City of Dayton Engineering Design Guidelines

Engineering Design Guidelines

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City of Dayton, Minnesota

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Prepared by:
Stantec

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Revision	Date	Sections Modified	Description
0	June 2025	N/A	Guidelines Issued

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Forward

This document is intended to assure quality development through uniform performance guidelines for the design and construction of the City of Dayton's infrastructure. This information has been prepared to assist Developers and their licensed professionals in the planning and construction of public infrastructure in the City. 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.

This document, as well as the City's Standard Plates, outlines certain requirements and standards that shall be incorporated into the preparation of plans and specifications for sanitary sewer, storm sewer, watermain, trails, streets, grading, and erosion control within the City. Compliance with these documents will help provide quality projects and assure uniform performance standards for the citizens of Dayton.

Jason Quisberg, P.E.
City Engineer

Acronyms / Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ANSI	American National Standards Institute
AWWA	American Water Works Association
BFE	Base Flood Elevation
BMP	Best Management Practice
BWSR	Board of Soil and Water Resources
CEAM	City Engineers Association of Minnesota
CFS	Cubic Feet Per Second
CN	Curve Number
CO	Certification of Occupancy
ECWMC	Elm Creek Watershed Management Commission
EOF	Emergency Overflow
FEMA	Federal Emergency Management Agency
FPS	Feet Per Second
HDPE	High Density Polyethylene
HSG	Hydrologic Soil Group
HWL	High Water Level
LGU	Local Government Unit
MCES	Metropolitan Council Environmental Services
MDH	Minnesota Department of Health
Mn/DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NURP	National Urban Runoff Program
NWL	Normal Water Level
OHWL	Ordinary High Water Level
ORVW	Outstanding Resource Value Waters
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
SWMP	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TRM	Turf Reinforcement Mat
USACE	United States Army Corps of Engineers
WCA	Wetland Conservation Act

Engineering Design Guidelines

The City of Dayton Engineering Design Guidelines and City Standard Detail Plates are intended to supplement the Subdivision Regulations in the City Code. If any conflicts between the Engineering Design Guidelines or Standard Detail Plates and the City Code are identified, the City Engineer shall be contacted to make a final decision on precedence. Where the term "City Engineer" appears, it shall refer to the City Engineer or an assigned designee.

1 General Engineering Requirements

Developers of property within the City of Dayton (City) are required to submit plans and specifications for review and acceptance by the City. These plans and specifications shall be prepared by competent professionals licensed in the State of Minnesota.
The professional services required of the Developer might include an architect, land surveyor, planner, wetland specialist and/or engineer. The professional services include not only preparation of plans and specifications, but also project management, field staking, and site managements in order to assure the City of a quality product and to assure that the completed project is in conformance with the accepted plans, specifications, and City standards. The Developer will provide competent professional services for staking and site management of the construction of improvements, unless other arrangements are made in advance with the City. The City will provide construction site inspection of the work on behalf of the City as it deems necessary. The cost of all site inspections and related items will be charged back to the Developer.

Whenever public improvements or other conditions of approval are required with a development, a contract (Developer's Agreement) is required between the Developer/property owner and the City. This agreement shall guarantee the City that all requirements will be satisfactorily completed by the Developer.

1.1 Developer Installed Improvements

The typical process is outlined as follows:

1. The Developer shall submit plans, specifications, and copies of all design calculations (as requested) to the City for review and acceptance. The Developer shall submit copies of the reviewed plans/construction documents in accordance with the Deliverables section of this document. These plans are to be prepared by a Licensed Professional (Engineer and Landscape Architect, as applicable) in the State of Minnesota and shall be in accordance with City standards as outlined herein. The City's comprehensive plans for sanitary sewer, water, storm drainage, and thoroughfare shall be adhered to in design considerations.
2. The Developer shall provide proper notification of improvements to the responsible governmental agencies, watershed districts, etc. affected by said construction. All necessary permits shall be obtained by the Developer and copies provided to the City's Engineering Department prior to commencing any work. All special requirements of the responsible agencies shall be complied with. The City is the responsible Local Government Unit (LGU) for implementation of the Wetland Conservation Act (WCA).
3. No work is to begin until all erosion and sediment control methods are in place and accepted by the City's Engineering Department. All project operations must comply with the City's Land Disturbance and Erosion and Sediment Control Ordinance (see Appendix A).

4. It is the practice of the City that any construction activity within the City be monitored/inspected by City staff or a designated representative on behalf of the City. Two (2) business days advance notice is required to the City's Engineering Department prior to any construction activity.
5. The Developer shall furnish to the City a list of contractors and subcontractors being considered for retention by the Developer for any of the public improvement work required for the project prior to the pre-construction meeting. The City has the right to reject any contractor or subcontractor deemed unacceptable for City work.
6. The contractor shall submit a list of suppliers as well as all certification tests of materials that will be used on the project to the City Engineer at or prior to the pre-construction meeting.
7. Any changes to the previously accepted plans and specifications shall be accepted by the City Engineer in writing before changes are made in the field, except in an emergency. In the case of an emergency, notification shall be provided to the City Engineer as soon as is reasonably possible.
8. The City's Engineering Department shall be notified two (2) business days in advance of all scheduled tests so its representatives can be present at the time tests are performed. The required tests will cover, but are not limited to, the sanitary sewer, watermain, storm sewer, street subgrade, non-wear course, wear course, sidewalk, and curb and gutter. The Developer shall retain a third-party testing agency to perform materials testing throughout the construction process.
9. After all public improvements have been completed and properly inspected as specified above, the public improvements will be scheduled for acceptance by the City subject to the following:
    a. The Project Engineer must submit written certification to the City Engineer stating that all public improvements have been completed in accordance with the approved plans and specifications.
    b. The Project Engineer shall provide the City with a complete set of record plans in accordance with the Record Plan Requirements (see Appendix B). Record plans shall be submitted within one (1) year after final completion or prior to starting construction of any subsequent phases.
    c. The final punch list has been completed and accepted by City Engineer.
    d. If within the time prescribed by the Developer's Agreement, any work is found to be unacceptable according to the City's standards or design guidelines, the contractor shall correct it promptly. The City shall give notice after the discovery of any work in an unacceptable condition or work that does not meet specifications per City of Dayton standards or design guidelines to the Developer responsible for the project.
    e. Unless otherwise noted in the Developer's Agreement, the following requirements shall apply:
        i. The contractor shall guarantee all work relating to utilities and their appurtenances, material and equipment furnished by them for a period of two (2) years from the date of City acceptance of the work.
        ii. Final wear course placement on either public or private roads will be allowed in a new housing development only after one (1) freeze – thaw cycle and after 85 percent of all units have been issued a "certification of occupancy" (CO). The City Engineer reserves the right to adjust the required buildout percentage on a case by case basis. Placement of wear course on new streets on non-housing projects shall be after at minimum one (1) freeze – thaw cycle. An inspection of the roadway will be performed by the City Engineer prior to wear course placement. From this inspection, any deficiencies or damage to the street, sidewalk, and curb will be noted and must be corrected prior to the placement of the wear course. All utility punch list items must be completed and accepted prior to the placement of wear course.
        iii. The contractor shall guarantee all work relating to street, sidewalk, and trail construction including concrete curb and gutter, materials and equipment

furnished by them for a period of one (1) year from the date of City acceptance of the work.

iv. The Developer shall provide a surety per the Developer's Agreement and be held until final City acceptance of work.

10. If private drives or utilities are included in a development, the following procedures are required:
    a. The design cross section of private drives shall be in accordance with the City Standard Detail Plates.
    b. Whenever practical, public sewer and water lines shall not be placed under private drives. A minimum of twenty (20) foot utility and drainage easement (centered over the utility line) will be required for any public utilities that are not constructed within the public street right-of-way. Depending on utility depth, a wider easement may be required by the City Engineer when deemed necessary for utility replacement. A minimum of 1:1 (H:V) trench slope shall be used to determine easement width.
    c. Private small utilities shall be installed per the City Standard Detail Plates. Junction boxes shall be installed in the back third of the drainage and utility easement on a property line. Junction boxes shall not be installed on property lines that have public utilities installed under them.

2 City Plan Standards

For the City to have consistent construction and record plans, the standards listed below shall be followed. The required items may include, but are not limited to, the following:

2.1 General Requirements – Plan Standards

1. A complete set of accepted project construction plans and specifications shall be submitted to the City's Engineering Department in PDF format (and AutoCAD .dwg if requested) prior to the pre-construction meeting. See Deliverables section.
2. During platting/site plan applications, the following drawings may be necessary with the application. The actual drawings and submittal information shall be in accordance with the City Code and requirements within this document:
    a. Title Sheet
    b. Existing Conditions
    c. Removals Plan
    d. Sanitary Sewer and Water Plan
    e. Street and Walk/Trail Plan (including alignments and pedestrian ramp layouts)
    f. Storm Sewer Plan
    g. Grading and Drainage Plan
    h. Erosion and Sediment Control Plan
    i. Storm Water Pollution Prevention Plan (SWPPP)
    j. Dewatering Plan
    k. Landscaping Plan
    l. Street Lighting Plan
    m. Signage/Striping Plan
    n. Applicable City Standard Detail Plates
    o. Plat
    p. Certificate of Survey
    q. Storm Sewer Design Calculations
    r. Watermain Design Calculations (if requested by City Engineer)

s. Sanitary Sewer Design Calculations (if requested by City Engineer)
t. Specifications (Grading, Streets, and Utilities)
u. Soil/Geotechnical Report with Recommendations
v. Construction bids received for Development Agreement preparation
w. Any other documents as required by City Code or Development Agreement
x. Others as required

3. Each sheet clearly labeled with sheet number, project name, identification of improvement, date of preparation and any revisions thereto, and other appropriate information.
4. Sheets shall be 22-inch by 34-inch (ANSI D)
5. Graphic/Bar Scales for each applicable plan sheet (engineering scales only):
    a. Horizontal Scale: 1-inch = 50 feet or less
    b. Vertical Scale: 1-inch = 10 feet or less
6. A title sheet shall be prepared for each project plan set. The title sheet shall include:
    a. A location plan/vicinity map, at a legible scale, indicating the extents of the entire project.
    b. An index of the construction plan sheets involved with the work.
    c. Applicant/Developer's name and contact information;
    d. Designer's name and contact information.
    e. Survey benchmark.
7. Detail drawings shall be on a separate sheet and referenced to the proper sheet. Use applicable unmodified City Standard Detail Plates.
8. Proposed utilities shall generally be located in public right-of-way at the following approximate locations unless approved by the City Engineer:
    a. Sanitary Sewer – on centerline of street, and at centerline/centerline at intersections
    b. Watermain – ten (10) feet minimum north or east of centerline, opposite of storm sewer
    c. Storm Sewer – ten (10) feet south minimum or west of centerline, typically under the curb line
9. The 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. Centerline stationing at each intersection shall be noted in the profile and or plan view.
10. Number all manholes/structures, flared end sections/aprons in both plan and profile with numbering starting at the lowest invert elevation manhole. Avoid using single letter designations (e.g. S-##), instead for example use SS-## for Sanitary and ST-## for Storm.
11. Show/depict and label the following (such as but not limited to):
    a. Parcels with lot and block numbers and plat name, or P.I.D. in un-platted areas. Developed parcels with their addresses.
    b. Street names
    c. Match line breaks with reference points marked. Plans which are broken by a match line shall be on the same or consecutive sheets when possible but always with a page number of the match line page indicated.
    d. Existing utilities (sanitary sewer, watermain, storm sewer, wells, septic systems, etc.) in both plan and profile labeled as existing.
    e. Gas, electric, telephone, communications, cable TV, and other utility lines.
    f. Right-of-way and pavement edge or curb and gutter alignment data.
    g. Proposed subdivision and adjacent land within 150 feet.
    h. Setbacks and dimensions to proposed and existing buildings and parking lots
    i. Lot corner elevations and benchmarks utilized.
    j. North arrows for each plan view on the sheet. North arrows shall generally be orientated either up or to the left.
    k. Wetland boundaries and buffers along with the name of the person or company who delineated the wetland boundaries and the date of delineation.
    l. Existing and proposed easements and outlots.
    m. Existing and proposed building and driveway footprints. It is desirable to show the driveway location so that services can be designed outside the limits of the driveway.

n. House pads with house style (as applicable), lowest floor elevations, garage elevation, and low opening elevation. Include a legend for these items. Elevations must be in accordance with the stormwater requirements set forth in this document and Elm Creek Watershed Management Commission requirements.

2.2 Sanitary Sewer – Plan Standards

1. Locate sanitary sewer manholes in public right-of-way unless approved by the City Engineer.
2. If the sanitary sewer is to be installed within private property, the easement shall be a minimum of twice as wide as the depth of the sewer or twenty feet (whichever is greater) with the pipe centered in the easement.
3. Extend sanitary sewer services from the main to a location as identified in the City Standard Detail Plates.
4. On combination sewer and water projects for low and medium density residential developments, place services in the same trench with the sanitary sewer service a minimum of three (3) feet horizontally (outside of pipe to outside of pipe) downstream of the water service. See City Standard Detail Plates. Conform with Minnesota Plumbing Code for service requirements of other development types.
5. All manholes that are not within a paved area will be marked by a structure marker sign and post. The sign shall state “MH” in reflective sheet. See City Standard Detail Plates.
6. Show/depict and label the following (such as but not limited to):
    a. Centerline stationing.
    b. Maintenance access for sanitary sewer manholes and lift stations off road.
    c. Sanitary sewer main in plan and profile with size/diameter, material, length, slopes, invert elevations (with size and direction in brackets), rim elevations, crossings, existing and proposed surface elevations.
    d. Sanitary sewer services in plan and profile with size/diameter, material, length, slopes, and invert elevations at main and at the end of stubs (tails). If risers are installed, indicate the height of each riser on the plans and drawn on the profile. Indicate if jacked/drilled and the size of the casing. Stationing of sanitary sewer wyes shall be indicated by an “S” in front of the stationing. If the sanitary sewer wye only is to be constructed, it shall be noted as "Wye Only" after stationing.
    e. On combination sewer and water projects, note service locations with an “S & W” in front of the stationing.
    f. Utility crossings in the plan and profile views.
    g. Flow direction arrows of the sanitary in the plan view.
    h. Storm sewer with thinner line weight clearly identifiable on sanitary and water plans.

2.3 Watermain – Plan Standards

1. Locate watermain in public right-of-way unless approved by the City Engineer.
2. If watermain is to be installed within private property and to be City Owned, the easement shall be a minimum of twice as wide as the depth of the sewer or twenty feet (whichever is greater) with the pipe centered in the easement.
3. Do not locate watermains, laterals and/or services within any defined or designated ponding easement.
4. Extend water services from the main to a location as identified in the City Standard Detail Plates.
5. On combination sewer and water projects for low and medium density residential developments, place services in the same trench with the sanitary sewer service a minimum of three (3) feet horizontally (outside of pipe to outside of pipe) downstream of the water service. See City

Standard Detail Plates. Conform with Minnesota Plumbing Code for service requirements of other development types.

6. All valves that are not within paved areas will be marked by a structure marker sign and post. The sign shall state “GV” (for gate valve) or “BV” (for butterfly valve) in reflective sheeting. See City Standard Detail Plates.
7. Show/depict and label the following (such as but not limited to):
    a. Centerline stationing.
    b. Top of hydrant nut elevations. Hydrants shall be placed to the proper height and location as indicated in the City Standard Detail Plates.
    c. Watermain in the plan and profile with size/diameter, material, depth below proposed grade/elevation, crossings, existing and proposed surface elevations.
    d. Hydrants, valves, tees, bends, plugs, crosses, and any other fittings or appurtenances with station, size, and type on the plan and profile.
    e. Water services in the plan and profile with size/diameter, material, and length. Indicate if service is jacked/drilled and size of the casing.
    f. Curb stop boxes shall be indicated by a "W" in front of its stationing.
    g. On combination sewer and water projects, note service locations with an “S & W” in front of the stationing.
    h. Utility crossings in the plan and profile views.
    i. Storm sewer with thinner line weight clearly identifiable on sanitary and water plans.
    j. Estimated watermain quantities table that includes but is not limited to the proposed lineal feet and size of each watermain and pipe material, amount of fittings and sizes, and number of hydrants.

2.4 Storm Sewer – Plan Standards

1. If the public storm sewer is to be installed within private property, the easement shall be a minimum of twice as wide as the depth of the sewer or twenty feet (whichever is greater) with the pipe centered in the easement.
2. All storm sewer inlets, outlets and manholes that are not within a paved area (excluding structures within private residential lots) will be marked by a structure marker sign and post. The sign shall state “FE” (for flared end) or “MH” (for manhole) in reflective sheeting. See City Standard Details Plates.
3. Show/depict and label the following (such as but not limited to):
    a. Boundary or limits of stormwater basin easements, stormwater basin outline, normal water level/elevation (NWL), high water level/elevation (100-year HWL), acre-feet of storage, discharge rate of flow, and outlet control device for each stormwater basin.
    b. Maintenance access for all Best Management Practices (BMPs) and off-road storm sewer manholes, lift stations, inlets and outlets.
    c. HWL and the grading for each BMP area along with the storm sewer inlets and outlets.
    d. Proposed storm in plan and profile with size/shape, length, material type and class, existing and proposed surface elevations, rim elevations, invert elevations with size and direction in brackets, etc.
    e. Storm sewer schedule with the structure number, size of structure, and proposed casting number in the schedule. Include all skimmer structures, manholes, catch basins/inlets, outlet control structures, flared end sections/aprons and sumps in this schedule.
    f. Flow direction arrows of the storm sewer in the plan view.
    g. Wetlands and wetland buffers.
    h. Existing and Proposed drainage area boundaries including off-site drainage areas that drain onsite.
    i. Utility crossings in the plan and profile views.
    j. Locations and elevations of Emergency Overflows (EOFs)

k. Sanitary and water with thinner line weight clearly identifiable on storm sewer/drainage plans.
l. Federal Emergency Management Agency (FEMA) and Regulated Local Floodplains and floodways.
m. Ponds, wetlands, lakes, streams or marshes.
    i. Outlet Elevation and HWL for ponds and wetlands.
    ii. Ordinary high-water level (OHWL) elevation and DNR pond number if applicable.
    iii. U.S. Fish & Wildlife classification if applicable.
    iv. Proposed stormwater basin storage volume.

