Chapter 1
GENERAL CONSIDERATIONS

1.000 GENERAL CONSIDERATIONS

1.010 Definitions

As used in these standards, unless the context indicates otherwise:

ABUTTING: Having a common boundary.

ACC or ADDITIONAL CAPACITY CHARGE: A charge to properties outside the Grand Mound Utility Local Improvement District 96-2, to fund expansion of the water pumping, storage, and transmission infrastructure to accommodate new development outside the original ULID.

ACCESS: The safe, adequate, and usable ingress/egress (entrance/exit) to a property or use.

APPLICANT: Owner(s) or lessee(s) of property, including their agent(s), who submit an application for development. This may also include person(s) who have contracted to purchase property contingent upon acquiring the necessary permits under these Standards.

BOD or BIOCHEMICAL OXYGEN DEMAND: A measure of the oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at twenty degrees centigrade, expressed in parts per million (mg/l) by weight.

BOND/SURETY: Any document, instrument, or individual bound with and for the acceptable performance, execution, and completion of the work and for the satisfaction of all obligations incurred.

BUILDING SEWER: See SIDE SEWER.

DIRECTOR: The Thurston County Director of Public Works, or authorized designee.

COMMUNITY PLANNING AND ECONOMIC DEVELOPMENT DEPARTMENT: The Thurston County Community Planning and Economic Development Department or its successor.

COMPREHENSIVE PLAN: A plan adopted by the County Council to guide the physical growth and improvement of the County and urban growth management area, including any future amendments and revisions.

CONTROLLED DENSITY FILL: A mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a nonsegregating, self-consolidating, free-flowing, and excavatable material that will result in a hardened, dense, nonsettling fill.

DEDICATION: The deliberate appropriating of land by an owner(s) for any general and public uses, reserving to themselves no other rights than such as are compatible with the full exercise and enjoyment of the public uses to which the property is to be devoted. The intent to dedicate will be evidenced by the owner by the presentment for filing of a final plat, short plat, or site plan that shows the dedication thereon. Acceptance by the public will be evidenced by written approval issued by the County of such document for filing with the County Auditor.

DEPARTMENT: The Department of Public Works.

DEVELOPMENT: The division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure; any mining, excavation, landfill, clearing, or land disturbance; and any use or extension of the use of land.

DEVELOPMENT PERMIT: Any land use permit that must be approved by Thurston County prior to the improvement and development of land or structures.

DEVIATION: A modification of these Standards approved by the Director, per Section 1.090 of Chapter 1 of these Standards.

DIRECTOR: The Director of Public Works or his or her designee or successor.

DSWSS: The Development Standards for Water and Sewer Systems of Thurston County, current edition.

EASEMENT: A right of one owner of land to make lawful and beneficial use of the land of another created by an express or implied agreement.

ECOLOGY: Washington State Department of Ecology.

EFFLUENT: The end product of a wastewater treatment process.

ENGINEER: See Director.

ERU or EQUIVALENT RESIDENTIAL UNIT: Is

A. One separate single-family residence; or

B. With respect to residential multi-family structures, one per single-family unit; or

C. With respect to mobile home or trailer park having more than two single-family residential units or spaces and served through a common meter(s), one per single-family unit or space for the first two and, thereafter, one ERU shall be equal to two single-family units or spaces; or

D. With respect to uses other than residential, except for Grand Mound, one ERU shall be designated for each nine hundred cubic feet per month of water consumed or sewerage discharged as measured at the source; provided that the minimum charge per service account shall not be less than one ERU.

E. For Grand Mound, an ERU shall be designated for each seven hundred cubic feet per month of water consumed or sewerage discharged as measured at the meter; provided, that the minimum charge per service account shall not be less than one ERU.

ESEC or EQUIVALENT SERVICE EXTENSION CHARGE: A charge to properties outside the Grand Mound Utility Local Improvement District 96-2, fund sewer system infrastructure that is equivalent to the assessment on properties within the ULID.

FRANCHISE: A document granted by the County authorizing the use of street rights-of-way by public or private entities, subject to specified conditions.

GENERAL FACILITY CHARGE: A connection charge that represents a portion of the costs associated with the capital plant and facilities.

GRADE: Rate or percent of change in slope, either ascending or descending from or along the street, measured along the centerline of the street or access point.

GRADING: Any excavating or filling of earth materials or any combination thereof.

IMPROVEMENTS: Any act that improves the value of public real and personal property, or that is necessary as a condition of development including, but not limited to, streets and roads complying with the development standards and specifications adopted by the County, public utility and pedestrian facilities, streetlights, landscape features, sewer and water liens, bridge structures, stormwater and drainage facilities, and traffic control devices as are required to be installed as a part of subdivision, short subdivision, large lot subdivision, binding site plan or commercial development.

INDUSTRIAL DISCHARGER: Any nonresidential user who legally discharges wastewater to a sewer system operated by the County for purposes of treatment.

INTERFERENCE: The inhibition or disruption of the sewer system or its treatment processes which will contribute to a violation of any of the requirements of Thurston County's National Pollutant Discharge Elimination System (NPDES) permit requirements as set by the Washington State Department of Ecology, a copy of which is on file at the Department.

MASTER METER: A meter used to supply water service to more than one residential customer or more than one commercial customer through a common meter.

PAVEMENT: The combination of sub-base, base course, and surfacing materials placed on a subgrade to support the traffic load and distribute it to the subgrade.

PERFORMANCE GUARANTEE: A financial guarantee in a form acceptable to the County Attorney to ensure all improvements, facilities, or work required by this ordinance will be completed in compliance with this ordinance, regulations, and approved plans and specifications.

PERMIT: A document or franchise authorized by the County.

PERSON OR OWNER: Means and includes persons, associations, partnerships and/or corporations.

PLAN REVIEWER: The engineering plan reviewer of Thurston County.

PLANS: The plans, profiles, cross sections, elevations, details, and supplementary specifications signed by a licensed professional engineer and approved by the Director of Community Planning and Economic Development that shows the location, character, dimensions, and details of the work to be performed.

PREMISES: A contiguous tract of land, building or group of adjacent buildings under a single control with respect to use of sewage treatment services and responsibility for payment thereof.

PRIVATE SEWER: That portion of the sewer system located on private property where no easements are granted to the County, including pressurized systems and gravity sewer collection systems internal to developments such as apartment complexes, condominiums, townhouses, shopping centers, commercial office parks, mobile home parks, etc. (see Chapter 5 for more specifics). Private sewer systems shall be constructed to County Standards. Maintenance of a private sewer shall be the responsibility of the property owner(s).

PROJECT: General term encompassing all phases of the work to be performed and is synonymous to the term “improvement” or “work.”

PROFESSIONAL ENGINEER:

PUBLIC SEWER SYSTEM: A system of collection and treatment of wastewater located within public rights-of-way and/or utility easements where the County has the responsibility for operation and maintenance of that system.

PUBLIC STREET: Publicly owned and maintained right-of way.

RECORD DRAWINGS: An approved final revision of design drawings or plans, updated to include information showing the true condition or configuration of what has been built. Each record drawing or plan is designated “Record Drawing” by stamp or lettering on the drawing and sealed by a licensed Professional Engineer. The primary function of Record Drawings is to document what was designed and what was actually built, including dimensions, elevations, location, and calculations. Formerly known as as-built or as-constructed drawings, see Section 2.090 of these Standards for additional requirements.

RESIDUAL PRESSURE: The pressure remaining in a water supply while water is flowing.

RESTORATION: All work necessary to replace, repair, or otherwise restore the right-of-way and all features contained within the right-of-way to the same or equivalent condition as before.

REVIEW AUTHORITY: A person, committee, commission, or council responsible for review and final action on a land use or development entitlement or permit.

RIGHT-OF-WAY: All property in which the County has any form of ownership or title and which is held for public street purposes regardless of whether or not any street exists thereon or whether or not it is used, improved, or maintained for public travel.

A. A strip of land acquired by reservation, dedication, forced dedication, prescription, or condemnation and intended to be occupied by a road, crosswalk, railroad, electric transmission lines, oil or gas pipeline, water line, sanitary sewer, stormwater facilities, street trees, and other similar public accesses or public uses

B. Generally, the right of one to pass over the property of another

ROAD: Used interchangeably with street.

SEWER SERVICE AREA: The geographic area described in the Wastewater Engineering and Facilities Plan approved by the Washington State Department of Ecology as required by WAC Chapter 173-240.

SEC or SERVICE EXTENSION CHARGE: A charge to properties outside the Grand Mound Utility Local Improvement District 96-2 as determined by the Special Benefit Study 2002, (on file with the Department) which is equivalent to the assessment on properties within the ULID to fund sewer system infrastructure.

SERVICE LATERAL: See SIDE SEWER.

SERVICE LINE:

SEWER MAIN: A sewer line that conveys wastewater from side sewers, STEP connections, grinder pump connections, lift stations and/or other sewer mains towards a County owned sewer main or treatment facility.

SIDE SEWER: That portion of the sewage collection system which connects the premises to the public sewer system, not operated or maintained by the County and outside of the County right-of-way or easement. The customer is required to keep the side sewer and cleanout in good operating condition and working as designed.

SINGLE-FAMILY RESIDENTIAL UNIT: One or more rooms in a residential building or residential portion of a building which are arranged, designed, used or intended for use as a complete, independent living facility for one family and which includes permanent provisions for living, sleeping, eating, cooking and sanitation. Any duplication of the above permanent provisions, specifically cooking, eating or laundry facilities, will be considered in excess of a single ERU allocation for single parcel and in excess of the allowed sewer service capacity for one ERU. Garages, shops, hobby rooms or any outbuilding with kitchens or cooking facilities, shower stalls, bathtubs or laundry facilities are not to be connected or served by the sewer utility. A sink and toilet are permissible if connected to the existing sewage system. A laundry facility could also be permitted if one does not exist in the residential unit.

SITE PLAN: The development plan for one or more lots on which is shown the existing and proposed conditions of the lot, including topography, vegetation, drainage, flood plains, and walkways; means of ingress and egress; circulation; utility services; structures and buildings; signs and lighting; berms, buffers, and screening devices; surrounding development; and any other information that reasonably may be required in order that an informed decision can be made by the reviewing authority.

STANDARD DRAWING: A standard detail, drawing or plan showing specific dimensions, notes and/or other information reflecting the standards and requirements pertinent to the installation of the feature, appurtenance, system, etc. being shown. Standard Drawings are listed at the end of each Chapter they are associated with and are available from the County in several electronic formats, to be included or referenced in all work associated with what is shown or described on the Standard Drawing.

STANDARD SPECIFICATIONS: The *Standard Specifications for Road, Bridge and Municipal Construction* as published by the Washington State Department of Transportation, current edition, as supplemented by *Development Standards for Water and Sewer Systems*, Thurston County, Washington, Current edition design standards.

STEP or SEPTIC TANK EFFLUENT PUMP – A septic system that collects effluent from a building into a septic tank on-site before being pumped through a small pressure line to gravity sewer collection lines. The effluent pump is controlled by float switches and is monitored by an alarm system on-site.

STREET: An open public way for the passage of vehicles that, where appropriate, may include pedestrian, equestrian, and bicycle facilities. Limits include the outside edge of sidewalks or curbs and gutters, planter strips, paths, walkways, or side ditches, including the appertaining shoulder and all slopes, ditches, channels, waterways, stormwater piping and appurtenances, and other features necessary for proper drainage and structural stability within the right-of-way. The term “street” is used interchangeably with “road.”

SURVEYOR: Any Washington State licensed professional land surveyor who represents the owner.

TAMPERING: The removal, unauthorized alteration, or damage of County owned equipment such as STEP tanks, manholes, clean outs, sewer mains, etc. (should say something about altering or damaging side sewers or cleanout since this could affect what goes into our sewer. Maybe something like customer is required to keep their side sewer in good condition and working as designed)

TCC or Thurston County Code: The Municipal Code of Thurston County, Washington as adopted by the Board of County Commissioners.

TRAFFIC: Movement of motorized and nonmotorized vehicles, persons, cargo, and equestrians through the transportation network comprised of streets, sidewalks, walkways, and shared use paths.

TRAFFIC CONTROL: Those activities necessary to safeguard the general public, as well as all workers, during the construction and maintenance of street and other facilities within the right-of-way.

UGA or Urban Grown Area: The unincorporated area contained within the final urban growth area boundaries identified in the Thurston County Comprehensive Plan on Map M-14. The Grand Mound UGA is the area identified in the Grand Mound Subarea Plan for the Grand Mound Urban Growth Area (Map 6), dated July 1996, or successor document.

ULID or Utility Local Improvement District: The Districts formed by action of the Board of County Commissioner to fund the establishment of water and/or sewer systems within the County.

UNOPENED RIGHT-OF-WAY: A County right-of-way that exists by dedication or deed but for which no vehicular street meeting these Standards has been constructed by the County or other parties.

UPSET: An exceptional incident where a premises unintentionally and temporarily is in a state of noncompliance with discharge limitations due to factors beyond the reasonable control of the customer

and excluding noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation thereof.

UTILITY: Any public or private entity whose principal purpose is to provide electricity, water, sewer, stormwater, gas, radio, television, telephone, and/or other forms of communication utilizing the electromagnetic spectrum to the public.

WASTEWATER: Domestic and industrial waste, sewage or any other liquid waste including that which will be discharged to the public sewer system.

WATER MAIN: A water line designed or used to serve more than one premises

WATER SERVICE LINE: That portion of the public water system connecting a premise to the water main including the tap into the main, the water meter, appurtenances, and the service line from the main to the meter.

WSDOT: Washington State Department of Transportation.

1.020 Authority

This edition of the *Development Standards for Water and Sewer Systems*, commonly known as the DSWSS, is adopted under Title 15 of the Thurston County Code. The Director shall adopt standard specifications for water and sewer service construction and material standards, for the construction and location of water and sewer systems.

1.030 Powers of the Director

The Director shall have the power to:

A. Administer provisions of these standards.

B. Prepare and administer procedures implementing these standards.

C. Prepare and publish, as necessary for public use, a procedures manual or manuals covering these standards.

1.040 Violations

Any violation of this section or any other provision of these Standards declaring conduct unlawful is a misdemeanor and shall be punishable as provided in Thurston County Code (TCC) Title 26. Each person shall be guilty of a separate offense for each and every day any portion of which any violation of this section occurs and shall be punishable accordingly.

1.050 Disclaimer of Liability

Responsibility for complying with the requirements of these Standards and other applicable code provisions rests solely with the permit applicant. Without limitation thereto, the applicant is responsible for determining and accurately representing to the County the following information:

A. Legal descriptions

B. Ownership interests and record title

C. Location of property lines and required setbacks

D. Land use classification (zoning)

E. Stormwater and drainage courses

F. Any other information supplied by the applicant

Thurston County may rely upon all information furnished by the applicant, both oral and written, and any other information acquired by it.

1.060 Purpose

The purpose of these *Development Standards for Water and Sewer Systems* is to ensure that public utility related facilities constructed in Thurston County meet appropriate standards for safety, constructability, durability, and maintainability.

These Standards accomplish the following:

A. Provide clear and specific standards for construction or modification of water and sewer facilities where such facilities distribute drinking water or reclaimed water from; or collect wastewater for delivery to a County facility.

B. Implement and administer the general development regulations contained in the Thurston County Code.

C. Ensure the design and construction of water and sewer facilities in the County service areas complies with all applicable laws, regulations, and standards of good engineering practice.

1.070 Applicability

The DSWSS shall govern all construction, development, re-development, and/or modification of Water, Reclaimed Water, and Sewer infrastructure.

The DSWSS apply to both public and private projects. The DSWSS apply to the infrastructure listed above, for all work located within Thurston County water and/or sewer service areas and for projects outside the service area who seek to connect to Thurston County water and/or sewer infrastructure.

Situations may arise where the application of individual standards in the DSWSS may not sufficiently ensure the protection of public health, safety, and welfare. Accordingly, the Director may impose additional or more stringent standards than those contained in this document or require the modification of plans, specifications, or operations to achieve the necessary public health, safety, and welfare. Modifications may include, but are not limited to, scheduling, phasing, or timing restrictions.

1.080 Administrative Interpretations and Revisions

It is recognized that administrative interpretation of these Standards will be required from time to time. Such interpretations are refinements or explanations of meaning or intent issued by the Director. Requests for administrative interpretations must be submitted in writing to the Director.

Revisions will be issued periodically to keep the document current.

1.090 Deviation from Standards

These Standards represent appropriate practice under most conditions, based on past experience in Thurston County and other jurisdictions. They are intended to provide facilities that are safe and appropriate for use in Thurston County.

Situations will arise where alternatives to these Standards may better accommodate existing conditions, overcome adverse topography, or allow for more cost-effective solutions without adversely affecting safety, operations, maintenance, or aesthetics.

Accordingly, requests for deviations from these Standards will be considered by the Director. Such requests must be submitted to include supporting information demonstrating compliance with the following criteria:

A. The deviation will achieve the intended result with a comparable or superior design and quality of improvement.

B. The deviation will not adversely affect safety or operations.

C. The deviation will not adversely affect maintenance and its associated cost.

D. The deviation will not adversely affect the aesthetic appearance.

E. The deviation will not impact future expansion, development, or redevelopment.

It is recognized that the need for and timing of a deviation request may not be predictable. Requests should be submitted as soon as the need becomes known. No request will be considered until an application for a permit or other approval has been submitted. Known deviation requests that affect lot yield or scope of development must be decided prior to any public hearing or official decision on the application. This is important for public notice and participation in the decision process.

Deviations that affect engineering design, to the extent they are known, must be decided prior to submittal of construction plans. This will prevent wasted effort in the preparation of plans with nonstandard features that cannot be approved.

Any deviation request concerning a provision of the International Fire Code requires concurrence by the Thurston County Fire Marshal. Documentation of concurrence by the Fire Marshal must be submitted with the request.

The Director reserves the right to direct or deny a deviation from these Standards at any time in the interest of public health, safety, and welfare. Formal appeals to deviation requests denied or approved shall be directed to the Hearing Examiner, per TCC 26.05.080.

1.100 References

Except where these Standards provide otherwise (including the additional standards listed in Section 2.010 of Chapter 2 of these Standards), design, construction workmanship, and materials shall be in accordance with the most current edition of the following publications published separately by the Washington State Department of Transportation (WSDOT) or jointly by WSDOT and the Washington State Chapter of the American Public Works Association (APWA):

For access to all WSDOT Manuals, go to http://www.wsdot.wa.gov/publications/manuals/index.htm.

A. WSDOT/APWA Standard Plans for Street, Bridge and Municipal Construction, referred to in these Standards as the WSDOT Standard Plans.

B. WSDOT/APWA Standard Specifications for Street, Bridge and Municipal Construction, referred to in these Standards as the WSDOT Standard Specifications.

C. WSDOT Hydraulic Manual.

D. WSDOT Utility Manual.

E. WSDOT Construction Manual.

In cases where these Standards conflict with the standards or procedures of WSDOT the state requirements shall take precedence for the County projects with state funding.

1.110 Permits

Other permits, approvals, or agreements may be required by the County or other jurisdictions prior to initiating any activities subject to these Standards. Questions regarding such permits, approvals, or agreements should be directed to the County's Community Planning and Economic Development Department.

1.120 Plan Review

Plan review requirements for County-constructed projects are governed by policies and procedures of the Department.

For developer-constructed projects, all plans, reports, drawings, and specifications that support permit or land use applications are to be submitted to the Community Planning and Economic Development Department. Copies of such supporting documentation are forwarded to the appropriate County staff for review.

Construction plan and profile drawings are required for all proposed improvements to water and sewer.

Engineering Record Drawings (previously known as as-built plans) for all construction completed within rights-of-way and easements, conforming to Section 2.090 of these Standards, must be submitted prior to final inspection approval. In some cases, these drawings will be required during the inspection process to approve facilities before the next phase of construction can proceed.

1.130 Professional Qualifications

Licensed professionals who prepare or are responsible for the preparation of plans, drawings, specifications, calculations, technical reports, legal descriptions, etc., for the purpose of obtaining County permits or approvals, shall be registered or authorized to practice in the State of Washington in accordance with Revised Code of Washington (RCW) Title 18. Registration or authorization to practice shall be in the specific technical area pertinent to the documents being prepared. Exceptions to this requirement are specified in RCW Section 18.42.130.

1.140 Inspection

The Director shall have authority to enforce these Standards as well as other referenced or pertinent specifications. The Director shall appoint personnel, as appropriate, to inspect work completed pursuant to these Standards; they shall exercise such authority as the Director may delegate.

Work performed within the public right-of-way, or outside the public right-of-way as mandated by the County land use codes, shall comply with the approved plans and specifications and these Standards. The Director must approve any revision to construction plans before implementation.

It is the responsibility of the developer, contractor, or their agents to have an approved set of plans, permits, and a copy of these Standards on the job site wherever work is being accomplished.

It is the responsibility of the developer, contractor, or their agents to notify the County in advance of the commencement of any authorized work in accordance with permit requirements. A preconstruction conference and/or field review will be required by the Community Planning and Economic Development Department (facilitated and attended by County staff) before the commencement of any work on significant projects.

As requested by the County and outlined in these standards, the applicant/developer will be required to provide tests to substantiate the adequacy and/or placement of construction materials.

1.150 Errors and Omissions

At the discretion of the Director, any significant errors or omissions in the approved plans or information used as a basis for such approvals may constitute grounds for withdrawal of the approvals and/or stoppage of any or all permitted work. It shall be the responsibility of the developer or contractor to show cause as to why such work should continue and make such changes in plans that may be required by the Director before the plans are reapproved.

1.160 Right-of-Way Site Maintenance

The developer or contractor shall schedule and control work to comply with all applicable provisions of the Thurston County codes and applicable state and federal codes to prevent any hazards to public safety, health, and welfare.

On existing streets, two-way traffic for vehicles, bicycles, and pedestrians shall be maintained at all times unless detour plans or lane closures have been approved in advance by the Board of County Commissioners (BoCC).

