city of edmonds
development information

Regulations for Private Residential Sewage Pumps in Edmonds
(Multi-Family Residential Only)

GENERAL

The following regulations apply only to multi-family, residential dwellings such as apartment complexes, condominiums, and two or more single-family dwellings sharing the same pump station. **These regulations do not apply to single 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 Engineering approval in all cases and shall require Building Division approval if the sewer pump is built within the confines of the structure.

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. The 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, gravity sewer inlet hubs, and the pump assembly, which are to be installed in the field.

The electrical billings for multi-family pump stations are not the responsibility of the City. Owners shall coordinate with Snohomish County PUD.

The Engineer of Record must be registered in the State of Washington and have had prior experience in designing similar systems to the satisfaction of the City Engineer. Qualifications shall be included within the design report.

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. The Ecology criteria include design standards and guidelines for lift station location, pump sizing and selection, wet well sizing criteria, alarm system, emergency response criteria, lighting, and ventilation.

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. Future additions and remodeling construction that affect the number and type of fixtures shall submit revised calculations showing the revised peak flow rates. Exterior hose bibs should not be included in these calculations.

CONSTRUCTION STANDARDS

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.

Pre-Design Report

A pre-design report to justify the installation of a pump station must be submitted to the City Engineer prior to design. The City Engineer must give approval of a pump station prior to issuance of a Side Sewer Permit. The report shall include the following information. A checklist of the pre-design report items is included at the end of these regulations for the applicant's use.

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, existing services, and the 100-year flood plain line. 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, and other applicable calculations.
3. List of acceptable manufacturers of packaged grinder pump station, unless otherwise approved by the City Engineer:
    - Myers
    - Barnes
    - Hydromatic

General Design

Pump stations are subject to review and approval by the City Engineer. Pump stations shall be duplex grinder pump units consisting of a sump basin, grinder pump assembly, guide rail system, discharge piping, control panel, and sump level controls. Plans and details shall include the following:

Site Requirements

1. Grinder pump station shall be located externally of the residential dwelling, unless otherwise approved by the City Engineer.
2. The location of the grinder pump system shall be chosen to reduce negative pressure and air entrapment.
3. The pump station, including electrical panel box, shall be protected from the 100-year flood.
4. Pump station shall be installed no closer than 5 feet from any structure, rockery, etc.
5. Pump station lid shall be installed no less than 2 inches above the surrounding grade in dirt, grass, or garden areas. Lids shall be installed flush in concrete or asphalt surface 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.
6. No potentially large shrubs or trees shall be placed along the force main alignment. Sewer lines shall not be installed directly under large trees or shrubs.
7. Hose bibs on house shall be within 15 feet of grinder pump.

Structural Requirements

1. 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.
2. Pump stations shall be equipped with ventilation that complies with NFPA code.
3. 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. A 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. Calculations shall assume that the groundwater table is at grade with the pump station lid and include a 20 percent factor of safety. Submit floatation calculations to the City Engineer for review and approval.
4. The sump basin shall provide for the volute of the pumps to be fully submerged.
5. For sump basins greater than 3 feet in diameter, the sump floor shall be sloped for proper installation and function of the pump inlet. The sump basin and piping system shall minimize vortexing, debris buildup, and other inlet problems. No down spouts, footing

drains, or floor drains shall be connected to any sanitary sewer line either through a gravity or forced sewer line.

6. Pump station sump basin shall be installed on a firm earth base or washed gravel. Calculations must show that the soil bearing pressure is adequate for a sump basin full of water.
7. Backfill material around the pump station and sewer lines shall be free of debris, rocks greater than 1½ inches in diameter, concrete, etc.
8. Sumps and receiving tanks shall be watertight and shall be constructed of fiberglass or high density polyethlene, unless otherwise approved by the City Engineer. Minimum sump basin capacity shall be 165 gallons per dwelling unit. In addition, the sump basin capacity between pump on and off levels shall be sized to limit pump cycle time to not exceed 10 starts per hour.
9. 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 to extend back to the dwelling and terminate through the roof.

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. Each pump inside of the duplex pump station shall be sized to handle the calculated peak flow rate.
3. Pumps shall have double mechanical seals. Pumps shall have a replaceable impeller and replaceable volute wear ring.
4. The pump grinder unit shall be capable of cutting solid material found in normal domestic sewage, including reasonable amounts of foreign objects such as plastic, rubber, sanitary napkins, and disposable diapers, into a fine slurry that will pass freely through the pump, service line, and force main.
5. The pump motor shall be of the submersible type rated for minimum 2 horsepower, unless otherwise approved by the City Engineer.
6. All hardware in the wet well and other vaults, including pump rails, float hangers, anchor bolts, etc. shall be 316 stainless steel. Fiberglass reinforced plastic (FRP) float hangers will also be accepted.
7. The sewer pump discharge line shall be provided with an accessible check valve and gate valve within the tank.
8. A 4-inch cleanout is required on the gravity sewer line between the building and the grinder pump.
9. Building sewers that receive discharge from any pump or other mechanical device shall be adequately sized to prevent overloading. Two fixture units shall be allowed for each GPM of continuous flow (refer to Uniform Plumbing Code, Chapter 4).