2.5 Streets and Walks/Trails – Plan Standards

1. Provie details for intersections including pedestrian ramps as applicable. Details must indicate curb and roadway crown grades. Show that pedestrian ramps comply with current Americans with Disabilities Act (ADA) standards.
2. Show/depict and label the following (such as but not limited to):
    a. Applicable typical street section(s).
    b. Stationing of the centerline at the beginning and ending of the project, as well as intersections in plan and profile. Start stationing with 0+00 at the beginning (generally west or north) of streets.
    c. Cross sections for rural roadways and off-street trails or as required by the City Engineer.
    d. Dimension right-of-way width, street width (face of curb to face of curb if applicable), and a typical radius dimension at intersections.
    e. Proposed horizontal alignment data.
    f. Existing and proposed vertical alignment data.
    g. Directional arrows for surface drainage sufficient to indicate drainage patterns. High and low points.
    h. Centerline street elevations every 100-feet and street grades.
    i. Curb types.
    j. Sidewalks and trail sections and dimensions.
    k. Proposed pavement markings and signage.

2.6 Erosion Control – Plan Standards

1. Sediment and erosion control plans shall be consistent with the general criteria set forth by the most recent versions of the Minnesota Stormwater Manual, practices outlined in the Minnesota Pollution Control Agency “Protecting Water Quality in Urban Areas”, and the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit.
2. Provide a SWPPP including appropriate plan documentation in accordance with the NPDES Construction Stormwater Permit requirements and City Code of Ordinances as required. Include additional information as required by the Land Disturbance and Erosion and Sediment Control Ordinance (see Appendix A).
3. For projects under 1 acre disturbance (and not part of a common plan of development or sale that will ultimately disturb 1 or more acres), a simplified erosion and sediment control plan may be required in lieu of a SWPPP.
4. Erosion control plans shall include at a minimum separate pre-construction and post construction plans. Additional sequencing/phasing plans may be required.
5. Show/depict and label the following (such as but not limited to):
    a. Areas that will be seeded and mulched, sodded, or seeded with erosion control blanket (or other rolled erosion prevention product). Common drainage swales must be seeded

and blanketed with material appropriate for the expected flows. Specify seed type on the construction plans.

b. Proposed erosion control BMPs, including but not limited to sediment traps/basins, silt fence, sediment control log, inlet protection, stabilized construction exits, riprap at outlets. A redundant layer of perimeter control is required if earth disturbance is within 50 feet of an existing wetland or surface water body. Refer to the latest version of the NPDES permit for all erosion control requirements. Silt fence is required in other downslope areas as needed to keep any soil runoff within the property.
c. Proposed borrow pits and stockpile areas including erosion control measures proposed.
d. Emergency overflow routes with directional flow arrows from low points and stormwater basins/facilities and high point elevations along emergency overflow routes.
e. Existing contours at 1-foot or 2-foot intervals to a mean sea level datum (depicted with dashed lines). The contours shall extend beyond the proposed plat boundaries 150 feet or more to completely show the limits of a drainage basin(s) not fully contained within the proposed plat.
f. Proposed contours at 1-foot or 2-foot intervals to a mean sea level datum (depicted with solid lines).
g. Limits of grading, clearance, and disturbance.
h. Existing and proposed storm sewer.
i. Any temporary conveyance improvements.
j. Ponds, wetlands, lakes, streams or marshes.
    i. Outlet Elevation and HWL for ponds and wetlands.
    ii. OHWL elevation and DNR pond number if applicable.
    iii. U.S. Fish & Wildlife classification if applicable.
    iv. Proposed pond storage volume.
    v. Drainage area boundaries

2.7 Grading – Plan Standards

1. Grading plans shall be consistent with the general criteria set forth by the most recent versions of the Minnesota Stormwater Manual, practices outlined in the Minnesota Pollution Control Agency “Protecting Water Quality in Urban Areas”, and the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit.
2. Show/depict and label the following (such as but not limited to):
    a. Emergency overflow routes with directional flow arrows from low points and stormwater basins/facilities and high point elevations along emergency overflow routes.
    b. Lot corner elevations and benchmarks utilized.
    c. Existing contours at 1-foot or 2-foot intervals to a mean sea level datum (depicted with dashed lines). The contours shall extend beyond the proposed plat boundaries 150 feet or more to completely show the limits of a drainage basin(s) not fully contained within the proposed plat.
    d. Proposed contours at 1-foot or 2-foot intervals to a mean sea level datum (depicted with solid lines).
    e. Limits of grading, clearance, and disturbance.
    f. Drainage arrows at high points and major grade changes.
    g. Spot elevations at top and bottom of retaining walls
    h. Spot elevations and flow arrows identifying swales and other defined drainage paths throughout the site, including side lot swales.
    i. Existing and proposed storm sewer.
    j. House pads with house style and lowest floor elevations, garage elevation and walkout elevation. Include a legend for these items. Elevations must be in accordance with the requirements set forth in the City’s Code of Ordinances and Stormwater requirements.

k. Low floor and low opening elevations for all buildings.
l. Typical lot detail indicating where lot and house elevations are (or on detail sheet).
m. Removal of all trees and brush below the controlled water level that will be impacted from existing and newly created stormwater basin areas. In the development of any subdivision or stormwater basin area, the developer is responsible for the removal of all significant vegetation (trees, stumps, brush, debris, etc.) from any and all areas which would be inundated by the designated controlled water elevation (Outlet Elevation) of any required ponding easement as well as the removal of all dead trees, vegetation, etc., to the HWL of the stormwater basin. If proposed, this shall be clearly identified in the plans and stormwater management plan for review by the City.
n. Access routes for maintenance purposes to all inlets, outlets, manholes and lift stations at stormwater basin areas.
o. 100-year design drainage boundaries with acreage of each drainage area/watershed.
p. Wetland buffer sign locations.
q. Ponds, wetlands, lakes, streams or marshes.
    i. Outlet Elevation and HWL for ponds and wetlands.
    ii. OHWL elevation and DNR pond number if applicable.
    iii. U.S. Fish & Wildlife classification if applicable.
    iv. Proposed pond storage volume.
    v. Drainage area boundaries

2.8 Lot Survey and Grading As-Builts – Plan Standards

1. All lot surveys and Grading As-Builts (GABs) must be prepared by a Professional Land Surveyor licensed in the State of Minnesota. It is recommended that the land surveyor meet the standards of the American Land Title Association (ALTA) and the American Congress of Surveying and Mapping (ACSM).
2. Proposed lot surveys and GABs shall be submitted and prepared with the following information:
    a. A certificate of survey or GAB signed by a professional land surveyor.
    b. Legal description of the lot.
    c. Lot dimensions, building setbacks, property line and easements.
    d. Special easements such as but not limited to trail, tree preservation or conservations easements.
    e. Scale, north arrow, and revision date.
    f. Home foundation type including low floor, low opening, top of foundation, and garage floor elevations.
    g. Permanent benchmark survey elevation shown on plans such as top nut of hydrant.
    h. Sidewalk, trails, curb, and street linework.
    i. Watermain, sanitary, and storm sewer structures, linework, valves, hydrants, and structures.
    j. Water and sewer services including surveyed curb stop location.
    k. Draintile, sump connections, cleanouts and manhole tie ins to structures.
    l. Wetland information including wetland name NWL and HWL label, wetland setback, wetland buffer and buffer sign locations as shown on approved plan.
    m. Proposed driveway.
    n. Tree line edge, conservation easements, and proposed landscaping.
    o. Well location and primary and secondary septic tank locations (if applicable) designed by a Licensed Professional.
    p. Fence lines or retaining wall as shown on plans.
    q. Existing and proposed structures such as houses, parking, pads, and outbuildings.
    r. Waterbodies such as wetlands, ponds, lakes, streams, and swales with labels showing NWL, HWL, and label I.D. matching plans.

s. Waterbody setbacks to the OHW/NHW contour.
t. FEMA floodplain information including 100-yr floodplain, floodway, and OHWL.
u. Emergency overflow routes with directional flow arrows.
v. Drainage and utility easement around drainage features such as swales, HWL of ponds/wetlands, overland drainage paths.
w. Retaining walls
x. Elevations and slope labels:
    i. Existing and proposed contours shown at a 1 foot or 2 foot interval matching the grading plan over the entire lot and extended across the property line a minimum of five (5) feet to show drainage patterns.
    ii. Lot Corner elevations, existing lot elevations and proposed lot elevations matching the grading plan.
    iii. Sidewalk and curb elevations in front of driveway and front corners of homes
    iv. Proposed driveway slopes
    v. Retaining wall top and bottom wall elevations
    vi. Emergency overflow spot elevations
    vii. Spot elevations showing lowest ground adjacent to building, lot corners, grading along lot lines at minimum 25-foot increments, grade breaks, high points, and overland flow routes

3 City Design/Construction Standards

The Developer's Project Professionals are solely responsible for providing a quality design that meets applicable laws and design standards. The City has adopted the following design standards for public facilities within the City of Dayton. These standards are meant to enhance not replace sound engineering judgment and industry standards. The project professionals shall provide specifications for materials used on the project. Project plans and specifications must also comply with current City Standard Detail Plates, Engineering Design Guidelines, and other City requirements as applicable.

3.1 General – Design Standards

1. All designs shall comply with the City's current Comprehensive Plans. City staff and consultants will consider the intent of the comprehensive plans when reviewing the proposed design. The City currently has the following comprehensive plans relating to Public Improvements:
    a. Wastewater (Sanitary Sewer) Plan
    b. Water Supply Plan
    c. Surface Water Plan
    d. Transportation Plan
    e. Parks, Trails, Open Space Plan

3.2 Sanitary Sewer – Design Standards

1. The design and construction of sanitary sewer and sewer services shall conform to the most recent editions of "City Engineers Association of Minnesota (CEAM) Standard Specifications", "Recommended Standards for Wastewater Facilities" (Ten State Standards), Minnesota Plumbing Code, or as modified herein, the City's most recent Standard Detail Plates, and comprehensive plans in addition to the standards in this document.
2. Manhole Spacing: Maximum of 400 foot between manholes.

3. Sewer Main Slopes: Minimum meeting the requirements of Ten State Standards and maximum slope resulting in flows no greater than 10 feet per second (fps).

Table 1. Minimum Main Line Sanitary Sewer Pipe Slope

Nominal Sewer Size	Minimum Slope in Feet Per 100 Feet
8-inch	0.40
10-inch	0.28
12-inch	0.22
15-inch	0.15
18-inch	0.12
21-inch	0.10
24-inch	0.08
27-inch	0.067
30-inch	0.058
33-inch	0.052
36-inch	0.046
39-inch	0.041
42-inch	0.037

Note: Sewers 48 inches or larger should be designed and constructed to give mean velocities, when flowing full, of not less than 3.0 feet per second, based on Manning's formula using an "n" value of 0.013.

4. Service Slopes: Minimum at two percent (2.0%) (1/4 inch per foot) in accordance with the Minnesota Plumbing Code. See City Standard Details Plates for additional requirements.
5. Service Risers: Required when the mainline is greater than 14.5 feet in depth, or in areas of high-water table. The service stub must be constructed to an elevation at which the end of the stub is not submerged in groundwater unless otherwise approved by engineer.
6. Service Ends: The end of all sanitary services shall be protected with a cap/plug and marker.
7. Sewer Main/Forcemain Pipe Depth/Cover: Minimum 7.5 feet depth/cover to top of pipe.
8. Sewer Service Depth/Cover: Minimum 7.5 feet depth/cover to top of pipe at the right-of-way or easement line unless approved by City Engineer. Along a deep trunk sanitary sewer (greater than 20 feet deep), the City may require 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.
9. Manhole Access: Off road sanitary sewer manholes must be accessible to the City's maintenance vehicles. Show or define access routes for maintenance purposes to manholes and lift stations that are outside of public right-of-way. Access routes shall have a seven percent (7.0%) maximum grade, four percent (4.0%) maximum cross slope, a minimum horizontal curve radius of 50 feet, a minimum width of 12 feet and load capacity of 30 tons. If necessary, access easements shall be dedicated at the time of final plat to provide this access.
10. Sewer Main Stubs: Manholes are required on the end of all stubs if the line will be active (takes flows). All ends of sewer mains must be at manholes with the exception of stubs for future development (no flows).

11. Additional Manhole Locations: A manhole is required at the property line/easement line in multi-family, commercial, industrial, business park, public or waste management areas where service connection to the City system is made.
12. Watertight Manholes: Manholes located within a designated or defined ponding & drainage area or wetland shall be made of watertight materials and utilize a watertight casting. See City Standard Detail Plates.
13. Junction Manholes: Sanitary sewer systems shall be designed to promote a laminar flow. Junction manholes shall be designed to limit the hydraulic head increase by matching flow lines and by providing smooth transition angles. Intersection angles must be a minimum of 90 degrees. Angles of connection less than 90 degrees are not allowed.
14. Outside Drop Manholes: An outside drop is required of any manhole with a drop in inverts 24 inches or greater. All drop manholes shall be lined per City Standard Detail Plates. No inside drops are allowed.
15. Elevation Drop in Manholes: On all sanitary sewer lines, excluding trunk lines, a drop of 0.1 feet shall be provided across each structure unless the structure is identified in the sanitary sewer comprehensive plan. If differing pipe sizes existing, the pipe crowns shall be at the same elevation.
16. Separation: Ten (10) feet of horizontal separation, outside of pipe/structure to outside of pipe/structure, between sanitary sewer and watermain is required. Eighteen (18) inch vertical separation, outside of pipe to outside of pipe.
17. Connections to Existing: Any connections to existing manholes shall be core drilled with watertight boot. No jack hammering or breaking the structure with a maul is permitted. Also, connections to an existing pipe shall require a manhole for access.
18. Sewer services connections: Connect to a wye on the main. Service connections to manholes will not be allowed without approval from City Engineer.
19. Changing of Pipe Material: Not allowed between manholes, with the exception of drop manholes. At drop manholes, 20 feet of Ductile Iron Pipe (DIP) is required before the change of material.
20. Dewatering: If sanitary installation requires dewatering, a plan must be submitted to the City for review.
21. Trench Conditions: When the bottom of the trench is soft or where in the opinion of the City Engineer unsatisfactory foundation conditions exist, the Contractor shall excavate to a depth to ensure proper foundation. The excavation shall then be brought up to grade with thoroughly compacted suitable material as recommended by the geotechnical engineer.
22. Service Cleanouts: Space at 100-foot maximum intervals including the riser on sanitary sewer services and at bends. All sanitary sewer cleanouts constructed in paved areas require the installation of a drive over casting. See City Standard Detail Plates.
23. Crossings: Sanitary sewer services are not allowed to cross over the top of the watermain, unless specifically approved by City Engineer.
24. Material Specifications (minimum):
    a. Mainline Pipe:
        i. Minimum size: 8-inch nominal inside diameter
        ii. Type: PVC Pipe. Pipe shall be of proper strength class for depths and soil conditions.
            1. For pipe 4 inches to 15 inches nominal inside diameter
                a. General: ASTM D1784 and D3034.
                b. Design: Integral belled pipe with minimum wall thickness of SDR 35 or SDR 26 conforming to depth requirements of the manufacturer and City Standard Detail Plates. For deeper pipe runs, PVC shall be AWWA C900 DR-18 per ASTM D1784 and F477. DIP or RCP may be required in very deep runs based on loadings, pipe strength, etc. as determined by the Project Engineer and accepted by the City Engineer.
                c. Gasket/Joint: Elastomeric gasket joint providing water-tight seal of synthetic rubber per ASTM F477 and ASTM D3212. Natural rubber gaskets will not be accepted.

d. Minimum Cell Classification: 12454 or 13364 per ASTM D1784.

2. For pipe 18 inches to 48 inches nominal inside diameter
   a. General: ASTM D1784 and F679.
   b. Design: Integral bell pipe with minimum wall thickness/pipe stiffness of PS46 or PS115 conforming to depth requirements of the manufacturer and City Standard Detail Plates. For deeper pipe runs, PVC shall be AWWA C900 DR-18 per ASTM D1784 and F477. DIP or RCP may be required in very deep runs based on loadings, pipe strength, etc. as determined by the Project Engineer and accepted by the City Engineer.
   c. Gasket/Joint: Elastomeric gasket joint providing water-tight seal of synthetic rubber per ASTM F477 and ASTM D3212. Natural rubber gaskets will not be accepted.
   d. Minimum Cell Classification: 12454, 12364, or 13343 per ASTM D1784.

iii. RCP: This shall only be allowed with written approval from City Engineer specific to its use. ASTM C76, wall B with circular reinforcing. Pipe class minimum 3 with higher class required in accordance with ACPA LRFD Fill Height Tables for the strictest condition/installation. Joints shall be bell and spigot per ASTM C361 with synthetic rubber gaskets per ASTM C443. Lining shall be PVC liner Ameron T-Lock by Ameron Protective Lining Products or approved equal or HDPE liner GSE Studliner by GSE Lining Technology, SureGrip (CPL) by AGRU or approved equal. The liner shall be installed in the entire 360 degree of the pipe interior surface.

iv. DIP: Except for as used with drop manholes, this shall only be allowed with written approval from City Engineer specific to its use. AWWA C151, Class 52 for diameters less than 20 inches and Class 51 for 20-inch diameter and greater. Internal lining shall be Protecto 401 Ceramic Epoxy or approved equal. External coating shall be asphaltic coating in accordance with AWWA C151. All DIP pipe and fittings shall be wrapped with black polyethylene encasement per AWWA C105 and ASTM A674 tube type, 8 mil nominal film thickness. Fittings shall be AWWA C153, 250 psi working pressure AWWA C111 with internal coating/lining of Protecto 401 or approved equal and external coating of AWWA C550 and C116 fusion bonded epoxy.

b. Service Pipe and Riser:
   i. Minimum 4-inch nominal inside diameter.
   ii. Type: PVC Pipe
      1. General: ASTM D1784
      2. Design: Schedule 40 sewer pipe installed in accordance with D1785 and D2665, and the City Standard Detail Plates. In areas where the main is alternate material, the service connection shall be specifically manufactured for the materials installed.
      3. Joints: Solvent cement (including primer and other manufacturer requirements) used to join pipe and fittings per ASTM D2564.
      4. Service Fittings: ASTM D2665 and be of the same class and grade as specified for the pipe, unless otherwise specified. Belled end pipe shall have tapered sockets conforming to ASTM D2672. Fittings shall be molded. Fabricated fittings are not allowed.

c. PVC to DIP/HDPE Connections: Shall be “MJ” adapter type or other method acceptable to the City Engineer. Fittings shall use Cor-blue bolts.

d. Manholes/Structures: Conform to City Standard Detail Plates. Manhole/structure base slab, perimeter walls, and top slab shall be designed and detailed drawings prepared by a Professional Engineer, experienced in precast concrete manhole design, who is registered in the State of Minnesota. The manhole base slab, perimeter walls, and top slab shall be designed for shear strength, flexural strength, and other applicable strengths due to hydrostatic loading. Provide internal coating if required by City or Metropolitan Council Environmental Services (MCES).

e. Castings/Frames/Covers: Per the City Standard Details Plates. Class 35B cast gray iron in accordance with ASTM A48. Any manhole located within a designated or defined ponding & drainage easement shall be made of watertight materials and utilize a watertight casting. See City Standard Details Plates.
f. Tracer Wire: Per CEAM Specification 2621 and the City Standard Detail Plates.
g. Pipe Bedding: In accordance with CEAM Specifications, City Standard Detail Plates, and ASTM D2321, F1668, D2774, and C1479, and AWWA C600 and C605, as applicable. Additional pipe bedding may be required depending on soil conditions as determined by the City Engineer, either during plan review or as required during construction.
h. Insulation: Extruded rigid polystyrene board insulation conforming to CEAM Specification 2600.
i. Pipe Connections to Existing Structures: for structures owned by the City, connect using a Kor-N-Seal flexible connector or approved equal. For structures owned by other Agencies such as MCES, meet Agency requirements.

