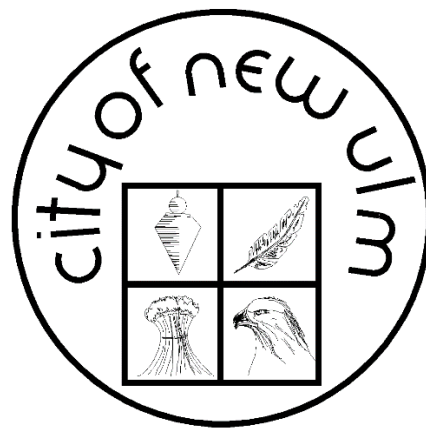


City of New Ulm

Engineering Guidelines



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Purpose

These Engineering Guidelines have been developed to assist developers, builders and engineers performing land development activities within the City of New Ulm. The following information is to serve as a reference to engineering guidelines that shall be incorporated into the design information, plans and specifications on any public infrastructure improvements made within the City of New Ulm.

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PROLOGUE

These Engineering Guidelines have been developed to assist developers, builders and engineers performing land development activities within the City of New Ulm. The following information is to serve as a reference to engineering guidelines that shall be incorporated into the design information, plans and specifications on any public infrastructure improvements made within the City of New Ulm. These guidelines are not intended to be, nor shall it be used as a specification for any improvement, but a guideline to assist with the preparation of those documents. All developed plans and specifications shall be prepared by a Licensed Engineer in the State of Minnesota.

All design and construction work shall conform to the most recent editions of the following, unless modified in the following:

- Mn/DOT Standard Specifications for Construction
- City of New Ulm Specification Sections 4000 (Trench Excavation& Backfill), 5000 (Watermain and Water End Services), 6000 (Sanitary Sewer and Sewer End Services), 6500 (Total Lining System for Wastewater Structures), 7000 (Cured In-Place Pipe Systems, CIPPS), 8000 (Pipe Bursting) and any applicable Special Provisions in section 3000.
- City Code of the City of New Ulm
- Ten States' Standards for Water Works and Wastewater Facilities
- New Ulm Stormwater Grading Manual
- Mn/DOT Road Design Manual
- Mn/DOT Bikeway Facility Design Manual
- Minnesota Manual on Uniform Traffic Control Devices
- MPCA Minnesota Stormwater Manual

All designs must incorporate the requirements identified in the City's Comprehensive Plan in effect at the time of development. A copy of the City of New Ulm Standard Specifications and Standard Detail Plates are available to download from the City of New Ulm website.

The Developer shall obtain all regulatory agency permits and approvals such as the following:

- Army Corps of Engineers
- Brown County
- City of New Ulm
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Pollution Control Agency

Design Standards

I. Storm Water Pollution Prevention and Grading

The grading plans and storm water pollution prevention plans for development shall conform to the most recent editions of the MPCA NPDES Permit for Construction Activity and City of New Ulm Storm Water Manual. The following requirements shall be implemented into the Grading and Storm Water Pollution Prevention Plans by the design professional for the development.

- 1) General Plan Items
 - a. All plans shall be designed and signed by a Licensed Professional Engineer in the State of Minnesota.
 - b. Site boundary lines and all existing/proposed easements.
 - c. Building pad footprints and finished floor elevations.
 - d. Existing topographic features with noted benchmarks.
 - e. Proposed site grading topographic features with specified lot corner grades.
 - f. Proposed finished driveway grades.
 - g. Access points for utilities located within easement areas.
 - h. Existing wetland boundaries.
- 2) Storm Water Pollution Prevention Plan
 - a. The Storm Water Pollution Prevention Plan (SWPPP) shall be separate from the site grading plan.
 - b. The SWPPP shall comply with the most current MPCA NPDES Permit for Construction Activity.
 - c. Show all proposed erosion control device Best Management Practices (BMPs)
 - i. Includes perimeter control, inlet protection, site entrances/exits, temporary and permanent sedimentation basins, site stabilization methods and other items as required by the MPCA NPDES Permit and City of New Ulm Storm Water Permit.
 - d. Sod shall be installed in the boulevard areas (area between back of curb & gutter and sidewalk) and immediately adjacent to the back side of sidewalk at a minimum 1 foot width within the City rights-of-way unless otherwise approved by the City Engineer.
- 3) Grading
 - a. Grading limits shall be shown for the site and shall show the areas that are immediately adjacent to the grading limits.
 - b. Existing contours shall be at 1' intervals preferred. 2' intervals may be used where site conditions require a larger contour interval. Contours shall extend a minimum of 100' beyond the site grading limits.
 - c. Proposed contours shall be at 1' intervals preferred. 2' intervals may be used where site conditions require a larger contour interval.
 - d. Minimum roadway grade preference is 1.0%. In instances where 1.0% roadway cannot be reasonably achieved, the absolute minimum shall be 0.5%. Boulevard grades shall be 1.5% preferred and 2.0% maximum. Cross slope on proposed sidewalk shall be 1.5% preferred and in no cases greater than 2.0% maximum.

