

City of Prior Lake
Public Works Design Manual

September 2022

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FORWARD

Since the City assumes perpetual ownership, maintenance and operation of the public infrastructure facilities referenced herein together with the inherent obligation and responsibility associated with the ownership thereof, it is necessary to ensure these facilities are designed and installed in a manner which minimizes the City's future financial and operational liabilities. The purpose of the **Public Works Design Manual** is to provide a standard for developers, builders, and their engineers, as well as City engineering and consulting engineering personnel, for use in design, construction, and connection to public infrastructure facilities within the City. This manual serves as a reference for engineering guidelines that must be incorporated into the design, plan and specification preparation.

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PART I

DESIGN AND CONSTRUCTION STANDARDS

This information has been prepared to assist developers, builders, and engineers in the development of final plans and specifications in the City of Prior Lake. It is not intended to be, nor should it be used as a specification for any improvement, but rather a guideline to be used in the preparation of such documents.

Design and construction work shall conform to the most recent editions of the following:

- Mn/DOT Standard Specifications for Construction
- City Engineers Association of Minnesota Standard Utilities Specifications
- Minnesota Stormwater Manual
- Recommended Standards for Water Works (Ten States' Standards)
- Recommended Standards for Wastewater Facilities (Ten States' Standards)
- National Urban Runoff Program (NURP)
- Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways
- Mn/DOT Road Design Manual
- NPDES
- MS4

or as modified herein and the most recent City of Prior Lake Standard Detail Plates, General Specifications and Comprehensive Plans.

A copy of City of Prior Lake's General Specifications with Standard Detail Plates, and the comprehensive plans are available on the City website.

Prior to beginning construction, all regulatory agency permits and approvals shall be obtained including the following, but not limited to:

- Army Corps of Engineers
- City of Prior Lake
- Scott County
- Metropolitan Council
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Pollution Control Agency
- Prior Lake-Spring Lake Watershed District
- Scott Watershed Management Organization
- Wetland Conservation Act

**SECTION ONE:
GRADING, EROSION AND SEDIMENT CONTROL, AND SITE RESTORATION:**

Grading, erosion and sediment control, and site restoration plans shall be completed in accordance with the most recent editions of the **MnDOT Standard Specifications for Construction**, the **Minnesota Stormwater Manual**, the **NPDES Construction Stormwater Permit**, and the **City's MS4 General Permit**, as applicable. Site erosion and sediment control requirements are in addition to the **Stormwater Pollution Prevention Plan (SWPPP)** as required by the **NPDES Construction Stormwater Permit**. All sites must comply with the **NPDES Construction Stormwater Permit** in accordance with **Minnesota Pollution Control Agency (MPCA)** rules.

The City requires the following for submittal of grading, erosion and sediment control, and site restoration plans:

Grading Standards

- 1.1 Grading, Erosion and Sediment Control, and Site Restoration Plans shall be designed and signed by a civil engineer licensed in the State of Minnesota**
- 1.2** Show adjacent plats, parcels, property lines, section lines, streets, existing storm drains and appurtenances, etc.
- 1.3** Show all existing and proposed contours.
- 1.4** Required standard is 1' contours with existing contours shown as grey dashed and proposed contours shown as solid. Extend existing 1' contour lines a minimum of 200' beyond the property boundary or more as determined by the City Engineer to accurately depict the existing drainage patterns.
- 1.5** Maximum slopes of 4:1 (Horizontal:Vertical) and minimum slopes of 2% are allowed.
- 1.6** Maximum length for drainage swales shall be 300 feet. Backyard drainage structures should be avoided. All drainage swales shall be stabilized in accordance with NPDES Construction Stormwater Permit requirements prior to the issuance of Building Permits.
- 1.7** Show lot corner elevations.
- 1.8** Show benchmarks utilized.
- 1.9** Show building elevations.
- 1.10** Show house type, garage floor, low floor, low opening and rear pad elevations. Also show house style detail drawing.
 - Building elevations must follow the requirements of the Zoning Ordinance and Part I - Section Three – Hydrology
- 1.11** Show driveway grades
 - Driveway grades shall be between 2% and 10% unless otherwise approved by the City Engineer.

- Show design details for ponds and water bodies in accordance with Part I - Section Three – Hydrology
- 1.12**
- Show the OE and HWL for constructed stormwater ponds and the OHW for water bodies on the plans.
- 1.13** Quantify proposed disturbed area and impervious area. Show limits of clearing and limits of grading on grading plan and tree preservation plan. Show removal of all trees and brush that will occur below the NWL of existing and newly created ponding areas.
- 1.14** Show all proposed retaining walls
- Retaining walls exceeding 4' in height shall require a plan prepared by a licensed engineer submitted for review and approval by the Building Official prior to permit issuance
 - Provide top and bottom of wall elevations at beginning and end of wall, at point of maximum height, and at points along the length of wall to adequately describe the retaining wall and to display final grading accurately.
 - Retaining walls are not allowed in easements or public rights-of-way
 - The construction of any retaining walls within the easements or public right-of-way will need prior approval of the City Engineer.
 - All retaining walls that need to be constructed in public right-of-way:
 - shall be a modular concrete block retaining wall system.
 - shall be non-deteriorating and virtually maintenance free.
 - will require the submittal of detailed plans and specifications for a review by City staff.
- 1.15** Show wetlands, wetland buffers, and wetland buffer sign locations on the grading plan.
- 1.16** Show all emergency overflow high point and drainage arrows for low points and water bodies.
- 1.17** Show emergency overflow routes using arrows from all low points in the street and greenspaces and show elevation of high points along emergency overflow route. All emergency overflow routes shall be graded, and the easement area sodded prior to Building Permit issuance.
- 1.18** Show construction limits and areas not to be disturbed.
- 1.19** Provide note on the plans specifying that sediment control BMPs shall be installed by the contractor and inspected by the City before any land disturbing activities can occur.
- 1.20** A minimum of 10 feet beyond the house pad shall have a slope less than 10:1 unless otherwise approved by the City Engineer.
- 1.21** Show or define access routes for maintenance purposes to all stormwater infrastructure and ponding areas (maximum of 8% grade, maximum of 2% cross slope, and minimum of 10' wide). Drainage and utility easements shall be dedicated at the time of final platting to provide this access.

**SECTION TWO:
STORM SEWER:**

Storm sewer design shall be completed in accordance with the most recent editions of the MnDOT Standard Specifications for Construction and the Minnesota Stormwater Manual, as applicable.

GENERAL STORM SEWER DESIGN

The following are specific requirements related to the design of storm sewer:

- 2.1** Show or define access routes for maintenance purposes to all stormwater infrastructure and ponding areas (maximum of 8% grade, maximum of 2% cross slope, and minimum of 10' wide). Drainage and utility easements shall be dedicated at the time of final platting to provide this access.
- 2.2** Drainage calculations shall be submitted to show the sizing of pipe, ponds, emergency overflow spillways, and inlet capacity analysis.
- 2.3** Storm sewer facilities shall use design criteria utilizing a rational or hydrograph method based on sound hydrologic theory to analyze the storm water runoff and proposed development. (Such as the Soil Conservation Service TR-55 Urban Hydrology for Small Watersheds)
- 2.4** Storm sewer facilities shall be designed for a 10-year, 24-hour rainfall event (NRCS MSE3 rainfall distribution) for local pipe design and a 100-year, 24-hour rainfall event (NRCS MSE3 rainfall distribution) for ponding detention basin design and trunk facilities.
- 2.5** The storm sewer alignment placed along the curb alignment shall be along the curb opposite the watermain to maintain the 10' separation.
- 2.6** Catch basins shall be located on the tangent section of the curb at a point 3' from the point of curve. Mid-radius catch basins are not allowed. Catch basins shall be designed to collect drainage on the upstream side of the intersection. Catch basins shall be located at property lines.
- 2.7** The maximum spacing between manholes is 400 feet.
- 2.8** The minimum pipe size allowed is 15" diameter.
- 2.9** The slope shall not be less than 0.5% unless approved by the City.
- 2.10** The invert elevation of pond inlet pipes shall match the normal water elevation of the pond.
- 2.11** Any connections to existing manholes or catch basins shall be core drilled or the opening cut out with a concrete saw. No jack hammering or breaking the structure is permitted. All connections to an existing system require a manhole for access.
- 2.12** Manholes within paved surfaces shall be located outside of wheel paths, (3' and 9' off centerline).
- 2.13** Type of pipe within right-of-way shall be Reinforced Concrete Pipe (RCP).
- 2.14** Flared end sections shall be placed at all locations where the storm sewer outlets. All flared end sections (inlet and outlet) shall be RCP.

- 2.15 The last three pipe joints from the flared end section shall be tied together.
- 2.16 Riprap and filter blanket shall be placed at all outlet flared end sections in accordance with the current MnDOT standard plate riprap detail.
- 2.17 Installation of Public Utilities or utilities to be maintained by the City including storm sewer on private property shall be installed within a drainage and utility easement. The minimum drainage and utility easement width shall be dictated by depth as indicated below:

| Depth | D&U Width |
|-----------------|-----------------------|
| 10 feet or less | 20 feet |
| 15 feet or less | 30 feet |
| 20 feet or less | 40 feet |
| 20 feet + | City Council approval |

- 2.18 Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles.
- 2.19 Sump manholes with a minimum 4 foot sump shall be constructed at the last road-accessible structure prior to discharge to any receiving water or stormwater pond.
- 2.20 Pond outlets shall provide oil skimming for the 10-year design storm event. A manhole with a baffle wall with orifice or notch is recommended to control rate. Outlet rate control manholes shall have a top mitered to conform to fill in accordance with Plate #304.
- 2.21 All storm sewer structures outside of roadway areas must have marking signs. Signs shall be green "Rhino Marking Posts" or approved equal and shall be shown on the plans (see Plate #103).
- 2.22 Pipe class shall conform to design standards as shown in the American Concrete Pipe Association LRFD Fill Height Tables. All 12", 15" and 18" pipe shall be Class V.

Submittals

- 2.23 Upon completion of the sanitary utility work, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

Specifications

- 2.24 See the current City of Prior Lake General Specifications and Standard Detail Plates for further storm sewer construction requirements and for additional information.

SECTION THREE: HYDROLOGY:

These rules are based on the policies and requirements set forth in the City of Prior Lake Local Surface Water Management Plan (LSWMP), the Water Resource Management Plan and Rules of the Prior Lake-Spring Lake Watershed District (PLSLWD), and the Comprehensive Water Resource Management Plan and Rules of the Scott Water Management Organization (Scott WMO).

Water resources requirements described in this section are in addition to the requirements of the City's Municipal Separate Storm Sewer System (MS4) general permit. All sites meeting the minimum MS4 thresholds must comply with the MS4 Permit in accordance with Minnesota Pollution Control Agency (MPCA) rules.

