External Prince William Water Plan Review Checklist

General Requirements:

1. All plan review fees must be paid prior to plan approval.
2. Provide a CAD file prior to plan approval. The CAD file must address all Prince William Water file requirements.
3. Include site grading, Prince William Water sheet, and plat in plan set.
4. No Beneficial Use or Partial Beneficial Use will be provided until easement and /or land dedication recordation information has been provided to Prince William Water.

Cover Sheet:

1. Provide anticipated sewage flow calculation. Match anticipated sewage flows to the Sanitary Sewer Design table in the Prince William Water sheet.
2. Provide anticipated fire flow. This must match the approved hydraulic model.
3. Use Prince William County Standard Cover Sheet for projects within the County.
4. Provide the standard legend for asset symbols and line types.
5. Reference the current Prince William Water USM.
6. Provide assigned Prince William Water plan number in the title block.

Plan View:

General:

1. Plan views at 1-inch:30-foot scale are preferred (1inch:50-inch scaled plans are acceptable but not desired). No other scales are permitted.
2. Show structures, light poles, traffic controls, signs, retaining walls, sidewalks, trails, walkways, concrete pads, fences, etc. that directly or indirectly impact water and sewer.
3. Report the use of non-residential buildings.
4. Report the square footage and height of multi-family and non-residential buildings.
5. Report the number of dwelling units in a multi-family building.
6. Provide a unique building identifier in plan sets that containing more than one multi-family or non-residential building. Reference building identifiers in the meter schedule table.
7. Show and identify right-of-way limits.
8. Show and label proposed and existing water and sanitary easements.
9. Ensure all proposed water and sanitary easements are clear of structures, fences, trees, retaining walls, etc.

Water:

1. Show all existing water line pipes, blow off assemblies, air releases, meters, and hydrants within 100 feet of the project limits or plan sheet limits, whichever is greater.
2. Show and identify size and material of existing water lines.

3. Identify proposed water line size and material (e.g., 12-inch DIP CL 52).
4. Assign a unique identifier to each water line that relates to a profile (e.g., 12-inch DIP CL 52 W/L "A").
5. Provide 10-feet of horizontal separation between water line and sanitary sewer. Seven and a half (7.5-feet) of horizontal separation is allowed between the water and sanitary sewer where conditions meet USM 120.05 and VDH 12VAC5-590-1190.
6. Provide 10-feet of horizontal separation between water line and other utilities where possible. Minimum separation requirements must meet USM 120.05 and 20 VAC 5-309-140.
7. Show, identify, and label size and material of fire line.
8. Specify tee connections to existing water lines as a wet tap or cut in tee.
    a. Create a pre-plan when cutting in the tee requires a water system shutdown.
    b. Avoid making a size on size wet tap on cast iron pipe.

9. Water line design:
    a. Provide efficient water designs that minimize the amount of needed pipe and the pipe size, excluding doing what is necessary to create and close loops.
    b. Provide hydraulic model if extending water main. Match site plan to approved hydraulic model.
    c. Provide effective water designs to provide the best possible water quality. Where possible avoid creating dead ends. Where dead ends are unavoidable, minimize pipe sizes and evaluate placing a water demand from a meter.
    d. Identify possible future water quality problems if the owner requires a large dead-end water system and cannot consume the water in the pipe within 3-5 days. Acquire additional easement area to install a future automatic water flushing station.
    e. Create and close loops where possible. Connect to all existing water line stubs accessible to the project even if they are not needed unless deemed unfeasible by Prince William Water.
    f. Where possible, avoid running the water line between residential lots.
    g. Where possible, avoid placing the water line near structural foundations.
    h. Where possible, align the water line to minimize restoration work (e.g., curb and gutter pan).
    i. Where possible, locate the water line under pavement to protect Prince William Water from other utilities placing their utilities near the water line.
    j. 10-inch and 14-inch pipe is not permitted.
    k. Provide water access to adjacent properties. Provide a water stub where appropriate to provide access.
    l. Stub out water lines that will be extended beyond the pavement.

10. Valve placement:
    a. Three (3) valves at tee intersections.
    b. Four (4) valves at crosses.
    c. Valves installed at a minimum of every 1,000-feet on long transmission lines.
    d. Place valves outside of sidewalks and gutters.

e. Avoid placing valves at pipe crossings where possible.
f. Valves are required to isolate existing customers from testing of a new water line.

