



City of Cottage Grove, Minnesota

Engineering Guidelines

SANITARY SEWER

Gravity Main

- Material .....PVC
Minimum Diameter..... 8-inch
Class:
Less than 18 feet depth ..... SDR-35
Less than 28 feet depth ..... SDR-26
Greater than 28 feet depth ..... Designed by Engineer
Minimum Cover ..... 10-ft minimum depth

Note: Maintain minimum cover unless approved by City Engineer

- Grade..... Ten States Standards (2 fps), n=0.013
Location.....Center of street

Note: Manhole is required at stub if line is to be active

Structures

- Type ..... Precast, See City Standard Specification
Minimum Diameter..... 48-inch
Maximum Spacing..... 400-feet
Inside Drop..... See City Detail Plate
Location.....Street Centerline

Services

- Material .....PVC
Wye (class) .....Match Sewer Main
Service Pipe.....SCH 40

Minimum Diameter:

- Single Family ..... 4-inch @ 2.0%
- Multi-Unit Residential ..... 6-inch @ 1.0%
- Commercial – Industrial ..... Determined by Engineer

*Note: Comply with Minnesota Plumbing Code*

Cleanout..... If service length exceeds 100-feet

## WATER MAIN

### Main Pipe

Material .....DIP

Minimum Diameter..... 8-inch unless approved by City Engineer

Class:

< 20-Inch Diameter ..... CL 52

20-Inch or Greater Diameter ..... CL 51

Standard Cover ..... 7.5 feet

Location..... 10-feet from sewers

*Note: North or west of street centerline*

Encasement..... Polyethelene

Bends..... Avoid use of 90 degree bends

Joint Restraint ..... See City Standard Specification

### Hydrants

Type ..... See City Standard Specification

Maximum Coverage Radius:

Single Family Lot..... 300-feet

Commercial, Industrial, Multi-Family Building ..... 250-feet

Valve..... Required on hydrant lead, 6-inch

Hydrant Pad ..... See City Detail Plate

Placement ..... At lot lines, 5-feet behind back of curb

Desired Location ..... Intersections, end of cul-de-sac

### Valves

Type:

< 12-Inch Diameter ..... Gate Valve

12-Inch Diameter and Greater ..... Butterfly Valve

*Note: See City Standard Specification for Product Information*

Maximum area isolated ..... 20-25 homes

Desired Location ..... Intersections or every 800-feet

### Services

Material:

Single Family ..... Type K copper

Other ..... DIP

Minimum Diameter ..... 1-inch (single family)

Curb Stop Location ..... At right-of-way, see City Detail Plate when sidewalk is present

## STORM SEWER

### Design

Design frequency for storm sewers ..... 5-year

Design frequency for stormwater basins ..... 100-year

Trunk pipe:

*Design to carry both the 100-yr pond discharge and 5-yr design flow for directly connected areas*

Pipe diameter change in profile ..... Match crown of pipe

*Note: In cases where not possible, submit calculations to demonstrate excessive surcharging does not occur*

Methodology ..... Rational method, gravity flow

Manning n-value ..... 0.013

Minimum Velocity (pipe) .....	3-fps
Maximum Velocity (pipe).....	10-fps
Maximum Velocity at Pond Inlets.....	6-fps
Maximum Velocity (overland discharge) .....	4-fps
Catch Basin Spacing .....	400' maximum street flow (local roads)

*Note: On State Aid routes, spread calculations are required*

Rear Yard Storm Sewer .....	Maximum 3-4 lots overland drainage
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*Note: 300-ft maximum length of run for jetting*

Pond inlets .....	Invert to match outlet elevation
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*Note: Submerged pipes not allowed*

### Main Pipe

Material .....	RCP
Minimum Diameter.....	12-inch
Class .....	Use Concrete Pipe Association Fill Height Tables
Minimum Cover .....	3-feet within street, 2-feet in greenspace
Location.....	South or east side of street (within street)