- e. Finished grade elevations shall be shown at every property corner and pin location.
- 4) Submittals
 - a. Detailed hydrologic and hydraulic calculations or report shall be submitted with the site construction plans.
 - b. Upon completion of construction, the developer shall submit an As-Built Grading Plan of the site that is signed by the Engineer of Record for the development project. The Engineer shall certify that all parameters set forth in the plans and permits have been met.

II. Storm Sewer Design

All storm sewer rainfall-runoff modeling shall utilize Atlas 14 Precipitation Frequency Estimates for design purposes. Drainage facilities shall conform to the City of New Ulm Standard Specifications for Construction and Standard Plate Details.

- 1) General Design Requirements
 - a. All storm sewer conveyance facilities shall be designed to handle a 10-year rainfall event unless determined otherwise by the City Engineer. All low areas shall be designed with an appropriate emergency overflow conveyance system.
 - b. Long radius bends may be utilized on 24" and larger pipe diameters for horizontal alignment.
 - c. Catch basin inlet spacing shall meet the 10-year design storm event for spread roadway design.
 - d. Catch basin inlets shall be placed in line with property lines to the maximum extent possible and shall not be located within driveways.
 - e. Catch basin inlets shall not be placed within intersection curb radii.
 - f. Maximum spacing between storm sewer manholes shall be 450'.
 - g. Storm water treatment facilities shall be designed to meet the current requirements of the New Ulm Storm Water Ordinance and Grading Manual and the current MPCA MS4 and Construction Activity Permits.
 - h. Storm events shall be defined as outlined below:
 - i. 2-year storm event is defined as 2.78" of rainfall in 24 hours.
 - ii. 5-year storm event is defined as 3.45" of rainfall in 24 hours.
 - iii. 10-year storm event is defined as 4.09" of rainfall in 24 hours.
 - iv. 100-year storm event is defined as 6.81" of rainfall in 24 hours.

III. Watermain Design

Watermain facilities shall conform to the City of New Ulm Standard Specifications for Construction and Standard Plate Details.

- 1) General Design Requirements
 - a. All watermain pipe shall be designed with a minimum of 8' of cover with a max of 10' of cover unless otherwise allowed by the City Engineer.

- b. There shall be a minimum of 18" of vertical separation between sanitary sewer mains and services and storm sewer crossings.
 - c. All connections to active mains shall be wet taps unless otherwise approved by the City Engineer and New Ulm Public Utilities Water Department.
 - d. All valves shall be gate valves unless otherwise approved by the City Engineer.
 - e. Horizontal alignment shall follow the sanitary sewer to the maximum extent possible with a minimum of 10' of horizontal separation.
 - f. Tracing wire system shall abide by the City of New Ulm Special Provisions and the Minnesota Rural Water Association Standard Details.
- 2) Watermain Requirements
- a. Minimum pipe size shall be 6". Sizing will be determined by modeling from the New Ulm Public Utilities and the City Engineer.
 - b. Material shall be DR14 PVC piping unless otherwise authorized by City Engineer.
 - c. Hydrants shall be installed at the end of dead-end watermain pipe runs. Looping of the watermain is preferred to the maximum extent possible.
 - d. Valves shall be installed off of every tee or cross junction that is installed.
 - e. Valve and fitting requirements shall conform to the City of New Ulm Standard Specification for Watermain and Water End Services (5000).
 - f. Watermain fittings shall be wrapped in polyethylene.
- 3) Hydrant Requirements
- a. Hydrants shall be located at each intersection and no further than 500' maximum spacing. When installed at locations other than intersection, hydrants shall be aligned with property lines.
 - b. Gate valves shall be installed on each hydrant lead.
 - c. The hydrant break-off line shall be 0.2' above the top of curb.
- 4) Water End Services
- a. Single family service size shall be 1" type PE service piping rated for 200 psi.
 - b. Water services for new subdivision construction shall be installed to the right-of-way line or utility easement line and shall have the curb stop placed on the line that is further into the parcel. Curb boxes shall be marked with a blue painted steel t-post.
 - c. Water and sewer service spacing shall conform to the requirements of the Minnesota Department of Health and Minnesota Pollution Prevention Agency.
 - d. If the curb stop is located within a paved area, the curb stop shall have a curb box casting installed when paving or placing the pavement. Casting shall conform to the City standard curb box casting specification.
 - e. Curb stops shall be installed with stationary rods and of the material specified in the City of New Ulm Standard Specification for Watermain and Water End Services (5000).
 - f. Services shall be installed with 8' of minimum cover.

