CITY OF VICTORIA
ENGINEERING DEPARTMENT

ENGINEERING DESIGN AND CONSTRUCTION STANDARDS MANUAL
FOR PRIVATE DEVELOPMENTS

REVISION DATE: FEBRUARY, 2022

CITY OF VICTORIA, MN.

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ENGINEERING DESIGN AND CONSTRUCTION STANDARDS MANUAL FOR PRIVATE DEVELOPMENTS

I. ENGINEERING DESIGN STANDARDS AND GUIDELINES

- A summary of acceptable products and minimum design requirements for proposed City infrastructure. This list is not all inclusive and shall be used as a design guide. Exceptions to these design standards will be allowed only upon City Engineer approval. To expedite City Plan reviews, exceptions shall be clearly identified in writing with the Plan submittal.

II. PLAN SHEET FORMAT REQUIREMENTS

- A summary of minimum requirements for plan sheets developed for each project. The minimum criteria shall be followed for all projects. Failure to follow these requirements may delay the City's Plan review.

III. CITY STANDARD SPECIFICATIONS FOR PUBLIC INFRASTRUCTURE

- The City Standard Specifications shall be included in the contract documents for all development projects. The specifications shall be bound with the project manual or project specifications book, and shall not be edited. Project specific requirement sections shall be inserted where specific requirements or changes are needed. Entire sections not pertaining to the specific project shall be excluded.

IV. STANDARD DETAILS FOR PUBLIC INFRASTRUCTURE

- The City Standard Details are specific requirements for the construction of public infrastructure. All drawings which apply to the specific project shall be included in the plan drawings. Details which do not pertain to the project shall not be included. City Standard Plan Notes shall be placed on the stated plan sheets of the construction drawings.

V. ELECTRONIC COPY OF THE ENCLOSED MATERIALS

- Electronic files of the City Standard Specifications and City Standard Details have been provided for your use. These files shall be used for insertion into the proposed plans and specifications for Development work to be completed in the City of Victoria. No changes or edits of these documents shall be made.

ENGINEERING DESIGN STANDARDS
for
CITY OF VICTORIA

STREET DESIGN AND GEOMETRICS

- **Geometric Design, Local Residential Street**
  -Minimum Street Width, back of curb to back of curb……28-feet
  -Center Crown……3.0%
  -Minimum Longitudinal Grade……0.5%
  -Maximum Longitudinal Grade……8%
  -Maximum Intersection Approach Grade, First 100-feet……2.0%
  -Minimum Vertical Curve Length, Crest……K=19
  -Minimum Vertical Curve Length, Sag……K=37
  -Minimum Horizontal Curve Radius……100-feet
  -Intersection Angles……90 degrees
  -Minimum Intersecting Street Offset, from Centerlines……150-feet
  -Curb Radius, Minimum Local to Local……20-feet
  -Curb Radius, Minimum Local to Collector……25-feet
  -Minimum Diameter of Cul-de-sac……90-feet
  -Minimum Grade around Cul-de-sac……0.5%
  -Maximum Cul-de-sac Street Length……1000-feet
  -Temporary Cul-de-sac at plat line……Required
  -Pedestrian Ramps……Per Current MnDOT Standards

- **Geometric Design, Collector Street**
  -Design Standards……Meeting State-Aid for minimum design speed
  -Minimum Street Width, back of curb to back of curb……Varies (32-feet min)
  -Maximum Longitudinal Grade……6%
  -Intersection Angles……90 degrees
  -Tangent Length at Intersection from Curb Line, Local Streets……50 feet
  -Tangent Length at Intersection from Curb Line, Higher Class Streets……100 feet
  -Tangent Minimum between curves……50 feet
  -Minimum Vertical Curve Length, Crest……Meeting State-Aid for minimum design speed
  -Minimum Vertical Curve Length, Sag……Meeting State-Aid for minimum design speed
  -Minimum Horizontal Curve Radius……Meeting State-Aid for minimum design speed
  -Minimum Intersecting Street Offset, if allowed, from Centerlines……250-feet
  -Street/Roadway Access……Per City Access Management Spacing Guidelines
  -Driveway Access, Residential……Prohibited
  -Driveway Access, Commercial…… Per City Access Management Spacing Guidelines
  -Curb Radius……25-feet