25. The following wastewater flows shall be used or from the current Comprehensive Plan if updated:

Table 2. System Design Wastewater Unit Flowrates

Land Use Type	Persons/ Unit	Gal/Cap/Day (GCD)	Gal/Unit/Day (GUD)	Units/Acre	Gal/Acre/Day (GAD)
Estate	3.0	90	270	0.1	675
Agricultural Preserve	3.0	90	270	2.5	675
Low Density Residential/Master Planned Development	3.0	90	270	2.5	675
Medium Density	2.5	80	200	6.0	1,200
High Density	2.0	70	140	15.0	2,100
Commercial/Industrial	--	--	--	--	1,200*
Mixed Use	2.0	70	140	15.0	2,100
Recreational/Public	--	--	--	--	800

* Flows may vary depending on commercial/industrial use.

26. The following BOD_5 values shall be used:
    a. Residential development: 0.64 pounds per day per residential unit
    b. Commercial/industrial development: Design Engineer shall provide detailed calculations including assumptions

3.3 Watermain – Design Standards

1. The design and construction of watermain and water services shall conform to the most recent editions of “City Engineers Association of Minnesota Standard Specifications”, ”AWWA Standards”, ”Recommended Standards for Water Works” (Ten State Standards), Minnesota Plumbing Code, or as modified herein and the City’s most recent Standard Detail Plates, and comprehensive plans.

2. Separation: Ten (10) feet of horizontal separation, outside of pipe/structure to outside of pipe/structure, between watermain and other utilities as required by the Minnesota Department of Health.
3. Pipe Depth/Cover: Watermain and water services shall be placed with minimum 7.5 feet of ground. A minimum vertical separation of eighteen (18) inches must be provided between the outer surfaces of the pipes, with preference that the watermain cross above the sewer and raw watermain, wherever possible. See City Standard Detail Plates for insulation requirements when crossing sanitary and storm sewer lines/services or raw watermain.
4. Crossings: One (1) full length of water pipe shall be located centered on the crossing so both joints will be as far from the conflicting utility as possible. All utilities that cross the water main shall cross at a 90-degree angle if possible, with the minimum requirement of a 45 degree angle for the crossing without prior approval from City Engineer.
5. Slope: Tie all joints along watermain installed on a vertical slope of ten percent (10.0%) or steeper.
6. Service Ends: The end of all water services shall be protected with a cap, curb stop, and marker. See City Standard Detail Plates.
7. Hydrant Valves: Gate valves are required on all hydrant leads. See City Standard Detail Plates.
8. Hydrant Location: Hydrants should be placed a minimum of 5 feet from back of curb and centered on side lot lines. See City Standard Detail Plates. Hydrants shall not be installed on the same side of the street as the sidewalk or trail where sidewalk and trail are limited to one (1) side of the street. Hydrants shall be provided at dead ends. Hydrants shall be located in single family residences such that a maximum 250-foot radius for fire protection of the buildings is provided. Hydrants shall be located in multi-family, commercial, industrial, business park, public or waste management areas such that a maximum 150-foot radius for fire protection of the buildings is provided, unless a closer spacing is required by Fire Code. Locate hydrants at intersections, if practical. Hydrants and valves and leads shall be restrained with mechanical joint restraint.
9. Valve Locations/Spacing: Locate valves within the street surface where possible. For residential developments, valves shall be placed in such a manner that a maximum of 18 lots are within one (1) section created between valves. A minimum of two (2) valves are required at a 3-legged intersection. A minimum of three (3) valves are required at a cross or 4-legged intersection. Maximum spacing of valves is 800-feet in residential areas and 500-feet in commercial and industrial areas. Additional valves may be required at the discretion of the City Engineer. Generally, valves shall be located at the end of street intersection radii in accordance with the City Standard Detail Plates.
10. Inactive Valves: Hydrants or water services are not allowed on the inactive side of valves for temporary stubs.
11. Dead-end lines: Shall be minimized by looping of all mains wherever practical. Where dead-end mains occur, a hydrant shall be installed at the end of the main for flushing purposes. All temporary and permanent dead-ends shall be secured with a gate valve and hydrant.
12. Connections to Existing: All connections to existing water mains shall be valved.
13. Reaction/Thrust Blocking: Reaction blocking/concrete thrust blocking and Megalugs (or approved equal) shall be provided at all changes in direction and at all fittings in accordance with City Standard Detail Plates, CEAM Specifications and EBAA Iron Restraint Length Calculator.
14. Pressure Reducing Valves/Pressure Booster Pumps: The City may require pressure reducing valves or pressure booster pumps if necessary to adequately serve high and low pressure areas.
15. Air Relief: Hydrants or air relief valves shall be placed at high points to provide accumulated air relief. Air relief valves, when required, shall have a valve prior to and after an air relief mechanism to allow replacement without shutting down the main.
16. Dewatering: If watermain installation requires dewatering, a plan must be submitted to the City for review.
17. Trench Conditions: When the bottom of the trench is soft or where in the opinion of the City Engineer unsatisfactory foundation conditions exist, the Contractor shall excavate to a depth to

ensure proper foundation. The excavation shall then be brought up to grade with thoroughly compacted suitable materials.

18. Trench Backfill: Backfilling at the "pipe zone" shall be selected backfill material and shall be deposited in the trench by hand and mechanically tamped in 6 inch layers to an elevation of one (1) foot above the top of the water main to provide required bedding. Each successive layer of backfill material shall be thoroughly compacted using suitable mechanical compaction equipment. The type of compactor is dependent on the type of backfill material used. The backfill material shall be compacted to 95 percent of the standard moisture density relationship of soils (ASTM D698) except for the upper three (3) feet of the trench if the sewer lies within an existing or future street right-of-way, alley, parking lot, etc. The upper three (3) feet shall be compacted to 100 percent density per ASTM D698.
19. Material Specifications:
    a. Watermain:
        i. Minimum size: 8-inch nominal inside diameter
        ii. Type: PVC Pipe
            1. General: AWWA C900 and ASTM D1784. ASNI/NSF 61 Certified. Pipe shall be American Made.
            2. Design: Cast-iron-Pipe equivalent outside diameters with a minimum dimension ratio (DR) of 18.
            3. Gasket/Joint: Elastomeric gasket joint providing water-tight seal of synthetic rubber conforming to ASTM F477 and ASTM D3139. Natural rubber gaskets will not be accepted.
            4. Minimum Cell Classification: 12454 in accordance with ASTM D1784.
            5. Fittings: AWWA C153 Ductile Iron, 250-psi working pressure, AWWA C111 mechanical joint or push-on. All internal and external surfaces of the fittings shall have a fusion bonded epoxy coating complying with ANSI/AWWA C550 (valves and hydrants) and C116/A21.16 (fittings). All DIP fittings shall be wrapped with black polyethylene encasement conforming to AWWA C105 and ASTM A674 tube type, 8 mil nominal film thickness. All water main fittings, including valve boxes, shall be manufactured in either the United States or Canada and the manufacturer shall be approved by the City.
    b. Hydrant Leads: AWWA C150 and C151, Special Thickness Class 52.
        i. Pipe shall be American Made.
        ii. Cement-mortar lining: AWWA C104 for pipe, unless otherwise specified.
        iii. DIP Pipe Joints: Mechanical, “Fastite” (American Cast Iron Pipe Company), “Bell-Tite” (James B. Clow and Sons, Inc.) or “Tyton” (U.S. Pipe and Foundry Company), except that mechanical joint, ductile iron, short body fittings, cement lined, Class 250, shall be used for stub ends and all fittings.
    c. Water services: Per the City Standard Detail Plates. Minimum size shall be one-inch
    d. Corporation Stop: Per the City Standard Detail Plates. Minimum size shall be one-inch
    e. Curb Stop: Per the City Standard Detail Plates. Minimum size shall be one-inch
    f. Curb Box: Per the City Standard Detail Plates. A.Y. McDonald Model 5614 or 5615, or equal, with 1-1/4 inch upper section, adjustable from 78 inches to 90 inches and shall have stationary rods. Adjustments shall be at mid-range at installation.
    g. Hydrants: Per the City Standard Detail Plates. All hardware shall be stainless steel. If the weep holes are plugged, hydrants shall have the caps painted blue and be equipped with a stainless-steel tag marked “PUMP AFTER USE”. Hydrant flags shall be a Hydrafinder Hydrant Marker or equal and shall be 54 inch long and 3/8 inch diameter, white fiberglass rod with four (4) red reflective bands, without a bulb end. One (1) flag shall be installed on the hydrant and another delivered to the City of Dayton Public Works Facility. One (1) hydrant wrench to be supplied to the City of Dayton Public Works Facility for every phase or every 5 hydrants installed, whichever is greater.

h. Gate Valves: Per the City Standard Detail Plates. For pipe 12 inches and less nominal inside diameter.
i. Butterfly Valves: Per the City Standard Detail Plates. For pipe greater than 12 inches nominal inside diameter.
j. Pipe Bedding: In accordance with CEAM, City Standard Detail Plates, ASTM F1668 and D2774, and AWWA C600 and C605, as applicable. Additional pipe bedding may be required depending on soil conditions as determined by the City Engineer, either during plan review or as required during construction.
k. Tracer Wire: In accordance with CEAM Specification 2611 and the City Standard Detail Plates.

3.4 Raw Watermain – Design Standards

1. The design and construction of raw watermain shall conform to the most recent editions of “City Engineers Association of Minnesota Standard 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, and comprehensive plans.
2. Separation: Ten (10) feet of horizontal separation, outside of pipe/structure to outside of pipe/structure, between sanitary sewer, watermain, and raw watermain is required.
3. Pipe Depth/Cover: Raw watermain shall be placed with minimum 7.5 feet of ground. A minimum vertical separation of eighteen (18) inches must be provided between the outer surfaces of the pipes, with preference that the watermain cross above the sewer, wherever possible. See City Standard Detail Plates for insulation requirements when crossing sanitary or storm sewer lines/services.
4. Crossings: One (1) full length of water pipe shall be located centered on the crossing so both joints will be as far from the sewer as possible. All utilities that cross the raw water main shall cross at a 90-degree angle if possible with the minimum requirement of a 45 degree angle for the crossing.
5. Slope: Tie all joints along raw watermain installed on a vertical slope of ten percent (10.0%) or steeper.
6. Hydrant Valves: Gate valves are required on all hydrant leads. See City Standard Detail Plates.
7. Hydrant Location: Hydrants should be placed a minimum of 5 feet from back of curb and centered on side lot lines. See City Standard Detail Plates. Hydrants shall not be installed on the same side of the street as the sidewalk or trail where sidewalk and trail are limited to one (1) side of the street.
8. Pressure Reducing Valves: The City may require pressure reducing valves or pressure booster pumps if necessary to adequately serve high and low pressure areas.
9. Air Relief: When required, there shall be a valve prior to and after an air relief mechanism to allow replacement without shutting down the main.
10. Reaction/Thrust Blocking: Reaction blocking/concrete thrust blocking and Megalugs (or approved equal) shall be provided at all changes in direction and at all fittings in accordance with City Standard Detail Plates, CEAM Specifications and EBAA Iron Restraint Length Calculator.
11. Air Relief: Hydrants or air relief valves shall be placed at high points to provide accumulated air relief. Air relief valves, when required, shall have a valve prior to and after an air relief mechanism to allow replacement without shutting down the main. There shall be a valve prior to and after an air relief mechanism to allow replacement without shutting down the main.
12. Dewatering: If raw watermain installation requires dewatering, a plan must be submitted to the City for review.
13. Trench Conditions: When the bottom of the trench is soft or where in the opinion of the City Engineer unsatisfactory foundation conditions exist, the Contractor shall excavate to a depth to ensure proper foundation. The excavation shall then be brought up to grade with thoroughly compacted granular materials.

14. Trench Backfill: Backfilling at the "pipe zone" shall be selected backfill material and shall be deposited in the trench by hand and mechanically tamped in 6 inch layers to an elevation of one (1) foot above the top of the water main to provide proper bedding. Each successive layer of backfill material shall be thoroughly compacted using suitable mechanical compaction equipment. The type of compactor is dependent on the type of backfill material used. The backfill material shall be compacted to 95 percent of the standard moisture density relationship of soils (ASTM D698) except for the upper three (3) feet of the trench if the sewer lies within an existing or future street right-of-way, alley, parking lot, etc. The upper three (3) feet shall be compacted to 100 percent density per ASTM D698.
15. Material Specifications:
    a. Raw Watermain:
        i. Minimum size: 8-inch nominal inside diameter
        ii. Type: PVC Pipe
            1. General: AWWA C900 and ASTM D1784. ASNI/NSF 61 Certified.
            2. Design: Cast-iron-Pipe equivalent outside diameters with a minimum dimension ratio (DR) or 18.
            3. Gasket/Joint: Elastomeric gasket joint providing water-tight seal of synthetic rubber conforming to ASTM F477 and ASTM D3139. Natural rubber gaskets will not be accepted.
            4. Minimum Cell Classification: 12454 in accordance with ASTM D1784.
            5. Fittings: AWWA C153 Ductile Iron, 250-psi working pressure, AWWA C111 mechanical joint or push-on. All internal and external surfaces of the fittings shall have a fusion bonded epoxy coating complying with ANSI/AWWA C550 (valves and hydrants) and C116/A21.16 (fittings). All DIP fittings shall be wrapped with black polyethylene encasement conforming to AWWA C105 and ASTM A674 tube type, 8 mil nominal film thickness. All water main fittings, including valve boxes, shall be manufactured in either the United States or Canada and the manufacturer shall be approved by the City.
    b. Hydrant Leads: AWWA C150 and C151, Special Thickness Class 52.
        i. Cement-mortar lining: AWWA C104 for pipe, unless otherwise specified.
        ii. DIP Pipe Joints: Mechanical, “Fastite” (American Cast Iron Pipe Company), “Bell-Tite” (James B. Clow and Sons, Inc.) or “Tyton” (U.S. Pipe and Foundry Company), except that mechanical joint, ductile iron, short body fittings, cement lined, Class 250, shall be used for stub ends and all fittings.
    c. Hydrants: Per the City Standard Detail Plates. All hardware shall be stainless steel. If the weep holes are plugged, hydrants shall have the caps painted blue and be equipped with a stainless-steel tag marked “PUMP AFTER USE”. If the hydrant is to be used for raw water purposes, the hydrant shall be painted yellow. Hydrant flags shall be a Hydrafinder Hydrant Marker or equal and shall be 54 inch long and 3/8 inch diameter, white fiberglass rod with four (4) red reflective bands, without a bulb end. One (1) flag shall be installed on the hydrant and another delivered to the City of Dayton Public Works Facility. One (1) hydrant wrench to be supplied to the City of Dayton Public Works Facility for every phase or every 5 hydrants installed, whichever is greater.
    d. Gate Valves: Per the City Standard Detail Plates. For pipe less than or equal to 12 inches nominal inside diameter.
    e. Butterfly Valves: Per the City Standard Detail Plates. For pipe greater than 12 inches nominal inside diameter.
    f. Pipe Bedding: In accordance with CEAM, City Standard Detail Plates, ASTM F1668 and D2774, and AWWA C600 and C605, as applicable. Additional pipe bedding may be required depending on soil conditions as determined by the City Engineer, either during plan review or as required during construction.

g. Tracer Wire: In accordance with CEAM Specification 2611 and the City Standard Detail Plates.

3.5 Storm Sewer – Design Standards

1. Drainage facilities shall conform to the most recent editions of “City Engineers Association of Minnesota Standard Specifications”, “Protecting Water Quality in Urban Areas” (Best Management Practices for Minnesota), “National Urban Runoff Program” (NURP), Minnesota Pollution Control Agency (MPCA) “Minnesota Stormwater Manual”, City of Dayton’s “Local Water Management Plan” or as modified herein and the City’s most recent Standard Detail Plates, general specifications, and comprehensive plans.
2. Riprap at Flared End Sections: Place at all outlet flared end sections outlets in accordance with City Standard Detail Plates.
3. Junction Manholes: Design to limit the hydraulic head increase by matching hydraulic flow lines and by providing smooth transition angles. Intersection angles must be a minimum of 90 degrees for main flow lines and 60 degrees for contributary flow lines.
4. Storm Sewer Inlets: Generally required every 250 feet on streets or a combination of streets and swales. Ensure that low lying areas have an acceptable overland drainage route with proper transfer capacity. Inlets should be placed and located to eliminate overland flow in excess of 400 feet on all streets or a combination of streets and swales. Additionally, inlets shall be located such that 1 cubic foot per second (cfs) is the maximum flow at the inlet for the 10-year flood design storm event. This may only be exceeded if spread calculations are provided showing less than half the traveled lane is inundated during the 10-year event. Inlets outside of the roadway shall show an area of inundation. Flared end sections are not allowed to be used as inlets, unless prior written approval is granted by the City Engineer.
    a. Backyard swales longer than 400 feet or four (4) residential lots will be required to have a storm sewer inlet. Other swales may require drain tile if determined by the City Engineer.
5. Storm Sewer Manhole Spacing: 400 feet maximum for sewer lines under 24 inches in diameter (or arch equivalent) and 500 feet for sewer lines 24 inches to 30 inches in diameter (or arch equivalent). Maximum spacing on larger diameter sewer lines shall be approved by the City Engineer. Manholes shall be placed in paved surfaces wherever possible.
6. Minimum Pipe Cover: 3 feet in paved areas (existing or future), two (2) feet in unpaved areas.
7. Storm Pipe Slope: Design to maintain a self-cleaning pipe full flow velocity of three (3) fps minimum full. The maximum velocity shall be ten (10) fps, except when entering a pond, where the maximum velocity shall be limited to eight (8) fps.
8. Dewatering: If storm sewer installation requires dewatering, a plan must be submitted to the City for review.
9. Trench Conditions: When the bottom of the trench is soft or where in the opinion of the City Engineer unsatisfactory foundation conditions exist, the Contractor shall excavate to a depth to ensure proper foundation. The excavation shall then be brought up to grade with thoroughly compacted granular materials or other suitable materials.
10. Trench Backfill: Backfill at the "pipe zone" shall be accomplished with select material hand placed and tamped carefully around and over the pipe to a depth of one (1) foot above the top of the pipe. Each successive layer of backfill material shall be thoroughly compacted using suitable mechanical compaction equipment. The type of compactor is dependent on the type of backfill material used. The backfill material shall be compacted to 95 percent of the standard moisture density relationship of soils (ASTM D698) except for the upper three (3) feet of the trench if the sewer lies within an existing or future street right-of-way, alley, parking lot, etc. The upper three (3) feet shall be compacted to 100 percent density per ASTM D698.
11. Storm Sewer Alignment: Shall follow the sanitary sewer alignment where practical with a minimum of ten (10) feet of separation, from outside of pipe/structure to outside of pipe/structure.

