

Applicant: Brent Malcom; Normandale Lutheran Church
Consultant: Mike Kettler; Sunde Engineering
Project: Normandale Lutheran Church – Trinity Commons
Location: 6100 Normandale Road, Edina, MN
Applicable Rule(s): 4, 5, 11 and 12
Reviewer(s): Josh Phillips and Louise Heffernan; Barr Engineering Co.

General Background & Comments

The applicant proposes access driveway improvements and construction of a parking lot walkway at Normandale Lutheran Church, located at 6100 Normandale Road in Edina. The 3.8-acre parcel is currently occupied by the church building, surface parking lots, and a playground. Stormwater management, rate control, volume retention, and water quality management, for the 20,352-square-feet of proposed disturbed area including the 7,813-square-feet of regulated new and reconstructed impervious surfaces will be provided by a constructed stormwater basin.

Site Summary

Site Information	Value
Total Site Area (acres)	3.78
Existing Site Impervious Area (acres)	2.97
Change (Increase/Decrease) in Site Impervious Area (acres)	2.87
Percent Change (Increase/Decrease) in Impervious Area (%)	-3.4%
Disturbed/Reconstructed Site Impervious Area (acres)	0.18
Percent Disturbance/Reconstruction of Existing Impervious Surface (%)	6.3%

Exhibits Reviewed:

1. Permit Application dated January 20, 2023 (received January 23, 2023).
2. Sheets C1, C2, and C3 of the plans dated February 9, 2023 (received March 10, 2023), prepared by Sunde Engineering
3. Stormwater Management Report dated March 10, 2023 (received March 10, 2023), prepared by Sunde Engineering
4. Electronic HydroCAD model received March 13, 2023, prepared by Sunde Engineering
5. Electronic MIDS Calculator model received March 13, 2023, prepared by Sunde Engineering

4.0 Stormwater Management

The district's requirements for stormwater management apply to the project because more than 50 cubic yards of material will be disturbed and 5,000 square feet or more of surface area is altered, Rules 4.2.1a and b.

The NMCWD's Rule for Redevelopment, Rule 4.2.3, states, if a proposed activity will disturb more than 50% of the existing impervious surface on the site or will increase the imperviousness of the site by more than 50%, stormwater management will apply to the entire project site. Otherwise, the stormwater requirements will apply only to the disturbed, replaced, and net additional impervious surface on the project site.

The project will result in a disturbance of less than 50% of the existing site impervious area and will not increase the site imperviousness by more than 50%; therefore, stormwater management is required for the 7,813 square feet of new and reconstructed impervious surface.

Stormwater management for compliance with subsection 4.3.1 will be provided by a basin (rainwater garden) to provide rate control, volume retention and water quality management for the regulated areas of the project.

Rule 4.3.1b requires the 2-, 10-, and 100-year post development peak runoff rates be equal to or less than the existing discharge rates for the collection points where stormwater leaves the site. The applicant used a HydroCAD hydrologic model to simulate runoff rates. The existing and proposed 2-, 10- and 100-year frequency discharge rates from the disturbed area are summarized in the table below.

Rate Control Summary

	2- year (c.f.s.)	10- year (c.f.s.)	100- year (c.f.s.)
Existing Conditions	<1.0	1.3	3.1
Proposed Conditions	<1.0	<1.0	1.0

The proposed basin plan provides rate control in compliance with the NMCWD requirements for the 2-, 10-, and 100-year events. Rule 4.3.1b is met.

A retention volume of 716 cubic feet is required from the proposed 7,813 square feet of regulated impervious surface. The Braun Intertec geotechnical report identifies the underlying soil within the area of the proposed basin as sandy lean clay (CL) underlain by poorly graded sand (SP). The plans indicate that soils with low permeability in area of the proposed basin will be excavated to a depth of 2.8 feet to the SP soils (approximately elevation 919.7 M.S.L.), removed, and backfilled with material suitable for infiltration. An infiltration rate of 0.8 inches per hour has been used for design, using infiltration rates for sand identified in the Minnesota Storm Water Manual. The table below summarizes the volume retention required and volume retention achieved. The proposed project is in conformance with subsection 4.3.1a.

Volume Retention Summary

Required Volume Retention Depth (inches)	Required Volume (cubic feet)	Provided Volume (cubic feet)
1.1	716	1,060

With an infiltration area of 723 square feet to be provided (224 square feet required), the required 716 cubic feet of volume retention is drawn down within the required 48-hours, complying with Rule 4.3.1a (ii).

Rule 4.5.4d (i) requires at least three feet of separation between the bottom of a stormwater management facility and groundwater. The borings taken by Braun Intertec did not encounter groundwater to the bottom of the boring(s), elevation 913.7 M.S.L. The bottom elevation of the basin is 922.5 feet M.S.L., providing a separation of 8.8 feet. Rule 4.5.4d (i) is met.

NMCWD's water quality criterion requires 60% annual removal efficiency for total phosphorus (TP) and 90% annual removal efficiency for total suspended solids (TSS) from the regulated site runoff. A P8 model was used to evaluate the proposed basin's annual removal efficiencies. The results of the P8 modeling are summarized in the table below. We agree with the modeling results and the project is in conformance with Rule 4.3.1c criteria.

Annual TSS and TP Removal Summary

Pollutant of Interest	Regulated Site Loading (lbs./year)	Required Load Removal (lbs./year)	Provided Load Reduction (lbs./year)
Total Suspended Solids (TSS)	105.4	63.2 (90%)	105.2 (99.8%)
Total Phosphorus (TP)	0.3	0.2 (60%)	0.3 (96.7%)

Rule 4.3.3 states that all new and reconstructed buildings must be constructed such that the low floor is at least two feet above the 100-year high-water elevation or one foot above the emergency overflow of a constructed facility. Additionally, Rule 4.3.3 states that all new and reconstructed buildings must be constructed such that no opening where surface flow can enter the structure is less than two feet above the 100-year high-water elevation of an adjacent facility.

Rule 4.3.3 also states that a stormwater management facility must be constructed at an elevation that ensures no adjacent habitable building will be brought into noncompliance with a standard in subsection 4.3.3. The low floor and low opening elevation of the proposed enclosure adjacent to the facility is 928.0 M.S.L. and the emergency overflow, should it occur, is towards the street at elevation 924.2 M.S.L.. The low floor and low opening elevations of the existing church building is not shown on the plans therefore, the applicant must demonstrate compliance with Rule 4.3.3 criteria relative to the 100-year high-water elevation of the proposed basin.

In accordance with Rule 4.3.4, a post-project chloride management plan must be provided that will, 1) designate an individual authorized to implement the chloride-use plan and 2) designate a MPCA certified salt applicator engaged in the implementation of the chloride-use plan for the site.

Subsection 4.3.5 requires the submission of a maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed. The applicant must provide a

receipt showing recordation of a maintenance declaration for the operation and maintenance of the stormwater management facility.

In accordance with Rule 4.3.1a (i), where infiltration or filtration facilities, practices or systems are proposed, pre-treatment of runoff must be provided. Pretreatment for runoff discharging to the storm water facility must be identified on the plans for compliance with Rule 4.3.1a (i).

5.0 Erosion and Sediment Control

The district's requirements for erosion and sediment control apply to the project because more than 50 cubic yards of material will be disturbed and 5,000 square feet or more of surface area is altered, Rules 5.2.1a and b.

The erosion control plan prepared by Sunde Engineering includes installation of silt fence, a rock construction entrance, and storm sewer inlet protection. The contractor for the project will need to designate a contact who will remain liable to the district for performance under the district's Erosion and Sediment Control Rule 5.0 from the time the permitted activities commence until vegetative cover is established, in accordance with subsection 5.4.1e. NMCWD must be notified if the responsible individual changes during the permit term.

11.0 Fees

Fees for the project are:

Rules 4.0-5.0 \$1,500

12.0 Financial Assurances

Financial Assurances for the project are:

Rule 4.0: Stormwater Management Facility: 224 SF x \$12/SF \$2,688

Rule 5.0: Perimeter Control: 135 LF x \$2.50/LF \$338

Inlet Protection 3 x \$100 each \$300

Site Restoration: 0.47 acres x \$2,500/acre \$1,175

Contingency and Administration \$1,899

Total..... \$6,400

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The proposed project will conform to Rules 4 and 5 with the fulfilment of the conditions identified below.
3. The proposed stormwater management facility will provide rate control, volume retention and water quality management in accordance with subsections 4.3.1a-c criteria.
4. In accordance with NMCWD Rule 4.3.5, the applicant must provide an agreement that assumes the obligations for the maintenance, inspection, and operations of the stormwater management facility.

