

# YELM ENGINEERING SPECIFICATIONS AND STANDARD DETAILS

## CHAPTER 5 SEWER

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## **CHAPTER 5.00 SEWER**

### **5.00 GENERAL CONSIDERATIONS**

#### **5.00.010 General**

The City of Yelm Technical Specifications were developed for use with onsite Septic Tank Effluent Pump (STEP) tank installations, onsite wastewater disposal system installations that are to be converted to STEP, and STEP collection line installations.

The City of Yelm Technical Specifications are subject to change as new regulations come into effect.

Within the corporate City limits where a public sewer is available it must be used. Where public sewer is not available within the City limits, connection is required provided that the premises are within 200 feet of the public sewer measured from the lot line closest to the existing portion of the City's collection system, except in the case of private residential or commercial developments. In this case, connection of all structures generating sewage shall be required to connect to the public sewer regardless of distance from the public sewer.

Prior to the release of any water meters, or operation of any STEP systems, all Public Works improvements must be completed and approved and all applicable fees must be paid.

See Section 13.08.010 YMC for definitions of specific sewers. Maintenance of the building or side sewer shall be the responsibility of the property owner. Maintenance of the lateral shall be the responsibility of the property owner.

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a Professional Engineer or Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

Ownership, operation and maintenance of the tank, pump, and pump controls shall be the responsibility of the City only after the system has been inspected and approved and an easement is granted, and ownership of the STEP component conveyed to the City and the warranty period of one year has expired. It is required by the City that the easements for a new development be granted on the plat, otherwise, an easement for each lot will have to be granted at the time of connection.

Power shall be provided by the customer. The customer shall be responsible for notifying the City when the control panel alarm buzzer is activated. All sewer pipe, drains and plumbing between the tank and the building shall be the responsibility of the customer. The customer shall be responsible for curtailing water usage until City forces respond to the customer's notification. The City will accept no responsibility for damages resulting from a plumbing backup, such as may occur if water usage is not curtailed during an alarm condition or if the customer disables the alarm.

The owner of commercial or residential property(s) with a City of Yelm STEP sewer system(s) shall not undertake any alterations of the sewer system(s), including covering or obstructing STEP tank riser lids, cleanouts, pump control panels and lockout switches, without the prior written approval of the City. Any damage caused by the owner or their agents, including tree and bush roots or unmaintained trimming of the same, shall be repaired by the City of Yelm at the owners expense.

Currently, only the Orenco STEP Pump System shown in the drawing section of this chapter has been approved by the City. Any alternate must be reviewed and approved by the City.

#### **5.00.020 Design Standards**

The design of any STEP sewer system shall conform to City standards and the latest version of the Criteria for Sewage Works Design prepared by the Department of Ecology (hereinafter referred to as the DOE Design Manual). In case of conflict between the two Standards, the most stringent conditions shall apply.

The layout of extensions shall provide for the future continuation of the existing system as determined by the City. In addition, main extension shall be extended to and through the side of the affected property fronting the main. Individual service boxes shall be installed to serve each lot.

Pump, STEP tank, and pipeline sizing shall conform to the criteria as set forth herein.

The applicable General Notes on the following pages shall be included on any plans dealing with pressure sanitary sewer design.

## **GENERAL NOTES (SANITARY SEWER MAIN INSTALLATION)**

- A. All workmanship and materials shall be in accordance with City of Yelm standards and the most current copy of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction (WSDOT/APWA).
- B. All approvals and permits required by the City of Yelm shall be obtained by the contractor prior to the start of construction.
- C. If construction is to take place in the County Right-of-Way, the contractor shall notify the County and obtain all the required approvals and permits.
- D. A preconstruction meeting shall be held with the City of Yelm prior to the start of construction.
- E. The City of Yelm shall be notified a minimum of 48 hours in advance of a tap connection to an existing main. A City representative shall be present at the time of the tap.
- F. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the Underground Locate Line at 1-800-424-5555 a minimum of 48 hours prior to any excavation.
- G. Side sewer services shall be PVC, ASTM D 3034 SDR 35 with flexible gasketed or solvent weld joints.
- H. All plastic pipe and services shall be installed with continuous tracer tape, installed 12" to 18" under the proposed subgrade. The marker shall be plastic non-biodegradable, metal core or backing marked "SEWER" which can be detected by a standard metal detector. In addition, step systems and force mains shall be installed with 14 gauge, heavy coated UF direct bury copper wire wrapped around all plastic pipe, brought up and tied off at valve body. Tape shall be Terra Tape "D" or approved equal. The tape and wire shall be furnished by the contractor.
- I. All buried power for STEP systems shall be installed with continuous tracer tape installed 12" above the buried power. The marker shall be plastic non-biodegradable, metal core backing marked "power". Tape shall be furnished by contractor.
- J. Bedding of the sewer main and all appurtenances shall be sand and compaction of the backfill material shall be required in accordance with the above mentioned specification (See general note 5.60-A).
- K. Temporary street patching shall be allowed for as approved by the City engineer. Temporary street patching shall be provided by placement and compaction of 2 inch minimum asphalt concrete cold mix. Contractor shall be responsible for maintenance as required.

- L. Erosion control measures shall be taken by the contractor during construction to prevent infiltration of existing and proposed storm drainage facilities and roadways.
- M. Provide traffic control plan(s) in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) as required.
- N. It shall be the responsibility of the contractor to have a copy of these approved plans on construction site at all times.
- O. Any changes to the design shall first be reviewed and approved by the City of Yelm.
- P. All STEP mains shall be hydrostatically tested in conformance with the above-referenced specification for testing water mains. (See note 1.) In addition, all STEP mains shall be pigged/cleaned in the presence of the City Inspector prior to placing STEP main in service.
- Q. Prior to backfill all mains and appurtenances shall be inspected and approved by the City of Yelm. Approval shall not relieve the contractor for correction of any deficiencies and/or failures as determined by subsequent testing and inspections. It shall be the contractor's responsibility to notify the City of Yelm for the required inspections.
- R. Pump control panels shall be located on garage wall or remote post, 5-feet from top of panel to finish grade, unless otherwise authorized by the City of Yelm.
- S. In the event that the Department of Labor and Industries or the city should require a separate "on-off" switch controlling power to the Pump Control Panel, said switch shall have a locking cover model # 5031-0 Rayntite Single Gang Weatherproof Cover 1.406" diameter.
- T. Inspections for onsite STEP installations are required. A 48 hour notice to the sewer department is required prior to the inspection.

Items needing inspection are:

- 1. Tank installation, ie; bedding and location
  - 2. Tank infiltration, exfiltration test
  - 3. S.S. pressure test
  - 4. Service line pressure test
  - 5. Final Inspection
- U. All posts used to support pump control panels, must be hot dip galvanized Unistrut or approved equal.

