



Regulations for Private Outdoor Residential Sewage Pumps in Edmonds (Single Family Residential Only)

GENERAL

The following regulations apply only to single family, residential dwellings for pump stations that are constructed outside and not under or in any dwelling or structures. **These regulations also do not apply to multi-family or industrial use.** All other applications shall be reviewed on an individual basis. Any extension of the City's Sanitary Sewer System shall be completed in accordance with the terms of a Side Sewer Permit. All extensions must conform to the State of Washington Department of Ecology (Ecology) and City of Edmonds requirements. Side sewers that require sewer pumps are subject to City Engineering Department approval in all cases and shall be subject to Building Division requirements and approval if the sewer pump is built within the confines of the structure. Ejector systems may be used within the dwelling when any portion of the dwelling sewer system cannot gravity drain and in all cases shall require Building Division approval. See separate handout for ejector system requirements.

It is the City's policy that conveying sewage by gravity is the best system. Sewage pump stations will be permitted only in those circumstances when a gravity sewer service would be impractical, unreasonably expensive, environmentally destructive, or otherwise not feasible. **If a portion of the dwelling cannot gravity drain, an ejector system may be used to pump those systems to the house gravity line.** In all cases, the ejector system shall be approved by the Building Official. Sewage pump stations shall be complete and operational package grinder pump stations. All equipment shall be factory installed, except for the externally mounted control panel, electrical power connections, force main, gravity sewer inlet hubs, and the pump assembly, which are to be installed in the field.

The Pump Station must be designed by a licensed Civil engineer. This Engineer of Record must be registered in the State of Washington.

DESIGN STANDARDS

Pump station design shall conform to the current edition of the Ecology Criteria for Sewage Works Design, the Uniform Plumbing Code, and City of Edmonds requirements.

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Design flow rates shall be based on peak water demands of all fixtures and roughed in plumbing, as outlined in the current edition of the Uniform Plumbing Code, Appendix A.

CONSTRUCTION STANDARDS

Refer to the City website for all [City Standard Details](#). All materials, installation, and workmanship shall be in accordance with City standards and shall be in compliance with OSHA, UL, ASTM, NEC, and other applicable codes and regulations. In addition, the grinder pump station standards, materials, and installation shall comply with the manufacturer's engineering data and specifications.

PUMP STATIONS

Pump stations will not be allowed in areas where gravity sewer service is currently available or where sewer service would be available through the construction of trunk or lateral gravity sewer lines.

Design Report/Submittal

A design report including, plans, associated data, cut sheets and calculations to justify the installation of a pump station must be submitted to the City Engineer for review and acceptance prior to construction. The City Engineer must give approval prior to issuance of a Side Sewer Permit. Below is additional information to aid in preparation of the submittal.

1. Service area map that includes a topographical representation of the proposed grinder pump station with the entire potential collection system to the pump station. This includes property boundaries, walls and structures, trees and significant shrubs, existing services, contours, and the 100-year flood plain line (if applicable). The nearest collection system and the proposed connection of the force main to the sewer lateral shall also be shown on this map.
2. Design Calculations: This would include present, design, and ultimate water fixture counts and their associated flows. Pump and system curves shall be developed and presented using actual proposed equipment. Hydraulic computations presented shall include pump cycling time, wet well capacity, flushing velocity, force main hydraulic losses, minor losses, net positive suction head, sump basin flotation, electrical power requirements, float/ultrasonic elevations and other applicable calculations.
3. Below is the City's list of pre-approved packaged grinder pump stations:
 - Myers – SRA-125S Simplex Rail system with 2 Horsepower MG 200 Pump and 3 foot diameter basin
 - Barnes – Pipe Rail Simplex Fiberglass Lift Station with 2 Horsepower SGVF Pump and 3 foot diameter wetwell basin
 - Hydromatic - TG-PRO Complete Grinder Package with 2 Horsepower HPG200 Pump and 3 foot diameter basin
 - Zoeller - QLS Series Prefabricated lift station with 2 Horsepower Model 840 Pump and 3 foot diameter basin
 - E-One - DH151/DR151 Series Package System

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General Design

Pump stations located outside, not located under or in building structures, are subject to review and approval by the City Engineer. Unless otherwise approved by the City Engineer, pump stations shall be simplex grinder pump units consisting of a sump basin of a least 3 feet in diameter and six feet deep, grinder pump assembly, guide rail system, discharge piping, control panel, sump level controls and associated electrical and piping appurtenances. Plans, details and submittal requirements to the City Engineer shall include the following:

Site Requirements

1. Grinder pump station shall be located externally of residential dwellings and structures.
2. The pump station, including electrical panel box, shall be outside of areas prone to flooding and if applicable, protected from the 100-year flood.
3. Pump station shall be installed no closer than 5 feet from any structure, rockery, wall etc.
4. Pump station lid shall be installed at least 3 inches above the surrounding grade in dirt, grass, or garden areas. If located in an area subject to vehicular traffic, lids shall be traffic rated and shall be installed flush to concrete, asphalt, or surrounding ground surface. The pump station shall be designed and located to allow easy access to the sump basin and installed equipment. Hatches and other openings shall be provided to permit access for inspection, repairs, equipment removal, and cleaning. Wet well covers shall include provision for padlocks.
5. No potentially large shrubs or trees shall be placed along the force main alignment. Sewer lines, conduits and pump station shall not be installed directly under large trees or shrubs.
6. Plan and profile of sewer force main and electrical conduit.
7. At least one hose bib on the house shall be within 15 feet of the sump basin.
8. Provide cross section of pump station showing all float/ultrasonic switch elevations, invert pipe in, top of electrical conduit pipe penetration elevation, and force main penetration elevation and associated pipe sizes.

Structural Requirements

1. The pump station shall be equipped with ventilation and odor mitigation that complies with manufacturer's and Department of Ecology Criteria for Sewage Works Design (Orange Book) requirements for outdoor applications.
2. Unless otherwise approved by the City Engineer, the sump basin shall be filament wound non-tapered fiberglass or high density polyethylene basin with a minimum wall thickness of 1/4 inch. An anti-flotation flange or steel plate shall be molded into the bottom of the basin. The concrete anti-flotation base shall be poured around the sump basin base and encapsulate the anti-flotation flange/plate to prevent buoyant forces from displacing the sump basin while empty. Sizing of anti-flotation base for the stations in the pre-approved list shall be per attached buoyancy tables. If a pre-approved station is not proposed by the design engineer, buoyancy calculations, with associated anti-flotation requirements, must be provided as part of the submittal. The calculations will assume groundwater

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elevation at finish grade and a 1.2 factor of safety. If a geotechnical report, provided by a licensed engineer, is included in the submittal for the site, buoyancy calculations reflecting actual groundwater elevations can be used to calculate actual anti-flotation requirements. All calculations shall include a 1.2 factor of safety.

3. Pump station sump basin shall be installed on a 12 inch minimum layer of Crushed Surfacing Base Course compacted to 95% of proctor density.
4. Sumps shall be watertight and shall be constructed of fiberglass or HDPE, unless otherwise approved by the City Engineer. Minimum sump basin capacity shall be 150 gallons. The sump basin capacity between pump on and off levels shall be sized to limit pump cycle time to not exceed the manufacturer's recommendations for starts per hour and meet Instrumentation requirements item #1 (below).
5. Sumps and receiving tanks shall be provided with substantial covers having a bolt and gasket-type manhole or equivalent opening to permit access for inspection, repairs, pump removal, and cleaning. Provide a vent pipe and any required odor control system per manufacturer's recommendations.

Mechanical Requirements

1. All components used within the pump station or as part of the pressure main shall have a source of supply and/or repair located within a 24-hour delivery time. Documentation of these sources shall be provided to the City Engineer at the time of submittal.
2. A 4-inch cleanout is required on the gravity sewer line between the building and the grinder pump basin.

Instrumentation Requirements

1. Unless one of the pre-approved package systems is used, pump on, off, and alarm levels shall be controlled by three mercury tube float switches or by ultrasonic level measurement of a manufacturer approved by the City Engineer. With the exception of the E-ONE package system, floats shall be a minimum of 1 foot apart, with the off float being a minimum of one foot above the bottom of the sump basin and the High water alarm float being a minimum of 12 inches below the invert elevation of the inlet pipe into the sump basin.
2. Provide alarms for high wet well and pump failure. Provide an audible (minimum 100-dB level), as well as visual, alarm panel located inside the residence. A battery operated backup power supply for the alarm system is required. The high wet well alarm level should be set per manufacturer's recommendations.
3. Pump stations shall be provided with a red, flashing alarm lamp mounted to be visible from the nearest public right-of-way. The red alarm lamp shall be energized only upon high wet well level or when the test switch is enabled.
4. Controls shall automatically re-start after disruptions in power supply.