- **Pavement Section Design**
  -Subbase, Select Granular Borrow (SPEC 3149.2B)…….. 24-inches
  -Subsurface Drainage System……..Required
  -Base, Aggregate Base, Cl. 5 100% Stone Aggregate……..8-inches
    - *Note: Class 5 Recycled Material Substitute must meet Section 3210 requirements*
  -Non-Wearing Course, MnDOT 2360 Type SP 12.5, Mixture 2B……..2-inches
  -Wearing Course, MnDOT 2360 Type SP 9.5, Mixture 2A……1½-inches
  -Asphalt Binder, MnDOT 2360……..PG 58H-34

- **Draintile/Street Subsurface Drainage**
  -Type……SCH 40 PVC Perforated
  -Size……6-inch
  -Sock……MnDOT SPEC 3733
  -Location……..Full Length of Street
  -Placement per the following criteria:
    - Connect DT into the side of all curb inlet storm structures.
    - Clean-outs are not necessary at storm structures.
    - Add 2 cleanouts (one in each direction) such that the maximum distance between structures and cleanouts is approximately 200 ft.
    - Add 2 cleanouts (one for each direction at high points.
    - For high point radius at intersections, run draintile through the radius and place high point clean-outs outside of ped ramps/sidewalk/trail. They may be spaced out along the radius on each side of the ped ramp/sidewalk.
    - Sump Pump services that connect to the street draintile shall be installed per city details 712 & 713.

- **Curb and Gutter**
  -Material, All Purposes……Concrete
  -Strength, Minimum Requirements……3,900 PSI
  -Type, New Developments, Single Family Residential……Surmountable
  -Type, New Developments, Multifamily, Commercial……B618
  -Type, Collector Roads, Reconstruction……B618

- **Utility Conduit**
  -Type……PVC Schedule 40
  -Location/Depth…….Perpendicular to Street and 6-inches below Street Subgrade and Draintile

- **Entrances/Driveways**
  -Maximum Driveway Width at Right-of-way……24-feet
  -Bituminous Driveway Minimum Thickness, Section……See detail
  -Residential Concrete Driveway Minimum Thickness……6-inches
  -Commercial Concrete Driveway Minimum Thickness……..8-inches

- **Signing**
  -Design Standards……..…MN MUTCD
  -Sheathing Type……High Intensity Diamond Grade DG3
  -Sign Posts, unpainted galvanized metal…….……..…3.0 LBS./ft.

RIGHT-OF-WAY AND BOULEVARD LAYOUT

- **Right of Way Widths**
  -Local Residential Street Minimum Width……60-feet
  -Cul-de-sacs……60-foot radius
  -Collector Street Minimum Width……Varies (77 feet Minimum)

- **Boulevard, Local Residential Street**
  -Width……16-feet
  -Slope, Typical and Maximum……4% and 4:1
  -Topsoil Minimum……6-inch
  -Turf Treatment……Reference Section 3292 and Standard Detail 805
  -Turf Treatment (Boulevards along City owned property)……Lawn Sod
  -Tree Location ……As Directed - No trees in sight triangle at intersections
  -Root Barrier ……..Adjacent to walkway and/or back of curb within ROW, and as directed by City
  -Street Light Location……5-feet back of curb
  -Hydrant Location……5-feet back of curb

- **Sidewalks**
  -Collector Street……As directed
  -Local Residential Street……Required on one side
  -Cul-de-sac Street……Required for trail connection
  -Width……6-feet
  -Sidewalk Maximum Longitudinal Grade……5%
  -Pavement Section……5-inch Concrete; 5-inch Class 5

- **Trails**
  -Locations……Per City trail plan and as directed
  -Width, Local Trail……8-feet
  -Pavement Section, Local Trail……2.25-inch Bituminous; 8-inch minimum Class 5

- **Berm Construction in Boulevard**
  -Maximum Side Slope ……3:1
  -Maximum Side Slope with Natural Vegetation……2:1

SANITARY SEWER

- **Force Main**
  -Material……..PVC or HDPE
  -PVC, 2-inch–24-inch…… C900/C905
  -HDPE Class, 1-inch……SDR 9
  -HDPE Class, 2-inch–24-inch……..SDR 11
  -Minimum Cover……7½-Feet
  -Location of main in Street……Project Specific
  -Tracer Wire……Copperhead SoloShot Xtreme PBX-50-LLS 4700lb Breakload
  -Air Relief Valve and Manhole Locations……All High Points