Streets, bridges, bikeways, and pedestrian facilities shall be kept free of dirt, debris, or any obstructions. Paved temporary detour(s) shall be provided during the entire time of repair or construction.

Pedestrian and vehicular access to occupied buildings shall be maintained except where written approval from the building owner has been obtained.

On-site grading shall be done in a manner to minimize off-site erosion and siltation in conformance with all statutory requirements, permits, and approved plans.

1.170 Penalties

Failure to comply with these Standards will be cause for withholding or withdrawing approval of plans or drawings, withholding of bonds, final inspection approval or occupancy certificates, and/or other penalties as provided by Thurston County Code or state law.

Chapter 2
GENERAL PUBLIC WORKS CONSIDERATIONS

2.000 GENERAL PUBLIC WORKS CONSIDERATIONS

2.010 Standard Specifications

Design detail, workmanship, and materials will be in accordance with the current edition of the *Standard Specifications for Road, Bridge, and Municipal Construction*, WSDOT, current edition, except where these standards provide otherwise.

The following referred materials will be applicable when pertinent, when specifically cited in the standards, or when required by a higher funding authority:

A. Conditions and standards as set forth in the applicable *Water System Plan*, most current edition.

B. Conditions and standards as set forth in the applicable *County Wastewater Management Plan*, most current edition.

C. Thurston County Comprehensive Plan, most current edition.

D. Rules and regulations as adopted in the *Thurston County Code*.

E. Thurston County Capital Facilities Plan, most current edition.

F. Conditions and standards as set forth in the *Thurston County Coordinated Water System Plan*, most current edition.

G. Rules and regulations of the State Board of Health regarding public water supplies, as published by the Washington State Department of Health.

H. Conditions and standards as set forth in the Ecology's *Criteria for Sewage Works Design*, most current edition.

I. Washington State Department of Transportation (WSDOT) Standard Plans, most current version.

2.020 Shortened Designation

These *Thurston County Development Standards for Water and Sewer Systems* will be cited routinely in the text as the Standards or DSWSS.

2.030 Design Standards

A. Detailed plans, prepared by a licensed engineer, must be submitted to Thurston County for plan review and approval prior to the commencement of any construction. Applicant's engineer will be a Professional Engineer, registered as such in the State of Washington. All plans must be stamped, signed, and dated by the applicant's engineer, consistent with the requirements of WAC 196-23-070, prior to submittal for plan review. Thurston County will review all submittals for general compliance with these specific Standards. An acceptance by Thurston County does not relieve the applicant or the applicant's engineer from responsibility for ensuring that all facilities are safe and that calculations, plans, specifications, construction, and Record Drawings comply with normal engineering standards, these Standards (see for example Section 2.090), and applicable federal, state, and local laws and codes. Final plans will be approved by the Director prior to the start of construction.

B. Materials proposed for use in construction of publicly owned or publicly maintained utilities must be in conformance to approved Thurston County material standards in place at the time of submittal. Unapproved materials cannot be adequately evaluated within the plan review period.

C. Plans as required by the Department are required to be submitted along with a completed Master Application, Supplemental Application, and Application for Utilities Service form. If submitted electronically, all drawings must be in a portable document format (PDF) meeting the requirements of ISO 32000-1, Document management – Portable document format – Part 1: PDF 1.7. Hard copy drawings, if accepted by the Department, shall be on 24-inch x 36-inch or 22-inch x 34-inch sheet size. Original sheets will be good-quality reproducible ink. Original drawings of the approved plan will be retained by Thurston County.

D. Plans and profile drawings are required for all sewer and water improvements. For specific minimum requirements, see the Plan Checklist on the following pages. On occasion, the scope of a project may not require engineered plans. This option will be decided by the Director.

E. Thurston County's Standard Drawings may be incorporated into plans submitted for approval. If a drawing remains unchanged from that included in these DSWSS, the drawing is to retain the block border which includes the date of the drawing, title, and Standard Drawing number. If the Standard Drawing is revised in any way, the border, date, and Standard Drawing number are to be removed.

F. Specifications will be required and submitted with the plans if General Notes and Construction Notes do not adequately cover the project requirements.

2.040 Drafting Standards

A. All plans submitted for either design approval or permanent record will be free of photographs, stick-ons, or shading. Hatching may be acceptable if the pattern is not excessively dense.

B. Design drawings will be submitted on clean, legible blue or black line format.

C. Record Drawings will conform to Section 2.090 of these Standards.

D. Minimum text height will be at least 0.08 times the scale factor (i.e., 1-inch = 20-foot scale; minimum text will be 20(0.08) = 1.6 units). Minimum nominal text size will be 1/8-inch.

E. No engineering plans will be accepted with architect's scale.

F. Street drawings will be either 1-inch = 5 feet, 1-inch = 10 feet, 1-inch = 20 feet, or 1-inch = 30 feet horizontal with vertical not to exceed 1-inch = 10 feet. Utility drawings may be accepted at 1-inch = 50 feet or 1-inch = 40 feet if they are legible.

G. Plans will show all existing and proposed monuments. All monumentation will be described using current Thurston County coordinates. Centerline of roadways, easements (with type and dimensions), and other pertinent data will be referenced to existing monuments.

H. All existing features (pipes, curbs, power poles, etc.) are to be produced with a fine (0.5mm) pen or half tones. Proposed features will be distinguished by a larger or bolder line weight.

I. Different line types will be used to distinguish different features. For example, centerline and right-of-way will have different line types.

J. General Notes and work-specific notes shall be included in all Plans submitted for approval. All of the General Notes listed on Standard Drawing 2-1 shall be included in each set of engineering plans. In addition, as applicable to the type of work shown on the plans, all other notes on Standard Drawing 2-1 shall be included in the engineering plans submitted for approval.

2.050 Plan Checklists

Plan checklists are provided in Appendix 2 to assist in preparation of submittals.

2.060 Construction Control

Work performed for the construction or improvement of Thurston County roads and utilities, whether by or for a private developer, by Thurston County forces, or by a Thurston County contractor, will be done to the requirements established by Thurston County and in accordance with approved plans. No work will be started until plans are approved. Any revision to such plans will be approved by the Director before being implemented. Failure to receive Thurston County's approval may result in removal or modification of construction at the contractor's or developer's expense to bring it into conformance with approved plans.

2.070 Construction Survey and Staking

For all private development and/or improvement projects, the contractor/developer is responsible for completing all applicable construction survey and staking, as required in this section. All surveying and staking shall be performed under the direct supervision of a Professional Land Surveyor, licensed in the State of Washington. The Director may, upon request, waive the requirement for staking to be

performed under the direct supervision of a Professional Land Surveyor, licensed in the State of Washington, for projects requiring only an Abbreviated Water and Sewer Plan.

A preconstruction meeting will be held with Thurston County prior to commencing staking. All construction staking will be inspected by Thurston County prior to construction.

The meaning of words and terms used in this section shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

Minimum staking requirements are as follows:

1. Primary Control: Establish intermediate elevation benchmarks, and/or control points throughout the project, with a minimum spacing of 500 lineal feet, to check work throughout the project.
2. Sanitary Sewer Structures: Sanitary sewer manholes, STEP tanks, vacuum pits, and buffer tanks will be staked with two offset stakes each. Gravity sanitary sewer and stormwater pipe will be staked as follows: one stake at 25-foot and one stake at 100-foot stations, as measured upstream from structures. Service stubs will be staked with two inline offsets.
3. Water and Force Mains: Water mains and force mains will be staked at major fitting (angle points) and valves, and at approximately 200-foot intervals. Fire hydrants, service meters, and other appurtenances will be staked with two inline offsets.
4. Utility Vaults and Joint Trench: Joint trench (power, gas, communication) will be staked with one set of stakes for all utilities. The staking will be at 100-foot intervals and at angle points. Two corners of each utility vault will be staked with one offset stake each.

These stakes and marks shall govern the contractor's work. The contractor shall furnish all additional survey deemed necessary. The contractor shall take full responsibility for detailed dimensions, elevations, and slopes measured from the survey stakes. The contractor shall provide Thurston County copies of any calculations and staking data performed by the contractor or its surveyor when requested by Thurston County.

All work performed shall be in conformity with the lines, grade, slopes, cross sections, super elevation data and dimensions as shown in the Plans or as staked. If the Plans, Special Provisions or Standard Specifications state specific tolerances, then the work shall be performed within those limits. The Contractor shall not deviate from the approved Plans unless the Director approves it in writing.

The Contractor shall work to preserve stakes, marks, and monuments. The Surveyor and Engineer of Record are responsible for locating and referencing those monuments shown on the Plans, of being removed or destroyed during construction, and preparing the required permit forms with the Department of Natural Resources (DNR) for those monuments.

The Surveyor of Record shall maintain a complete and accurate reference record of all survey markers, monuments, and property corners on the project. The Contractor shall inform the Surveyor of Record and Thurston County when monuments are discovered that were not identified in the Plans and construction activity may disturb or damage the monuments. All monuments noted on the plans "DO NOT DISTURB" shall be protected throughout the length of the project or be replaced at the Developer's expense. In the event the monument(s) are disturbed or destroyed during the course of construction,

and not indicated to be removed/replaced on the Plans, the Developer shall bear all costs of survey, resetting, legal claims, and filing state forms.

2.080 Inspection

All work performed within the public right of way or easements or as described in these standards, whether by or for a private developer, by Thurston County forces, or by a Thurston County contractor, will be done to established requirements outlined by Thurston County and in accordance with the Standard Specifications, any approved plans, and these standards. Any revision to construction plans must be approved by Thurston County before being implemented.

It is the responsibility of the developer, contractor, or their agents to notify the Thurston County in advance of the commencement of any authorized work. A preconstruction meeting and/or field review will be required before the commencement of work. All applicable fees will be paid prior to the preconstruction meeting. Any required easements or offers of dedications are required before finalizing of a project and issuance of Certificate of Occupancy.

It is the responsibility of the developer, contractor, or their agents to have an approved set of plans and any necessary permits on the job site whenever work is being accomplished.

The Director will have authority to enforce these standards as well as other referenced or pertinent specifications. The Director will appoint project engineers, assistants, and inspectors as necessary to inspect the work, and they will exercise such approved authority as the Director may delegate.

All specific inspections, test measurements, or actions required of all work and materials are set forth in their respective chapters herein. Tests will be performed at the developer's or contractor's expense.

Failure to comply with the provisions of these standards may result in stop work orders, removal of work accomplished, or other penalties as established by ordinance.

A project is considered final when record drawings, bills of sale, easements, bonds, and maintenance agreements have been submitted to and approved by the Director and a letter of acceptance is issued by the Director to the party responsible for the project.

No water meters will be released for any lot or building served by a project until final acceptance has been granted.

2.090 Record Drawings

An approved final revision of design drawings or plans updated to include information showing the true condition or configuration of what has been built shall be submitted to Thurston County for approval. Each Record Drawing or plan is to be designated "Record Drawing" by stamp or lettering on the drawing and sealed by a licensed Professional Engineer. Record Drawings submitted with any disclaimer or caveats written on the face of them (for example, stating that "…to the best of my knowledge, the project was constructed substantially in accordance with these drawings…") are not acceptable and will be rejected.

Record Drawings shall conform to Sections 2.030, 2.040, and 2.050 of these Standards. In addition, original sealed Record Drawings shall be on 24-inch x 36-inch or 22-inch x 34-inch sheet size. Original sheets will be monochrome, no shading or color images, ink on good quality white bond paper. Electronic copies of final, approved Record Drawings shall also be submitted to Thurston County, in two formats: (1) 300 dpi TIF or PDF (high resolution), and (2) AutoCAD compatible files.

2.100 Fees

Fees, charges, or bonding requirements will be as established by the Board of County Commissioners adopting a fee, charge, and bonding requirement schedule, except where specifically set forth in the TCC. Fees are due at the time as required by TCC.

2.110 Permits

Before any person, firm, or corporation will commence work, plans must be approved by the Director and permits must be issued by the Community Planning and Economic Development Department.

2.120 Utility Locations

Utilities within a right-of-way or easement on new roads or in roadways where existing utilities are not in conflict will be located as shown in typical sections. Where existing utilities are in place, new utilities will conform to these standards as nearly as practical and yet be compatible with the existing installations. Deviations of location will be approved by the Director. Existing utilities will be shown using the best information available. This verification may require exploration/ excavation (potholing) if utilities are in conflict with proposed design.

The contractor/developer will be responsible for utility locates in conjunction with their project until final approval is given by the Director.

2.130 Easements

A. Where public utilities such as water and sanitary sewer facilities, or their conveyance systems, cross or are located on private property, an easement must be granted to Thurston County. The Department will process, record, and file all easements. If the property is platted, the easement may be conveyed when the short plat or final plat is filed. All easements not shown on a plat must be prepared by an attorney or a licensed land surveyor or engineering firm capable of performing such work.

B. Easement widths will be centered on the utility and be 20 feet for a single utility and 30 feet for dual utilities, ensuring 10 feet of clear space on both sides of each pipe. For STEP Tank effluent pumping lines from the tank to the main this may be decreased to 10ft width along centerline of the effluent line and extending to 5ft around the perimeter of the STEP Tank.

   Construction/slope easements will be required when appropriate with widths as necessary to encompass work area. An all-weather access road may be required to be constructed as part of the initial construction of the public facilities in order to facilitate future maintenance. A wider easement may be required by the Director, to enable installation, access and/or maintenance of the utility(ies), particularly for larger pipe diameters, depth of pipe, manholes or vaults larger than a nominal 4 feet in width, or location of the easement in an undeveloped area of the parcel(s).

C. Easements are required to be submitted in draft, unsigned form for review and approval prior to plan approval. Signed copies are required prior to final approval. Any change in design that places an amenity, i.e., water or sewer, outside of the easement may necessitate stopping of construction until plans and easements can be resubmitted and approved. Plan review fee will be based on the rate as established by the BoCC. Easements will be filed by Thurston County upon satisfactory completion of the work.

A copy of the standard easement form may be obtained from the Department's Water Resources Division. Standard Easement language requires that Grantor of the easement "shall not excavate within or otherwise change the ground surface grade of the Easement Area, or construct, or maintain any buildings or structures within the Easement Area without prior written consent of Grantee (Thurston County)".

2.140 Bill of Sale

For all improvements installed by the developer/contractor to be owned and maintained by Thurston County, a Bill of Sale must be submitted and accepted by the Department's Water Resources Division. The Bill of Sale must be signed and executed by the Director prior to issuance of Final Plat Approval or a Certificate of Occupancy for any building.

2.160 Call Before You Dig

All developers/contractors are responsible for timely notification of all utilities in advance of any construction in right of way or utility easements. The utilities one-call Underground Location Center phone number is 1-800-424-5555. A minimum of two working days' advance notice is required.

2.170 Emergency Work Policy for Private Utilities

Should the work of a developer/contractor result in an emergency street or utility shut down during nonworking hours, the direct overtime costs of responding Thurston County personnel will be billed to the responsible party. The Department's 24-hour emergency telephone number is 1-800-929-7761.

Appendix 1: List of Standard Drawings

Title	Drawing No.	File Type (DWG includes all drawings in chapter)	File Type
General Notes	GN-01	PDF DWG	PDF DWG
General Notes Continued	GN-02	PDF DWG	PDF DWG

Appendix 2: Plan Checklists

Abbreviated Plan Standard Items

All development not requiring an Engineered Plan by the Director must submit, at a minimum, a drawing including, at a minimum, the below items.

- ☐ North Arrow
- ☐ Plat Number
- ☐ Parcel Number
- ☐ Site Address
- ☐ Existing and Proposed Site Improvements:
  - ☐ All Structures are accurately located
  - ☐ Access is clearly delineated
  - ☐ Existing Septic (if applicable)
  - ☐ Existing Well (if applicable)
- ☐ Property Lines
- ☐ Easements (existing and proposed)
- ☐ Existing Water and Sewer Infrastructure
  - ☐ Existing Sewer Main Size
  - ☐ Existing Water Main Size
  - ☐ For Gravity Sewer, invert elevations of sewer main in nearest manhole, upstream and downstream, of proposed sewer tap
- ☐ Proposed Water Service Location
  - ☐ Location of meter box (must be located at parcel boundary)
  - ☐ Location of main tap(s)
  - ☐ Location of service line(s)
  - ☐ Size of service line(s)
  - ☐ Location and type of backflow prevention device (if applicable)
- ☐ Proposed Side Sewer Location
  - ☐ Location of lateral tap
  - ☐ Size and slope of side sewer
- ☐ Location of Vacuum Pit (if applicable)
  - ☐ Make/Model of Vacuum Pit
  - ☐ Location of Vacuum Pit easement (if not property line)
  - ☐ Setback from other utilities
- ☐ Location of STEP tank (if applicable)
  - ☐ Make/Model of STEP tank
  - ☐ Location of Proposed STEP tank easement
  - ☐ Location of STEP alarm panel and model

- ☐ Show setback distance from tank and other utilities (2’ minimum setback from any underground utilities)

☐ References to Thurston County’s standard details include name and # as found in the Development Standards for Water and Sewer Systems. (e.g. Sanitary Sewer Connection per TC Standard SS-07)

Engineered Plans: Sanitary Sewer and Water

All development must provide an engineered plan addressing, at a minimum, the following elements.

- ☐ Plans submitted on 22" x 34" or 24" x 36" sheet size
- ☐ Minimum text height of 1/4"
- ☐ Vicinity map (showing project location and the surrounding street network for 0.25 miles on each edge of the development boundary)
- ☐ Legend (APWA Standard Symbols or approved alternatives)
- ☐ North arrow with current Thurston County meridian
- ☐ Scale bar
- ☐ Current Thurston County datum-bench mark # elevation (MSL) and location; vertical datum used shall be NAVD 88
- ☐ Title block:
  - ☐ Title
  - ☐ Date
  - ☐ Design by
  - ☐ Drawn by
  - ☐ Checked by
  - ☐ Signature Approval block
  - ☐ Sheet number of total sheets (e.g., 2 of 5)
  - ☐ Revisions and revision dates
- ☐ Engineer's/Land Surveyor's stamp signed and dated
- ☐ Detail sheet(s) describing applicable work
- ☐ "Call Before You Dig" note
- ☐ Sheet index
- ☐ Cover sheet (can include vicinity map, legend, general notes, construction details[s])

REQUIRED PLAN PORTION ITEMS

- ☐ Construction centerline stations with origin based on existing monumentation
- ☐ Right-of-way dimensions and right-of-way lines labelled
- ☐ Match lines with station and see page notation
- ☐ Edge of pavement, width, and pavement type
- ☐ Roadway and restoration sections (if applicable)
- ☐ Existing utilities (above and below ground)
- ☐ Adjacent property lines and addresses
- ☐ Note when matching existing features and utilities
- ☐ Easements-existing, proposed, type, and dimensioning (if applicable)
- ☐ Define survey baseline vs. construction baseline (if applicable)
- ☐ Street names with quadrant suffix

- ☐ Profile grades (decimal FT/FT)
- ☐ Existing ground profile (on construction baseline for street or over utility installation when roadway section not included)
- ☐ Scale (horizontal and vertical)
- ☐ Vertical elevation increments 25' stations on vertical curves and 50' on all tangents

SANITARY SEWER

Plan View:

- ☐ Station and offset shown at each proposed manhole
- ☐ Manholes numbered
- ☐ Manhole type designation
- ☐ Flow direction (with arrow on pipe)
- ☐ Distance from water lines (if applicable)
- ☐ Pipe material
- ☐ Size of pipe
- ☐ Length of pipe from center of manhole to center of manhole
- ☐ Depth at property line
- ☐ Station for side sewers at property line
- ☐ S.T.E.P. System and appurtenances with station and offset
- ☐ Force main and appurtenances with station and offset
- ☐ Invert elevations

Profile View:

- ☐ Station and offset shown at each manhole
- ☐ Manholes numbered
- ☐ Invert elevation showing direction in and out
- ☐ Rim elevation
- ☐ Grades shown (decimal form FT/FT)
- ☐ Pipe material
- ☐ Size of pipe
- ☐ Length of pipe from center of manhole to center of manhole (in L.F.)
- ☐ Existing utility crossings with clear dimensions
- ☐ S.T.E.P. system valves, pigg ports, pressure-sustaining devices, aeration vaults, air relief valves
- ☐ Force main and appurtenances with stations and offsets

WATER

Plan View:

- ☐ Existing utility crossings
- ☐ Show fixtures with stations
- ☐ Fire hydrants
- ☐ Valves
- ☐ Blow-off (at dead end of line)
- ☐ Vacuum and air release valves when required
- ☐ Tees, crosses, elbows, adapters, and valves; meter station and offset
- ☐ Size of pipe
- ☐ Pipe Material
- ☐ Type and brand of fixtures
- ☐ Length of water main in L.F. between fixtures
- ☐ Distance from sanitary sewer, reclaimed water, or stormwater (if applicable)

Profile View:

- ☐ Existing utility crossings
- ☐ Show fixtures with stations and elevation
- ☐ Show valves and stations and elevations
- ☐ Size and material of water main
- ☐ Length of water main in L.F.
- ☐ Grades

Chapter 3
DRINKING WATER

3.000 General

Any extension of a Thurston County owned water system must be approved by the Department, and all extensions must conform to the most current version of the applicable Thurston County Water System Plan.

In designing and planning for any development, it is the developer's responsibility to see that adequate water for both domestic use and fire protection is attainable. The developer must show in the proposed plans how water will be supplied and whether adequate water volumes at acceptable pressure and velocity will be attained in case of fire. The Director may require additional analysis of the system if it appears that the system might be inadequate.

Anyone who wishes to extend or connect to the County owned water system should contact the Department for a water extension/connection fee estimate. This fee estimate is an estimate of the costs due the County for a waterline extension or connection.

Water meters will be installed by the Department. In new plats, prior to the installation of any water meters, all Department improvements must be completed and approved, including granting of right-of-way or easements, Record Drawings conforming to Section 2.090 of these Standards submitted and approved, or bonded for in accordance with Chapter 2 of these Standards, and all applicable fees must be paid.

Issuance of building permits will not occur until the Director of the Department or their designee has given final approval of the required water system improvements.