## 5.10 STEP TANK SYSTEM

### 5.10.010 STEP Tanks

STEP tanks shall be the size and type as denoted in these specifications and as shown on the standard drawings. Grease interceptors shall be sized in accordance with the EPA Design Manual (625/1-80-012) and shall be of a configuration consistent with industry standards. Grease interceptor vessels will be subject to requirements of the STEP tank.

STEP tanks with an influent pipe invert elevation of less than or equal to 4 feet, which are not placed in traffic bearing areas shall meet the loading criteria listed in section 5.10.030.

All models of tanks will be certified by a licensed structural engineer that they will meet the loading conditions specified herein. The Structural Engineer certifying each model of tank shall submit drawings including but not limiting to the following:

1. Plan view showing dimensions of tanks and the size and location of any openings in the tank.
2. Side section of tank showing dimensions and thickness.
3. End section of tank showing dimension and thickness.

STEP tanks with influent pipe inverts greater than 4 feet, and/or are subject to traffic bearing loading, shall meet the loading criteria listed in section 5.10.030.

All models of tanks will be designed by a licensed structural engineer. Calculations shall be submitted for review.

An inspection port will be required over the inlet baffle for all STEP tanks. A 24" diameter minimum riser inspection port/clean-out shall be required.

### 5.10.020 STEP Tank Sizing

STEP tanks for the City of Yelm will be sized and configured as outlined, and shall meet the DOE Design Manual criteria for vessel sizing and configuration.

<b>TABLE 1 – STEP TANK SIZING</b>	
<b><u>Descriptions</u></b>	<b><u>Tank Size</u></b>
Up to 4 bedroom home	Min 1,250 gallons liquid capacity
5/6 bedroom home/Duplex	Min 1,500 gallons liquid capacity

STEP tanks for any applications of institution, multi-family dwelling or, other structures not listed above shall be sized in accordance with the latest version of the DOE Design Manual. Peak-day flow for purposes of sizing STEP tanks shall be calculated using Table 2, Accepted Engineering Manual, or actual operating records, whichever is more stringent. All STEP tank configuration will be two compartment and shall meet requirements of the DOE Design Manual with the following additions:

- A. All concrete STEP tanks 1,250-3,000 gallons will be two compartment tanks divided by a baffle as shown in Drawing Detail 5-10 and 5-11. On 1,500 gallon tanks, install one 4-inch diameter hole centered on baffle wall 20 inches on center from bottom of floor. 3,000 gallon tanks will have one 4" diameter hole centered on tank baffle wall 29" on center from floor of tank.
- B. On 6,000-gallon tanks, install one 6-inch diameter hole centered across width of tank baffle 40 inches on center above floor of tank in each baffle.
- C. If approved by the Owner, 6,000-gallon tanks used in conjunction with a pump tank may not require a baffle depending on diameter.
- D. No tank larger than 6,000 gallons will be used in the City of Yelm STEP system.

<b>Table 2 – Estimated Daily Sewer Flows</b>	
Type of Establishment	Gallons per person per day (unless otherwise noted)
Airports (per passenger)	5
Apartments - multiple family (per resident)	65
Bathhouses and swimming pools	10
Camps:	
Campground with central comfort stations	35
With flush toilets, no showers	25
Construction camps (semi-permanent)	50
Day Camps (no meals served)	15
Resort camps (night and day) with limited plumbing	50
Luxury camps	100
Cottages & small dwellings with seasonal occupancy	50
Country clubs (per resident member)	100
Country clubs (per non-resident member present)	50
Dwellings:	
Boarding houses	50
additional for non-resident boarders	10
Luxury residences and estates	150

Multiple family dwellings (apartments)	65
Rooming houses	40
Single family dwellings	75
Factors (gallons per person, per shift, exclusive of industrial wastes)	35
Hospitals (per bed space)	250+
Hotels with private baths (2 persons per room)	60
Hotels without private baths	50
Institutions other than hospitals (per bed space)	125
Laundries, self-service (gallons per wash, i.e., per customer)	50
Mobile home parks (per space)	250
Motels with bath, toilet, and kitchen wastes (per bed space)	50
Motels (per bed space)	40
Picnic Parks (toilet wastes only) (per picnicker)	5
Picnic parks with bathhouses, showers, and flush toilets	10
Restaurants (toilet and kitchen wastes per patron)	10
Restaurants (kitchen wastes per meal serviced)	8
Restaurants additional for bars and cocktail lounges	2
Schools:	
Boarding	100
Day, without gyms, cafeterias, or showers	15
Day, with gyms, cafeterias, and showers	25
Day, with cafeteria, but without gyms, or showers	20
Service stations (per vehicle served)	10
Swimming pools and bathhouses	10
Theaters:	
Movie (per auditorium seat)	5
Drive-in (per car space)	5
Travel trailer parks w/o individual water and sewer hook-ups (per space)	50
Travel trailer parks with individual water and sewer hook-ups (per space)	100
Workers:	
Construction (at semi-permanent camps)	50
Day, at schools and offices (per shift)	15

All tanks install a 4-inch diameter hole within 1 inch of crown of baffle for venting or 11 ½ inch space between top of baffle wall and top of tank.

Designers to consult with Public Works Director prior to design of commercial STEP installation and tanks over 3,000 gallons to verify tank sizing, vault configuration, pump requirements, and electrical requirements.

Underestimating the wastewater flow anticipated to be received by either the STEP tank or primary tanks by the property owner or the owner's designer



based on estimated use will result in the property owner increasing the septic tank holding capacity to meet the above criteria. Refusal to increase the size of the septic tank to meet the design criteria will result in discontinuance of sewage collection services.

#### **5.10.030 Loading Criteria**

- A. 135 lb./cu. ft. weight of backfill.
- B. The water table is at ground level. Lateral loading is 85 lb.cu. ft., which includes hydrostatic water pressure.
- C. The tank will support a minimum 1000 lb. wheel load.
- D. Tanks designated as traffic bearing tanks shall be designed to withstand HS-20 truck loading with appropriate impact factors. All tanks shall be structurally sound and watertight and shall be guaranteed in writing by the tank manufacturer for a period of two (2) years from the date of final acceptance. The tank guarantee/warranty shall be furnished at the time of installation. Tank warranty shall not limit liability to replacement cost of the tanks.

#### **5.10.040 Fiberglass Tanks**

Unless superseded by the Standard Specifications, the fiberglass tanks will meet all requirements of IAMPO\_1-87. If requested by the Owner, the manufacturer shall supply to the Owner, without charge, approved original laboratory report showing compliance with IAMPO PS 1-87 and requirements of the suppliers licensed Structural Engineer. All STEP tanks installed larger than 3,000 gallons shall be fiberglass tanks manufactured by either Containment Solutions Inc. or Xeres Inc. Any alternate must be approved by the City.

All fiberglass STEP tanks shall be installed by qualified installers, following the manufacturer test directions and shall be secured with tie-down straps with "Dead Men". Sizing and materials for Dead Men and strapping shall be per the manufacturer test recommendations.

##### **A. Method of Calculations**

Fiberglass tanks shall be analyzed using finite element analysis for buried structures.