- **Gravity main**
  -Material……PVC
  -Minimum Diameter……..8-inch
  -Class, up to 20-feet in depth……SDR 35
  -Class, 20-25 feet in depth……SDR 26
  -Class and Material, over 25 feet in depth……..Project Specific
  -Minimum cover over pipe……5.5-feet
  -Maximum depth of pipe……30-feet
  -Location of main in Street……..Centerline
  -Slope……Ten States Standards
  -Tracer Wire……Copperhead #12 High Strength part #1230G-HS

- **Sanitary Sewer Manholes**
  -Type……...Precast Concrete
  -Maximum inlet/outlet elevation difference……..2-feet
  -Minimum depth of Manhole……6-feet
  -Type of Casting……R-1642-B (see detail No. 107)
  -Joints and Assembly……Per City Details
  -Location……Street Centerline
  -Maximum Spacing……400-feet
  -Flow Line Match Required……8/10ths Rule
  -Drop Across All Manholes Required……0.1-feet
  -Connections to Existing Manholes……Core Drill with Boot
  -Outside drop minimum……..2-feet
  -Outside drop Material……..Ductile Iron

- **Service Pipe**
  -Material……PVC
  -Minimum Diameter……...4-inch
  -Class……Schedule 40
  -Location……Downstream of water service

WATERMAIN

- **City Water System Adequate Service Pressure Zone (2-story residential, 50 psi static)**
  -First Floor Elevation (FFE) below 1,021 and above 970……..Adequate
  -FFE at 970 or below……Pressure Reducer
  -FFE at 1,021 up to 1,030……Booster Pump
  -FFE at 1,030 or above……..Eng. Analysis

- **Main Pipe**
  -Material……..PVC
  -Class……C900, DR-18
  -Minimum Diameter – Mainline……8-inch
  -Minimum Diameter – Residential Hydrant Lead……6-inch
  -Minimum Diameter – Commercial/Industrial Hydrant Lead……..8-inch
  -Minimum Cover……7½-feet
  -Location of main in Street……..North or West
  -Tracer Wire…….Copperhead #12 High Strength part #1230B-HS
  -Maximum Length of Dead Ends……600-feet
  -Air Release measures……At highpoints via MH or Hydrant
  -Temporary Dead End Lines……Hydrant/Bleed Valve Required

- **Hydrants**
  -Type……...Waterous Pacer WB-67
  -Depth of Bury……8½-feet
  -Spacing Radius from Building……250-feet
  -Gate valve on Hydrant leads……..Yes

- **Valves**
  -Resilient Seat Gate Valve, for 12-inch pipe & smaller……American Flow Control 2500 Series
  -Butterfly Valve, for pipe over 12-inch……Mueller Lineseal III
  -Valve Box……Tyler G-Box6860
  -Maximum area isolated by valving……20 services
  -Maximum distance between valves on Trunk Mains……800-feet

- **Service Pipe**
  -Service Material……SIDR 7 IPS PE
  -Corporation Stop……A.Y. McDonald 74701B
  -Curb Stop ……A.Y. McDonald 76104
  -Curb Box ……A.Y. McDonald 75614 w/rod & Mpls. Top
  -Tracer Wire…….Copperhead #12 High Strength part #1230B-HS

STORM SEWER

- **Design**
  -Design Frequency for Storm Sewer……..10-year
  -Minimum storm sewer design velocity……3-fps
  -Maximum storm sewer design velocity……..15-fps
  -Maximum storm sewer outlet velocity……5-fps
  -Minimum Pipe Slope……0.5%
  -Minimum Outfall Pipe Slope…….verify positive grade at completion (no reverse grade)

- **Main Pipe**
  -Storm Sewer Pipe Material……RCP
  -Minimum Cover Depth, street……..4-feet
  -Minimum Cover Depth, green areas……..3½-feet
  -Minimum Pipe Diameter, Main……...15-inch
  -Minimum Catch Basin Lead……..12-inch
  -Location of main in Street……South or East

- **Culvert pipe**
  -Culvert Material ……RCP
  -Minimum Culvert Size……...15-inch
  -Apron and Trash Guard Required……...Yes