Recommendation:

Approval, contingent upon:

Compliance with the General Provisions (attached).

Financial Assurance in the amount of \$11,400, including \$6,400 for stormwater management, erosion control, and site restoration, and \$5,000 for compliance with the chloride management requirements.

The applicant provides a name and contact information for the individual responsible for the erosion and sediment control at the site. NMCWD must be notified if the responsible individual changes during the permit term.

Per Rule 4.3.5, a receipt showing recordation of a maintenance declaration for the operation and maintenance of the stormwater management facility is required. A draft of the declaration must be approved by the district prior to recordation.

To comply with Rule 4.3.1a (i), pretreatment for runoff entering the proposed rain garden must be identified on the plans.

Rule 4.3.3 states that all new and reconstructed buildings must be constructed such that the low floor is at least two feet above the 100-year high-water elevation or one foot above the emergency overflow of a constructed facility. Additionally, Rule 4.3.3 states that all new and reconstructed buildings must be constructed such that no opening where surface flow can enter the structure is less than two feet above the 100-year high-water elevation of an adjacent facility. Alternatively, Appendix 4a analysis may be used to demonstrate compliance with low floor criteria. To comply with Rule 4.3.3, the low floor and low opening elevations of the existing building must be shown on the plans. The applicant must demonstrate compliance with Rule 4.3.3 criteria relative to the 100-year high-water elevation of the proposed rain garden.

By accepting the permit, when issued, the applicant agrees to the following stipulations for closeout of the permit:

The work for the Normandale Lutheran Church Trinity Commons project under the terms of Permit 2023-005, if issued, must have an impervious surface area, stormwater infrastructure design, and grading plans consistent with the approved plans. Design that differs materially from the approved plans will need to be the subject of a request for a permit modification or new permit, which will be subject to review for compliance with all applicable regulatory requirements.

Per Rule 4.5.6, an as-built drawing of the stormwater management facility conforming to the design specifications, including a stage volume relationship in tabular form for the stormwater basin, as approved by the district, must be provided.

Submission of a plan for post-project management of Chloride use on the site. The plan must include 1) the designation of an individual authorized to implement the chloride use plan and 2) the designation of a Minnesota Pollution Control Agency certified salt applicator engaged in the implementation of the chloride-use plan for the site.

Per Rule 12.4.1b, demonstration and confirmation that the stormwater management facility has been constructed or installed and is functioning as designed and permitted. Verification, through daily observation logs and photographs, must be provided showing the stormwater

management facility used for volume retention has been drawn down within 48 hours from the completion of two 1-inch (approximate) separate rainfall events.



TRINITY
COMMONS

EDINA, MN

DATE	REVISION
11/15/21	ORIGINAL PLAN DATE
1/7/22	REVIEW SET
12/20/22	REVIEW SET
3/9/23	WATERSHED DISTRICT COMMENTS

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
PROFESSIONAL ENGINEER UNDER THE LAWS
OF THE STATE OF MINNESOTA.

DATE: REG. NO.: 40425

INFORMATION:

PROJECT NO.: 21-500

DRAWN BY: _____

CHECKED BY: _____

APPROVED BY: _____

SCALE: _____

DATE: _____

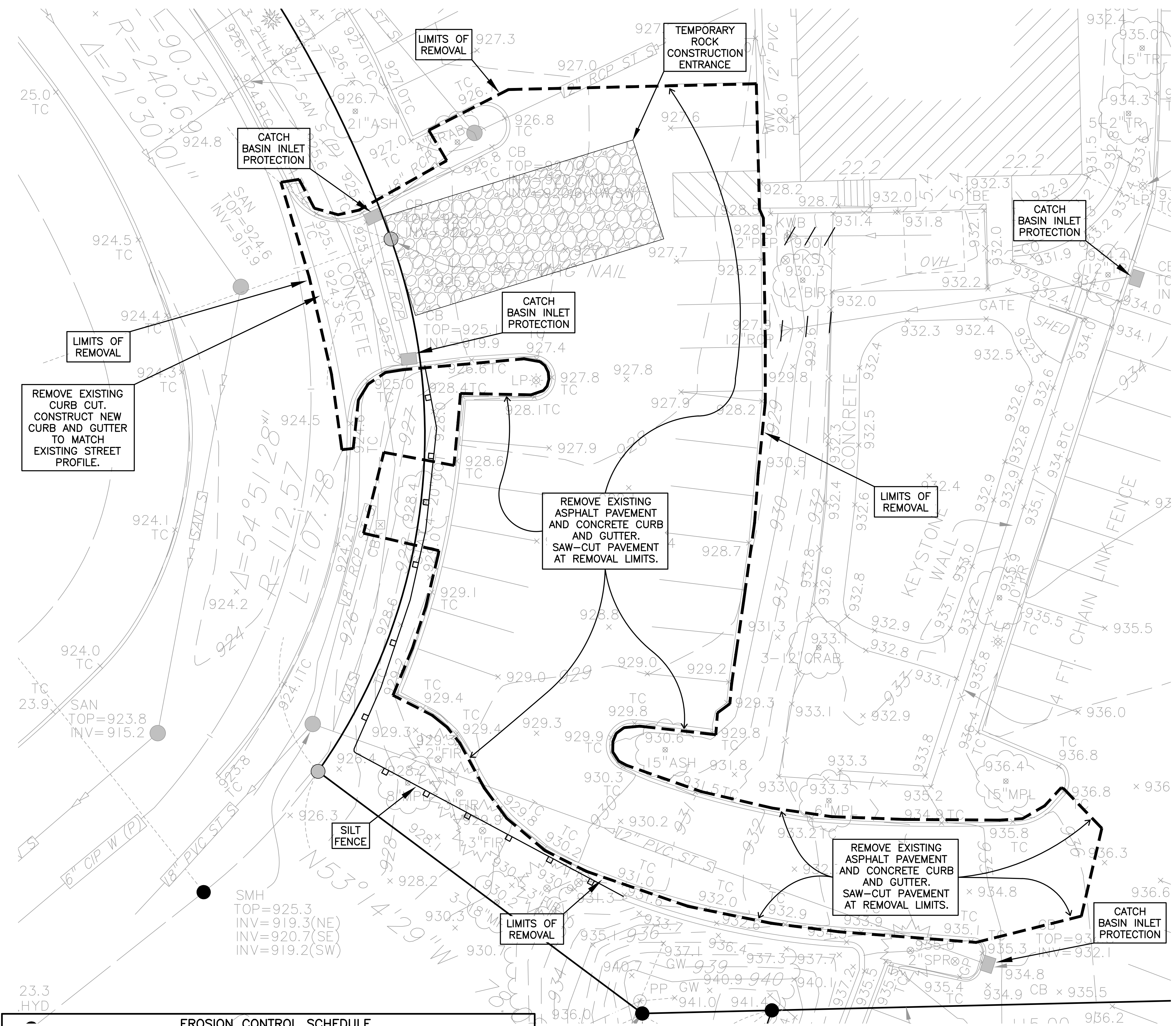
DESCRIPTION:

DEMOLITION AND EROSION CONTROL PLAN

SHEET NO:

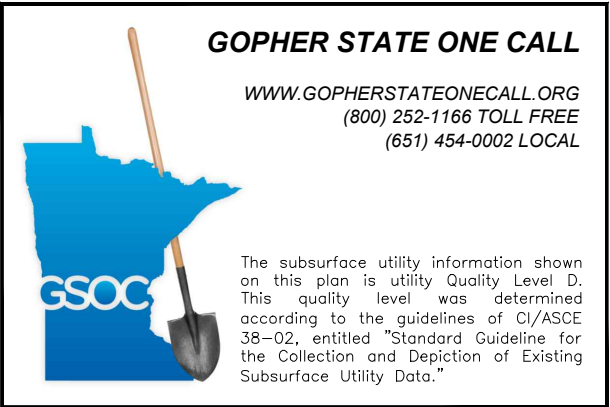
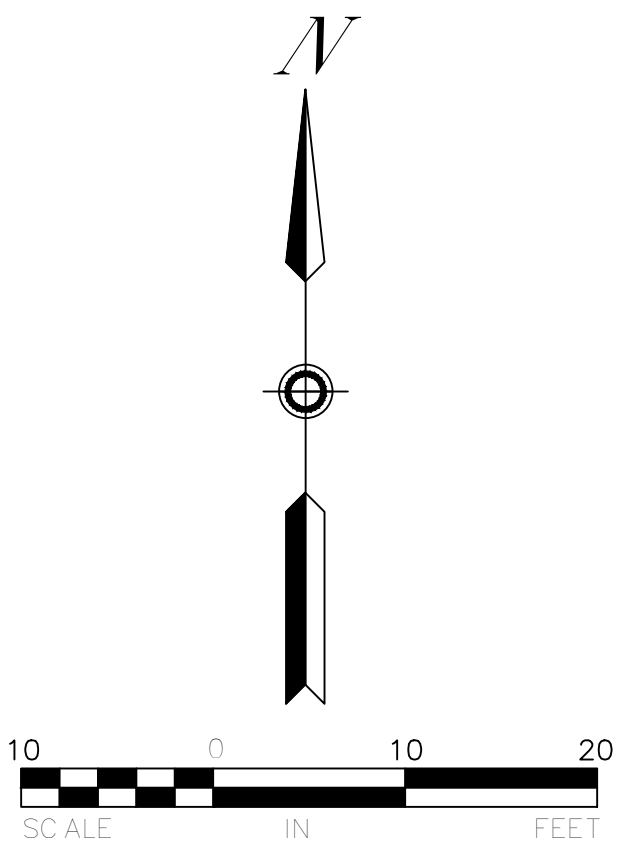
C1

of3



ITEM	INSTALLATION	INSPECTION/MAINTENANCE	REMOVAL
SILT/FENCE	PRIOR TO ANY CONSTRUCTION	INSPECT AND MAINTAIN AFTER EACH RUNOFF EVENT. REMOVE SEDIMENTS AS REQUIRED.	AFTER TRIBUTARY DRAINAGE AREA HAS BEEN RESTORED
TEMP. ROCK ENTRANCE	PRIOR TO INITIAL GRADING	INSPECT REGULARLY. MAINTAIN AS REQUIRED.	WHEN SITE PAVING OPERATIONS BEGIN
INLET PROTECTION	PRIOR TO ANY CONSTRUCTION OR SAME DAY STRUCTURE IS CONSTRUCTED	INSPECT AND MAINTAIN AFTER EACH RUNOFF EVENT. REMOVE SEDIMENTS AS REQUIRED.	WHEN TRIBUTARY AREA IS PAVED
SEED AND MULCH	AFTER FINAL GRADING	INSPECT AND MAINTAIN AFTER HEAVY RAINS. RESTORE WASH-OUT AREAS IMMEDIATELY.	N/A

COORDINATE SMALL UTILITY
(GAS, ELECTRIC, PHONE,
CABLE, DATA, ETC.)
RELOCATION WORK REQUIRED
WITH LOCAL UTILITY
COMPANIES.



S I T E C L E A R I N G :

1. Perform all clearing and grubbing work in accordance with the provisions of MNDOT Standard Specification Section 2101, and the additional requirements contained herein.
2. Clearing is defined as the complete removal and disposal of all portions of natural and artificial objectionable materials, structures, trees, shrubs, bushes, windfalls, grass, sod, and other vegetation in the designated areas that exist above ground except stumps. Grubbing is defined as the excavation, removal, and disposal of all portions of natural and artificial objectionable materials, structures, trees, shrubs, bushes, windfalls, and other vegetation that exist below ground including stumps.
3. Clear and grub the construction area in advance of the grading operation.
4. Building Areas: Completely remove all stumps, roots 40 mm (1.5 inches) in diameter or larger, buried logs, and all other objectionable material occurring within the lines of the new building and to horizontal distance of 4.5 m (15 feet) beyond the building walls.
5. Other Areas: Grub all stumps, roots 40 mm (1.5 inches) in diameter or larger, buried logs, and all other objectionable material occurring within the grading limits to a depth of not less than 1 m (3.28 feet) below the existing ground surface or subgrade excavation, whichever is deeper.
6. Backfill and compact all depressions resulting from the clearing and grubbing operation with suitable material in order to make the surface conform to the original adjacent surface of the ground.
7. After the site has been cleared and prior to any cutting or filling operations, strip all topsoil and organic soils from areas to be built upon, paved, or where grades are to be changed more than 152 mm (6 inches). Strip the existing topsoil to whatever depths encountered. Prevent intermingling with underlying subsoil, or other objectionable material. Remove heavy growths of grass from areas before stripping. Where trees are to be left standing, stop topsoil stripping a sufficient distance away from the trees in order to prevent damage to the main root system.
8. Stockpile soil to be re-used in an area clear of the new construction. Remove excess soil from the site.
9. Construct stockpiles in a manner that will freely drain surface water. Maintain soil stockpiles free from debris and trash. Do not obstruct site drainage. Do not exceed a stockpile depth of 8 feet.
10. Keep the soil stockpile damp in order to prevent drying and dust.



TRINITY
COMMONS

EDINA, MN

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OF THE STATE OF MINNESOTA.

Mr Kutt

Mike R. Kettler

DATE: REG. NO.: 40425

INFORMATION:

PROJECT NO.: 21-500

DRAWN BY:

CHECKED BY: MK

APPROVED BY: MK

SCALE:

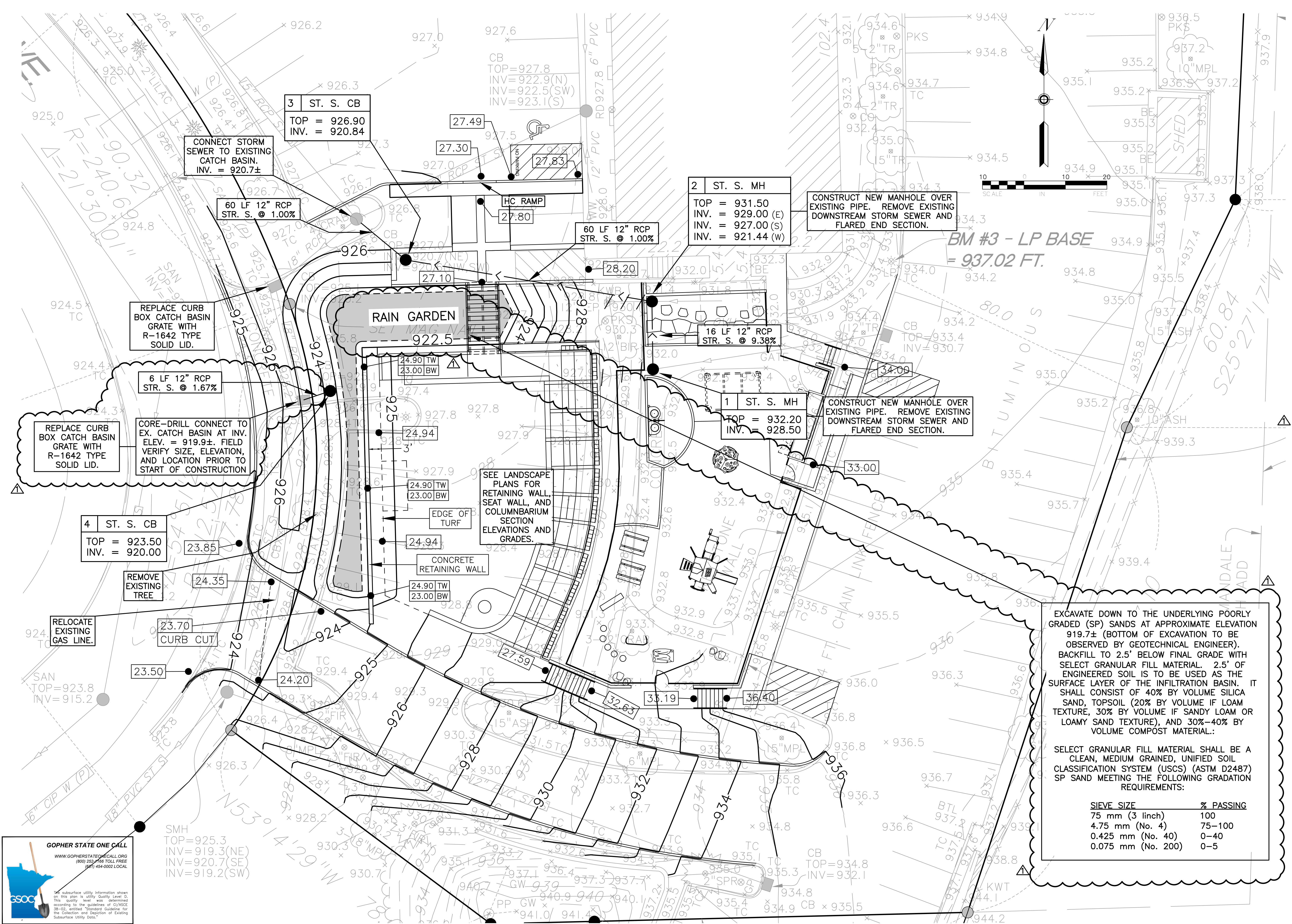
DATE: 11/15/21

DESCRIPTION:

GRADING AND DRAINAGE PLAN

SHEET NO:

C2



GENERAL:

- Existing boundary, location, topographic, and utility information shown on this plan is from a field survey by Sunde Land Surveying dated November 25, 2020. The Engineer is not responsible for inaccuracies related to the survey information.
- Perform all construction work in accordance with State and Local requirements.
- Perform all construction activity in accordance with the Minnesota Pollution Control Agency GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY issued August 1, 2018 and all subsequent amendments thereto.
- Comply with all applicable local, state, and federal safety regulations. Comply with the work safety practices specified by the Occupational Safety and Health Administration (OSHA). OSHA prohibits entry into "confined spaces," such as manholes and inlets (see 29 CFR Section 1910.146), without undertaking certain specific practices and procedures. Bench or slope sidewalks in order to provide safe working conditions and stability for the placement of engineering materials. Perform excavations in accordance with the requirements of O.S.H.A. 29 CFR, Part 1926, Subpart P, Excavations. The Contractor is responsible for naming the "Competent Individual" in accordance with CFR 1926.6. Sloping or benching for excavations greater than 20 feet deep must be approved by a registered professional engineer (www.osha.gov).
- Safety is solely the responsibility of the Contractor, who is also solely responsible for the construction means, methods, techniques, sequences or procedures, and for safety precautions and programs in connection with the Work.
- The Engineer shall not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work. The Engineer's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures.
- Examine all local conditions at the site, and assume responsibility as to the grades, contours, and the character of the earth, existing conditions, and other items that may be encountered during excavation work above or below the existing grades. Review the drawings, specifications, and geotechnical report covering this work and become familiar with the anticipated site conditions.
- The Contractor is solely responsible for all utility locates. Contact utility companies for locations of all public and private utilities within the construction area. Contact COPENHAGEN STATE ONE CALL at (651) 454-0002 in the Minneapolis/St. Paul metro area, or 1-800-252-1166 elsewhere in Minnesota for exact locations of existing utilities at least 48 working hours (not including weekends and holidays) before beginning any construction in accordance with Minnesota Statute 216D. Obtain ticket number and meet with representatives of the various utilities at the site. Provide the Owner with the ticket number information. Copenhagen State One Call is a free service that locates municipal and utility company lines, but does not locate private utility lines. Use an independent locator service or other means in order to obtain locations of private utility lines including, but not limited to, underground electric cables, telephone, TV, and lawn sprinkler lines.
- A licensed surveyor shall perform construction staking. The Contractor shall provide and be responsible for the staking. Verify all plan and detail dimensions prior to construction staking. Stake the limits of walkways and curbing prior to valvebox, maintenance hole, and catchbasin installation. Adjust valvebox and maintenance hole locations in order to avoid conflicts with curb and gutter. Adjust catchbasin locations in order to align properly with curb and gutter.
- Provide temporary fences, barricades, coverings, and other protections in order to preserve existing items to remain, and to prevent injury or damage to person or property.
- Pothole to verify the positions of existing underground facilities at a sufficient number of locations in order to assure that no conflict with the proposed work exists and that sufficient clearance is available.
- Where existing gas, electric, cable, or telephone utilities conflict with the Work, coordinate the abandonment, relocation, offset, or support of the existing utilities with the appropriate local utility companies. Coordinate new gas meter and gas line installation, electric meter and electric service installation, cable service, and telephone service installation with the local utility companies.
- Arrange for and secure suitable disposal areas off-site. Dispose of all excess soil, waste material, debris, and all materials not designated for salvage. Waste material and debris includes trees, stumps, pile, concrete, asphaltic concrete, cans, or other waste material from the construction operations. Obtain the rights to any waste area for disposal of unsuitable or surplus material either shown or not shown on the plans. All work in disposing of such material shall be considered incidental to the work. All disposal must conform to applicable solid waste disposal permit regulations. Obtain all necessary permits at no cost to the OWNER.
- Straight line saw-cut existing bituminous or concrete surfacing at the perimeter of pavement removal areas. Use saws that provide water to be tracked onto the area to be removed. Do not allow the slurry produced by the saw cut to be discharged into the immediate work area or discharged into the sewer system. Lock and match all connections to existing bituminous pavement.
- All materials required for this work shall be new material conforming to the requirements for class, kind, grade, size, quality, and other details specified herein or as shown on the Plans. Do not use recycled or salvaged aggregate, asphaltic pavement, crushed concrete, or scrap shingles. Unless otherwise indicated, the Contractor shall furnish all required materials.
- Document existing conditions (photographs, video, field survey, etc.) in order to enable restoration to match existing conditions and in order to ensure that restored areas have positive drainage similar to existing conditions.
- Protect sub grades from damage by surface water runoff.
- Full design strength is not available in bituminous pavement areas until the final lift of asphalt is compacted into place. Protect pavement areas from overloading by delivery trucks, construction equipment, and other vehicles.
- Adjust all curb steps, valve boxes, maintenance hole castings, catchbasin castings, cleanout covers, and similar items to finished grade.
- Compact 3" of Class 5 Aggregate Base into place below all proposed curb and gutter.
- These plans, prepared by Sunde Engineering, PLLC., do not extend to or include systems pertaining to the safety of the construction or the employees, agents, or representatives in the performance of the work. The seal of Sunde Engineering's registered professional engineer herein does not extend to any such safety systems that may nor hereafter be incorporated into these plans. The construction contractor shall prepare or obtain appropriate safety systems which may be required by U.S. Occupational Safety and Health Administration (OSHA) and/or local regulations.
- Bituminous Pavement Tolerances:** Check bituminous pavement surfaces with a 10-foot (3-meter) straightedge. Remove and replace any part of the bituminous pavement where the deviation of surface flatness in excess of 1/4 inch (6 mm). After compaction, the thickness of each bituminous course shall be within plus or minus 1/2 inch (13 mm) of the thickness shown on the Plans. Remove and replace any part of the bituminous pavement that is constructed with less than the minimum required thickness.
- Pavement Alignment Tolerances:** Lateral deviation from established alignment of the pavement edge shall not exceed plus or minus 0.10 foot (30 mm). Vertical deviation from established grade of the pavement shall not exceed plus or minus 0.04 foot (13 mm) at any point.
- Grading for all sidewalks and accessible routes, including driveway crossings, shall conform to current State and Federal Americans with Disabilities Act (ADA) requirements. In accordance with ADA Section 403.3, slopes shall not exceed + exceed 2% cross slope or 5% in the direction of travel. Sidewalk access to exterior building doors shall be ADA compliant. Accessible parking stalls shall not exceed 2% slope in any direction.
- Curb ramps on accessible routes shall comply with sections 405 and 406 of the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- Accessible parking spaces shall be provided in accordance with Minnesota Rules 1341.0502 A117.1 Section 502.
- Accessible parking spaces shall include the International Symbol of Accessibility complying with ADA Section 703.7.2.1 painted in the center of the parking space, 4-1/2" high. Hatch handicapped access aises with white 4-inch wide painted stripes 18-inches on center and at 45 degree angles to the stalls.