IV. Sanitary Sewer Design

Sanitary Sewer facilities shall conform to the City of New Ulm Standard Specifications for Construction and Standard Plate Details.

- 1) General Design Requirements
 - a. All connections to existing sanitary sewer manholes shall be done by core drilling. No jackhammering or breaking of the structure will be allowed.
 - b. Inside drops are not allowed unless approved by the City Engineer.
 - c. Outside drops shall be constructed according to New Ulm Standard Plates and Details.
- 2) Sanitary Sewer Requirements
 - a. Sanitary sewer alignment shall follow the roadway centerline unless otherwise authorized by the City Engineer.
 - b. Maximum manhole spacing shall be 450'.
 - c. All dead-end sewer mains shall have a manhole constructed at the end of the sewer main.
 - d. All PVC sewer piping & fittings shall be SDR26.
 - e. When sewer trunk main depth is greater than 25' the City may require the installation of a shallower collector main for the connection of the neighborhood sewer services. This determination will be made by the City Engineer.
- 3) Sewer End Services
 - a. Single family sewer services in new subdivision construction shall be 4" SDR26 PVC.
 - b. Sewer services for new subdivision construction shall be installed to the right-of-way line or utility easement line and shall have the tracing wire access terminal box placed on the line that is further into the parcel. Access terminal box shall be marked with a green painted steel t-post.
 - c. Cleanouts on services are required every 100' and shall include a cleanout riser.
 - d. If the cleanout and/or access terminal box is located within a paved area, the cleanouts and/or access terminal box shall have a casting installed when paving or placing the pavement. Casting shall conform to the City standard curb box casting specification.
 - e. Sewer and water service spacing shall conform to the requirements of the Minnesota Department of Health and Minnesota Pollution Prevention Agency.
 - f. Single family services shall not be connected to a manhole unless otherwise approved by the City Engineer.

V. Roadway Design

Roadway design shall conform to the City of New Ulm Standard Specifications for Construction and Standard Plate Details, Mn/DOT Standard Specification for Construction, Mn/DOT Road Design Manual and the Minnesota Manual on Uniform Traffic Control Devices.

- 1) General Design Requirements
 - a. All curb and gutter shall be design V624 unless otherwise authorized by the City Engineer.
 - b. All street widths shall be measured from face of curb to face of curb. Minimum residential roadway width shall be 36' unless otherwise authorized by the City Engineer. Minimum roadway width for industrial or commercial areas shall be 44'.
 - c. Roadways shall intersect at 90° angles whenever possible, minimum angle is 80°.
 - d. Streets shall have a roadway grade of minimum 0.5% and 1.0% preferred. Roadway cross slope shall not exceed 2%.

- e. The maximum cul-de-sac roadway length shall be 750'. The terminal turnaround shall have a radius of no less than 50' to face of curb.
- f. Intersection radii in residential areas shall be 15' from the face of curb. Intersection radii in commercial or industrial areas shall be a minimum of 25' from face of curb. Larger radii will be required where the turning movements of the design vehicle require a larger radius.
- g. All pedestrian ramps shall meet the current Mn/DOT Standard Plans for Pedestrian Curb Ramps.
- h. Minimum sidewalk width shall be 5' when within a 60' wide right-of-way and 6' when within an 80' wide or larger right-of-way.
- i. Construction of trails and sidewalk shall conform to the most current edition of the Mn/DOT Bikeway Facility Design Manual.
- j. Street lighting shall conform to the current City and PUC specifications and standards.
 - i. All wiring placed in schedule 40 PVC conduit.
 - ii. All conduit placed 6 inches to 10 inches behind curb, 12" below finished grade.
 - iii. Concrete bases shall be 2 feet from back of curb, poured with ½" x 8' grounding rod.
 - iv. Wiring for source of power lighting feeds shall be #3 black, white, red copper wire with #8 stranded ground wire.
 - v. Wiring for lighting runs shall be #6 black, white, red copper wire with #8 stranded ground wire.
 - vi. Power for street lighting shall not be metered.