- **Manholes**
  -Type……Precast Concrete
  -Sump Depth and Location…… Prior to stormwater BMP
  -Minimum Structure Depth……...4½-feet
  -Casting……..R-1642-B (see detail no. 107)
  -Minimum Adjustment Rings……4-inches
  -Maximum Adjustment Rings……...1-foot

- **Catch Basins**
  -Type……Precast Concrete
  -Minimum Structure Depth……...4½-feet
  -Maximum run to Catch Basin……..350-feet
  -Casting, Curb & Gutter, B Style Curb……..R-3067V
  -Casting, Area Drain……R-4342

STORMWATER MANAGEMENT AND STORMWATER BMPs

Note: Stormwater facilities shall be in accordance with the Requirements listed herein; in accordance with the Requirements of the Minnehaha Creek Watershed District (MCWD) or Carver County Water Management Organization (CCWMO); and in accordance with the Minnesota Stormwater Manual if not otherwise addressed. When referencing the Minnesota Stormwater Manual, all "Recommended" and "Highly Recommended" provisions shall be considered requirements by the City of Victoria unless specifically approved otherwise by the City Engineer.

- **Site Design**
  -Facility location (Including wetlands and buffers)…….Outlots deeded to City
  -Location……..……above 100-year HWL
  -Building Lowest Opening above 100-year HWL……..2-feet
  -Building Lowest Opening above EOF……1-foot
  -Minimum access road easement width……..20-feet
  -Maximum grade for maintenance access roads……..10%
  -Setback from building foundations……35-feet
  -HSG D Soil Classification ……..Soil Borings Required
  -Wetland Buffer Signs……Installed per MCWD
  -Minimum slopes……...3%
  -Maximum slopes……..3H:1V
  -Sump Structures……Prior to All Stormwater BMPs

- **Stormwater Ponds (Detention Basins)**
  -Design Frequency (DF), SCS Type II……2, 10, and 100-year
  -DF, Landlocked Basins (Requires Volume Control)……...Back to Back 100-year
  -Minimum Basin Depth to NWL……4-feet
  -Maximum Pond Depth to NWL……...10-feet
  -Average Permanent Pool Depth……4-feet to 6-feet
  -Permanent Pool Length-to-Width Ratio……...3:1 or greater
  -Maintenance Bench Maximum side slope, first ten feet above Permanent Pool……10:1
  -Aquatic Bench Maximum side slope, first ten feet into Permanent Pool……10:1
  -Maximum side slope, beyond first ten feet……3:1
  -Pretreatment Sediment Forebay……Required 10% Pond Area
  -Required freeboard……..2 feet above HWL

- **Drainage Swales**
  -Maximum side slopes on Swales……...3:1
  -Maximum side slopes on Right-of-Way Swales……..4:1
  -Minimum longitudinal Swale grade……..3%
  -Minimum Swale depth within Right-of-Way……..18-inches
  -Minimum Bottom Width……...4-feet

- **Infiltration Facilities (Bioretention Areas and Rain Gardens)**
  -Inlet control from Streets.....Use Neenah R-3067-V casting on Catch Basin (no curb cuts)
  -Maintenance Agreement for public right-of-way.....Required
  -Maintenance Access Easement.....Required

-Minimum distance from septic system or drainfield……35-feet
-Minimum distance from public or private well……50-feet
-Maximum Site Slope……5%
-Minimum depth to Bedrock……3-feet
-Minimum depth to Seasonally High Water Table……3-feet
-Located in "hotspot" drainage shed (i.e. gas stations)……Prohibited
-Located in Hydrologic Soil Group D Soils……Prohibited
-Underdrain, ……6" PVC Schedule 40
-Soil infiltration rates……*By Field Testing at Facility Location
-Minimum In-situ Permeability……1-inch per hour
-Maximum side slope……4:1
-Maximum drain dry time……48 hours
-Soil medium……MnDOT 3877 E Rooting Topsoil Borrow
-Plantings……Seed per MnDOT 3876 Specifications with Type 33-261
……Seed to be enhanced with 1 plug per 4 Square Feet
……Infiltration areas 10,000 sqft or greater requires 3 grass mixes for variety
……Native Shrubs to be planted in conformance with City approved landscape plan

** Soil borings are required to verify infiltration rates. Borings must be taken to a depth of 20 feet below proposed infiltration basin elevation.*

- **Other Stormwater BMPs:** *The City of Victoria has adopted the following additional BMPs and Low Impact Development practices for the City and promotes their use in accordance with these Engineering Design Standards and MCWD or CCWMO Requirements.*

