

Private Residential Pump Station Design Checklist



DISCLAIMER - This checklist is provided to Consulting Engineers for the express purpose of assisting them in compiling private residential pump station design plans for submittal to Pierce County Public Works. This checklist is merely a guide to assist the design engineer in providing the minimum information required for plan submittal. This checklist should be utilized in conjunction with the Residential Pump standard plans in completing your design. The complexity of your design may require additional information not included on this checklist. This checklist may be revised from time to time and the design engineer should insure that he/she has the most recent copy prior to compiling a design. If you have any questions regarding this checklist, please contact our office at (253) 798-4050.

A. Submittals

Done N/A

1. All application submittals and resubmittals must be submitted electronically by uploading PDF files at: <https://palsonline.co.pierce.wa.us/palsonline/#/dashboard>.
2. Initial submittal requirements:
 - a. A completed Residential Sewer Service Permit Application Form, and
 - b. private residential pump station plans, and
 - c. pump calculations stamped, signed and dated by design Engineer, and
 - d. If there are off-site or on-site Private Sanitary Sewer Easements required, submit the draft private easement documents for our review prior to execution and recording with the Pierce County Auditor's Office.
 - e. If the proposed private sewer line will serve more than one existing parcel, a draft Perpetual Reciprocal Easement, Mutual Maintenance Agreement and Covenant Running with the Land must be submitted for our review prior to execution and recording with the Pierce County Auditor's Office. The off-site private easements shall be executed and recorded prior to plan approval.
 - f. other supporting documents (if any).

B. Drafting

Done N/A

1. Vicinity Map: Identify project location on map, provide a north arrow and identify the scale used. Vicinity Maps must include a major arterial (e.g., SR512, I-5, Canyon Road East, etc.)
2. Plan size is 22" x 34" with sheets numbered consecutively (1 of 3, 2 of 3, etc.).
3. Approval signature block in upper right hand corner. It must be five (5) inches wide.

B. Drafting (cont.)

- | | <u>Done</u> | <u>N/A</u> | |
|-----|-------------|------------|---|
| 4. | | | Place "Plan approval expires one (1) year from the date of approval" inside or under signature block. |
| 5. | | | Engineering scale and north arrow: North arrow must point to top, left or right of page. |
| 6. | | | Existing/proposed adjacent roads: Show and label road names, include existing/proposed right-of-way, edge of pavement, road centerline, utilities, shoulder ditch, etc. if any side sewer work is required within existing right of way, easements or proposed right of way. Clearly identify roads as public or private. |
| 7. | | | Show and label all existing structures on the site to remain or to be demolished. All plumbed buildings to remain must be connected to the existing or proposed sanitary sewer system. Connection charges for each building to remain must be paid under a separate Sewer Service Permit (SWSR). |
| 8. | | | Project description: Number of Single-family Residences, Duplex Units, etc. — identified on plans. Include the proposed use for each building (SFR, Duplex, ADU, Garage, etc.). |
| 9. | | | Color text and graphics are not allowed. |
| 10. | | | Minimum text height is 0.08 inches. Minimum line width is 0.005 inches. Smaller text and lines may be allowed if they are legible, able to be scanned, and are reproducible. |
| 11. | | | Hatching patterns (lines or dots) must be used in lieu of solid hatching (fill). |
| 12. | | | Show Standard Pierce County Public Works construction notes for residential pump station on the plans |

C. Survey

- | | <u>Done</u> | <u>N/A</u> | |
|----|-------------|------------|---|
| 1. | | | Note the name of the licensed surveyor/engineer who provided the field topography on the plans. Include the date when the survey was completed |
| 2. | | | Two foot contour intervals: Show the existing and proposed topography for the entire property. If the property is flat, provide spot elevations. If the plan requires a cover sheet, the existing topography shall be shown on the cover sheet and the proposed topography shall be shown on the design sheets. |
| 3. | | | Elevations and contours must be based on NAVD 88. |
| 4. | | | Pierce County Benchmark or Temporary Benchmark: Location, and elevation must be shown on the plans. |
| 5. | | | Show bearings and distances for all existing property lines. Show parcel number(s) and property lines of the existing and adjacent parcel(s). |