Index of Sub-Sections

- SUB-SECTION 3.1 DEFINITIONS**
- SUB-SECTION 3.2 STORMWATER MANAGEMENT**
- SUB-SECTION 3.3 DRAINAGE ALTERATIONS AND FLOODPLAIN MANAGEMENT**
- SUB-SECTION 3.4 WETLANDS**
- SUB-SECTION 3.5 POND DESIGN CRITERIA**

SUB-SECTION 3.1: DEFINITIONS

Best Management Practices (BMPs): Practices to prevent or reduce the pollution of the waters of the state, including schedules of activities, prohibitions of practices, and other management practices, and also includes treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge, or waste disposal or drainage from raw material storage. [Minn. R. 7001.1020, Subp. 5]. BMPs include practices documented in the Minnesota Stormwater Manual (MPCA), Protecting Water Quality in Urban Areas (MPCA, 2000), and other MPCA manuals, all as amended.

Buffer: An area of natural, unmaintained, vegetated ground cover abutting or surrounding a watercourse or wetland measured from the delineated edge of the wetland.

Buffer Averaging: Varying the width of a buffer while maintaining compliance with all buffer requirements outlined in Sub-Section 3.4, Wetlands. A buffer around a wetland may have variable width as long as minimum buffer width requirements are met; however, there may be exceptions made to the minimum buffer width due to roadway alignment. The overall buffer area must be equal in area to a corresponding fixed width buffer around the same wetland, set at the average width.

Common Plan of Development or Sale: A contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. One plan is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land-disturbing activities may occur. [Minn. R. 7090].

Construction Activity: Activities including clearing, grading, and excavating, that result in land disturbance of equal to or greater than one acre, including the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one acre. This includes a disturbance to the land that results in a change in the topography, existing soil cover, both vegetative and nonvegetative, or the existing soil topography that may result in accelerated stormwater runoff that may lead to soil erosion and movement of sediment. Construction activity

does not include a disturbance to the land of less than five acres for the purpose of routine maintenance performed to maintain the original line and grade, hydraulic capacity, and original purpose of the facility. Routine maintenance does not include activities such as repairs, replacement and other types of non-routine maintenance. Pavement rehabilitation that does not disturb the underlying soils (e.g., mill and overlay projects) is not construction activity. [Minn. R. 7090].

EOF: Emergency Overflow.

Expandable Ponding: Ponds built in low areas common to multiple developments that can be easily expanded when neighboring areas develop.

Fully Reconstructed: Areas where impervious surfaces have been removed down to the underlying soils. Activities such as structure renovation, mill and overlay projects, and other pavement rehabilitation projects that do not expose the underlying soils beneath the structure, pavement, or activity are not considered fully reconstructed. Maintenance activities such as catch basin repair/replacement, utility repair/replacement, pipe repair/replacement with same hydraulic capacity, lighting, and pedestrian ramp improvements are not considered fully reconstructed. [Minn. R. 7090].

HWL: High water level of a pond or basin resulting from the 100-year, 24-hour storm.

Landlocked Basin: Any depression with a contributing drainage area greater than 1 acre that does not have a natural surface outflow below the level of the 100-year flood elevation as determined by the 100-year, 10-day runoff event. Prior Lake is not considered to be a landlocked basin.

Linear Project: Construction of new or fully reconstructed roads, trails, sidewalks, or rail lines that are not part of a common plan of development or sale. For example, roads being constructed concurrently with a new residential development are not considered linear projects because they are part of a common plan of development or sale. [Minn. R. 7090].

Low Opening: Lowest opening of a structure. This includes the top of an egress pit if poured with building foundation.

LSWMP: Local Surface Water Management Plan.

Maintained Area: Turf grass or landscaped area that receives regular maintenance such as mowing or mulching.

Maximum Extent Practicable (MEP): The statutory standard (33 U.S.C. 1342(p)(3)(B)(iii)) that establishes the level of pollutant reductions that an owner or operator of regulated MS4s must achieve. The USEPA has intentionally not provided a precise definition of MEP to allow maximum flexibility in MS4 permitting. The pollutant reductions that represent MEP may be different for each small MS4, given the unique local hydrologic and geologic concerns that may exist and the differing possible pollutant control strategies. Therefore, each permittee will determine appropriate BMPs to satisfy each of the six Minimum Control Measures (MCMs) through an evaluative process. The USEPA envisions application of the MEP standard as an iterative process. [Minn. R. 7090]

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains:

- Owned or operated by a state, city, town, county, district, association, or other public body, created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, stormwater, or

other wastes, including special districts under state law such as a sewer district, flood control district, or drainage district or similar entity, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management Agency under section 208 of the federal Clean Water Act, United States Code, title 33, section 1288, that discharges into waters of the state;

- Designed or used for collecting or conveying stormwater;
- That is not a combined sewer; and
- That is not part of a publicly owned treatment works as defined in 40 CFR 122.2.

Municipal separate storm sewer systems do not include separate storm sewers in very discrete areas, such as individual buildings. [Minn. R. 7090.0080, Subp. 8]

MS4 Permit: MPCA General Permit authorizing the discharge of stormwater associated with small Municipal Separate Storm Sewer Systems (MS4) under the NPDES/SDS permit program; Permit No. MNR040000.

Net Acre: Total land area minus any wetland, lake, or bluff acreage.

New Development: All construction activity that is not defined as redevelopment.

No-grade zone: An area where no change in grade is allowed.

NPDES Construction Stormwater Permit: MPCA General Permit authorizing the discharge of stormwater associated with construction activity under the NPDES/SDS Program; Permit No. MNR100001.

NWL: Normal water level, the elevation of the permanent wet pool for a pond or basin.

OE: Outlet Elevation, the primary outlet elevation of a pond or basin.

OHW: Ordinary High Water level.

Redevelopment: Any construction activity where, prior to the start of construction, the areas to be disturbed have 15 percent or more of impervious surface(s).

Reduce: Reduce to the Maximum Extent Practicable (MEP) unless otherwise defined in the context in which it is used.

Regional ponding: Permanent stormwater facility used to provide rate control and water quality treatment for an area that encompasses two or more entities (including but not limited to developments, subdivisions, building additions, and conditional uses).

Stormwater: Stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Management Overlay District: An area within the City that has a separate set of standards, generally defined by a tributary feature (Example: Any area draining to the Prior Lake Outlet Channel).

Structural Stormwater BMP: A stationary and permanent BMP that is designed, constructed, and operated to prevent or reduce the discharge of pollutants in stormwater.

Swale: A wide, shallow, vegetated depression in the ground designed to channel drainage of water.

Tributary Area: Total land area that drains into a pond, wetland, ditch, stream, reach, or other point of interest on site in the existing condition, prior to any drainage alterations or landlocked basin connections.

Volume Control: Limiting volume of stormwater by impounding water for extended durations within a tributary area.

Volume Storage: Volume set aside for holding stormwater below a natural or created outfall that during hydrologic variation mitigates effects of increased stormwater volume.

SUB-SECTION 3.2: STORMWATER MANAGEMENT

3.2.i. General Standards

A hydrologic method, based on sound hydrologic theory must be used to analyze runoff for the design of stormwater conveyance systems and permanent stormwater facilities. Curve numbers shall follow recommendations of SCS Technical Release 55, Second Edition (TR-55, 1986), unless otherwise specified by PLSLWD Rule D, Section 3(g).

Rate and volume control and a Stormwater Management Report are required for all development, redevelopment, or change in use that results in a net increase of 3,500 square feet or more of impervious surface and includes more than 10,000 square feet of land disturbing activity.

A PLSLWD permit may be required if new development or redevelopment of a parcel riparian to a public water that increases from existing conditions the percent of impervious surface and requires a variance from the City's shoreland ordinance for the percent impervious surface limit for the property.

3.2.ii. Stormwater Management Report

Calculations shall be submitted showing proposed design elements that meet requirements of this Section. A narrative describing the proposed system shall accompany this collection of calculations. The stormwater narrative shall be a brief and clear description of the stormwater system that summarizes and reference figures, tables, and plan sheets. The following are the minimum summary/narrative elements:

- Narrative describing the proposed system, referencing requirements in this Section
- Summary of existing and proposed offsite runoff rates and volumes
- Summary of volume control requirements
- Narrative describing volume control method and why it was chosen
- Summary of volume control system showing that it meets requirements
- Existing and proposed drainage maps
- Walker method calculations

3.2.iii. Rate Control

NOAA Atlas 14 precipitation depths resulting from the 2-, 10- and 100-year, 24-hour storm events (NRCS MSE3 rainfall distribution) shall be modeled for existing and proposed conditions. NOAA Atlas 14 precipitation depths for Prior Lake are 2.84", 4.22" and 7.39" for the 2-, 10- and 100-year, 24-hour storm events, respectively.

- Rate Control Standard:
Peak discharge rates for the developed condition shall not exceed pre-development peak discharge rates at each point of site discharge for the 2-, 10-, and 100-year, 24-hour storm events. Discharge rates at a particular point of discharge may increase if there is adequate conveyance capacity and this increase is offset by a decrease at another point of discharge to the same receiving water.

Runoff rates may be required to be restricted to less than the pre-development rates when necessary due to the capacity of downgradient stormwater conveyance structures and features.

- Stormwater Management Overlay District #1 – Prior Lake Outlet Channel: (Figure 1)
Rate control for areas tributary to the Prior Lake Outlet Channel shall hold total offsite peak runoff at or below the following schedule:
2-year, 24-hour event: no increase from existing peak discharge rate
10-year, 24-hour event: no increase from existing peak discharge rate
100-year, 24-hour event: 0.25 cfs per acre

3.2.iv. Volume Control

Sites (excluding linear projects) must capture and treat a water quality volume calculated as one (1) inch times the sum of the new and fully reconstructed impervious surface.

Linear project sites must provide a water quality volume calculated as the larger of one (1) inch times the net increase in impervious surface or one-half (0.5) inch times the sum of the new and the fully reconstructed impervious surface.

Additional requirements for volume control are incorporated by reference:

- For sites within the Prior Lake-Spring Lake Watershed District, PLSLWD Rule D shall govern
- For sites within the Scott Watershed Management Organization, MS4 permit requirements shall govern

For linear project sites within the Scott WMO: Where the entire water quality volume cannot be treated within the existing right-of-way, a reasonable attempt to obtain additional right-of-way, easement, or other permission to treat stormwater during the project planning process must be made. Volume reduction practices must be considered first. Volume reduction practices are not required if the practices cannot be provided cost effectively. If additional right-of-way, easements, or other permission cannot be obtained, owners of construction activity must maximize the treatment of the water quality volume prior to discharge from the MS4.