10. All grinder pumps shall be on a rail system and shall be installed for easy removal of the pump, unless otherwise approved by the City Engineer.

Instrumentation Requirements

1. Pump on, off, and alarm levels shall be controlled by four mercury tube float switches or by ultrasonic level measurement of a manufacturer approved by the City Engineer. A fifth level control is recommended for redundant off/low water alarm.
2. Pump controls shall alternate the run cycle time of the pumps.
3. 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 should activate when more than two-thirds of the wet well tank depth is exceeded.
4. 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.
5. Controls shall automatically restart after disruptions in power supply.

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. All electrical controls except audio alarm must be installed outside of the home and accessible.
3. All electrical leads to grinder pumps 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 (200psi) polyethylene pipe from the grinder pump to the existing 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 the 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 E6.9.
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 sewer lines 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.

#E61

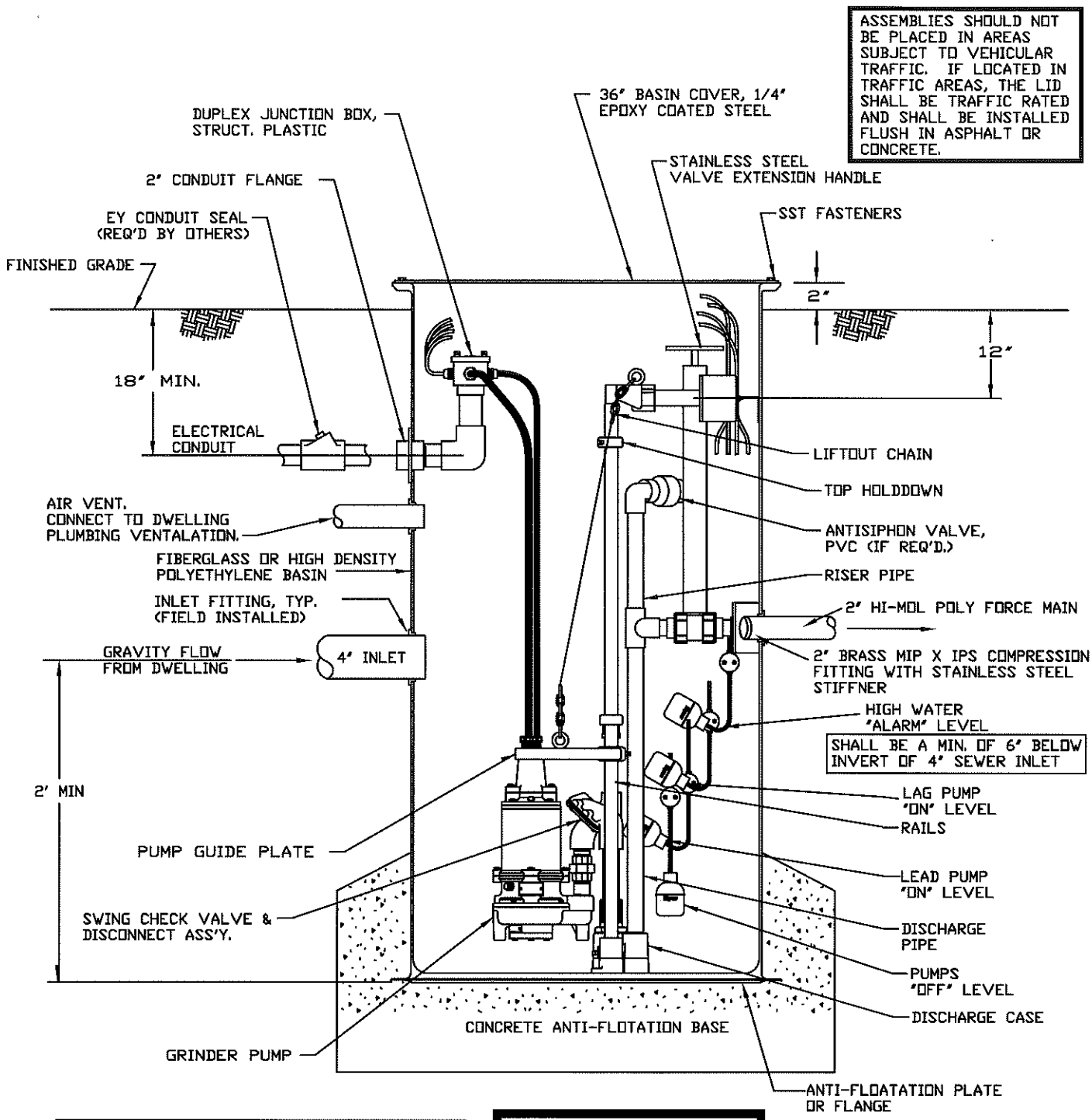
Pre-Design Report Checklist (Multi-Family)