Certificate of Occupancy for new developments will not be issued until the Director or their designee has given final approval for all public infrastructure improvements as being both constructed and complete or an acceptable completion surety is in place for the improvements.

3.030 Main Line

A. Main Sizing

Water mains will be sized to provide adequate domestic plus fire flow at the required residual pressure. The quantity of water required will in no case be less than 1,000 gpm at 20 psi residual pressure, and 1,500 gpm at 20 psi for multi-family, commercial, and industrial areas within the UGA. Outside the UGA water mains shall be sized to provide adequate domestic flow at 20 psi residual pressure.

The minimum water main size will be 6 inches diameter where looped. Dead-end mains will be 8 inches diameter to the last fire hydrant. Larger-sized mains are required in specific areas outlined in the current applicable Water System Plan. Nothing shall preclude the County from requiring the installation of a larger-sized main if the County determines a larger size is needed to meet fire protection and domestic requirements or for future service.

All water mains that may be extended or looped will end with an approved gate valve and MJ plug. A blow-off or hydrant may be required.

B. Materials and Chemicals

All materials used for the construction of potable water distribution infrastructure shall conform to NSF 61 and all chemicals must comply with NSF 60.

C. Pipes

All water main pipe will have flexible gasketed joints and will comply with one of the following types:

All water main 4-inch to 16-inch diameter:

- Ductile iron pipe shall meet the requirements of AWWA C151. Ductile iron pipe shall have a cement mortar lining and a 1-mil thick seal coat meeting the requirements of AWWA C104. Ductile iron pipe to be joined using bolted flanged joints shall be Special Thickness Class 53.

All other ductile iron pipe shall be Special Thickness Class 50, minimum Pressure Class 350. Nonrestrained joints shall be rubber gaskets, push-on type, or mechanical joint, conforming to AWWA C111.

- PVC pipe for water mains shall meet the requirements of ANSI/AWWA C900 or ANSI/AWWA C905. PVC pipe shall have the same outside dimensions as ductile iron pipe. PVC pipe for distribution pipelines shall be a minimum of SDR 18. Pipe shall be listed by Underwriters' Laboratories, Inc.
- PVC pipe shall be considered flexible conduit. Joints shall meet the requirements of ASTM D3139 using a restrained rubber gasket conforming to ASTM F477. Solvent welded pipe joints are not permitted.
- HDPE pipe meeting the requirements of ANSI/AWWA C906. Pipe materials shall be high-density polyethylene PE3408 conforming to a minimum cell class 345464 C, D, or E per ASTM D3350. Pipe diameter shall be either iron pipe size per Table 3 and Table 5 of ANSI/AWWA C906. Pipe pressure class shall be as listed in Table 9 of ANSI/AWWA C906 for DR 9 PE3408 material.

All water mains larger than 16-inch diameter will be ductile iron pipe and will conform to AWWA C151, Class 50.

All fire service connections 4-inch diameter and larger shall be ductile iron or HDPE iron pipe. See Section 3.106 for more information.

D. Fittings

All fittings for ductile iron pipe or HDPE pipe will be ductile iron compact fittings conforming to AWWA C153 or AWWA C110 and C111. All fittings will be epoxy coated conforming to AWWA C104. Plain-end fittings with mechanical joint retainer glands installed on the plain ends will be ductile iron. All fittings will be connected by flanges or mechanical joints. Where required, mega-lug retainer glands will be used.

E. Tracer Tape and Toning

All pipe and services will be installed with continuous tracer tape installed 12 inches to 18 inches under the final ground surface, Terra Tape D or approved equal. The tape will be plastic non-biodegradable metal core or backing that can be detected by a standard metal detector, colored blue for water, and labeled "Water".

In addition, toning (tracer) wire will be installed over all pipe, conduit and service lines, colored blue for water. Toning wire will be UL listed for direct bury, Type UF, HDPE or HMWPE-coated, 12-gauge coated copper taped to the top of the pipe to prevent movement during backfilling. Nylon PVC coated THHN wire shall not be used for toning wire. The wire will be laid loosely enough to prevent stretching and damage. The wire will be brought up and tied off at valve body, meter setter, or other fitting or structure as necessary. Sufficient wire to allow a minimum of 2 feet (slack) above final grade shall be coiled/looped into the valve box or structure to ensure the end of the wire will be accessible to hook up to a locator. If there is an existing locate wire contractor will connect new wire to existing wire using approved method.

A 1-pound magnesium anode will be buried with the wire and every 1,000 linear feet thereafter for cathodic protection of the toning wire. All toning wire splices and connections will join wires both mechanically and electrically and will employ epoxy resin or heat-shrink tape insulation.

Toning wire shall be tested by an approved locating company prior to acceptance of the pipe system. All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the County, prior to acceptance. Continuity testing in lieu of actual line tracing shall not be accepted. A written notice from the contractor to the County at least two working days prior to the test is required; such notice is to include information on the relevant experience of the company proposed to complete the testing.

F. Pipe Cover

The minimum cover for all water mains, from top of pipe to finish grade, will be 36 inches for ductile iron, 42 inches for any other material. The maximum cover for all water mains, from top of pipe to finish grade, will be 60 inches for all materials, unless otherwise approved by Thurston County.

G. Water Main Looping, Pressure, and Velocity

Water mains shall be extended and “looped” to the nearest existing water main as part of any commercial or multifamily development, to ensure improved water quality and provide redundancy of service, except where impractical or infeasible due to topography or where an easement(s) are not obtainable. For larger commercial and residential developments, a minimum of two connection points to the existing water system shall be provided.

Outside the UGA no dead-end mains shall be longer than 1,200 linear feet.

Water mains shall be designed not to exceed velocities of 7 feet per second during any flow condition to reduce the chance of water hammer. Pressure of 45 to 60 psi will be maintained at the main during peak-day demands.

H. Markers

Within easements outside of County right-of-way, at each bend in the water main a bend marker shall be placed indicating the angle of the bend and direction of the water main each way. Bend marker posts shall be 4-inch Carsonite CWV-116 posts, or equivalent, stamped with “Caution Water Main.”

3.035 Pressure Reducing Valve

A pressure-reducing valve (PRV) is required on the customer’s side of the meter for all water services that have a static water pressure above 80 psi. All PRVs are owned by the property owner after the initial installation is complete.

For all new construction or remodels for which a building permit is required, with the exception of publics works projects replacing existing water mains and existing service connections, the developer or permittee is required to pay for and install an approved PRV when a PRV is required. The developer or permittee shall then warrant the PRV for one year from the date of installation, after which the property owner is required to maintain the PRV at its own expense.

For PRVs installed as part of a Department project replacing existing water mains and/or existing service connections, the PRV will be maintained by the County for one full year after the date of the initial installation, after which the property owner is required to maintain the PRV at its own expense.

3.040 Connection to Existing Water Main

The developer's engineer will be responsible for determining the scope of work for connection to existing water mains. All cut-ins and taps shall be done under the supervision of a representative of The Department's Water Resources Division. A minimum of ten working days' notice following application at the Community Planning and Economic Development Department is needed to schedule shutdowns. The Department's Water Resources Division, Utility Operations Supervisor will be consulted regarding fittings or couplings required.

It will be the contractor's responsibility to field-verify the location and depth of the existing main and the fittings required to make the connections to the existing mains. All excavation, connections, piping, tapping, valve fittings, services, anchors, blocking, bedding, backfill, compaction, restoration, or other labor and materials required will be furnished and placed by the contractor.

Until such time as a list of Thurston County approved tapping contractors can be obtained from the Department, applicant may use the City of Olympia's list of approved tapping contractors. The Department's Water Resources Division will be notified a minimum of two business days prior to the contractor performing the tap. All taps must be completed under the supervision of a representative of the Department's Water Resources Division and occur between the hours of 8:30am and 3:00pm Monday thru Thursday.

The Department's Water Resources Division will make all shutdowns on existing mains. The contractor may operate the valve under the immediate supervision of the County's Utility Operations Supervisor or their designee.

At any connection to an existing line where a new valve is not anticipated, the existing valve must be pressure tested to County Standards prior to connection. If an existing valve fails to pass the test, the Contractor shall make the necessary provisions to test the new line prior to connection to the existing system or install a new valve and replace the existing valve, at the discretion of Thurston County.

All material required for the connection will be at the site prior to shut down and start of work. Connection to a new section shall only be made after the new section has been tested and disinfected. Connecting pipe will be swabbed with strong chlorine solution such as liquid household bleach with 5%–6% chlorine before making the connection. After work is started, work will proceed continuously, as rapidly as possible, until necessary connection and restoration of service is accomplished. Care shall be taken throughout construction to avoid contamination of materials.

3.050 Service Interruption

Following Community Planning and Economic Development Department issuance of permits for connection to the existing water main, the contractor will give the Department a minimum of ten working days' 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 County will notify customers involved or affected of the water service interruption 48 hours in advance. The contractor will make every effort to schedule water main construction with a minimum interruption of water service. In all situations, the County will dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

3.060 Hydrants

A. The lead from the main to the fire hydrant will be ductile iron cement mortar-lined Class 50, and no less than 6 inches in diameter and a maximum of 50 feet in length. Greater than 50-foot lengths will require oversizing, as designed by an engineer. Every joint shall be restrained.

B. The gate valve shall be located a minimum of 8 ft from the hydrant unless otherwise approved by the Director.

C. Fire hydrants will have two 2 1/2-inch outlets and one 4 1/2-inch pumper port outlet with PCT threads and 5-inch Storz adaptor, Style 5-37 w/sc cap. All 2 1/2-inch outport threads will be National Standard thread. The valve opening will be 5 1/4-inch diameter. The hydrant will have a positive and automatic barrel drain and will be of the safety or breakaway style. The chain connecting the Storz fitting to the hydrant shall be removed.

D. Hydrants will be M&H Style 129S, Mueller Centurion, or approved equal. All hydrants will be bagged until the system is approved. Developments being served by existing hydrants will be required to upgrade the hydrants to these standards.

E. Hydrants will be painted with Parker Paint Marathon Enamel Safety Yellow paint or equal, if not pre-coated.

F. Unless otherwise required by Thurston County, the following guidelines will apply for hydrant number and location:

1. At least one hydrant will be installed at all intersections.
2. Hydrant spacing of 300 feet will be required in all areas except single-family and duplex residential areas.
3. Hydrant spacing of 600 feet will be required for single-family and duplex residential areas.
4. Where hydrants are providing water to meet the fire flow requirements, where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction, is more than three hundred feet (91.44 m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided.
5. For dead-end mains within the UGA, hydrants shall be placed off dead-ends of mains, with a valve, blind flange, and appropriate thrust blocking.

G. Fire hydrants will be set as shown in Thurston County Standard Drawings.

H. Requirement regarding use, size, and location of a fire department connection (FDC) and/or post indicator valve will be determined by the Building Official and the Thurston County Fire Marshal. Location of the FDC will be shown on the water plans.

I. Where hydrants are located within 10 feet of a vehicular travel path, hydrants shall be protected by two or more bollards, each 4-6 inches in diameter and made of steel. The top of bollard shall match the top of hydrant height.

J. Fire hydrants must be installed, tested, and accepted prior to issuance of a certificate of occupancy.

K. Fire hydrants shall be abandoned per Section 3.300.

L. Fire hydrants will not be installed over areas being used for underground stormwater treatment storage.

3.070 Valves

All valves and fittings will be coated ductile iron with ANSI flanges or mechanical joint ends. All existing valves will be operated by County employees only.

Valves will be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case will there be less than one valve every 600 feet. There shall be three valves on all TEES and four valves on all crosses in each intersection. All water mains that may be extended or looped will end with an approved gate valve and blind flange. Specific requirements for valve spacing will be made at the plan review stage.

A. System gate valves will be resilient wedge, NRS (Non-Rising Stem), with O-ring seals. Valve ends will be mechanical joint or ANSI flanges. Valves will conform to AWWA 509-80 or AWWA C-515. System gate valves will be M&H, Kennedy, AVK, Mueller, or Clow.

   Gate valves will be used on all 2- to 10-inch lines. Gate valves may be used on 12-inch lines.

B. Butterfly valves. Butterfly valves will conform to AWWA C504-87, Class 150B, with cast iron short body and O-ring stem seals. Butterfly valves will be Mueller, M&H, Clow, Kennedy, or American Flow.

   Butterfly valves may be used for 12-inch lines and will be used on all lines 14 inches and larger.

C. Valve box. All valves will have a standard 950 cast iron water valve box set to grade. If valves are not set in a paved area, a 1-foot by 6-inch-thick circular concrete pad minimum shall be placed around the valve box. Concrete shall extend beyond the valve box by 1-foot minimum. In areas where the valve box falls in the road shoulder, the ditch and shoulder will be graded before placing asphalt or concrete pad. Valve box lids will be ductile iron and shall be anti-kickout.

   Valve marker post. Valve marker posts will be 4-inch Carsonite CWV-116 posts stamped with “Caution Water Valve.” See Thurston County Standard Drawings.

3.075 Meters

At least 10 weeks advance notice to Thurston County shall be given for ordering 3-inch or larger meters. All meters, regardless of size, will be installed by Thurston County.

3.080 Casing

Steel casing pipe will be Schedule 20 steel or equal. Pipe spacers will be Cascade Style CC5 with 8-inch runners as available from Cascade Waterworks or approved equal. Casing pipe and spacers will be sized for pipe being installed. Install minimum of three spacers per section of pipe. The casing pipe will then be sand-packed.

3.090 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) will be ARI combination air release valve or approved equal. Installation will be as shown on Thurston County Standard Drawings.

The installation will be set at the high point of the line when required. Where possible, pipes are to be graded to prevent the need for an air release valve. Air release valves may not be required when services are in the vicinity.

3.100 Blowoff Assembly

Where a fire hydrant is not located at the end of a dead-end main, a blowoff assembly will be required. On water mains that will be extended in the future, the valve that operates the blowoff assembly will be the same size as the main and provided with a concrete thrust block. The pressure rating for blowoff assemblies will be 200 psi. Installation will be as shown on Thurston County Standard Drawings.

3.105 Sampling Station

The number of sampling stations required for subdivisions and other major developments will be determined on a case-by-case basis during plan review An Eclipse #88-SS stainless steel water quality sampling station shall be manufactured by Kupferle or approved equal. See Standard Drawing WA-20 for installation details.

3.106 Fire Service Line

The County shall maintain that part of the fire service line (also referred to as the fire department connection, or FDC) from the connection at the main to and including the valve closest to the main (in most cases the “tapping” valve), which shall be a 4-inch minimum gate valve. The property owner shall own and maintain the fire service line from this valve to and within the building. If the water main is located in public right-of-way (ROW), then the closest valve to the main shall also be in the ROW. If the main is in an easement on private property, then the valve shall be within 2 feet of the main. Toning wire shall be installed on all fire service lines, from the main to the building, per Section 3.030.D.

Only ductile iron or high-density polyethylene (HDPE) pipe, 4-inch minimum nominal diameter, may be used for fire service lines located partly or entirely within a street ROW or water utility easement, except that if hydraulically warranted a 3-inch HDPE may be approved. The tapping valve for a 3-inch HDPE pipe shall remain 4-inch.

Fire service line plans shall be submitted to the County for approval prior to construction.

3.110 Backflow Prevention

All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems will comply with the minimum backflow prevention requirements as established by the Washington State Department of Health and Thurston County in its Cross-Connection Program.

The installation of required backflow devices is necessary to protect the existing water system and users from possible contamination. All backflow prevention assemblies will be of a type and model pre-approved by the Washington State Department of Health or the County.

No cross connections will be created, installed, used, or maintained within Thurston County water service area.

Approved backflow prevention assemblies will be installed at the expense of the user, either at the service connection or within the premises, as determined by the Director.

A backflow prevention assembly is required on all new irrigation services, at all new commercial buildings, and at all existing commercial buildings where there is an expansion or change of use. The Director may require a backflow prevention assembly on any service where they determine there is a potential for a backflow or back siphonage incident.

A reduced pressure (RP) backflow assembly is required at all new commercial buildings and will be required to be installed when a change of use occurs at a commercial building. The RP device shall be installed at the meter.

The County will have the authority to perform regular inspections on all backflow assemblies, both inside and outside any building connected to the County owned water system and will be provided access to the premises to inspect.

The Department must receive and approve the test results of any backflow prevention assembly before releasing the Certificate of Occupancy on any building.

Backflow Prevention Assembly Testers shall hold a current Washington State Department of Health Backflow Assembly Tester Certification and have proof of calibrated test kit.

The Thurston County Fire Marshal will test the fire line and obtain the certificate for underground piping. In any situation, the Thurston County Fire Marshal will not test the fire line until the Department has tested and approved the main up to the fire line. Backflow assemblies for fire protection shall have integrated shutoff valves approved as part of the assembly and shall be separate from any post indicator valve installed on the first service line. Reduced pressure principle detector assemblies shall be required on all fire lines.

3.111 Backflow Prevention Assemblies

Backflow prevention devices for industrial, commercial, and multi-family residential facilities shall be readily accessible to the County's Cross Connection Control Specialist, which normally means in an above ground, insulated enclosure adjacent to the right of way. See Section 3.112 below for more information on location and accessibility.

A. Double-Check Valve Assembly (DCVA). The term "double-check valve assembly" will mean an assembly composed of two independently acting approved check valves, including tightly closing shutoff valves attached at each end of the assembly, and fitted with properly located test cocks. This assembly will only be used for irrigation services rated as a non-health hazard.

B. Double-Check Detector Check Valve Assembly (DCDA). The term "double-check detector check valve assembly" will mean a specially designed assembly composed of a line-sized approved double-check valve assembly with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter will register accurately for only very low rates of flow and will show a registration for all rates of flow. This assembly will only be used to protect against a non-health hazard and may only be used on fire protection lines rated as a non-health hazard existing as of December 31, 2020.

C. Reduced Pressure Principle Backflow Prevention Assembly (RPBA). The term "reduced pressure principle backflow prevention assembly" will mean an assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit will include properly located test cocks and tightly closing shutoff

valves at each end of the assembly. This assembly is allowed on all lines requiring a backflow prevention assembly except fire lines.

D. Reduced Pressure Principle Detector Assembly (RPDA). The term "reduced pressure principle detector assembly" will mean a specially designed assembly composed of a line-sized approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. This assembly will be used on all new fire protection services.

   The meter will register accurately for only very low rates of flow and will show a registration for all rates of flow.

Only the types of backflow prevention assemblies listed above shall be allowed.

3.112 Backflow Assembly Installation Requirements

Fire suppression systems connected to the potable water system shall be protected by an approved reduced pressure principle detector assembly as minimum protection. Fire systems using chemicals shall be required to install a reduced pressure detector assembly as minimum protection.

Horizontal and vertical assemblies must be approved by the Washington State Department of Health and Thurston County at the time of installation.

To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements will apply to the installation of these devices:

A. No part of the backflow prevention assembly will be submerged in water or installed in a location subject to flooding.

B. Assemblies must be installed at the point of delivery of the water supply, before any branch in the line on private property, in a location approved by the Director.

C. The assembly must be protected from freezing and other severe weather conditions.

D. All backflow prevention assemblies to be installed will be of a type and model pre-approved by the State of Washington State Department of Health (Washington Administrative Code 246-290-490) and the Director.

E. Only assemblies that have been approved for vertical installation by the Washington State Department of Health and the Director shall be used when necessary.

F. The assembly will be readily accessible with adequate room for maintenance and testing. Devices 2 inches and smaller will have at least a 6-inch clearance on all sides of the assembly. All assemblies larger than 2 inches will have a minimum clearance of 24 inches on the back side, 24 inches on the test cock side, 12 inches below the device, and 36 inches above the device (refer to Thurston County Standard Drawings). A strainer shall be installed immediately upstream of the assembly except for fire line devices.

G. If written permission is granted by the Director to install the backflow assembly inside of the building, the assembly will be readily accessible during regular working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday.

H. If, after receiving written permission by the Director, an assembly is installed inside the premises and is 4 inches or larger and is installed 4 feet above the floor, it must be equipped with a rigidly and permanently installed scaffolding acceptable to the Director. This installation must also meet the requirements set out by the US Occupational Safety and Health Administration (OSHA) and the State of Washington Occupational Safety and Health Administration (WISHA).

I. Reduced pressure principle assemblies may not be installed in a vault underground or anywhere it may be subject to flooding. All installations of reduced pressure principle assemblies shall be above ground with insulated enclosures where needed.

J. An approved air gap will be located at the relief valve orifice. This air gap will be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than 1 inch.

K. Where a backflow device is deemed necessary, the assembly and installation plans will be submitted to Thurston County Community Planning and Economic Development Department for approval by the Department prior to installation.

L. Upon completion of installation, the Department's Water Resources Division will be notified, and all devices must be inspected and tested. All backflow devices must be registered with Department's Water Resources Division. Registration with all the required information shall be submitted within five days of installation. Forms must be completed in ink, and legible. An original copy of the registration form can be mailed to the Department's Water Resources Division or a signed scanned pdf may be emailed to TCutilities@co.thurston.wa.us. A test tag shall be installed on the device by the certified tester.

M. The Department's Water Resources Division reserves the right to reject test reports that are not complete and accurate. Submittal of inaccurate test reports shall result in denial of report forms and a requirement to retest the backflow assembly.

N. Any deviation from these installation requirements will be requested in writing by the owner and approved by the Director, or designee, prior to the device installation.

O. No field modifications shall be made to an approved backflow assembly that will change its configuration or function.

3.120 Service Connection

A. All service connections relating to new development will be of the appropriate size as determined by the Department and by the Building Official or Fire Marshal and installed by a licensed developer at the time of mainline construction. After the lines have been constructed, tested, and approved, the owner may apply for a water meter. The County will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after the system is inspected and approved.

B. When water is desired to a parcel fronting an existing main but not served by an existing setter, an application must be made to the County. Upon approval of the application and payment of all applicable fees, a licensed and bonded contractor will tap the main and install the service line. A Department Utility Supervisor shall be notified 2 business days prior to work commencing. A Department Utility Supervisor, or his delegee, shall be present to inspect tap. Department Utility staff will install the meter.

