



Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co. (Barr)
Subject: Item 4G – CSAH 9 (Rockford Road) and I-494 Interchange – Plymouth, MN
BCWMC February 21, 2019 Meeting Agenda
Date: February 13, 2019
Project: 23270051 2018 2176

4G CSAH 9 (Rockford Road) and I-494 Interchange – Plymouth, MN BCWMC 2018-31

Summary:

Proposed Work: Reconstruction of CSAH 9 (Rockford Road) and I-494 Interchange

Basis for Review at Commission Meeting: Linear project with more than five acres of disturbance and diversion of surface water runoff

Impervious Surface Area: Increase 1.756 acres

Recommendation: Conditional Approval

General Background & Comments

The proposed linear project is located in the Medicine Lake North and Plymouth Creek subwatersheds in Plymouth, MN. While the entirety of the proposed linear project is located within the BCWMC jurisdictional boundary, a portion of the project area drains into the jurisdiction of the Shingle Creek Watershed Management Commission (SCWMC). The linear project includes reconstruction of the County State Aid Highway 9 (CSAH 9) [Rockford Road] and I-494 interchange including bridge replacement, bridge approach and ramp reconstruction, trail reconstruction, and drainage improvements, resulting in 19.172 acres of disturbance (grading). The proposed linear project creates 1.756 acres of net new impervious surfaces, from 5.906 acres (existing) to 7.662 acres (proposed).

Floodplain

The proposed project does not involve work in the BCWMC 100-year floodplain therefore BCWMC floodplain review is not required.

Wetlands

The proposed linear project involves work in or adjacent to wetlands. The City of Plymouth is the local government unit (LGU) responsible for administering the Wetland Conservation Act, therefore BCWMC wetland review is not required.

Diversion of Surface Water Runoff

The August 2017 BCWMC Requirements for Improvements and Development Proposals (2017 Requirements) document states that the BCWMC reviews diversion plans to determine the effect of the proposal on the Bassett Creek watershed. With respect to diversions, the BCWMC:

- Prohibits any diversions of surface water within, into, or out of the watershed that may have a substantial adverse effect on stream flow or water levels at any point within the watershed.
- Requires that plans for intra- or inter-watershed diversions must include an analysis of the effects of the diversion on flooding, water quality, and aesthetic quality along the creek.
- Requires effort be made to ensure that there is no fish migration from one watershed to another (Policy 42).

As part of the proposed linear project, stormwater runoff from approximately 5.49 acres of the Bassett Creek watershed, located generally north and west of the Rockford Road and I-494 interchange, will be redirected to the north and ultimately into Curtis Lake in the Shingle Creek watershed. In existing conditions, an outlet, northwest of the interchange, directs water to the east towards I-494 and eventually to Medicine Lake. This outlet will be blocked, and drainage will be redirected north. To allow for a continuous connection to the north, an outlet control structure and emergency overflow will be installed between wetland 6 and wetland 7 (labeled RFR-17B and labeled RFR-18A, respectively, on the enclosed Drainage Overview Map). An inverted culvert and emergency overflow will also be installed at the north end of wetland 7. Since this portion of the project drains into the jurisdiction of the Shingle Creek Watershed Management Commission (SCWMC), the applicant sent a separate permit application to the SCWMC for review. According to the SCWMC's engineer, the proposed diversion of surface water runoff is recommended for approval at the SCWMC's February 14, 2019 meeting.

The proposed diversion will reduce the size of the Medicine Lake North subwatershed by 5.49 acres from 491.41 acres (existing conditions) to 485.92 acres (proposed conditions), a 1.1% reduction. The proposed diversion of surface water runoff is not expected to result in a substantial adverse effect to stream flows or water levels at any point in the watershed, due to the relatively small change in drainage area. In addition, because the proposed diversion of surface water runoff will reduce runoff to the Bassett Creek watershed, the proposed diversion of surface water runoff will not result in increased flood levels or increased pollutant loading (reduced water quality) in the Bassett Creek watershed, and the diversion is not expected to result in any impact to aesthetic quality along the creek. The applicant has also indicated there are no known fish species in the shallow wetland complex. Therefore, the proposed diversion of surface water runoff appears to meet the BCWMC requirements.

Based on the City of Plymouth's Surface Water Management Plan (SWMP), the BCWMC's XP-SWMM model, and the SCWMC's Watershed Management Plan, it was previously believed that runoff from this area discharged to the Curtis Lake subwatershed.

