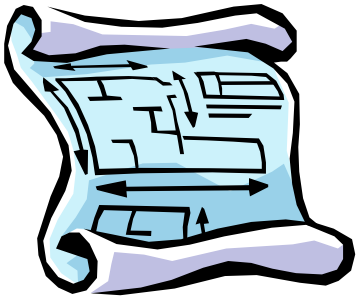
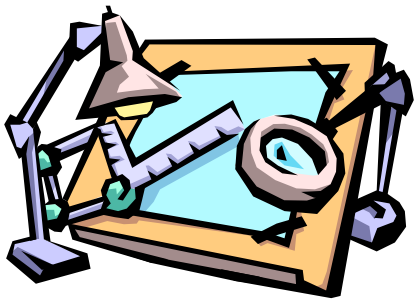
City of Hastings

Public Works
Design Manual



Revised
January 2006



CITY OF HASTINGS

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SECTION ONE
PRELIMINARY PLATS

A. BLOCKS

1. **LENGTH.** Block lengths shall not exceed 1,200 feet and shall not be less than 400 feet.

2. **PEDESTRIAN WAYS.** In blocks longer than 600 feet, a pedestrian crossway easement or right of way with a minimum width of 20 feet may be required near the center of the block. The use of additional access ways to schools, parks and other destinations may be required.

B. LOTS

1. **LAYOUT.** Where possible, side lot lines shall be at right angles to straight street lines or radial to curved street lines. Lots with frontage on two parallel local streets shall be prohibited.

2. **SIZE AND DIMENSION.** Minimum lot area and lateral dimensions shall be as set forth in Chapter 10 of the City Codes. The following table is an excerpt from Chapter 10;

SECTION 10.26. DISTRICT LOT REGULATIONS.

It is unlawful to erect or alter any building within the City unless the following minimum lot and yard areas are provided and maintained in connection with such building.

DISTRICT	A	R-1	R-2	R-3	R-4	R-5	R-6	Other
AREA	10 acres	9000 SF, other*	7000-one 9700-two other*	5000 SF	2500 SF	500 SF	2500 SF	*
WIDTH AT SETBACK	150 FT	75 FT	50 -one 66-two					*
FRONT SETBACK	20 FT	20 FT	20 FT	20 FT	20 FT	5 FT	15 FT	*
INTERIOR SIDE SETBACK (b)	10 FT	10 FT	7 FT	7 FT	1/2bldg height	1/4bldg. height-g	5 FT	*
CORNER SIDE SETBACK (c & d)	10 FT	10 FT	10 FT	10 FT	10 FT	5 FT	10 FT	*
REAR SIDE SETBACK (b & d)	20 FT	20 FT	20 FT	20 FT	20 FT	1/2bld height-g	5 FT	*
HEIGHT	25 FT (e)	25 FT (e)	25 FT (e)	25 FT (e)	25 FT (e)	40 FT (f)	25 FT (e)	*

***** Minimum lot area requirements for other uses and all other districts not listed above shall be determined by the City during site plan review. The Community Development Director may, at her/his discretion, determine setbacks for accessory structures.

FOOTNOTES:

(a) Where adjacent structures have front yard setbacks different from those required, the minimum front yard setback shall be the average setback of such structures, but in no case shall the front yard setback be less than 10 feet.
(b) In the R-1 District, an accessory structure (garage, shed, open deck, etc.) shall be no closer than five feet to the rear or adjacent interior side lot line.
(c) In the R-2 District, an accessory structure (garage, shed, open deck, etc.) shall be no closer than five feet to the rear or adjacent interior side lot line.
(d) Garages facing the street/alley R.O.W. shall be setback at least 20 feet.
(e) Buildings over 25 feet in height shall require one-half (1/2) foot additional setback for each additional one foot of building height on the required minimum side yard.
(f) Except as allowed by Section 10.15, Subd. 3.
(g) The maximum setback required shall be 15 feet but in no case less than five feet.

3. **CORNER LOTS.** Corner lots shall be platted at least 10 percent wider than the minimum lot width required.

4. **NATURAL FEATURES.** When subdividing land, due regard shall be shown for all natural features which if preserved will add attractiveness and stability to the proposed development and which may alter normal lot platting.

5. **LOTS ALONG THOROUGHFARES.** There shall be no direct vehicular access from residential lots to an arterial street, and residential lots shall be separated from arterial streets and railroad right-of-ways by a 25 foot buffer strip, which may be in the form of added depth or width of lots backing on or siding on the thoroughfares or railroad right-of-way.

6. **LOT REMNANTS.** Lot remnants which are below the minimum lot size must be added to adjacent or surrounding lots rather than be allowed to remain as an unusable outlot or parcel unless the owner can show plans for the future use of such remnant.

C. STREET LAYOUT

1. **GENERAL COMMENTS.**
    a. The design of all streets shall be considered in their relation to the following: existing and planned streets, to reasonable circulation of traffic, to topographic conditions, to runoff of storm water and to the proposed uses of the area to be served.

    b. Where new streets extend existing adjoining streets, their projections shall be at the same or greater width, but in no case less than the minimum required width.

    c. Where adjoining areas are not subdivided the arrangement of streets in new subdivisions shall make provisions for the proper projection of streets. When a new subdivision adjoins unsubdivided land susceptible to being subdivided, then the new streets shall be carried to the boundaries of such unsubdivided land.

d. The street arrangements shall be such as to cause no hardship to owners of adjoining property in platting their own land and providing convenient access to it.

2. **CUL-DE-SACS.** Cul-de-sacs shall not be permitted unless there are specific engineering reasons to require them based on existing property condition, topography, or natural features. Maximum length of permanent cul-de-sac streets shall be 500 feet measured along the center line from the intersection or origin to end of right-of-way. Each Cul-de-sac shall be designed according to City Standards. Cul-de-sacs shall be required to have a landscaped island according to City specifications.

3. **STREET JOGS.** Street jogs with centerline offsets of less than 125 feet shall be avoided.

4. **STREET INTERSECTIONS.** Insofar as practical, streets shall intersect at right angles. No intersection shall contain more than four (4) corners. Unless approved by the City, 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.