11. Hydrant Design:
    a. Connect hydrants to main with a 6-inch DIP line.
    b. Place independent 6-inch gate valve on hydrant lead line as close to the service main as practical.
    c. If a water line will not be extended, water lines 8-inches or greater are typically terminated with a hydrant for flushing purposes.
    d. Hydrant leads 50-feet or longer require a valve at the tee and a second valve near a hydrant.
    e. Provide a second hydrant valve within 5-feet of the hydrant if the valve on the tee is inaccessible (e.g., the hydrant is placed behind a fence making the valve at the tee inaccessible).
    f. If subject to vehicle traffic the hydrants are to be set behind the back of curb with the proper offset distance, or bollards shall be set to protect the hydrant.
    g. Provide a minimum 4-foot clear area around the hydrant. Grade around the hydrant needs to be flat enough for a person to stand around the hydrant. Avoid placing hydrants in ditches or steep slopes.

12. Water Meters & Service Connection Design:
    a. Residential:
        i. Show meter location with standard meter symbol.
        ii. Set meter outside in a grassy area, behind the property line and sidewalk.
        iii. Do not set meters in the right-of-way.
        iv. Avoid placing the meters on top of storm pipe and storm easements if possible.
        v. Set meters as close to the water main as possible.
        vi. Limit service lines to 100-feet.
        vii. No couplings or 90-degree bends in the service line.
        viii. Water services cannot be tapped on a tee or bend.
        ix. Where possible, avoid back-to-back taps on water pipe.
        x. Do not tap water services off a hydrant lead.
        xi. Service lines cannot run through other pipes, manholes, storm structures, or valve boxes.
        xii. Three-quarter inch (¾") Type K Cooper is required per the detail. 1-inch copper can be used for fire suppression systems running through the meter or to mitigate friction loss in a long service line.
        xiii. Private water service lines between the meter and house greater than 100-feet, are to be specified (size and material) if available pressure is marginal (less than 45 psi.) to mitigate friction loss.

    b. Multi-family & Non-Residential Meters:
        i. All non-residential meters require a tee, 4-inch valve, and 4-inch DIP service line to meter.
        ii. The 4-inch valve shall be placed on the branch side of tee when applicable.

iii. Specify 4-inch DIP CL52, fully restrained, fully poly-wrapped pipe for the service line between the water line and meter. This specification is typically made in the plan view as the services lines are typically not profiled.
iv. Locate the meter in a grassy area where it is not subject to vehicle or pedestrian traffic, where possible.
v. Do not locate meters in sidewalks, front of doors, or decorated hardscape (e.g., stamped concrete).
vi. Meters are permitted in the asphalt where no grass area is available. Set meters next to the building with bollards for protection.
vii. Set meter locations as close to the water main as possible.
viii. Set water services perpendicular to the water main when possible.
ix. Provide the minimum requirement for straight runs of pipe going to and from the meters. Avoid 90-degree bends directly before and after the meter.
x. All meter sizes must be called out in the plan view. In addition, label sub-meters, water only meters, and irrigation meters.
xi. Consider water quality when locating meters.
xii. Do not tap water services off a hydrant lead or fire lines.
xiii. Meters greater than 3-inch must submit shop drawings for the meter vault.

Sewer:

1. Show all existing sanitary sewer pipes, manholes, laterals, force mains, flushing stations, air releases, vacuum breakers, and valves within 100-feet of the project limits or plan sheets, whichever is greater.
2. Identify size and material of the existing sanitary sewer lines. Indicate the direction of flow in the sewer line.
3. Identify all existing manholes with Prince William Water manhole numbers.
4. Show all proposed sanitary sewer pipes, manholes, laterals, force mains, flushing stations, air releases, vacuum breakers, and valves.
5. Identify proposed sewer size and material (ex. 8-inch C-900). C-900 PVC is required for all PVC applications. Alternative materials, such as DIP, may be required in certain circumstances.
6. Label all private sanitary sewers in plan view.
7. Sanitary Sewer Design:
    a. Make sanitary sewer connections at no less than 90-degrees to downstream flow. No acute angles to the downstream flow.
    b. Where possible, avoid running the sewer line between residential lots.
    c. Where possible, locate the sewer line under pavement to protect Prince William Water from other utilities placing their utilities near the water line.
    d. Provide sewer access to adjacent properties. Stub a sanitary line with a manhole where appropriate to provide access.
    e. Terminate all sanitary sewer stubs with a manhole, preferably outside the pavement. Avoid capped sanitary sewer stubs.
    f. Provide the best means to access the sanitary sewer. (e.g., SWM pond access roads).