Calculations shall address the following:

1. Strength with a safety factor of 2.5
2. Buckling with a safety factor of 2.5
3. Deflection of 5 percent of the tank diameter, based on service load (including long-term deflection lag).

#### 4. Buoyancy

##### B. Performance Testing

In lieu of calculations for fiberglass tanks, the supplier may elect for in situ performance testing.

In situ testing of each tank model shall include use of strain gauges and deflection gauges. The tank will be subjected to external forces equal to twice the actual load.

Maximum initial deflection based on service loading shall not exceed 2 percent of the tank diameter.

Performance testing will be evaluated by a licensed Structural Engineer registered in the State of Washington. The Owner will have the sole responsibility to determine the maximum external loading on any of the tank models.

1. Inspections may be made by the Owner in the suppliers' yard, within the plant, upon delivery and again after installation. The wall thickness shall average at least 1/4 inch unless superseded by the requirements of the Structural Engineer. When less than 3/16 inch in thickness or any delamination is suspected within any portion of the tank wall for inspection purposes. If the required minimum 3/16-inch thickness is not found, repair, if feasible, shall be the responsibility of the Contractor. If repair is judged not feasible, the tank shall be rejected. If twenty percent or more of the tanks are rejected for any of the aforementioned reasons, each tank under this bid will become suspect of substandard quality and subject to rejection by the Owner. If the required minimum 3/16-inch thickness is found, and no delamination is present, the repair shall be the responsibility of the Owner.
2. The Structural Engineer shall specify the minimum weight of each tank model that will be allowed and submit those weights during the submittal process. The manufacturer will weight each tank and place that weight on the side of each tank in a manner that will not be affected by rain or inclement weather.
3. Holes required in the tank shall be provided by the manufacturer. Resin shall be properly applied to all cut or ground edges so that no glass fibers are exposed and all voids are filled.
4. Dual Tite or Ty-Seal neoprene gaskets, or equal, shall be used at the inlet to join the tank wall and the ABS inlet piping. ABS Schedule 40 pipe and fittings shall be used at the inlets.
5. Inlet plumbing shall penetrate 18-inches into the liquid from the

inlet flow line.

6. Each tank shall be water tested on the project site after assembly by the manufacturer and witnessed by the Owner. Every tank shall be assembled by the manufacturer and water raised to the brim of the manhole for a minimum of two (2) hours. The tank shall show no leakage from section seams, pin-holes or other imperfections. Any leakage is cause for rejection.
7. When leakage occurs, if the tank is not rejected by the Owner, an additional water test for a minimum of two (2) hours shall be made on the tank after repairs have been completed, upon request by the Owner. The manufacturer shall be responsible for making all corrective measures in production or assembly necessary to ensure a completely watertight tank.
8. After installation of tank with riser is completed each tank shall be filled with water 2" above the rim of the rider adapter ring installed into tank lid. Test shall hold for a two (2) hour period as per paragraph 6, to assure that there is no leakage. Every tank test shall be witnessed by the Owner.
9. Each tank will also include a serial number and date of manufacturer.
10. Installation shall be in accordance with the manufacturer's recommendations, and as shown on the contract plans, no variations.

#### **5.10.050 Concrete Tanks**

- A. Concrete tanks will be allowed in sizes up to 3,000-gallon capacity.
- B. Wall, bottom and top of reinforced-concrete tanks shall be designed across the shortest dimension using one-way slab analysis. Stresses in each face of monolithically-constructed tanks may be determined by analyzing the tank cross-section as a continuous fixed frame.
- C. The walls and bottom slab shall be poured monolithically; alternatively, water stops may be provided.
- D. Reinforcing steel shall be ASTM A-615 Grade 60,  $f_y=60,000$  psi. Details and placement shall be in accordance with ACI-35 and ACI-318.
- E. Concrete shall be ready mix with cement conforming to ASTM C-150, Type II. It shall have a cement content of not less than six (6) sacks per cubic yard and maximum aggregate size of 3/4 inch. Water/cement ratio shall be kept low (0.35+), and concrete shall achieve a minimum compression strength of 4000 psi in 28 days. The

Contractor shall submit a concrete mix design to the Owner for review and approval. Three (3) concrete sample cylinders shall be taken and tested for each tank manufactured until the manufacturer and Owner are satisfied that the minimum compression strength is being obtained. To insure compliance, the manufacturer shall then make and test three (3) sample cylinders for a minimum of 20 percent of the remaining tanks at the discretion of the Owner. If the minimum compressive strength is not being obtained, the manufacturer shall be required to make and test sample cylinders for each tank manufactured. Calcium chloride will not be allowed in the mix design. The cost of testing cylinders shall be the tank manufacturer's responsibility. The tank manufacturer may supply a Swiss hammer for compressive testing in the field in lieu of sample cylinders.

- F. Form release used on tank molds shall be Nox-Crete or equal. Diesel or other petroleum products are not acceptable.
- G. Tanks shall not be moved from the manufacturing site to the job site until the tank has cured seven (7) days or has reached two-thirds of the design strength.
- H. Tanks shall be manufactured and furnished with access openings of the size and configuration to accommodate individual packaged pump systems. Modification of completed tanks will not be permitted.
- I. The septic tank and the top slab shall be sealed with a pre-formed flexible plastic gasket. The flexible plastic gasket shall be equal to the flexible butyl resin sealant conseal CS-102 or CS-202 as manufactured by Concrete Sealants, Inc. of New Carlisle, Ohio and shall conform to federal specification SS-S00210(210A) and AASHTO M-198.
- J. Tanks shall be furnished without concrete access hole lids and equipped with tank riser adapters as manufactured by Orenco Systems. In order to demonstrate water tightness, the tanks shall be tested as follows:
- K. Inlets to the septic tank will be water tight pipe seal as Ty Seal pipe seal or equal. Outlets for effluent filters shall be configured as shown on the contract plans.
  - 1. Factory Test: All of the tanks supplied by the precast manufacturer will be hydrostatically tested in the factory. The tank shall be tested by filling with clean water to the soffit and let stand for a minimum of 24 hours. After the 24-hour period, the water will be replaced to soffit. The water level shall be checked after 2 hours. Any water loss will not be acceptable.
  - 2. b. Field Tests: After the tanks have been set in place, but prior to

backfilling, each tank shall be tested for a 2-hour period. Any tank that fails the test as outlined in 12a shall be repaired and/or replaced until the tank passes said test. After backfilling, the tank shall be filled with water to 2 inches above riser and tank connection and tested for exfiltration over a two (2) hour period. No tank will be accepted if there is any leakage over the two (2) hour period.

3. The water required to fill a tank in order to conduct the tank pressure test and check for leaks shall be provided by the contractor and/or owner at their expense. This is a testing requirement associated with construction and considered "water for construction".

## **5.20 STEP PIPELINES**

### **5.20.010 General**

STEP pipelines constructed and sized within private developments and public Right-of-Way shall conform to the City of Yelm Sewer Comprehensive Plan and the DOE Design Manual, whichever is more stringent.