C. Domestic Service lines will be, high-density polyethylene (HDPE) pipe minimum pressure Class 250 psi, Grade PE 4710 iron pipe size (IPS). Service lines will be installed a minimum of 45 degrees off the main. Tracer tape and toning wire wrapped around the pipe shall be installed on all service lines. See Section 3.030E for tracer tape and toning wire requirements.

   Service saddle shall be nylon coated ductile iron with double stainless-steel straps. All clamps will have rubber gaskets. Service saddles shall have tapped IP threads. Romac 202NS or approved equivalent.

   Corporation stops will be ball valve all US lead free brass and will be Ford, Mueller, or AY McDonald with IP threads conforming to AWWA C800. Stainless steel inserts shall be used with compression joints and polyethylene pipe.

D. Specifications for meter setters are shown on Thurston County Standard Drawings.

E. Specifications for meter boxes are shown on Thurston County Standard Drawings.

F. Other than existing ones with an active water utility account as of December 31, 2020, master meters will not be allowed for use in County owned water systems.

3.130 Required Separation Between Water Lines and Sanitary Sewers

The basic separation requirements apply to all nonpotable pipelines of 24-inch diameter or less; larger non-potable pipelines may create special hazards because of flow volumes and joint types and accordingly require additional separation requirements. The special construction requirements given are for the normal conditions found with nonpotable and water systems. More stringent requirements may also be necessary in areas of high groundwater, unstable soil conditions, and so on. Any site conditions not conforming to conditions described in this section will require assessment and approval of the appropriate state and local agencies. In case of conflict between the Thurston County Development Standards for Water and Sewer Systems and the Ecology's *Criteria for Sewage Works Design* regarding requirements for nonpotable and water separation, the most restrictive shall be used.

Standard industry guidance calls for a minimum of 10-foot horizontal separation between the outer walls of potable and nonpotable pipelines in parallel installations, and a minimum of 18-inch vertical separation (potable water line above) between the invert of the potable water line and the crown of the nonpotable line at pipeline crossings (Ten State Standards, WAC 246-290-200). Actual conditions can make it impossible to comply with these standards. If the design of a new or replacement water main cannot provide the standard 10-foot horizontal separation, design engineers should consult *Pipeline Separation Design and Installation Reference Guide (Ecology and DOH 2006)* and the *Washington State Department of Health Water System Design Manual (DOH Publication 331-123, June 2020)*. Provisions allow for parallel potable and nonpotable installations to be as close as 4-feet horizontally if they meet certain conditions. Design engineers should provide justification and demonstrate that the conditions for a pipe separation less than 10-feet are met in the project report.

If the potable line is closer than 18 vertical inches from the nonpotable line at the point of crossing, or the potable line must cross under the nonpotable line, the potable line should be encased with ductile iron or steel pipe designed to withstand a minimum static pressure of 150 psi extending at least 10 feet to either side of the crossing. Additional measures may be necessary to mitigate the risk posed by crossing an existing nonpotable line, especially when it is located above the new water line.

If the developer receives permission from the County to do so, mitigation of close parallel or crossing installations may be applied to the nonpotable line. To allow for future maintenance, the use of casing pipes shall be the standard mitigation.

3.140 Irrigation

All irrigation systems will be installed with backflow prevention assemblies approved by the Washington State Department of Health, and in accordance with Thurston County installation guidelines. The backflow prevention assembly must be located next to the meter, unless otherwise approved by the Director.

Irrigation sprinklers will be situated so as to not wet any impervious surface, such as a public street or sidewalk.

3.150 Surveying and Staking

All surveying and staking shall be performed as required in Chapter 2, Section 2.070 of these Standards.

3.160 Trench Excavation

A. Clearing and grubbing where required will be performed within the easement or public right-of-way as permitted by the County and/or governing agencies. Debris resulting from the clearing and grubbing will be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

B. Trenches will be excavated to the line and depth designated by the County to provide the required minimum cover. See Section 3.030 for required cover. Except for unusual circumstances where approved by the County, the trench sides will be excavated vertically, and the trench width will be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. All necessary shoring operations will be performed to ensure that the excavation can be carried out in accordance with WISHA and OSHA safety standards. The trench will be kept free of water until joining is complete. Surface water will be diverted so as not to enter the trench. The contractor will maintain sufficient pumping equipment on the job to ensure that these provisions are carried out.

C. The contractor will perform all excavation of every description and whatever substance encountered, and boulders, rocks, roots, and other obstructions will be entirely removed or cut out to the width of the trench and to a depth 6 inches below water main grade. Where materials are removed from below water main grade, the trench will be backfilled with material satisfactory to the County and thoroughly compacted.

D. Trenching and shoring operations will not proceed more than 100 feet in advance of pipe laying without approval of the County and will be in conformance with WISHA and OSHA safety standards.

E. The bottom of the trench will be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes will be excavated with hand tools to sufficient size to make up the joint.

F. The contractor will maintain the presence of a “competent person”, as defined by the Washington State Department of Labor and Industries, when any trench excavation and backfill work is being done at the project site.

3.165 Thrust Blocking

Location of thrust blocking will be shown on the plans. Thrust block concrete will be commercial concrete meeting the requirements of Standard Specifications Section 6-02.3(B) poured against undisturbed earth. A plastic barrier will be placed between all thrust blocks and fittings. See Thurston County Standard Drawings for thrust block locations and calculations.

We will only accept MJ Mega Lug retainers with mega-bond coating, Romac restrained flange couplings, and Romac Grip Ring Retainers with Romabond coating, or approved equal, for restraints. The restraints shall be required to be used in conjunction with thrust blocking.

3.170 Backfilling

Backfilling will not commence until the pipe installation has been inspected and approved.

Backfilling and surface restoration will closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the County. Selected backfill material will be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill will be compacted to 95 percent of the maximum density in traveled areas and 90 percent outside traveled areas. Where governmental agencies other than the County have jurisdiction over roadways, the backfill and compaction will be done to the satisfaction of the agency having jurisdiction. Suitable backfill material, as determined by the County, shall conform to the current WSDOT/APWA Section 7-09 with the exception of gradation of the bedding material to be a maximum size of 1-inch.

3.180 Hydrostatic Tests

Prior to the acceptance of the work, the installation will be subjected to a hydrostatic pressure test by the contractor of 225 psi for a minimum of 15 minutes. See Section 7-09.3(23) Hydrostatic Pressure Test in the current addition of the Standard Specifications for more detail. Any leaks or imperfections developing under said pressure will be immediately remedied by the contractor. The main will be tested between valves. Insofar as possible, no hydrostatic pressure will be placed against the opposite side of the valve being tested. Test pressure will be maintained while the entire installation is inspected by the County. See Section 7-09, Water Mains, of the current Standard Specifications for more detail.

The contractor will provide all necessary equipment and will perform all work connected with the tests. Tests will be made after all connections have been made and the roadway section is constructed to subgrade. This is to include any and all connections as shown on the plan. The contractor will perform a test to assure that the equipment to be used for the test is adequate, in good operating condition, and the air in the line has been released before requesting the County witness the test. Only authorized personnel of the Department will operate isolation valves. The County may require the contractor to perform a final hydrostatic test if there has been any modification to the compacted soils.

See Section 3.110 for testing responsibilities for backflow prevention devices.

3.190 Sterilization and Flushing

Sterilization of the water main will be accomplished by the contractor in accordance with the requirements of the Washington State Department of Health and AWWA Standards and in a manner satisfactory to the County. At no time will chlorinated water from a new main be flushed into a body of water. This includes lakes, rivers, streams, drainage ways, Puget Sound, and any and all other waters where fish or other natural water life can be expected. All dechlorination procedures will meet all local,

state, and federal regulations. The contractor will provide the Department Utility inspector a written copy of their plan or procedures to be used prior to the sterilization process.

Once the line has been installed to County standards it will be super chlorinated by following AWWA Standard ANSI/AWWA C651-14 for Disinfecting Water Mains.

1. Each stick of pipe shall be chlorinated by spraying the ends of the pipe with super chlorinated solution and adding highly concentrated NSF sodium hypochlorite chlorine granules for water disinfection.
2. County water is added to the pipe, using a hydrant or valve, until the pipe is filled, and all air is removed. Once the air is removed, the County shall perform a test of the free chlorine residual in the newly installed pipe to verify it is at least 25 mg/L. The water shall remain in the pipe for 24 hours without disturbance. At the end of 24 hours, the County shall perform a test of the chlorine residual. The chlorine residual at the pipe must be at least 10 mg/L. If during the course of testing, the system water in the line has an elevated pH or free chlorine residual above the expected levels in the distribution system, the sample will not be collected and the line will need to be flushed, dechlorinated, valve closed, and retested.
3. If the water main meets the residual requirements, flush the new water main with County water until the chlorine residual is consistent with the current system residual. Water flushed from the main shall be dechlorinated per the current AWWA method. Highly chlorinated water shall not be allowed to enter the County distributions system.
4. Following flushing, the County will take a bacteriological test samples of the water in the main. If more than one service connection exists, multiple samples will be required. If any initial sample fails and bacteria are present, the disinfection procedure will be repeated starting with super-chlorinating the line. Only after all samples taken show absence of bacteria shall the line be allowed to be placed in service.

3.200 Construction Completion Form

A “Construction Complete Report for Distribution Main Projects” [form number DOH331-147 (3/00)] shall be completed for each project as required per Washington State Department of Health, Drinking Water Program (DOH) and referred to in WAAC 246-290-125(2). The applicable sections of this form shall be completed by the Engineer of Record and submitted with the record drawings. The completed form may be maintained on file at Thurston County and be made available to DOH. Thurston County, at its discretion, may forward a copy of the completed forms to DOH.

3.300 Abandonments

At time of abandonment for any service line, the corporation stop, and saddle shall be removed, and a full circle stainless steel repair band shall be installed.

When a main line or hydrant is abandoned, the abandonment shall occur back to the closest tee or cross, removing the valve and installing a blind flange or plug. The water line being abandoned must be removed. In areas where the tees are lead-in fittings, the whole tee will be removed along with a small section of main. In some situations, where removal of the valve will require significant interruption in service, the Department will allow a blind flange or plug to be placed on existing valve and the valve box filled with sand. This alternative method of abandonment requires pre-approval of the Department.

3.310 Asbestos Cement Pipe Abandonment

Asbestos Cement (AC) pipe being abandoned in place shall be filled with "Pumpable Controlled Density Fill (CDF)" using a Line Pumper to place the required mix. For AC pipe larger than 6 inches in diameter, or for any AC pipe located under a paved roadway section, the Contractor shall pothole and window the pipe every 100 feet to verify the pipe is full. Handling of AC pipe shall be in accordance with Department of Labor and Industries requirements.

New water mains and service connections shall be installed and tested prior to AC water pipe abandonment unless otherwise approved by the Engineer.

3.400 Termination of Service

If, in the opinion of Thurston County, failure on the part of any customer to discontinue the use of all cross connections, except in accordance with the Standard, is sufficient cayuse for the immediate discontinuance of public water service to the premises (Washington Administrative Code 246-90-490). Thurston County may install the appropriate backflow prevention device at the owner's expense.

Appendix 1: List of Standard Drawings

Title	Drawing No.	File Type (DWG includes all drawings in chapter)
Water Nonpotable Separation	WA-01	PDF DWG
Connection to Existing Main	WA-02	PDF DWG
Fire Hydrant	WA-03	PDF DWG
Standard Valve Box	WA-04	PDF DWG
Valve Marker Post & Hydrant Bollard Detail	WA-05	PDF DWG
2" Air and Vacuum Release Valve	WA-06	PDF DWG
2" Blowoff Assembly	WA-07	PDF DWG
2" Temporary Blow-Off Assembly Type "A" and "B"	WA-08	PDF DWG
Typical Installation with Minimum Clearance & Backflow Prevention Device Assembly	WA-09	PDF DWG
2" and Smaller Reduced Pressure (RP) Installation	WA-10	PDF DWG
Standard Reduced Pressure Backflow Assembly 2-1/2" Or Larger	WA-11	PDF DWG
2-1/2" and Larger Double Check Valve Assembly	WA-12	PDF DWG
2" and Smaller Double Check Valve Assembly	WA-13	PDF DWG
1" Dual Water Service	WA-14	PDF DWG
Typical 1-1/2" and 2" Water Service & Meter Setter W/Bypass	WA-15	PDF DWG

Title	Drawing No.	File Type (DWG includes all drawings in chapter)
Large Meter Vault	WA-16	PDF DWG
Standard Blocking Detail	WA-17	PDF DWG
Thrust Block Areas	WA-18	PDF DWG
Thrust Loads	WA-19	PDF DWG
Water Quality Sampling Station	WA-20	PDF DWG
Water Testing – Charging & Flushing	WA-21	PDF DWG
Single Service Connection 1" Diameter To ¾" Setter	WA-22	PDF DWG
Single Service Connection 1" Diameter To 1" Setter	WA-23	PDF DWG
Typical Meter Placement	WA-24	PDF DWG
Blowoff Sizes for Flushing Pipelines	WA-25	PDF DWG
Octave Water Meter with Bypass For 6" and 8" Size	WA-26	PDF DWG
Material List for Octave Water Meter with Bypass For 6" and 8" Size	WA-27	PDF DWG
Pressure Vacuum Breaker Assembly	WA-28	PDF DWG
2-1/2" and Larger Double Check Detector Check Valve Assembly	WA-29	PDF DWG
Spill Resistant Pressure Vacuum Breaker Assembly	WA-30	PDF DWG
Groundwater Monitoring Well Design	WA-31	PDF DWG
Near Building Residential PRV Assembly	WA-32	PDF DWG
Near Street Residential PRV Assembly	WA-33	PDF DWG
13" X 24" X 2" rpm Cover with Cast Iron Read Lid	WA-34	PDF DWG
17" X 30" X 2" rpm Cover with Cast Iron Read Lid	WA-35	PDF DWG

Chapter 4
WASTEWATER

Chapter 4

4.000 GENERAL CONSIDERATIONS

4.010 General

Sanitary sewage refers to wastewater derived from domestic, commercial, and industrial pretreated waste to which storm, surface, and ground water are not intentionally admitted. Industrial discharges must follow all requirements set forth by Ecology and Thurston County Code.

The standards established by this chapter are intended to represent the minimum standards for the design and construction of wastewater facilities. Except as otherwise stated herein, these standards apply to all sewer pipe and facilities, regardless of whether final ownership is private or public.

Any extension of Thurston County's sanitary sewer system must be approved by the Department and must conform to the current Thurston County Health Department, Washington State Department of Ecology (Ecology)'s Criteria for Sewage Works Design, and Washington State Department of Health (DOH) requirements.

Abandonment of any of Thurston County's sewer pipes must be in accordance with current WSDOT and Thurston County Standards.

Stormwater, groundwater, rain water, street drainage, subsurface drainage, yard drainage, roof drainage, or unpolluted water (including, but not limited to, cooling water, process water or blow-down from cooling towers or evaporative coolers, condensate from heat pumps, air conditioners and swimming pool water) shall not be allowed to be discharged to the County wastewater system.

See Chapter 1 for definitions of specific types of sewers.

4.020 Sanitary Sewer/Water Main Crossings

See Chapter 3, Section 3.130 for requirements regarding sewer and water separation.

4.030 Surveying and Staking

All surveying and staking shall be performed as required in Chapter 2, Section 2.070 of these Standards.

4.040 Trench Excavation

See Chapter 3, Section 3.160 for requirements regarding trench excavation.

4.050 Backfilling

See Chapter 3, Section 3.170 for requirements regarding backfilling.

4.065 Pipe Repairs

Repair couplings shall be of the type with a stainless-steel shear ring, meeting the ASTM C1173 shear resistance test and equal to Fernco 1000 RC or 5000 RC Series couplings. Unshielded repair couplings shall not be used.

4.070 Testing

The Department must be notified of all testing a minimum of two business days prior to conducting a test. All testing shall be performed in the presence of a representative from the Department's Water Resources Division. The Contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been made, lines have been backfilled, and site is at final grade.

Prior to acceptance and approval of construction, the following tests shall apply to each type of construction:

A. Gravity Sewer

1. After the pipes have been cleaned, the gravity sewer pipe shall be subject to a low-pressure air test pursuant to the current Standard Specifications Section 7-17. The contractor shall furnish all equipment and personnel for conducting the test under the observation of a representative from the Department. The testing equipment shall be subject to the approval of the County.

   The contractor shall make an air test for its own purposes prior to notifying the Department to witness the test. The air test for acceptance shall be made after the trench is backfilled and compacted and the roadway section is completed to subgrade.

   All wyes, tees, and end-of-side sewer stubs shall be plugged with flexible joint caps, or acceptable alternates, securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable, and their removal shall provide a socket suitable for making a flexible, jointed lateral connection or extension.

2. The Department shall be notified a minimum of two business days prior to testing. Testing of the sewer main shall include a television (video) inspection. The video inspection will be conducted at the applicant's expense. All video inspections shall be performed in accordance with NASSCO's Pipeline Assessment and Certification Program (PACP) standards.

The video inspection will use an Asset ID number assigned to each sewer pipe section and manhole by the Department. If not already provided to the contractor by the Department, the contractor shall request from the Department assignment of these unique Asset IDs at least one week prior to completing the video inspections.

Video inspection shall be done after the air test has passed, the manhole has been channeled, and before the roadway is paved. Immediately prior to a video inspection, enough water shall be run down the line, so it comes out the downstream manhole and the line is flushed clean. Contractor must capture and remove all debris from the downstream manhole.

Two copies of the video and two copies of the written report shall be submitted to the Department for review and approval. Acceptance of the pipeline(s) will only be made after the video inspection documents have been reviewed and approved by the Department. No sags or bellies in the sewer pipe shall be greater than ½ inch in depth, per Section 4.130.D.

Any tap to an existing sewer main needs to be televised at the applicant's expense.

The Department may require the Contractor to televise the new line during periods of high groundwater within the first two years after construction and acceptance of the line. Any defects in the pipe material, installation, or conditions resulting in inflow and infiltration (I&I) will be considered a system failure that shall be repaired by and at the expense of the contractor.

B. Manholes

1. A vacuum test of all manholes is required prior to acceptance. The structure shall be tested in accordance with the latest edition of ASTM-C 1244. This test method covers procedures for testing cast in place or precast concrete manhole sections using the vacuum test method to demonstrate the integrity of the installed materials and the construction procedures.

   The Department shall be notified a minimum of two business days in advance of testing and will be required to witness the tests.

   Testing shall be done in the following manner after manhole is sealed and coated:

   a. All lift holes and pipes entering into the manhole shall be plugged, taking care to securely brace each plug from being drawn into the structure.

   b. The test head shall be placed at the top portion of the structure in accordance with the manufacturers' recommendations.

   c. A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop by 1 inch to 9 inches. The manhole will pass the vacuum test if the time is greater than the time shown in Table 1.

   d. If the manhole fails the initial test, necessary repairs shall be made by an approved method. The structure shall then be retested until a satisfactory test is obtained.

e. If the manhole joint is displaced during the vacuum test, the manhole shall be disassembled, the seal replaced, the structure reassembled, and retested until compliance is obtained.

f. Testing shall be done after backfilling operations around the structure are complete. If during backfill operations it is found that the structure has been disturbed and it is suspected that the integrity of the joint has been compromised, retesting shall be required.

g. All other requirements stipulated in Section 7-05 of the latest edition of the Standard Specifications that has been adopted by the County shall also be adhered to for final acceptance of the manhole structure.

Table 1 below gives allowable time loss in seconds, i.e., test section is acceptable if vacuum does not drop below 9 inches until after the times shown below have expired.

Table 1: Minimum Test Times for Various Manhole Diameters

Depth (ft)	Diameter in Inches						
	48	54	60	66	72	84	96
	Time in Seconds						
8	20	23	26	29	33	38	44
10	25	29	33	36	41	47	55
12	30	35	39	43	49	53	66
14	35	41	48	51	57	62	77
16	40	46	52	58	67	71	88
18	45	52	59	65	73	80	99
20	50	53	65	72	81	89	110
22	55	64	72	79	89	98	121
24	59	64	78	87	97	107	132
26	64	75	85	94	105	116	143
28	89	81	91	101	113	125	154
30	74	87	98	108	121	134	165

2. A mandrel test in accordance with Section 7-17.3(2)(G) of the Standard Specifications shall be performed by and at the expense of the contractor on all sewers except laterals as defined in Chapter 1 of these standards when televising reveals a possible defect or belly in the pipe.

3. Any time that testing reveals problems that lead to repairs by the contractor, the Department may require complete retesting of the entire system that was repaired. This

work shall be required to ensure that the integrity of the system was not compromised during the repair work.

C. Force Main

1. Prior to road construction, the backfilled pressure line shall be subjected to a hydrostatic pressure test. The pressure test shall be pursuant to Section 7-09.3(23), Hydrostatic Pressure Test, in the Standard Specifications. Any leaks or imperfections developing under said pressure shall be remedied by the contractor. The pressure test shall be maintained while the entire installation is inspected.

   The contractor shall perform a test to assure that the equipment to be used for the test is adequate, in good operating condition, and the air in the line has been released before requesting the County witness the test.

2. A water test for all wet wells in accordance with the Section 4.589 shall be required.

3. Verification of operating parameters such as pump operation, alarms, and an electrical inspection is required prior to acceptance of all lift stations. Upon request, the County will provide a final inspection checklist for all pump station components.

D. STEP/Grinder Pressure Main System

1. The pressure mainlines and service lines shall be subject to a hydrostatic pressure test. The pressure test shall be pursuant Section 7-09.3(23), Hydrostatic Pressure Test, in the Standard Specifications.

   The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been made. The contractor shall perform a test to assure that the equipment to be used for the test is adequate, in good operating condition, and the air in the line has been released before requesting the County witness the test.

2. A water test of the septic, STEP, or grinder tank at the factory and on-site after installation is required in accordance with the criteria outlined in Section 4.460 General Installation. The contractor shall perform the test and supply all necessary equipment and materials. The testing shall be conducted in the presence of a County Inspector.