Stormwater Management

The BCWMC 2017 Requirements document states that linear projects on sites without restrictions that create one or more acres of net new impervious surfaces must manage stormwater such that peak flow rates leaving the site are equal to or less than the existing rates leaving the site for the 2-, 10-, and 100-year events, based on Atlas 14 precipitation amounts and using a nested 24-hour rainfall distribution. As

shown below, the proposed stormwater management system meets the BCWMC rate control requirements.

In existing and proposed conditions, stormwater runoff for the project site generally flows from west to east. Existing stormwater features, including depressions between I-494 and the entrance and exit ramps for CSAH 9, Dread Pirate Roberts wet pond, and Indigo Montoya dry pond, provide rate control for most of the project area. Table 1, Table 2, and Table 3 summarize the existing and proposed peak discharges to the North, East, and South, respectively. Table 4 summarizes the proposed peak discharge rates toward Curtis Lake, which is located within the SCWMC.

Table 1: Summary of existing and proposed peak discharge rates to the north

| Storm Event | Existing Peak Discharge (cfs) | Proposed Peak Discharge (cfs) |
|-------------|-------------------------------|-------------------------------|
| 2-year | 0.43 | 0.43 |
| 10-year | 0.69 | 0.69 |
| 100-year | 1.30 | 1.30 |

Table 2: Summary of existing and proposed peak discharge rates to the east

| Storm Event | Existing Peak Discharge (cfs) | Proposed Peak Discharge (cfs) |
|-------------|-------------------------------|-------------------------------|
| 2-year | 1.83 | 1.83 |
| 10-year | 3.03 | 3.03 |
| 100-year | 5.78 | 5.78 |

Table 3: Summary of existing and proposed peak discharge rates to the south

| Storm Event | Existing Peak Discharge (cfs) | Proposed Peak Discharge (cfs) |
|-------------|-------------------------------|-------------------------------|
| 2-year | 14.60 | 14.23 |
| 10-year | 26.75 | 26.07 |
| 100-year | 57.50 | 54.56 |

Table 4: Summary of existing and proposed peak discharge rates toward Curtis Lake (SCWMC)

| Storm Event | Existing Peak Discharge (cfs) | Proposed Peak Discharge (cfs) |
|-------------|-------------------------------|-------------------------------|
| 2-year | 9.03 | 2.51 |
| 10-year | 12.58 | 3.25 |
| 100-year | 23.77 | 8.58 |

Water Quality Management

The BCWMC 2017 Requirements document states that linear projects on sites without restrictions that create one or more acres of net new impervious surfaces must treat stormwater in accordance with the BCWMC water quality performance goals. If the BCWMC water quality performance goal is not feasible and/or is not allowed for a proposed project, then the project proposer must implement BCWMC flexible treatment options (FTOs). As shown below, the proposed stormwater management system meets BCWMC water quality requirements.

The proposed linear project creates 1.756 acres of net new impervious surfaces. The proposed linear project was unable to meet the BCWMC water quality performance goal or FTO #1 due to the presence of high seasonal groundwater. Therefore, FTO #2 was selected for the proposed linear project to provide water quality treatment. FTO #2 requires volume reduction to the maximum extent practicable and removal of 60% of the annual TP load.

The proposed linear project will utilize existing stormwater BMPs to provide the 60% TP removal. Table 4 summarizes the annual TP removal provided by the existing stormwater BMPs in the project area. Table 5 summarizes the annual TP loading for the net new impervious surfaces of the proposed project and the required TP removal to be provided for compliant with BCWMC water quality requirements. As shown below, the existing stormwater BMPs meet the BCWMC water quality requirements.

Table 4: Summary of annual TP removals for project components

| BMP | TP Loading (lbs/year) | Percent Removal (%) | TP Removal (lbs/year) |
|---|-----------------------|---------------------|-----------------------|
| Pond: RFR-9A SW Ramp | 1.2 | 14.5 | 0.2 |
| Pond: RFR-9 SW Ramp Infield | 1.6 | 5.2 | 0.1 |
| Pond: RFR-11 SE Inigo Montoya Dry Pond | 38.3 | 8.8 | 3.4 |
| Pond: RFR-15 NW Ramp Ditch | 0.8 | 16.9 | 0.1 |
| Swale: RFR-C NE Ditch | 2.6 | 9.3 | 0.2 |
| Swale: RFR-B SE Ditch | 0.8 | 19.1 | 0.1 |
| Swale: RFR-14 NW Infield | 1.4 | 37.5 | 0.5 |
| General Device: RFR-12 NE Dread Pirate Roberts Wet Pond | 22.9 | 45.2 | 10.3 |
| Pond: RFR-C NE Basin Wetland 3 | 14.9 | 30.1 | 4.5 |
| Overall | 30.2 | 56.2 | 17.0 |