For linear project sites within the PLSLWD: Public linear sites shall comply with all applicable requirements found in PLSLWD Rule D – Stormwater Management. Where the entire water quality volume cannot be treated within the existing right-of-way, PLSLWD-approved volume control credits may be utilized per PLSLWD Rule D.3(o). Linear projects may also meet applicable criteria through the use of a Public Linear Project Cost Cap as specified in PLSLWD Rule D.3(p).

- Methods for Volume Control:
BMPs for Volume Control are outlined in the Minnesota Stormwater Manual:
 - Requirements and recommendations laid out in the Minnesota Stormwater Manual shall be followed.

- If infiltration is proposed, a minimum of two infiltration tests shall be used per BMP to provide a base infiltration rate of surrounding soils. The base rate shall be reduced to a conservative rate for the design. The infiltration tests shall be conducted at the location and elevation of the proposed infiltration system.
- Stormwater Management Limitations and Exceptions:

Infiltration techniques to achieve volume control requirements are prohibited when infiltration BMPs will receive discharges from, or are constructed in areas:

 - That receive discharges from vehicle fueling and maintenance areas, regardless of the amount of new and fully reconstructed impervious surface;
 - Where high levels of contaminants in soil or groundwater may be mobilized by the infiltrating stormwater. To make this determination, the owners and/or operators of construction activity must complete the MPCA's site screening assessment checklist, which is available in the Minnesota Stormwater Manual, or conduct their own assessment. The assessment must be retained with the site plans;
 - Where soil infiltration rates are more than 8.3 inches per hour unless soils are amended to slow the infiltration rate below 8.3 inches per hour;
 - With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock;
 - Of predominately Hydrologic Soil Group D (clay) soils;
 - In an Emergency Response Area (ERA) within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, Subp. 13, classified as high or very high vulnerability as defined by the Minnesota Department of Health.
 - In an ERA within a DWSMA classified as moderate vulnerability unless the permittee performs or approves a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater;
 - Outside of an ERA within a DWSMA classified as high or very high vulnerability unless the permittee performs or approves a higher level of engineering review sufficient to provide a functioning treatment system and to prevent adverse impacts to groundwater;
 - Within 1,000 feet up-gradient or 100 feet down gradient of active karst features; or
 - That receive stormwater runoff from these types of entities regulated under NPDES for industrial stormwater: automobile salvage yards; scrap recycling and waste recycling facilities; hazardous waste treatment, storage, or disposal facilities; or air transportation facilities that conduct deicing activities.
- Stormwater Mitigation Provisions:

Stormwater mitigation provisions shall apply to all NPDES Permit Sites, as defined in this section. Stormwater mitigation shall comply with the MS4 Permit.
- Long-Term Maintenance of Structural Stormwater BMPs:

Structural stormwater BMPs not owned or operated by the City of Prior Lake that were implemented to meet the conditions for post-construction stormwater management in the MS4 Permit shall comply with the MS4 Permit.

3.2.v. Low Floor / Low Opening Elevations

Low Floor Elevations and Low Opening Elevations are to be designed to the following standards:

Low floor elevations shall be at least:

- 3' Above OHW or Highest Known (whichever is greater)
- 2' Above HWL

Low opening elevations shall be at least:

- 2' Above EOF

For landlocked basins, low floor elevations shall be at least:

- 1' above the surveyed basin overflow elevation
- Where an outlet structure is proposed below the overflow elevation, lowest floor elevations shall be at least 3' above the high water level of the 100-year, 10-day runoff event or the back-to-back 100-year, 24 hour rainfall event (NRCS MSE3 rainfall distribution), whichever is higher. Aerial photos, vegetation, soils, and topography will be used to derive a "normal" starting water elevation for the basin.

3.2.vi. Water Quality

For sites where a stormwater management report is required, water quality modeling must be provided demonstrating that the proposed stormwater management practices result in a reduction of at least 60% of total Phosphorus (TP) and 90% of total suspended solids (TSS).

For any impervious surface subject to volume control requirements under Section 3.2.iv, total suspended solids (TSS) in runoff that is not captured by an onsite BMP must be reduced to the maximum extent practicable. Compliance with this requirement may be achieved, for example, by incorporation of practices such as SAFL Baffles® or sump manholes.

Alternative compliance for volume control must be considered onsite to comply with water quality requirements, if stormwater volume reduction BMPs do not fully meet requirements. The volume conversion factors for alternative BMPs are as follows:

| Table 3.2.vi Volume Conversion Factors for Properly Designed Practices | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------|
| BMP | BMP Design Variation | Volume Conversion Factor* |
| Infiltration ** | Infiltration Feature | 1.00 |
| Water Reuse ** | Irrigation | 1.00 |
| Enhanced Filtration | Iron or other additive | 0.70 |
| Biofiltration | Underdrain | 0.65 |
| Stormwater Wetlands | Pond/Wetland | 0.55 |
| Stormwater Ponds *** | Multiple Pond | 0.60 |
| | Wet Pond | 0.50 |
| Source: Adapted from the Minnesota Stormwater Manual, MPCA. | | |
| * Refer to MPCA Stormwater Manual for additional information on practice performance. Volume conversion factors shown reflect comparative average annual total phosphorus percentage removal efficiencies to compare water quality treatment among various practices. | | |
| ** These BMPs reduce runoff volume. | | |
| *** Stormwater ponds must also provide dead storage for runoff from the 2.5-inch event. | | |

3.2.vii. Salt Storage

For commercial, institutional, and non-NPDES permitted industrial facilities, the following is required:

- Designated salt storage areas must be covered or indoors
- Designated salt storage areas must be located on an impervious surface
- Design must incorporate practices to reduce exposure when transferring material in designated salt storage areas (e.g., sweeping, diversions, and/or containment)

SUB-SECTION 3.3: DRAINAGE ALTERATIONS AND FLOODPLAIN MANAGEMENT

3.3.i. Landlocked Basins

If a landlocked basin is proposed to be connected to a downstream system, the following is required:

- The volume storage lost to connection must be mitigated by increasing volume storage of a stormwater pond or other BMP equal to the lost volume of the landlocked basin utilized in the back-to-back 100-year, 24-hour rainfall events (NRCS MSE3 rainfall distribution).

SUB-SECTION 3.4: WETLANDS

3.4.i. General Requirements

Any drainage, fill, excavation, or other alteration of public waters or wetlands is regulated by the Wetland Conservation Act (WCA), State Statutes 103G.245, and regulations adopted hereunder. The city is the Local Government Unit (LGU) under these rules (City Resolution 94-01).

All projects having the potential to impact wetlands, as determined by the city, must be evaluated to determine the applicability of the WCA and the other requirements of this section.

The following requirements are dependent on the location of the wetland(s). Wetlands located within the PLSLWD must meet PLSLWD requirements and wetlands located within the Scott WMO must meet Scott WMO requirements; watershed-specific requirements are indicated within this Section. To determine which watershed requirements apply to a project, applicants should contact the City early in the planning process.

Charges for implementation of the WCA shall be set forth in the city fee schedule, adopted annually by the city council. If impacts are proposed to any wetland, the procedure follows the requirements of the Wetland Conservation Act and these rules.

A wetland is given a functional classification determined by the Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM). Categories are: Preserve, Manage 1, Manage 2, and Manage 3.

3.4.ii. Procedure

The applicant must submit a "Joint Application Form for Activities Affecting Water Resources in Minnesota" including Attachment A, "Request for Delineation Review, Wetland Type

Determination, or Jurisdictional Determination,” for all wetland delineation reports. The City will review the submitted materials in accordance with WCA requirements. If impacts are proposed to any wetland, the applicant must follow the requirements of the WCA and these rules.

3.4.iii. Wetland Management Standards

Wetland Management shall meet the stormwater treatment and hydrologic guidelines of Table 1.1, MnRam Version 3.0 (or current version).

| Management Class | Stormwater Treatment | Hydrologic Guidelines |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A – Preserve | Avoid conveyed flows where prudent and feasible. Upstream sediment and nutrient pretreatment required to maintain background loading rates. Maintain existing hydrology—divert increased flows. Avoid concentrating flows. | <u>Bounce (10 yr):</u> Existing <u>Inundation (1 & 2 yr):</u> Existing <u>(10 yr):</u> Existing <u>Runout Control:</u> ² No Change Maintain existing hydrology. Encourage infiltration and reduced impervious BMPs. Conduct water budget analysis. |
| B – Manage 1 | Maintain wetland without degrading existing functions, values and wildlife habitat. Apply WCA sequencing process. | <u>Bounce (10 yr):</u> Existing + 0.5 ft <u>Inundation (1 & 2 yr):</u> Existing plus 1 day <u>(10 yr):</u> Existing + 7 days <u>Runout Control:</u> ¹ No Change Maintain existing hydrology. Encourage infiltration and reduced impervious BMPs. |
| C – Manage 2 | Maintain wetland footprint. Improve wetland biological and plant community diversity/integrity or enhance other functions if possible. Apply WCA sequencing process. Consider for restoration. | <u>Bounce (10 yr):</u> Existing + 1.0 ft <u>Inundation (1 & 2 yr):</u> Existing plus 2 days <u>(10 yr):</u> Existing + 14 days <u>Runout Control:</u> ¹ 0.0 to 1.0 ft above existing runoff |
| D – Manage 3 | Allow for relaxed sequencing and replacement plan flexibility. Consider for restoration/enhancement. | <u>Bounce (10 yr):</u> No Limit <u>Inundation (1 & 2 yr):</u> Existing plus 7 days <u>(10 yr):</u> Existing + 21 days <u>Runout Control:</u> ¹ 0.0 to 4.0 ft above existing runoff |

¹ Where possible, use 300-foot buffers as per MnRAM (Question #23)

² If currently landlocked, new outlet should be above delineated wetland elevation. For sites within the PLSLWD, sites shall provide sufficient dead storage to retain back-to-back 100-year, 24-hour rainfalls and runoff above the highest anticipated groundwater elevation and prevent damage to property adjacent to the basin.

3.4.iv. Wetland Buffers

Buffers shall be installed and/or maintained around the perimeter of all delineated wetlands. Buffer requirements apply whether or not a watercourse or wetland is on the same parcel as a proposed development. Wetlands on adjacent parcels need not be delineated, but an estimation using aerial photos or other methods will be required.

A buffer width may vary using “Buffer Averaging.” Buffer areas of specific concern, including locations with significant flow accumulation, must be at least the average buffer width.

- **PLSLWD:**

PLSLWD Rule J shall apply to all required buffers within PLSLWD boundaries. Buffers shall be protected by a conservation easement dedicated to the PLSLWD that describes the boundaries of the buffer, identifies monument locations, and prohibits alterations and monument removal set forth in PLSLWD Rule J, Paragraph 5(f).