C. Survey (cont.)

Done N/A

6. Show 100-year flood plain elevation on the plans. All manholes, cleanouts, and vaults shall be set a minimum of one (1) foot above flood plain elevation. If the property is not in the flood plain, make a note of this on the plans.
7. All public and private off-site sewer easements must be recorded and shown on the plans along with the respective Auditor's File Numbers (AFN) prior to plan approval
8. All public and private on-site sewer easements must be shown on the plans prior to plan approval, and must be recorded and their respective Auditor's File Numbers (AFN) added to the as-builts prior to final acceptance.
9. Show the bearings and distances of existing and proposed sewers within existing and proposed easements as well as the easement boundaries.

D. Utilities

Done N/A

1. All existing/proposed utilities in vicinity of residential pump station and building sewer shown on plans.
2. Parallel sewer and water lines must have ten (10) feet of horizontal separation (separation shall be measured from the outer wall of the pipes).
3. Sanitary sewer lines and water crossings:

The standard minimum vertical separation for water lines is 1.5 feet above the sanitary sewer line. Separation shall be measured from the outer walls of the pipes.

Contact the Sewer Division for unusual circumstances for the Sewer Division to determine if a reduced minimum vertical separation will be allowed. Additional provisions will be required.

If concrete encasement of the sanitary sewer is provided, then a reduced minimum vertical separation of 0.75 feet will be allowed. The concrete encasement shall extend 10 feet on each side of the crossing.

Class 52 ductile iron pipe may be used for the sanitary sewer in lieu of concrete encasement provided that there is no transitioning to other pipe materials between manholes.

E. Building Sewer

Done N/A

1. The plan view must show and label the existing and proposed building sewer pipe and pump station. Pipe must be labeled with the length, diameter, type, and slope. Sewer pipes must be dimensioned from buildings, property lines, and water lines. Show sleeves, trench dams, and concrete encasement of sewer pipe, if any. See the **Building Sewer Installation Guidelines** for more information.

E Building Sewer (cont.)

Done N/A

2. Show and label all existing and proposed manholes, cleanouts and sewer lines, located on or adjacent to parcel. Show existing sewers as dashed lines, and proposed sewers as solid lines.
3. Prior to the submittal of plans the point of connection (sewer main and sewer manhole) must be field verified unless bubble data/information exists. The location of existing sewer manhole ladder, invert and rim elevations **must** be field verified and shown on the plans as "Field Verified".
4. Show and label the existing side sewer stub "bubble" data. You can find the "bubble" data by researching the sewer main as-built plan drawings at <http://matterhorn3.co.pierce.wa.us/publicgis/> or by contacting a Sewer Division Engineering Technician at (253) 798-2737 or Sewer Division Engineer at (253)798-4050.
5. If a side sewer stub does not exist, show the proposed tap, its distance from the upstream and downstream sewer manhole, the pipe length, diameter, type, and the invert elevation of the proposed connection point to the existing sewer main. Show the existing sewer main, including pipe length, diameter, type and slope and both the upstream and downstream sewer manholes with the field verified rim elevations and invert elevations. If the sewer stub will cross other existing or proposed utilities, show and label them.
6. Side sewer taps will not be allowed to existing interceptors 18 inches in diameter or greater.
7. Any ductile iron pipe (DIP) used must be Class 52 and lined per Pierce County Specifications. All sewers to be constructed in fill areas must be DIP.
8. Minimum cover over pipe:

<u>Public ROW & Public Sewer Easement</u>	<u>Private Property not within a Public Sewer Easement</u>
5 Feet (PVC)	3 Feet (PVC)
5 Feet (D.I.)	3 Feet (D.I.)
9. Gravity building sewers shall have a minimum 2% slope
10. Show and label the existing and proposed cleanouts. Label all cleanouts with rim (top) elevation and invert (bottom) elevation.
11. Cleanouts are required at 100-foot intervals and at bends totaling 90 degrees or more.
12. Cleanouts located in paved areas require rings and covers.
13. The interior of existing concrete manholes that are tapped for a force main connection must be coated with protective coatings per Pierce County Specifications. New manholes that receive force main connections must be HDPE
14. Show and label existing on-site septic system location.