    - **Filtration Basin and Underground Infiltration Trench.**
        - Underdrain requirements:
            - 6" PVC SCH40 Pipe with 3/8" perforations with tracer wire
            - Minimum draintile grade shall be 0.5%
            - 45-degree maximum bends
            - Cleanouts at pipe ends cut 2' above finished grade with watertight removable caps.
            - Connections shall be wye fittings.
            - Lateral spacing less than 25 feet.
            - Underdrain must drain through access structure and outlet through RCP pipe with RCP flared end section.
            - Underdrain bedding: When bed in sand, use circular knit fabric around pipe, otherwise, 3-inches of #57 stone on side and top of pipe.
    - **Vegetated Swales.**
    - **Tree Preservation and Planting.**
    - **Soil Amendments.**
    - **Capture and Reuse of Stormwater.**

DETAIL PLATE NUMBERS AND PLAN NOTES

• Pipe Installation	101,103,105
• Watermain	200A,201,203,204,206,207,208,210,211
• Sanitary Sewer	300A,301,302,303,305,306,313,314,315
• Storm Sewer	400A,402,404,405,406,407,408,409,410, 411,412,416,417,419,420,421,423A,423B,424
• Pavements, Curbs, Walks	500A,501,502,503,504,505A,505B,505C, 505D,505E,505F,506,507,508,509, 510,511,512,513
• Erosion Control	600A,600B,600C,600D,601,603,604,605
• Miscellaneous	700A,705,712,713
• Typical Sections and Right-of-Way	801,804,805,806,807A,807B
• Landscaping	900A, 901A, 901B, 902A, 902B, 903A, 903B, 904

PLAN SHEET FORMAT REQUIREMENTS
for
CITY OF VICTORIA

This document outlines the required plan format and minimum acceptable plan sheet requirements for each development project within the City of Victoria. The minimum requirements shall be met for all projects before approval may be granted by the City Engineer.

GENERAL REQUIREMENTS:

1. Plan sheet size shall be 22" x 34".
2. All electronic files must be accompanied by a "layer description list" that clearly identifies the elements of each layer or level.
3. Vertical control of Construction Record Drawings must be on the City's Benchmark System.

CONSTRUCTION PLANS: The following plan sheets shall be bound together in one plan set and distributed to the City in the number and plan size as required.

I. Title Sheet
   A. Location Map with Section, Range and Township provided.
   B. Sheet Index.
   C. Plan Date with all Revision Dates.
   D. Preparer's Name and Contact Information.
   E. Owner's Name and Contact Information.

II. Legend and Typical Sections
   A. Plan Legend for all Applicable Symbols.
   B. City of Victoria Typical Sections as Applicable to the Project.
   C. Additional Typical Sections as Deemed Appropriate by the Design Engineer.

III. Standard Details and Storm Sewer Construction Chart
   A. City of Victoria Standard Details as Applicable to the Project.
   B. Additional Standard Details as Deemed Appropriate by the Design Engineer.
   C. Storm Sewer Construction Chart.

IV. Grading, Drainage, and Erosion Control Plans
   A. North Arrow (Up or to the right on all sheets).
   B. Scale: 1"=50' horizontal.
   C. Maximum plan sheet size 22" x 34".
   D. Street names and right-of-way lines
   E. Building pads with first floor elevation, low floor elevation, garage floor elevation, low opening elevation, and building type.
   F. Wetland delineations, creeks, streams, lakes & other water bodies.
   G. Normal water level (NWL) and high water level (100-year HWL) for all water bodies within and adjacent to the property.

H. All emergency overflow elevations, placed in **BOLD** on the plans.
I. All erosion control measures, permanent and temporary.
J. Grading and erosion control city standard plan notes.
K. Tree protection fencing.
L. Retaining Walls (wall heights and elevations).
M. Existing storm sewer, drainage and culvert structures to a distance of 150 feet beyond plat boundary with pipe material, size and inverts.
N. Topographical features to a distance of 150 feet beyond plat boundary (fences, trails, sidewalks, streets, driveways, etc.)
O. Property, right-of-way and easement lines.
P. Existing street and driveway widths with type of surface identified.
Q. Lot corner elevations.
R. Spot elevations along trails not adjacent to primary development streets.
S. Proposed driveway slopes.
T. Proposed drainage swale locations, elevations, and grades.