When a buffer is required under PLSLWD Rule J, the following procedure applies:

- Submit to the PLSLWD for its approval a development agreement and conservation easement for protection of approved buffer strips. The easement shall describe the boundaries of the watercourse or wetland and buffer strips, identify the monuments and monument locations, and prohibit any of the alterations set forth in PLSLWD Rule J, Paragraph 5(f) and the removal of the buffer strip monuments within the buffer strip or the watercourse or wetland;
- File the approved conservation easement for record and submit evidence thereof to the PLSLWD; and
- Install permanent wetland monumentation as required in Section 3.4.vi below.

Table 3.4.iv.a - PLSLWD Buffer Requirements

Buffers around wetlands, as measured from the delineated edge of the wetland, shall comply with the following minimums and averages:

| Wetland Management Class | Minimum Width (ft) | Average Width (ft) |
|-----------------------------------------|--------------------|--------------------|
| Natural Areas Wetland | 50 | 75 |
| Hydrology Wetland | 25 | 50 |
| Restoration/Enhancement & Basic Wetland | 15 | 30 |

Buffers on watercourses shall be a minimum of 15 feet wide with an average width of 30 feet, measured from the OHW of the watercourse.

Alternative PLSLWD Buffers:

- Because of unique physical characteristics of a specific parcel, narrower buffer strips may be necessary to allow a reasonable use of the parcel; and in combination with other best management practices may provide equivalent water quality treatment performance. An alternative buffer width may be permitted if any one or more of the following conditions is met:
 - The proposed activity, development or redevelopment of land will not increase runoff volumes for the 5-year critical storm event, not including the 10-day snow melt event, that is discharged to the watercourse or wetland; or
 - The applicant demonstrates that a combination of best management practices to be incorporated with the proposed activity, development or redevelopment of land will provide storm water quality treatment performance equivalent to the PLSLWD average-width buffer requirements; or
 - The dominant wetland type, as determined by methods acceptable under the Minnesota Wetland Conservation Act, is a low-quality Type 1 or 2 Wet Meadow, where low quality is defined as having a highly impacted vegetative community such that reed canary grass comprises more than 40 percent cover, and/or European buckthorn, if present, comprises greater than 30 percent cover, and/or vegetation was frequently (at least three of the past five years) removed by cropping.
- The use of alternative buffer strips will be evaluated as part of the review of a stormwater management plan under PLSLWD Rule D. Where alternative buffer strip standards are approved, the width of the buffer strips shall be established based on a minimum width of 15 feet. Alternative buffer strips must be in keeping with the spirit and intent of the PLSLWD Rules. The PLSLWD may require maintenance agreements, restrictive covenants, or easements, in form acceptable

to the PLSLWD, to cover best management practices used to justify the alternative standard, to assure maintenance in perpetuity and that best management practices continue to function as originally designed.

- **Scott WMO:**

The following are the buffer and minimum no-grade zone requirements for each functional classification. The tiered buffer requirement is based on a functional classification of; exceptional, high, medium or low, and can be found using the results of the MnRAM vegetation assessment as described above.

Table 3.4.iv.b - Scott WMO Buffer, Setback and No-Grade Requirements

| Buffer Requirement | Exceptional | High | Medium | Low |
|----------------------------------------|--------------------|-------------|---------------|------------|
| Average Buffer Width (ft) | 65 | 50 | 30 | 25 |
| Minimum Buffer Width (ft) | 25 | 25 | 25 | 25 |
| Minimum No-Grade Zone (ft) | 25 | 25 | 25 | 25 |
| Foundation setback from <i>wetland</i> | 35 | 35 | 35 | 35 |

Grade changes or other disturbances are not allowed in no-grade zones with the following exceptions: Pipe outlets and associated riprap, reseeding or soil amendments, embankment and impacts associated with an approved CIP transportation corridor, grade changes adjacent to approved WCA impacts to wetlands, approved wetland or flood storage mitigation areas and temporary impacts associated with utility installation.

3.4.v. Buffer Vegetation Requirements:

Where acceptable natural vegetation exists in a buffer area, the retention of such vegetation in an undisturbed state is required unless the City approves the replacement of such vegetation. Acceptable natural vegetation has the following characteristics:

- A continuous, dense layer of perennial grasses that has been uncultivated or unbroken for at least 5 consecutive years; or
- An overstory of trees and/or shrubs that has been uncultivated or unbroken for at least 5 consecutive years; or
- Contains a mixture of these two plant communities.

The City may determine existing buffer vegetation to be unacceptable if:

- It is composed of undesirable plant species including but not limited to European buckthorn, purple loosestrife, leafy spurge, and plants listed on the Minnesota Noxious Weed List; or
- It has topography that tends to channelize the flow of runoff; or
- For some other reason it is unlikely to retain nutrients and sediment.

Where buffers are not vegetated or have been cultivated or otherwise disturbed within 5 years of the proposed project commencing, such areas shall be replanted and maintained. The buffer plantings must be identified on the approved project plans. The buffer landscaping shall comply with the following standards:

- Buffers shall be planted with a native Minnesota State Seed Mix appropriate for site conditions.
- The seed mix shall be installed in accordance with the selected Minnesota State Seed Mix specifications.

- All seeded areas shall be protected and stabilized immediately in accordance with the project SWPPP.
- Native shrubs may be substituted for native grasses and forbs. All substitutions and density of plantings must be approved by the City. Shrubs shall be distributed so as to provide a natural appearance and shall not be planted in rows.
- Any groundcover or shrub plantings installed within the buffer strip are independent of any landscaping required elsewhere.
- Grasses and forbs shall be seeded or planted by a qualified contractor. The method of application must be authorized by the City and shown on the approved project plans.
- No fertilizer shall be used in establishing new buffer strips, except on highly disturbed sites when necessary to establish acceptable buffer strip vegetation and then limited to amounts indicated by an accredited soil testing laboratory.
- If straw mulch is proposed, seeded areas shall be mulched immediately with a clean straw rake at a rate of 1.5 tons per acre. Mulch shall be anchored with a disk or tackifier.
- Buffers shall be protected from erosion and sedimentation during construction in accordance with the approved project SWPPP. Erosion and sediment control measures shall remain in place until the buffer vegetation is established.

Buffer vegetation shall be established and maintained in accordance with the requirements found in this Section based on a buffer establishment plan shown on the approved plans and meeting the following requirements:

- Establishment plans must extend for the period beginning at the time of planting and extending two full years from completion of initial planting and mulching operations.
- Establishment plans must include an irrigation or watering plan for the period beginning at the time of planting and extending one full year from completion of initial planting and mulching operations.
- Establishment plans must include replacement of any buffer vegetation that does not survive during the two year period extending from the completion of the initial planting. Establishment maintenance and watering of replaced buffer vegetation shall extend one full year from completion of replacement planting and mulching operations.
- The owner shall be responsible for reseeding and/or replanting if the buffer strip vegetation does not survive at any time through human intervention or activities.
- Establishment plans must include a schedule for weeding throughout the duration of the plan.
- Establishment plans will include an escrow amount for the term of the establishment plan as part of the development agreement.

Prohibited Buffer Alterations:

- Building, storage, paving, mowing, plowing, introduction of noxious vegetation, cutting, dredging, filling, mining, dumping, grazing livestock, agricultural production, yard waste disposal, and fertilizer application, are prohibited within buffers.

Acceptable Buffer Alterations:

- Invasive or noxious vegetation, such as European buckthorn, purple loosestrife, and reed canary grass, may be removed as long as the buffer is maintained to the standards required by the PLSLWD or Scott WMO rules.
- Plantings that enhance the natural vegetation, or selective clearing or pruning of trees or vegetation that are dead, diseased, or pose similar hazards.

- Use and maintenance of a single, unimproved access strip through the buffer, not more than 5 feet in width, and maintained only by means of mowing, for recreational access to the watercourse or wetland and the exercise of riparian rights.
- Placement, maintenance, repair, or replacement of utility and drainage systems that exist on creation of the buffer or are required to comply with any subdivision approval or building permit obtained from the City so long as any adverse impacts of utility or drainage systems on the function of the buffer have been avoided or minimized to the extent possible.
- Construction, maintenance, repair, reconstruction, or replacement of existing and future public roads crossing the buffer, so long as any adverse impacts of the road on the function of the buffer have been avoided or minimized to the extent possible.

3.4.vi. Buffer Monuments and Easements:

Buffers shall be identified within each parcel by permanent monuments. A monument shall be required at each parcel line where it crosses a buffer and at each point where the bearing of the buffer boundary line changes. Monuments shall have a maximum spacing of 200 feet along the edge of the buffer. Additional monuments shall be placed as necessary to accurately define the edge of the buffer. A monument shall consist of a post and a sign. The signs shall comply with City Plate #203, Wetland Buffer Boundary Monument. The signs shall be installed prior to the issuance of a Building Permit and shown on the approved plans.

City Wetland Buffer signs must be purchased from the City at a cost shown on the latest city fee schedule. PLSLWD Wetland Buffer signs are required for areas within the PLSLWD and must be obtained from the PLSLWD.

All buffers must be covered by a drainage and utility easement granted to the City of Prior Lake.

SUB-SECTION 3.5: STORMWATER POND DESIGN CRITERIA

3.5.i. General Requirements

Design of stormwater ponds shall be in accordance with the requirements of the Minnesota Stormwater Manual (“Design Criteria for Stormwater Ponds”).

- Additional Design Criteria
 - A 10’ wide aquatic vegetation bench is required below the OE of the pond, with the maximum slope of 10:1.
 - The invert elevations of pond inlet flared end sections shall match the OE of the pond. Submerged inlets will only be allowed at the discretion of the City.
 - The EOF of a pond should be at least 1 foot higher than the HWL. The top of berm elevation should be at least 2 feet higher than the HWL.
 - Berms used to create rate control ponds must at maximum use 4:1 slopes and measure 10’ wide at top. At minimum, a clay core should be designed in consideration of groundwater flow. If head difference between OE of pond and downstream land exceeds 3’, soils data will be required in the area and berm design must address maintenance of pond water level and berm stability. Outlet pipes through engineered berms with head differences greater than 6’ should be designed with anti-seep collars. Sand bedding shall not be used through berm section.

- Stormwater pond outlets shall be designed in accordance with City Plate #304, Pond Skimmer Outlet. Stormwater pond outlet structures must provide floatable debris skimming for the 10-year, 24-hour rainfall event (NRCS MSE3 rainfall distribution). A weir wall with orifice or notch may be installed within the outlet structure for rate control. Minimum orifice size is 4 inches. Stormwater pond outlet structures shall have a top mitered to conform to fill. A 66" minimum diameter is required for outlet structures with a weir wall.

