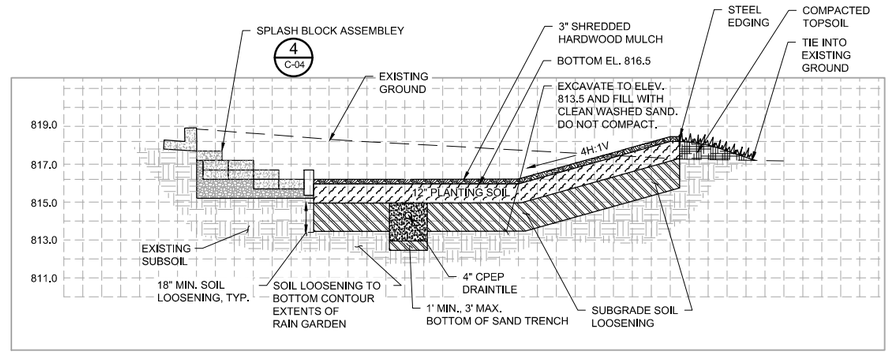



1 - PLAN: GRADING, EROSION CONTROLS, AND REMOVALS
AS SHOWN

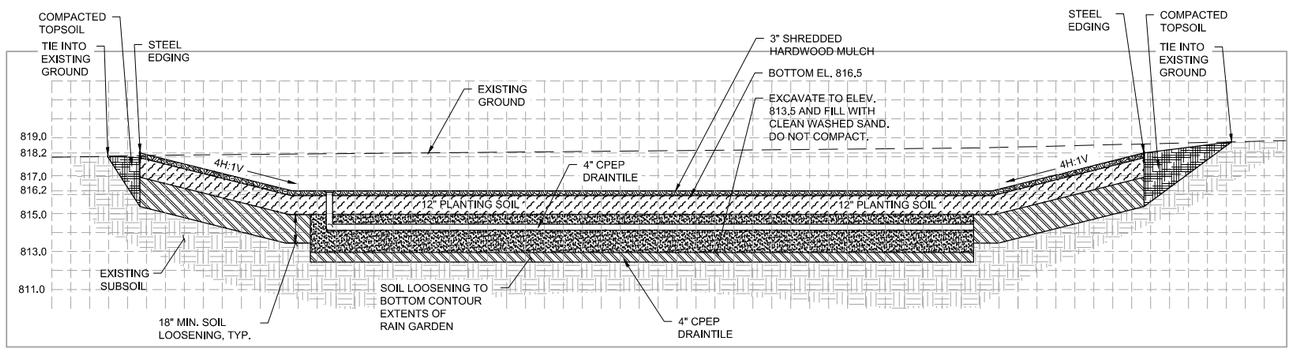
0 10 20
SCALE IN FEET




4 - PLAN: ASPHALT REMOVAL
NOT TO SCALE




2 - SECTION: RAINWATER GARDEN
NOT TO SCALE




3 - PROFILE: RAINWATER GARDEN
NOT TO SCALE

*PRELIMINARY DRAFT*

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NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

ST LUKE'S LUTHERAN CHURCH
MINNEAPOLIS, MN

GRADING, EROSION CONTROL, & REMOVALS

| BARR PROJECT No. | |
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| 23270634.00 | |
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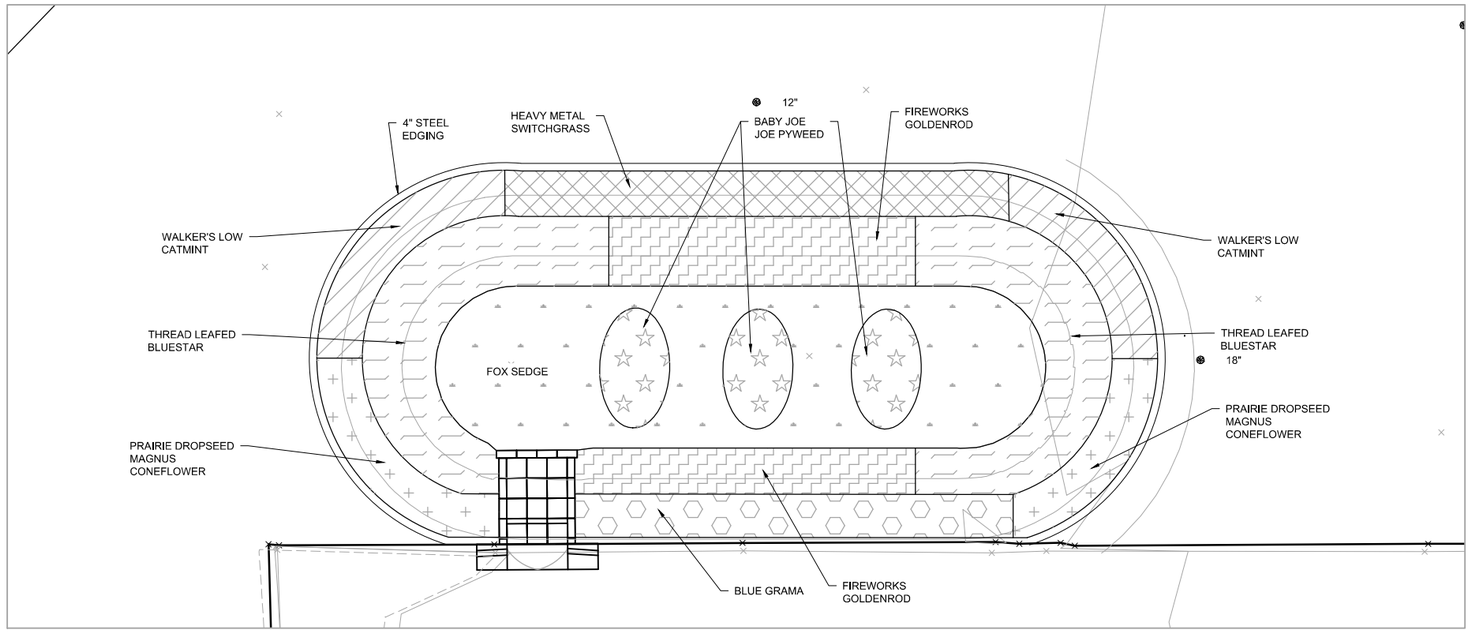
| C-01 | 0 |