1. **Qualifications of Engineer**

2. **Topographic Service Area Map**
   - ❑ Topographical limits of pump station service area
   - ❑ Property boundaries
   - ❑ 100-year flood plain line
   - ❑ Location of nearest sewage collection system piping
   - ❑ Location of sewer stub that the force main will connect to
   - ❑ Location of domestic and fire line to the building

3. **Design Calculations**
   - ❑ Present, design, and ultimate water fixture counts and their associated flows
   - ❑ Proposed grinder pump curve and system curve
   - ❑ Pump station hydraulic computations for the following design elements:
     - ❑ Pump cycling time
     - ❑ Wet well capacity
     - ❑ Flushing velocity
     - ❑ Force main hydraulic losses
     - ❑ Minor hydraulic losses due to valves and fittings
     - ❑ Net positive suction head
   - ❑ Sump basin anti-floatation calculations
   - ❑ Soil bearing pressure
   - ❑ Electrical power requirements
   - ❑ Other applicable calculations

4. **Additional Submittal Requirements Checklist**
   - ❑ Manufacturer's data, drawings and details for pre-assembled grinder pump station and instrumentation clearly indicating compliance with all specified requirements.
   - ❑ Documentation of source of supply and/or repair located within 24 hour delivery time.
   - ❑ Drawing showing location of pump station , discharge line, connection to sewer main, cleanouts, fittings, and alarm panel (audio and visual), etc.