5. **REVERSE CURVES.** Tangents of at least 100 feet in length shall be introduced between reverse curves.

6. **CORNERS.** Curb lines at street intersections shall be rounded at a radius of not less than 15 feet.

7. **ACCESS TO ARTERIAL AND COLLECTOR ROADWAYS.** Where a proposed plat is adjacent to an arterial or collector roadways as designated by the Hastings Comprehensive Plan, spacing between access points and driveways to such thoroughfares of less than 660 feet for collectors and 1,320 feet for arterials shall be avoided except where impractical or impossible due to existing property divisions or topography.

8. **LOCAL SERVICE DRIVES.** Where a proposed plat is adjacent to a major thoroughfare, the Council may require the developer to provide local service drives along the right-of-way of such facilities or they may require that lots should back on thoroughfares, in which case, vehicular and pedestrian access between the lots and thoroughfares shall be prohibited.

9. **ARTERIAL AND COLLECTOR ROAD DRIVEWAYS.** Driveway access to arterial streets is strongly discouraged. Residential driveway access to collector streets should be avoided. If residential driveway access to arterial or collector streets is approved due to specific engineering reasons, topography or natural features, a 35 ft. setback from the property line shall be required, and the driveways must be constructed with a turnaround.

10. **PRIVATE STREETS.** Public improvements shall not be approved for any private street. Private drives and utilities shall be constructed according to approved City standards and shall be privately maintained. Drainage and utility easements shall be dedicated over the width and length of private streets.

11. **ALLEYS.** Alleys may be permitted as part of planned residential developments (PRD).

12. **DRIVEWAYS.** Driveways must not exceed 24 feet in width within the City Right-of-Way. Driveway wings are not included in the width measurement, but must be constructed to the City's specifications.

D. EASEMENTS.

1. **LOTS.** Easements at least 10 feet wide along front and side-corner lot lines as well as centered on rear and side lot lines shall be provided for drainage and utilities across all lots.

2. **UTILITIES.**
    a. Easements for water main, storm or sanitary sewers shall be at least three times the depth of the utility plus 4' rounded to the next 5' increment.

    b. Where utility mains are constructed within easement areas that are not parallel to and abutting improved road right of ways, the Public Works Director may require construction of 10 feet wide bituminous paved utility access trails to provide access for maintenance vehicles to service the utility mains.

    c. Easements for drainage inlets shall cover all area that will be inundated by at least a 100 year storm event.

3. **Trail Easements.** Trail easements shall be at least 20 ft. wide unless abutting public right of way. All structures, trees, gardens, etc. on private property shall be located at least 2' behind the property line. The required width of trail easements abutting public right of way shall be determined by the Public Works Director.

SECTION TWO
IMPROVEMENT PLAN & CIVIL SITE PLAN FORMAT

A. SIGNED PLANS. Submitted grading, street and utility improvement plans must be signed by a professional engineer licensed in the State of Minnesota.

B. SIZE. All plans sheets must be 22 inches by 34 inches in size.

C. SCALE. Grading plans scale may be as small as 1 inch equals 100 feet. Street and utility improvement plans scale may be no smaller than 1 inch equals 50 feet.

D. ELECTRONIC FORMAT. Approved grading, street and utility improvement plans shall be provided to the Hastings Engineering Department in an electronic format meeting the following City standards:

1. AutoCad drawing file – AutoCad 2000 version preferred and based on the Dakota County Coordinate system.
2. Layers as per Hastings Engineering Department standards – see Appendix A
3. Pen standards using Hastings Engineering Department standards – AutoCad pen standards file available from the Hastings Engineering Department.

E. TITLE BLOCKS. To simplify the city's data retrieval process, a title block shall be included on bottom right hand corner of each plan sheet showing

1. Sheet subject (Grading, Sewer, Water, Storm Sewer, Streets, Details/Sewer, etc.)
2. Subdivision or development name.
3. A list all streets shown on the plan sheet (Names with Termini).

F. REVISIONS. All plan sheets shall include a revisions note box to display revision dates and a brief description of each plan revision. Revisions shall also be highlighted on the plan sheet.

G. BENCHMARKS. All plan sheets shall include at least two benchmarks to be used to establish elevations during construction, and both benchmarks must be within two hundred feet of the site.

H. TITLE SHEET. All plan sets shall include a title sheet containing the following information:

1. Location map siting the proposed project.
2. Legend for the symbols on the drawings.
3. Sheet index.
4. Note referencing Gopher State One Call and listing their 1-800 number.
5. Reference to specifications which apply to the project, including their effective date. Specification references shall at a minimum include the current versions of the following specifications:
    a. City of Hastings Standard Specifications
    b. Minnesota Department of Transportation Standard Specifications
    c. City Engineers Association of Minnesota Standard Utility Specifications
    d. Minnesota Manual on Uniform Traffic Devices standard specifications for construction signing.

I. PLAN SET SUBMITTALS. Three sets of plan copies and one electronic data file shall be submitted for review. One reproducible copy of approved plans and one electronic file which includes staking information shall be submitted prior to start of construction.

J. APPROVED PLANS. No changes are to be made to the City approved plan set without City review and concurrence.

K. INSURANCE REQUIREMENTS. Specifications for private construction of public street and utility improvements shall include provisions requiring the City of Hastings and their designated representative to included as named insured on all Contractor insurance policies. The specified insurance requirements shall match the minimum limits set for local government contracting as per Minnesota Statutes as detailed below:

1. General Aggregate $ 1,000,000
2. Products- Completed Operations Aggregate $ 1,000,000
3. Personal and Advertising Injury $ 1,000,000
4. Each Occurrence (Bodily Injury and Proper Damage) $ 1,000,000
5. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
6. Excess or Umbrella Liability
   a. General Aggregate $ 1,000,000
   b. Each Occurrence $ 1,000,000
7. Automobile Liability:
   a. Bodily Injury:
      Each person $ 1,000,000
      Each Accident $ 1,000,000
   b. Property Damage: Each Accident $ 1,000,000
   c. Combined Single Limit of $ 1,000,000

L. WARRANTY BOND. A warranty bond in the amount of 20% of the cost of the installed street and utility improvements shall be provided to the City to cover repairs for the constructed improvements for a period of one year after written acceptance of the improvements by the City.