SECTION FOUR: SANITARY SEWER:

The design and construction of sanitary sewer and sewer services shall conform to the most recent editions of, "City Engineers Association of Minnesota Standard Utilities Specifications," "Recommended Standards for Wastewater Facilities (Ten State's Standards)," or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans.

These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the design of sanitary sewer:

General

- 4.1 Any connections to existing manholes shall be core drilled and attached to the manhole with a rubber boot, or as approved by the supplier.
- 4.2 Drop manholes are required when the pipe inverts are greater than 2 feet apart. Only outside drops are allowed, except in retrofit situations, where inside drop manholes may be used as determined by the City Engineer.
- 4.3 Changing of material pipe type is not allowed between manholes except for drop manholes.

Sanitary Sewer

- 4.4 Manholes shall be placed on street centerline. Other locations outside the wheel paths (3' and 9' off centerline) may be allowed with City approval.
- 4.5 The maximum spacing between manholes is 400'.
- 4.6 If the pipe diameters of the existing and proposed pipes are the same, then the invert elevations shall drop 0.10 feet through the manhole. If the pipe diameters are different, the 8/10ths line of the two pipes shall match at the manhole.
- 4.7 Manholes are required at the terminus of all stubs if the line will be active.
- 4.8 All manholes outside of roadway areas must have marking signs placed at the front and back of the property lines. Signs shall be green "Rhino Marking Posts" or approved equal and should be shown on the plans.
- 4.9 Trunk sanitary sewers shall be designed to promote a laminar flow through the sewer system. Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing transition angles greater than or equal to 90 degrees.

- 4.10** Installation of Public Utilities or utilities to be maintained by the City including sanitary sewer on private property shall be installed within a drainage and utility easement. The minimum drainage and utility easement width shall be dictated by depth as indicated below:

| Depth | D&U Width |
|-----------------|-----------------------|
| 10 feet or less | 20 feet |
| 15 feet or less | 30 feet |
| 20 feet or less | 40 feet |
| 20 feet + | City Council approval |

- 4.11** The following pipe types and class are identified in general with respect to depths with soil type verification and design criteria required to substantiate size and type of pipe used.

| Size | Depth | Type & Class |
|-----------|------------|----------------|
| 8" to 10" | 8' to 16' | PVC, SDR 35 |
| 8" to 10" | 16' to 26' | PVC, SDR 26 |
| 8" to 10" | >26' | As approved by |

Pipe Materials for trunk sanitary sewer larger than 10" shall be constructed as directed by the City Engineer.

- 4.12** No manhole shall be located within a designated ponding/drainage easement without City approval. If such location is unavoidable, then the structure may be required to be built to a higher elevation to avoid flooding, constructed to tolerate frost action, and shall be made of water-tight materials. The City requires that manholes located in possible flooding areas will require an additional internal manhole chimney seal.

- 4.13** Sanitary sewer flow shall have a minimum of 2 feet per second. The minimum slopes for sanitary sewer shall be as follows:

| Size of Pipe | Minimum Slope |
|--------------|---------------|
| 8 inch | 0.40% |
| 10 inch | 0.28% |
| 12 inch | 0.22% |
| 15 inch | 0.15% |

- 4.14** Along a deep trunk sanitary sewer (greater than 20' deep), the City may require the Developer to construct a parallel, shallower sanitary sewer that the services would connect to. The shallow sanitary sewer would eliminate the need for deep risers that connect to the trunk sanitary sewer.

Sewer Services

- 4.15** Sanitary sewer services shall have a minimum of 4 inches nominal inside diameter and be constructed with PVC SDR 26.
- 4.16** Determination of sanitary sewer services size and design shall be done in accordance with the Department of Health, Minnesota Plumbing Code.

- 4.17 On new development projects, sewer and water services shall be placed in the same trench, with sanitary sewer services three feet downstream from water services.
- 4.18 The maximum depth of the sanitary sewer service at the ROW line shall be 10' unless documented by a proposed house or building elevation that justifies a deeper service.
- 4.19 Sanitary sewer services shall not be located under driveways.
- 4.20 Cleanouts are required at 100' intervals including the riser on sanitary sewer services.
- 4.21 Sewer services shall be connected to a wye on the main and shall not be connected to manholes.
- 4.22 Developers are responsible for constructing the services to 10' beyond the right of way line.
- 4.23 Minimum grade for sanitary sewer services shall be 1/4" per foot (2%).

Submittals

- 4.24 Upon completion of the sanitary utility work, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

Specifications

- 4.25 See the current City of Prior Lake General Specifications and Standard Detail Plates for further sanitary sewer construction requirements and for additional information.

**SECTION FIVE:
WATERMAIN:**

The design and construction of watermain and water services shall conform to the most recent editions of, "City Engineers Association of Minnesota Standard Utilities Specifications," "AWWA Standards," "Recommended Standards for Water Works" (Ten State's Standards) or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the design of watermain:

General

- 5.1 For all watermains the depth of cover shall be a minimum of 8' to top of pipe and maximum of 10' of cover. Also 10' of horizontal separation shall be provided from other parallel utility alignments.
- 5.2 Provide a minimum of 18" vertical separation for all watermain crossings with sanitary and storm sewer. Also, other utilities that cross the watermain shall cross at a 90-degree angle, if possible, with the minimum requirement of a 45-degree angle for the crossing. Provide insulation for all storm sewer crossings within 36" or as determined by the City Engineer.
- 5.3 Activation of the watermain system shall be performed by City personnel only.
- 5.4 All valves and curb stops shall be in accordance with City Standard Specification.

Watermain

- 5.5 Minimum watermain size shall be 8" for residential developments. Minimum watermain size shall be 12" for Commercial or Industrial developments or as required to meet fire flow conditions.
- 5.6 Materials shall be PVC AWWA C900 (DR 18) watermain. Materials for fittings shall be ductile iron in accordance with the City Standard Specification.
- 5.7 Dead-end lines shall be minimized by looping of all mains wherever practical. Where dead-end mains occur a hydrant shall be installed at or near the end of the main for flushing purposes. In commercial and industrial developments, watermain over 500' in length must be looped. All temporary and permanent dead-ends shall be secured with a gate valve at least 40' from the plugged end. Automatic flushing units may be required.
- 5.8 Valves outside of roadway areas must have marking signs. Signs shall be blue "Rhino Marking Posts" or approved equal and should be shown on the plans.
- 5.9 All connections to existing watermains shall be valved. Locate valves within the street surface where possible. Locate the valve as close as possible to the tee or cross so that the valve can be rodded back to the tee or cross. A minimum of two valves is required at a 3-legged intersection. A minimum of three valves is required at a cross or 4-legged intersection.

- 5.10** Gate valves shall be located within street surface and at the extended right-of-way line approximately 25 feet from intersection centerline. A mid-block gate valve is required when intersection spacing exceeds 1000'.
- 5.11** Installation of Public Utilities maintained by the City, not within public rights of way, shall be installed within a drainage and utility easement. The minimum drainage and utility width shall be dictated by depth as indicated below:

| Depth | D&U Width |
|-----------------|-----------------------|
| 10 feet or less | 20 feet |
| 15 feet or less | 30 feet |
| 20 feet or less | 40 feet |
| 20 feet + | City Council Approval |

- 5.12** Watermains, laterals, and/or services shall not be located within any defined or designated ponding easement.
- 5.13** All watermain gate valves and curb stops shall have adjustable gate valve extension stems.
- 5.14** The use of bends greater than 45 degrees are not allowed.

Hydrants

- 5.15** Hydrant spacing shall be in accordance with Minnesota State Fire Code. In no instance shall the spacing be less than 450' in residential and 300' in commercial.
- 5.16** Locate hydrants at all intersections and/or property lines.
- 5.17** Gate valves are required on all hydrant leads.
- 5.18** Hydrants or water services are not allowed on the inactive side of gate valves for temporary stubs

Water Services

- 5.19** Water services shall be a minimum of one-inch nominal diameter and shall be in accordance with the Minnesota State Plumbing Code.
- 5.20** Water services shall not be located under residential driveways.
- 5.21** A minimum of 8' of cover is required on all water services.

Submittals

- 5.22** Upon completion of the sanitary utility work, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

Specifications

- 5.23** See the current City of Prior Lake General Specifications and Standard Detail Plates for further watermain construction requirements and for additional information.

**SECTION SIX:
STREETS**

Streets shall conform to the most recent editions of "Mn/DOT Standard Specification for Construction," "Mn/DOT Road Design Manual," "Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways" or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City

The following are specific requirements related to the design of streets:

General

- 6.1 Roadway widths from face of curb to face of curb and right of way widths should be determined as follows:

| Classification | Road Width | ROW Width | Curb Style |
|-------------------|------------|----------------|--------------|
| Local Street | 32 feet* | 60 feet** | Surmountable |
| Commercial Street | 36 feet | 60 feet** | B618 |
| Collector Street | 36 feet | 80 to 120 feet | B618 |
| Arterial Street | 44 feet | 80 to 120 feet | B618 |

* 28 foot wide streets in environmentally sensitive areas as determined by the City Engineer.

**Sidewalk on one side.

- 6.2 The minimum street and right-of-way width shall be determined by the City Engineer for streets approaching County and State roadway intersections.
- 6.3 Streets shall be laid out so as to intersect at right angles, except where topography or other conditions justify variations. The minimum angle of intersection of streets shall be eighty (80) degrees with a minimum tangent length of 200 feet. Local street intersections must have a centerline offset of at least 280 feet. Local streets intersecting with a collector or higher order street must have a centerline offset of at least 660 feet unless topographic or other conditions render the requirements of this provision unreasonable.
- 6.4 Minimum street grade shall be 1.00%. The design maximum shall be 8.00%. At intersections, the street grade shall not exceed 2.00% for the first 100' approaching said intersection. The 100' is measured from the curb line of the intersected street. In cul-de-sacs, the gutter grade shall not be less than 0.80%.
- 6.5 Cul-de-sac design shall follow the requirements of Plate #605.
- Maximum length of a cul de sac is 500'.
 - Temporary "dead-end" situations associated with providing access for future extension to and through adjacent undeveloped property require a cul-de-sac with concrete curb and gutter installation and a sign reading "Future Roadway Connection".