3. Verification by County Inspector of all operating parameters, such as pump operation and alarms, and an electrical inspection is required prior to acceptance of any STEP system installation. Upon request, the County will provide a final inspection checklist for all STEP and grinder system components.

E. Vacuum Sewer

1. All system components shall be subject to a vacuum test. The testing shall be done pursuant to the current AIRVAC Standards. The testing shall be conducted in the presence of a County Inspector.

F. Side Sewers (Laterals) from Cleanout at Property Line to Sewer Main

Side sewers, or laterals, from the cleanout at the property line to the gravity sewer main, shall follow the testing and television inspection requirements of gravity sewer mains as described in 4.070.A above.

4.080 Abandonment

The County prefers defunct sewer systems be removed; however, it may allow petition to abandon in-place where circumstances are to the County's benefit. Abandoned facilities shall not interfere with proposed utilities nor create conditions that undermine foundations or road bases.

Abandonment shall follow the following procedures:

A. Abandon sewer lines by completely filling the sewer line with flowable fill. Abandon manholes and other structures by filling with flowable fill, together with ballast, as applicable, within the depth of structures left in place.

B. Place flowable fill to fill the volume between the manholes as completely as practicable. Continuously place flowable fill from manhole to manhole with no intermediate pour points, but not exceeding 500 feet in length.

C. Plug each end of force mains being abandoned.

   1. Clean the inside surface of force mains at least 12 inches from the ends, as necessary, to achieve a firm bond and seal the grout plug or manufactured plug to the pipe surface. Similarly, clean and prepare the exterior pipe surface if a manufactured cap is to be used.

   2. When using a grout plug, place a temporary plug or bulkhead approximately 12 inches inside the pipe. Fill the pipe end completely with dry-pack grout mixture.

   3. When using a manufactured plug or cap, install the fitting, as recommended by the manufacturer's instructions, to form a watertight seal.

D. Vacuum pits shall be abandoned by removing the vacuum valve, capping the main-side vacuum connection line, removing the sensor and suction lines, and filling with ballast and flowable fill.

4.100 GRAVITY SEWER

4.110 General

All sewers shall be designed as a gravity sewer whenever physically and/or economically feasible.

4.120 Design Standards

The design of any sewer extension/connection shall conform to Department of Ecology's *Criteria for Sewage Works Design*, most current edition, and any applicable standards as set forth herein.

The layout of extensions shall provide for the future continuation of the existing system as determined by the County. Sewer mains shall be sized for the ultimate development of the tributary area. Nothing shall preclude the County from requiring the installation of a larger sized main if the County determines a larger size is needed to meet the requirements for future service.

New gravity sewer systems shall be designed on the basis of an average daily per capita flow of sewage of not less than 80 gallons per day. See Table 2 below, Criteria for Sewage Works Design, for estimating flows for other facilities. When a deviation from these flow rates is requested, in addition to the criteria

described in Section 1.090, a description of the procedure used for sewer design shall be included in the submittal to the Director for review and approval.

The minimum size for sewer mains shall be 8-inch nominal diameter. The minimum size for a side sewer within the street right-of-way shall be 6 inches. See definitions in Chapter 1, Section 1.010.

Table 2: Criteria for Sewage Works Design

Source: Washington State Department of Ecology

Discharge Facility	Design Units	Flow* (gpd)	BOD (lb/day)	SS (lb/day)	Flow Duration (hr)
Dwellings	per person	100	0.2	0.2	24
Schools with showers and cafeteria	per person	16	0.04	0.04	8
Schools without showers and with cafeteria	per person	10	0.025	0.025	8
Boarding schools	per person	75	0.2	0.2	16
Motels at 65 gal/person (rooms only)	per room	130	0.26	0.26	24
Trailer courts at 3 persons/trailer	per trailer	300	0.6	0.6	24
Restaurants	per seat	50	0.2	0.2	16
Interstates or through highway restaurants	per seat	180	0.7	0.7	16
Interstate rest areas	per person	5	0.01	0.01	24
Service stations	per vehicle serviced	10	0.01	0.01	16
Factories	per person per 8-hour shift	15-35	0.03-0.07	0.03-0.07	Operating Period
Shopping centers	per 1,000 square feet of ultimate floor space	200-300	0.01	0.01	12
Hospitals	per bed	300	0.6	0.6	24
Nursing Homes	per bed	200	0.3	0.3	24
Homes for the aged	per bed	100	0.2	0.2	24
Doctor's office in medical center	per 1,000 square feet	500	0.1	0.1	12

Discharge Facility	Design Units	Flow* (gpd)	BOD (lb/day)	SS (lb/day)	Flow Duration (hr)
Laundromats, 9 to 12 machines	per machine	500	0.3	0.3	16
Community colleges	per student and faculty	15	0.03	0.03	12
Swimming pools	per swimmer	10	0.001	0.001	12
Theaters, drive-in type	per car	5	0.01	0.01	4
Theaters, auditorium type	per seat	5	0.01	0.01	12
Picnic areas	per person	5	0.01	0.01	12
Resort camps, day and night, with limited plumbing	per campsite	50	0.05	0.05	24
Luxury camps with flush toilets	per campsite	100	0.1	0.1	24

4.130 Main Line Gravity

A. Main line sewers, unless otherwise approved by the Director, shall be constructed using materials conforming to one of the following:

1. PVC pipe, 8-inch to 15-inch diameter, must meet either ASTM D 3034, SDR 35 solid wall pipe or ASTM F 794 for solid seamless profile pipe.

2. PVC pipe, 18-inch to 27-inch diameter, shall conform to ASTM F 679 Type 1 only.

3. All joints for PVC pipe shall conform to ASTM D 3212 with rubber gaskets conforming to ASTM F 477. Ribbed pipes shall not be allowed for use in the sanitary sewer system.

4. Cases where ductile iron is approved for use by the Director, it shall conform to AWWA C151, pressure class 50, and shall be epoxy-lined, push-on, mechanical or restrained joint as appropriate. Joints shall be rubber gasketed, conforming to the requirements of AWWA C111.

B. Gravity sewer shall maintain a minimum depth of 5 feet, unless otherwise approved, to provide gravity service to adjoining parcels, adequate head room within manholes for maintenance personnel, future areas to be served, and vertical clearance between water and sewer lines. Gravity sewer mains and associated manholes shall not exceed a maximum depth of 20 feet at any point along its length.

C. All building sewer connections to the main shall be made with a sanitary tee (wye) connection. A cleanout assembly shall be provided at the edge of the right-of-way, as shown in Standard Drawing SS-07, for all new and rehabilitated sewer laterals. Backflow prevention devices shall be provided as required by the most recent edition of the U.P.C. All new mains connecting to

existing mains, if not made at an existing manhole, shall require the installation of a new manhole.

D. All sewers shall be designed and constructed to give mean velocities of not less than 2.0 feet per second based on Manning's formula using an "n" valve of 0.013. Use of other practical "n" values may be permitted by the County if justified by a licensed Professional Engineer. Table 3 lists the minimum slope for gravity sewer main for Thurston County. Shallower slopes, less than those indicated in Table 3 but equal to or greater than minimum slopes for gravity sewer main as set forth in the Ecology's *Criteria for Sewage Works Design*, most current edition, may be considered if calculations submitted by a licensed professional engineer show that a shallower slope shall still provide a minimum 2.0 feet per second based on anticipated flows.

Table 3: Sewer Size and Minimum % Slope

Sewer Size (Inches)	Minimum % Slope % (Feet per 100')
8	1.00 (0.010 Ft/Ft)
10	0.50 (0.0050 Ft/Ft)
12	0.45 (0.0045 Ft/Ft)
14	0.35 (0.0035 Ft/Ft)
15	0.30 (0.0030 Ft/Ft)
16	0.28 (0.0028 Ft/Ft)
18	0.25 (0.0025 Ft/Ft)
21	0.20 (0.0020 Ft/Ft)
24	0.16 (0.0016 Ft/Ft)
27	0.15 (0.0015 Ft/Ft)
30	0.12 (0.0012 Ft/Ft)
36	0.10 (0.0010 Ft/Ft)

Under special conditions, slopes slightly less than those required for the 2.0 feet per second velocity may be permitted by the Director. Such decreased slopes will only be considered where the depth of flow will be 30 percent of the diameter or greater for design average flow. Whenever such decreased slopes are proposed, the design engineer shall furnish with the plans computations of the depths of flow in such pipes at minimum, average, and daily or hourly rates of flow. Larger pipe size will not be allowed to achieve lesser slopes.

Sewers shall be laid with uniform slope between manholes and located along the center of the street. Exceptions to this will only be considered through the Deviation from Standards process outlined in Chapter 1, and approval of such a deviation request may include the requirement to install a sewer service line (lateral) stub-out to the property line for each parcel located along the alignment of the sewer main. The allowable tolerance for sags or bellies in a newly installed pipe shall be 0.5 inches or less.

E. Gravity sewers shall be designed with straight alignment between manholes. All pipe and services shall be installed with continuous tracer tape installed 12 inches to 18 inches under the proposed finished subgrade. The marker shall be plastic, non-biodegradable metal core or backing, marked "sewer" that can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal.

Toning wire is also required for all gravity sewer mains and sewer service laterals. Toning wire shall be green, UL listed for direct bury, Type UF, HDPE or HMWPE-coated, 12-gauge copper taped to the top of the pipe to prevent movement during backfilling. Nylon PVC coated THHN wire shall not be used for toning wire. The wire shall be laid loosely enough to prevent stretching and damage. The wire shall be wrapped to manhole or cleanout rings on gravity sewers, or the cleanout cap at the property line on all sewer service laterals. Sufficient wire to allow a minimum of 2 feet (slack) above final grade shall be coiled/looped in structures to ensure the wire shall be accessible to hook up to a locator.

A 1-pound magnesium anode shall be buried with the pipe every 1,000 linear feet maximum for cathodic protection of the wire. Toning wire splices and connections to anodes shall join wires both mechanically and electrically and shall employ epoxy resin or heat-shrink tape insulation. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the contractor to the County at least two days prior to the test is required; such notice is to include information on the relevant experience of the company proposed to complete the testing. All costs incurred for the testing shall be the responsibility of the contractor. Contact the Thurston County Water and Sewer Utilities Section at (360) 867-2078 for a copy of the Thurston County Toning Wire Test Form, which shall be filled out during testing and submitted to the Thurston County Water and Sewer Utilities Section before the work will be accepted.

4.140 Connection of New Sewer Mains to Existing System

A. At connection to existing system, all new sewer connections shall be physically plugged until all tests have been completed and the Department approves the removal of the plug.

B. Connection of new pipelines to existing manholes shall be accomplished by using cored holes drilled for the connection. New channels shall be constructed so as not to interrupt existing flow patterns. All connections shall utilize Kor-N-Seal fittings.

C. Connection of a pipeline to a system where a manhole is not available shall be accomplished by pouring a concrete base and setting manhole sections. The existing pipe shall not be cut into until approval is received from the Department.

D. Connections to manholes requiring a drop shall follow the criteria as outlined in Section 4.150.

E. Where a new sewer main is connected directly to a stubbed out section of existing sewer main, extending sewer along the same alignment, a repair coupling shall be used, of the type with a stainless steel shear ring, meeting the ASTM C1173 shear resistance test and equal to Fernco 1000 RC or 5000 RC Series couplings. Unshielded repair couplings shall not be used.

F. See Section 4.180 for requirements when connecting side sewers (sewer service lines) to a sewer main.

4.150 Manholes

A. Precast manholes shall meet the requirements of ASTM C 478 with either a precast base or a cast-in-place base made from 4,000 psi structural concrete. Manholes shall be Type 1, 48-inch diameter minimum. The minimum manhole frame opening shall be 24 inches. Joints shall be rubber gasketed, conforming to ASTM C 443 and shall be grouted from the inside. Lift holes shall be grouted from the outside and inside of the manhole. Manholes constructed of other materials may be approved by the Director, provided they meet the requirements of Ecology's *Criteria for Sewage Works Design*. Material specifications need to be submitted for review before an alternate material will be considered. See Standard Drawings SS-01 and SS-02 for details.

B. Eccentric manhole cone shall be offset so the manhole cover shall not be located in the tire track of a travel lane.

C. Manhole frames and covers shall be cast iron casting marked "Sewer," conforming to the requirements of ASTM A-45, Class 25, and shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects that would impair serviceability. Repairs of defects by welding or by the use of smooth-on or similar material will not be permitted. Manhole rings and covers shall be machine-finished or ground-on seating surfaces so as to assure a nonrocking fit in any position and interchangeability. The interior of manholes shall be cleaned and coated with Raven 405 or approved equal. The exterior of manholes shall be coated with WrapidSeal Manhole Encapsulation System or approved equal. Manholes shall be equipped with East Jordan Watertite castings or approved equal.

D. Where lock-type castings are called for, the casting device shall be such that the cover may be readily released from the ring and all movable parts shall be made of non-corrosive materials and arranged to avoid possible binding. Lock-type manhole covers shall be required in all multi-family residential complexes, on school grounds, on manholes containing odor control devices and in any other locations as determined by Director.

E. All castings shall be coated with a bituminous coating prior to delivery to the job site.

F. Safety steps shall be fabricated of polypropylene conforming to an ASTM D-4101 specification, injection molded around a 2-inch ASTM A-615, Grade 60, steel reinforcing bar or hot dipped galvanized bar with antislip tread. Steps shall project uniformly from the inside wall of the manhole. Steps shall be installed to form a continuous vertical ladder with rungs equally spaced on 12-inch centers.

G. Manholes shall be provided at a maximum of 400-foot intervals, at intersections and at changes in direction, grade, or pipe size. Manholes shall not exceed a maximum depth of 20 feet.

H. Slope through the manhole shall be a minimum 1/10 of 1 foot from invert in to invert out, unless otherwise approved by the Department Director.

I. Where a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 80 percent depth point of both sewers at the same elevation.

J. Pipe material shall be consistent between manholes. Straight grades between invert out of last manhole and connection to existing are preferred over drops whenever possible. Care must be

taken when designing steep grades so as not to create a situation of excessive velocity or excavation. Grade changes associated with “sweeps” shall not be allowed.

K. The angle between the line(s) entering a manhole (inlets) and the line leaving (outlet) shall be no less than 90 degrees.

L. An outside drop connection will be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert shall be filleted to prevent solids deposition.

M. All manholes that are to be owned and maintained by the County shall be accessible at all times to operations and maintenance equipment and vehicles. At the discretion of the Director, access drives may be required to provide a sufficient driving surface for County vehicles.

N. Inside drop connections will only be allowed when approved by the Director. When approved, inside drops shall not exceed 8 inches in diameter and shall include a RELINER Inside Drop Bowl or approved equivalent.

O. Outside drop structures shall be constructed pursuant to Standard Drawing SS-04.

P. If an interior manhole coating is required, see Section 4.285.

4.155 Manhole Sizing

A. Minimum manhole diameter shall be 48" and at least 38" greater than the largest connecting main.

B. Manhole diameter must be a multiple of 6" (48", 54", 60", etc.).

C. Each connecting main shall have at least 12" of manhole wall spacing between it and all other mains.

D. The angle between the main(s) entering a manhole and the main leaving shall be no less than 90 degrees.

E. The above configurations shall provide adequate shelves and room for maintenance and TV inspections of inlet and outlet pipes.

4.160 High-Velocity Protection

Where velocities greater than 15 feet per second are expected, special provisions such as thrust blocking, pipe anchors, and piping materials shall be made to protect against displacement by erosion and shock and the presence of hydrogen sulfide gas.

4.170 Sewer Main Cleanouts

Sewer main cleanouts are not an acceptable substitute for manholes; however, they may be used in lieu of manholes at the end of 8-inch-diameter lines of not more than 150 feet in length. Location of cleanouts for side sewers and building sewers are governed by Section 4.180 below, and the *Uniform Plumbing Code* as adopted.

Cleanouts on large diameter pipes are acceptable as a temporary structure for pipe lengths less than 150 feet. Requests for large diameter cleanouts will only be considered on the sewer lines that will be extended in the future. At no time shall a cleanout be substituted where a manhole is required as defined in Section 4.150.

All cleanouts in County right of way shall be extended to grade. See Standard Drawing SS-06.

4.180 Side Sewer

A side sewer means that portion of the sewage collection system which connects the premises to the public sewer system, not operated or maintained by the County, and outside of County right-of-way or easement. Side sewers from the sewer main to the right-of-way line shall be minimum 6-inch diameter. See Section 4.130.E for tracer tape and toning wire requirements.

Each separate building on a parcel shall be served by an individual side sewer, except under the following conditions:

1. A single-family residence with an accessory dwelling unit (ADU) may share a side sewer if they are in the same building. If they are in separate buildings, a separate side sewer is required from each building to the cleanout at the right-of-way line.
2. A duplex may have a shared side sewer for both units of the building. Alternatively, at the applicant's option, the units may have either (a) separate side sewers from each unit to the cleanout at the right-of-way line or (b) separate side sewers with separate connection at the sewer main.
3. Separate side sewers are required for cottages on the same parcel, from the building to the cleanout at the right-of-way line. If two cottages are attached to each other, they may share a side sewer from the building to the cleanout at the right-of-way line.
4. If a building has no inside plumbing fixtures, a side sewer to that building is not required.

The configuration of side sewers does not affect the connection charges and fees due per TCC 15.09. A cleanout shall be installed on all side sewers at the property line, as shown on Standard Drawing SS-07. Prior to the installation of a cleanout on an existing side sewer, a plumbing permit shall be obtained from the County.

Prior to connection of a side sewer to the public sewer, a connection permit must be obtained from the Department. Side sewer pipe must meet either ASTM D 3034, SDR 35 solid wall pipe or ASTM F 794 for solid seamless profile pipe and meet design criteria covered by the Uniform Plumbing Code (UPC) as adopted.

The Department's Water Resource Division shall be notified at least two business days prior to physically connecting to a County sewer main.

If an existing sewer main with stubout(s) is located along one or more of the frontages of a proposed building requiring sewer service, then the building must be connected to the sewer system at an existing stubout, using a shielded repair coupling if a gasketed connection cannot be made. Repair couplings shall be of the type with a stainless-steel shear ring, meeting the ASTM C1173 shear resistance test and equal to Fernco 1000 RC or 5000 RC Series couplings. Unshielded repair couplings shall not be used. Exceptions to this requirement (to connect to an existing stubout) include the following:

1. Site constraints that require the building be connected to the sewer main at a different location than the stubout in order to maintain gravity flow from the building to the sewer main, or
2. The sewer main has been rehabilitated with cured-in-place-pipe (CIPP) material and the existing stubout was not reinstated (i.e. the CIPP material was not cut out at the stubout), or
3. The existing stubout diameter is less than the diameter of the proposed side sewer.

The property owner or developer should contact the Department's Water Resource Division to find out whether or not a sewer stubout is available to connect a proposed building to the sewer system.

If an existing stubout is not available to connect to, or one of the above exceptions applies, then the building shall be connected to the sewer main as shown in Standard Drawing SS-07. Taps shall be done by use of a core drill and to the service line shall not protrude into the existing main. The Department's Water Resource Division shall be notified two business days prior to any tap of a County sewer and shall be present to witness the tap. The inspector will collect all tapping cores from the contractor or shall be informed if the cores were washed into the sewer. Sewer saddles shall be Romac type CB.

Connections where a new building sewer is the same size as the existing main shall be accomplished by the installation of a new manhole. See Section 4.140 above

4.200 FORCE MAINS

4.210 General

This section provides general information applicable to all force mains. Lift station force mains are addressed further in Section 4.300. STEP systems are addressed separately in Section 4.400. Grinder systems are addressed separately in Section 4.500. Requirements for abandoning asbestos cement force mains are in Section 3.310.

4.220 Design Standards

The design of any sewer extension/connection shall conform to Ecology's *Criteria for Sewage Works Design* and any applicable standards as set forth herein and in Chapter 2, Sections 2.010 through 2.040.

The layout of extensions shall provide for the future continuation of the existing system as determined by the County. In addition, main extensions shall be extended to and across the side of the affected property fronting the main.

The system shall be designed at full depth of flow on the basis of an average daily per capita flow as shown on the table in Section 4.120. A coefficient of friction of 120 shall be used for the Hazen-Williams "C" value, or 0.013 for Manning's "N" value.

New sewer systems shall be designed by methods in conjunction with the basis of per capita flow rates. Methods shall include the use of peaking factors for the contributing area, allowances for future commercial and industrial areas, and modification of per capita flow rates based on specific data. Documentation of the alternative method used shall be provided along with plans.

Privately owned pressure mains shall have a control valve installed on the main at the right-of-way.

Grinder system pressure mains shall not be combined with or connected to STEP pressure sewer mains. Grinder and/or STEP sewers may be allowed to connect to gravity sewer mains.

Minimum pressure sewer pipe size for lift stations shall be 4-inch diameter.

4.230 Sewer Force Main

Sewer force mains, unless otherwise approved by the Director, shall be constructed using materials conforming to one of the following:

1. Pressure polyvinyl chloride (PVC) pipe shall be rigid plasticized PVC suitable for use as a pressure conduit for conveyance of domestic sewage. PVC pipe shall conform to the requirements of ASTM D2241, pressure class 200 or better. The PVC pipe shall be in a white or green hue, not blue, yellow, or orange. Joints for pipe and fittings shall use sewage-resistant synthetic rubber gaskets conforming to the requirements of ASTM F477.

2. Pressure high density polyethylene (HDPE) pipe and fittings shall be PE 3608 HDPE meeting cell classification 345464C for black per ASTM D3350. HDPE pipe shall be manufactured in accordance with ASTM F714 and AWWA C906 (IPS), with a minimum wall thickness of DR11.

3. Depth. Force mains shall have a minimum 30 inches of cover to top of pipe. See Section 4.020 for sanitary sewer/water main crossing requirements.

4. Velocity. The minimum velocity allowed is 3 feet per second (fps) at average dry weather flow. Three fps is required to scour settled solids. Maximum velocity allowed will be 6 fps.