Storm sewer placed along the curb shall be along the curb opposite the water main to maintain ten (10) feet separation, from outside of pipe/structure to outside of pipe/structure.

12. Roof Drainage Leaders: All newly constructed and reconstructed buildings will route drain leaders to pervious areas wherein the runoff can be allowed to infiltrate, where possible. The flow rate of water exiting the leaders shall be controlled so no erosion occurs in the pervious areas.
13. Manhole Locations: Manholes shall be placed in paved surfaces wherever possible.
14. Storm Structure Minimum Build: Storm sewer catch basins, catch basin manholes and manholes shall be designed with a minimum 4-foot build, while also maintaining cover requirements, from the lowest invert to the top of casting or flow line of a catch basin grate.
15. Maximum Lateral/Horizontal Adjusting Ring Offset: 3 inches.
16. Elevation Drop in Manholes: A tenth of a foot drop is required through manholes if the diameter of pipes is the same. If differing pipe sizes exist, the pipe crowns shall be at the same elevation.
17. Catch Basins Near Radii: Catch basins shall be located on the tangent section of the curb at the point of curvature or point of tangency. See City Standard Detail Plates. Mid-radius catch basins will not be allowed. Catch basins shall be designed to collect drainage on the upstream side of the intersection.
18. Sump Manholes: The last manhole in a paved area before entering a stormwater basin area and all structures with a pipe drop equal to or greater than 18-inches shall have a sumped bottom. The sump shall be a minimum of 3 feet in depth, unless otherwise approved by the City Engineer. See City Standard Detail Plates.
19. Aprons/Flared End Sections: Place at all locations where the storm sewer outlets to a stormwater basin area. All aprons or flared end sections shall be tied to the next three (3) pipes. All trash guard installations will be subject to approval by the City Engineer. See City Standard Detail Plates.
20. Outlet control structures (OCS): Provide OCS from stormwater basin areas as directed by the City Engineer.
21. Inlet Flared End Section Elevation: Elevation shall be no lower than the Outlet Elevation of the stormwater basin. Submerged outlets will only be allowed at the discretion of the City Engineer.
22. Access: Show or define access routes for maintenance purposes to all manholes, lift stations, inlets, and outlets at stormwater BMP areas that are outside of public right-of-way. Access routes shall have a seven percent (7.0%) maximum grade, four percent (4.0%) maximum cross slope, minimum horizontal curve radius of 50 feet, a minimum width of 12 feet and a load capacity of 30 tons. The maintenance access for stormwater BMPs shall be placed beginning one (1) foot above the basin's EOF outlet elevation. This access must be tied into an access path connecting to a street, parking lot, or other point of entry for maintenance vehicles. If necessary, access easements or outlots shall be dedicated at the time of final platting to provide this access.
23. Swales: Swales flatter than two percent (2.0%) may be allowed with special accommodations for drainage such as draintile with catchbasin inlets approved by the City Engineer.
24. Material Specifications:
    a. City Owned Pipe/Pipe in City Right-of-Way/Easements:
        i. Minimum size: 12-inch nominal inside diameter
        ii. Type: Reinforced Concrete Pipe (RCP)
        iii. ASTM C76, wall B with circular reinforcing. Pipe class minimum 3 with higher class required in accordance with ACPA LRFD Fill Height Tables for the strictest condition/installation. Joints shall be bell and spigot per ASTM C361 and Bureau of Reclamation Type R-4.
    b. Rural Residential Driveway Culvert Pipe:
        i. Minimum Size: 18-inch nominal inside diameter
        ii. Type: Corrugated Metal Pipe (CMP) in accordance with Mn/DOT Spec 3222, corrugated aluminized steel pipe (type 2), 16 gage or stronger as determined by the Project Engineer.
        iii. Alternate Type: Corrugated Smooth Interior Dual Wall Polypropylene (PP)

1. High-performance polypropylene pipe using a bell and spigot joint conforming to AASHTO M330. HP Storm Dual Wall Pipe as manufactured by Advanced Drainage Systems or approved equal.

c. Structures/Manholes: Conform to City Standard Detail Plates. Manhole/structure base slab, perimeter walls, and top slab shall be designed and detailed drawings prepared by a Professional Engineer, experienced in precast concrete manhole design, who is registered in the State of Minnesota. The manhole base slab, perimeter walls, and top slab shall be designed for shear strength, flexural strength, and other applicable strengths due to hydrostatic loading.
d. Castings/Frames/Covers: Per the City Standard Detail Plates. Class 35B cast gray iron in accordance with ASTM A48.
e. Flared End Sections/Aprons: Per the City Standard Detail Plates. Reinforced concrete pipe with trash guards in accordance with the City Standard Detail Plates. Galvanized steel flared end sections when used with CMP and PP pipe.
f. Riprap: Per the City Standard Detail Plates. Material in accordance with Mn/DOT Spec 3601. Only granite riprap shall be used.
g. Bedding: In accordance with CEAM, City Standard Detail Plates, and ASTM D2321, F1668, D2774, and C1479, as applicable. Additional pipe bedding may be required depending on soil conditions as determined by the City Engineer, either during plan review or as required during construction.
h. Filtration media and drainage layer shall meet Minnesota Stormwater Manual Standards.

3.6 Stormwater Management – Design Standards

1. A Stormwater Management Plan (SWMP) documenting compliance with all stormwater standards shall be provided. Applicants are responsible to submit to Elm Creek Watershed Management Commission. Watershed application will not be authorized until the City's preliminary review is complete.
2. The following values shall be used for hydraulic and hydrologic design unless variation is clearly supported by engineering data.
    a. Peak Rate Design Standards
        i. Discharge rates from new development and redevelopment sites shall be no greater than the existing condition discharge rates for the 2-, 10-, and 100-year, 24-hour MSE3 rainfall events using the Natural Resource Conservation Service (NRCS) CN Method, or other City approved method.
        ii. The design storms depths shall be as defined in National Oceanic and Atmospheric Administration (NOAA) Atlas 14, volume 8 or the current version if more recent.
        iii. Existing on-site CNs for agricultural land use shall utilize the following CNs based on Hydrologic Soil Group (HSG) to represent pre-development conditions (off-site existing may be modeled as currently developed).
            1. HSG A – 32
            2. HSG B – 58
            3. HSG C – 72
            4. HSG D – 79
            5. Dual HSG classifications shall use the first letter unless there is evidence of a seasonally high groundwater level within 2 feet of the surface.
        iv. All BMPs, wetlands, natural depressions and other storage shall be modeled and HWLs determined and labeled on plan sets.
        v. In both existing and proposed conditions, any water surfaces and effective infiltration/filtration areas shall be modeled with a curve number of 100 up to the OHWL or NWL surface.

vi. For discharges to special water, such as the Outstanding Resource Value Waters (ORVW) of the Mississippi River, permanent storm water management systems must be designed such that post project runoff rate and volume from the 1-year and 2-year 24-hour precipitation events are less than or equal to the pre project values.

vii. Land Locked Basins: landlocked depressions that presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet provided the downstream impacts are addressed and applicable requirements are met such as those in the NPDES Municipal Separate Storm Sewer System (MS4) permit, the City of Dayton's SWPPP, and the state and federal rules and regulations.

1. The 100-year back-to-back 24-hour storm is the design storm for land locked basins peak rate control and HWLs.

viii. Initial water level shall be set at the constructed outlet elevation for wet ponds, filtration basins, and infiltration basins.

ix. HydroCAD, XPSWMM, or other engineer-approved models may be accepted for peak rate calculations.

b. Water Quality Design Standards

The City's water quality design standards follow the most current version of the MS4 General Permit (MNR04000). The City must develop, implement, and enforce post construction stormwater management that prevents or reduces water pollution after construction activity is complete. These items are outlined in sections 20.4 through 20.15 of Minimum Control Measure (MCM) 5 the general permit. Engineering plans and stormwater management report submittals to the City shall include the following water quality standards.

i. All projects that create one (1) or more acres of new or fully reconstructed impervious surface must design a stormwater management system that meets MPCA and Elm Creek Watershed Management Commission requirements.

ii. Elm Creek Watershed Management Commission requirements for water quality must be met.

iii. Abstraction requirements shall meet or exceed the requirements listed in the most current version of the MPCA's MS4 General Permit and NPDES Construction stormwater permit requirements. Permittees must calculate the water quality volume as 1.1 inches times the net increase of impervious surfaces created by the project. For linear projects, the water quality volume must be calculated as the larger of 1.1 inches times the new impervious surface or 0.55 inches times the sum of the new and the fully reconstructed impervious surface. Elm Creek Watershed Management Commission requirements may be more stringent and must be met.

iv. Volume reduction practices (e.g. infiltration or other) to retain the water quality volume on-site must be considered first when designing permanent stormwater treatment systems.

v. Water quality calculations shall be submitted using MIDS, P8, WinSLAMM or other engineer-accepted models.

vi. The City allows a maximum 1.5 foot water quality depth measured from the top of filtration media to the constructed outlet.

vii. A maximum of 2.5 feet of bounce is allowed in biofiltration basins from the constructed NWL outlet to the HWL. This equates to a total of 4 feet of depth including the water quality depth.

viii. Pre-treatment devices are only allowed for settlement and are not applicable to water quality TSS and TP calculations due to the amount of suspended sediment

bypassed at a smaller sieve size. Pre-treatment surface area must be removed from all water quality calculations.

ix. Pre-treatment is required upstream of all filtration, biofiltration, and infiltration systems. Pre-treatment methods such as filtration swales, forebays, and check dams must be sized to accommodate ten percent (10%) of the water quality volume.

c. Storm Sewer
   i. Design of the storm drainage system shall be based on a 10-year frequency storm for storm sewer and a 100-year frequency storm for ponds and open channels.
   ii. System must be designed using the rational method for the 10-year event and checked for the 25- and 100- year event to evaluate surcharging. NOAA Atlas 14 (or most current) Rainfall Intensities shall be used and no more than 10 minutes time of concentration without appropriate justification/calculation.
   iii. Draintile sump connections shall be provided to all homes which do not back up to a pond or wetland. All homes will be required to hook up to provided sump connection. The connection stub shall be 4 inches in diameter, main line 6 inches in diameter, connecting to a storm sewer structure.
   iv. All outlets and discharge locations shall require appropriate protection from erosion (i.e., establish vegetation or riprap based on velocity/shear).
   v. All sag/local low points shall have inlets/catch basins located to intercept runoff. If more than one (1) inlet is required at a sag, one (1) inlet shall be placed at the low point and the other inlet offset (typically 6 feet) to the side with a shallower longitudinal profile.

3. Misc. Stormwater and Water Resources
   a. In verifying stormwater management calculations, please reference at a minimum the Minnesota Stormwater Manual, MPCA Construction Stormwater General Permit, Elm Creek Watershed Management Commission requirements, and Mn/DOT Seeding Manual.
   b. Hydrologic and Hydraulic Modeling Parameters
      i. Rational Formula “C” coefficients – Utilize appropriate current MN Stormwater Manual referenced values.
      ii. Manning’s “n” coefficient

Table 3. Manning’s “n” Coefficient by Material

Material	Manning’s “n” coefficient
PVC	0.011
HDPE	0.011
RCP	0.013
CMP	0.024
Grass Channel	0.030-0.040

      iii. Time of Concentration “Tc”
         1. Time of concentration method shall be calculated using sheet/shallow concentrated flow with TR-55 methodology. Other methods may be allowed with approval from the City Engineer.
         2. Maximum sheet flow path of 100 feet.

3. Maximum 10-minute time of concentration if not explicitly calculated. Existing time of concentrations must be explicitly calculated for subwatersheds larger than 0.5 acres.
4. Direct Entry is only allowed if the time of concentration is under 10 minutes.

c. BMP Design Parameters
   i. EOF drainage routes shall be provided at all locations at least 1 foot below the lowest building opening. An overflow drainage route shall be constructed in a manner that will accommodate a 100-year storm. Piped EOFs shall not be allowed unless approved by the City Engineer.
   ii. Drainage and utility easements are required for all basins, storm sewer, swales, ditches, and overflow routes to the basin's or conveyance route's 100-year critical duration storm HWL elevation. This means EOF and downstream flow path must be in an easement. Easement shall also include maintenance access routes (12 feet width minimum).
   iii. Approved surface water treatment options include NURP ponds, (bio)filtration basins, infiltration basins, iron enhanced sand filter/trench/bench, green roofs, porous/permeable pavements, constructed wetlands, or approved equal by the City Engineer. Native plantings are not approved treatment options. Refer to Minnesota Stormwater Manual for design considerations.
   iv. Adequate access for future maintenance including easements, grading and elimination of obstructions shall be provided. This may require the construction of access roads for heavy construction equipment. Access routes shall have a seven percent (7.0%) maximum grade, five percent (5.0%) maximum cross slope, minimum horizontal curve radius of 50 feet, a minimum width of 12 feet and a load capacity of 30 tons. No trees or shrubs shall be installed within maintenance access.
   v. The high-water levels of the storm water ponding areas (and localized depressions such as catch basins) shall be based on a 100-year storm. The minimum freeboard above the established high-water levels for the lowest floor shall be two (2) feet. EOF must be at least one (1) foot above the 100-year HWL. Top of Berm must be one (1) foot above the EOF and two (2) feet above the HWL.
   vi. Discharge pipes to BMPs must have riprap from discharge pipe elevation to basin bottom or NWL whichever is higher. The discharge pipe elevation shall meet Minnesota Plumbing Code as applicable.
   vii. EOF routes shall be provided to drain low points along streets or lot lines to ensure a freeboard of two (2) feet from the lowest opening elevation and the calculated 100-year critical storm event HWL elevation
   viii. Landlocked BMP
      1. Low floor elevation shall be set a minimum of two (2) feet above the back-to-back 100-year HWL event.
      2. An overland EOF to a street or other conveyance shall be required and low floor shall be set at a minimum of one (1) foot above the EOF even if already two (2) feet above the back to back 100-year HWL event.
      3. A redundant piped emergency overflow piped outlet may be used as the EOF requirement if accepted by the City's Engineer and may be required if acceptable overland EOF is not possible.

d. Sub-surface storm water features shall utilize the same design parameters as surface stormwater features, as applicable to their products.
e. Wetland and Wetland Buffer Standards
   i. The City of Dayton requires developers to complete a wetland delineation and a function and values assessment by a trained wetland professional to identify the

location and extent of any wetlands present within the development site and adjacent right-of-way.

ii. On-site wetland mitigation shall meet Wetland Conservation Act (WCA) and United States Army Corps of Engineers (USACE) requirements. The City will require a performance escrow for wetland credits and the monitoring process.

iii. Buffer strips on Elm Creek, Rush Creek, North Fork Rush Creek, and Diamond Creek shall be an average of 50 feet wide and a minimum of 25 feet wide, measured from the top of bank. Buffer strips on other watercourses, lakes, and wetlands shall be an average 25 feet wide and a minimum of 10 feet wide. Buffer areas disturbed by grading operations must be finish graded to a slope of 6:1 (H:V) or less or an increase in width of five (5) feet for each one (1) foot decrease in horizontal width (i.e., a 25 foot buffer width at a 5:1 (H:V) slope must be 30 feet wide, 4:1 (H:V) must be 35 feet wide, and 3:1 (H:V) must be 40 feet wide.). Wetland buffers shall require a wetland buffer planting and establishment plan in accordance with Appendix D.

1. 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 meeting City Standard Detail Plates.

iv. Maximum 2-foot bounce for 10-year design storm event in wetlands.

v. Follow the Board of Soil and Water Resources (BWSR) recommended wetland management standards and hydrologic guidelines for bounce, inundation, and runout control.

vi. Prior to planting and seeding, all newly constructed wetland and buffer areas shall be treated to control weed growth with herbicide (aquatic approved for use in wetlands) that breaks down sufficiently within 14 days to allow planting.

vii. For new wetland buffer areas adjacent to existing wetlands, two (2) rows of perimeter control shall be installed along the edge of the wetland prior to any grading. After the buffer area has been graded, prepared, seeded, planted, and buffer monuments installed, a line of perimeter control shall be installed along the edge of the buffer area. All perimeter control shall be maintained in accordance with the City Land Disturbance and Erosion and Sediment Control Ordinance (see Appendix A).

f. Designed outlet and emergency spillway are required.

g. Lowest floor elevation shall be 2 feet above the 100-year flood elevation, or 3 feet above the Ordinary High Watermark (OHW) of the public water if better data is not available at the discretion of the City Engineer.

h. Removal of all trees and brush below the NWL that will be impacted from existing and newly created ponding areas. In the development of any subdivision or ponding area, the developer is responsible for the removal of all significant vegetation (trees, stumps, brush, debris, etc.) from all areas which would be inundated by the designated NWL (Outlet Elevation), as well as the removal of all dead trees, vegetation, etc., to the HWL of the ponding area/basin.

i. A stormwater facilities maintenance agreement is required for all non-public stormwater BMPs. See Appendix C for the stormwater facilities maintenance agreement template.

4. Floodplain

a. The City of Dayton prohibits activities that impact the storage volume within the 100-year A-zone floodplain and AE flood fringe unless compensatory floodplain mitigation is provided at a 1:1 ratio by volume and it is demonstrated that the 100-year floodplain will not be impacted. In addition, no filling within the designated floodway shall be allowed. Suitable calculations must be submitted and accepted demonstrating that filling in the

flood fringe will not impact the 100-year flood profile. The 100-year floodplain is defined as that area associated with a storm event that has one percent (1.0%) chance of being equaled or exceeded any year. Additional watershed and FEMA regulations may apply. The Developer is responsible for acquiring all permitting associated with any floodplain impacts. If the Base Flood Elevation (BFE) is not identified, a floodplain study shall be required to determine it.