1 / - PLAN: LANDSCAPE PLANTING
AS SHOWN

0 5 10
SCALE IN FEET

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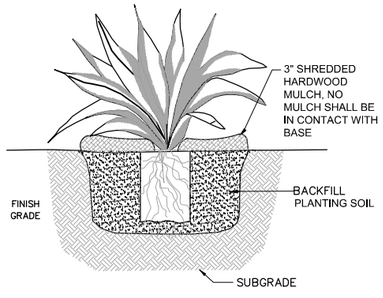


1 / - DETAIL: PERENNIAL PLANTING
NOT TO SCALE

HERBACEOUS PLUG AND POT PLANTING NOTES:

1. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
2. EXCAVATE HOLE 3 TIMES WIDTH OF ROOTBALL.
3. BREAK BOTTOM OF ROOTBALL TO LOOSEN ROOTS.
4. PLANT THROUGH MULCH ALIGNING ROOTBALL TOP EVEN WITH SOIL - DO NOT PLANT TOO DEEP OR TOO SHALLOW. FIRM SOIL TO ENSURE GOOD CONTACT WITH ROOTS.
5. BACK FILL WITH PLANTING SOIL FIRM SOIL AROUND ROOT MASS TO MAINTAIN PLUMB AND ENSURE NO AIR GAPS AROUND ROOT MASS.
6. APPLY 3" DEPTH SHREDDED HARDWOOD MULCH TO ENTIRE PLANTING AREA (SOIL PREPARED AS PER SPECIFICATIONS).
7. NO MULCH TO BE IN CONTACT WITH PLANT.
8. CONSTRUCT 3" WATERING BASIN. THOROUGHLY WATER WITHIN 3 HOURS OF INSTALLATION.
9. WATER THOROUGHLY AFTER PLANTING.
10. ALL PERENNIAL PLANTS PROVIDED BY THE CONTRACTOR SHALL BE GUARANTEED FOR ONE YEAR FROM THE DATE OF OWNER ACCEPTANCE. AT THE END OF THE ONE-YEAR GUARANTEE PERIOD ALL PERENNIALS SHALL BE IN SATISFACTORY CONDITION, EXCLUDING INSTANCES OF VANDALISM, AS DETERMINED BY OWNER.
    - 10.1. REPLACEMENTS: AT THE END OF THE ONE YEAR WARRANTY PERIOD ALL PLANTS SHALL FULFILL ALL THE REQUIREMENTS OF THESE SPECIFICATIONS AND REFERENCES WITH REGARD TO QUALITY AND CONDITION; FURTHER, THEY SHALL BE FREE OF DEAD BRANCHES AND TWIGS AND SHALL BEAR A MINIMUM OF 50% OF THE FOLIAGE PRESENT WHEN PLANTED HAVING NORMAL DENSITY, SIZE, SHAPE AND COLOR AS DETERMINED BY THE ENGINEER. ANY PLANTS FAILING TO SATISFY ALL THESE CONDITIONS SHALL BE REPLACED AS PER THE PRELIMINARY AND FINAL ACCEPTANCE PROCESS. PLANTS MAY BE REPLACED PRIOR TO THE END OF THEIR WARRANTY PERIOD IF SUCH AN AGREEMENT EXISTS BETWEEN THE CONTRACTOR AND THE OWNER. REPLACEMENT STOCK SHALL BE SUBJECT TO ALL REQUIREMENTS AS TO SELECTION, INSPECTIONS, PREPARATION, PLANTING AND MAINTENANCE OPERATIONS. REPLACEMENTS SHALL MATCH CALIPER AND/OR HEIGHT ATTAINED BY OTHER STOCK OF THE ORIGINAL PLANTING.
11. CONTRACTOR SHALL NOTIFY OWNER FOR A FINAL INSPECTION AFTER THE END OF THE GUARANTEE PERIOD, AND AGAIN AFTER ANY AND ALL REPLACEMENTS ARE PLANTED.

*PRELIMINARY DRAFT*

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NINE MILE CREEK WATERSHED DISTRICT
EDEN PRAIRIE, MN

ST LUKE'S LUTHERAN CHURCH
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LANDSCAPE PLAN AND DETAILS

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