SITE GRADING:

- Visit the site. Become familiar with the site and existing site conditions including available soil reports. Examine all local conditions at the site, and assume responsibility as to the grades, contours, and the character of the earth, existing conditions, and other items that may be encountered during excavation work above or below the existing grades. Review the drawings and specifications covering this work and become familiar with the anticipated site conditions.
- Unless otherwise noted, all proposed grades shown are finished grades. Finished grades at points between spot elevations shall be uniform slopes between the given grades. All proposed spot elevations shown at curbsides are to bottom of curb (gutterline) unless otherwise indicated.
- At locations where new work connects to existing work, field verify existing elevations and grades prior to beginning the new work. Match existing grades at construction limits.
- Remove all unsuitable material (organic soils, uncontrolled fill, debris, and natural or artificial obstructions) in the zone from 1 m (3.28 feet) below the finished subgrade to finished subgrade in the proposed pavement areas.
- Compact backfill in all utility trenches to 95% Standard Proctor maximum dry density (ASTM D698-78 or AASHTO T-99) from the pipe zone to within 1 m (3.28 feet) below the finished subgrade, and 100% Standard Proctor maximum dry density in the final 1 m (3.28 feet). Provide density tests in backfills and fills placed beneath footings, slabs, and pavements. At least one compaction test is required for every 100 feet of trench at vertical intervals not exceeding one foot.
- Compact all fill placed in pavement areas in accordance with MNDOT Standard Specification 2105.3.F1 (Specified Density). Comply with the requirements of O.S.H.A. 29 CFR, Part 1926, Subpart P, "Excavations" (www.osha.gov).
- Construct all proposed sideslopes with grades not exceeding 3:1 (3 horizontal to 1 vertical), unless otherwise indicated.
- Test roll the building and pavement areas in the presence of the Geotechnical Engineer. Perform base preparation and test rolling prior to curb and gutter construction, placing of gravel base, sand/gravel sub-base, bituminous stabilized base, or plant mixed bituminous base on all street and pavement areas. Test roll the area between 300 mm (12 inches) outside of the back of the curbs on either side of the paved areas. Use a heavy pneumatic-tired roller, towed by suitable tractive equipment, with two wheels spaced not less than 1,800 mm (71 inches) apart (transversely center to center), line size equal to 18x24 or 18x25 (18" wide) inflated to a pressure of 650 kPa (94 psi), and a gross mass of the roller not less than 13.5 metric tons (14.9 tons) and not more than 13.7 metric tons (15.1 tons). Test roll the above specified area in a minimum of three passes in order to compact one of the lines at least once. Operate the roller at a speed of not less than 4 km/h (2.5 mph) and not more than 8 km/h (5 mph). The subgrade shall be considered unstable if, at the time that the heavy roller passes over the subgrade, the surface shows yielding or rutting of more than 2 inches (2 inches), measured from the original surface to the bottom of the rut. Correct any soft spots or displacements which appear during the test rolling by scarifying, aerating or watering, and recompacting as required to obtain stability; or by excavating to solid material and backfilling with material suitable for base construction. Remove material such as vegetation, rubbish, large stones, peat, and wet clay. Retest the area after correction.
- In areas where the proposed grade adjacent to the curb line slopes upward or downward, grade the first 5 feet of lawn area parallel to the curb line at a 20:1 slope before making the transition to 3:1.
- Coordinate inspection and approval of all subgrades within the building and pavement areas with the Geotechnical Engineer. Coordinate inspection and approval of all fill materials prior to placement within the building and pavement areas with the Geotechnical Engineer. Use only uncontaminated fill material.
- Conduct all grading operations in a manner that minimizes the potential for site erosion.
- Grade the site to the finished elevations shown on the plan. Import embankment material, or remove and dispose of excess excavation material as required. Provide waste areas or disposal sites for excess material including, but not limited to, excavated material or broken concrete that is not desirable to be incorporated into the work involved on this project. Determination of material import and export quantities is solely the responsibility of the Contractor and the cost of material import and export is incidental to the contract.
- Tolerances:** The completed subgrade under slabs and pavement areas shall be compacted, free from irregular surface changes, and fine-graded not more than 16 mm (0.05 feet) above or below the specified subgrade elevation. The completed subgrade in other areas shall be compacted, free from irregular surface changes, and fine-graded not more than 30 mm (0.10 feet) above or below the specified subgrade elevation. The completed top of topsoil shall be compacted, free from irregular surface changes, and fine-graded not more than 16 mm (0.05 feet) above or below the specified finished grade elevation.
- Choose equipment and work procedures that will not disturb the subgrade soils. Route construction traffic away from foundation soils and areas of pavements and slabs in order to minimize soil disturbance. If the construction equipment causes rutting or soil pumping, then switch to other types of equipment or methods. The Contractor is solely responsible for the proper selection of construction equipment in order to avoid disturbing soils on the site.
- It is typical to abbreviate spot elevations. Elevations shown as 12.8 or 12.1 are understood to mean 912.8 or 912.1 respectively.

EROSION PREVENTION PRACTICES:

- Delineate the location of areas not to be disturbed (e.g. with flags, stakes, signs, silt fence, etc.) on the development site before work begins.
- Avoid removal of trees and surface vegetation wherever possible. Schedule construction in order to expose the smallest practical area of soil at any given time. Implement appropriate construction phasing, vegetative buffer strips, horizontal slope grading, and other construction practices that minimize erosion.
- Following initial soil disturbance or redistribution, complete permanent or temporary stabilization against erosion as soon as possible, but in no case later than 14 calendar days, on all disturbed or graded areas including stormwater management pond sideslopes. This requirement does not apply to those areas that are currently being used for material storage or for those areas on which grading, site building, or other construction activities are actively underway.
- Provide temporary grass seed cover on all topsoil stockpiles and other areas of stockpiled excavated material in order to prevent soil erosion and rapid runoff during the construction period. Prolonged periods of open, bare earth without grass cover will not be permitted. Stabilize all disturbed greenspace areas with a minimum of 4" topsoil immediately after final subgrade completion. Seed and mulch, or sod and stake these areas within 48 hours after completion of final grading work (weather permitting).
- Stabilize all disturbed areas to be paved using early application of gravel base.
- Apply necessary moisture to the construction area in order to prevent the spread of dust.
- In areas to be permanently stabilized, landscape with decorative rock, plantings, and sod. Refer to the approved Landscape Plan for design and details.
- The street will be swept clean before the end of each day of active construction, when sediment is tracked into the street.
- Areas with slopes greater than 3 to 1 and areas next to wetlands/waterbodies graded or exposed during construction shall be protected with temporary vegetation, mulching or other means as soon as practical.
- No concrete washout shall occur on site unless it is done with an approved Minnesota Pollution Control Agency (MPCA) device or standard.
- Stockpiles shall be surrounded with adequate perimeter control to prevent sedimentation and erosion.
- Site shall be kept clean at all times and refuse properly controlled.
- Temporary pumping shall not be permitted without the use of an approved Minnesota Pollution Control Agency (MPCA) device or standard.
- The contractor shall inspect on a weekly basis and after any rainfall greater than 0.5" all erosion control devices and make any repairs immediately. An inspection log shall be kept on site detailing these inspections and repairs performed.

INFILTRATION AREA:

- Protect the infiltration area from compaction and disturbance of existing soils.
- Schedule the construction so that excavation of the infiltration system to final grade occurs after the contributing drainage areas have been constructed and fully stabilized. Excavate the infiltration areas to within one foot of final grade initially. Delay final excavation of the basin floor until all disturbed areas tributary to the basin are stabilized. Utilize tracked excavation equipment that has relatively light bearing pressures. In order to minimize compaction, no heavy equipment is allowed on the infiltration areas before or after construction.
- Delineate the location of infiltration areas (e.g. with flags, stakes, signs, silt fence, etc.) before work begins so that heavy construction equipment will not compact the soil in the proposed infiltration system.
- Use rigorous erosion prevention and sediment controls (e.g. diversion berms) during the construction of the infiltration system in order to keep sediment and runoff completely away from the infiltration area.
- Inspect all infiltration areas in order to ensure that no sediment from ongoing construction activity is reaching the infiltration areas and that these areas are protected from compaction due to construction equipment driving across the infiltration area.
- Provide dual-ring infiltrometer testing at the infiltration site in order to verify infiltration rates used for the basin design. Perform a minimum of 3 tests at each infiltration site. The tests shall be performed at the bottom elevation of the infiltration basin and shall be performed by a qualified geotechnical professional. Do not begin construction until soil type and infiltration rate verification has been made.
- After final grading, till the floor of the infiltration area to a depth of at least 12 inches in order to provide a wet aerated, porous surface texture. Till in 6 inches of MndOT 3890 Grade 2 Compost Material if the soils become compacted.
- Place all excavated materials downstream and away from the infiltration area during and after excavation.
- Stabilize the bottom and sideslopes of the infiltration area immediately following construction of the basin.
- Use **native** seed mixture equivalent to MNDOT No. 310. Apply seed mixture at a rate of 94.7 kg per hectare (84.5 lbs per acre) in accordance with MNDOT Standard Spec. 2575. Incorporate a Type 3 fertilizer (slow release type with 10 week residual) consisting of 22-5-10 (N-P-K) into the soil at an application rate of 392 kg per hectare (350 lbs per acre) by diskling prior to seeding.
- Establish **patux** seed mix in accordance with MNDOT Standard Spec. 2575.3. Use a Truax type, or equal interseeder drill with at least two seed boxes: a small/fine seed box and a large/coarse seed box. Drill large/luffy seeds to a final planting depth of 10 mm (1/2 inch) to 25 mm (1 inch) deep from the large/luffy seed box. Split the drill rates in half and make two passes over the site in order to decrease competition in drill rows. Scatter small/fine seeds over the soil surface by drop-seeding from the small/fine seed box, or broadcast. Coordinate with the seed vendor to keep the large/luffy seeds separate from the small/fine seeds so that they may be installed from separate seed boxes. Lightly harrow or rake the site following the seeding operation. Pack the site following harrowing in order to ensure a firm seed-bed.
- Comply with the requirements of MNDOT Standard Spec. Table 2575-1 for season of planting **patux** seed mixtures. The appropriate dates for spring seeding are from April 15 through July 20. Fall seeding dates are from September 20 to October 20. Dormant seeding dates are from October 20 to November 15. Dormant seeding will only be allowed if the maximum soil temperature at a depth of 25 mm (1 inch) does not exceed 10 degrees C (50 degrees F) in order to prevent germination. When the dates in the season of planting prohibit seeding of the permanent seed mixture, apply temporary seeding and mulch in order to comply with the requirements of the GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY and then apply permanent seeding at a later date.
- Maintain Areas Planted With Native Seeds: To reduce weed establishment, mow 2 to 3 times (30 days apart) during the first year with the mower deck about 6" - 8" off the ground. Mow one time during the 2nd year before weeds set their seeds. Mow once every 3 to 5 years following the initial 2 years of maintenance in order to remove dead plant material and stimulate new seed.
- Furnish and install infiltration area marker 3X-6A (MNDOT Spec. 2561).
- Install detectable underground marking tape directly above all pvc, polyethylene, and other nonconductive underground utilities at a depth of 18 inches below finished grade, unless otherwise indicated. Bring the tape to the surface at various locations in order to provide connection points for locating underground utilities. Install **grass** Rhino TriView Flex Test Stations, or approved equal, with black caps at each surface location.
- Temporarily bulkhead inlet and construct the final infiltration pond off line in order to establish vegetation prior to sending water to the basin.
- Perform all the soil amendments before the landscape installation phase. The infiltration basin area shall be live planted. Install fox sedge grass plugs planted 18 inches on center. Upon completion of the seeding, cover all areas of the infiltration basin with erosion control blanket (e.g. MndOT Category 0, net free). Cut slits through the erosion control blanket for live plantings on basin bottom in order to insure that planted plugs penetrate blanket into soil media. Stake blanket on slopes and basin bottom, in accordance with manufacturer's recommendation.