## **5.30 CONSTRUCTION REQUIREMENTS – STEP TANKS/PIPELINES**

### **5.30.010 General**

Installation and materials used for construction of the City of Yelm STEP system shall conform to the requirements of sections 13.08.030 through 13.08.080 of the Standard Specifications, unless amended herein.

All STEP tanks deemed commercial must utilize 2 inch piping for the service line.

### **5.30.020 Pipeline and Service Line Materials**

- A. All pipe less than 2 inches shall meet the following requirements:

Schedule 40 PVC pipe shall be designed for solvent weld joints and shall comply with ASTM D 1785.

All pipe 2 inches and above shall meet the following requirements:

1. PVC 1PS 1120 SDR 21 Class 200 pipe shall have rubber ring gasket joints, shall comply with ASTM D 1784 and have a working pressure rating of 200 psi.
2. 2 inch service lines shall be schedule 40 PVC pipe designed for solvent weld joints and shall comply with ASTM D 1785.

- B. Bedding

1. Bedding shall be sand.
2. Bedding shall be installed as shown on the Standard Details.

#### C. Joints

##### 1. Solvent Weld Joints

- a. Solvent cements and primer for joining PVC pipe and fittings shall comply with ASTM D 2564 and be as recommended by the pipe and fitting manufacturers. Primer shall be required for use on all solvent weld joints.

##### 2. Rubber Ring Gasket Joints

- a. Rubber ring gaskets shall comply with ASTM D 1869 and ASTM D 3139 and shall be supplied by the pipe or fitting manufacturer with a sufficient amount of lubricant. The lubricant shall be water soluble, non-toxic, nonsupportive of bacterial growth and have no deteriorating effect on the PVC or gasket.

#### D. Fittings

All fittings shall have a minimum working pressure equal to the pipe with which they are connected.

##### 1. Solvent Weld Fittings

- a. Solvent weld fittings for pipe less than 2 inches shall be socket type Schedule 40 fittings and shall comply with ASTM D 2466 and 2467.

##### 2. Rubber Ring Gasket Fittings

- a. Rubber ring gasket fittings for pipe 2 inches and larger shall be PVC 1120 complying with ASTM F 477, as manufactured by Head Manufacturing Co., Preston, Idaho; Gault Fabrication Company, Stockton, California; Spears Fabrication, Stockton, California; or approved equal.

It is exceptable to use socket type 'T's on 2 inch Mainlines at the connection point for either a 2 Inch or 1 inch service connection.

### **5.30.030 STEP Tank Installation**

It shall be the Contractor's responsibility to verify the location and the elevation of all existing sewer lines prior to installing the individual tank. STEP tanks shall be located in front of building unless otherwise approved by the City of Yelm.

It is anticipated that existing utility lines will be encountered during installation of the STEP tank and appurtenances. Prior to starting construction the Contractor will notify the proper utility for underground locations and also contact the property owner to determine location of foundation drains, electrical lines, etc.

The Contractor shall be responsible to obtain all necessary permits for work on public Right-of-Way such as street opening permit available at City hall. All cost for permits will be the Contractor's responsibility.

Excavations for all tanks shall be sufficient to leave a minimum of 6 inches of bedding (see tank bedding Detail Drawings 5-16 and 5-17).

Tanks set in holes with high water table issues or suspected high water table issues will be H-20 tanks with minimum 24 inches of cover (6" of sand bedding and 18" native backfill).

All tank installations shall adhere to the following:

- A. Location of the STEP tank site will be submitted to the City upon request for review and approval.
- B. All excavation and backfill of tanks shall conform to standard specification. Compaction for non traffic areas shall be 85 percent of maximum density. Compaction for traffic areas shall be 95 percent of maximum density.
- C. For work within public Right-of-Way, the contractor shall be responsible on a daily basis for providing ingress and egress for both pedestrian and vehicle traffic on all work sites. The contractor shall clean up his work area on a daily basis to avoid inconvenience to the public.
- D. For work within public Right-of-Way, the contractor shall safeguard his work on a daily basis to prevent possible injuries. The contractor shall submit to the City his method of safeguarding his work prior to beginning any construction on public Right-of-Way.
- E. Depth of Bury not to exceed 5 feet from invert elevation of influent pipe to finished grade on commercial systems.
- F. Any modifications resulting in an existing non-H20 tank ending up in a traffic/load bearing situation shall have a 6 inch concrete pad constructed over it. It shall extend 12 inches past all sides of tank and contain rebar/wire mesh embedded in concrete with aluminum rings and covers per detail DWG. No. 5-19.
- G. There shall be no hose bibs above pump control panels or disconnects and minimum of 2 feet separation from sides and bottom of disconnect and pump control panel.

- H. There shall be a hose bib within 50 feet of the farthest riser of the farthest tank for maintenance and pumping.
- I. STEP tanks shall not go under sidewalks, porches, porch overhangs, or roof eaves. Tanks shall be 5 feet minimum separation from property line, foundation of houses, and/or porch foundations, and located 2 feet on the side of the driveway closest to the inlet, and 2 feet minimum separation from utility easements.
- J. Residential non-traffic bearing risers shall be no higher than 24 inches from tank lid to finish grade, unless preapproved by the Director or their assigned designee.
- K. The owner of the property will have sole ownership and responsibility of side sewer and clean out from house to tank inlet.

#### Tanks in Driveways

- A. Tanks set in driveways shall be 5 feet from the building foundation, porch foundation, property line, and up to utility easement. Any undermined foundations will require backfill with controlled density fill (CDF).
- B. Access to tank risers shall have a traffic bearing lid set up according to sewer specifications, DWG. No. 5-19 with 12" of compacted crushed rock under concrete collars.
- C. Tanks under driveways shall be H-20 rated tanks.
- D. Concrete driveways shall be 4 inches thick with welded wire mesh placed in the concrete driveway. If a high water table is an issue, the concrete driveway shall be 6 inches thick with wire mesh to help with buoyancy of the tank when empty from pumping.
- E. The minimum depth of bury shall allow for the combination of an 18 inch riser, the thickness of the aluminum H-20 lid and 2-3 inches between fiberglass riser lid and bottom of aluminum H-20 lid.

#### **5.30.040 Pipeline and Service Line Installation**

##### A. Grade and Alignment

Service lines shall be placed a minimum of 18 inches of cover within private property. Deeper excavation may be required due to localized breaks in grade such as curbs, retaining walls, and terraced ground. Where required by the City of Yelm, the pipeline shall be laid to the profile or elevation shown, regardless of depth. Maximum cover of any mainline within public Right-of-Way or easement shall be 60", unless otherwise approved by the public works director or designee.



Sewer main line gate valves should be a distance of 1,000 feet on a case by case basis.

All ductile iron fittings shall be epoxy coated or P.E. lined both inside and outside. The coating material shall be designed for use with corrosive materials.