V. Sanitary Sewer and Watermain Plan Sheets

A. Plan and Profiles for Sanitary Sewer and Watermain shall be placed on the same sheet(s).
B. The following information shall be shown:
    1. North Arrow (Up or to the right on all sheets).
    2. Scale: 1”=50’ horizontal and 1”=10’ or 1”=5’ vertical (Maximum sheet size 22” x 34”)
    3. Street names and right-of-way lines.
    4. Lot and block numbers.
    5. Location of all existing utilities with pipe material and size within 150 feet beyond plat boundary.
    6. Existing and proposed easements.
    7. Size of mains.
    8. Material and Class of pipe.
    9. Length of mains and each sanitary sewer pipe segment.
    10. Size, type, casting type and build of manholes.
    11. Proposed grade of each sanitary sewer pipe segment.
    12. Elevation of inverts of all sanitary sewer lines, at MH and at stub ends.
    13. Arrows indicating the direction of flow on the sanitary sewer plan views.
    14. Number each sanitary sewer structure on both plan and profile views.
    15. Stationing of sanitary sewer structures on profile view.
    16. Proposed main line pipe crossings on the profile views.
    17. Proposed storm sewer shown in plan and profile views (background view).
    18. Service locations and wye stationing on the plan view (from the main line to the utility easement line).
    19. Proposed invert elevations at the utility easement line. Risers must be listed for each lot if needed.
    20. Elevation of the top of the water service stop box at the utility easement line.
    21. Hydrant, valve and fitting locations on the plan view (gate valve or butterfly valve noted as applicable).
    22. Proposed and existing pump or lift stations.
    23. Proposed and existing Well Pumphouses.
    24. Existing grade profile over main line pipe.

25. Finished grade profile over main line pipe.
26. Centerline stationing at 100 foot minimum intervals.
27. Sanitary Sewer City Standard Plan Notes.
28. Watermain City Standard Plan Notes.

VI. Street and Storm Sewer Plan Sheets

A. Plan and Profile shall be shown on the same sheet.

B. The following information shall be shown:

1. North Arrow (Up or to the right on all sheets).
2. Scale: 1”=50’ horizontal and 1”=10’ or 1”=5’ vertical (Maximum sheet size 22” x 34”)
3. Street names and right-of-way lines.
4. Lot and block numbers.
5. Existing and proposed easements/right-of-ways within 150 feet beyond plat boundary.
6. Show concrete walks and bituminous paths.
7. Sizes of storm sewer pipe.
8. Material and Class of storm sewer pipe.
9. Length of each storm sewer pipe segment.
10. Proposed grades of each storm sewer pipe segment.
11. Size, type and build of manholes and catchbasins.
12. Proposed drainage swale locations.
13. Elevations on all inverts and castings of all storm sewer structures.
14. Arrows indicating the direction of flow on the storm sewer plan views.
15. Number of each storm sewer structure on both plan and profile views.
16. Proposed watermain and sanitary sewer shown in plan and profile views.
17. Proposed pipe crossings on the storm sewer profile views.
18. Existing grade profile over storm sewer pipe.
19. Finished grade profile over storm sewer pipe including beyond the end of outlet pipe.
20. Finished centerline street elevations every 50 feet minimum.
21. Centerline stationing.
22. Street grades on profile.
23. Vertical curve data on profile.
24. Horizontal alignment and curve data on plan view.
25. Flow line elevations at the beginning, mid-point and end of all radii and at all intersections where drainage is a concern, at maximum or at minimum grades.
26. Drainage flow arrows at street intersections.
27. Proposed driveway slopes.
28. Finished profile for centerline of trails (plan and profiles for trails may be on separate sheets from street and storm sewer plans).
29. Storm Sewer City Standard Plan Notes.
30. Sidewalk and Trail City Standard Plan Notes.

C. Draintile Information to be Shown

1. Size, type and location of pipe and location of sump pump service on plan view.
2. Locations of service wyes and clean-outs.