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Electrical Requirements

1. Pump control panel shall be a NEMA 4X cabinet and located in direct line of sight from the pump station. The panel shall have a dedicated circuit from the dwelling's panel board.
2. With the exception of the items in the instrumentation requirements, all electrical controls must be outside of the home and accessible.
3. All electrical leads to grinder pump and accessories must be installed in buried, non-metallic conduit.
4. State electrical permit is required. This can be obtained at the State Department of Labor & Industries.
5. All electrical connections, conduit, etc. must be inspected by the State Electrical Inspector.

Force Main Requirements

1. All pipe and fittings for the grinder pump system shall be 2-inch High Mol (200 psi) polyethylene pipe from the grinder pump to the gravity sewer stub at the property line. The polyethylene pipe shall be joined by brass fittings with stainless steel inserts. The pipe location shall be identified by installation of a 12-gauge tracer wire wrapped and taped every 10 feet to the force main. Minimum cover on force mains shall be 3 feet (or as required to provide minimum clearance from water mains and other utilities).
2. Force main diameter shall be sized for a minimum flushing velocity of 2.5 ft/sec. The minimum force main diameter shall be 2 inches.
3. All discharge pipes should be located within private property and connect to a side sewer cleanout at the street right-of-way per City of Edmonds Standard Detail SS-202.
4. Fittings along the force main, such as bends, will not be allowed. Pipe couplings shall be brass compression with stainless steel inserts.

Other

1. All newly installed sewer lines and force main must be left exposed in the trench for City inspection and location recorded.
2. Prior to the construction of the grinder pump station and permit issuance, the Engineering Division must approve the plans and profile. A separate right-of-way permit must be secured for all work in the City right-of-way. Only licensed and bonded contractors can obtain this permit. All sanitary side sewer line installations in the City right-of-way must be constructed of 6-inch or larger PVC or ductile iron pipe. Any deviation from these rules and regulations must receive the prior approval of the City Engineer.
3. A summary checklist of the required items listed above, buoyancy table, and lift station min requirement graphic has been included below to aid in preparation of the design report.

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Design Report Checklist (Single Family)

Note: **If site is located in the Perrinville LID 210 area**, the City of Edmonds Public Works provides the design for grinder pump station (no need for submittals) using data supplied by the developer. A side sewer permit is required and a licensed and bonded Contractor shall install the grinder pump station and appurtenances.

1. Qualifications of Engineer

Signed and stamped drawings and supporting data

2. Drawings (to scale drawings)

- Topographical plan with property boundaries, existing site building locations, trees, large shrubs, existing utilities, walls, and 100-year flood plain (if applicable)
- Location of Proposed Pump station, Red Flashing alarm, Electrical Control Panel, associated conduits, proposed force main, gravity pipes and connections and profile of force main.
- Location of hose bib that is within 15' of pump station.
- Pump station cross section with associated float and pipe sizes with grades.

4. Design Calculations

- Ultimate water fixture counts and their associated flows
- Proposed grinder pump performance curve reflecting site conditions
- Float elevations
- Pump station hydraulic computations for the following design elements:
 - Pump cycling time and max starts in an hour
 - Wet well capacity
 - Flushing velocity
 - Force main hydraulic losses
 - Minor hydraulic losses due to valves and fittings
- Sump basin anti-floatation/buoyancy calculations or table values (if pre-approved system is used)
- Electrical power requirements
- Other applicable calculations

5. Additional Submittal Requirements Checklist

- Manufacturer's data, drawings and details for pre-assembled grinder pump station, instrumentation and associated appurtenances clearly indicating compliance with all specified requirements in this regulation packet.
- Documentation of source of supply and/or repair located within 24 hour delivery time.

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Buoyancy Calculation Tables for Pre-Approved pump stations

| E-One Buoyancy Calculations | |
|-----------------------------|--|
| Model | Minimum amount of Concrete needed (cf) |
| DH/DR-151-63 | 14.5 |
| DH/DR-151-74 | 16.6 |
| DH/DR-151-93 | 20.4 |
| DH/DR-151-129 | 27.5 |
| DH/DR-151-160 | 33.6 |

| 3' Diameter Basin Calcs (all other pre-approved stations) | |
|--|--|
| Depth of structure to Finish Grade | Minimum amount of concrete needed (cf) |
| 6 | 21.2 |
| 7 | 24.7 |
| 8 | 28.2 |
| 9 | 31.8 |
| 10 | 35.3 |
| 11 | 38.8 |
| 12 | 42.3 |
| 13 | 45.9 |
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LIFT STATION MIN REQUIREMENTS