#### B. Trench Excavation and Backfill

Native material from trenches and excavations may be considered unsuitable for trench backfill. The City of Yelm shall determine the suitability of native material for trench backfill. If the native material is deemed unsuitable by the City, "Bank Run Gravel for Trench Backfill" shall be used. Bank run gravel shall be equal to Section 9-03.19 of the Standard Specifications.

The Contractor has the option of jacking or boring pressure sewer lines under existing improvements. The Contractor's proposed method of construction and material type shall be submitted for the City's approval prior to commencing work. Pipeline material shall be approved by the manufacturer for jacking or boring application. No jacking operation shall exceed 40 feet unless authorized by the City.

At locations where paved or graveled streets, shoulders, alleys, parking lots, driveways, patios, and sidewalks will be reconstructed over the trenches, the backfill shall be spread in layers not exceeding 8 inches in loose thickness and be compacted by mechanical tampers to 95 percent of maximum density. Proof of compaction is required. At locations where lawn, landscaping, and unimproved surfaces will be reconstructed over the trench, the backfill shall be spread in layers not exceeding 8 inches in loose thickness and be compacted by mechanical tampers to 85 percent of maximum density.

Maximum density and optimum-moisture content shall be determined using the modified Proctor maximum dry density procedure (AASHTO T180 or ASTM D 1557). In place density shall be determined using the Washington Densimeter method or Nuclear Gauge as outlined in the WSDOT Construction Manual.

#### C. Detectable Marking Tape

Heavy duty fourteen-gage insulated copper toning wire designed for direct-bury applications, shall be placed directly over all non-metallic pressure sewer lines and service lines. The Contractor shall bring the toning wire to the surface of the valve box and service boxes for purposes of attaching a utility detection device. All connection of the toning wire for service connections shall be stripped of insulation and

attached to the copper portion of the main line toning wire. The connection point shall be D.B.R. Direct Bury Splice Kits.

D. Hydrostatic Pressure Test

All sewer mains, service lines, and appurtenances shall be hydrostatically tested in lengths specified. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be accompanied with certifications of accuracy from a laboratory approved by the Owner.

The sewer pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

The sewer lines shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air.

The test shall be accomplished by pumping the sewer line up to the required pressure, stop the pump for 15 minutes, and then pump the sewer line up to the test pressure again. During the test, the section being tested shall be observed to detect any visible leakage. There shall not be an appreciable or abrupt loss in pressure during the 15-minute test period.

The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering one gallon per revolution. The meter shall be approved by the Owner.

The maximum allowable leakage for sewer lines shall be, according to AWWA C600, Section 4 Hydrostatic Testing, as follows:

Test	Pipe Diameter			
	3"	4"	6"	8"
150 PSI	No Loss	No Loss	No Loss	No Loss

Portions of the sewer line that are determined to be critical, or suspected of leaking, should be left with the joints exposed during the testing procedure to allow visual inspection. The use of dye in the testing water will assist the location of leaks if ground water is present in the trench. Any visible leakage detected shall be corrected by the Contractor regardless of the allowable leakage specified above.

Should the tested section fail to meet the pressure test successfully as specified, the Contractor shall, at his expense, locate and repair the defects and then retest the pipeline.

Prior to calling out the Owner to witness the pressure test, the Contractor shall have all equipment set up completely, ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

Defective materials or workmanship, discovered as a result of a hydrostatic field test, shall be replaced by the Contractor at his expense. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be rerun at the Contractor's expense until a satisfactory test is obtained.

Service lines shall be sleeved under driveways, sidewalks, and where the service line can make contact with any part of the tank.

The Contractor shall provide the water necessary to fill the pipelines for testing purposes. Water may be purchased from the Water Utility. Contractor to coordinate with the City of Yelm Water Utility. The Contractor will be responsible for transporting the water to the project site. The Contractor will also be responsible for furnishing a backflow prevention device or other Owner approved method to avoid contamination of the water supply during loading, an appropriate water meter and all other appurtenances required. Water meter and appurtenances shall be approved by the Owner.

The Contractor shall demonstrate to the satisfaction of the Owner that the air release valves and vacuum release valves are operating correctly.

1. Sewer Main Line Testing.

Sewer Main Lines shall be tested under a hydrostatic pressure equal to 150 psi.

After the sewer main test has been completed, each mainline valve shall be tested by closing valves in turn and relieving the pressure beyond. This test of the valves will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The Contractor shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.

When testing sewer main lines, they shall be tested against service line test valve at 150 psi for 15 minutes after that has passed pressure will be reduced to 80 psi and test valves will be opened one at a time to put pressure against check valve. This service line

between check valve and test valve shall be prefilled with water before testing to reduce initial pressure drop. After that, remaining pressure shall have no drop for one minute.

Prior to any main line testing, all service lines within the main line test area shall be installed, tested, and approved. The Contractor shall test no more than 500 linear feet for the first test to qualify crews and materials. Sections of collection main line to be tested shall not exceed 1,000 linear feet per each individual test. Once successful test results have been achieved, the Contractor may request in writing test sections greater than 1,000 linear feet for the Owner's approval. The Contractor is required to keep his pipe testing and service line testing concurrent with his pipeline laying operations.

## 2. Sewer Service Line Testing.

In order to test the service line, the ball valve (or self-tapping saddle if used) at the sewer main shall be closed and the test pump shall be attached at the end of service line with ball valve and check valve, if required. This portion of the service line shall be tested under a hydrostatic pressure of 70 psi. The test will be deemed successful if the pressure is constant for a minimum of 1 minute.

3. The contractor shall be responsible for replacing any shut-off valve or check valve in carson box, if it does not hold pressure during testing.

## E. Air and Vacuum Release Valves

Air release valves and air/vacuum valves shall be located at the high points of the line. Profiles for each pipe run shall be submitted with the hydraulic gradeline for both static and dynamic flow conditions to show where the critical points are for air release valves. Vehicular access to air/vacuum valves is required for maintenance.

Because the air released by these valves will contain hydrogen sulfide, the valves and their enclosures have to be constructed of corrosion resistant materials. The air released from the valve will be quite odoriferous, thus, each vent will be equipped with an odor control system such as activated carbon filters impregnated with sodium hydroxide. All air release, vacuum release, and combination air release/vacuum release valves shall be a model D-021 combination air valve "MINI SAAR".

## F. Pigging Ports/Cleanouts

A pipeline pig is a projectile that is forced through the inside of a pipe to clean pressure pipelines. A pigging port/cleanout is used as a point to send the pig (see Standard Detail 7-20).

Pigging ports are required:

1. At every 2-inch diameter change in pipeline size;
2. At the end of every dead end line;

Specific locations are subject to review and approval by the city.

#### G. Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings.

See drawing numbers 4-13 and 4-14 in Chapter 4. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type and size shall be specified on the plans. Material shall be stainless steel, epoxy coated, or approved equal.

#### H. Service Connections

This work consists of installing the service line and appurtenances. The service connection at the sewer main includes a check valve and ball valve, without valve boxes, and a saddle or tee at the sewer main.