VII. Cross Sections

A. Cross sections shall be provided for all street reconstruction work, turn lanes, or when interfacing new streets along existing streets and roadways.
B. Cross sections shall be provided for all trails, except when the trail is placed in the boulevard in accordance with a typical standard street section.
C. At a minimum, each cross section shall show the following:
    1. Finished ground to the match points of existing grade.
    2. Existing ground.
    3. Right-of-way and easement locations.
    4. Centerline of proposed improvement.
    5. Full depth proposed section.
    6. Label all slopes proposed at maximum grades.
D. When provided, cross sections shall be shown a minimum of every fifty (50) feet, at all low points, critical drainage locations, driveways, and at intersections.

VIII. Street Signage, Lighting, and Pavement Marking Plan

A. Signing, Pavement Markings, and Lighting City Standard Plan Notes.

IX. Landscape Plan Sheets

A. Irrigation Systems.
B. Include tree removals, planting schedule, and tree replacement plan.
C. Include City Standard Landscaping Plan Notes
D. Include BMP/utility access routes
E. Include location of all utility services (sewer, water, sump pump)

RECORD DRAWINGS: Record drawings must be completed and submitted to the City Engineer to assist the city in the review, verification and acceptance of the work completed. The submittal information outlined below is considered the minimum documentation requirements. The City Engineer may request additional information specific to the improvements as deemed reasonably necessary to verify the work conforms to the approved grading and construction plans.

I. Submittal Requirements
   A. As-built Construction Plans shall be certified by the engineer and prepared in accordance with the Plan Sheet Format Requirements.
   B. All changes from the as-bid plans should be indicated on the as-built Construction Record Drawings. All changes shall be lined out and corrections shall be shown in ***bold italics***.
   C. Each Record Drawing shall list Contractor's name, Developer Engineer's name, City Project Number, Construction Completion Date, and Record Plan Drawing Number (provided by City).
   D. Final record drawings shall be submitted as one (1) set of full size plans (22" x 34"), two 11" x 17" paper copies, and submitted in electronic form DWG files and PDF files that are printable to scale on 11"x17".
   E. As-built surveyed information shall tie out to benchmarks as indicated on the plans.
   F. GIS shape files must be provided to include all as-built public infrastructure data, as requested.

II. Certified Record "As-built" Grading Plan shall include [Note: As-built elevation shot locations must match the same location as shown on the construction plans.]
   A. Location and as-built elevations at lot corners and house pads.
   B. Location and as-built elevations along all swales, berms, slopes and ditches.
   C. Location and as-built elevations at all emergency overflow (EOF) points.
   D. Location, as-built and/or cross section(s) for pond bottom, aquatic bench, maintenance bench, NWL and HWL elevations and provide as-built volume calculation.
   E. Location and as-built elevations at low points.
   F. Location and as-built for all storm sewer structures and overflows.
   G. Location and as-built elevations at all retaining walls, including top and bottom of wall at maximum wall height locations, and each end of the wall.
   H. Location and as-built elevations for any private wells or wastewater systems.
   I. Location and as-built elevations for other features critical to drainage performance.
   J. Indicate all property lines, easements and access points.
   K. Indicate location of all existing utilities.
   L. As-built grading plan must conform to the approved final grading plan. Elevation shots must be within +/- 0.2 feet.

III. Certified Record "As-built" Construction Plans shall include
   A. As-built surveyed elevations for sanitary and storm sewer manhole and catch basin casting/inlet tops and inverts, flared end section inverts, and any other structure elevations shown on the as-bid drawings. Actual elevations must be recorded to the nearest 0.01 foot, and the actual pipe grades recorded to the nearest .01%.
   B. Sanitary and storm sewer lines must be field measured from center of casting to center of casting or from center of casting to end of flared end. Record lengths to nearest 0.5 foot.
   C. Indicate and record all changes from planned pipe, structure, or hydrant locations.
   D. Measured distances from center of casting to end of stubs for sanitary and storm sewer.

E. Ties from ends of watermain stubs to permanent structures.
F. Ties from ends of sump pump service stubs to permanent structures (hydrant, watermain valve, catch basin, or manhole).
G. Service ties for the curb box for each lot. Including pipe quantity, size and type on plans.
H. All sewer services shall be shown on the plans with stationing from downstream manhole to wye location. Pipe quantity, type and invert elevation at utility easement line shall be shown on the property served.
I. Location of watermain fittings (i.e. bends, tees, valves, etc.).
J. Top nut of hydrant elevations.
K. Type, size, and class of piping.
L. All pipe insulation.
M. All lots shall have address numbers shown on street record plans.