VI. Construction Requirements

The following requirements are necessary for developers and their contractors during and after construction.

- 1) As-Builts (Record Drawings) and Construction Data
 - a. The developer's engineer shall submit to the City the following information on an As-Built Plan Set (paper, .pdf and .dwg format) and electronic data file (.csv format) that utilizes the current City point code description. The as-built data shall include the following:
 - i. Water gate valves & box elevation
 - ii. Hydrants
 - iii. Watermain fittings
 - iv. Water service saddles & corporation stops
 - v. Water service curb stop
 - vi. Watermain and service flow-line elevations
 - vii. Sanitary sewer manholes casting & flowline elevations
 - viii. Sanitary sewer service wye branches
 - ix. Sanitary Sewer service fittings & tracer wire access terminal box
 - x. Storm sewer manholes and catch basin casting & flowline elevations
 - xi. Storm sewer long radius bends
 - xii. Roadway underdrain location and flowline elevation

- xiii. Street lighting standards
 - xiv. Street lighting hanholes
 - xv. Street lighting conduit bends/fittings
 - xvi. Final grading topographic survey
 - b. The developer's engineer shall submit to the City the following testing information:
 - i. Density compaction
 - ii. Watermain bacterial
 - iii. Watermain hydrostatic
 - iv. Sanitary sewer pressure
 - v. Sanitary sewer mandrel
 - vi. Sanitary sewer television
 - vii. Storm sewer television
 - viii. Roadway aggregate gradation
 - ix. Roadway roll test
 - x. Bituminous cores (if required)
 - xi. Concrete air, slump and compressive strength
 - xii. Lift station start-up reports (if applicable, City and PUC staff must be present)
 - c. The developer's engineer shall submit to the City the following tabulations/reports
 - i. Final project quantities
 - ii. Final project inspection diary
 - iii. Lift Station operation and maintenance manual documentation
- 2) Final Project Acceptance
- a. The developer or their representative shall be made available for a substantial completion project walk through to develop the final project punch-list with the City Engineer or their representative.
 - i. The developer shall perform any corrective work that is identified during the walkthrough.
 - b. Once all identified corrective work is complete the developer or their representative shall perform a final project walk through with the City Engineer.
 - c. If no corrections are needed the project will be issued final acceptance by the City.

VII. Construction Plan Standards & Submittals

The following requirements are necessary for infrastructure improvements that will be owned and maintained by the City. These standards apply to all necessary construction plan sheets.

- 1) General Standards. The following shall apply to plan sets submitted to the City.
 - a. Title page shall include a signature line for City Engineer approval
 - b. Submitted plan sheets shall be sized 11" x 17"
 - c. Plan scale shall be 1" = 25' or 1" = 20' horizontal and 1" = 5' vertical unless otherwise approved by the City Engineer
 - d. The following sheets are typical plan requirements but will vary depending on the project
 - i. Title Sheet
 - ii. Legend Sheet

- iii. Estimated Quantities and Project Tabulation Sheets
- iv. Standard Details
- v. Storm Water Pollution Prevention Plan
- vi. Demolition/Removal Plan
- vii. Existing Condition Plan
- viii. Utility Plan & Profile (watermain and sanitary sewer)
- ix. Storm Sewer Plan & Profile
- x. Roadway Plan & Profile
- xi. Grading & Intersection Detail Plan
- xii. Traffic Control & Signing Plan
- xiii. Street Lighting Plan
- xiv. Cross Section Sheets
- e. Plan Review Submittals
 - i. Final Plan for City review
 - ii. Soil boring report
 - iii. Storm sewer calculations
 - iv. Sanitary sewer calculations
 - v. Roadway pavement design calculations and documentation
 - vi. Any necessary project permits