- 6.6** Street connections shall be reviewed in accordance with the Comprehensive Plan.
- 6.7** Sight line analysis shall be provided for all intersections. All intersections shall meet the sight line requirements for both horizontal and vertical alignment of the design speed. A minimum design speed of 30 mph shall be used for local streets.
- 6.8** Street alignment for local streets, both vertical and horizontal, shall be designed for 30 MPH design speed based on the MNDOT State Aid Manual. Vertical and horizontal curves on major and minor collector streets must be designed in accordance with the MNDOT State Aid Manual for the corresponding design speed provided by the City.
- 6.9** Flexible pavement design by a geotechnical engineer including soil borings, pavement design calculations, and/or special design considerations are required to verify design and shall be based on design procedures set forth by the Minnesota Department of Transportation.
- Arterial, commercial, or collector streets shall be designed for a minimum nine (9) ton pavement design. Local streets shall be designed for a minimum seven (7) ton pavement design.
 - Regardless of soil type, the minimum bituminous thickness for street sections shall be 4". The base course shall be 2 1/2" thick after compaction. The wear course shall be 1 1/2" thick after compaction and placed. A minimum of 6" of Class 5 (crushed limestone) and 2' subcut with granular borrow is also required.
 - Provide drain tile at all low points across roadway along both sides of the storm sewer pipe and fifty feet along curbline in each direction of the low point catch basins.
- 6.10** A crown of 2% cross-slope grade, is required of all street cross-sections. The minimum curb return radius shall be 25'. The minimum grade around curb returns shall be 0.50%.
- 6.11** Opposing street intersections and commercial driveway intersections shall match at the centerlines. If the streets or driveways cannot be aligned to match, then the intersections shall be offset as approved by the City Engineer.
- 6.12** No driveway access will be allowed on collector roads except as approved by the City Engineer.
- 6.13** Roadways with center boulevards shall have a minimum width of 16' face to face on each side
- 6.14** The design and construction of sidewalks and trail shall be in accordance with the City's Standard Plates. Sidewalks shall be 5' wide concrete and trail shall be a minimum of 8' wide bituminous. The cross slope of the sidewalk or trail shall not exceed 2% and must follow the requirements of the American Disabilities Act. The boulevard between the street and the sidewalk or trail must be between 3% - 5%. At low points, the boulevard should be between 5% - 10%.
- 6.15** Pedestrian curb ramps shall meet the latest MNDOT specification.
- 6.16** Provide conceptual layout for adjacent areas which have not been developed. The roadway grade and location should be reviewed for adjacent properties.
- 6.17** Street signage shall be placed on the striping and signage plans and shall follow the requirements of the MN Manual on Uniform Traffic Control Devices and Plate #611, #612, and #613.
- 6.18** Pavement markings must follow the requirements of MNDOT and be included in the signing and striping plan.

- 6.19 Provide note on the plans stating that the final date for paving of the bituminous base and wear course placement is October 31st. Wear course pavement shall not be placed prior to the site punchlist being completed.
- 6.20 Concrete valley gutters will be constructed where cross-section slopes are less than 1% and/or as directed by the City Engineer.
- 6.21 New residential subdivisions will require modified 'S' design curb and gutter as shown on the current Concrete Curb and Gutter Detail in the City's General Specifications. B618 curb and gutter is required on all collector streets and at all intersection radii.
- 6.22 The design and construction of sidewalks and trail ways shall be in accordance with current ADA Standards and the current edition of the "**Mn/DOT Bikeway Facility Design Manual.**"

Submittals

- 6.23 Upon completion of the street work, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

Specifications

- 6.24 See the current City of Prior Lake General Specifications and Standard Detail Plates for further street construction requirements and for additional information.

PART II

CONSTRUCTION GUIDELINES

The purpose of this part of the Public Works Design Manual is to provide guidance on the construction testing and inspection. Work quality, project progression, and minimizing inconveniences are primary goals of the City during public infrastructure construction.

SECTION ONE: INSPECTION

It is the policy of the City of Prior Lake that any construction activity within the City be monitored/inspected by the City staff personnel or a designated representative on behalf of the City. See below for a description of the City's policy for construction inspections and testing for private development projects.

The Contractor shall notify the Engineer anytime they anticipate working on this project. No work will be allowed without notifying the Engineer a ***minimum of 24 hours beforehand***.

POLICY FOR PRIVATE DEVELOPMENT PROJECTS

1.1 CONSTRUCTION OBSERVATION AND TESTING OF DEVELOPER PROJECTS

It is the policy of the City of Prior Lake that construction activity for all private development projects within the City shall be observed by City staff personnel or City engineering consultant firm personnel. The construction inspection fee charged to the private development shall be based upon the fee structure outlined in the Development Contract and the actual engineering services completed by the City's Engineering Department or their consultant's representative.

1.2 CONSTRUCTION OBSERVATION ENGINEERING SERVICES FEE STRUCTURE

Private development projects shall be financially responsible for the engineering inspection of the development to the City through the approved Development Contract. Testing services are the responsibility of the Developer.

1.3 CONSTRUCTION OBSERVATION SERVICES

The construction observation services include the inspecting of public infrastructure construction relating to the development.

- a. The construction observation service shall include:
 - Inspection of public improvement systems which include grading, sanitary sewer, watermain, storm sewer/ponding, and street systems. Grading inspection is for overview of drainage swales, erosion control, and seeding.
 - Documentation of construction work and all testing of improvements.
 - As-built location dimensions for sanitary sewer, watermain, and storm sewer facilities.
 - Coordination with testing company for soil and material testing.
- b. All other construction services are to be provided by the Developer's engineer which include the following:
 - Construction surveying

- As-built drawings of development improvements (Tie dimensions to sewer and water services from City staff or City consultant)
 - Construction quantities
 - Change Orders
 - Construction administration of project
 - Construction payment vouchers
- c.** All City construction designated project representatives are required to complete daily a “Construction Project Status Report” which is submitted weekly to the City.
- d.** Weekly progress meeting minutes shall be submitted to the City Engineer at the end of each week.
- e.** Document all delays/extensions agreed to or process them in a Change Order.
- f.** Only consider invoices for extra work if immediately submitted and documented by observer. Contractor and observer shall agree in field on hours if work is done by time and material.
- g.** Document all private utility hits and immediately notify the City Engineer
- h.** Field emergency:
- All City of Prior Lake representatives will have all small utility emergency contact information available. Notify the following as necessary:
 - i.** 911
 - ii.** City Hall – (952) 447-9800
 - iii.** City Engineer – (952) 447-9896
 - iv.** Public Works Department – (952) 447-9896
 - v.** Police – (952) 440-3555
- i.** Connections to existing mains shall be coordinated with the City Engineer. The City requires a minimum 48-hour notice if residents are to be without water.
- j.** Activation of the watermain system shall be performed by City personnel only. The City requires a minimum 48-hour notice before the activation of the watermain system.

SECTION TWO: TESTING:

All public infrastructure facilities will be tested in accordance with the appropriate sections of the City of Prior Lake Specifications, this manual, and witnessed by the City designated project representative. Notify City staff within 48 hours of any scheduled testing. Copies of all test results, either passing or failing, shall be provided to the Observer, Owner, and Engineer.

MnDOT's 2019 SALT Schedule of Materials Control – Local Government Agency will be followed. Initial testing of materials and/or densities, in accordance with the requirements, will be paid for by the Owner. Any retesting due to failures shall be at the expense of the Contractor. The schedule of Materials Control is available online: <http://www.dot.state.mn.us/stateaid/construction/2019-salt-smc-lga.pdf>.

2.2 STORM SEWER

a. STORM SEWER TELEVISIONING

- Follows jetting and completion of punchlist.
- Report and video submitted to the City of Public Works Department.

b. FINAL INSPECTION OF STORM SEWER

- Performed after completion of all street construction, including final grading and restoration of boulevards, ponding areas and drainage swales, by designated City Project Manager.
- Punch list of any required corrective work is given to designated City Project Manager.
- After completion of all punch list items is certified by contractor, corrective work is re-inspected by a designated City Project Manager.

2.3 SANITARY SEWER

a. SANITARY SEWER AIR TEST

- Follows completion of all main line pipe, service pipe and manhole installations.
- Requires 48 hours notice to be given to Project Representative by Contractor prior to test.
- Witnessed by Project Representative and follow City of Prior Lake specification section 02621.3 F1.

b. SANITARY SEWER MANDREL TEST

- Follows completion of all main line pipe installations by a minimum of 30 days.
- Requires 48 hours notice be given to Project Representative by Contractor to test.
- Witnessed by Project Representative and follow City of Prior Lake specification section 02621.3 G.

c. SANITARY SEWER FORCEMAIN PRESSURE TEST

- Follows completion of all main line pipe installations by a minimum of 30 days.
- Requires 48 hours notice be given to Project Representative by Contractor to test.
- Witnessed by Project Representative and follow City of Prior Lake specification section 02621.3 F5.

d. SANITARY SEWER TELEVISIONING

- Follows successful mandrel test, jetting, and completion of punchlist.
- Report and video submitted to the City of Public Works Department.

e. FINAL INSPECTION OF SANITARY SEWER

- Performed after completion of final manhole casting adjustments and construction of first lift of bituminous, and prior to any building Certificate of Occupancy Permit by designated City Project Manager.
- Punch list of any required corrective work is given to designated City Project Engineer.
- After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Manager.

f. LIFT STATION STARTUPS

- Start-up shall be coordinated by the Project Manager.
- Observer should ensure contractor has demonstrated all parts are in working order.
- All lift station subcontractors must be in attendance before beginning start-up.
- O & M's shall be given to the City (include electronic copy).
- City Staff must be present.

2.4 WATERMAIN

a. WATERMAIN PRESSURE TEST

- Follows installation of all main line pipe, services and hydrants, and pre-testing by Contractor.
- Requires 48 hours notice be given to Project Representative by Contractor prior to record test.
- Witnessed by Project Representative and follow City of Prior Lake specification section 02611.3 G
- Pressure drop shall not exceed 1 psi in a 2 hour period at 150 psi.

b. ELECTRICAL CONDUCTIVITY TEST

- Performed on all iron pipe water mains within 7 days of satisfactory completion of the pressure test.
- Requires 48 hours notice to be given to Project Representative by Contractor prior to test.
- Witnessed by Project Representative and representative of City Public Works Department and follow CEAM specification.
- Electrical conductivity shall be 350 amps for 3 minutes then 400 amps for 1 additional minute.

c. WATERMAIN BACTERIOLOGIC QUALITY TEST

- Performed on the completed watermain after final flushing and before being placed in service.
- Samples taken by an approved testing laboratory.
- Follow City of Prior Lake specification section 02611.3 I.4
- After final flushing, one test shall be taken for every 1000 feet of pipe.

d. FINAL INSPECTION OF MAIN LINE VALVES

- Performed after construction of first lift of bituminous by designated City Project Manager.
- Punch list of any required corrective work is given to designated City Project Manager.

- After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Manager.
- e. **FINAL INSPECTION OF HYDRANTS, HYDRANT VALVES AND CURB BOXES**
 - Performed after completion of all street construction, including final boulevard grading and restoration, by designated City Project Manager.
 - Punch list of any required corrective work is given to designated City Project Manager.
 - After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City Project Manager.