F. Residential Pump Station Design

Done N/A

1. Pump calculations shall be provided with the construction plans. Calculations shall include the following:
 - a. Total dynamic head (TDH) (Static head and friction loss calculated to point of discharge into gravity system).
 - b. Size of impeller.
 - c. Type of pump(s), manufacturer and model number.
 - d. Pump curve with the appropriate flow rate and head characteristics plotted.
 - e. Catalog cut sheet of selected type of pump.
 - f. Size of pipe (for handling minimum velocity of 2 fps velocity).
 - g. Size and dimensions of wet well.
 - h. Type of wet well. Provide manufacturer and model number for prefabricated fiberglass wet wells. Provide shop drawings for concrete wet wells (septic tanks not allowed).
 - i. 24-hour holding capacity (from alarm-on to invert elevation of the lowest building sewer into the wet well). A dedicated emergency generator with an automatic transfer switch may be substituted for 24-hour holding capacity.*
 - j. Specifications for wet well, pump(s), and all appurtenances.
 - k. Cycle time for pump-on and pump-off at peak flow.
 - l. Number of pump cycles per 24-hour period (minimum of 3 cycles per day suggested).
 - m. Specifications for control panel and alarm.
 - n. Supporting documentation for calculations (e.g., tables, charts, references).
 - o. If more than one pump system is connecting to a common pressure main, an engineering analysis is required that addresses the probability and effect of more than one pump operating at one time.
- * **Designs that specify an E-one pump system are not required to meet these design requirements.**
2. The wet well detail must show the following:
 - a. Pump installation and elevations (wet well base, pump off, pump on, alarm elevation, top of wet well, finished floor elevation etc.).
 - b. Dimensions of wet well.

F. Residential Pump Station Design (cont.)

Done

N/A

- c. Must maintain a minimum 1:1 slope set back from base of building foundation to the bottom of excavation where the wet well is to be installed.
- d. One (1) foot minimum separation between the bottom of wet well and pump off.*
- e. 24" minimum access hole into wet well. Duplex systems require a hatch and lifting rails.
- f. Separation between pump on and pump off:*
 - * < 0.5': unacceptable
 - * > 0.5' < 1.0': provide support letter from pump/float manufacturer
 - * > 1.0': acceptable
- g. Show bracket assembly used to attach float switch cables. The float switch cables shall not be attached to the discharge pipe. PVC or stainless steel fixtures must be used. Nylon wire ties, Velcro straps or predrilled holes shall be used to secure the float cables to the bracket assembly.*
- h. The junction box shall be located outside wet well. It shall be a corrosion resistant application. Use PVC type meter box as the junction box with the lid marked ELECTRIC.
- i. Rigid electrical conduit to be used from wet well to junction box.
- j. A waterproof seal on all lids is required.
- k. One half inch polyvinyl rope or stainless steel cable must be attached to the pump and secured to wet well for pump removal.*
- l. A quick disconnect inside the wet well is required for the pump system and must be above the 24-hour storage elevation.
- m. A check valve on each discharge line shall be provided inside of the wet well and must be above the 24-hour storage elevation.
- n. For duplex systems, a separate vault shall be provided outside the wet well to house the gate valves and combine flows from the two discharge lines into a single force main.
- o. The interior of concrete wet wells, if used, shall be waterproofed with coal tar epoxy per Pierce County Public Works – Sewer Division Specifications.
- p. If the pump system is in a traffic area or loading area, the structure shall be design to accommodate HS20 loading standards.

*** Designs that specify an E-one pump system and a 237-gal w-series tank (a.k.a. "squat tank") are not required to meet these design requirements.**