M. SURETY. In accordance with City Ordinances, Chapter 11, Subd. 8A:

"Prior to installation of improvements required under 11.06 of this chapter that are to be furnished and installed by the Developer, the Developer shall provide the City a letter of credit, cash escrow, or other approved form of surety, in the amount of 125% of the estimated cost of furnishing and installing the required improvements. This surety shall be used to cover failure of the Developer to construct the improvement in accordance with the approved plans and specifications and City standards, or failure to complete the improvements as approved."

If the developer chooses to provide the City a letter of credit, it must be self-renewing and irrevocable such that the City must authorize any reductions in its amount, and its termination when all outstanding work items have been completed.

SECTION THREE
GRADING AND EROSION CONTROL DESIGN STANDARDS

A. PLAN SUBMITTAL REQUIREMENTS.

1. **Grading Plan**. The following information shall be included in all grading plans:
    a. Finish grades and surface drainage of all parcels including overall final contours at 2-foot intervals, with existing contours shown as dashed and proposed contours shown as solid.
    b. Extend existing 2' contour lines a minimum of 200' beyond the property boundary or more as needed to accurately depict the existing drainage patterns.
    c. Show limits of clearing and grading.
    d. Show adjacent plats, parcels, property lines, section lines, streets, existing storm drains and appurtenances, etc.
    e. Detail of housing types proposed with basement, first floor, lowest opening and garage floor elevations.
    f. Proposed lot corner elevations.
    g. All drainage swales and critical drainage areas shall be clearly identified with grade and spot elevations.
    h. Preliminary street grades and drainage plan with elevations.
    i. Existing benchmarks used for surveying grading plan.
    j. Lot layout including lot lines, lot numbers and block numbers.
    k. Other right-of-way or easement locations, width and purpose.
    l. Show the Normal Water Level (NWL), High Water Level (HWL) and overflow elevation for all storm water ponds.

    Grading plans shall be updated after plat approval to show platted lot and block numbers and street names. The Grading plan shall contain a box to record the date of latest revision approval from the City.

2. **Erosion Control Plan**. The erosion control features may be illustrated on the submitted grading plan or on a separate plan sheet. Erosion control features such as silt fence, rock access driveways, inlet protection, concrete truck wash out areas, rock check dams, dirt stockpiles, and temporary sedimentation basins shall be clearly identified on the erosion control plan.

B. GRADING STANDARDS

1. **NPDES Permit.** Prior to start of construction, the Developer shall obtain all regulatory agency permits and approvals including those from the Minnesota Pollution Control Agency for "General Storm Water Permit for Construction Activity", and the signature of the company responsible for erosion and sediment control plan preparation, implementation and maintenance.

    The developer shall also submit a copy of their NPDES Construction Storm Water Permit and approved Storm Water Pollution Prevention Plan (SWPPP) to the City prior to starting grading activities.

2. **Minimum Grades.** Minimum grade for drainage swales and lot grading shall be 2% or greater.

3. **Maximum Grades**. Maximum 4:1 slopes are allowed in "maintained" areas except approved by the City Engineer. Maximum slopes in ponding basins are 5:1. Approved slopes greater than 4:1 shall have erosion control blanket installed immediately after finished grading.

4. **Drainage Swales**. Maximum length for drainage swales shall be 300 feet or a total of eight lots draining to a point, or as approved by the Public Works Director. All drainage plans shall contain a detail of a typical drainage "Swale", with a minimum depth of 18", a minimum 18-inch wide bottom; 5:1 side slopes, and minimum 2% grade. All swales must be contained within easements of sufficient size and width. All cross lot drainage must be contained in such swales, which shall be located in defined easements.

5. **Emergency Overflow Swales.** Show emergency overflow routes from all low points and show elevation of high point along emergency overflow route. Submit design calculations verifying the adequacy of the overland drainage route capacity. The following emergency overflow construction and design requirements shall apply:
    a. Emergency over flows, which drain over vegetated areas, shall be lined with Geotextile Erosion Control Matting such as: Enkamat, Tensar, LAN lock or approved equal.
    b. After the overflow area is fine graded the area it shall be sodded to match the specified overflow elevation and is to be protected with a temporary fence, which shall delineate the easement limits and protect the finished overflow swale from disturbance by adjacent home construction and lot grading.
    c. Emergency over flows will have a minimum 3' flat bottom with 4 to 1 slopes (please refer to your drainage calculations for flow path widths in excess of 3-feet). Please check that all necessary flow paths are included within easements of sufficient size and widths.
    d. Abutting structure "lowest" openings shall be at least 24-inches above the 100-year overflow profile (HWL) of the emergency swale.
    e. There shall be at least a 15-foot separation from the overflow swale drainage easement to any livable structure.

6. **Ponding and Sedimentation Basins.** If suitable soil conditions are available for use, infiltration of runoff on-site shall be required for site development storm water management. Water quality treatment measures to promote sedimentation of suspended particles in storm water runoff are required for all developments. Dual purpose ponds that provide both water quality treatment and storm water detention without a creating a permanent pool are encouraged. If a permanent pool is to be construed as part of the sedimentation basin (rather than a dual purpose pond), the following minimum design criteria shall govern:

a. An average permanent pool depth of four to ten feet;
b. A permanent pool length-to-width ratio shall be 3:1 or greater;
c. Pool side slopes shall not exceed 5:1;
d. A protective buffer strip of vegetation surrounding the permanent pool shall be constructed at a minimum width of 16.5 feet and a maximum slope of 10:1.

The developer shall be responsible for maintenance of all ponds until the later of; 2-years after the improvements are accepted by the City or until 50% of the lots are developed

7. **Storm Water Design Review**. Provide detailed hydrologic/hydraulic design calculations that include:
    a. Drawings showing the existing and proposed drainage boundaries.
    b. 2-year design, 10 year design, and 100 year design drainage boundaries.
    c. Existing and proposed hydrologic/hydraulic calculations for 2, 10, and 100 year storms.