#### I. Service Interruption/Line Connections

The contractor shall give the City a minimum of 72 hours notice of any planned connection to an existing pipeline. This includes all cut-ins and live taps. Notice is required so any disruptions to existing services can be scheduled. The City will notify customers involved or affected of the sewer service interruption. The contractor shall make every effort to schedule sewer main construction with a minimum interruption of sewer service. In certain situations, the City may dictate scheduling of sewer main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

All connections made to sewer lines 2" – 6" can be live taps that can be performed by the contractor using SPEARS "Hot Tap Saddle", or saddle previously approved by the City. Any pipe greater than 6" or C900 pipe shall be performed by a certified tapping company. Tap installation must be inspected and approved by the City.

Tap installation shall be performed by a professional company that specializes in this work, and the company doing this work will first be approved by the sewer department. When tapping non-C900 main

lines (6" or less), "Hot Tap Saddles" as manufactured by Spears are acceptable and can be used by the underground sewer main installer with prior approval from the Sewer department and installation must be inspected by City Sewer Inspector.

## **5.40STEP PUMP ASSEMBLIES**

### **5.40.010 Materials and Installation**

#### **A. General**

This work shall include but not be limited to providing and installing pump assemblies, effluent filters, risers, electrical equipment and pump control and alarm assemblies in accordance with the plans and these specifications. The pump assemblies provided shall restrict the discharge to low flow over a wide range of head conditions to assure that solids remain in the STEP tank and not be transmitted into the pressure line. Pumps installed shall be protected by a screen to prevent solids greater than 1/8 of an inch entering the pressure line and prevent plugging the intake to the impeller or the flow restriction device.

#### **B. Ball Valves**

One-inch ball valves shall be PVC ball valves and shall comply with ASTM D 2846. It shall be designed for use with corrosive fluids, for low torque manual operation, and for a working pressure of 150 psi. The PVC material shall be Type 1 (NSF). The valve shall be Model No. LT-1000-S as manufactured by KBI (King Brothers Industries), or equal approved by the City.

#### **C. Gate Valves**

Gate valves for sewer systems shall be NRS gate valves, complying with AWWA C509. Buried valves shall have 2-inch square AWWA Standard operating nuts. Valve stem extensions, if necessary, shall be installed on valves deeper than 5 feet and provided by the same supplier as the gate valves. All Gate valves to be Resilient Wedge epoxy coated

All gate valves shall be equipped with operator extensions that bring the operating nut to within 24" inches of the surface for valves over 5 feet deep.

#### **D. Check Valves**

Check valves for sewer systems shall be PVC swing check valves designed for use with corrosive fluids and shall have a Buna-N seal on a swing gate which lifts to allow for unobstructed flow. The PVC material shall be Type 1 (NFS). The valve shall have no metallic parts. It shall have a working pressure of 150 psi and shall require only 1/2 psi back pressure for complete closure. It shall be as manufactured by KBI (King Brothers Industries), or equal approved by the Owner.

#### E. Valve Boxes

The word Sewer shall be cast into the lid. The top section shall be made of cast iron conforming to the following specifications: ASTM A 4876; WWP 401; and CS-88. It shall be slip type with top flange, weight 40 pounds or more, be at least 10 inches in length, have an inside diameter sufficient to house the bottom section, and have an average material tensile strength of 30,000 psi. It shall be Rich Model 910 heavy duty, or equal approved by the City. The bottom section of the valve box shall be 6-inch PVC pipe (ASTM 3034), white in color. the entire valve box top and bottom shall perform as a unit that has the ability to extend.

#### F. Saddles

Standard saddles shall be band-type saddles designed for use on PVC pipe. The material shall be UNS S 30400 stainless steel for the shell, bolts, washers, nuts, and tapped outlet. Gaskets shall be NBR compounded rubber complying with ASTM D 2000-343K515\_E34. Saddles shall be Style 304, manufactured by Romac Industries, Inc., or equal approved by the City.

Self tapping saddles shall have a PVC body and be secured in place by four stainless steel bolts and nuts. After tapping, the tapping mechanism shall retain the coupon from the pipe and serve as a shut-off valve. The tapping mechanism shall be operated by a 5/8" allen head wrench and have a PVC cover to prevent fouling of the mechanism when not in use. The saddle shall have an O-ring seal glued in place by the manufacturer.

#### G. Standard Service Box

The Standard Service Box shall be made from a structural plastic, have extensions as required, and have a bolt down cover. It shall be Model No. 1419, as manufactured by Carson Industries, Inc. or equal approved by the City. Larger carson boxes for 2" services may be required as approved by City of Yelm

#### H. Traffic Bearing Service Boxes

All Traffic Bearing Service Boxes shall be a model MSBCF 1324-BCF-12", manufactured by Old Castle Manufacturing. Larger carson boxes for 2" services shall be model 1324-18-BCF by Old Castle Manufacturing.

I. Traffic bearing carson boxes shall have 6"-8" compacted crushed rock under base of box, per manufacturer's recommendation.

### **5.40.020 Effluent Pump - 4" Submersible Pumps**



A. Simplex Pumps: Systems for tanks 1,500 gallons or less.

1. General - For Discharge to a STEP Collection System provide Orenco Model P10 05 11 or approved equal. Pumps shall be listed by an approved testing laboratory, e.g., UL or CSA or use as an effluent pump.

Pumps shall be stainless steel and/or thermoplastic.

All wetted fasteners shall be 300-series stainless steel.

2. Motors

Motors shall be permanent split phase-type operating at 3450 RPM. Motors shall be 1/2 HP, 115 volt, single phase, 60 Hz.

Motors shall be thermally-protected with an automatic-reset feature.

3. Operating Conditions

The effluent pump shall be of the submersible turbine type capable of delivering 5 gpm against a TDH of 105 feet, and with a shut-off head of not less than 160 feet. Pumps will be provided with an orifice installed in the discharge piping to restrict flow to a maximum of 9 gpm over any head condition. The supplier shall provide a head curve showing performance of the pump with the orifice installed.

4. Bypass

A 1/8" bypass orifice shall be drilled in the discharge head of the pump to allow for cooling pump motor during periods of no discharge.

5. No flow restrictors in 10 or 20 gpm pump discharge systems.

B. Duplex Pump Systems and Triplex Pump Systems for 3,000 Gallon Tanks or Larger.

1. General - For Discharge to a STEP Collection System

All STEP tanks housing more than one pump must utilize 2 inch piping for the service line.

Provide Orenco Model P20 05 11 or approved equal.

Pumps shall be listed by an approved testing laboratory e.g., UL or CSA for use as an effluent pump.

Pumps shall be stainless steel and/or thermoplastic.

All wetted fasteners shall be 300-series stainless steel.

2. Motors

Motors shall be permanent split phase-type operating at 3450 RPM. Motors shall be 1/2 HP, 115 volt, single phase, 60 Hz. The supplier shall provide a head curve showing performance of the pump with the orifice installed.