2.5 STREET CONSTRUCTION TESTING

- Witnessed by Project Representative and follow City of Prior Lake specification section 1603.
- Topsoil per “Mn/DOT Standard Specifications for Construction”
- Gradations for select granular borrow and aggregate base
- Density test for subgrade and aggregate base
- Roll test for subgrade and/or aggregate base
- Bituminous per current “**Mn/DOT Standard Specifications for Construction**”
- Air, slump and compressive strength for concrete
- Cores on wear course, base course if questionable

2.6 WARRANTY

- **Performed in accordance with Development Agreement**

PART III

PLAN STANDARDS

SECTION ONE: PLAT AND DEVELOPMENT/UTILITY CONSTRUCTION PROCESS

- 1.1 The developer is required to enter into a “Development Contract” with the City which ensures the City that the required public infrastructure facilities necessary to serve the development will be installed in a timely manner and in accordance with the standards and specification as set forth by the City Code.
- 1.2 As set forth in Chapter 1000 of the City Code, developers of property within the City of Prior Lake are required to submit detailed plans and specifications of proposed improvements for review and comment by the City. These plans and specifications are required to be prepared by professional engineers licensed to practice within the State of Minnesota. The engineer who designs, prepares and certifies plans does not lose their primary responsibility for the accuracy and adequacy of the plans when the plans are reviewed and approved by the owner.
- 1.3 Except those improvements designed and constructed by the City, it is the responsibility of the developer to determine and obtain all necessary approvals, permits and licenses from the City of Prior Lake, Minnesota Department of Transportation, Scott County Highway Department, appropriate watershed district or watershed management organization, utility companies, Minnesota Department of Natural Resources, Army Corps of Engineers, Minnesota Pollution Control Agency, Metropolitan Council, Minnesota Department of Health and any other regulatory or jurisdictional agency affected by or having jurisdiction over the improvements required for the proposed development. Any design requirements of any such agencies shall be determined and incorporated into plans and specifications. All costs incurred to obtain said approvals, permits and licenses and also all fines or penalties levied by an agency due to the failure of the developer to obtain or comply with conditions of such approvals, permits and licenses shall be the sole responsibility of the developer. The developer agrees to defend and hold the City harmless from any action initiated by a regulatory agency resulting from such failures of the developer.
- 1.4 CONSTRUCTION PLAN – After approval of the Grading/Erosion Control Plan, a Construction Plan and Specifications must be submitted for City review. Upon final City Engineer approval, provide a final plan set for City Engineer’s signature.
- 1.5 CONSTRUCTION PLAN RECORD DRAWINGS – a record drawing of the construction plan is to be submitted for review by City.
- 1.6 GIS UTILITY UPDATE –all utilities for the development/utility construction project will be mapped in an ESRI SDE database format.

**SECTION TWO:
PLAT SUBMITTALS**

2.1 Preliminary Plat Phase:

- a. Developer submits preliminary plat application which includes grading and erosion control plans, general street and utility layout, copies of all hydrology calculations to the City for review and comment. These plans are to be prepared in accordance with current City Standards as outlined herein and the applicable sections of the City Code.
- b. City staff reviews submission and provides comments to Developer.
- c. Developer submits revisions to preliminary plat plans.
- d. Preliminary plat general design is conditionally approved by the City Council.
- e. Grading may commence with preliminary plat approval. Developer must apply for an Excavating and Grading Permit. As-built grading plans will be required prior to release of the grading security.
- f. Preliminary Plat Submittals:
 - Grading Plans in accordance with Grading Plan section
 - Stormwater management report in accordance with Stormwater Management Section
 - Submit stormwater modeling documents in HydroCAD or engineered approved format

2.2 Final Plat Phase:

- a. Developer submits final plat application which includes detailed plans, specifications and copies of all design calculations to the City for review and comment. These plans are to be prepared in accordance with current City Standards as outlined herein and the applicable sections of the City Code.
- b. City staff reviews submission and provides comments to Developer.
- c. Developer submits revised plan submittal for staff review and comment together with any City “redline” copies and letter stating how each of the City comments has been addressed.
- d. Developer submits a cost estimate or bid of the construction work to be done.
- e. City prepares Development Contract. After completion of all required submittals, the City computes the Letter of Credit amount and the financial requirements in accordance with the City’s most recent fee schedule.
- f. After plans are complete or approved, the Development Contract and Final Plat are scheduled for Council approval. The Developer must sign the Development Contract before the City Council will consider the Final Plat approval.
- g. After City Council approval of the Development Contract and Final Plat, the Developer will be required to submit a notice showing insurance coverage has been provided, along with a Letter of Credit and all fees outlined in the Development Contract. In addition, the Developer shall record the plat and Development Contracts prior to the construction phase. See below list of items required prior to construction:

Notice to Proceed Requirements

- All Easements Received and Signed
- MPCA Permit
- Met Council Letter
- MN Dept. of Health Permit
- DNR Permit
- NPDES Permit
- Watershed Permit _____ (List which one applies)
- Grading Permit

- State Aid Approvals
- Scott County Highway Dept. Permits
- MnDOT Permits
- Final Plat Approval (including final plans) by Council
- Contract Documents Signed
- Development Contract Signed/ Security Agreement
- Insurance Certificate
- Plat Recorded
- Financial Guarantee: Letter of Credit
- Escrow Deposit & Amount
- Pre-construction Conference Held

SECTION THREE: PLAN STANDARDS

The City has certain standards of a plan for infrastructure improvements which are to be owned and maintained by the City. These standards apply to grading plans, construction plans, and record plans. To standardize these plans, the guidelines listed below shall be followed.

3.1 GENERAL PLAN STANDARDS

The City requires specific plan format and graphic standards for infrastructure improvements which are to be owned and maintained by the City. The following provides, in outline form, the City's requirements for these plans:

- a. All plans shall be drafted in computer aided drafting (CAD) format. The drawings shall be plotted in grayscale.
- b. Provide digital copy of all the construction drawings in PDF format
- c. All drawings shall use the Scott County coordinate system (feet). Coordinate system must be shown on the survey sheets.
- d. All full size plans shall be set up for **22"x34"** sheets. Half size plans, 11"x17" shall also be provided.
- e. Scale: Maximum Horizontal Scale 1" = 50' (Half scale 1" = 100')
Maximum Vertical Scale 1" = 10' or approved scale by City Engineer
- f. Title Block shall be located along the right side or right edge of bottom of each plan sheet and set in 1/2" from the edge. Information shall include name and address of engineering firm, sheet title name, sheet number, certification signature and registration number of registered professional engineer, project title, revision block, and City project number.
- g. All plans shall have properly placed north arrows and bar scales for each plan on the sheet. The north arrows and bar scales should be placed on the top and on the right side of the plan sheet. The direction north shall be oriented between 0 and 90 degrees on all plan sheets.
- h. Benchmarks shall be placed on all sheets. (Top nut of existing hydrant is preferred benchmark).
- i. Use of all typical engineering symbols is required including a key within the plans.
- j. All match-line breaks shall be clean with reference points and plan sheet numbers of continuation clearly marked. All plans which are broken by a match-line shall be on the same or consecutive sheets.

- k. All parcels shall be properly labeled with lot and block numbers and plat name, or parcel number in unplatted areas. Developed parcels shall have their address shown on the plan.
- l. All easements, permanent and temporary, shall be shown and labeled.
- m. Right-of-way, pavement, curb and gutter alignment data shall be shown.
- n. Approximate locations of existing utilities including gas, electric, cable, telephone lines, pipelines, etc. must be shown on the construction drawings.
- o. Existing utilities shall be shown and labeled as existing. When drafting utility and/or street plans, use a solid line for new utilities and a grey lines for existing utilities.
- p. Any revisions must be noted, initialed and signed on all affected sheets.
- q. Organize plan sheets generally in the following order:
 - Title Sheet
 - Overall Plan Sheet
 - Survey Sheet(s)
 - Removal Plan Sheet(s) (if necessary)
 - Grading Plan Sheet(s)
 - Erosion and Sediment Control Plan Sheet(s)
 - Sanitary Sewer and Watermain Plan & Profile Sheet(s)
 - Storm Sewer and Street Plan & Profile Sheet(s)
 - Typical Sections and Details Sheet(s)
 - Tree Inventory with Table
 - Landscape Plan Sheet(s)
 - Street Cross-Sections Sheet(s) (if necessary)
 - Retaining Wall Plan Sheet(s) (if necessary)
- r. The Title Sheet shall include a Project Location Map (Scale 1" = 2000') showing the location and names of all major streets within one mile of the proposed project and all streets in the proposed project area. The project area shall be clearly indicated with a circle.
- s. Provide an Overall Plan with a maximum scale of 1" = 200' showing the proposed project area as well as adjacent property. Overall plan shall have the following information:
 - Property lines - existing and proposed.
 - Easements – existing and proposed.
 - Street and street names.
 - Schematics for proposed improvements of sanitary sewer, watermain, and storm sewer. Proposed manholes and appurtenances clearly shown. Existing piping and appurtenances information shall be shown and labeled.
 - All property within plan shall be identified with lot number or appropriate title.
 - Location and elevation of City or United States Geological Survey Benchmarks.
- t. The following utilities shall be located in the approximate locations:

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Sanitary Sewer | On centerline of street right-of-way. No curvilinear design is permitted. |
| Watermain | Ten feet on either side of centerline and/or parallel to sanitary sewer. |
| Storm Sewer | Curb line on the opposite side of centerline as of watermain. |
| All Street surface structures (i.e. manhole, gate valve covers, etc.) shall be located as necessary to avoid being in the traveled wheel paths. | |

- u. All sewer and watermain shall be shown in profile with the appropriate information such as size, material, existing and proposed surface elevations, invert elevations, etc. Storm sewer plan shall be on a separate sheet from sanitary sewer and water. Any utility crossings shall be shown on plan and profile. Indicate where potential conflicts may exist.
- v. The utility profile shall be directly below the plan with the stationing aligned as closely as practical. Stationing shall be shown on the plan view as well as the profile.
- w. All detailed drawings shall be on separate sheets

3.2 CONSTRUCTION PLAN STANDARDS

The following standards are specific to Construction Plans.