*Note: Avoid running behind curb as that location typically conflicts with streetlight bases, signs, and boulevard tree plantings*

### Structures

Type .....	Precast, See City Standard Specification
Minimum Diameter.....	48-inch
Maximum Spacing.....	400-feet

*Note: Also required at all pipe connection points*

Catch Basin Location .....	See City Detail STR-28
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*Note: Avoid mid-radius placement when possible*

Sumps.....	Last structure in street prior to pond
Skimmer Structures.....	Placed prior to infiltration feature and at pond outlet

Castings ..... See City Standard Specification

## Miscellaneous

Pond Benching ..... See City Detail Plate

Minimum Freeboard:

100-yr HWL.....3-feet below low adjacent grade of building

Basin EOF .....2-feet below low adjacent grade of building

*Note: For backyard and side-yard conveyance and temporary ponding areas, provide 1-foot freeboard to the overland EOF*

Pond Requirements ..... See Surface Water Plan

Wet Ponds..... 12" min. clay liner

1. Place liner along pond bottom to an elevation 1 vertical foot above NWL.
2. Liner shall have a maximum permeability of  $1 \times 10^{-6}$  cm/s with a minimum 15% passing the #200 sieve.

Infiltration Basin..... 12" min. media

1. The City recommends providing a Filter Topsoil Borrow (MnDOT 3877.2.G) consisting of 70% sand (meeting the gradation requirements of 3126) and 30% Grade 2 Compost (MnDOT 3890).

Pond 100-yr HWL..... Contained entirely in Outlot

Minimum basin & pond access:

Access Width ..... 20-foot wide Outlot

Slope ..... 1:6 Maximum

*Note: Need ability to access structures around basin with 10' maintenance bench*

Minimum greenspace grade for drainage ..... 2%

## PUBLIC STREETS

### Geometric Design, Local Residential

Minimum Street Width (face of curb to face of curb) ..... 28-feet

Typical Crown..... 2.4%

Curb Type ..... Surmountable D428

Minimum Longitudinal Grade ..... 0.75%

Maximum Longitudinal Grade ..... 5.0%

*Note: Maximum 8% is allowed only if existing topography prohibits 5.0% grade*

Maximum Intersection Approach Grade ..... 2.0% for first 100-feet

Intersection Angles ..... 90 degrees

Minimum Horizontal Curve Radius ..... 100-feet

Minimum Vertical Curve Length ..... Minimum K=19 (crest) and K=37 (sag)

Minimum Curb Radius ..... 20-feet

Cul-de-sacs ..... See City Detail Plates

*Note: Temporary cul-de-sac with bit curb is required at phased plat boundary of dead-end street*

### Geometric Design, Collector or Commercial

Minimum Street Width (back of curb to back of curb)..... Varies

Typical Crown..... 2.0%

Curb Type ..... B618 (design speed < 45 mph)

Minimum Longitudinal Grade ..... 0.75%

Maximum Longitudinal Grade ..... 5.0%

Maximum Intersection Approach Grade ..... 2.0% for first 100-feet

Intersection Angles ..... 90 degrees

Minimum Horizontal Curve Radius ..... State Aid Tables

Minimum Vertical Curve Length ..... State Aid Tables

Tangent length at intersection from curb line..... 100-feet

Minimum Curb Radius ..... 30-feet

### Pavement Design

Minimum Structural Design ..... 10-ton R-value, MnDOT Flex Pave (collectors)

*Note: For local roads, see City Detail Plate*

**Bituminous Mix Types:**

Residential .....	C-oil
Collector .....	F-oil
Trail .....	C-oil

*Note: See City Standard Specification*

Minimum Bituminous & Aggregate Base .....	See City Detail Plate
Sub-base .....	In-place granular or as determined by Engineer