Motors shall be thermally-protected with an automatic-reset feature.

### 3. Operating Conditions

The effluent pump shall be of the submersible turbine type capable of delivering 20 gpm against a TDH of 105 feet, and with a shut-off head of not less than 160 feet.

### 4. Bypass

A 1/8" bypass orifice shall be drilled in the discharge head of the pump to allow for cooling pump motor during periods of no discharge.

## **5.40.030 Pump Vault, Riser, and Lid**

### A. General

Provide an internal pump vault which will be of sufficient size and structural integrity to house and support the pumping equipment necessary for transportation of effluent. The pump vault will have a screen to prevent solids larger than 1/8" from entering the pipeline and to protect the pump and flow restriction device from plugging. The internal vault will be removable for access into the STEP tank for septage pumping. All risers and connections to the septic tank with risers shall be water tight. Any hour meter for pump installed in pump control panel with more than 100 hours at the time of sewer final will be considered a used pump and meter and shall be replaced.

### B. Internal Vault

Simplex pump assemblies shall be a Biotube Pump Vault as manufactured by Orenco Systems, Inc., Model Number X4S 1254-18 19. Vaults for duplex 4" submersible pump assemblies shall be a Biotube Pump Vault Model Number X4D 12xx-18 19 as manufactured by Orenco Systems, Inc., or equal.

### C. Risers

Risers shall be required for access to internal vaults and access into the septic tanks for septage pumping. All risers shall be constructed of PVC, fiberglass, or polyethylene and shall be constructed water tight. Risers over pump vault shall be 30-inches in diameter. All risers shall be of sufficient length to meet minimum requirement of the latest version of the National Electric Code (NEC) and shall vary depending

on the depth of bury on the various tanks. The risers shall be attached to the tanks such that a watertight seal is provided. Epoxy required to adhere the PVC or fiberglass risers to fiberglass or concrete tanks shall be a two part epoxy as supplied by the manufacturer of the riser, or equal as approved by the City.

When applicable, Neoprene grommets shall be installed by the manufacturer for discharge piping, vent piping and/or the electrical conduit to assure a watertight seal. Neoprene grommets will not be allowed on risers not requiring discharge piping, etc.

Risers shall be Model RR24 (length as required) for solids chamber, and RR30 (length as required) for pump chamber as manufactured by Orenco Systems, Inc., or approved equal approved by the City.

#### D. Lids

1. Standard Lid: The standard lid shall be a flat fiberglass lid, green in color, with a non skid aggregate finish. The lid shall be the diameter required to fit the required riser and shall be supplied with a minimum of two stainless steel bolts and the lid shall have a gasket. Allen wrench will not be included as part of the pump packages but 2 wrenches will be included in the spare parts. Lids shall be as manufactured by Orenco Systems, Inc., Model Number FLD24XX or FLD30xx or equal approved by the City.
2. Traffic Bearing Lid: All traffic bearing lids shall be an HS-20 loading with all frames and covers to be constructed of aluminum composite material unless otherwise approved by the City. The cover shall have the words "YELM SEWER" cast into it. Reference EJ 1480 30" with quarter turn paddle lock and pick slot. Reference EJ 1584 36" with quarter turn paddle lock and pick slot.

#### **5.40.040 Internal Splice Box**

For applications with 5 or less residential units, each residential riser requiring electrical connections shall have a PVC splice box located in the interior of the riser. All splice boxes shall be installed within 1'0" of the riser lid for access purposes. The splice box shall be complete with cord grips and dual wall heat shrink with butt connectors. Splice boxes shall be UL listed for the application. The number of cord grips and heat shrink connectors shall be equivalent to the number of floats and electrical leads within the pump vaults. The splice box and accessories shall meet all requirements of labor and industries and shall be UL listed for wet locations.

For all Class I, Division I installations more than 5 residential units or non-residential applications, risers requiring electrical connections shall have two separate splice boxes. All splice boxes shall be installed 10" from the top of

the riser to center of conduit access for access purposes. One splice box shall be for the pump wire and one splice box shall be for the low voltage wire for the float system. The splice boxes for the pump leads shall meet all requirements of the Department of Labor and Industries for a Class I, Division I, Type D gas application. The splice box for the low voltage float leads on an intrinsically safe relay shall be a non-metallic PVC splice box. The PVC splice box shall be complete with cord grips and dual wall heat shrink butt connectors. The number of cord grips and heat-shrink butt connectors within the PVC splice box shall be equivalent to the number of floats. The pump wire splice box simplex assemblies shall be single gang Model SBX-S as supplied by Orenco Systems, Inc., and the splice box for duplex assemblies shall be two gang Model SBX-D as supplied by Orenco Systems, Inc. or equal as approved by the Owner. Mounting box shall be mounted to riser with stainless steel bolts. An explosion proof EY fitting shall be provided directly outside of the mounting box for the pump wire connection

#### **5.40.050 Level Control and Alarm Floats**

Level control floats shall be UL or CSA listed for use in effluent on an adjustable or preset PVC stem which attaches directly to the pump vault. Floats shall consist of high level alarm, on/off, model Super G. Level control floats shall be Model PG for simplex pump assemblies and Model P2GN for duplex pump assemblies as manufactured by Orenco System, Inc. or equal as approved by the City.

- A. Pump control and alarm panels for simplex pump assemblies shall be Model S1 RO ETMCT as manufactured by Orenco Systems, Inc. or equal as approved by the City. Pump control panels for simplex commercial and intrinsically safe applications shall be Model S1 1R RO ETMCT as manufactured by ORENCO or equal as approved by the City.
- B. Pump control and alarm panels for duplex pump assemblies shall be Model DAX1 IR2 RO ETMCT as manufactured by Orenco Systems, Inc. or equal as approved by the City.
- C. All pump control panels shall have NEMA 4x fiberglass enclosures, an audio and visual alarm, an elapsed time meter, event counter, stainless steel latch and internal 120-volt, 20-amp circuit breaker for each pump. Commercial and residential applications shall also include a 10-amp circuit breaker for controls.
- D. Residential float set-ups shall not have low level, redundant off floats or "T" floats. Electrician is still required to pull the lead wire from pump control panel to tank "J" box and use silicone filled wire nuts, heat shrink butt connectors, or pre-approved equal on each end of spare wire.

#### **5.40.060 Hose and Valve Assembly**

Hose and valve assembly for a 4" submersible shall include 1" diameter 100 psi PVC hose with PVC union and ball valve and anti-siphon valve Model Number HV100BASX as manufactured by Orenco Systems, Inc., or approved equal.

#### **5.40.070 Additional Material Requirements**

All equipment including but not limited to pump vault, riser, standard lid, bonding epoxy, splice box, discharge piping, control float assembly, pump(s), pump control and alarm panels, etc. shall be supplied by one single supplier or manufacturer as a packaged unit. The supplier or manufacturer shall upon request by the City, submit information on availability of replacement parts, maintenance records of operating pump assemblies. The package as supplied by the manufacturer or supplier will have a standard guarantee against material defect for a period of not less than 1 year. The date of guarantee shall begin on the date equipment is delivered on a particular site and may be a single guarantee incorporating all the components or individual guarantees on the various components. The manufacturer or supplier will be responsible to handle replacement or repair of defective parts.