8. **Retaining Walls**. Retaining walls will not be allowed within the City's right of way or easements, unless approved with the overall subdivision grading plan. Approved subdivision retaining walls within the right of way or easement areas shall meet current MnDOT standards and specifications. Detailed plans and specifications for retaining walls shall be submitted for review.

9. **Maintenance Access Routes**. Show or define access routes for maintenance purposes to all inlets or outlets at ponding areas (must be a maximum of 8% grade, 2% cross slope and 10' wide) and side yard or back yard utility manholes and drainage structures. Ten foot wide bituminous trails may be required to be constructed to provide access for maintenance vehicles. Bituminous maintenance shall have a minimum cross section of 1.5 inches of wearing course, 1.5 inches of base course, and 6 inches of aggregate base.

10. **Buffer Strip Requirement**: A buffer strip shall be maintained around the perimeter of all wetlands. The buffer strips shall meet the following requirements:
    a. Buffer strips shall be a minimum of twenty (20) feet wide with an average width of thirty (30) feet, measured from the ordinary high water level of the wetland.
    b. Buffer strips shall be required whether or not the wetland is on the same parcel as the proposed development or on an adjacent parcel.
    c. Where acceptable natural vegetation exists in buffer strip areas, the retention of such vegetation in an undisturbed state is required, unless the applicant receives approval to replace such vegetation.
    d. Buffer strips shall be identified within each parcel by permanent monumentation. A monument shall be required at each parcel line where it crosses a buffer strip and shall have a maximum spacing of 200 feet along the edge of the buffer strip. Additional monuments shall be placed as necessary to accurately define the edge of the buffer strip. A monument shall consist of a post and a buffer strip sign. The signs shall be 11 inch x

17 inch vertical, have brown field with white lettering, and shall be securely mounted on a post to a minimum height of 4 feet above grade. The signs shall include warnings about disturbing or developing the buffer strip. The signs shall be installed prior to the issuance of a building permit.

11. **Asbuilt Grading Plan.** Upon completion of site grading, the Developer shall submit to the Public Works Division for review, an as-built grading plan in a type and format specified by the Public Works Division showing the newly graded elevations at all lot corners, critical elevations in drainage ways, one foot contours at ponding and sedimentation basins, and at ponding level control points for ponding basin emergency overflow swales. The submitted as-built grading plan will be spot checked by a representative of the Public Works Division. As-built plans must show appropriate revision dates platted lot and block and street names.

12. **Topsoil.** Provide a detail or note on the grading plan showing that a minimum of 4-inches of topsoil will be provided across the development, excluding roadbeds. If graded roadbeds are not scheduled to be constructed in the same year they are graded, topsoil and seed must be placed within these roadbeds to stabilize the surface soils and prevent erosion.

C. EROSION CONTROL STANDARDS

1. **Silt Fence.** Silt fence shall be placed along all side slopes and down slope sides of the site. If a channel or area of concentrated runoff passes through the site, silt fences shall be placed along the channel edges to reduce sediment reaching the channel. Plans shall include a note requiring all silt fence to be installed by the contractor and inspected by the City prior to any site work. Silt fence shall be installed in accordance with the Hastings Standard Specifications standard plate for "Preassembled Silt Fence". Some conditions may require the installation of heavy duty silt fence, as determined by the Public Works Division.

2. **Rock Access Driveway.** Each site shall have rock access drives and parking areas of sufficient width and a length providing a minimum of 50 feet of maintained rock surface both from the edge of the public or private roadway to prevent sediment from being tracked onto public or private roadways. Rock Access Driveways shall be installed in accordance with the Hastings Standard Specifications standard plate for "Rock Construction Entrance". Any sediment reaching a public or private road shall be removed by street cleaning (not flushing) before the end of each workday. Failure to keep the public or private roadway clean may result in the City ordering construction halted until such time as the roadways are properly clean.

3. **Inlet Protection**. All storm drain inlets shall be protected during construction with filter material and washed rock in accordance with the Hastings Standard Specifications standard plate for "Inlet Protection at Catch Basins".

4. **Rock Check Dams.** Rock check dams shall be required for drainage swales with slopes exceeding 4% grade and in drainage channel areas experiencing erosion.

5. **Sedimentation Basins.** Discharge of development storm sewer to overland swales or drainage ways shall require the construction of sedimentation basins for water quality treatment. If the development storm sewer is proposed to be extended for future phases of the development, a temporary sedimentation basin may be permitted. Each sedimentation basin shall have a surface area of at least one percent of the area draining to the basin and at least three feet of depth and constructed in accordance with accepted design specifications. Sediment shall be removed to maintain a depth of three feet. The basin discharge rate shall also be sufficiently low as to not cause erosion along the discharge channel or the receiving water. Temporary sedimentation basins shall be located and defined on grading plans.

6. **Concrete Truck Wash Areas.** All developments shall designate a concrete truck wash area for concrete trucks to wash out their vehicles after delivering ready mix concrete loads. The developed concrete truck wash area must remain in place until all street and utility construction and all building/structure construction for the development is completed. Concrete trucks are not allowed to wash out vehicles into the storm sewer or onto areas that drain to the street or ponding basins. The wash area shall include an excavated sedimentation basin that is at least 15 ft. by 15 ft. in area and 3 ft. deep. The access to the concrete truck wash area must have a rock access driveway installed and maintained. Signs shall be posted directing concrete trucks to the approved wash area. Silt fence shall be installed at the overflow point of the wash area sedimentation basin. Restoration of the development shall include removal of waste concrete material and filling and vegetation of the wash area sedimentation basin.

7. **Re-vegetation.** All disturbed ground left inactive for fourteen or more days shall be stabilized by mulching and seeding, or sodding (only available prior to September 15) and/or by mulching or covering or other equivalent control measure. Straw, hay or other vegetative mulch shall be disc anchored. Geotextile or other approved covering shall be anchored in accordance with the manufacturer's specifications.