Table 5: Summary of annual TP loading from net new impervious surfaces

| Net New Impervious Surfaces (acres) | BCWMC Water Quality Goal (acre-feet)* | TP Loading From Net New Impervious Surfaces** (lbs/year) | Required TP Removal From Net New Impervious Surfaces (%) | Required TP Removal From Net New Impervious Surfaces (lbs/year) |
|-------------------------------------|---------------------------------------|--|--|---|
| 1.756 | 0.16 | 3.09 | 60% | 1.86 |

*Calculated by multiplying the net new impervious surfaces by 1.1 inches of runoff

**Calculated using the MIDS Calculator

Table 6: Comparison of required and provided annual TP removals

| Required TP Removal From Net New Impervious Surfaces (lbs/year) | Provided TP Removal (lbs/year) |
|---|--------------------------------|
| 1.86 | 17.0 |

Erosion and Sediment Control

The proposed linear project involves more than one acre of land disturbance, therefore the proposed linear project must meet the BCWMC erosion and sediment control requirements. Proposed temporary erosion and sediment control features include rapid stabilization, stabilized construction exits, sediment control logs, floatation silt curtains, silt fence, culvert end controls, and storm drain inlet protection. Permanent erosion and sediment control features include stabilization with seed, sod, erosion control blankets, and wood fiber sediment control logs.

Recommendation

Conditional approval based on the following comments:

1. The HydroCAD models must be revised as follows to demonstrate that the proposed linear project meets BCWMC rate control requirements:
 - a. The total area for the existing HydroCAD model (79.740 acres) does not match the total area for the proposed HydroCAD model (79.992 acres). The total area(s) must be revised to accurately compare existing and proposed conditions.
 - b. The increase in impervious surfaces from the existing conditions HydroCAD model to the proposed conditions HydroCAD model (0.368 acres) does not match the increase in impervious surfaces indicated on the plans (1.756 acres). The HydroCAD model must be revised to match the plans or the discrepancy between the HydroCAD model and plans must be clarified.
 - c. The stage storage data for *pond RFR-18-EX P* (existing conditions) and *pond RFR-18-PRO P* (proposed conditions) are the same, with the exception of the 968.0 contour in proposed conditions, however the plans indicate that grading will occur in this area. The existing and/or proposed HydroCAD model must be revised to reflect these changes.
 - d. In the proposed conditions HydroCAD model, the emergency overflow berm for *pond RFR-18-PRO P* must be revised to match the plans.
 - e. In the proposed conditions HydroCAD model, the pipe sizes for the outlets of *pond RFR-C (N-26)-PR-NE Wet 3-Opt 2 No Ret Wall 3* (proposed conditions) must be revised to match the plans.
2. The CSAH9 P8 model must be revised as follows to demonstrate that the proposed linear project meets BCWMC water quality goals (or flexible treatment options).
 - a. The pervious curve numbers for the following watersheds in the CSAH9 P8 model do not match the proposed HydroCAD model. The pervious curve numbers for the following watersheds must be revised in the CSAH9 P8 model to match the proposed HydroCAD model and plans (we recommend using a composite CN), or documentation must be provided to support the discrepancies.

i. Watershed RFR-12 NE Ramp-DreadPirate R Pond

ii. *Watershed RFR 9B & 9C & 9E*

iii. *Watershed RFR 11 Ramp*

- b. Documentation (i.e. stage discharge tables or curves from HydroCAD) must be provided to clarify how the rating curve for device *General Device RFR-12 NE DreadPirateR Pond-Total Area* was developed.
3. Details for erosion and sediment control features (silt fence, sediment control logs, etc.) must be provided for review for compliance with BCWMC requirements.
 4. If the stabilized construction exits do not extend the full width of the roadway, sediment control logs, or other perimeter controls, must be installed adjacent to the stabilized construction exits to limit sediment-laden runoff from leaving the project area.
 5. On Sheet 244, culvert end controls are recommended at the outlet to Wetland 3.
 6. On Sheet 245, perimeter controls must be installed along the full length of the north edge of the project area, or clarification must be provided to support the current perimeter control layout.
 7. Revised plans (paper copy and final electronic files) and supporting documentation must be provided to the BCWMC Engineer for final review and approval.