5. Surge protection. PVC pipe is subject to fatigue failure due to cyclic surge pressures. Lift stations shall be constructed to minimize rapid changes in velocities and a properly sized surge tank and “soft start and stop” pump controls.

6. Pigging ports shall be required on all new force main installations

7. All pipe and services shall be installed with continuous tracer tape installed 12 inches to 18 inches under the proposed finished subgrade. The marker shall be plastic, non-biodegradable metal core or backing, marked “sewer” that can be detected by a standard metal detector. Tape shall be Terra Tape “D” or approved equal.

Toning wire is required for all force mains, and shall be green, UL listed for direct bury, Type UF, HDPE or HMWPE-coated, 12-gauge copper taped to the top of the pipe to prevent movement during backfilling. The wire shall be laid loosely enough to prevent stretching and damage. Nylon PVC coated THHN wire shall not be used for toning wire. The wire shall be wrapped to manhole or cleanout rings and valve body. Sufficient wire to allow a minimum of 2 feet (slack) above final grade shall be coiled/looped in structures to ensure the wire shall be accessible to hook up to a locator.

A 1-pound magnesium anode shall be buried with the pipe every 1,000 linear feet maximum for cathodic protection of the wire. Toning wire splices and connections to anodes shall join wires both mechanically and electrically and shall employ epoxy resin or heat-shrink tape insulation. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the contractor to the County at least two days prior to the test is required; such notice is to include information on the relevant experience of the company proposed to complete the testing. All costs incurred for the testing shall be the responsibility of the contractor. Contact the Thurston County Water and Sewer Utilities Section at (360) 867-2078 for a copy of the Thurston County Toning Wire Test Form, which shall be filled out during testing and submitted to the Department before the work will be accepted.

4.250 Air/Vacuum Valves

Air release valves and combination air/vacuum valves shall be constructed as shown in the Standard Drawings and located at the high points of the line within a manhole or approved vault that provides 18 inches of clearance on all sides between the assembly and the walls. Air release valves shall be fitted with an activated carbon canister as manufactured by Orenco Systems, or approved equal, to prevent the release of disagreeable odors to the surrounding area. Grades shall be designed to minimize the need for air/vacuum valves when practical. Vehicular access to valve is required for maintenance.

4.260 Force Main Drain

Provisions to drain a force main to facilitate repairs or to temporarily remove force main from service shall be provided. This may be accomplished through the use of a valved tee connected to a drain line at the low point of the line, with isolation valves on both sides of the tee along the main. A manhole shall be set over the force main at the valved tee.

4.270 Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B, 3000 psi, poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings.

See Standard Drawings SS-25 and SS-26 in Chapter 4. Restraining joint systems may be allowed in lieu of thrust blocking when designed by a licensed engineer and approved by the Director. Restraining joint brand, type, and size shall be specified on the plans.

4.280 Force Main Termination

Hydrogen sulfide odors (H_2S) and the buildup of sulfuric acid (H_2SO_4) occur in the operation of a force main. To mitigate these conditions, some type of control method(s) shall be used. This may include chemical addition at the pump station and/or near the terminus.

Citizens, rightfully, have the expectation to live in an environment, by and large, free of sewer odors. Therefore, to mitigate odors, development must anticipate the provision of odor control method(s). At a minimum, a preliminary design for odor control equipment addressing the potential method(s) shall need to be provided prior to permitting. Only proven technologies for the control of sewer odors will be approved by the County. The preliminary design shall need to discuss the feasibility of the method(s) proposed, provide construction design for any components to be installed beneath the paved areas, designate location(s) for placement of equipment and provide an engineer's estimate for the cost of designing, installing and maintaining the proposed odor control methods. The developer shall enter into an agreement with the Department to design and install odor control equipment, should it become necessary. A bond or other allowable security in an amount equivalent to 125 percent of the value estimated for the design and installation of the odor control equipment will be required by the County to guarantee the provision of the odor control equipment, should it become necessary. The necessity for installation of the odor control equipment will be predicated on whether complaints regarding odors are received from citizens and confirmed by County staff to be attributable to the pressurized sewer. The duration of the agreement and surety shall extend 2 years beyond the occupation of seventy-five percent (75%) of the residences or commercial space served by the pressure sewer.

4.285 Discharge Manhole Coating

The entire interior of the discharge manhole (point of connection where force main discharges into gravity sewer) and the next downstream manhole on the gravity sewer shall be lined or coated with one of the following systems to protect the concrete against corrosion.

1. Precast PVC Lining. The PVC lining shall be cast into the walls and floor of the manhole. No exposed concrete shall be permitted. All work shall be done in accordance with manufacturer's recommendations and must be approved by the County.

2. Spray-on Coating. For both new and existing manholes, if approved by the County, spray-on coatings shall be either a Spraywall system, including a moisture resistant primer coat, or Raven Lining 405 Epoxy. All work shall be done in accordance with manufacturer's recommendations and must be approved by the County. The gravity sewer line pipe connecting these manholes, if concrete, shall also be protected from the effects of hydrogen sulfide in a manner approved in writing by the County.

4.300 LIFT STATIONS

4.310 General

All lift stations shall be designed to serve the appropriate basin as determined by the Director. All sewer lift stations shall be designed and located to optimize the service area to provide regional service. Temporary or interim lift stations will not be permitted. For basins that will serve more than 50 ERUs when fully developed to the zoned densities and that are unable to be served by gravity service, the Developer shall design and provide a lift station complying with the following minimum standards.

4.320 Lift Station Design Report

If a lift station is determined to be necessary, the Developer shall perform a study prepared and stamped by a professional engineer licensed in the State of Washington, to determine that the lift station installation is sized to serve the overall sewage flows generated within the potential service area. The service area study shall include the Developer's plat boundary area and may include adjacent and future service areas as determined by the County. The final service area shall be the entire area which could be served by the installation of the lift station(s).

The design of any lift station shall conform to Thurston County standards, Ecology's *Criteria for Sewage Works Design*, especially Chapter C2 Sewage Pump Stations (most current edition), and applicable standards as set forth herein.

Four copies of the Design Report shall be submitted to the County for review. At a minimum, the report shall include:

- Vicinity map and preliminary site plan layout
- Basin description, showing existing, new, and future planned development and improvement
- Analysis of existing flow, including I/I if there is flow data
- Population projection, flow projection, capacity requirements based on overall data collected
- Peaking factor (PF) from Battelle Laboratories Equation
- Pump selection based on system curve (TDH calculation) and pump curve analysis
- Run time calculation and cycle time
- Mechanical systems including HVAC
- Electrical system including lighting, power, communications, security, controls, instrumentation, and SCADA
- Force main size, length, and material (see Section 4.230)
- Force main flow velocities based on minimum and maximum head conditions

- Surge analysis and protection, if any
- Wet well sizing and details
- Wet well and dry well buoyancy analysis using site-specific soil and groundwater information
- Geotechnical analysis for wet well and lift station site and backfill and compaction specifications
- Connection point with downstream capacity
- Second power source or generator sizing
- Electrical requirements
- Odor and corrosion control
- Noise control
- For projects to expand or replace existing facilities: An approach and plan to maintain pump station operations during construction

4.330 Lift Station Special Requirement

All lift stations shall be submitted to the Director for approval. The pumps shall have sufficient capacity and capability to efficiently handle the peak design flow with one pump out of service and to ensure a minimum velocity of 3 feet per second in the force main.

The following equipment and special modifications are standard requirements for all permanent wastewater lift stations constructed within Thurston County. County wastewater lift stations shall comply with Thurston County landscaping standards. The following requirements are minimum standards and not all-inclusive.

A. The proponent is required to provide Thurston County a fee simple site outside existing right-of-way for construction of the lift station. The site shall have sufficient area with dimensions that allow for easy and safe access to the lift station. A chain link fence meeting the requirements shown on Standard Drawing SS-23 shall be installed around the entire lift station property, unless a smaller area to be enclosed is approved by the Director as part of the lift station design.

B. A concrete slab a minimum of 6 inches in depth shall surround the pump station wet wells and dry wells and on-site generator, with a minimum of 2 feet side exposure for all openings. The slab shall be continuous between the wet well and the dry well and shall be installed at ground level as pursuant to Standard Drawing SS-13.

C. Ingress and egress to perform preventative maintenance and repairs to wet wells and dry wells shall meet the turning radius requirements of AASHTO BUS-45. When performing routine or preventative maintenance access shall be such that a vehicle with an AASHTO BUS-45 rating will be clear of the vehicle travel lane and bike path. Any access roads longer than 150ft shall provide a turn around for a vehicle with an AASHTO BUS-45 rating.

D. Access roads, curb-cuts, etc., shall be designed with a driveway approach that meets current Thurston County Roads Standards, and will accommodate vehicle ingress/egress requirements associated with AASHTO BUS-45.

E. If an access road is needed, a minimum 20-foot wide easement designed to support 20,000-pound axle loads throughout the year shall be provided from the nearest public road to the station to allow for maintenance of the station.

F. Wet well shall be provided with full-depth (to bottom of cone) permanent, attached, internal stainless steel or polypropylene-coated (Lane International Corporation or approved equal) access ladder, impervious to corrosion.

G. Entry hatch to the station wet well shall be locking, aluminum, rated for H-20 loading, and pneumatically opened. The hatch shall be located over the full depth portion of the wet well closest to the access drive. The lift station shall be accessible at all times to operations and maintenance equipment and vehicles.

H. Entry lid to the station dry well shall be constructed of fiberglass or aluminum.

I. Station entry access shall be keyed to match all other County package stations. The Yale Lock key system with single-key operation of the mechanism shall be supplied. For all other lock points and padlocks, a blank tumbler will be supplied, and the County will key to the desired code.

J. Dry wells shall be a minimum of 9 feet in diameter with a forty-four inch (44") inside diameter entrance tube.

K. The dry well shall be vented with an exhaust fan to meet state safety standards and provide a minimum of six air changes per hour.

L. Dry wells shall be provided with an automatic sump pump plumbed to the lift station wet well.

M. Dry wells shall be provided with dehumidifier equipment appropriately sized to remove moisture from the dry well.

N. Safety guards shall be provided for all exposed drive lines and couplings.

O. Spare parts shall be provided as recommended by the manufacturer, with a minimum of two spare impellers (as designed), one complete set of seals, filters, and one set of volute gaskets. Two complete sets of operation and maintenance manuals and a list of the nearest dealers for spare parts and repair shall be provided. All replacement parts shall be readily available from a distributor in the U.S.A.

P. The pumps, motors, and wet well shall be in compliance with current engineering practices. They shall be fully compatible as an assembly and shall be engineered for the specific basin.

Q. The station shall be designed to have an isolation valve located in the discharge line between the station and the pumping bypass port no less than 12 pipe diameters from the dry well.

R. The station shall be designed to have a magnetic flow meter with remote transmitter and wall mounting. The flow meter shall be a County approved model. The flow meter flow tube will typically be located in the bypass pumping port vault.

S. Hydrostatic level-measurement for pump control shall be provided by an ultrasonic transducer, installed as shown on Standard Drawing SS-20.

T. County water shall be provided to the station for hose down. An approved backflow prevention device shall be provided on the water supply line outside the dry well and outside the perimeter lift station fence. The backflow device must be tested and certified by a Backflow Assembly

Tester licensed in the State of Washington, and a copy of the test submitted to the County, prior to acceptance of the system. The backflow device shall be installed inside an insulated enclosure to prevent freezing.

U. A 100-amp minimum 480/277-volt, 3-phase, 4-wire main service shall be provided pursuant to plans.

V. All electrical equipment shall be enclosed in a free-standing, vandal-proof, all-weather, NEMA 3R or better stainless-steel traffic-control-type enclosure with factory-installed back panels and accessories. (Refer to Standard Drawing SS-18.) Accessories should include internal fluorescent fixture, intrusion switch, panel heater and thermostat, vents, thermostat-controlled fan, double-entry doors with three-point door latch system. Door latch shall be keyed to the County standard lock system, and able to be padlocked.

W. A 100-amp minimum, 480-volt, 3-phase emergency power hookup shall be provided. The transfer switch shall be sized to accommodate the load with a 100-amp minimum. The receptacle shall be Crouse-Hinds AREA-10314 or Appleton ADR-1033 4-wire, 3-pole with male pins. See Section 4.340 below for additional requirements.

X. The electrical equipment shall include a 5 KVA minimum transformer in the dry well for the 120-volt, single-phase equipment.

Y. Wiring shall be THHN stranded copper, labeled at each end.

Z. Lift station telemetry shall be coordinated with the County. Alarm and station status points shall be pursuant to attached list. The telemetry shall be enclosed in a NEMA 1 enclosure within the electrical cabinet. Prior to ordering the above equipment, the contractor shall contact the Department for complete ordering specifications for the above telemetry. Nominal lead time is 12 weeks.

AA. Pump control system shall be of the solid-state programmable logic controller (PLC) type, RUGID Model 9 or approved equivalent. The system shall include a 4-20mA solid state liquid level sensing device. The controller shall be compatible with all established County systems and shall be accessible for ease of maintenance.

BB. The program for the pump controls will be furnished and installed by an electrical contractor licensed in the State of Washington.

CC. Pump motors shall be 3-phase, 480-volt, and be provided with elapsed time meters.

DD. Inspection and verification of operating parameters and standard requirements by a representative from the Department in addition to an electrical inspection, is required prior to acceptance of all lift stations.

EE. Wet Well Sizing Criteria:

1. Provide wet well operating volume pursuant to Ecology's *Criteria for Sewage Works Design*, most current edition. For constant speed pumps, the minimum volume between pump on and off levels can be calculated using the following general formula:

   V = tQ/4, where

V = minimum volume (gallons)

t = minimum time between pump starts

Q = pump capacity (gallons/minute)

2. Provide for a minimum of 45 seconds pump run time per pump cycle and a maximum of 6 pump cycles per pump per hour.

FF. Lift Station Emergency Storing Criteria:

1. Emergency storage shall be provided for 2 hours of design average flow using a peaking factor of 2. This calculation is to be submitted with the system design and approved by Department staff.

   Note: The 2-hour time was determined as an average response time by a County crew. The peaking factor was set at 2, as opposed to 3 or 4, due to typical emergency being caused by power outage.

2. All volume below the hydraulic gradient may be used as emergency storage, i.e., wet well, conduit, manholes. This condition must be verified by calculation and submitted for approval by Department staff.

GG. All lift stations shall be provided with an on-site Cummins/Onan diesel emergency power generator, or approved equivalent, in accordance with Section 4.340.

HH. Plans and specifications must be submitted and approved in writing prior to ordering a package lift station.

II. The contractor shall supply and install all sensors for the above alarm points and connect them with the appropriate wire size and label to an alarm terminal strip. The alarm points terminated on the terminal strip shall be identified by number and a label showing the number, and an alarm shall be provided adjacent to the terminal strip. From the terminal strip to the telemetry terminal strip, all points shall be connected by a single multiconductor-shielded cable encased in a single conduit. The following note shall be added to all lift station plans:

   Cage#-card#-point# is required labeling. Labels must be installed at both ends of each wire: at the PLC and at the terminal blocks. An example label for a wire having an input point number of 7 and its slot/card number is 4 would be labeled “Slot 4 Point 7” in two lines of text. Prior to ordering and wiring of telemetry components, the contractor shall contact the Department at 360-867-2288.

4.340 Auxiliary Power System

General:

Diesel emergency power generation equipment (genset) designed with capacity and rating to safely carry the entire connected lift station load shall be provided at the lift station site and will operate the lift station in the event of a power outage. The Developer shall provide Thurston County the design load calculations during the submittal process. The diesel genset shall be manufactured by Cummins/Onan, or approved equivalent.

The auxiliary power unit shall include, but not be limited to, the following:

A. Generator, control panel and circuit breaker.

B. Engine, radiator, and exhaust system.

C. Fuel tank (capacity 48 full load, plus 25% with minimum volume of 200 gallons). The tank shall be completely filled with diesel at the time of acceptance by the County.

D. Locking generator enclosure, keyed with Thurston County standard Yale Lock key system with single-key operation of the mechanism. A blank tumbler shall be supplied, and the County will key to the desired code.

E. Automatic transfer switch.

F. Radiator protection (as approved by the County) or automatic louvers.

G. Block heater connected to power supply and not generator.

H. Battery and rack.

I. Battery charger connected to power supply and not generator.

J. Conduit, wire, and piping.

K. Coolant recovery system.

The generator set and transfer switch shall be Cummins/Onan, or County approved equal complying with the latest edition of Onan Corporation standard specifications and with County standards.

The generator set shall include the following:

Engine:

- Single phase, 1500-watt coolant heater: 115 volt or 240 volt sized accordingly for the engine and climate conditions

Generator Set:

- Mainline circuit breaker
- Weather-protective/sound dampening enclosure with mounted silencer.
- 5-year basic power warranty

Accessories:

- Batteries
- Battery charger, 2 AMP, 12 VDC, 120 VAC input (Shall maintain a float charge)
- Vibration isolators, pad type

Control Panel:

- Annunciator relays (12)

- Run relay package (3)
- Low coolant level shutdown
- Anti-condensation space heater, 120 VAC
- Oil temperature gauge
- Emergency stop switch

Fuel System:

- Diesel or approved equal

Alternator:

- Anti-condensation heater, 120 VAC

Exhaust System:

- Exhaust silencer

Control Features:

- Run-stop remote switch
- Remote starting, 12-volt, 2-wire
- Coolant temperature gauge
- Field circuit breaker
- DC voltmeter
- Running time meter
- Lamp test switch
- Oil pressure gauge
- Fault reset switch
- Cycle cranking
- 12-light engine monitor with individual 1/2-amp relay signals and a common alarm contact for each of the following conditions:
- Run (Green Light)
- Pre-Warning for low oil pressure (Yellow Light)
- Pre-Warning for high coolant temp (Yellow Light)
- Low oil pressure shutdown (Red Light)
- High coolant temperature shutdown (Red Light)
- Over crank shutdown (Red Light)
- Over speed shutdown (Red Light)
- Switch off (Flashing Red Light: indicates generator set not in automatic start mode)
- Low coolant temperature (Yellow Light)
- Low fuel (Yellow Light)
- Two customer selected faults (Red Light)
- All lights shall be LED

AC Meter Package:

Order with NFPA 110 monitor to meet code requirements.

- AC voltmeter (dual range)
- AC ammeter (dual range)
- Voltmeter/ammeter phase selector switch with an off position
- Dual scale frequency meter/tachometer
- AC rheostat (panel mounted) for +5% voltage adjust

The transfer switch shall include the following:

- Sized for full station and auxiliary equipment load, plus 25%

Pole Configuration:

- 4 pole

Frequency:

- 60 Hertz

Application:

- Application: Utility to genset

System Operation:

- Three-phase, 3-wire or 4-wire

Enclosure:

- B002 Type 3R; Intended for outdoor use (dust proof and rainproof) with radiator grill protection or automatic louver system (as approved by the Department)

Listing:

- Listing: UL 1008

Programmed Transition:

- Program Transition: 1–60 seconds

Suitable guards shall be provided on all electrical parts to minimize the personal shock hazard.

Generator shall be broken in sufficiently to permit application of full load immediately upon installation.

Generator supplier shall provide all tools for the generator set as recommended and required by the manufacturer.

Generator installation shall be checked by the supplier after installation to determine that the installation is correct. Written confirmation shall be provided to the Department. Generator supplier shall perform a full load test for 2 hours after installation is complete. Results from the start upload tests and generator checklists shall be provided to the Department. Inspection and verification of operating

parameters and standard requirements by a representative from the Department in addition to an electrical inspection, is required prior to acceptance of a generator.

Generator supplier shall provide a minimum of 4 hours of training for County personnel at the station site during startup.

Generator manufacturer shall provide two copies of the maintenance and operation manual and one Adobe Acrobat Reader (PDF) electronic version. These manuals shall be complete and shall include all information necessary to all County personnel to maintain the generator.

The Developer shall provide the following spare parts for the generator: one complete replacement set, combustion air filters, two complete replacement sets, lube oil filters, two complete replacement sets, fuel filter (if required), two complete replacement sets, coolant filters (if required), one complete replacement set, all V-belts, one complete replacement set, special tools for engine or generator.

Generator and fuel tank mounting pad shall be per the manufacturer's requirements.

4.400 STEP SYSTEM

4.410 General

A Septic Tank Effluent Pump (STEP) system may be installed to serve residential and light commercial locations only where approved by the County. A STEP application with a proposed site plan is required for each individual on-site system.

Any new single-family subdivision designed with STEP sewers shall include an easement on the face of the plat for access to all lots.

A STEP system is a facility consisting of a tank or tanks for settling and digesting wastewater solids and a pressure piping system for conveying the supernatant liquid into the sewer system. Most of the wastewater solids remain in the STEP tank and are removed periodically.

Only sanitary wastewater shall be discharged into the tank. Roof drains and other stormwater sources shall be strictly excluded.

Operation and maintenance of the tank, pump, and pump controls will be the responsibility of the County only after the system has been inspected and approved and an easement is granted to the County and the warranty period of one year has expired. It is required by the County that the easements for a new development be granted on the plat; otherwise, an easement for each lot shall have to be granted at the time of connection. The contractor shall submit Record Drawings conforming to Section 2.090 of these Standards for review and approval by the Department. Service will not be provided to the customer until Record Drawings have been approved by the Department.

Power and telephone service (when applicable) shall be provided and paid for by the customer. Property owners shall be responsible for the operation and maintenance of their generator transfer switch, as well as alarm panels and electricity. The generator transfer switch for all STEP systems shall be accessible without opening the control panel. The customer shall be responsible for notifying the County 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 County personnel respond to the customer's notification. The County 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 alarm is disabled prior to the response of

County personnel. The audible alarm may be silenced after County personnel have been properly notified of the alarm condition. Service shall not be provided in cases where the STEP tank and/or controls are made inaccessible by the installation of fences or other impediments.

Service shall not be provided to systems that have situations where a dangerous or potentially dangerous situation exists.

STEP pump system shall be Orenco, or approved equivalent. The specifications must be submitted to the Department for review and approval.