8. **Material Storage piles.** Any soil or dirt storage piles containing more than ten cubic yards of material shall not, to the extent possible, be located with a downslope drainage length of less than 25 feet from the toe of the pile to a roadway or drainage channel, or wetland. If remaining for more than seven days, storage piles shall be stabilized by mulching, vegetative cover, tarps or other means. Erosion from piles which will be in existence for less than seven days shall be controlled by placing silt fence barriers around the pile. In-street utility repair or construction soil or dirt storage piles located closer than 25 feet of a roadway or drainage channel must be covered with tarps or suitable alternative control, if exposed for more than seven days, and the storm drain inlets must be protected appropriate filtering barriers.

SECTION FOUR
STREET DESIGN STANDARDS

A. Street Width and Grades. The following standard of street design shall be followed:

Street Category	Minimum Right of Way	Minimum Pavement Width	Maximum Grade **	Minimum Grade	Minimum Curve Radius
Arterial	80 feet	44 feet	4%	0.5%	600 feet
Collector	66 feet	40 feet *	6%	0.5%	600 feet
Local	60 feet *	28-36 feet*	8%	0.5%	150 feet

* To be based on traffic and parking needs determined with approval of the City Council based on recommendation from the Public Works Department.

** For safety considerations a lesser maximum grade may be required at or approaching intersections.

B. Intersection Approach Grades. 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.

C. Curb Radius. The minimum curb return radius shall be 25'.

D. Crown. A 2% cross-slope grade is required of all street cross-sections.

E. Design Speed. Street alignment for local streets, both vertical and horizontal, shall meet MnDOT State Aid standards for 30 MPH design speed. Street alignment for collector and arterial may be required to meet 40 MPH or higher design speed standards.

F. Intersection Sight Distance – A minimum 400 ft. intersection sight distance is required. The sight distance shall be measured from a starting point of 10 feet behind the curb line of the intersected street, as measured from a vehicle stopped at the intersection.

G. Vertical Curves. The minimum length of vertical curve is 90-feet.

H. Pavement Design. Flexible pavement design shall be based on design procedures set forth in the "Road Design Manual II" 7-5.0 prepared by the Minnesota Department of Transportation. Local streets shall meet a seven ton design. Collector and arterial streets shall be designed to a ten ton pavement design. Minimum pavement cross sections shall be as follows:

	Local	Collector	Arterial & Industrial
Bit. Wear Course	2 inches	2 inches	3 inches
Bit. Base Course	2 inches	3 inches	3 inches
Aggregate Base	5 inches	10 inches	14 inches
Subcut	12 inches	12 inches	18 inches

I. Soil Borings, Geotechnical Analysis. Pavement designs must be submitted along with a geotechnical analysis of existing soil conditions establishing an "R value" used in the pavement design. A minimum one foot subcut with granular borrow is required, unless the subbase material meets granular borrow requirements.

J. Temporary Dead-End Streets. Cul-de-sacs are required on all "temporary dead-end" public streets contain driveway accesses. Temporary dead-end streets that will be extended as part of a future phase of a development shown on an approved preliminary plat do not require concrete curb and gutter along the radius of the cul-de-sac. Temporary "dead-end" public streets associated with providing access for future extension to and through adjacent undeveloped property require concrete curb and gutter installation. Temporary dead-end public streets without driveway access may be terminated without a cul-de-sac.

K. Barricades. Type III barricades in accordance with the Minnesota Manual on Uniform Traffic Control Devices shall be installed at the terminus of all temporary dead-end streets. Additional signage noting that the street is planned to be extended in the future shall also be installed.

L. Valley Gutters. Valley gutters installations across intersections are not permitted. Storm sewer and catch basin installation will be required.

M. Sidewalks. Sidewalks are required on one side of all arterial streets, and are generally required along through streets within a development, along streets in commercial areas, and connecting neighborhoods to parks, trails, and playgrounds. Sidewalks shall be constructed of concrete, a minimum of 4 inches thick, 5 feet wide, and offset one foot from the right of way line. Sidewalks extended through driveways shall be constructed of concrete, a minimum of 6 inches thick.

N. Bituminous Trails. Bituminous trails are required along one side of all arterial streets, and generally required along collector streets and through neighborhoods connecting to the existing trail system, parks or schools. Bituminous trails along arterial streets or alongside streets with an 80 ft. wide right of way; off street trails; and maintenance trails; shall be 10 ft. wide. Bituminous trails along streets with 66 ft. wide right of way shall be 8 ft. wide. All bituminous trails shall have a minimum cross section of 1.5 inches of wearing course, 1.5 inches of base course, and 4 inches of aggregate base. Bituminous trails within street right of way shall be offset two feet from the right of way line.

O. Boulevard Sod. The developer shall install a 3 ft strip of sod directly behind the curb as part of the street construction process. This boulevard sod strip shall be planted prior to the development being approved for building permits. If weather or sod supply does not allow the sod to be installed before building permits are requested, then the developer shall provide the City a letter of credit for the sod installation and shall install the sod as soon as feasible. Along streets with sidewalk or trails constructed in the boulevard area, the entire boulevard between the sidewalk or trail and the curb must be sodded. In addition, a 3 ft. strip of sod must be installed directly behind the trail or sidewalk.

P. Multiple Mailbox Units. All new residential developments are required to be service by Unites States Postal Service multiple mailbox units. Mailbox unit foundations and concrete pads shall be constructed with the development's street improvements, and in accordance with the latest recommended plans and specifications prepared by the Public Works Division and on file at City Hall. The location and number of mailbox units will be determined by the Public Works Director in consultation with the U.S. Post Office. Where possible, multiple mailbox units shall be installed in cul-de-sac islands.

Q. Subbase Review. Note, either in the plan set or specifications, to reflect the requirement that prior to the placement of any base material, a City of Hastings inspector be present to review the condition of the sub base with the contractor to insure that it has been constructed to the proper alignment and grade. Deflection testing will also be required and will be conducted by means of test rolling. The Contractor will furnish a tandem truck with a minimum of 14 ton load to check the completed subgrade. The truck will be driven in any locations the inspector may direct to determine if any soft spots exist. Any soft spots encountered shall be removed as directed by the inspector.