5. Stormwater quality treatment ponds shall be designed and constructed to meet NURP design standards.
6. Stormwater BMPs shall be designed according to the most current methods. The Elm Creek Watershed Management Commission (ECWMC) currently reviews and approves development BMPs. General guidelines for BMPs include:
    a. Wet Detention and Rate Control
        i. A minimum permanent pool depth of four (4) feet with a maximum of ten (10) feet and length-to-width ratio of 3:1.
        ii. A twelve (12) foot-wide maintenance bench with a maximum of ten percent (10.0%) cross slope elevated above the high-water level. See City Standard Detail Plates.
        iii. A ten (10) foot-wide safety/aquatic bench with an optimum slope of 10:1 (H:V) sloped from the normal water level down into the basin. See City Standard Detail Plates.
        iv. Basin side slopes shall be a maximum of 3:1 (H:V) below the normal water level and 4:1 (H:V) above the NWL.
        v. The pond should be wedge shaped with the inlet at the narrowest end and the outlet at the widest end to the extent practicable. Distance between storm sewer outfalls and the pond outlet should be maximized to avoid short circuiting.
        vi. Rate control typically limits peak flows to pre-development conditions
    b. Filtration
        i. Underdrains shall be minimum 6-inches in diameter and shall not exceed a horizontal spacing of 25 feet. Minimum slope is 0.5 percent. Cleanouts shall be placed at all ends, joints, and bends.
        ii. Maximum 4:1 (H:V) side slopes
        iii. Native and wet-tolerant plants shall be specified for the filtration surface if not Iron-enhanced
        iv. Specify Media Mix C or D from the Minnesota Stormwater Manual.
        v. Engineered media surface shall be a minimum of two (2) feet above the top of the underdrain. No filter fabric permitted. Choking stone and pea gravel may be used.
        vi. Minimum three (3) foot vertical separation from seasonally high groundwater or an impermeable liner must be provided.
    c. Infiltration
        i. Minnesota Stormwater Manual values for infiltration rates must be used in the absence of in field tests. A higher rate may be used, however, the higher rate will require ECWMC approval based off pre and post filtration testing methods such as double ring infiltrometers.
        ii. Maximum 4:1 (H:V) side slopes
        iii. 48-hour drawdown is required.
        iv. Capped/Plugged Orifice (minimum 6 inches diameter) must be placed at the lowest infiltration elevation to allow maintenance.
        v. Minimum three (3) foot vertical separation from seasonally high groundwater.
    d. Water Reuse
        i. Reuse systems (typically irrigation from wet ponds) will need a maintenance plan approved by the City.

   ii. System shall have a meter that can be read from the outside for City staff access if secondary pond refilling is to be from city water system.
   iii. System shall comply with applicable health and safety regulations, which may include Minnesota Department of Health (MDH), etc.
7. Calculations and drainage area maps showing 10-year design and 100-year flood boundaries shall be submitted with the plans and specifications verifying the adequacy of the number of catch basins, pipe capacities and pond sizes.
8. Over-excavate the bottom of the water quality ponds to compensate for any erosion that could occur. The developer will be responsible for verifying, at the end of the warranty period, that the ponds are providing the required volumes.

3.7 Streets – Design Standards

1. Streets shall conform to the current versions of the Mn/DOT Standard Specification for Highway Construction, Mn/DOT Road Design Manual, Mn/DOT Facility Design Guide, and American Association of State Highway and Transportation Officials (AASHTO) current version of "A policy on Geometric Design of Highways and Streets" (AASHTO Green Book), "Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways" or as modified herein and the City's most recent Standard Detail Plates, and comprehensive plans for roadway design.
2. Pavement Design Section: Soil testing is required to provide for a minimum 10-ton 20-year pavement design section. The minimum design section is shown on the City Standard Detail Plates. The section shall be verified by the Developer's Project or Soils Engineer based on site specific conditions (subgrade conditions, traffic volumes, or other circumstances may require a larger/thicker section) - design considerations may require a section that exceeds the minimum. The Developer's Project Engineer shall provide recommendations for pavement design sections based on the existing subgrade soils. The City Engineer shall have the ultimate determination on the necessary design section of the roadways. Where soil tests indicate unsuitable soils, frost susceptible soils, or presence of excessive ground moisture, a recommendation by the Developer's Soils Engineer for corrective work is required and shall be reviewed with the City Engineer. The City requires the determination of an R-value to be used in calculating the total granular equivalency (G.E.) of a street's design requirements.
3. Residential Street Design: All residential streets are to be designed to meet or exceed Mn/DOT standards for 30-mph vertical and horizontal curve data unless otherwise determined by the City. Collector streets are to be designed to meet or exceed the Mn/DOT standards for 40- mph. Street design shall meet standards contained in the "Mn/DOT Road Design Manual" And "Mn/DOT Facility Design Guide" Residential and collector streets – ten (10) ton minimum.
4. Clear Zone: The design of streets shall accommodate a minimum of a seven (7) foot clear zone behind the curb where trailways or sidewalks are proposed and a minimum of ten (10) foot in areas without trailway or sidewalk to provide for adequate sight distances and snow storage unless otherwise directed by City Staff.
5. Horizontal Sight Distance: Horizontal curves on residential streets with concrete curb and gutter shall be designed to ensure a horizontal sight distance of not less than 200 feet and in compliance with Mn/DOT Road Design Manual/Facility Design Guide and AASHTO Greenbook. All collector or higher classification roadways shall be constructed in accordance with the Mn/DOT Road Design Manual.
6. Residential Street Width: City Streets shall be constructed in compliance with the City Standard Detail Plates unless otherwise required or approved by the City Engineer.
7. Street Grades: The minimum longitudinal grade for all new streets shall be six tenths of one percent (0.60%). The minimum grade for reconstructed streets shall be one half of one percent (0.50%). Grades within thirty (30) feet of intersections and grades for the turnaround portion of a cul-de-sac street shall not exceed three percent (3.0%). Otherwise, the maximum allowable grades on City streets shall be as follows:

   a. Minor Arterial – Five percent (5.0%) maximum grade
   b. Collector – Six percent (6.0%) maximum grade
   c. Local/Residential – Six percent (6.0%) maximum grade
8. Intersection Grades: At intersections, the street grade shall not exceed two percent (2.0%) for the first 100 feet approaching said intersection unless otherwise approved by the City Engineer. The 100 feet is measured from the nearest curb line or pavement edge of the intersected street.
9. Driveways: Shall be designed at a minimum grade of two percent (2.0%) and a maximum grade of ten percent (10.0%), unless otherwise approved by the City. Driveways with sidewalk crossings shall meet Americans with Disabilities Act (ADA) requirements. They also may not be placed within five (5) feet of a sewer or water service unless approved by the City Engineer. If placed within driveway, a Ford Meter Box A1 Style or similar approved drive over casting shall be used to protect service shutoffs and tracer wire boxes.
10. Cul-De-Sacs: The gutter grade shall not be less than one percent (1.0%). A cul-de-sac must be provided for dead end streets 150 feet or longer and all locations as required by public safety for access. If there will be driveway access for streets that are dead-ended for future expansion, a temporary turn-a-round must be provided. Cul-de-sacs with a street longer than 500 feet must be signed indicating that there is no thru street. Reference City Standard Detail Plates for minimum cul-de-sac dimensions.
11. Intersection Angles: Streets shall intersect at right angles unless otherwise approved by the City.
12. Intersection Radii: A 20 foot minimum intersection radius shall be used on residential streets. A 30 foot minimum intersection radius shall be used for collector roads. Minimum grade along curb radii is 0.5 percent.
13. Pedestrian Curb Ramp: A concrete pedestrian curb ramp is required when sidewalk or pathway intersect with curbs. The ramp shall be constructed according to the City Standard Detail Plates and ADA Standards.
14. Traffic Control/Street Signs: Street signs, stop signs or other traffic control signage shall be installed by the developer and per “Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways,” Mn/DOT, and City Standard Detail Plates. All signs must be installed prior to final building inspection approval or earlier if necessary, as determined by the City Engineer. Street signs shall be on a separate post from stop/other traffic control signs and shall be on the opposing corner from stop signs.
15. Pavement Markings: Pavement markings shall be installed by the developer and per “Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways,” Mn/DOT, City Standard Detail Plates, and as directed by the City Engineer.
16. Street Lighting:
   a. Provide lighting cobra style street lighting at major intersections and other locations as determined by the City Engineer.
   b. Provide decorative style lighting at residential intersections, pedestrian crossings, and other locations as determined by the City Engineer.
17. Dead End Streets: Permanent barricades in accordance with the City Standard Detail Plates and Minnesota Manual on Uniform Traffic Control Devices and as approved by the City Engineer shall be placed on all dead-end streets. “Future Through Street” signs per City Standard Detail Plates shall be placed on all dead-end streets that will be extended through future development, or as directed by the City Engineer.
18. Subsurface drain pipe: Shall be required at road localized low point catch basins and extended a minimum of 250 feet in each direction parallel to the gutter line. Subsurface drain pipe shall be installed at catch basins located in the mid slope and extended 150 feet in the upstream direction parallel to the gutter line. Subsurface drain pipe shall also be required as recommended in the geotechnical report/soils analysis and at other places that may be required to intercept subsurface moisture. Cleanouts are required at a maximum of 200 foot intervals, at bends, and at the end of the run. All cleanouts shall be cut off 2-inches below grade and be installed with a locatable metal cap.

19. Street Curb: Mn/DOT Design B618 concrete curb and gutter shall be installed along designated parking areas, around radiuses, development entrances, catch basin transitions, or any sustained stretches with no driveways. Surmountable concrete curb shall generally be installed in all other areas where residential driveways are needed.
20. Concrete valley gutter will not be used unless approved by the City Engineer.
21. Retaining walls:
    a. Walls over four (4) feet in height (measured from the bottom of the footing to the top of the wall) shall be designed by a qualified Professional Engineer licensed in the State of Minnesota.
    b. A permit issued by the City's Building division is required to construct retaining walls.
    c. Retaining walls shall not be built within the street right-of-way or easements. Retaining walls, associated fences, and landscaping will be considered private and shall be maintained by the property owner.
22. Street construction materials: Shall be in conformance with the Minnesota Department of Transportation Standard Specifications for Construction, Latest Edition and all subsequent revisions and supplements, except as specifically altered or modified herein.
    a. Aggregate base shall be Class 5, 100 percent crushed meeting the requirements of Mn/DOT Section 3138 and which has a maximum Liquid Limit (LL) of 25 and a Plasticity Index (PI) of 0 to 3.
    b. Geotextile Fabric - Shall be installed after completion and approval of subgrade if required by the City Engineer or recommended by the Soils Engineer. All splices shall be overlapped a minimum of 24 inches or seamed (sewed, glued, welded,) to produce equivalent fabric strength. Fabric shall not be left exposed to the sun for a period in excess of 3 days. Rips shall be patched with fabric lapped a minimum of 36 inches around the rip.
    c. Bituminous mixture shall conform to Mn/DOT 2360. The asphalt and bituminous mixture for collector roads and residential streets shall be at a minimum:
        i. Wearing course: Mn/DOT 2360 SPWEA340B
            1. Recycled content: Wearing courses may have a maximum of ten percent (10%) recycled asphalt pavement (RAP). No recycled asphalt shingles (RAS) allowed in wearing course.
        ii. Non-wearing course Mn/DOT 2360 SPNWB330B
            1. Recycled content: Non-wearing courses may have a maximum of twenty percent (20%) recycled asphalt pavement (RAP).
    d. Bituminous Tack Material shall be in conformance with Mn/DOT 3151.2.D, for cationic emulsified asphalt.
    e. Pavement markings shall be Mn/DOT 3590 multi-component with glass beads per Mn/DOT 3592 for markings required on public streets.
    f. Street lighting may depend on the electrical utility provider at the project location.
    g. Concrete Curb and Gutter - Mn/DOT Section 2531. Curb section shall be as indicated on Plans in accordance with the City Standard Detail Plates. Joints shall be installed as outlined in Mn/DOT Section 2531. Maximum spacing of expansion joints shall be sixty (60) feet for hand formed curb; two hundred (200) feet for slip formed curb. Concrete curing and protection shall be in accordance with Mn/DOT Section 2531.
    h. Drain tile/subsurface drain pipe: Pipe shall be rigid, thermoplastic schedule 40 PVC. Corrugated polyethylene pipe will not be allowed.

3.8 Trails – Design Standards

1. Trails and sidewalks shall be designed and constructed in accordance with "Bicycle Facility Design Manual, Minnesota Department of Transportation", latest edition, the City Parks, Trails,

and Open Space Plan, and the City Standard Detail Plates. Regional trails which are part of the Three Rivers Park District Trail Plans shall be in accordance with Three Rivers Park District requirements.

2. Easements: Trails located outside of the ROW will require dedicated trail easements allowing use and maintenance of the trails. Drainage and Utility easements are not sufficient for trail use.
3. A sidewalk or trail is required along arterial and collector roadways consistent with the Comprehensive Plan. A sidewalk is required along one (1) side of local streets and shall be installed along with the street construction.
4. Trail Width: Standard trail width is 10 feet. This may be adjusted depending on site conditions with approval of the City Engineer.
5. Clearing: All trees, stumps, brush, etc., shall be cleared within two (2) feet of the edges of trails. The exception will be only hardwood specimen trees or other exceptional items of high significant value, as determined by the City. These shall be specifically noted on the plans to be maintained during construction.
6. Grades/Slopes: Avoid long steep grades; five percent (5.0%) maximum slope preferred, eight percent (8.0%) maximum where unavoidable by existing terrain. Use flatter grades or slopes at intersections with streets or other trail ways. Provide positive surface water drainage away from the trail way with shallow drainage swales or ditches, culverts and/or storm sewer as required. For drainage purposes, the minimum cross slope is one percent (1.0%). Provide two percent (2.0%) maximum cross-slope (1.5 percent preferred).
7. Horizontal and Vertical Alignment: Avoid sharp or sudden changes in horizontal and vertical alignment. Provide adequate site distance for bicycles at intersections and on vertical changes in alignment. Provide clearance for vertical obstructions (trees, power poles, signs, etc.); four (4) foot minimum for bicycle facilities, two (2) feet offset from the edge minimum. Use a minimum twenty-foot radius at trail intersections. The trail shall be a minimum of one (1) foot above the HWL of adjacent water bodies/stormwater basins.
8. Traffic Signage: Bicycle trails shall be marked and signed in accordance with the Mn/DOT Bicycle Facility Design Manual and the Minnesota Manual on Uniform Traffic Control Devices, latest edition.
9. Pavement Section: Minimum standards for trail and sidewalk sections shall be increased as necessary where required by poor subgrade soil, traffic volumes, hazardous conditions, or other special circumstances. Extra width and/or flatter curves may be required on long downhill slopes for additional reaction space. Excavate and remove all topsoil, black dirt, peat, muck, silt, or other unsuitable soils from beneath trail/sidewalk; backfill with suitable grading material. Subgrade of trail way to be minimum of two (2) feet above water table/ground water.
10. Root inhibiting barrier shall be added within the trail section where the trail abuts low lying areas or areas in which significant tree growth is present.
11. Trail construction materials: Shall be in conformance with the Minnesota Department of Transportation Standard Specifications for Construction, Latest Edition and all subsequent revisions and supplements, except as specifically altered or modified herein.
    a. Aggregate base shall be Class 5, 100 percent crushed meeting the requirements of Mn/DOT Section 3138 and which has a maximum Liquid Limit (LL) of 25 and a Plasticity Index (PI) of 0 to 3.
    b. Bituminous mixture shall conform to Mn/DOT 2360. The asphalt and bituminous mixture for trails shall be at a minimum:
        i. Wearing course: Mn/DOT 2360 SPWEA240B
            1. Recycled content: Wearing courses may have a maximum of ten percent (10%) recycled asphalt pavement (RAP). No recycled asphalt shingles (RAS) allowed in wearing course.

3.9 Grading Outside of Roadway – Design Standards

1. The grading plans shall conform to the most recent editions of Minnesota Pollution Control Agency "National Pollutant Discharge Elimination System", MPCA's "Minnesota Stormwater Manual", City of Dayton MS4 General Stormwater Permit or as modified herein and the City's most recent Standard Detail Plates and comprehensive plans.
2. Minimum Topsoil Thickness: Six (6) inches of topsoil must be applied to all pervious areas of the development prior to seeding or sodding.
3. Dewatering: If dewatering is required for grading, a plan must be submitted to the City for review.
4. Sloping requirements:
    a. Bituminous/Asphalt pavement: minimum of 1.5 percent, two percent (2.0%) minimum for driveways, maximum along accessible routes shall meet ADA Standards. See Street and Trail Sections for additional requirements.
    b. Concrete pavement: minimum of one percent (1.0%), maximum along accessible routes shall meet ADA Standards.
    c. Drainage swales: minimum of two percent (2.0%), maximum 4:1 (H:V) slope. 3:1 (H:V) slope in unmaintained areas with approval from the City Engineer.
    d. Pervious areas: minimum two percent (2.0%), maximum 4:1 (H:V) slope. 3:1 (H:V) slope in unmaintained areas with approval from the City Engineer.
    e. Stormwater systems: see Stormwater Management – Design Standards section.
    f. ADA parking stalls and routes: in accordance with local, state and federal ADA standards

3.10 Sediment and Erosion Control – Design Standards

1. Erosion control shall at a minimum observe standards established in the following: Minnesota Pollution Control Agency NPDES Construction Stormwater Permit, Elm Creek Watershed Management Commission Rules, City Ordinance Chapter 151 (see Appendix A), and the City of Dayton MS4 General Stormwater Permit or as modified herein.
2. A Construction SWPPP in accordance with the most current MPCA NPDES Construction Stormwater Permit shall be provided. This SWPPP shall be included in the plan submittal and will document all measures required.
3. Sediment and Erosion Control Design: Shall be consistent with the general criteria set forth by the most recent versions of the Minnesota Stormwater Manual, practices outlined in the Minnesota Pollution Control Agency "Protecting Water Quality in Urban Areas", Mn/DOT Manuals and Guides and the MPCA NPDES Construction Stormwater permit.
4. Turf Establishment: Either sod or seed with erosion stabilization product shall be placed in all disturbed areas to protect from erosion and meet regulatory requirements.
5. EOFs shall be reinforced with Turf Reinforcement Mat (TRM).
6. Erosion control blanket or turf reinforcement mat shall be placed on all vegetated slopes 4:1 (H:V) or steeper.
7. Ditch checks shall be placed on all swales spaced in accordance with the City Standard Detail Plates
8. Material Specifications
    a. TRM for Emergency Overflows: MnDOT Rolled Erosion Product Category 74 (minimum) in accordance with appropriate shear/velocity rating, and other factors as determined by the Project Engineer.
    b. Erosion control blanket: natural netting only, type of blanket shall meet site requirements for shear, velocity, and other factors as determined by the Project Engineer.