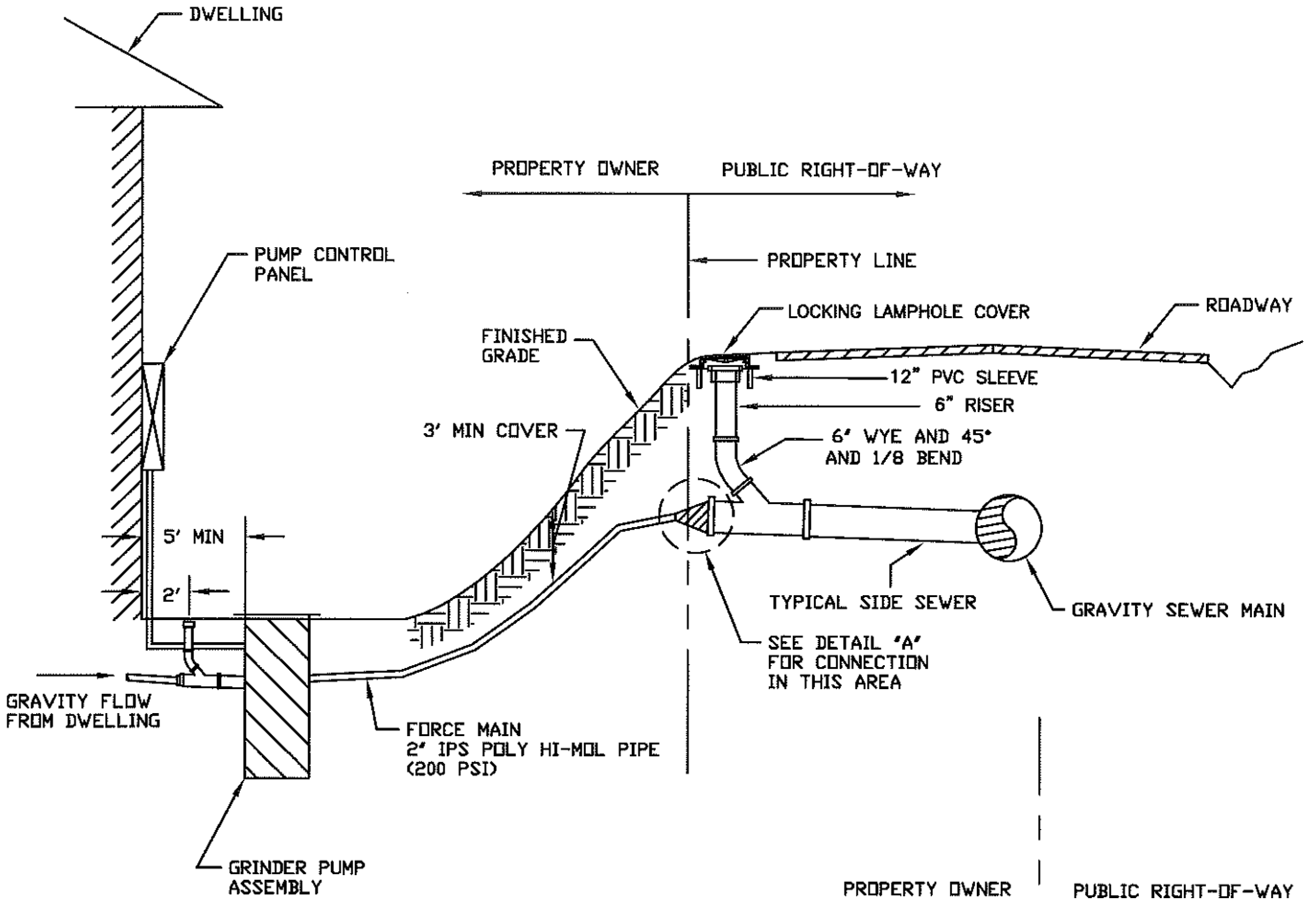
CITY INSPECTION REQUIRED BEFORE BACKFILL

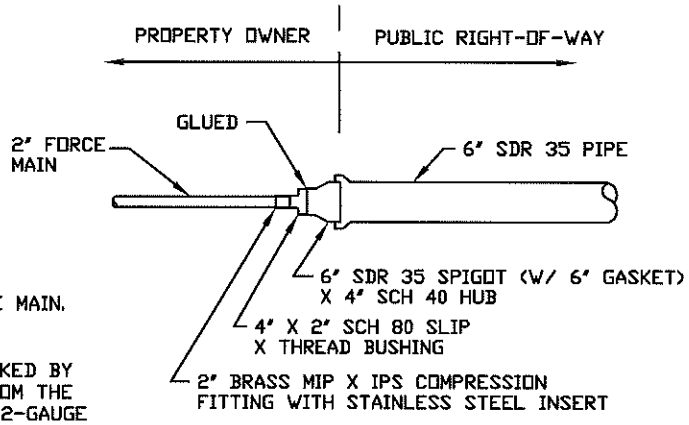
REFER TO CITY HANDOUT #75 FOR DESIGN AND PERMIT REQUIREMENTS

1890–1990

CITY OF EDMONDS

REVISIONS		STANDARD DETAIL			
APPROVED BY	DATE				
D. GEBERT	6/16/03	36" DUPLEX GRINDER PUMP WITH REMOTE MOUNTED CONTROL PANEL			
D. GEBERT	6/23/03	DATE 5/9/02	SCALE NTS	DWG NO. E6.8	





DETAIL "A"

GRINDER PUMP SERVICE LINE NOTES

1. WRAP AND TAPE 12 GAUGE TRACER WIRE EVERY 10' TO THE FORCE MAIN.
2. THE LOCATION OF THE STUB SERVICE TERMINATION SHALL BE MARKED BY THE CONTRACTOR WITH 2" X 4" TIMBER EXTENDED VERTICALLY FROM THE PLUG END TO A MINIMUM OF 3' ABOVE THE GROUND SURFACE. A 12-GAUGE GALVANIZED WIRE SHALL BE ATTACHED TO THE TIMBER FROM END TO END. NEITHER THE WIRE NOR THE 2" X 4" SHALL BE ATTACHED TO THE SEWER PIPE OR PLUG. THE EXPOSED PORTION OF THE 2" X 4" SHALL BE PRE-PAINTED TRAFFIC WHITE WITH THE WORDS "GRINDER PUMP SEWER CONNECTION" STENCILED ON WITH BLACK PAINT. THE END OF THE 2" X 4" SHALL BE PRE-MARKED IN PERMANENT INK WITH THE LENGTH OF THE TIMBER INSTALLED.
3. GRINDER PUMP VENTILATION SHALL BE CONNECTED TO THE HOUSE SEWER VENTING SYSTEM, PER NFPA CODE.

CITY INSPECTION REQUIRED PRIOR TO BACKFILL

1890–1990

CITY OF EDMONDS

REVISIONS	
APPROVED BY	DATE
D. GEBERT	6/16/03
D. GEBERT	6/23/03

STANDARD DETAIL

GRINDER PUMP SERVICE CONNECTION TO GRAVITY SEWER MAIN

DATE	SCALE	DWG NO.
5/9/02	NTS	E6.9