R. Electronic Plan File Format. The developer shall submit a full size set of street and utility plans in AutoCAD 2000 and PDF format for engineering review.

SECTION FIVE
STORM SEWER DESIGN STANDARDS

A. Guide Plans. Storm water plans for the development shall comply with the City's Watershed Management Plan and Storm Water Management Ordinance.

B. Level of Service/Protection. Storm water facilities shall be designed for a 10-year frequency storm for local pipe design and a 100-year frequency storm for ponding detention basin design.

C. Review. Drainage calculations shall be submitted to show the sizing of pipe, ponds, emergency overflow spillways, and catch basin interception analysis. Storm sewer design will be reviewed by a consultant engineer contracted with the City to check design calculations and to update the City's storm water model with the approved design. The storm water review fees and storm water model update fees will be charged to the developer and deducted from their escrow account.

D. Permits. The developer shall obtain all regulatory agency permits and approvals necessary for the proposed construction; i.e. DNR, Army Corp. of Engineers, MPCA, etc.

E. Alignment. The storm sewer alignment shall follow the sanitary sewer and watermain alignment where practical with a minimum of 10' of separation. Storm sewer placed along the curb alignment shall be along the curb opposite the watermain to maintain the 10' separation. All storm sewer piping shall cross streets and rights of way perpendicular to the centerline, unless the City Public Works Division provides approval otherwise.

F. Catch Basins. 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 will not be allowed. Also, catch basins shall be designed to collect drainage on the upstream side of the intersection. All catch basin leads must cross streets perpendicular to the centerline of the street. Minimum depth from top of casting to invert is 4.0 feet.

G. Manhole Spacing. The maximum spacing between manholes is 400'.

H. Manhole Locations. To the greatest extent possible, manholes shall be placed in paved surfaces outside of wheel paths, (3' and 9' off centerline) or in other readily accessible areas such as islands or medians. Storm sewer manholes shall be located as to provide at least 10 ft. separation to sanitary sewers and manholes, and 20 LF of separation between other significant in-ground structures (e.g. barrel sections of sanitary manholes). The use of catch basin manholes located in the curb line is encouraged.

I. Manhole and Catch Basin Seals. An Infi-Shield (or approved equal) MH ring protection system is required on all manholes and catch basins.

J. Signage. City standard U-channel post mounted aluminum signs identifying a manhole or catch basin location shall be installed adjacent to all manholes and catch basins installed outside of the surfaced street area.

K. Pipe Size. Minimum pipe size shall be 12" diameter, which are approved for catch basin leads only. Otherwise, all storm sewer pipe shall be 15" in diameter or greater.

L. Pipe Material. Unless authorized by the Public Works Director, all storm sewer pipe within the street right-of-way shall be Reinforced Concrete Pipe (RCP). Refer to the City of Hastings Standard Specifications for other material types permitted outside of the street right-of-way.

M. Pipe Depth. Minimum cover over storm sewer pipe shall be 3.0 feet.

N. Pond Inlets/Outlets. The invert elevations of the pond inlet flared end sections shall match the NWL of the pond. Submerged outlets will only be allowed at the discretion of the Public Works Director.

O. Trash Guards. All flared end sections, 15 inches in diameter and above, shall include City standard trash guards.

P. Manhole Hydraulic Design. Junction manholes should be designed to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles.

Q. Sump Manholes. Environmental manholes with 3 feet deep sumps, shall be constructed as the last structure which is road accessible prior to discharge to any water body.

R. Electronic Plan File Format. The developer shall submit a full size set of street and utility plans in AutoCAD 2000 and PDF format for engineering review.

SECTION SIX
WATERMAIN DESIGN STANDARDS

A. Permits. The developer is responsible for obtaining all necessary regulatory agency permits and approvals including that of the Minnesota Department of Health.

B. Water System Operation. When connecting to existing watermain or at any time during construction activities, only representatives of the City Public Works Department are permitted to operate valves on the existing water system.

C. Pipe Size. Minimum watermain size shall be 8", except for hydrant leads and short cul-de-sacs.

D. Alignment. Watermain shall be installed north and east sides of the street centerline with 10' of horizontal separation from other parallel utility alignments. All watermain should be located at least 3-feet off the curb face. Refer to the Hastings Standard Specifications standard plate for "Typical Water Layout". Water mains, laterals, and/or services shall not be located within any defined or designated ponding easement.

E. Dead-end Mains. Dead-end water mains 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. The hydrant shall be located behind the curb on stub streets to allow the City's snow plow crews to pile snow on the end of the stub street. All temporary and permanent dead-ends shall be secured with a gate valve at least 40' from the plugged end.

F. Depth. For all water mains the depth of cover shall be a minimum of 7.5' to top of pipe and maximum of 10' of cover.

G. Pipe Materials. Materials shall be ductile iron pipe Class 52 for 5" to 12" diameter watermain. Materials for fittings shall be ductile iron. The materials for watermain over 12" shall be ductile iron Class 51, or as determined by the Public Works Director.

H. Hydrants. Hydrants shall be located so as to provide coverage to all structures based on a 250-LF service hose run. Submitted plan sheets should show a 250 ft. radius drawn around all hydrants. Final hydrant locations shall be approved by the Hastings Fire Department, (submit PDF plans to Assistant Fire Marshal). Hydrants shall be installed on the northwest corners of intersections. Mid-block hydrants shall be located at a property line. Hydrants at the end of cul-de-sacs shall be installed in the landscaped island.

I. Gate Valves. All valves shall be gate resilient seal valves. Locate gate valves within street surface where possible and at right-of-way line extended. When intersection spacing exceeds 1000', then a mid block gate valve will be required. Gate valve operating nut extenders shall be installed when the depth exceeds 9 feet.

J. Utility Crossings. Show on plans the existing and proposed watermain in plan and profile view along with other existing and proposed utilities in the construction zone. Provide a minimum of 18" vertical separation for all water main crossings with sanitary

and storm sewer (watermain on top). Also, other utilities that cross the water main shall cross at a 90 degree angle, if possible.