- a. The construction plans for water main and sanitary sewer shall include the lowest elevation of all houses or buildings to be served.
- b. All manholes shall be numbered and stationed in both plan and profile.
- c. The size, type, and class of all sanitary sewer services shall be noted on the plans.
- d. Show the existing and proposed sanitary sewer in plan and profile view, along with other existing and proposed utilities in the construction zone.
- e. Show on plans the existing and proposed watermain in plan and profile view along with other existing and proposed utilities in the construction zone.
- f. All water fittings should be labeled as to size and type such as bends, tees, plugs, etc.
- g. The size, type, and class of all water services shall be noted on the plans.
- h. Plan and profile sheets are required for all new subdivision streets. The plan and profile sheets should include centerline stationing and the typical section for the street shown. The street construction plans shall include a grading plan and/or cross sections.
- i. The horizontal and vertical curve data must be shown on the street plans and should include: curve lengths, radius lengths, tangent lengths, stationing, delta, algebraic differences, and K values.

3.3 RECORD DRAWING PLAN STANDARDS

Record plans are required for all residential subdivisions, commercial subdivisions, commercial building sites, and public improvement projects. The record plans must follow the requirements below:

- a. All as-built record plans shall be provided in digital format (PDF – including Engineer’s signature), and CAD format.
- b. Distances, lengths and ties on as-built plans shall be lettered in italics. All tie measurements to gate valves and service stubs shall be to the nearest foot.
- c. All curb stop boxes and sanitary sewer lines shall be tied at the property line with at least two ties using the following priority:
 - The served structure with address noted
 - Neighboring structures with address noted
 - Fire hydrants
 - Manholes
 - Catch basins (if curb and gutter are in place)
 - Other permanent structures (telephone pedestals, transformers, bridges, etc.)
 - Power poles, trees, other semi-permanent items
 - Stationing from hydrants, manholes, catch basins. These may be used with back-of-curb distance
 - Adjacent services
 - All ties should be less than 100 feet. All ties should be shown in table format.

- d. All gate valves shall be tied with at least two ties using the following priority:
 - Fire hydrants
 - Manholes
 - Catch basins (if curb and gutter are in place)
 - Buildings with address noted
 - Other permanent structures (telephone pedestals, transformers, bridges, etc.)
 - Power poles, trees, other semi-permanent items.
 - Stationing from hydrants, manholes, catch basins. These may be used with back-to-curb distance
 - Adjacent services
 - All ties should be less than 100 feet. All ties should be shown in table format.
- e. Final quantity tabulations shall be submitted for the following:
 - Sanitary sewer by footage and size
 - Watermain by footage and size
 - Number of hydrants, gate valves, manholes, catch basins, etc.
 - Storm sewer by footage and size
 - Streets by linear footage and square yards
 - Sidewalks by linear footage and square yards
 - Trails by linear footage and square yards
- f. Upon the completion of the construction of a Structural Stormwater BMP, the developer is required to submit an as-built record plan of the ponding area certifying that the Structural Stormwater BMP constructed meets all design parameters. The developer may over-excavate the bottom of stormwater ponds to compensate for erosion that will occur. The developer will be responsible for verifying, at the end of the warranty period, that the ponds are providing the required volume.
- g. At the bottom of each as-built sheet indicate the following:
 - Contractor's name
 - City Project number
 - "Record Plan" and date completed
- h. Digital CAD format of record plan data ("base plan") shall meet the following criteria:
 - Base Plan drawings shall be in Autodesk AutoCAD (DWG or DXF) format, compatible with the City's current software version.
 - Base Plan drawings shall be in the Scott County coordinate system (feet) or a system approved by the City Engineer.
 - Base Plan shall be drawn using the City of Prior Lake layer system as shown in the attached "EXHIBIT R".
 - Base Plan shall have all lines representing pipes drawn continuous between fittings, bends, structures, etc. Pipe lines shall meet end to end.
 - Base Plan shall have all lines representing gravity pipes drafted in the direction of flow.
 - Insertion point of all blocks representing structures shall be placed at the end point of lines.
- i. Top nut elevation shall be shown on each new hydrant.

3.4 As-builts

- a. The survey crew will establish X, Y, and Z coordinates on all structures that can be accessed above ground (curb stops, gate valves, manholes, and catch basins) and below ground (all horizontal deflections on sanitary sewer services and all conduit crossings noting intended user) through the use of the GPS system.

3.5 Utility survey codes

- a. The City shall be provided with an electronic file copy of the as-built coordinates for each of the following utility locations that are within the public right-of-way and the drainage and utility easement. The points in this file shall use the following description codes:

| # | <i>Description</i> |
|-----|---------------------------------|
| 101 | Curb Stop |
| 102 | Fire Hydrant |
| 103 | Junction Box |
| 106 | Water Meter Vault |
| 109 | Water Valve |
| 110 | Waterline ARV (Air Relief) MH |
| 111 | Waterline Bend |
| 112 | Waterline Corp |
| 114 | Waterline Cross |
| 115 | Waterline Curb Box |
| 116 | Waterline Hydrant Valve |
| 117 | Waterline Plug |
| 120 | Waterline Sleeve |
| 121 | Waterline Tee |
| 122 | Waterline Wet Tap |
| 202 | Pump |
| 204 | Sanitary Sewer Cleanout |
| 206 | Sanitary Sewer FM ARV MH |
| 208 | Sanitary Sewer Manhole Invert |
| 209 | Sanitary Sewer Manhole Rim |
| 210 | Sanitary Sewer Plug |
| 211 | Sanitary Sewer Service Bend |
| 212 | Sanitary Sewer Service Tee |
| 213 | Sanitary Sewer Service Wye |
| 301 | Arch Pipe - Flared End |
| 302 | Arch Pipe - Invert |
| 306 | Corrugated Metal Pipe (Invert) |
| 307 | Corrugated Metal Pipe (Top) |
| 308 | Environmental Manhole |
| 313 | Reinforced Concrete Pipe Invert |
| 314 | Reinforced Concrete Pipe Top |
| 317 | Storm Drop Inlet Top/Grade |
| 319 | Storm Sewer Beehive |
| 320 | Storm Sewer Bend |
| 321 | Storm Sewer Box Culvert Invert |
| 322 | Storm Sewer Boxed Culvert Rim |
| 323 | Storm Sewer CB INV |
| 324 | Storm Sewer CB Rim |
| 325 | Storm Sewer Flared End Section |
| 327 | Storm Sewer Manhole Invert |
| 328 | Storm Sewer Manhole Rim |
| 351 | Drain Tile Bend |
| 352 | Drain Tile Clean out |
| 353 | Drain Tile Invert |
| 355 | Drain Tile Plug |
| 356 | Drain Tile Wye |
| 401 | Conduit |

PART IV

MAPPING STANDARDS

SECTION ONE: ELECTRONIC DRAWING FILES

The actual data for the City Engineer approved construction plan and record drawing should be submitted to the City's Project Manager in AutoCAD or ArcMap compatible format projected in Scott County Coordinate, NAD83 datum. Include with the electronic AutoCAD files all pen tables used for plotting. All electronic submittals will include metadata (description of files and explanation of data layers).

SECTION TWO: LAYER REQUIREMENTS

To standardize all electronic file submittals, the City has the following requirements:

- 2.1 File format (These items need to be correct before we will continue further review of the electronic files.)
 - Information is in Scott County Coordinate System
 - Special Characters – **Do not** use special characters (i.e. \$,_,-) while naming files or layers. Be sure to review layer names after binding and before submitting electronic files.
 - All polygons and polylines must be snapped and closed.
- 2.2 CAD Layer System for Construction Plans
 - The intent of the CAD Layer System for Construction Plans is to separate items and text within a drawing. The general concept of the layering is to separate:
 - Proposed features from existing features
 - Proposed text labeling from existing features
 - Different utilities within a construction project
 - Proposed lateral and trunk features from utility services
- 2.3 Additional layers to those indicated by the table below is acceptable based on the needs of the project or consultant policy. Placing similar items on multiple layers is unacceptable.

2.4 A Layer Description List that identifies the elements of each layer or level must accompany all electronic file submittals.

| LAYER NAME | CONTAINS |
|-------------------|---------------------------------------------------------|
| EAS exist | existing easement boundary polygon |
| easement | easement boundary polygon |
| SAN exist | sanitary – all existing features |
| SAN forcemain | sanitary sewer forcemain pipe line |
| SAN lift station | sanitary lift station point |
| SAN manhole | sanitary manhole point |
| SAN pipe | sanitary gravity pipe line |
| ST centerline | street centerline |
| ST curb | street curb line |
| STM catch basin | storm sewer catch basin point |
| STM draintile | storm sewer draintile points & lines |
| STM end section | storm sewer end section point |
| STM environmental | environmental catch basin / manhole point |
| STM exist | storm sewer – all existing features |
| STM manhole | storm sewer manhole point |
| STM outlet | storm sewer outlet point |
| STM pipe | storm sewer gravity pipe line |
| STM treatment | sediment trap manhole / water treatment structure point |
| WET exist | existing wetland polygon |
| Wetland | created / mitigated wetland polygon |
| WM exist | watermain – all existing features |
| WM hydrant | watermain hydrant point |
| WM pipe | watermain pipe line |

| | |
|----------|-----------------------|
| WM valve | watermain valve point |
|----------|-----------------------|

SECTION THREE: GIS UTILITY UPDATES:

The City of Prior Lake maintains all utility data in a GIS. To develop a consistent, comprehensive procedure for the development of this GIS, the City has created the following guidelines.

3.1 Procedure

- a. Convert utility CAD drawing to SDE database for each project. Note: the same utility drawing must be used for each as-built sheet.
- b. Merge all developments together.
- c. Separate utilities into SDE feature classes.
- d. Export temporary geometry file for interim use at City office or create an ArcGIS Server link to the City server.
- e. Export CAD drawings into png image format using unique as-built number as file name.
- f. Link digital as-built to geometry file.
- g. Add attribute data to geometry file.
- h. Perform quality control on data
- i. Update City SDE database

3.2 Updated Layers

- a. Sanitary Sewer
 - i. Lines
 - Sanitary sewer
 - Sanitary sewer service
 - ii. Points
 - Sanitary sewer lift station
 - Sanitary sewer structures
 - Sanitary sewer service at D/U easement
 - iii. Annotation
 - Sanitary sewer pipe diameter
 - Sanitary sewer pipe length
 - Sanitary sewer pipe material
 - Sanitary sewer manhole ID
- b. Storm Sewer
 - i. Lines
 - Storm sewer
 - ii. Points
 - Storm sewer lift station
 - Storm sewer structures
 - iii. Annotation
 - Storm sewer manhole ID
 - Storm sewer pipe diameter
 - Storm sewer pipe material

- c.** Watermain
 - i.** Lines
 - Watermain
 - Water service
 - ii.** Points
 - Water tower
 - Water well
 - Gate valve
 - Hydrant
 - Curb stop
 - iii.** Annotation
 - Watermain size
 - Watermain pipe material
- d.** Miscellaneous
 - i.** Lines
 - Street centerline
 - Sidewalk centerline
 - Easements
 - Right of Way
 - ii.** Points
 - Street signs
 - Street lights