g. Provide special protections for sanitary sewer and manholes in flood plain (e.g., raising the manhole and strapping down the sections), crossing a creek (e.g., pipe material & clay water stops), or aerial crossing.
h. Where possible, avoid bucking grade.
i. Do not locate the sanitary sewer in any type of structural area (e.g., dam embankment, geo-grid, loading area of a foundation, etc.).
j. Specify pump arounds where cutting in a sanitary sewer on an existing (active) sewer line.
k. DOG HOUSE MANHOLES ARE NOT PERMITTED.
l. Confirm that inverts to not conflict when coring an existing manhole. This becomes more critical as sanitary sewer pipe becomes larger than 8-inches.

8. Manhole design:
    a. Maximum distance between manholes is 600-feet.
    b. Manholes are not permitted in sidewalks or parking spaces.
    c. Provide and specify watertight manhole frames and covers for all manholes located outside of paved areas.
    d. Provide and specify watertight frames and covers in areas where the frames will be below the 25-year flood level.
9. Assign a unique manhole number to proposed manholes.
10. Sewer laterals:
    a. Show all sanitary laterals. Identify non-residential laterals with the size, material, and slope.
    b. No lateral connections to in-line manholes.
    c. No more than three laterals may tie to a terminal manhole.
    d. Clean-outs shall not be located in a sidewalk, driveway, or entrance.
11. Fats, Oils, and Grease (FOG):
    a. Provide external grease traps for any food preparation activities (schools, hotels, restaurants, etc.).
    b. Oil, Grease, Grit & Volatile liquids separator is required for automotive uses and car washes.
    c. Complete pretreatment standards and survey for any chemical use (cooling water returned to the sewer, laboratories, hazardous land use, etc.).
12. Horizontal separation:
    a. Provide 10-feet of horizontal separation provided between sanitary sewer and other utilities.
    b. Water line may be laid to 7.5-feet from the sanitary sewer or sewer manhole IF:
        i. The bottom of the water main is 18-inches above the top of the sewer.
        ii. The sewer manhole is watertight.
13. Low Pressure Force Mains (LPFM):
    a. Low pressure force main sizes range from 1-inch to 4-inches.
    b. LPFM shall be specified SCH 40 PVC. Label and provide pipe identifiers similar to water lines.

c. Minimize the number of bends in the force main.
d. Where possible, discharge the force main to a lateral.
e. All force mains greater than 4-inches will be constructed of DIP, unless approved by the Director.

Profile View

Water:

1. Profile water lines separately from sanitary sewer.
2. Profile all grade changes over existing water lines.
3. Identify each profile with unique identifier that matches the plan view (ex. 12" DIP CL 52 W/L A").
4. Report size and material of proposed water line.
5. Specify polywrapped for all DIP.
6. Provide minimum cover of 3.5-inch.
7. Provide hydrants at high and low points of the water line. Avoid high and low points where possible.
8. Call out all proposed valves, reducers, fittings, blow off assemblies, air releases, meter connections, fire line connections, and hydrants.
9. Show all pipes crossing the water line.
10. Specify the station restraint starts and ends. Eliminate small gaps between restraining zones.
11. Profile the existing water line if it needs to be restrained for new connections.
12. Show all utility crossings.
    a. 18-inch minimum between bottom of water line and the top of the sanitary sewer.
    b. 12-inches of separation between water line and other utilities (including storm sewer).
    c. Call out vertical separation from other utilities less than two feet.
13. Show existing and proposed grade over W/L.
14. Specify casing pipe material, size, and length, if applicable.
15. Match plan view and profile stationing.
16. Profile walls (including foundation) crossing the water line, if applicable.

Sewer:

1. Identify existing manholes with Prince William Water manhole numbers.
2. Report elevations of existing manhole tops. Report the new elevation if the manhole will be adjusted.
3. Report all invert elevations of existing manholes. Report new invert elevations cored into existing manholes.
4. Report the size, material, and slopes on all runs of sewer.