K. Easement Installations. Watermain installed in side lot easements adjacent to building pads shall be encased in carrier pipe from 15 feet in front of the building pad to 15 feet behind the building pad. Watermain installed within the carrier pipe must be tied together using stainless steel attachments.

L. Lawn Irrigation Services. All lawn irrigation services locations and diameters must be shown on the submitted watermain construction plan.

M. Watermain Stubs. All watermains stubbed out for future watermain extensions must be stubbed out to the plat boundary. A gate valve shall be installed a minimum of 30 ft. back from the end of the watermain stub.

O. Signage. With the exception of hydrant gate valves, City standard U-channel post mounted aluminum signs identifying a gate valve location shall be installed adjacent to all gate valves installed outside of the surfaced street area.

P. Measures to Ensure the Ability to Locate Utility Services. Plans should be designed, and include notes out of consideration for the following:

i. All services must be installed perpendicular to the nearest service main, and sewer services must be offset parallel to the water service line no greater than 2 feet downstream. All services (sewer & water) must have a steel "T" fencepost installed over its terminus and must be painted with the corresponding location system color (water – blue, sewer – green). The post must extend above the surface to a height of no less than 4 feet, and below grade no less than 2 feet.

ii. Where a sewer service is installed and it <u>is not</u> accompanied by a water service – a steel "T" fencepost must be installed at the terminus of the service line. This post must extend from a depth of no greater than 1 foot below finished grade down to the elevation of the sewer service line. This steel post must maintain its position after the service line has been extended to a future structure. Again, whenever possible, the service line must be installed perpendicular to the mainline. When it is not possible to provide straight alignment of the sewer service, the same type of steel fence post must be provided over all bends that occur in the line.

iii. All services must terminate at the same location; in most cases this will be a minimum of 10' beyond the property line.

iv. The top of the curb and gutter which the service utility crosses beneath shall be stamped with an S and W over the respective locations of each service.

v. Services must be installed outside the area of the future driveway whenever possible. When this is not possible, a Gate Valve Cap & Sleeve must be installed over the curb stop box at the time of driveway installation.

vi. The contractor must contact the City's Engineering department to coordinate an inspection of the newly replaced facility by a technician so that they may record the alignment and location of the newly installed or replaced facility. This information will be kept on file at the City for future reference. All contractors

obtaining a Right-of-Way permit will be notified of this requirement at the time of applying for such a permit.

Q. Available Pressure. Plans shall show the results of water flow and pressure test conducted on the existing hydrant closest to the proposed connection point. In the event the Hastings Utility Department does not have a record of such a test, the Engineer shall coordinate such a test with the Utility Department. The Public Works Department's phone number is (651) 480-6185. The current fee for test flowing a hydrant is $75.

R. Electronic Plan File Format. The developer shall submit a full size set of street and utility plans in AutoCAD 2000 and PDF format for engineering review.

SECTION SEVEN
SANITARY SEWER DESIGN STANDARDS

A. Permits. The Developer shall obtain all regulatory agency permits and approvals including those from the Minnesota Pollution Control Agency and Metropolitan Council prior to beginning of construction.

B. MPCA Permit Calculations. The City of Hastings Comprehensive Sanitary Sewer Plan estimates residential wastewater flow at 80 gallons per capita per day with 2.7 persons per household. Industrial wastewater flow is estimated at 750 gallons per acre per day. BOD_5 loading is estimated at 0.17# per capita per day.

C. Manholes.

1. **Location.** Manholes shall be placed on street centerline to the greatest extent possible, other locations outside the wheel paths (3' and 9' off centerline) may be allowed with City approval.
2. **Spacing.** The maximum spacing between manholes is 400'.
3. **Stub Lines.** Manholes are required on the terminus end of all stubs if the line will be active.
4. **Ring Seals.** Infil-Shield (or equal) MH ring protection system are required on all manholes.

D. Minimum Slopes. 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%

E. Minimum Depth. The minimum cover over the top of sanitary sewer pipe shall be 5.0 feet.

F. Pipe Material. 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 20'	PVC, SDR 35
8" to 10"	20' to 30'	PVC, SDR 26
8" to 10"	Over 30'	DIP, CLASS 52

G. Parallel Utilities. Maintain a minimum of 10' of horizontal separation between sanitary sewer and watermain.

H. Utility Crossings. Show on plans the existing and proposed sanitary sewer in plan and profile view along with other existing and proposed utilities in the construction zone. Water mains crossing sanitary sewers shall be provided a vertical separation of at least 18

inches between the bottom of the watermain and the top of the sewer main. Where local conditions prevent the minimum separation the following construction shall be used:

1. Sewers passing over or under water mains shall be constructed of materials equal to watermain standards of construction for a distance of at least 9 feet on either side of the watermain.

2. Sewers passing over water mains shall be adequate structural support for the sewers to prevent settlement, or deflection of the joints, or settling on and breaking of water mains.

I. Drop Manholes. Drop manholes are required when the pipe inverts are greater than 2 feet apart. Only outside drops are allowed. The sanitary sewer main connecting to the drop section shall be ductile iron pipe (DIP) and shall extend beyond the drop manhole to undisturbed soil or a minimum distance of 20-feet, which ever is greater.

J. Ponding/Drainage Conflicts. No manhole shall be located within a designated ponding/flowage 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.

K. Connection to Existing Structures. Extensions of sanitary sewer main from an existing manhole structure shall, wherever possible utilize existing stubs. In the event that appropriate stubs do not exist, the extension shall include reforming the base to include a flow channel from the extension. Any intrusions through the manhole wall shall be drilled and a waterproof seal and boot shall be grouted into the hole.

L. Sanitary Sewer Stubs. All sanitary sewer mains stubbed out for future extensions must be stubbed out to the plat boundary. A 4"X4" wooden post shall be installed at the terminus of the stubbed pipe. This post shall extend from a minimum of 4 feet above the existing grade down to the elevation of the stubbed pipe.