4.420 Design Standards

The design of any STEP sewer system shall conform to County standards, the Ecology's *Criteria for Sewage Works Design*, and any applicable standards as set forth herein and in Chapter 2, Sections 2.010 through 2.040.

The layout of STEP force main extensions shall provide for the future continuation of the existing system as determined by the County. Individual service boxes shall be located near the right-of-way line at the property corner opposite to the location of water meter.

Pipeline sizing shall conform to the criteria as set forth in Section 4.430.

Aerators may be required for each five residential installations or commercial/multifamily installations with 50 gpm or greater average discharge.

A. Pipeline design information/calculations. The following information shall be submitted to the County for review:

    1. Map showing contributing area for each pipe.

    2. Flow generation assumptions, including:

        a. Units per acre

        b. Gallons per capita per day

        c. Population per unit

        d. Average flow

        e. Design flow: the minimum peak flow equal to or greater than the following:

            i. Q = 15 + .5D or

            ii. Q = 15 + .15P

            Where:
            Q = Design peak flow, gpm
            D = Number of equivalent dwellings
            P = Population
            Peak flow is defined as an event that lasts about 15 minutes

    3. Average and design flow velocities

4. Slope of hydraulic grade line (ft./ft.)

5. Total head loss (ft.)

6. Site-specific calculations verifying tank resistance to buoyancy forces

B. Commercial/multifamily STEP submission requirements:

All commercial/multi-family systems must meet or exceed all criteria set forth for single-family residential installations. All design calculations are required as part of the submittal. Tanks placed in series to provide the required storage capacity will be strictly prohibited. Tanks placed in parallel will be allowed when approved by the Department. Electrical service shall be sized appropriately to serve the equipment installed.

A STEP tank shall contain detention volume, working volume, and storage volume. The minimum STEP tank size shall be 1,500 gallons. Detention volume is defined as the volume of liquid below the "OFF" switch (STEP). Tanks that serve multiple structures or structures with commercial wastewater discharge shall be sized in accordance with the following equations:

V = 1.5Q (residential strength waste)

V = 2.0Q (nonresidential strength waste)

Where:

V = Liquid volume (gallons)

Q = Peak day flow for the structure being served (gallons per day)

The equation provides the minimum liquid volume within the STEP tank. The tank shall also contain sufficient working volume and storage volume. Liquid volume shall be approximately 65 to 75 percent of the total tank volume.

Working volume is defined as the volume between the "ON" and the "OFF" switch. The working volume shall be greater than the difference between the peak influent flow and the discharge of the STEP or grinder pump over a period of time estimated to be the peak duration (typically 15 minutes).

STEP tanks shall have a minimum of 24 hours of emergency storage volume. Tanks without 24 hours of storage shall be installed with a power transfer switch with an emergency generator plug or other device for allowing emergency power connection or shall have reserve volume provided with a separate vessel. Storage volume is defined as the volume between the "OFF" switch and the top of the tank.

The following information shall be submitted to the Department for review:

- Tank Sizing Calculations:
    - Maximum hydraulic grade lines (mainline, service line, and minor friction losses based on peak flow shall be no greater than the installed elevation of a STEP pump plus 85 percent of the total available head of the pump.

- Pump Operation Criteria and Sizing Calculations:
    - Pump time per cycle
    - Total volume pumped per cycle
    - Pumping cycles per day
    - Total pumping time per day
    - Total dynamic head
    - Pump size
    - Standby or alternate pump requirements
    - Auxiliary power generating equipment requirements

4.430 STEP Force Main

A. Mainline. The minimum pipe size used is 2 inches nominal diameter. This is based on maintenance requirements rather than flow. Pipe shall be PVC, ASTM D2241, SDR 21 (200) with rubber gasketed joints. Gaskets shall comply with ASTM D 1869. STEP mains shall have a minimum 36 inches of cover to top of pipe. See Section 4.020 for sanitary sewer/water main crossing requirements. STEP main lines shall be the following diameters: 2, 3, 4, 6, 8, 10, 12.

   The discharge manhole (point of connection where STEP main line discharges into gravity sewer) and the next downstream manhole on the gravity sewer shall be lined or coated with one of the systems described in Section 4.285. All work shall be done in accordance with manufacturer's recommendations and must be approved by the Department. If a new discharge manhole and subsequent downstream structures are installed as part of the new system design, the configuration will be approved by the Department.

B. Service line. Service connection pipe shall be minimum 1-inch diameter, Schedule 80 PVC water pipe, solvent weld joint located at 90 degrees to the main line when possible. Solvent cements and primer for joining PVC pipe and fittings shall comply with ASTM D 2564 and shall be used as recommended by the pipe and fitting manufacturers.

   Services shall have a minimum 24 inches cover to top of pipe. Pressure services crossing over any waterline shall follow Ecology's requirements.

C. Building sewer. The gravity building sewer between the building and the tank shall be designed and installed in accordance with the Uniform Plumbing Code as adopted by the County. The owner shall be responsible for maintenance of the building sewer.

D. All STEP mains and service lines shall be installed with continuous tracer tape installed 12 to 18 inches under the proposed finished grade. The marker tape shall be marked "sewer" and be plastic, non-biodegradable metal core or backing that can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal.

Toning wire is also required for all STEP mains and service lines. Toning wire shall be green, UL listed for direct bury, Type UF, HDPE or HMWPE-coated, 12-gauge copper taped to the top of the pipe to prevent movement during backfilling. Nylon PVC coated THHN wire shall not be used for toning wire. The wire shall be laid loosely enough to prevent stretching and damage. The wire shall be brought up and tied off at the inside top of valve boxes on STEP mains, or the cleanout cap on the house side of STEP tanks on all service lines. Sufficient wire to allow a minimum of 2 feet (slack) above final grade shall be coiled/looped in structures to ensure the wire shall be accessible to hook up to a locator.

A 1-pound magnesium anode shall be buried with the sewer line every 1,000 linear feet for cathodic protection of the wire. Toning wire splices and connections to anodes shall join wires both mechanically and electrically and shall employ epoxy resin or heat-shrink tape insulation. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the contractor to the County at least two days prior to the test is required; such notice is to include information on the relevant experience of the company proposed to complete the testing. All costs incurred for the testing shall be the responsibility of the contractor. Contact the Thurston County Water and Sewer Utilities Section at (360) 867-2078 for a copy of the Thurston County Toning Wire Test Form, which shall be filled out during testing and submitted to the County before the work will be accepted.

4.435 Fittings

All pipe fittings shall have a minimum working pressure rating equal to 150 psi. Fittings shall be PVC 1120, rubber joint complying with ASTM D-1784, D-2466, or D-2467 for pipe larger than 1 inch. Solvent weld fittings for 1-inch pipe shall be socket-type Schedule 40 and shall comply with ASTM D-1784 and ASTM D-2466.

4.440 Valves

A. Ball and gate valves. All 1-inch valves shall be PVC ball valves with preloaded EPDM stem seals, micro finished PVC ball, and self-adjusting polyethylene ball seat to compensate for wear and prevent over tightening. Valves shall be designed for use with corrosive fluids, for low-torque manual operation, and for a working pressure of 150 psi. One-inch valves shall be LT-1000-S as manufactured by KBI (King Brothers Industries) or GF500 as manufactured by George Fisher Signet, Inc.

   Two-inch and larger valves shall be M&H Valve Company or American Flow Control Series 2500 resilient wedge gate valves with an epoxy coating to resist corrosion. A ball or gate valve shall be located at every intersection and at a maximum of every 500 feet. Valves may be installed in conjunction with required pigging ports.

B. Air/vacuum 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 grade line 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 valve vaults shall also have insulated lids to prevent freezing. The air released from the valve will be quite odoriferous; thus, each vent shall be equipped with an odor-control system such as activated carbon filters impregnated with sodium hydroxide.

C. Check valves. Check valves used on service lines shall be a tee or wye pattern swing check, PVC. It will have a working pressure of 150 psi. Valves shall be designed for use with corrosive fluids. A check valve shall be installed at the end of the service stub-out at the property line and installed in a valve box pursuant to Standard Drawing SS-38, located near a front corner of the lot. Check valves shall be King Brothers, KSC, Spears, or approved equal.

D. Pressure-sustaining valve assembly. Pressure-sustaining valves are sometimes required in the design of STEP systems to keep the pipeline full during periods of low or no flow or when siphoning conditions exist.

The pressure-sustaining valve shall maintain inlet pressure at a predetermined set point, as determined by the County. It shall open as pressure starts to increase above the set point and close as pressure falls below the set point. In the open position, flow shall enter the valve in a direction axial to the pipe, turn radially outward through a slotted grillwork, and then inward to the former inlet axial direction. The valve shall be constructed of two parts: a 316 stainless steel body and an elastomeric liner or control element. The valve shall be a Roll Seal Valve as manufactured by the Cla-Val Valve Company or approved equal.

E. Pressure-sustaining valve vaults. Pressure-sustaining valve vaults shall be precast reinforced concrete vaults with spring-assisted hinged galvanized steel doors that open to a minimum of 36-inch by 60-inch clear opening and shall be marked “sewer.” The entire unit shall be rated for H-20 traffic load and have extensions as needed.

F. Pressure tank. The pressure tank shall consist of a steel tank containing a sealed-in-place heavy-duty diaphragm that separates air from the water. The portion of the tank where water is stored shall be coated with an FDA-approved fusion-bonded polymeric lining material that isolates water from the metal tank and protects the tank from corrosion. The tank shall be suitable for direct bury or continuous operation in a damp environment. The tank shall be similar in all respects to an Aqua-Air V-45B as manufactured by A.O. Smith, Consumer Products Division, Inc., or approved equal.

G. Pressure gauge. The pressure gauge shall be capable of measuring the pressure of water from 0 to 30 psi within a 1 percent full-scale accuracy. The gauge shall have a 22-inch face and shall be corrosion- and weather-resistant, suitable for outdoor installation.

H. Valve stand. Valve stands shall include, as the top portion, an adjustable stanchion type support with at least 4 inches of adjustment. They shall comply with Federal Specifications WW-H-171E (Type 39) and Manufacturers Standardization Society SP-69 (Type 38). They shall be similar in all respects to Figure No. 264, as manufactured by Grinnell, Inc., or equal approved by the engineer. The bottom portion shall be manufactured as shown on Standard Drawing SS-11.

I. Valve box lids. Valve box lids shall be specified to be marked with “sewer” so they can quickly be distinguished from valves in the water system.

All service connection boxes shall be traffic rated Carson with hinged bolt-down cover and 1419E extension box as required or approved equal.

All main line valve boxes shall be Rich No. 940 or approved equal.

4.450 STEP/Grinder Pigging Ports

A pipeline pigg is a projectile that is forced through the inside of a pipe to clean pressure pipelines. A pigging port is used as a point to send or retrieve the pigg. Pigging ports shall be located outside the paved area but within right of way as shown in Standard Drawings SS-27 and SS-28.

Pigging ports may be required:

A. At a change in pipeline size

B. At the end of every dead-end line

C. At the connection point to the main where the line being constructed will be a secondary main

D. No farther than every 3,000 feet

These locations are subject to review and approval by the County.

4.460 STEP System Septic Tank

STEP tanks shall be designed for a site-specific application and meet all requirements within this section.

Tanks for single-family residential use shall be rectangular precast concrete or fiberglass, two-compartment, and shall have been designed by a registered structural engineer. Tank liquid volumes shall be sized as follows:

STEPs Tanks serving Single Family Residential Homes or Duplexes shall have a minimum capacity of 1,500 gallons. The Director shall have the ability to require a larger tank if they deem it in the best interest of the system.

Tank sizes for applications other than those noted, including commercial uses, will be approved by the County.

STEP tank maximum depth shall be 30 inches (as measured by the pump riser length). Deeper installations, if required by local conditions and approved by the Director, will require special access modifications.

All tanks shall be manufactured for acceptance of pump assemblies or effluent filters and have a precast groove 1-inch wide by 2 inches deep, 30 inches in diameter, to allow positive attachment of the riser. The manufacturer shall provide the structural design and certification to the County for review. Concrete or fiberglass manufacturers not yet approved or approved manufacturers seeking approval for a new tank design are subject to an independent structural analysis if required by the Director. The manufacturer shall bear the expense of this analysis. The design or analysis shall be in accordance with accepted engineering practice. Tanks 0 to 30 inches in depth shall be designed for the following loading conditions:

A. Top of tank 400 pounds per square foot.

B. Lateral load of 62.4 pounds per square foot.

C. The tank shall be designed to support a 2,500-pound wheel load.

D. The tank shall be designed to withstand hydrostatic loading equal to the maximum depth of bury in addition to the soil loading. Maximum depth of bury shall be measured from the ground elevation to the invert of the sewer line entering the tank.

   Deeper installations, if required by local conditions, will require special consideration, as will tanks located where a vehicle might be driven over them. Tanks approved as traffic-bearing tanks shall be designed to withstand an H-20 live load with a minimum soil cover of 18 inches.

   All tanks shall be guaranteed in writing by the tank manufacturer for a period of two years from the date of County acceptance. Manufacturer’s signed guarantee shall accompany delivery.

Systems installed on a site where an existing septic tank exists may not use the existing tank. The existing tank must be removed or abandoned pursuant to DOH and/or Thurston County Environmental Health Department requirements.

E. All STEP tanks shall be located within 20 feet of the roadway fronting the home served by the system. Tanks shall be accessible at all times. Enclosing STEP tanks with fencing, shrubbery, or other obstructions is not permitted. An exception to this standard may be granted for sewering existing structures where in the opinion of the Department it is not practical or feasible to maintain the standard.

4.462 Concrete Tank

Concrete material and construction shall meet the requirements of Section 6-02 of the Standard Specifications.

Walls, 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. The walls and bottom slab shall be poured monolithically. Concrete shall achieve a minimum compressive strength of 5000 psi in 28 days.

Reinforcing steel shall be ASTM A-615, Grade 60, fy = 60,000 psi. Details and placement shall be in accordance with ACI 315 and ACI 318. The concrete mix shall not be modified unless the mix design is reviewed and approved by the County.

Tanks shall be protected by applying a heavy cement-base waterproof coating, Thoroseal or equal, on both inside and outside surfaces.

Tanks shall be manufactured and furnished with an 18-inch-diameter access opening over each compartment. Modification of completed or existing tanks will not be permitted for structural, warranty, and liability reasons. Tanks shall be furnished without concrete access hole lids. In order to demonstrate water tightness, tanks shall be tested prior to acceptance. Each tank shall be tested at the factory by filling with water to the top of the riser and letting stand. After 24 hours, the tank shall be refilled to the top of the riser and the exfiltration rate shall be determined by measuring the water loss during the next two hours. The two-hour water loss shall not exceed ½" or 1 gallon.

Tanks shall not be moved from the manufacturing site to the job site until the tank has cured for seven days and has reached two-thirds of the design strength.

4.464 Alternative STEP Tank

Thurston County will accept Prelos STEP tanks by Orenco Systems, 814 Airway Ave Sutherlin, Oregon 97479. The tank shall be constructed with Dicyclopentadiene (DCPD) and the manufacturer must be approved by Orenco Systems as well as the Department. The manufacturer shall supply to the County, without charge, satisfactory evidence of testing by an approved laboratory showing compliance with IAPMO ICC 3-74, excepting as herein modified. Any metal part shall be 300 series stainless steel.

Holes specified for the tank will 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.

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.

Each tank shall be water tested on the project site after assembly and prior to backfill by the contractor and witnessed by the inspector. Every tank shall be assembled by the contractor and water raised to the brim of the access opening for a minimum of two hours. The tank shall show no leakage from section seams, pinholes, or other imperfection. Any leakage is cause for rejection.

Fiberglass tanks shall be handled, stored, and installed as recommended by the manufacturer. Backfill shall include a minimum 6-inch-thick envelope of pea gravel or washed gravel completely around the tank.

Concrete of sufficient volume to address buoyancies forces shall be placed above the gravel envelope between the riser ports on the top of the tank. A layer of 6-mil. plastic shall be placed between the concrete and the gravel to prevent bonding. The concrete cap shall be rough formed in sections not exceeding 10 cubic feet each. Adequate reinforcing steel shall be placed to form lifting handles in each section to allow removal to gain access to the tank for maintenance or replacement.

4.466 General Installation

Tanks shall be bedded on 6-inch sand or pea gravel. Backfill for all tanks shall include a minimum 6-inch thick envelope of pea gravel completely around the tank to at least halfway up the side of the tank. Sides shall be compacted in 1-foot lifts to the same or greater density than the surrounding area.

After the tanks have been set in place and the riser installed, but prior to backfilling, each tank shall be tested by filling the tank to 2 inches above the base of the riser for a 4-hour period. Water loss shall not exceed 1 gallon over the 4-hour period.

Tanks installed where groundwater levels are above tank bottom require precautions to prevent flotation. In general, tanks shall immediately be filled with water and shall not be pumped down more than 3 feet below top of tank.

Tank excavation shall be backfilled with select material free of boulders and compacted to a dry density equal to or greater than that of the adjacent, undisturbed soil. Finish grading, cleanup, and restoration shall be completed prior to final acceptance by the County.

4.470 Tank Riser

Pump chamber risers shall be 30-inch-diameter fiberglass or ribbed PVC as manufactured by Orenco Systems, Inc., or approved equal. Solids compartment riser shall be as shown on the engineering drawings and have a diameter of 24 inches. Pump chamber risers shall be factory equipped with the following:

A. Two 1-inch or one-3-inch-diameter (IPS) neoprene grommets, one for the pump discharge, installed between 8 to 12 inches from the top of the riser, and one for the splice box conduit.

B. A PVC splice box with 4 cord grips and 1-inch outlet fitting, Orenco Model No. SB4i or approved equal.

C. A lid shall be furnished with each riser. It shall be latching and shall be constructed of fiberglass with an aggregate finish. Riser and lid combination shall be able to support a 2,500-pound wheel load. This does not imply that PVC risers are intended for traffic areas. All valves and unions shall be no more than 12 inches deep in riser.

D. Each riser shall be bonded to the top of the concrete tank with a two-part epoxy that shall be supplied with the riser by the manufacturer. The epoxy shall be applied in accordance with the manufacturer's recommendations. A generous bead of epoxy shall be laid completely around the bottom of the riser prior to mounting the riser on the top of the tank. After the riser is in place, a generous fillet shall be run completely around the inside base. The epoxy shall be allowed 4 hours curing time at 64°F; otherwise a greater time shall be allowed based on the manufacturer's recommendations before backfill is placed over tank. Care shall be exercised during the curing period to avoid dislodging the riser or disrupting the watertight seal between the riser and tank.

4.480 Pumping Tank Equipment

Pumps shall be stainless steel, thermoplastic, or coated inside and out with baked-on epoxy paint, UL listed for use in effluent. All pumping systems shall be Orenco Systems Model Series P100511 High Head Pumping Assemblies or approved equal comprised of:

A. Standard vault: 12-inch by 54-inch Biotube pump vault with external flow inducer, Orenco Model No. PVU 54-1819, with eight 1 3/8-inch-diameter inlet holes; 19 inches from base; with an 18-inch tall Biotube filter cartridge or approved equal.

B. Hose and valve assembly: Includes 1-inch-diameter flexible PVC hose with quick-disconnect fittings and PVC ball valve. Orenco Model No. HV 100 BFC or approved equal.

C. Mechanical float switches shall be mercury-free. See Standard Drawing SS-30 for information on float switch spacing, mounting, etc.

D. Pump: OSI High Head, 1/2 hp, 115-volt, single-phase, Model P100511 high head, with 8-foot cord and 1/8-inch bypass orifice for effluent application, or approved equivalent. Higher head or discharge pumps may be allowed under certain circumstances with prior approval. Wiring to the control panel shall be #12 AWG THHN stranded wire as a minimum and follow the manufacturer's color coding.

All pumping systems shall be installed in accordance with the manufacturer's recommendations. Wire type and color shall conform to the control panel manufacturer's recommendations. Marking wire with tape or labels in lieu of recommended wiring colors will not be accepted. Pumps shall be accessible for operation and maintenance from ground level.

4.485 Gravity Discharge Tank Equipment

Gravity discharge tanks shall be equipped with Orenco Systems Model FT1254-36 Effluent Filter, or approved equal, installed in conformance with the Standard Drawings and composed of the following components:

A. PVC Vault: 12-inch diameter by 54-inch depth with eight 1 3/8-inch-diameter inlet holes, polyethylene effluent screen, 13-inch-diameter PVC intrusion pipe with overflow screen on top.

B. 13-inch-diameter PVC discharge fitting with seep ring.

C. 13-inch-diameter PVC 90-degree elbow for mounting on the bottom of the vault.

D. 13-inch-diameter flexible PVC hose, a minimum of 60 inches in length, with quick-disconnect fittings on vault end.

4.490 Controls and Alarms

All residential STEP systems shall be wired to a dedicated 25-amp breaker that supplies power to the STEP system control box only. This is required to avoid damage or overload to system and appliances. The homeowner shall be responsible for the operation and maintenance of the breaker and feeder wires that serve the STEP system. See Standard Drawing SS-39 for the control wiring layout. All buried power shall be installed with continuous tracer tape installed 12 inches above the buried power. The tracer tape shall be plastic non-biodegradable metal core backing marked “power.”

Control panels shall be Orenco Systems Model S-IRODS (without redundant off) or approved equal with the following features:

A. Rating: 1 HP/115 VAC, 2 HP/230 VAC, single-phase, 60 Hz. Motor start contact shall be rated for 25 FLA, single-phase, 60 Hz.

B. Audible alarm panel mount with a minimum of 80 dB sound pressure at 24 inches continuous sound. Alarm shall be located within sight from the tank and from the street when practical.

C. Oil-tight visual alarm, red lens, with push-to-silence feature.

D. Automatic audio alarm reset.

E. 15-amp motor rated toggle switch, single pole, double throw with three positions: manual (MAN), automatic (AUTO), and center (OFF).

F. NEMA 4X-rated fiberglass enclosure with gasketed, hinged cover and locking latch. Padlock will be furnished and installed by County at time of County’s acceptance of the completed installation and will signify final acceptance.