3.11 Lot Survey and Grading As-Builts – Design Standards

1. Individual lots shall be designed to meet the following standards for slopes:
    a. General drainage shall be sloped a minimum of two percent (2.0%) from a house to the street and drainageways.
    b. Driveways shall be sloped a minimum of two percent (2.0%) and maximum of ten percent (10.0%)
    c. Grading must slope away from the building a minimum of 6 inches in the first ten (10) feet around a building (5.0%).
    d. The maximum slope within a lot shall not exceed 4 foot horizontal to 1 foot vertical (25.0%). Slopes 3 foot horizontal to 1 foot vertical are only allowed in unmaintained areas such as wetland buffers or approved by the City Engineer due to site constraints.
2. Primary and secondary septic tank locations shall be designed on undisturbed native soil.
3. Lots shall provide a concrete apron in front of the garage in accordance with the City Standard Details.
4. Retaining walls over four (4) feet in height shall be designed by a Professional Engineer licensed in the state of Minnesota.
5. Low opening constructed elevation must be a minimum of two (2) feet above the 100-year flood elevation (HWL) established by the approved plans and City Engineer.

4 Miscellaneous City Requirements

1. It is the Developer's responsibility to make arrangements for receiving water from public or private sources, secure necessary permits and pay regular charges. City water for construction use may be purchased from the City; coordinate with Public Works (Public Works facility: 13700 Zanzibar Lane North; Dayton, MN 55327). Under no circumstances shall hydrants be used to supply water without prior coordination with Public Works to acquire a meter with backflow preventor.
2. Contractors shall not operate existing valves or hydrants.
3. Utilities shall be tested in accordance with the City Standard Detail Plates.
4. Disposal of any test water into the City sanitary sewer system is not permitted.
5. A plan for the routing of construction traffic shall be submitted to the City Engineer for acceptance. If alternative major streets are available, the use of local City streets is prohibited. City streets that are utilized for access or egress to the construction site shall be kept free of dirt and other debris resulting from said construction. The Developer shall maintain adequate control of dust.
6. It is the responsibility of the Developer to protect and leave undisturbed those markers or monuments set for the subdivision of land.
7. Material or labor supplied by the contractor or Developer that is rejected by the City Engineer as defective or unsuitable shall be promptly removed, disposed of off the job site, and replaced with suitable material. The rejected work shall be done anew to the specifications and acceptance of the City Engineer.
8. The Developer and/or their contractor shall immediately repair or replace at their own expense any defective workmanship or material of which they are notified during the construction period, or within the maintenance period after the date of final acceptance of the work, regardless of the acceptance of the work.
9. The standard ten (10) foot drainage and utility easement adjacent to the street right-of-way shall be cleared, grubbed, and graded for the placement of private utilities. The only exception will be any hardwood trees or others that the City authorizes to remain standing.
10. A permit is required to work in the City's public right-of-way. Contact the City's Public Works to apply for the permit or for any questions at (763) 427-3224. New construction for sanitary sewer,

water, storm sewer and street work would be exempt in most situations. Small utilities installation, irrigation installation, etc. are required to obtain a permit. A permit is required for work within Hennepin County right-of-way and shall be in accordance with Hennepin County requirements.

11. The City Public Works shall be notified a minimum of two (2) business days prior to commencing any work. Contractors are subject to being shut down and/or having work rejected if proper notification is not given to the City.
12. Work shall not commence before 7:00 a.m. nor extend beyond 7:00 p.m. Monday through Friday. On Saturdays, work hours are from 8:00 a.m. to 4:00 p.m. No work is permitted on Sundays or Holidays unless authorized by the City. Existing roadways shall not be restricted between 7:00 a.m. & 9:00 a.m. and 3:00 p.m. & 6:00 p.m. unless accepted by the City Engineer. The definition of "Work" also includes the starting of equipment and the delivery of materials to the job site.
13. Streetlights shall be installed at all intersections and at other locations, as required by the City Engineer.
14. If construction requires dewatering, a plan must be submitted to the City and other applicable agencies for review prior to starting dewatering work.
15. WCA Regulatory Procedure
    a. General
        i. The City of Dayton is the LGU
        ii. Projects may require one or more WCA approval
        iii. Minnesota DNR and USACE may also require permits
    b. Pre-Application Meeting
        i. Encouraged, but not required
        ii. May be helpful to introduce a project and identify WCA related issues early in the process.
    c. Required for a complete City WCA Application
        i. Joint Application Form (JPA) and Supporting Documentation
        ii. City of Dayton Wetland Application Form
        iii. City Fee and Escrow
    d. WCA Application Types
        i. Wetland Delineation
            1. Should be completed prior to concept plan development.
            2. Required to determine extent of wetlands on a project site.
            3. Results shall guide site layout to aid in wetland impact avoidance and minimizing of impacts.
            4. Delineations must be conducted during the growing season (approximately April 15th to October 31st).
            5. City will not review a delineation outside the growing season.
            6. Minimum time for review and approval: 30 days.
        ii. Replacement Plan
            1. Required for projects with wetland impacts that require mitigation.
            2. Requires an approved wetland delineation.
            3. Alternatives that avoid all wetland impacts, as well as an avoidance and minimization analysis are required elements of the replacement plan application.
            4. Wetland mitigation is required and the responsibility of the applicant.
            5. Minimum time for review and approval: 45 days.
            6. Replacement Plan shall be submitted prior to or with the Final Plat submittal.
        iii. Exemptions
            1. For wetland impacts that are exempt from mitigation.
                a. Applies for certain activities (drainage activities, utilities, de minimis).

2. Minimum time for review and approval: 20 days.

iv. No-Loss
    1. For projects not requiring mitigation
        a. Incidental (manmade) wetlands not regulated under WCA
        b. Temporary impacts
        c. Sediment removal
    2. Minimum time for review and approval: 20 days.

5 City Deliverables

The following items shall be forwarded to the City Engineer in a timely manner. The City may request additional items to those listed below.

Provide a submittal form/letter including date on which the information is submitted.

Table 4. Pre-Construction/Construction City Deliverables

Pre-Construction/Construction			
Item	**Paper Copy**	**PDF Copy**	**Other Format**
Geotechnical Report	1 copy	1 copy	
Accepted Construction Plans and Specifications	2 copies (22x34)	1 copy	AutoCAD .dwg file*
Stormwater Pollution Prevention Plan (SWPPP)	1 copy	1 copy	
Final Plat	1 copy (22x34)	1 copy	
SWMP documenting Stormwater Design Calculations and Report	1 copy	1 copy	Electronic models, spreadsheets or other calculations
Retaining Wall Design	1 copy	1 copy	
Changes or modifications to plans or specifications	1 copy	1 copy	
List of subcontractors and material suppliers	1 copy	1 copy	
Site safety representative contact	1 copy	1 copy	
After hours emergency contact	1 copy	1 copy	
Shop drawings and list of materials, tests of materials	1 copy	1 copy	

*If requested

Table 5. Post-Construction City Deliverables

Post-Construction			
Item	**Paper Copy**	**PDF Copy**	**Other Format**
Testing results	1 copy	1 copy	Televising
Record Plans	2 copies (22x34)	1 copy	Files per Appendix B

6 Final Completion/Acknowledgement

Upon completion of all improvements required on both the public and private portions of the project, the City Engineering Department will make final inspections of work. This includes a final inspection of the improvements and acceptance by the City. Acceptance of said work shall be documented by issuance of Certificate of Final Acceptance form (see Appendix E) provided by the City.

The Developer shall warrant all improvements required to be constructed by the Developer's contractor against poor material and faulty workmanship.

The warranty period for streets is one (1) year. The warranty period for underground utilities is two (2) years. The warranty for all landscaping and plantings is one (1) year. The warranty period for all infrastructure and landscaping/plantings shall commence upon issuance of the Certificate of Final Acceptance form. The Developer shall post maintenance bonds or other surety acceptable to the City to secure the warranties. The City shall retain ten percent (10%) of the security posted by the Developer until the bonds or other acceptable surety are furnished to the City or until the warranty period has been completed, whichever first occurs. The retainage may be used to pay for warranty work.

Appendix A Land Disturbance and Erosion and Sediment Control Ordinance

CHAPTER 151: LAND DISTURBANCE AND EROSION AND SEDIMENT CONTROL

Section

§ 151.01 INTENT.

The intent of this chapter is to promote the health, safety and general welfare of the citizens of the city by requiring storm water management practices for construction activity.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.02 STATUTORY AUTHORIZATION.

This chapter is adopted pursuant to M.S.§ 462.351 (for cities and towns), as it may be amended from time to time, and as required by the latest version of the Minnesota Pollution Control Agency Construction Stormwater General Permit (MN RI 00001).

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.03 FINDINGS.

The city hereby finds that uncontrolled land disturbing activity at construction sites are subject to soil erosion and other pollutants which enter into receiving water bodies adversely affecting the public health, safety and general welfare by impacting water quality, creating nuisances, impairing other beneficial uses of environmental resources and hindering the ability of the city to provide adequate water, sewage, flood control and other community services.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.04 PURPOSE.

The purpose of this chapter is to promote, preserve and enhance the natural resources within the city and protect them from adverse effects occasioned by poorly sited development or incompatible activities by regulating land disturbing activities that would have an adverse and potentially irreversible impact on water quality and environmentally sensitive land; by minimizing conflicts and encouraging proper installation and maintenance of best management practices (BMPs) for land disturbing activities; and by requiring detailed review standards and procedures for land disturbing activities proposed for such areas, thereby achieving a balance between development, redevelopment and protection of water quality and natural areas.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.05 DEFINITIONS.

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning. When inconsistent with the context, words used in the present tense include the future tense, words in the plural number include the singular number and words in the singular number include the plural number. The word “shall” is always mandatory and not merely directive.

APPLICANT. Any person or persons, firm, or governmental agency or other institution that signs a permit application submitted to the city.

BEST MANAGEMENT PRACTICE (BMP). Erosion prevention and sediment control, and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing the degradation of surface water, including avoidance of impacts, construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, pollution prevention through good housekeeping, and other management practices published by state or designated area-wide planning agencies.

DEWATERING. The removal of surface or ground water to dry and/or solidify a construction site to enable construction activity. ***DEWATERING*** may require a Minnesota Department of Natural Resources water appropriation permit and, if dewatering is contaminated, a discharge of such water may require an individual MPCA NPDES/SDS permit.

DISCHARGE. The release, conveyance, channeling, runoff or drainage of storm water, including snowmelt, from a construction site.

EROSION. The wearing down or washing away of the soil and land surface by the action of wind, water, gravity, ice or a combination thereof.

EXPOSED SOIL AREAS. All areas of the construction site where the vegetation (trees, shrubs, brush, grasses and the like) or impervious surface has been removed, thus rendering the soil more prone to erosion. This includes topsoil stockpile areas, borrow areas and disposal areas within the construction site. It does not include stockpiles or surcharge areas of gravel, concrete or bituminous. Once soil is exposed, it is considered ***EXPOSED SOIL*** until it meets the definition of "final stabilization".

FINAL STABILIZATION. All soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover of at least 70% of the expected final vegetative growth density or other permanent cover has been established over the entire pervious surfaces.

ISSUING AUTHORITY. A city employee or authorized designee who has the authority over application reviews, inspection, determinations of compliance, enforcement actions and other matters, as it relates to this chapter.

LAND DISTURBING ACTIVITY. Any disturbance to the land that results in a change of the existing soil cover, both vegetative and nonvegetative, creates bare soil, alters hydrology, or may cause erosion or sedimentation. Such activities include, but are not limited to, clearing, stripping, grubbing, excavating, filling, grading, logging, storing of materials, and the construction of any structure.

PERENNIAL VEGETATION. Grass or other appropriate natural growing vegetation that provides substantial land cover, erosion protection and soil stability and that is capable of sustained and healthy growth over multiple years. Annual grasses that do not regenerate after winter, ornamental plants or shrubs that do not offer effective erosion and sediment protection shall not be considered ***PERENNIAL VEGETATION***.

PERMANENT COVER. Surface types that will prevent soil failure under erosive conditions. Examples include: concrete, perennial vegetation, or other landscaped material that will permanently arrest soil erosion. Permittees must establish a uniform perennial vegetative cover (i.e., evenly distributed, without large bare areas) with a density of 70% of the native background vegetative cover on all areas not covered by permanent structures, or equivalent permanent stabilization measures. ***PERMANENT COVER*** does not include temporary BMPs such as wood fiber blanket, mulch, and rolled erosion control products.

PERMIT. Written warrant or license granted for construction, subdivision approval, or to allow land disturbing activities.

PERMIT HOLDER. Person or persons, firm, or governmental agency or other institution that is issued a permit and is responsible for compliance with the terms and conditions of this chapter.

PERSON. Any individual, firm, corporation, partnership, franchise, association or governmental entity.

PUBLIC WATERS. All water basins and water courses, as defined in M.S. § 103G.005, Subd. 15, as it may be amended from time to time.

SEDIMENT. Solid matter carried by water, sewage or other liquids.

STORM SEWER SYSTEM. Any conveyance or system of conveyances for storm water, including road with drainage systems, streets, catch basins, curbs, gutters, ditches, man-made channels, ponds, or storm drains.

STORM WATER. Water that is generated by rainfall or snowmelt which causes runoff.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP). A plan for stormwater discharge that includes all required content under § 151.07 that describes the erosion prevention, sediment control and waste control BMPs.

STRUCTURE. Anything manufactured, constructed or erected which is normally attached to or positioned on land, including portable structures, earthen structures, roads, parking lots, paved storage areas, fences and retaining walls.

WATERS OF THE STATE. As defined in M.S. § 115.01, Subd. 22, the term ***WATERS OF THE STATE*** means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.

WETLANDS. As defined in Minn. Rules 7050.0186, Subd. 1a.B, the term ***WETLANDS*** means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal

circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. ***WETLANDS*** generally include swamps, marshes, bogs, and similar areas. Constructed wetlands designed for wastewater treatment are not waters of the state. ***WETLANDS*** must have the following attributes:

(1) A predominance of hydric soils;

(2) Inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and

(3) Under normal circumstances support a prevalence of such vegetation.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.06 SCOPE AND EFFECT.

(A) *Applicability.* Every applicant for a land disturbance permit, grading permit, building permit, subdivision approval or other permit to allow land disturbing activities where the area to be disturbed is greater than or equal to one acre or part of a larger common plan or development greater or equal to one acre must submit a storm water pollution prevention plan (SWPPP) to the issuing authority. No land disturbance permit, grading permit, building permit, subdivision approval or other permit to allow land disturbing activities shall be issued until approval of the SWPPP or a waiver of the approval requirement has been obtained in strict conformance with the provisions of this chapter. The provisions of division (B) below apply to all land, public or private.

(B) *Exemptions.* The provisions of this chapter do not apply to:

(1) Any part of a subdivision if a plat for the subdivision has been approved by the City Council on or before the effective date of this chapter;

(2) A lot for which a building permit has been approved on or before the effective date of this chapter;

(3) Emergency work to protect life, limb or property, provided that erosion control measures, including any necessary remedial action, are implemented as soon as possible; or

(4) Tilling, planting or harvesting of agricultural, horticultural or silvicultural (forestry) crops.

(C) If the land disturbance activity threatens or impedes the ability of the city to meet its own permit requirements under the National Pollutant Discharge Elimination System (NPDES) program, the issuing authority may terminate the exemption and require the applicant to obtain a land disturbance permit in full compliance with this code.

(D) *Responsible person(s).* The responsible person(s) are the owner of the property upon which a land disturbing activity takes place and any person(s) performing a land disturbing activity. When a permit is issued, the owner is responsible for all land disturbing activities from permit issuance to closure, unless the issuing authority approves a transfer or responsibility to a new owner when the land is sold.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.07 LAND DISTURBANCE PERMIT SUBMITTAL PROCEDURES.

(A) *Land disturbance permit application.* A land disturbance permit shall be submitted to the city on a city-approved application and shall conform to the standards set forth in this chapter. The issuing authority shall review the application and submitted documents to determine if the application is complete. Incomplete applications will be returned to the applicant, the issuing authority shall advise the applicant which elements are not in compliance.

(B) *Storm water pollution prevention plan.* An SWPPP shall be a required component of the landdisturbance permit. At a minimum, the SWPPP shall contain the following information:

(1) *Project information.*

(a) A project description, including the nature and purpose of the land disturbing activity and the amount of grading, utilities, and building construction involved;

(b) A project narrative describing the timing for installation of all erosion prevention and sediment control BMPs;

(c) Site location and property address;

(d) Property owner's name, address and telephone number;

(e) The name and address of the applicant;

(f) Names, addresses, telephone numbers and responsibilities of all contractors, subcontractors and other persons who will engage in the land disturbing activities;

(g) Name, address and telephone number of a single individual responsible for overseeing implementation of the erosion control plan on site;

(h) Number of acres to be disturbed, number of acres of impervious surface for pre and post construction;

(i) Phasing of construction, including time frames and schedules; and

(j) Date SWPPP was prepared and name of preparer.

(2) *Existing site map.* A map of existing site conditions showing the site and immediately adjacent areas, including:

(a) Location of the tract by an insert map at a scale sufficient to clearly identify the location of the property and giving such information as the names and numbers of adjoining roads, railroads, utilities, subdivision, towns and districts or other landmarks;

(b) Existing topography with a contour interval appropriate to the topography of the land, but in no case having a contour interval greater than two feet;

(c) A delineation of all receiving waterbodies, including streams, rivers, public waters and wetlands located on, immediately adjacent or to which the site discharges, including any designations for special or impaired waters. The classification given to the water body or wetland shall be consistent with the State Department of Natural Resources, the State Pollution Control Agency and/or the United States Army Corps of Engineers;

(d) Location and dimensions of existing storm water drainage systems and natural drainage patterns on and immediately adjacent to the site delineating in which direction and at what rate storm water is conveyed from the site, identifying the receiving stream, river, public water or wetland, and setting forth those areas of the unaltered site where storm water collects;

(e) A description of the soils of the site, including a map indicating soil types of areas to be disturbed as well as a soil report containing information on the suitability of the soils for the type of development proposed and for the type of sewage disposal proposed and describing any remedial steps to be taken by the applicant to render the soils suitable;

(f) Existing vegetative cover and clearly delineating any vegetation proposed for removal;

(g) Locations of existing buffer strips; and

(h) One-hundred-year floodplain, flood fringes and floodways.