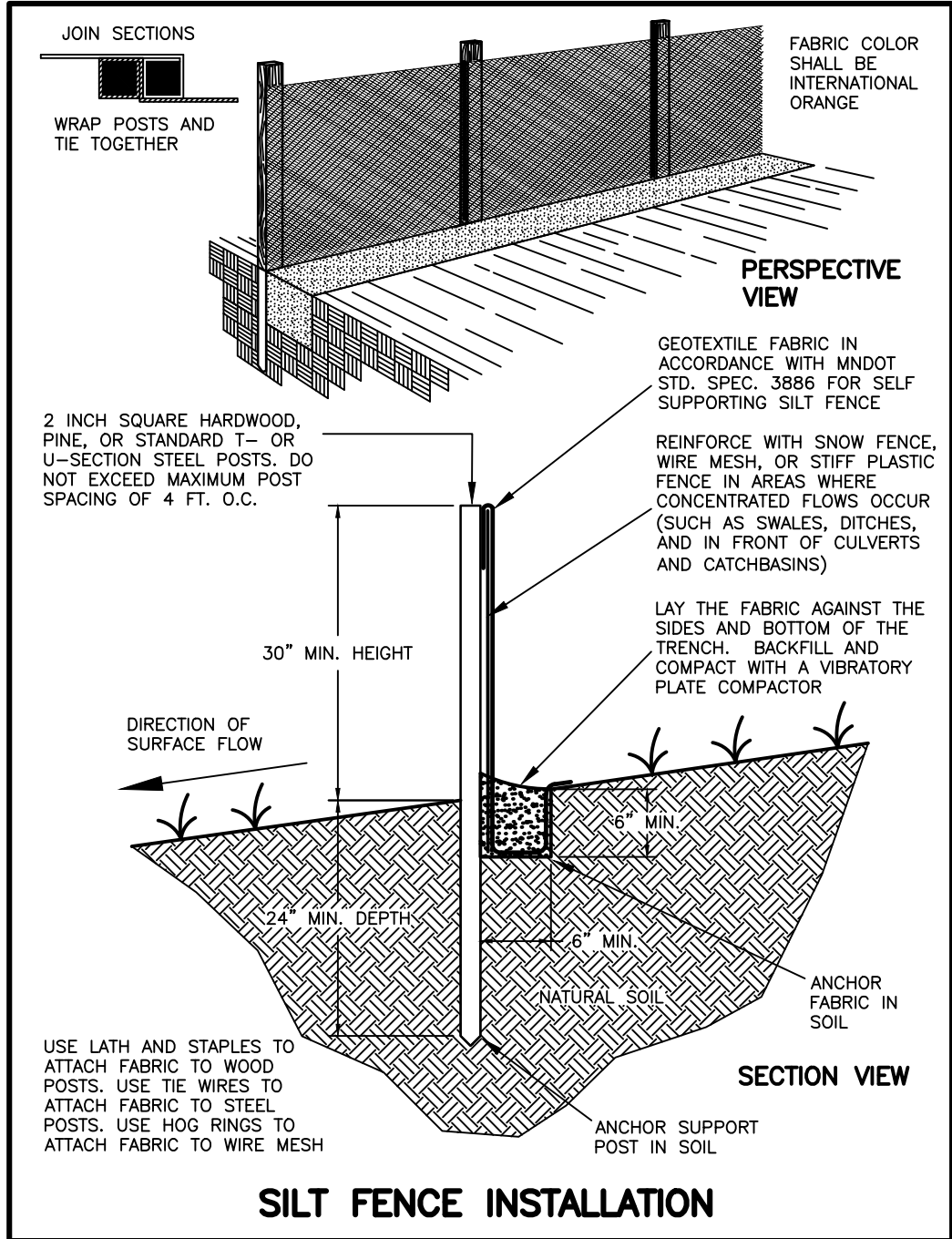
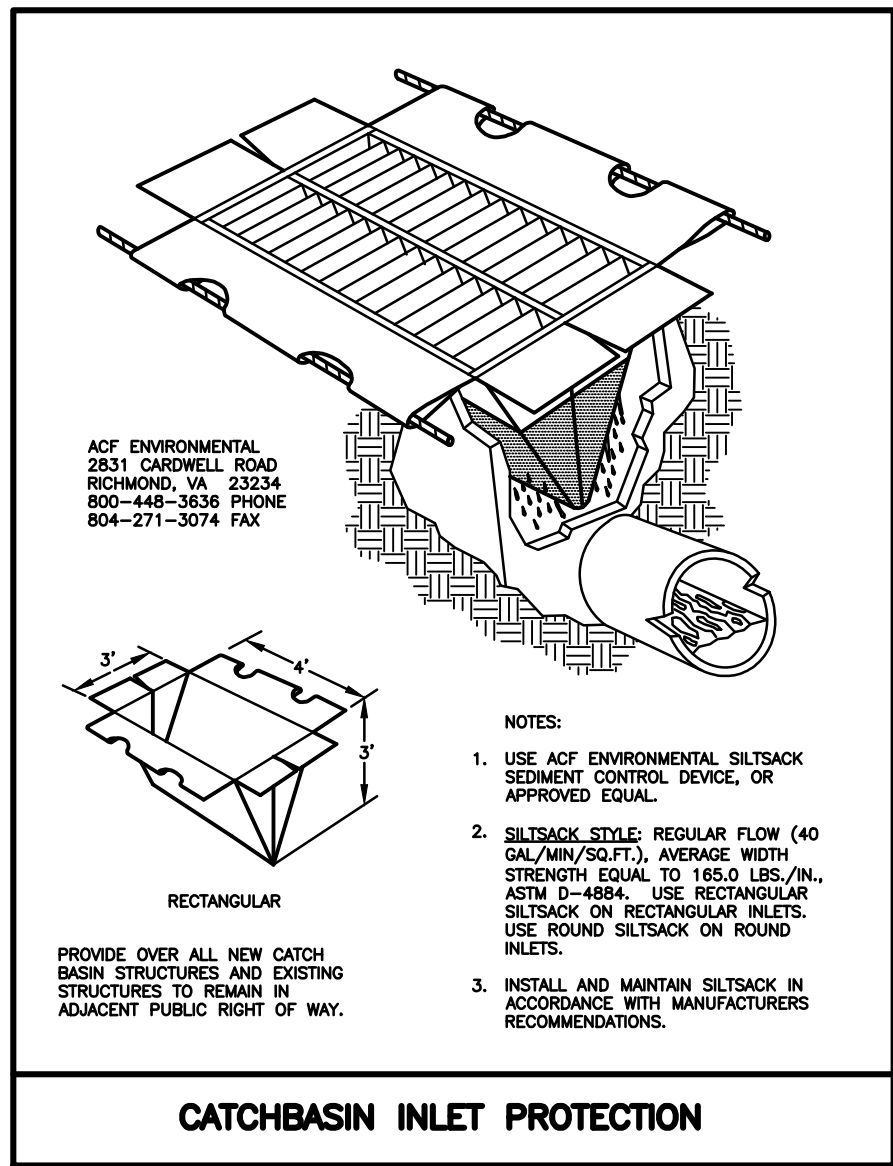
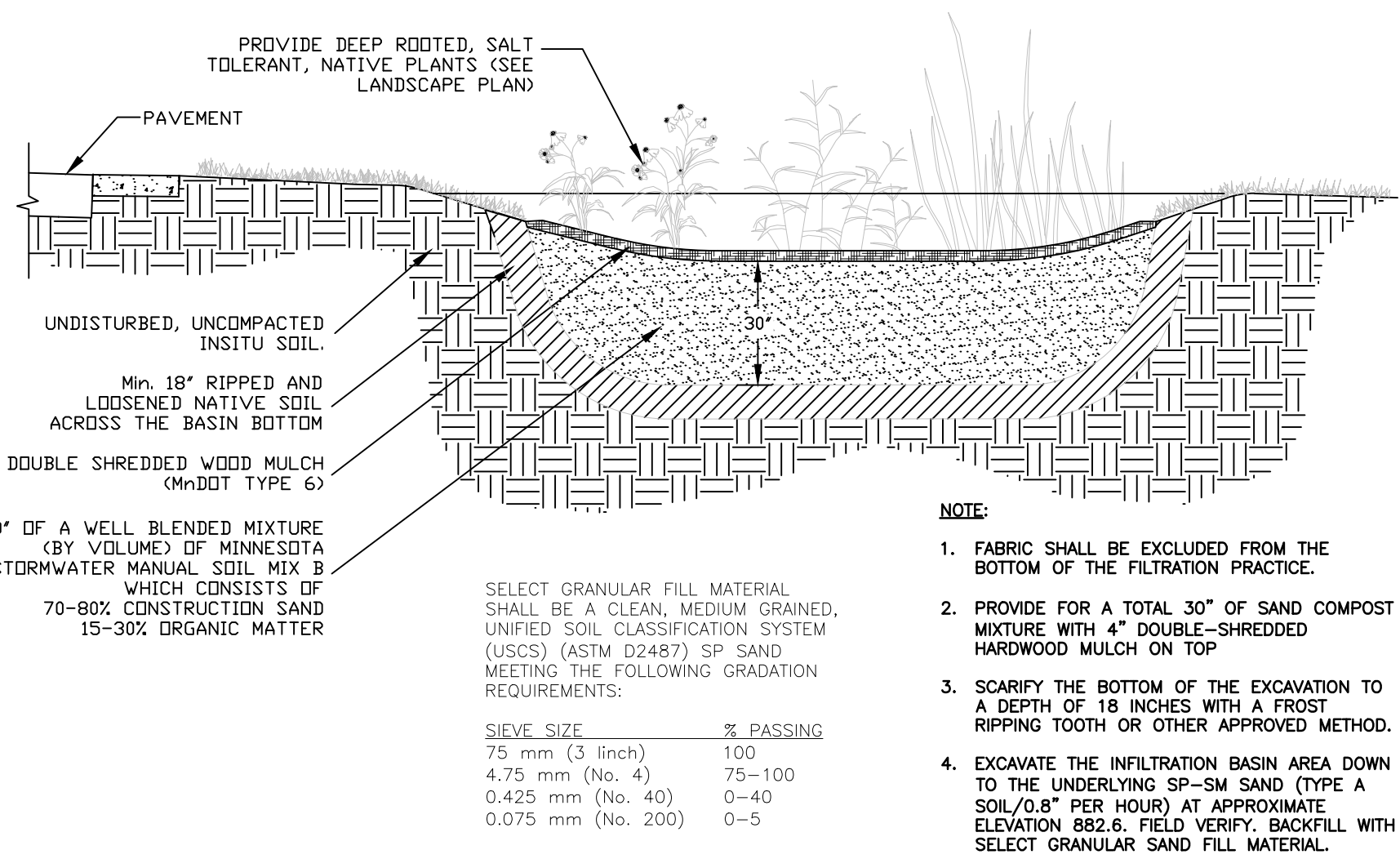
MATERIALS:

- Storm Sewer Inlet Protection (areas with pedestrian or vehicle traffic):** Emergency overflow is required. Take care to protect the catch basin curb-box from additional sediment escaping over the top of these devices while still allowing for emergency overflow.
- Road Drain Curb & Gutter:** With replaceable filter sock. Manufactured by WIMCO, 799 Theis Drive, Shakopee, MN 55379, Phone (952) 233-3065, (www.roaddrain.com).
- Silt Sock:** Type B, regular flow (50 gpm/ft2), with curb deflector as required. Rectangular siltsock on rectangular inlets. Round siltsock on round inlets. Manufactured by ACT ENVIRONMENTAL, 2831 Cardwell Road, Richmond, VA 23234, Phone (800) 448-3636, (www.actenvironmental.com).
- Dandy Sock:** With curb filter as required. Manufactured by DANDY PRODUCTS, 1095 Harcourt Road, Mount Vernon, OH 43050, Phone (800) 591-2284, (www.dandyproducts.com).
- Dandy Bags:** With curb filter as required. Manufactured by DANDY PRODUCTS, 1095 Harcourt Road, Mount Vernon, OH 43050, Phone (800) 591-2284, (www.dandyproducts.com).
- Sedguard Filter:** With Sedguard curbguard as required. Available from ERO-TEX, N94 W14330 Garwin Mace Drive, Menomonie Falls, WI 53051, Phone (866) 437-6839, (www.ero-tex.net).
- Topsoil:** Topsoil used for finish grading of areas to be turfed or planted shall meet the requirements of MNDOT Standard Specification 3877 for topsoil borrow modified to contain no more than 35% sand. Topsoil shall be reasonably free of subsoil, heavy clay, coarse sand, stones, and other objects over 51 mm (2 inches) in diameter; and without plants, roots, sticks, and other objectionable material.
- Geotextile Fabric for Subgrade Stabilization (if required):** MNDOT Standard Specification 3733 Type V permeable geotextile material, e.g. 3137 CA-1, CA-2, or CA-3 Coarse Aggregate, or equal.
- Supporting Posts for Siltfence:** 51 mm (2 inch) square or larger hardwood, pine, or standard T- or U-section steel posts. T- or U-section steel posts shall weigh not less than 1,802 kg per meter (1.25 lb per lined foot). Posts shall have a minimum length of 1524 mm (5 feet). Posts shall have projections to facilitate fastening the fabric and prevent slippage.
- Siltfence Fabric:** MNDOT Standard Specification 3886 self supporting silt fence. Furnish in a continuous roll in order to avoid splices. Geotextile fabric shall be uniform in texture and appearance and have no defects, flaws, or tears. The fabric shall contain sufficient ultraviolet (UV) ray inhibitor and stabilizers to provide a minimum two-year service life outdoors. Fabric color shall be international orange.
- Aggregate for Temporary Rock Construction Entrance:** 25 mm (1 inch) to 50 mm (2 inch) diameter rock, MNDOT Standard Specification 3137 CA-1, CA-2, or CA-3 Coarse Aggregate, or equal.
- Geotextile Fabric for Temporary Rock Construction Entrance:** MNDOT Standard Specification 3733 Type V permeable geotextile fabric material, e.g. 3137 CA-1, CA-2, or CA-3 Coarse Aggregate, or equal.
- Block and Rock Inlet Filters:** Block and Rock Inlet Filters consist of open-core concrete masonry blocks, wire screen with 12 mm (0.5 inch) openings, and washed rock. Place open-core concrete masonry blocks lengthwise on their sides around the catchbasin inlet. Place wire screen around the perimeter to the top of the block barrier before the rock is placed. The screen acts to prevent the rocks from being washed through the blocks. Place rock against the wire mesh to the top of the blocks. Use 25 mm (1 inch) to 50 mm (2 inch) diameter rock, MNDOT Standard Specification 3137 CA-1, CA-2, CA-3, or equal Coarse Aggregate. Install two courses of 8" blocks in order to form a barrier height of 16".
- Concrete Block for Block and Rock Inlet Filter:** Standard units with nominal face dimensions of 16 x 8 inches. Minimum 8 inches nominal depth.
- Wire Screen for Block and Rock Inlet Filter:** 12 mm (0.5 inch) openings
- Bales:** Tightly bound bales of unrotted hay, straw, or other grass locally available from recent cuttings.
- Erodigradable Erosion Control Blankets:** In accordance with MNDOT Standard Specification 3885.
- Erosion Control Matting:** LandLok TRM 450 Turf Reinforcement Mat manufactured by Propex, Inc. (www.geotextile.com), or approved equal soil erosion control matting.
- Staples:** Staples used to anchor erosion control blankets shall be U-shaped, 3 mm diameter or heavier steel wire. The span width at the crown shall be a minimum of 25 mm (1 inch). Staples shall have a length of 250 mm (10 inches) or more from top to bottom after bending.
- Bio-Loks:** Curlex Sediment Log, as manufactured by American Excelsior Company (www.curlex.com), or approved equal. Erosion fibers shall be weed seed free, TYPE III 9-inch (23-cm) diameter. Excelsior color shall be standard (natural). Netting at each end of the log shall be secured to assure fiber containment.

INSPECTIONS AND MAINTENANCE:

- Inspect the entire construction site at least once every 7 days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in a 24-hour period. Following an inspection that occurs within 24 hours after a rainfall event, the next inspection must be conducted within 7 days after that rainfall event.
- Inspect all erosion prevention and sediment control BMPs, infiltration areas, and stabilized areas.
- Record all inspections and maintenance conducted during construction in writing and keep these records. The inspections and maintenance records must include date and time of inspections, date and amount of all rainfall events greater than 0.5 inches in a 24-hour period, name of person(s) conducting inspections, findings of inspections, recommendations for corrective actions, and any corrective actions taken.
- Inspect all erosion prevention and sediment control BMPs in order to ensure integrity and effectiveness. Repair, replace, or supplement any nonfunctional BMPs with functional BMPs within 24 hours after discovery, or as soon as field conditions allow access unless another time frame is specified.
- Remove accumulated sediment deposits from behind erosion and sediment control devices as needed. Do not allow sediment to accumulate to a depth of more than one-third of the height of the erosion and sediment control devices. Repair, replace, or supplement deteriorated, damaged, rotted, or missing erosion control devices within 24 hours of discovery, or as soon as field conditions allow access.
- Repair, replace, or supplement all silt fences when they become nonfunctional or the sediment reaches 1/3 of the height of the fence. These repairs must be made within 24 hours of discovery, or as soon as field conditions allow access.
- Clean sedimentation basins, storm sewer catch basins, ditches, and other drainage facilities as required in order to maintain their effectiveness. Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches 1/2 of the storage volume. Drainage and removal must be completed within 72 hours, or as soon as field conditions allow access.
- Inspect surface waters (including drainage ditches and conveyance systems) for evidence of erosion and sediment deposition. Remove all deltas and sediment deposited. Stabilize areas where sediment removal results in exposed soil. Removal and stabilization must be completed within 7 days of discovery unless precluded by legal, regulatory, or physical access constraints. If precluded, removal and stabilization must take place within 7 days of obtaining access.
- Inspect construction site vehicle exit locations for evidence of off-site sediment tracking onto paved surfaces. Remove all soils and sediments tracked or otherwise deposited onto adjacent property, pavement areas, sidewalks, streets, and alleys. Remove shoes to be on a silt pad throughout the duration of the construction. Clean paved roadways by shoveling or wet-sweeping. Do not dry sweep. If necessary, scrape paved surfaces in order to loosen compacted sediment material prior to sweeping. Haul sediment material to a suitable disposal area. Street washing is allowed only after sediment has been removed by shoveling or sweeping.
- Perform any corrective measures ordered by the City or Watershed District within 24 hours of notification. Install any additional erosion protection or sediment control measures deemed necessary by the City or Watershed District within 24 hours of notification.

INFILTRATION BASIN



TEMPORARY ROCK CONSTRUCTION ENTRANCE

NINE MILE CREEK WATERSHED NOTES:

- Provide soil borings at the infiltration sites in order to screen for soil contamination. Provide a geotechnical report including visual and odor analysis as the boring is taken.
- All erosion control measures shown on the plans must be installed prior to commencement of grading operations and be maintained until all areas altered on the site have been restored.
- If silt fence is used, the bottom flap must be buried and the maximum allowable spacing between posts is 4-foot on center. All posts must be at least 2-inch x 2-inch pine, hardwood, or steel fence posts. If hay bales are used, all bales must be staked in place and reinforced on the downstream side with snow fence.
- All areas altered because of construction must be restored with seed and disced mulch, sod, wood fiber blanket, or be hard surfaced within two weeks after completion of construction.
- Upon completion of construction and restoration of areas disturbed, the Contractor is responsible for the removal of all erosion control measures installed throughout the project site.
- At all entryways onto the site, a rock filter dike being a minimum of two feet in height and having maximum side slopes of 4:1 must be constructed. This rock filter dike will enable construction traffic to enter the site and also provide an erosion control facility.
- Notify the NMCWD a minimum of 48 hours prior to commencement of construction.
- If dewatering is required and sump pumps are used, all pumped water must be discharged through an erosion control facility prior to leaving the construction site. Proper energy dissipation must be provided at the outlet of the pump system.
- Relocate overhead power, telephone, and cable lines as required. Seal and report any existing unused on-site wells and septic systems in accordance with Minnesota Department of Health (MDH) requirements. Provide the MDH with the Boring Sealing Record, or certify in writing that there are no unused wells on the property.
- Classification of soils at the site of the infiltration sites must be provided to the Nine Mile Creek Watershed District for review and approval before a permit will be issued. Provide a soil boring, test pit, or hand auger boring at each infiltration basin location in order to verify the soil classification and to verify that ground water is not within 3 feet of the bottom of the infiltration system. Classification of the soils shall be performed by a qualified geotechnical specialist.



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DATE	REVISION
11/15/21	ORIGINAL PLAN DATE
1/7/22	REVIEW SET
12/20/22	REVIEW SET
3/9/23	WATERSHED DISTRICT COMMENTS

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Mike R. Kettler
DATE: 11/15/21 REG. NO.: 40425

INFORMATION:

PROJECT NO.: 21-500

DRAWN BY:

CHECKED BY: MK

APPROVED BY: MK

SCALE:

DATE:

DESCRIPTION:

NOTES AND
DETAILS

SHEET NO:

C3