#### **5.40.080 Electrical Connections**

All electrical equipment and materials shall be installed in conformance to requirements of the latest edition of the National Electrical Code as enforced by the State of Washington Labor and Industries Electrical Section. The Contractor shall be required to acquire all necessary permits and coordinate directly with the appropriate authority on the necessary inspection.

Splice boxes shall be installed in the STEP tank riser in accordance with the instruction from the supplier or manufacturer. The control panel shall be installed either on a remote post constructed of hot dipped galvanized unistrut or approved equal, or on the garage wall, unless approved by the City of Yelm. The panel shall be affixed by stainless steel screws to either the structure or the post. The screws shall be of sufficient size and length to securely fasten the panel.

Power and control wire from the splice box in the riser to the pump control shall be UL approved with a minimum of 12 gauge for each control or power wire. Power and control wire shall be color-coded for ease of tracing between the alarm panel and pumps and float switches. The Contractor shall submit type and size of cable for review and approval by the City and Labor & Industries. Cable attached to the exterior of the building shall be contained in approved electrical conduit. All wire connections shall be made with heat shrink butt connectors.

Power and control wire for commercial or intrinsically safe applications shall be contained in two IMC or rigid metal conduits for separation of low and high voltage lines between the control panel and pump vault and shall meet the requirements of Labor & Industries.

All exterior electrical wire shall be contained within PVC conduit. Exterior conduit and wire will be on the exterior of the house directly below the control panel and will be installed plumb and vertical. Underground electrical cable shall have a minimum of 24 inches of earth cover. All cable or wire shall be contained in PVC conduit.

Electrical: All materials used for control and electrical connections shall meet requirements of labor and industries and the Uniform Electrical Code.

The Pumping Assemblies shall comply with the latest State of Washington's Department of Labor and Industries Electrical Inspection Section Policy.

Power supply for I.R. Commercial Systems from house breaker panel to the pump control panel shall be a 20 amp dedicated circuit for each pump with separate neutral wires. A dedicated 10 amp circuit shall be required for the control system. Residential (non I.R.) Symplex applications shall have one dedicated 20 amp breaker in-house panel.

Disconnects are required for power to all Pump Control Panels. Symplex (non I.R.) applications shall use a model B-5V one gang weatherproof outlet box as manufactured by Intermatic and a single pole switch rated for 20 amp.

Duplex systems (2 pumps) shall use a Deep, one gang outlet box with 3 threaded outlets Model # DB-75V as manufactured by Intermatic. The switch shall be a three pole single throw, AC manual motor starting switch. Model # MS303 as manufactured by Leviton.

All disconnect switches shall include a Rayntite single Gang Weatherproof cover Model # 5031-0 as manufactured by Bell.

Surge arrestors shall be installed in the Pump Control Panel For all Class I Division I installations. Surge arrestors shall be a Model # AG2401 as manufactured by Intermatic, or equal approved by the City, and shall be installed on the power wire supplying power to the control circuit, and be installed within the pump Control Panel.

Buildings served by STEP sewer, utilizing on-site backup generators for power outages, must have electrical service installed in such a manner that the STEP system will also be supplied power by the auxiliary generator.

The pump control panels for all STEP tanks housing 2 or more pumps shall be fitted with the transfer switch model DT323 URK you are K as manufactured by Cutler Hammer or approved equal and a male plug, model

70530 AMB WP as manufactured by Byrant for use with the city's portable auxiliary generator or approved equal.

## **5.50 GRAVITY SEWER**

### **5.50.010 General**

The use of gravity sewer lines shall be limited to the collections of sewerage or transport of sewerage to the City STEP system. All gravity sewers shall be privately maintained. The City will maintain gravity sewer lines with prior arrangements and approval from the Director of Public Works.

### **5.50.020 Side Sewers**

Minimum slope for any 4" gravity side sewer lines shall be no less than 2 percent or 1/4 inch of rise to 1 foot of run. Slopes less than 2 percent will only be allowed if approved by the City. Installation of gravity clean-outs shall meet the requirements of the City of Yelm, the uniform plumbing code (see Standard Detail 5-7). At a minimum, a gravity clean-out with a 2-way sanitary sweeping T will be required 2 ½ feet from the foundation of the structure.

Grade stakes will not be provided by the City for side sewers. It shall be the Contractor's responsibility to determine the differential in elevation between the invert to the STEP tank and the invert at the building side sewer. Based on that information the Contractor shall determine the percent of fall between the STEP tank and the connection point at the side sewer.

Side sewer clean-outs shall be installed per "Sewer Service" 7A.010, Definition of Terms per Yelm Ordinance 505 (YMC 13.08), "House Drain" or "Building Drain".

## **5.60 RESTORATION**

### **5.60.010 General**

This work shall consist of various types of surface restoration. As required by the City of Yelm for all work on public Right-of-Way, all surfaces and surface improvements effected by the Contractors operations shall be restored to conditions equal to or better than preconstruction conditions. The City shall be the sole judge as to the equality of materials and work when comparing post-construction conditions to preconstruction conditions.

Cement concrete sidewalk and driveway repair shall conform to the Standard Specifications and Standard Detail 5-3, except that the finish, dimensions, and joints shall be the same as the original work. Cement concrete driveways shall be defined so as to include cement concrete alleys and parking lots.

Curb repair shall conform to the Standard Specifications, except that the finish, dimensions, and joint shall be the same as the original work.



### **5.60.020 Crushed Surfacing**

Shoulders, driveways and other graveled or crushed surfaced areas which are disturbed by the Contractor's operations shall be resurfaced with 2 inches of crushed surfacing. All work and material shall conform to the requirements of the Standard Specifications.

### **5.70 INSPECTION GUIDE FOR STEP SEWER INSTALLATION**

A basic sketch of the proposed installation must be submitted to the Public Works Office prior to issuance of permit.

The City of Yelm Sewer Department will perform the following required inspections:

1. Tank placement (See tech. spec. for req)
2. Leak test tank (2 hours, no loss)  
    Pressure test service line. (70 p.s.i. water for 1 minute)  
    All pipe before backfill. (See bedding and toning wire req)
3. A final inspection is required after all work (including electrical) has been completed. A record drawing is required before system can be excepted.

Additional inspections beyond the 3 shown above will be at the Contractor's expense. We try to combine these 3 inspections into 3 trips to the site if possible. 48 hours notice is required for inspection. *We do however make every effort to be out sooner, if possible.* For inspection call the City of Yelm Inspection Hotline 458-8410 If no answer leave a detailed message.

## LIST OF DRAWINGS - SEWER

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Typical Double Service Connection.....	5 - 2
Typical Pipe Trench .....	5 - 3
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