(3) *Site construction plan.* A site construction plan including:

(a) Schedule of anticipated starting and completion date of each land disturbing activity, including the timing of installation of construction site erosion and sediment control measures;

(b) Locations and dimensions of all proposed land disturbing activities;

(c) Locations and dimensions of all temporary stockpiles;

(d) Description of all BMPs for the site and the sequence and schedule of when BMPs will be implemented;

(e) Location and type of all temporary and permanent erosion prevention and sediment control BMPs;

(f) Estimated quantities for all erosion prevention and sediment control BMPs;

(g) Standard details and/or specifications for all BMPs;

(h) Identify temporary sediment basins, if more than ten acres are disturbed and drain to a single point of discharge;

(i) Calculations used for the design of temporary sediment basins;

(j) Dewatering practices;

(k) Procedures used to establish additional temporary BMPs as necessary for the site conditions during construction;

(l) Any vehicular access locations for the site;

(m) Locations of areas to be phased to minimize duration of exposed soils;

(n) Final stabilization plan for each phase;

(o) Methods used for permanent cover of all exposed soil areas;

(p) Areas not to be disturbed on site;

(q) Identify required buffer zone areas;

(r) A description of construction and waste materials to be stored on-site, and a description of controls and storage practices to minimize exposure of the materials to storm water; and

(s) A description of spill prevention controls.

(4) *Plan of final site conditions.* A plan of final site conditions on the same scale as the existing site map showing the site changes including:

(a) Finished grading shown at contours at the same interval as provided above or as required to clearly indicate the relationship of proposed changes to existing topography and remaining features;

(b) A landscape plan, drawn to an appropriate scale, including dimensions and distances and the location, type, size

and description of all proposed landscape materials which will be added to the site as part of the development;

(c) A drainage plan of the developed site delineating in which direction and at what rate storm water will be conveyed from the site and setting forth the areas of the site where storm water will be allowed to collect;

(d) The proposed size, alignments and intended use of any structures to be erected on the site;

(e) A clear delineation and tabulation of all areas which shall be paved or surfaced, including a description of the surfacing material to be used; and

(f) Any other information pertinent to the project which, in the opinion of the applicant, is necessary for the review of the project.

(5) *MPCA permit.* Copy of MPCA permit for discharging storm water from construction activity (MN R1 00001).

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.08 STORM WATER POLLUTION PREVENTION PLAN REVIEW PROCESS.

(A) *Process.* SWPPPs meeting the requirements of §151.07 of this chapter and minimum BMP requirements of §151.09 of this chapter will be reviewed by the issuing authority which may approve, approve with conditions or deny the SWPPP. If the SWPPP is part of a large subdivision, the city may require the SWPPP be reviewed by the Planning Commission. The Planning Commission may approve, approve with conditions or deny the SWPPP. Following Planning Commission action, the SWPPP shall be submitted to the City Council at its next available meeting. City Council action on the SWPPP must be accomplished within 120 days following the date the application for approval is filed with the city.

(B) *Duration.* Approval of an SWPPP submitted under the provisions of this chapter shall expire one year after the date of approval unless construction has commenced in accordance with the plan. However, if prior to the expiration of the approval, the applicant makes a written request to the city for an extension of time to commence construction setting forth the reason for the requested extension, the Planning Department may grant one extension of not greater than one single year. Receipt of any request for an extension shall be acknowledged by the city within 15 days. The city shall make a decision on the extension within 30 days of receipt.

(C) *Condition.* An SWPPP may be approved subject to compliance with conditions reasonable and necessary to ensure that the requirements contained in this chapter are met. Such conditions may, among other matters, limit the size, kind or character of the proposed development, require replacement of vegetation, establish required monitoring procedures, stage the work over time or require alteration of the site design to ensure buffering.

(D) *Financial security.*

(1) Prior to approval of any SWPPP, the applicant shall submit a financial security in the amount specified by the current city fee and security structure. The securities shall guarantee completion and compliance with conditions within a specific time, which time may be extended in accordance with division (B) above.

(2) The adequacy, conditions and acceptability of any financial security shall be determined by the City Council or any official of the city as may be designated by resolution of the City Council.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.09 MINIMUM CONSTRUCTION SITE BEST MANAGEMENT PRACTICES.

(A) *General.* No SWPPP which fails to meet the standards contained in this section shall be approved by the City Council or issuing authority.

(B) *Site dewatering.* Waters related to dewatering or basin draining must be discharged to a temporary or permanent sediment basin on the project site unless infeasible. If discharging to a sedimentation basin is infeasible, it must be treated with appropriate BMPs such that the discharge does not adversely affect the surface water or downstream properties. All discharge from dewatering activities must be done in a manner that does not cause erosion, scour, or flooding.

(C) *Construction site waste.*

(1) *Solid waste.* Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.

(2) *Hazardous materials.* Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spill, leaks or other discharge. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with MPCA regulations.

(3) *Liquid waste.* All other non-storm water discharges (concrete truck washout, vehicle washing, maintenance spills and the like) conducted during the construction activity shall be managed and disposed of in a way that will prevent discharge to the municipal storm sewer, wetlands, natural drainageways or waters of the state.

(D) *Erosion prevention practices.*

(1) Channelized runoff from adjacent areas passing through the site shall be diverted around disturbed areas, if practical. Otherwise, the channel shall be protected as necessary to prevent erosion. Sheet flow runoff from adjacent areas

shall also be diverted around disturbed areas, if practical. Diverted runoff shall be conveyed in a manner that will not cause erosion, scour or flooding.

(2) All activities on the site shall be conducted in a logical sequence to minimize the area of bare soil exposed at any one time.

(3) Stabilize exposed soils, including stockpiles, whenever it is known that land disturbing activity will cease for 14 days or more. The stabilization must be initiated immediately and completed within 14 days.

(4) Stockpiles must be located outside of buffers and storm water conveyances and have effective sediment controls in place to prevent discharge. For soil stockpiles greater than ten cubic yards, the toe of the pile must be more than 25 feet from a road, drainage channel, or storm water inlet. If such stockpiles will be left for 14 days, they shall be stabilized by mulching, vegetative cover, tarps or other means. If left for less than 14 days, stockpiles shall be controlled by placing effective sediment controls around the base of the pile. In-street utility repair or construction storage piles must be covered with tarps or suitable alternative control and storm drain inlets must be protected with an appropriate filtering barrier.

(E) *Sediment control practices.*

(1) *Perimeter controls.* Establish sediment control BMPs on all downgradient perimeters of the site and downgradient areas of the site that drain to any surface water, including curb and gutter systems.

(2) *Inlet protection.* All storm drain inlets shall be protected during construction until final stabilization has been established or until approval from the city.

(3) *Vehicle tracking.* Vehicle tracking of sediment from the site must be minimized by BMPs such as rock construction entrances, track pads, wash racks, or equivalent systems. Vehicle tracking of sediment onto paved surfaces must be removed by street sweeping as needed to prevent discharge of sediment laden water from entering the city storm sewer system.

(4) *Buffer.* Maintain a 50-foot natural buffer or, if a buffer is infeasible on the site, provide redundant (double) perimeter sediment controls when a surface water is located within 50 feet of the land disturbances and storm water flows to the surface water. Redundant perimeter controls must be at least five feet apart unless limited by lack of available space.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.10 INSPECTION AND MAINTENANCE.

(A) *Initial inspection.* The permit holder shall notify the issuing authority when initial erosion and sediment control measures are installed in accordance with the SWPPP. No land disturbance activities shall begin prior to approval from the issuing authority that all pre-construction erosion and sediment control measures are correctly installed per the approved SWPPP.

(B) *Routine inspection.* The permit holder shall ensure the entire construction site is inspected on a regular schedule and that BMPs on the site are maintained and functioning. The permit holder shall inspect the construction site at least once every seven days during active construction and within 24 hours after a rainfall event greater than one-half inch in 24 hours. A written record must be kept of each inspection. The inspection frequency may be reduced to once per month on areas of the site with permanent cover. If there is no active construction at the site and permanent cover is in place, monthly inspections may cease after 12 months. Inspections may cease during frozen conditions when construction has stopped but must resume within 24 hours of runoff or if construction begins again. Any deficiencies shall be noted in a report and shall be signed by the person performing the inspection.

(1) Applicants must record all inspections and maintenance activities within 24 hours of being conducted and retain records with the SWPPP. The inspection report shall include the following minimum information:

(a) Date and time of inspection;

(b) Name of persons conducting inspection;

(c) Findings of inspections, including specific location where corrective actions are needed;

(d) Corrective actions taken (including dates, times, and party completing maintenance activities);

(e) Date of all rainfall events greater than one-half inch in 24 hours;

(f) Any observed discharges during the inspection, with photographs, locations, and a description of the discharge; and

(g) Any amendments to the SWPPP proposed as a result of the inspection.

(2) The issuing authority may also perform inspections of the site to verify compliance with the SWPPP. Should it be found that the control methods are ineffective or not being maintained properly, the issuing authority may take enforcement actions described within this chapter.

(C) *Final inspection.* Once the site is stabilized a final inspection shall be requested. The site shall be considered stabilized when all the following conditions are met:

(1) All soil disturbing activities have been completed;

(2) Perennial vegetation or permanent cover, cover all areas that have been disturbed. Perennial vegetation shall be considered established and completed for stabilization when it has established a healthy and growing stand with a uniform cover of at least 70% of the expected final vegetative growth density;

(3) The permanent storm water management system has been constructed and is operational;

(4) Sediment has been removed from basins, ditches and other conveyance systems; and

(5) Temporary BMPs have been removed.

(D) *Maintenance.* The permit holder must inspect and maintain all erosion and sediment control BMPs to ensure integrity and effectiveness. The permit holder must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery. Permit holders may take additional time if field conditions prevent access to the area.

(Ord. 2020-09, passed 4-14-2020)

§ 151.11 COMPLETION OF WORK.

Work will be considered complete when all exposed soil areas have undergone final stabilization and have permanent cover, as defined in § 151.05 of this chapter, is constructed to finish grade, is in conformance with all permit conditions of approval to the satisfaction of the city, and has passed a final inspection. The applicant or representative shall notify the issuing authority when the land disturbing operations are ready for final inspection. Final approval shall not be given until all work, including installation of all drainage facilities and their protective devices, and all erosion control measures, have been completed and final stabilization has occurred in accordance with this chapter.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.12 ENFORCEMENT PROCEDURES.

The issuing authority may also perform inspections of the site to verify compliance with the SWPPP and this chapter. Should it be found that the site control methods are ineffective or not being maintained properly, the issuing authority may proceed with any or all of the following enforcement actions:

(A) *Right of entry.* The applicant shall promptly allow issuing authority, upon presentation of credentials to:

(1) Enter upon the permitted site for the purpose of obtaining information, examination of records, conducting investigations, inspections, surveys, or correcting deficiencies in erosion and sediment control;

(2) Bring such equipment upon the permitted site as is necessary to conduct such surveys and investigations;

(3) Examine and copy any books, papers, records or memoranda pertaining to activities or records required to be kept under the terms and conditions of this permitted site;

(4) Inspect the storm water pollution control measures; and

(5) Sample and monitor any items or activities pertaining to storm water pollution; and any temporary or permanent obstruction to the safe and easy access of such an inspection shall be promptly removed upon the inspector's request. The cost of providing such access shall be borne by the applicant.

(B) *Warning letter.* If, upon inspection by the issuing authority, the applicant fails to implement the erosion and sediment control practices outlined in the approved SWPPP or minimum BMP standards outlined in this chapter, the issuing authority will notify the applicant with a letter of warning which outlines the issues of non-compliance and a timeline for completion of any work to bring the site into compliance.

(C) *Refusal of inspection.* Request for an inspection of any permitted activity may be denied if it is found that the erosion and sediment control measures have not been implemented or are found to be ineffective or are not maintained. No further inspections will be performed until the erosion and sediment control measures have been implemented or violations have been abated.

(D) *Denial of permit issuance.* The issuing authority is authorized to deny the issuance of any permit to the permit holder or other responsible persons if it is found that the erosion and sediment control measures have not been implemented or are found be to ineffective or are not maintained. No permits will be issued until the erosion and sediment control measures have been implemented or violations have been abated.

(E) *Stop work order.* The issuing authority is authorized to issue a stop work order for any or all construction activity within the established boundary of the permit. The stop work order shall be in writing and shall be given to the owner of the property involved, or the owner's agent or the person doing the work. In addition, notice of the stop work order shall be posted on the site. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the work will be permitted to resume. Any person who shall continue to work after having been served a stop work order, except such work as directed by the city to perform to remove a violation or unsafe condition, is guilty of a public offense and may be subject to penalties as prescribed herein.

(F) *Abatement.* Should any person fail to comply with the provisions of this chapter, the issuing authority is authorized to correct or abate such violation. This action can be taken in lieu of, or in conjunction with, any enforcement actions set forth in

this chapter.

(G) *Notice of violation.* The issuing authority is authorized to serve a notice of violation or order on any person found to be doing work in violation of the provision of this chapter. Such order shall direct the discontinuance of the illegal action or condition and order the abatement of the violation by the responsible person.

(H) *Action against the financial security.* The issuing authority may act against the financial security, if any of the conditions listed below exist. The issuing authority shall use funds from this security to finance any corrective or remedial work undertaken by the issuing authority or a contractor under contract to the city and to reimburse the city for all direct cost incurred in the process of remedial work including, but not limited to, staff time and attorney's fees:

(1) The applicant ceases land disturbing activities and/or filling and abandons the work site prior to completion of the city-approved SWPPP;

(2) The applicant fails to conform to any issuing authority approved grading plan and/or the SWPPP, or related supplementary instructions;

(3) The techniques utilized under the SWPPP fail within one year of installation;

(4) The applicant fails to reimburse the city for corrective action taken; and

(5) Emergency action under division (I) below.

(I) *Emergency action.* If circumstances exist such that non-compliance with this chapter poses animmediate danger to the public health, safety and welfare, as determined by the issuing authority, the issuing authority may take emergency preventative action. The issuing authority shall also take every reasonable action possible to contact and direct the applicant to take any necessary action. Any cost to the city may be recovered from the applicant's financial security.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

§ 151.99 PENALTY.

Any person, firm or corporation violating any provision of this chapter shall be fined not less than $5, nor more than $500, for each offense and a separate offense shall be deemed committed on each day during or on which a violation occurs or continues.

(Ord. 2005-04, passed 3-22-2005; Ord. 2020-09, passed 4-14-2020)

Appendix B Record Plan Requirements

As-Built/Record Plans are a set of plans showing what was constructed in the field. It is a way of verifying the plan was constructed according to the design and a way to show any changes that may have occurred in the field.

The following list includes information that will need to be provided on the record plans. This list is not necessarily all inclusive but should be used as a guide/checklist to verify items of interest are clearly shown on the plans.

B.1 General

1. All As-builts shall include the following:
    a. Contractor
    b. As-built in the appropriate area on the plan (revision block, stamp, etc.)
    c. As-built date
    d. Appropriate notes. Examples include:
        i. All hydrants are tied to hydrant gate valve with joint restraints. All hydrant gate valves are tied back to watermain tee with joint restraints.
        ii. All sewer services are located three (3) feet downstream of water services if sewer and water are in the same trench.
        iii. All water services are one (1) inch HDPE and all sewer services are four (4) inch PVC, unless otherwise specified.
        iv. All hydrant benchmarks are to top nut of hydrant.
        v. All ties and distances are to the center of surface structure.
2. Incorrect information (elevations, distances, grades, etc.) must be updated with verified information. This should be shown by using a strikethrough font for the original (design) information and an italics font for the verified information, with it clearly indicated to what design value each verified value pertains.
3. Elevations of all structures (top of castings and all inverts, weirs, etc.) and jack-bored castings.
4. Top nut of all new or relocated/adjusted existing hydrants shall be shown on the record plan sheets. Top nut elevations shall be provided on every plan sheet (grading, watermain, sanitary sewer, storm, and street plan sheets).
5. If an as-built vertical dimension deviates from the proposed plan vertical dimension by less than or equal to 0.1 foot, no revision will be required.
6. As-built horizontal dimensions shall be revised if deviating from proposed dimensions by more than one (1) foot.
7. If revised horizontal or vertical elevations are required, recalculate and show the revised percent of grade.
8. Any significant changes in utility alignment or grade should be shown graphically in plan or profile view as appropriate
9. All structures shall be identified as type, size (diameter), etc. on the plan or profile view or in a tabulated schedule.

B.2 Grading

1. Any significant changes in grading should be shown graphically.

2. Note any significant known changes of structure elevations (basement floor, low opening, etc.), especially for lots adjacent wetlands or ponds.
3. Remove existing contours, gray back the design contours and show contours based on as-built information. Provide sufficient contour labeling to identify elevations clearly.

B.3 Sanitary Sewer

1. Verified rim and invert elevations for all sanitary sewer structures.
2. The size, type, and invert elevations of all sanitary sewer services shall be shown on the plans. If risers are installed, the height of each shall be indicated on the plans; also drawn on the profile, along with the height of each riser. Locations of the services will be noted on the plans with STA preceding the stationing. Wye stations and manhole distances will be taken from the TV report submitted.
3. The ends of all sewer services shall be tied with at least two (2) ties using the following priority: hydrants, manholes, catch basins, served structure with address noted, neighboring structures with address noted, buildings or other permanent structures, power poles, back of curb, utility pedestals.
4. Force mains should be recorded by tying all major bend locations.
5. Televising video and report required for all sanitary mains installed or repaired as part of the project. Include title of video/report on plans if known at time of submittal.
6. Label locations of tracer wire connection points.

B.4 Watermain

1. All water main gate/butterfly valves shall be tied with two (2) ties using the following priority: Hydrants, manholes, catch basins, building corners, power poles, back of curb, light poles, utility pedestals.
2. The ends of all water services (or curb stops) shall be tied with at least two (2) ties using the following priority: hydrants, manholes, catch basins, served structure with address noted, neighboring structures with address noted, buildings or other permanent structures, power poles, back of curb, utility pedestals.
3. Verified elevations on all top nuts of hydrants installed.
4. Any watermain valves added, deleted or installed at a location significantly different than where originally depicted.
5. Water main fitting stationing will be shown on the profile view of the plan sheets.
6. Any watermain offsets added and/or verification of proposed offsets installed.

B.5 Storm Sewer

1. Verified rim and invert elevations for all structures and end sections. This includes all pipes inverts, sumps, weirs and weir notches, orifices, etc.
2. Ties to all storm service stub locations (minimum two ties).
3. Key features of stormwater basins including: pond, top edges of access of bench, edges of aquatic bench, EOF elevations, drainage swales, or other.
4. Pond volumes, based on proposed NWL, for each constructed pond. Sufficient survey data to be provided such these volumes can be verified. Plans shall indicate spot elevations at one (1) per 100 square feet from the bottom of the pond to a minimum of two (2) feet above the 100-yr HWL. Overlay spot elevations of previously accepted master grading plan. A point file (.csv format preferred) containing survey points for each pond area is to be submitted with the record plans. The appropriate density of shots (bottom, toe, top and bottom of bench, other grade breaks and

angle points) should be taken to allow a reasonable representation of the dead storage volume for each pond when information is used to create a surface model in CAD.
5. Verified elevations/information should be shown at all locations depicted on the plans (plan view, profile, insets, details, schedules, etc.).
6. Televising video and report required for all storm sewer and draintile installed or repaired as part of the project. Include title of video/report on plans if known at time of submittal.