5. Drop across manholes:

a. Minimum difference in invert elevation = .2-feet for sewers less than 18-inches.
b. No connections shall be made where the difference in invert elevations is between 12-inches and 30-inches.
c. Provide inside drop connection where the difference is greater than 30-inches. Specify 5-foot manhole where a drop connection is required.
d. Manholes larger than 4-foot diameter are required for the sewer mains greater than 12-inches. The size increases as the sewer pipe increases.
e. If manholes are built on fill, specify a false bottom or spread footer.
f. Match the crowns of the existing sanitary sewer pipes in a manhole.
g. Manholes greater than 29-feet deep should be a minimum 5-foot diameter base.
h. No landings in the manholes.

6. Depth of Cover:
    a. All sewers with a depth of cover of 18-feet or greater will be DIP.
    b. See USM Table 1-6 for maximum depth of cover.
    c. Sewer main constructed in a street or travel-way must have 5-feet of cover.
    d. Sewer (in streets) installed between 3.5 and 5-feet must be DIP.
    e. Sewer in open areas must have a minimum cover of 3.5-feet.
    f. Force mains must be set no less than 3.5-feet deep and no greater than 8.0-feet deep.
    g. Avoid lateral connections deeper than 18-feet where possible.

7. Sewer Slopes:
    a. Minimum Slopes (USM Table 1-5):
        i. 8-inch in-line sewer at a slope of .47% or greater.
        ii. Terminal runs at a slope of .8% or greater.
        iii. Where possible, avoid slopes less than 1% on all sewer runs, including those upstream, which make a drop connection.
    b. Slopes of 20% or greater require approval of the Director.
    c. For run of sewer at slopes 14% or greater:
        i. Provide DIP.
        ii. Anchor to the slope.
        iii. Fully restrain all joints.
        iv. Place bend before the manhole to circular invert. Inverts at a steep angle create an elliptical core that does not seal well.
        v. Provide a concrete pad under the bend to disperse the weight of the pipe, to prevent settling that would shear the pipe from the manhole.
8. Specify cut-in manholes on the existing sanitary sewer runs, if applicable.
9. Call out vertical separation from other utilities less than two-feet.
10. Call out all lateral connections.
11. Specify watertight frame and covers, when located out of the pavement.
12. Specify polywrapped for any DIP runs of sewer.
13. Specify internal pipe coating, if applicable (e.g., larger than 12-inches, running between lots).

14. Show and identify vented manholes every 1,000-feet if line is running out of the pavement.
15. Profile walls and their foundation crossing the sewer line, if applicable.
16. Profile all pipes crossing the sanitary sewer line.
17. Low Pressure Force Main:
    c. Provide air release valves at high points.
    d. Force main shall enter the receiving manhole at no more than one-foot above the flow line of the manhole.
    e. Identify manholes within 1,000-feet of the receiving manhole of a force main discharge as lined.

Prince William Water Sheet:

1. Provide accurate water service level and sewer shed.
2. Provide the proper LFC designation, if applicable.
3. Thrust Restraint:
    a. Complete entire block.
    b. Note polywrapped DIP.
    c. Trench type 3 is required.
    d. Safety factor 1 to 1.5 is required as a minimum.
4. Match quantities reported for the fees, Local Review Table, and bond sheet match to what is proposed in the plans.
5. For lateral connections, note minimum inspection fees.
6. Sign as built release of plans block.
7. Provide approved hydraulic model summary where applicable or fire flow test data.
8. Select meter size in accordance with AWWA M22.
9. Provide meter schedule and fixture unit count list.
10. Complete sanitary lateral table.
    a. Provide 4-foot difference in elevation between the lowest floor elevation provided sanitary sewer and the crown of the sewer main.
    b. Specify ejector pumps for lots with less than 4-feet of elevation difference between lowest sewered floor and the crown of the sewer main.
    c. Provide a minimum slope of 2% for laterals in the right-of-way.
    d. Lateral materials located in the right-of-way must match the sanitary sewer main material.
    e. Provide inspector columns.
11. Include sanitary sewer design table.
    a. Report n value of 0.013.
    b. Account for existing flows, when applicable.
    c. Properly peak and total flows.
    d. Match slope and material in the design table to the plans.
    e. Peak flows must provide a scour velocity of 2.25-feet per second.
    f. Report d/D value and ensure it is under 80%.

g. Provide inspector columns.

12. LPFM design tables.
    a. Report the number pump per zone.
    b. Provide a zone map matching the design table.
    c. Provide scour velocity of 2-feet per second.

Updated: 6/12/2024 SK; SM