**Signing & Striping**

Design Standards .....	Follow MMUTCD
Signs .....	Follow City Sign Policy
Sign Panels .....	Diamond Grade DG3
Epoxy .....	Collector road lane striping
Latex .....	Parking lot striping, temporary markings
Thermoplastic (ground in) .....	Pavement messages, stop bars, crosswalks

**Typical Widths:**

Stop Bar .....	24-inches
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*Note: Required on all collector and arterial intersections*

Crosswalk .....	12-inches
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*Note: Required on collector and arterial intersections; not required on controlled residential streets*

Mid-Block Crossings .....	Marked crosswalk required
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**Entrances & Driveways**

Commercial Apron .....	See City Detail
Maximum Driveway Grade (residential) .....	10.0%
Private Streets .....	Max. approach to match boulevard grade

**Boulevard**

Typical Slope .....	3.0%
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Minimum Topsoil Depth .....	6.0-inches
Street Light Pole/Conduit Location .....	3-feet behind curb
Hydrant Location.....	5-feet behind curb
Tree Location (with sidewalk) .....	5-feet behind curb
Tree Location (without sidewalk) .....	10-feet behind
Sign Post.....	6-feet behind curb

### Sidewalks & Trails

Typical Section .....	See City Detail Plates
Locations .....	As directed
Maximum Longitudinal Grade .....	See current ADA standards
Maximum Cross Slope.....	See current ADA standards
Pedestrian Ramps .....	See current ADA standards & MnDOT details

*Note: Concrete flares on sidewalk; Graded flare on 8' wide or greater bituminous trails, unless adjacent to walkable surface*

Clear Zone.....	2-feet
Intersecting Trails.....	Provide a 10' min. radius for plowing and maneuverability

### Street Lighting

Spacing, Residential .....	Approx. 200-250-feet at lot lines
Spacing, Commercial/Collector Streets .....	IES Standards

*Note: Or as directed by Engineer*

Location.....	Place along trail or sidewalk side of road
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*Note: Place poles at intersections, mid-block pedestrian crossings, at lot lines, and end of cul-de-sacs when possible*

Lights per circuit and length of run.....	Designed by Engineer
Feed Point Cabinet.....	See City Standard Specification
Conduit.....	1.5-inch minimum NMC

*Note: Required for all underground wiring*

Pole Types .....	See City Detail Plates
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## Landscaping

### Planting Restrictions:

1. Deciduous trees should be located a minimum of 5' off any utility pipe
2. Coniferous trees should be located a minimum of 15' off any utility pipe
3. No tree should be located within 10' of a hydrant or 15' from a streetlight
4. No trees should be located within a storm pond HWL
5. No trees should be located within a storm pond's 20' access route
6. No coniferous trees within 20' of a proposed sidewalk/trail
7. No deciduous trees within 5' of a sidewalk/trail
8. For trees within public right-of-way or public outlot, trees shall conform to the current list of approved species

### Boulevard Tree Planting List 2021

#### Overstory

Northern Pin Oak- *Quercus ellipsoidalis*  
Red Oak- *Quercus rubra*  
White Oak- *Quercus alba*  
Swamp White Oak- *Quercus bicolor*  
St. Croix Elm- *Ulmus americana* 'St. Croix'  
New Horizon Elm- *Ulmus* 'New Horizon'  
Accolade Elm- *Ulmus davidiana* var. *japonica* 'Morton'  
Skyline Honeylocust- *Gleditsia tricanthos* var. *inermis* 'Skycole'  
Hackberry- *Celtis occidentalis*  
River Birch- *Betula nigra* (SINGLE STEM ONLY)  
Yellowwood- *Cladrastis kentuckea*  
Kentucky Coffeetree- *Gymnocladus dioicus*  
London Planetree- *Platanus* × *acerifolia*  
Tuliptree- *Liriodendron tulipifera*

#### Understory

Japanese Tree Lilac- *Syringa reticulata* 'Ivory Silk'  
Spring Snow Crabapple- *Malus* 'Spring Snow'  
Ironwood- *Carpinus caroliniana*