M. Measures to Ensure the Ability to Locate Utility Services. Plans should be designed, and include notes out of consideration for the following:

i. All services must be installed perpendicular to the nearest service main, and sewer services must be offset parallel to the water service line no greater than 2 feet downstream. All services (sewer & water) must have a steel "T" fencepost installed over its terminus and must be painted with the corresponding location system color (water – blue, sewer – green). The post must extend above the surface to a height of no less than 4 feet, and below grade no less than 2 feet.

ii. Where a sewer service is installed and it is not accompanied by a water service – a steel "T" fencepost must be installed at the terminus of the service line. This post must extend from a depth of no greater than 1 foot below finished grade down to the elevation of the sewer service line. This steel post must maintain its position after the service line has been extended to a future structure. Again, whenever possible, the service line must be installed perpendicular to the mainline. When it is not possible to provide straight alignment of the sewer service, the same type of steel fence post must be provided over all bends that occur in the line.

iii. All services must terminate at the same location; in most cases this will be a minimum of 10' beyond the property line.

iv. The top of the curb and gutter which the service utility crosses beneath shall be stamped with an S and W over the respective locations of each service.

v. Services must be installed outside the area of the future driveway whenever possible. When this is not possible, a Gate Valve Cap & Sleeve must be installed over the curb stop box at the time of driveway installation.

vi. The contractor must contact the City's Engineering department to coordinate an inspection of the newly replaced facility by a technician so that they may record the alignment and location of the newly installed or replaced facility. This information will be kept on file at the City for future reference. All contractors obtaining a Right-of-Way permit will be notified of this requirement at the time of applying for such a permit.

N. Signage. City standard U-channel post mounted aluminum signs identifying a manhole location shall be installed adjacent to all manholes installed outside of the surfaced street area.

O. Electronic Plan File Format. The developer shall submit a full size set of street and utility plans in AutoCAD 2000 and PDF format for engineering review.

SECTION EIGHT
SANITARY SEWER & WATER MAIN SERVICES
DESIGN STANDARDS

A. Size. Minimum size for water services shall be one inch nominal inside diameter. Minimum size for sanitary sewer services shall be 4 inches in diameter.

B. Pipe Material. Water main services shall be copper or D.I.P. Sanitary sewer services shall be SDR 26, Schedule 40 PVC or extra heavy cast iron soil pipe.

C. Right-of-Way Stubs. All sewer and water services are to be stubbed 10-feet past the Right-of-Way to the edge of the drainage and utility easement. The curb box should be placed on the inside edge of drainage and utility easement. Elevations for the invert of the sewer service line at the easement line shall be shown on the plans.

D. Location. Sewer and water service line stubs should avoid future driveway locations. If a curb stop ends up in a driveway location, the curb box shall be covered with a gate valve box for protection.

E. Depth. The maximum depth of the sanitary sewer service at the ROW line shall be 12' unless documented by a proposed house or building elevation that justifies a deeper service.

F. Testing. The sewer and water service shall be included in the pressure and leakage testing requirements for the main lines.

G. Grade. Minimum grade for sanitary service stubs shall be 1/4" per foot (2%).

H. Cleanouts. Cleanouts are required at 100' intervals including the riser on sanitary sewer services. All sanitary sewer cleanouts constructed in paved areas require the installation of a gate valve box and cover for ease of access to the clean out.

I. Service Connections. Sewer services shall be connected to a wye on the main and shall not be constructed into manholes unless approved by the City.

J. Measures to Ensure the Ability to Locate Utility Services. Plans should be designed, and include notes out of consideration for the following:

i. All services must be installed perpendicular to the nearest service main, and sewer services must be offset parallel to the water service line no greater than 2 feet downstream. All services (sewer & water) must have a steel "T" fencepost installed over its terminus and must be painted with the corresponding location system color (water – blue, sewer – green). The post must extend above the surface to a height of no less than 4 feet, and below grade no less than 2 feet.

ii. Where a sewer service is installed and it is not accompanied by a water service – a steel "T" fencepost must be installed at the terminus of the service line. This post must extend from a depth of no greater than 1 foot below finished grade down to the elevation of the sewer service line. This steel post must maintain its position

after the service line has been extended to a future structure. Again, whenever possible, the service line must be installed perpendicular to the mainline. When it is not possible to provide straight alignment of the sewer service, the same type of steel fence post must be provided over all bends that occur in the line.

iii. All services must terminate at the same location; in most cases this will be a minimum of 10' beyond the property line.

iv. The top of the curb and gutter which the service utility crosses beneath shall be stamped with an S and W over the respective locations of each service.

v. Services must be installed outside the area of the future driveway whenever possible. When this is not possible, a Gate Valve Cap & Sleeve must be installed over the curb stop box at the time of driveway installation.

vi. The contractor must contact the City's Engineering department to coordinate an inspection of the newly replaced facility by a technician so that they may record the alignment and location of the newly installed or replaced facility. This information will be kept on file at the City for future reference. All contractors obtaining a Right-of-Way permit will be notified of this requirement at the time of applying for such a permit.

K. Electronic Plan File Format. The developer shall submit a full size set of street and utility plans in AutoCAD 2000 and PDF format for engineering review.

SECTION NINE
STREET LIGHTING DESIGN STANDARDS

A. Street Light Policy. Residential street lighting shall conform to the City of Hastings' Street Light Policy adopted January 2, 1990 and on file in the Public Works Department.

B. Installation. In all new developments, street lights shall be installed at the same time electrical service to the development is installed. Street lighting plans require the approval of the Public Works Department which shall be granted as part of the right-of-way permit for utility installation.

C. Requirements. In new subdivisions developers shall:

i. Pay the full capital cost of every light to be installed.

ii. Place street lights at intersections, midblock when intersections are more than 500 feet apart, and at the ends of cul-de-sacs in the cul-de-sac island.

iii. On local streets, 100 watt post top decorative fixtures shall be installed. On collector or arterial streets, 150 watt HPS lamps with cobra-head fixtures (as approved by the City and the utility) shall be installed.

APPENDIX

CAD PLAN & DRAWING STANDARDS