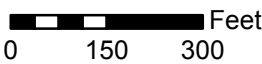
Surface Water Diversion from Bassett Creek Watershed (Medicine Lake subwatershed) to Shingle Creek Watershed

Project Location

Dread Pirate Roberts Wet Pond

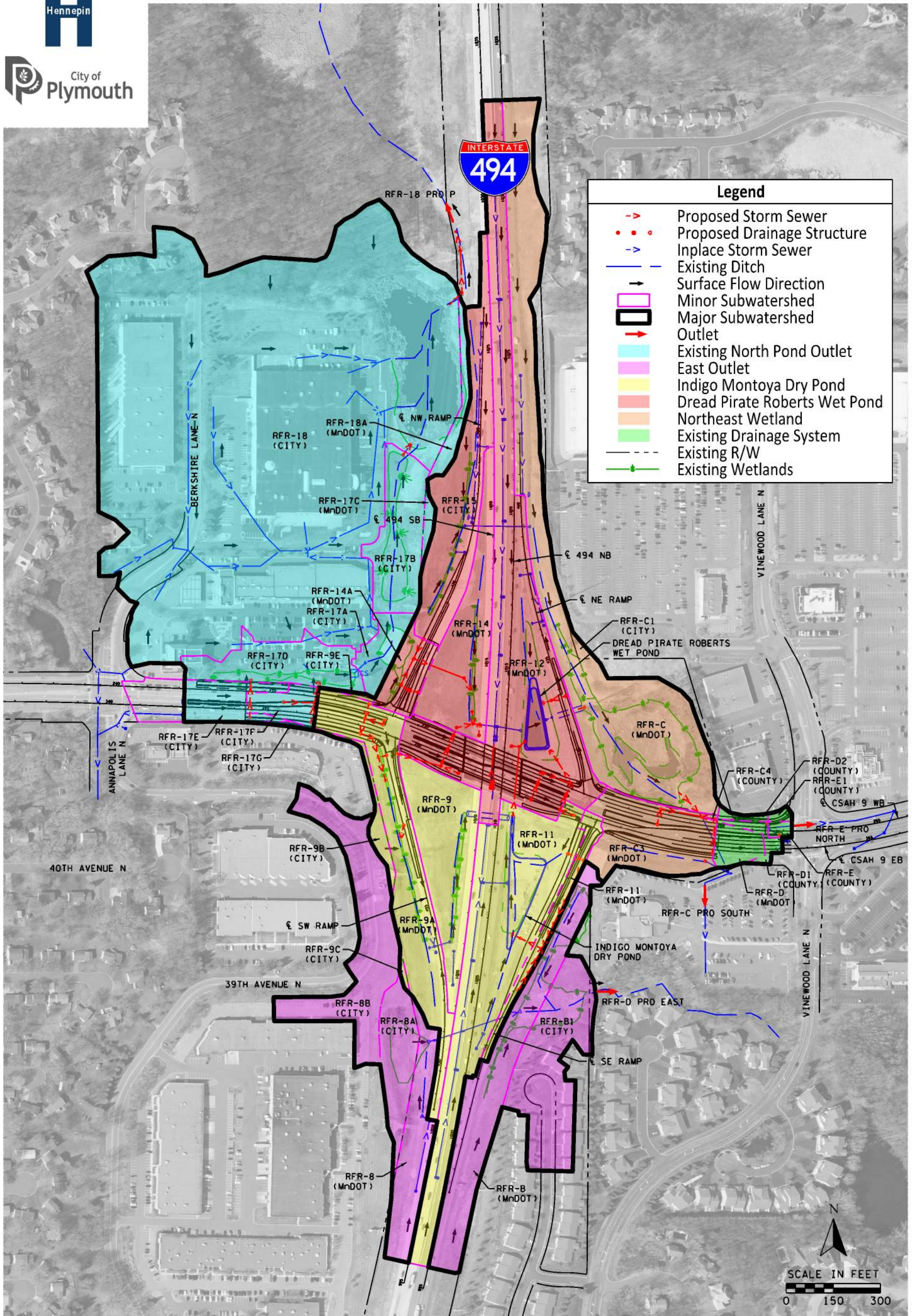
Indigo Montoya Dry Pond

-  Project Location
-  Surface Water Diversion from Bassett Creek Watershed to Shingle Creek Watershed
-  Municipality
-  BCWMC Legal Boundary
-  BCWMC Hydrologic Boundary
-  Major Subwatershed
-  Bassett Creek



BCWMC #2018-31
 CSAH 9 (ROCKFORD ROAD)
 & I-494 INTERCHANGE
 Plymouth, MN

LOCATION MAP



Date: Printed: 12/23/2018
WSB Filename: K:\0485-000\Cad\Exhibits\Drainage\1485-000_DOM.dgn

Drainage Overview Map