B.6 Streets

1. Any significant alignment or grade changes.
2. Drain tile locations, connections, cleanouts, etc. shall be indicated on the plans.
3. Provide a minimum of two (2) ties to all draintile cleanouts.
4. Changes in street widths, pavement section (including local subgrade corrections, over-excavations, geotextile fabrics, etc.), curb type, etc.

B.7 Landscaping

1. Any changes in count of trees/plantings or significant changes in location.

B.8 Submittal

1. Two (2) complete sets of full size plans (bound).
2. One (1) electronic (pdf) complete set of plans.
3. Televising video and report for sanitary sewer included in the project.
4. Televising video and report for storm sewer included in the project.
5. Televising video and report for draintile included in the project.
6. Submittal form/letter including date on which information submitted.
7. Survey information:
    a. .csv (PNEZD) file or other acceptable format
    b. Hennepin County coordinate system
    c. Provide X,Y data for all:
        i. Watermain valves
        ii. Water shut offs (curb stops)
        iii. Street and traffic signs
        iv. Boulevard trees
        v. Draintile cleanouts
        vi. Sump connection cleanouts
        vii. Light poles
        viii. Small utilities (peds, transformers, etc.)
    d. Provide X,Y,Z data for:
        i. Center of casting for all sanitary manholes and storm structures (MH, CB (including plastic yard drains), OCS, FES, etc.)
        ii. Top nuts for all hydrants
        iii. Stormwater pond info (see item under Storm Sewer heading for more detail)
    e. Clearly identify feature pertaining to shot in point description. If abbreviated point codes are used, submit list defining codes with full descriptions.

Appendix C Stormwater Facilities Maintenance Agreement Template

STORMWATER FACILITIES MANAGEMENT AGREEMENT

THIS AGREEMENT is made and entered into as of the _____ day of _____, 20__, by and between [Property Owner Name]_____, a [limited partnership, etc.]_____ ("Developer") and the **CITY OF DAYTON**, a Minnesota municipal corporation ("City").

WITNESSETH:

WHEREAS, the Developer owns certain real property located in the City of Dayton, County of Hennepin, State of Minnesota, legally described on Exhibit A attached hereto (the "Property");

WHEREAS, the Elm Creek Watershed Management Commission requires permanent provisions for handling stormwater runoff, including provisions for operation and maintenance of all stormwater runoff facilities, rain gardens and ponds, and such provisions are to be set forth in an agreement to be recorded in the real estate records;

WHEREAS, the Developer intends to construct within the Property certain stormwater improvements (the "Stormwater Improvements") as illustrated on the attached Exhibit B for the benefit of the Property and certain adjacent properties; and

WHEREAS, the City and the Developer intend to comply with certain conditions, including entering into this maintenance agreement regarding the Stormwater Improvements.

NOW, THEREFORE, in consideration of mutual covenants of the parties set forth herein and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Maintenance of the Stormwater Improvements. The Developer and its successor or assigns as fee owner of the Property shall be responsible for maintaining the Stormwater Improvements so that they function as designed and intended, and observing all drainage laws governing the operation and maintenance of the Stormwater Improvements. The Developer shall inspect the Stormwater Improvements annually and shall keep record of all inspections and

maintenance activities. The cost of all inspections and maintenance, including skimming and cleaning of the Stormwater Improvements, shall be the obligation of the Developer and its successors or assigns as the fee owner of the Property. Developer shall follow the maintenance standards and schedule set forth at Exhibit C.

2. City's Maintenance Rights. The City may maintain the Stormwater Improvements, as provided in this paragraph, if the City reasonably believes that the Developer or its successors or assigns have failed to maintain the Stormwater Improvements in accordance with applicable drainage laws, and such failure shall continue for thirty (30) days after the City shall give the Developer written notice of such failure. The City's notice shall specifically state which maintenance tasks are to be performed. If Developer or its successors or assigns, does not complete the maintenance tasks within sixty (60) days after such notice is given by the City, the City shall have the right to enter upon the Property to perform such maintenance tasks. In such case, the City shall send an invoice of its reasonable maintenance costs to the Developer or its successors or assigns, who shall pay said costs within thirty (30) days of receipt of said invoice. Notwithstanding the foregoing, in the event of an emergency, as reasonably determined by the City Engineer, the thirty (30)-day notice requirement to the Developer or its successors or assigns for failure to perform maintenance tasks shall be and hereby is waived by the Developer or its successors or assigns, and the Developer or its successors or assigns shall reimburse the City for any expense so incurred by the City in the same manner as if written notice as described above has been given. The City and its agents and employees may utilize privately-owned on-site parking lot facilities to access Stormwater Improvements requiring maintenance in order to perform said maintenance, regardless of whether there is an easement over the parking lot facilities.

3. Hold Harmless. The Developer or its successors or assigns agrees to indemnify and hold harmless the City and its agents and employees against any and all claims, demands, losses, damages, and expenses (including reasonable attorneys' fees) arising out of or resulting from the Developer's or its successors or assigns, or their respective agents or employee's negligent or intentional acts, or any violation of any safety law, regulation or code in the performance of this Agreement, without regard to any inspection or review made or not made by the City, its agents or employees or failure by the City, its agents or employees to take any other prudent precautions.

4. Costs of Enforcement. The Developer or its successors or assigns agrees to reimburse the City for all costs incurred by the City in the enforcement of this Agreement, including court costs and reasonable attorneys' fees.

5. Notice. All notices required under this Agreement shall either be personally delivered or be sent by certified or registered mail and addressed as follows:

To the Developer:
Property Owner Name
Address 1
Address 2
Attn: Contact/Title

To the City:
City Administrator
City of Dayton
12260 S. Diamond Lake Road

Dayton, MN 55327

All notices given hereunder shall be deemed given when personally delivered or two (2) business days after being placed in the mail properly addressed as provided herein.

6. Successors. All duties and obligations of Developer under this Agreement shall also be duties and obligations of Developer's successors and assigns. Developer, or its successors or assigns shall only have liability hereunder with respect to matters occurring and obligations accruing during the period such party holds fee title to the Property. The terms and conditions of this Agreement shall run with title to the Property.

7. Effective Date. This Agreement shall be binding and effective as of the date hereof.

DEVELOPER:
[PROPERTY OWNER NAME]_____,
a [limited partnership, etc.]_____
By: Owner's Authorized Representative
Its: Position/Title

By: _____
Its: _____

CITY:
CITY OF DAYTON, a Minnesota municipal corporation

By:_____
Its: Mayor

By:_____
Its: City Administrator

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNPIN)

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by [Owner's Authorized Representative]_____, the [Position/Title] _____ of [Property Owner Name]_____, on behalf of said [Property Owner Name]_____.

_____
Notary Public

(Notary Public Seal)

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____ and _____, the Mayor and City Administrator of the City of Dayton, a Minnesota municipal corporation, on behalf of said municipal corporation.

_____
Notary Public

(Notary Public Seal)

Drafted By
City of Dayton
12260 South Diamond Lake Road
Dayton, MN 55327
763-427-4589

EXHIBIT A

LEGAL DESCRIPTION

[Insert property legal description.]

EXHIBIT B

STORMWATER IMPROVEMENTS

[Include pertinent stormwater information (plan sheets, details, etc.)]

EXHIBIT C

Stormwater Pond and Biofiltration Maintenance Schedule

After First Year Following Installation

- □ Ensure that at least 50% of wetland plants survive
- □ Check for invasive wetland plants.
- □ Replant wetland vegetation, if required

Annually or After Major Storms (>2")

- □ Inspect low flow orifices and other pipes for clogging
- □ Check the permanent pool or dry pond area for floating debris, undesirable vegetation.
- □ Investigate the shoreline for erosion
- □ Monitor plant composition and health, reseed if necessary
- □ Remove debris
- □ Repair undercut, eroded, and bare soil areas.
- □ Remove invasive plants

Every 2 to 3 years

- □ All routine inspection items above
- □ Inspect riser, barrel, and embankment for damage
- □ Inspect all pipes
- □ Forebay maintenance and sediment removal when needed

Every 3 to 5 years

- □ Monitor sediment deposition in facility and forebay
- □ Forebay maintenance and sediment removal when needed

Appendix D Wetland Buffer Plan Requirements

D.1 Buffer Requirements

Wetland buffers shall be comprised of a diverse native plant community. Buffers must be free of noxious weeds, and reasonably free of non-native species. In most cases it is anticipated that any existing vegetation will be removed or altered during grading of the site, and that vegetation will be established by planting a native seed mix.

Existing vegetation may meet the requirements for a buffer plant community. Applicants may request that existing vegetation be considered as meeting the buffer vegetation requirements. The City shall conduct an inspection to determine the suitability of such sites and verify the suitability of the existing vegetation as an appropriate wetland buffer. Presence of invasive species such as buckthorn and honeysuckle, trees susceptible to disease such as elm and ash, and non-native species such as smooth brome and quackgrass would most likely not meet the requirement of a native species buffer and require removal of vegetation. Presence of native species of trees such as oaks, hackberry, hickory, but with an invasive species herbaceous layer may only require removal of some species.

D.2 Buffer Establishment Plan

Plan sets shall include a separate plan titled “Buffer Establishment Plan” and shall provide the following items:

- All areas designated as wetland buffer, with callouts indicating square footage of each buffer area.
  - Locations of all buffer monuments at all property lines at edge of buffer, and at a minimum of 200 feet apart for all other areas.
  - Plan details shall note that monuments shall be on 4”x4” treated wooden posts with signage bolted to post and include a detail of buffer sign.
- Plan shall depict grading, roads, buildings, trails, etc., to demonstrate that no land uses inconsistent with the buffer are present.
- Plans shall indicate the State Seed Mix to be used. Seed Mixes | MN Board of Water, Soil Resources (state.mn.us). Seed mix should be appropriate for hydrology, soils, and landscape position and approved by the City.
- Specify the following:
  - Seeding rate (pounds per acre) based on the State Seed Mix rates.
  - Areas (sq ft) to be seeded and amount of seed needed (pounds).
  - Seeding shall be conducted from May 1 to July 1, or October 15 to freeze-up
  - The buffer seed bed shall be bare soil, free of weeds, debris and rocks, and finish graded prior to seeding.
  - Erosion control BMPs shall be used (straw mulch, erosion control blanket, etc.) to protect the buffer from erosion.
  - Cover crop to be used (oats, winter wheat) and seeding rate based on State seed mix rates.

- Identify that a contractor that is qualified in native plant installation and maintenance shall be used to perform buffer plant installation and 3 years of maintenance.
- State that the buffer may not be seeded or planted until the City has conducted a site preparation inspection and has approved the site for plant installation.
- Provide annual performance standards for the development of the buffer vegetation, including goals native plant species observed, non-native plants, bare ground.

D.3 Wetland Buffer Zone Monuments

All wetland buffer zones shall be identified with markers. The applicant shall be responsible for the cost of obtaining the monument signs from the City and installing the monuments. Monuments shall be on 4”x4” treated wooden posts with signage bolted to post. Signage shall face away from the wetland, and toward user property when applicable. Wetland monument sign details shall be specified by the City and provided to the applicant. Monuments shall be placed at the edge of the buffer area at all common lot lines and every 200 feet thereafter.

D.4 Seeding Dates

Seeding should be conducted at appropriate times of the year.

- Seeding may be conducted from May 1 to July 1, or October 15 to freeze-up
- No seeding allowed from July 2 through October 14 without prior approval from the City.

D.5 Buffer Installation Contractor

- The applicant shall use a contractor for buffer vegetation installation that is qualified in native plant community installation and maintenance.
- The applicant is required to provide documentation that a qualified native plant contractor is under contract to perform installation of buffer vegetation and at least three years of maintenance.
- A list of contractors can be found at Native plant suppliers, landscapers, and restoration consultants for Minnesota | Minnesota DNR (state.mn.us).

D.6 Buffer Site Preparation Inspection

- No wetland buffer vegetation installation shall occur until the applicant notifies the City that the planting site preparation is complete and ready for City inspection.
- The applicant shall not conduct buffer vegetation installation until after the City has conducted the site preparation inspection and approves the site for installation.
- Prior to installation, the City shall conduct a pre-seeding inspection to ensure that the site has been prepared properly and is ready for seeding.
    - Seed bed has been finish graded with soil clumps no larger than 1” in diameter.
    - Seed bed is free of vegetation.

  - No debris (construction materials, garbage, rocks) are present.
  - No other issues are present that would inhibit successful seeding.
- If seed bed issues are observed, the City shall notify the applicant in writing of issues needing to be resolved before seeding can commence.
  - The City shall perform a follow up inspection to ensure issues have been corrected and the site is ready for seeding.
- If no issues are observed, the City shall notify the applicant that the site is ready for planting.

D.7 Contractor Pre-Installation Meeting

- Prior to installation, the City shall conduct a meeting with the installation contractor, either in person, virtually, or via phone.
- The City shall confirm with the contractor the details of the approved buffer establishment plan, planting areas, seed mixes, rates, methods, and erosion control methods.
- Any proposed changes to the approved buffer establishment plan shall be confirmed with the City and are subject to City approval.

D.8 Buffer Installation Observation

- Following the site preparation inspection, the applicant shall confirm the seeding date with the City.
- The Contractor shall contact the City by phone or onsite at least two (2) business days prior to seeding to confirm installation time and date, that a City inspector will be onsite to inspect materials and equipment, and to confirm the installation plan.
- An inspector representing the City shall be present for seeding.
  - The inspector will meet with the native plant installer contractor on site to review the planting plan, inspect seed, verify quantities, and review planting methods (drill or broadcast).
  - The inspector shall be presented with all seed tags for inspection and have copies provided.
  - The inspector shall inspect equipment to ensure proper calibration of seeder.
  - The inspector shall complete an inspection form and collect photographs of the seeding operation.

D.9 Maintenance

The applicant's native plant contractor shall be under contract for a period of three growing seasons to perform maintenance of all buffer vegetation and ensure compliance with buffer vegetation requirements. Maintenance activities may include:

- Mowing
- Hand pulling of weeds
- Spot spraying herbicide

- Clipping seed heads
- Prescribed burning
- Re-seeding of bare areas

Long-term maintenance beyond the monitoring period shall be identified in the buffer maintenance agreement. Buffer vegetation shall be mowed every three years to prevent invasion of woody vegetation. Additional mowing to address vegetation maintenance issues may be conducted with prior approval of the City.

D.10 Escrow

The City shall require a performance for the wetland buffers. City may draw on the escrow if the applicant fails to install vegetation, monitor, or conduct maintenance or for any time spent by city staff or consultants pertaining to the wetland establishment.

D.11 Performance Standards

Buffer vegetation shall meet the following performance standards:

- 1st Monitoring Year
  - 2 native grass species and 2 native forb species from the seed mix shall be present throughout the seeded buffer areas.
  - Invasive species cover less than 60%
  - Bare ground less than 20%
  - No noxious weeds present
- 2nd Monitoring Year
  - 2 species of native grass shall be dominant from the seed mix used.
  - 10 or more native species of grasses and forbs from the seed mix shall be present
  - Bare ground less than 10%
  - Invasive species cover less than 30%
  - No noxious weed present
- 3rd Monitoring Year
  - 3 species of native grass shall be dominant from the seed mix used.
  - 14 or more native species of grasses and forbs from the seed mix shall be present
  - Bare ground less than 5%
  - Invasive species cover less than 20%
  - No noxious weed present

D.12 Monitoring

The applicant shall conduct monitoring of the buffers for three full growing seasons to ensure proper vegetation establishment. The monitoring shall be conducted by a firm or individual knowledgeable with the establishment of native plant communities. Monitoring shall be conducted during from June through September (growing season).

Monitoring plan shall include:

- Photos of buffer areas
- Plants species observed and percent cover (for each contiguous buffer area)
- Percent cover of non-native species
- Summary of maintenance conducted (contractor records required with dates of maintenance)
- Summary of next season's anticipated maintenance.

Monitoring report is due no later than December 31 of each year. Failure to submit monitoring reports by the deadline may result in the City drawing on the escrow to perform its own inspections.

The City may conduct its own inspections of wetland buffers for compliance with performance standards, in response to complaints, or to verify findings of the applicant's monitoring reports.

D.13 Unauthorized Activities

Any alterations within the wetland and upland buffer zone, except those stated in the City Code, shall be prohibited, including, but not limited to, the installation or placement of structures and impervious surfaces, the destruction or removal of trees, shrubs or other vegetation, the introduction of any non-native vegetation, any mowing, dredging or excavation activities and the placement or storage of any fill material or trash and the application of fertilizer.

During the monitoring period it is the applicant's responsibility to address and remedy wetland buffer violations. This may include removal of materials or structures placed in the buffer, addressing violations with adjacent property owners, restoring vegetation, replacing damaged or destroyed buffer monuments, or other actions needed to restore buffer vegetation. Following the conclusion of the monitoring and City approval of the buffer, this responsibility shall be outlined in the buffer maintenance agreement.

D.14 Final Inspection

Following three full growing seasons and receipt of the 3rd monitoring report, the applicant may request in writing that the buffer monitoring period has been completed and the buffers are ready for final inspection, City approval, and release of all remaining escrow.

- No weed present that are listed on the State of Minnesota Noxious Weed List.
- No areas of bare ground
- Vegetation meets the 3rd Monitoring Year performance standard.
- Removal of all erosion and sediment control BMPs

Appendix E Certificate of Final Acceptance

CERTIFICATE OF FINAL ACCEPTANCE

Development: _____ Developer: _____

Primary Contractor: _____ Engineer's Project No.: _____

_____ _____

Date of Acceptance _____

This project included the construction of publicly owned sanitary sewer, water mains and related service. The improvements were designed and installed by the developer's private consultants and contractors, respectively.

The project was tested and inspected in accordance with standard policy and procedure. The work was found to be complied and complies with the specifications. Therefor the project is recommended to be accepted and begin the warranty period as defined in the Development Agreement.

The project includes all work within the specified phase except as amended as follows:

☐ | **Amended Responsibilities** ☐ **Not Amended**

Work remaining within the acceptance area which is not included in this acceptance agreement

_____

_____

The following documents are attached to and made part of this Certificate:

_____

_____

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

_____ _____
Accepted by Engineer Date

_____ _____
Accepted by Public Works Date

_____ _____
Accepted by City Planning Date