G. Alarm circuit shall be wired separately from the pump so that if the internal pump overload switch is tripped, the alarm will still function.

H. The pump control panel shall be mounted on a pedestal near an exterior garage wall or facing street, within sight of the tank in all cases and in sight of the street where practical. The panel shall be between 4 feet and 5 feet above finished grade.

I. There shall be a dedicated 20-amp circuit breaker serving the pump control panel.

J. A lockable, weatherproof, covered 25-amp power disconnect assembly shall be installed in an enclosure within sight of the tank.

4.495 Commercial/Multi-family Installations

All commercial/multifamily installations must meet or exceed all applicable residential standards and general conditions. Inspection and verification of operating parameters and standard requirements by a representative from the Department in addition to an electrical inspection, is required prior to acceptance of all commercial/multifamily installations.

The following features shall be added and provided by the proponent:

A. Telemetry. The County may require commercial STEP system telemetry. Alarm and station status points shall be pursuant to Section 4.330 (HH). The telemetry shall be enclosed in a NEMA 1 enclosure within the electrical cabinet. Prior to ordering the above equipment, the contractor

shall contact the Department for complete ordering specifications for the above telemetry. Nominal lead time is 12 weeks.

B. Pump control system shall be of the solid-state programmable logic controller (PLC) type, RUGID Model 9 or approved equivalent. The system shall possess a solid state KPSI 705 Level Transducer of the 4-20ma analog design. The controller shall be compatible with all established County systems and shall be accessible for ease of maintenance.

   The program for the pump controls will be furnished and installed by Thurston County personnel. For assistance contact the Department at 360-867-2288.

C. Alternate power source. Property owners are responsible for providing an alternative power source for commercial STEP systems during power outages. An approved, dedicated generator set is recommended. If building being served has emergency power generators, they shall be wired to the STEP system. The transfer switch shall be SD Type 1, Class 3140, double throw or equivalent. If equipped, the motor base receptacle shall be NEMA L14-20, Bryant Catalog #71420-MB and #71420-NC or approved equal. The property owner shall sign a maintenance agreement indicating their responsibility to curtail water usage and supply, and own and maintain an alternative power source in the event of a power outage. The maintenance agreement shall be recorded at the Thurston County Auditor's Office. The maintenance agreement shall run with the land and be transferred automatically to all subsequent owners.

D. Electrical enclosures:

   1. Electrical enclosures shall be of satisfactory dimensions to install and contain the required equipment. (See Standard Drawing SS-36.)

   2. Enclosures shall be vandal-proof, all-weather, NEMA 3R or better, constructed of stainless steel with intrusion switch, panel heater and thermostat and double-entry doors.

   3. Alternative power source transfer switch and receptacle shall be installed within its own electrical enclosure separate from pump and telemetry controllers.

   4. Posts or pedestals necessary to support electrical enclosures shall be of galvanized steel construction.

   5. Electrical enclosures shall open in direct line of site with the tank and pump chamber risers.

   6. The enclosure latch will be keyed with Thurston County standard Yale Lock key system with single-key operation of the mechanism, a blank tumbler will be supplied, and the County will key to the desired code.

E. Electrical service. Electrical service shall be sized appropriately to meet the requirements of the installation and the current NEC. Electrical services other than single-phase, 110-volt must be approved by the County.

F. Splice boxes shall not be installed in the pump chamber but shall be installed within 12 inches of finished grade or external to the riser.

G. Access. Commercial STEP systems shall be accessible at all times to operations and maintenance equipment and vehicles. STEP systems located within parking lots shall be placed where it is

acceptable for vehicle traffic to be restricted for extended periods during the business day. Tank and pump chamber risers shall not be located within parking stalls. STEP systems located within fenced enclosures must be accessible via a County lock. Service will not be provided in cases where the STEP tank and/or controls are made inaccessible by parked vehicles or other impediments.

4.500 GRINDER PUMP SYSTEM

4.510 General

Grinder pump system may be installed to serve one or multiple residential and commercial user(s) only where approved by the Department. Maintenance of grinder pump systems is the sole responsibility of the owner. A grinder pump application with approved site plat is required.

A grinder system is a facility consisting of a holding tank, grinder pump, and pressure piping system for conveying the wastewater and solids into the sewer system.

Power, including auxiliary power in the event of a power outage, shall be provided, and paid for, as well as owned and maintained, by the customer.

All sewer pipe, drains, and plumbing between the building and force main before discharging to the sewer main shall be the responsibility of the customer.

Currently, the County will only accept the Environmental-One (E/One) Grinder Pump System for connection to County-owned gravity or pressured sewer mains.

Commercial grinder systems that have kitchen or cooking facilities, such as churches, community gathering places, restaurants, schools, etc., shall require installation of a grease trap.

Only sanitary wastewater shall be discharged into the tank; roof drains and other stormwater sources shall be strictly excluded.

4.520 Design Standards

The developer or builder shall submit a grinder system designed by a licensed engineer for the County's approval. The design of any grinder system shall conform to County standards, Ecology's *Criteria for Sewage Works Design*, and any applicable standards as set forth herein and in Chapter 2, Sections 2.010 through 2.040.

The layout of grinder system force mains shall provide for the future continuation of the existing system as determined by the County. Individual service boxes shall be located near the right-of-way line at the property corner opposite to the location of water meter.

Grinder system tanks shall have a minimum of 24 hours of emergency storage volume (70 gallons per ERU served). Tanks without 24 hours of storage shall be installed with a power transfer switch with an emergency generator plug or other device for allowing emergency power connection or shall have reserve volume provided with a separate vessel. Storage volume is defined as the volume between the "OFF" switch and the top of the tank.

The following information shall be submitted to the County for review:

1. Map showing contributing area for each pipe.

2. Flow generation assumptions, including:

    a. Units per acre

    b. Gallons per capita per day

    c. Population per unit

    d. Average flow

    e. Design flow: the minimum peak flow equal to or greater than the following:

        i. Q = 15 + .5D or

        ii. Q = 15 + .15P

        Where:
        Q = Design peak flow, gpm
        D = Number of equivalent dwellings
        P = Population
        Peak flow is defined as an event that lasts about 15 minutes

3. Average and design flow velocities

4. Slope of hydraulic grade line (ft./ft.)

5. Total head loss (ft.)

6. Site-specific calculations verifying tank resistance to buoyancy forces

4.530 Grinder System Force Main

A. Mainline. The minimum pipe size used is 2 inches nominal diameter. This is based on maintenance requirements rather than flow. Pipe shall be PVC, ASTM D2241, SDR 21 (200) with rubber gasketed joints. Gaskets shall comply with ASTM D 1869. Mains shall have a minimum 36 inches of cover to top of pipe. See Section 4.020 for sanitary sewer/water main crossing requirements. Main lines shall be the following diameters: 2, 3, 4, 6, 8, 10, 12.

B. Service line. Service connection pipe shall be minimum 1-inch diameter, Schedule 80 PVC water pipe, solvent weld joint located at 90 degrees to the mainline when possible. Solvent cements and primer for joining PVC pipe and fittings shall comply with ASTM D 2564 and shall be used as recommended by the pipe and fitting manufacturers.

    Services shall have a minimum 24 inches cover to top of pipe. Pressure services crossing over any waterline shall follow Ecology's requirements. A ball valve and check valve shall be installed at the end of the service stub-out at the property line and installed in a valve box pursuant to Standard Drawing SS-40, located near a front corner of the lot. Check valves shall be Spears or approved equal.

C. Building sewer. The gravity building sewer between the building and the tank shall be designed and installed in accordance with the *Uniform Plumbing Code* as adopted by the County. The owner shall be responsible for maintenance of the building sewer.

D. All pipe shall be installed with continuous tracer tape installed 12 to 18 inches under the proposed finished grade. The marker tape shall be marked “sewer” and be plastic, non-biodegradable metal core or backing that can be detected by a standard metal detector. Tape shall be Terra Tape “D” or approved equal. In addition to tracer tape, install 14-gauge, green-coated copper wire meeting the requirements of Section 4.430, wrapped around the pipe, brought up and tied off at the valve boxes.

   A 1-pound magnesium anode shall be buried with the sewer line every 1,000 linear feet for cathodic protection of the wire. Toning wire splices and connections to anodes shall join wires both mechanically and electrically and shall employ epoxy resin or heat-shrink tape insulation. Furnishing and installing the tracer wire and anodes shall be incidental to pipe installation.

E. Pigging ports shall be provided in accordance with Section 4.450.

4.540 Grinder Main Termination

Hydrogen sulfide odors (H2S) and the buildup of sulfuric acid (H2SO4) occur in the operation of a force main. The outfall manhole (point of connection where force main discharges into gravity sewer) and the next downstream manhole on the gravity sewer shall be lined with Rave 405, or approved equivalent to protect the system against corrosion. No exposed concrete will be permitted. All work shall be done in accordance with manufacturer’s recommendations and must be approved by the Director. If a new outfall manhole and subsequent downstream structures are installed as part of the new system design, the configuration will be approved by the Director. The downstream gravity sewer main connecting these manholes shall also be protected from the effects of hydrogen sulfide with a lining of Raven 405, or approved equivalent.

4.600 VACUUM SEWER SYSTEM

4.610 General

A vacuum sewer system may be installed to serve residential and commercial locations only where approved by the County. A vacuum sewer system application with a proposed site plan is required for each individual service location.

Any new single-family subdivision designed with vacuum sewers shall include an easement on the face of the plat for access to all lots.

A vacuum sewer system is a facility consisting of a vacuum pump tank, or tanks, maintaining negative pressure in the system, a vacuum piping system for conveying effluent into the vacuum tank, and valve pits which collect the effluent until the pressure differential opens the vacuum valve and draws in the effluent to the piping system. The valve pits are mechanically operated and do not require power connections. Effluent collected in the vacuum pump tank can be discharged into the regional sewer system via gravity or force main.

Only sanitary wastewater shall be discharged into the valve pits. Roof drains and other stormwater sources shall be strictly excluded.

Operation and maintenance of the vacuum tank and valve pits will be the responsibility of the County only after the system has been inspected and approved and an easement is granted to the County and the warranty period of one year has expired. It is required by the County that the easements for a new development be granted on the plat; otherwise, an easement for each lot shall have to be granted at the time of connection. The contractor shall submit Record Drawings conforming to Section 2.090 of these

Standards for review and approval by the Department. Service will not be provided to the customer until Record Drawings have been approved by the Department.

The customer shall be responsible for notifying the County in the unlikely event of a sewage backup. The County will ensure the vacuum valve is properly functioning. All sewer pipe, drains, and plumbing between the valve pit and the building shall be the responsibility of the customer. The customer shall be responsible for curtailing water usage until County personnel respond to the customer's notification. The County will accept no responsibility for damages resulting from a plumbing backup, such as may occur if water usage is not curtailed prior to the response of County personnel. Service shall not be provided in cases where the valve pit is made inaccessible by the installation of fences or other impediments.

Service shall not be provided to systems that have situations where a dangerous or potentially dangerous situation exists.

Currently, only the Airvac System, manufactured by Aqseptence Group, Inc. (Airvac), has been approved by the County. However, other suppliers of vacuum sewer system components will be considered if equal to the Airvac product. The specifications must be submitted to the Department for review and approval.

4.620 Design Standards

The design of any vacuum sewer system shall conform to County standards, the Ecology's *Criteria for Sewage Works Design*, the manufacturer's design standards (e.g., Airvac Municipal Design Manual, current edition), and any applicable standards as set forth herein. All vacuum sewer system components shall be compatible with the existing Airvac vacuum sewer system manufactured by Aqseptence Group, Inc. as approved by Thurston County.

The layout of vacuum sewer main extensions shall provide for the future continuation of the existing system as determined by the County. Individual valve pits shall be located near the right-of-way line at the property corner opposite to the location of water meter.

4.625 Design Calculations Submittal

Vacuum system design information/calculations. The following information shall be submitted to the County for review:

A. Map showing contributing area for each main and vacuum station.

B. Basis of Design: Many of the major vacuum system components are sized according to peak flow, expressed in gallons per minute (gpm). Peak flow rates are calculated by applying a peaking factor to an average daily flow rate and then converting to gpm.

C. Average Daily Flow: Average daily flow rates are based on one of the following methods:

   1. Documented average daily flow for the area being served (preferred method). Water use records are typically used for this purpose.
   2. 100 gallons/person/day x population (Ten States Standards).
   3. 75 gallons/person/day x 3.5 per/house x # of houses (EPA and Airvac standard).

D. Peaking Factor:

   Peaking factor shall follow the Ten States Standards formula:

$$P \frac{18 + \sqrt{POPULATION/1000}}{4 + \sqrt{POPULATION/1000}}$$

Peaking factor shall not be less than 2.50.

E. Peak flow (gpm) calculation:

$Q_{max} = Q_a/1440 \times PF$

Where:

Q_{max} is peak flow (gpm)

Q_a is average daily flow (gpd)

PF is peaking factor

All commercial/multi-family systems must meet or exceed all criteria set forth for single-family residential installations. All design calculations are required as part of the submittal. Valve pits placed in parallel will be allowed when approved by the County.

4.630 Equipment and Materials

Vacuum sewer equipment and materials shall be per the manufacturer's design standards.

4.640 Gravity Sewer from the Building

Gravity sewers laid to collect sewage flow prior to the valve pit shall be schedule 40 or SDR 21 PVC pipe. An air terminal or air intake shall be required per the manufacturer's recommendations. Each collection valve pit sump shall serve a maximum of two residences.

4.650 Locating Tape and Wire

All pipes shall be installed with continuous tracer tape 12 to 18 inches under the proposed finished grade. The tracer tape shall be marked "sewer" and be plastic, non-biodegradable metal core or backing that can be detected by a standard metal detector. Tape will be Terra Tape "D" or approved equal. In addition to tracer tape, install 12-guage coated copper wire wrapped around the pipe. The wire shall be brought up and tied off at valve boxes and valve pits.

4.660 Division Valves

Division valves shall be placed at the beginning of each branch and on the mainline near these branch connections. Should branch spacing exceed 1,500 feet, install an additional isolation valve near the center of that run.

Division valves shall be resilient wedge gate valves suitable for service in sewage under both vacuum and/or pressure.

- Valves shall conform to AWWA C509, Standard for Resilient Wedge gate Valves, as manufactured by M&H, Kennedy, AVK, Mueller, or Clow.

- Valves shall be capable of sustaining a vacuum of 24" Hg, and each valve shall be tested and certified to two and nine tenths (2.9) pounds pressure absolute (24" Hg) by an independent laboratory.
- Wedge shall be constructed of ductile iron, fully encapsulated in synthetic rubber except for guide and wedge nut areas.
- Wedge rubber shall be molded in place and bonded to the ductile iron portion. It shall not be mechanically attached with screws, rivets, or similar fasteners.
- Wedge shall seat against seating surfaces arranged symmetrically about the centerline of the operating stem, so that seating is equally effective regardless of direction of pressure unbalance across the wedge.
- All seating surfaces in body shall be inclined to the vertical at a minimum angle of 32 degrees (when stem is in a vertical position) to eliminate abrasive wear of rubber sealing surfaces.
- The stem shall be sealed by at least two O-rings; all stem seals shall be replaceable while the valve is wide open and while it is subjected to full rate pressure.
- Fasteners shall be stainless steel Type 18-8, ASTM F-593, Group 1.
- Waterway shall be smooth and shall have no depressions or cavities in its seat area where foreign material can lodge and prevent closure or sealing.
- Valve body and bonnet shall be fusion bonded epoxy coated, inside and out.
- The valve manufacturer should provide a full 10-year warranty.

Buried valves shall be provided with mechanical joint end connections with transition gaskets. Buried valves shall be installed in APWA valve boxes marked “sewer”, and the operating nut of all buried valves shall be extended to within 6 inches plus or minus 3 inches of the finished grade.

4.670 Testing

A. Daily Testing: At the completion of each day's work, all sewer mains and lateral connections laid that day shall be tested as follows: Plug all open connections with rubber stoppers or temporary caps, fitted to the pipe by “no-hub” couplings. Apply a vacuum of 22" mercury to the pipes and allow the pressure to stabilize for 15 minutes. There shall be no loss of vacuum in excess of 1% per hour for a two-hour test period. As pipe is laid the new section will be tested in addition to the previous laid pipe on that main.

B. Prior to final acceptance, the complete vacuum sewer system including the vacuum collection station shall be subjected to a vacuum of 22" mercury and allowed to stabilize for 15 minutes. There shall be no loss greater than 1% per hour over a four-hour test period. This test must be completed prior to the installation of any AIRVAC® valves and must be witnessed by Thurston County or its agents.

Appendix 1: List of Standard Drawings

Title	Drawing No.	File Type (DWG includes all drawings in chapter)
Type 1 Manhole	SS-01	PDF DWG
Shallow Manhole	SS-02	PDF DWG
Manhole Collar	SS-03	PDF DWG
Outside Drop Connection	SS-04	PDF DWG
Inside Drop Connection	SS-05	PDF DWG
Terminal Cleanout	SS-06	PDF DWG
Sanitary Sewer Service Connection	SS-07	PDF DWG
Combination Air Valve Assembly and Vault	SS-08	PDF DWG
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Title	Drawing No.	File Type (DWG includes all drawings in chapter)
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Terminus Pigg Launch Port	SS-29	PDF DWG
1500 Gallon STEP Septic Tank	SS-30	PDF DWG
2” Air Release Assembly	SS-31	PDF DWG
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Typical STEP Air Release Manifold Connection Plan Detail	SS-33	PDF DWG
Typical STEP Air Release Manifold Connection Section View	SS-34	PDF DWG
Typical STEP Main/Force Gate Valve 2 In. or Greater	SS-35	PDF DWG
Commercial/Multi-Family STEP System Electrical Cabinet Layout	SS-36	PDF DWG
Typical Riser Conduit Plan for Commercial/Multi-Family STEP System	SS-37	PDF DWG
Typical STEP System Service Connection	SS-38	PDF DWG
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Title	Drawing No.	File Type (DWG includes all drawings in chapter)
Vacuum Sewer Fiberglass Dual Buffer Tank Plan	SS-57	PDF DWG
Vacuum Sewer Buffer Tank Pipe Anchors	SS-58	PDF DWG
Vacuum Sewer Main Profile Details	SS-59	PDF DWG

APPR. DATE:
DATE

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FIG NO: GN-01

GENERAL NOTES

REQUIRED GENERAL NOTES FOR ALL PROJECTS:

1. ALL WORK AND MATERIALS SHALL BE COMPLETED IN ACCORDANCE WITH THE FOLLOWING:
   A. THURSTON COUNTY'S MOST CURRENT DEVELOPMENT STANDARDS FOR WATER AND SEWER SYSTEMS (DSWSS),
   B. THE MOST CURRENT "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" FROM THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION,
   C. THE THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL (DDECM), AND
   D. THE CONTRACT SPECIFICATIONS AND SPECIAL PROVISIONS, AS APPLICABLE.
2. A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD WITH THE COUNTY PRIOR TO THE START OF CONSTRUCTION.
3. UNLESS NOTED OTHERWISE, UTILITIES SHOWN ON THE PLAN AND PROFILE ARE EXISTING, AND ARE LOCATED TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PRINTING. THE CONTRACTOR SHALL VERIFY PRIOR TO CONSTRUCTION AND TAKE EXTRAORDINARY CARE WHEN EXCAVATING NEAR OR AROUND UTILITY CROSSINGS INCLUDING "HAND" EXCAVATION AND POT HOLING. IN THE EVENT OF A CONFLICT, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND THE PRIVATE UTILITY TO RAISE, RELOCATE, OR LOWER THE CONFLICTING APPURTENANCES.
4. 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 811, THE UNDERGROUND LOCATE LINE, A MINIMUM OF 48 HOURS (TWO WORKING DAYS) PRIOR TO ANY EXCAVATION. IT IS THE RESPONSIBILITY OF THE REQUESTER TO MAINTAIN THE MARKINGS AFTER THE INITIAL LOCATE IN ACCORDANCE WITH RCW 19.122.
5. EROSION CONTROL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT DDECM.
6. CONTRACTOR SHALL PROTECT ALL TREES AND VEGETATION THAT ARE NOT TO BE REMOVED AS DIRECTED BY THE ENGINEER.
7. ALL DRAINAGE STRUCTURES, SANITARY MANHOLES, WATER METERS, WATER VALVES OR OTHER APPURTENANCES SHALL BE ADJUSTED TO FINAL GRADE BY THE CONTRACTOR UNLESS OTHERWISE NOTED ON THE PLANS.
8. CONTRACTOR SHALL MAINTAIN FUNCTION OF ALL EXISTING UTILITIES DURING CONSTRUCTION, UNLESS OTHERWISE AGREED.
9. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE EXISTING SIDEWALK AND ROAD SURFACES OUTSIDE OF THE PROJECT LIMITS. ALL DAMAGE OR UNDERMINING SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO IMMEDIATELY REPAIR TO COUNTY STANDARDS AT THE CONTRACTOR'S EXPENSE.
10. ALL EXISTING SIGNS THAT INTERFERE WITH CONSTRUCTION SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER.
11. ACCESS TO PRIVATE PROPERTY SHALL BE MAINTAINED AT ALL TIMES UNLESS PRIOR APPROVAL AND COORDINATION HAS OCCURRED.
12. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL IN ACCORDANCE WITH THE U.S. DEPARTMENT OF TRANSPORTATION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). PRIOR TO DISRUPTION OF ANY TRAFFIC, TRAFFIC CONTROL PLANS WILL BE PREPARED AND SUBMITTED TO THE COUNTY FOR APPROVAL. NO WORK WILL COMMENCE UNTIL ALL APPROVED TRAFFIC CONTROL IS IN PLACE.
13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE A COPY OF THE APPROVED CONSTRUCTION PLANS ON SITE AT ALL TIMES.
14. ANY CHANGES TO THE DESIGN SHALL FIRST BE REVIEWED AND APPROVED BY THE ENGINEER.

STANDARD NOTES FOR EROSION AND SEDIMENT CONTROL PLANS:

THE FOLLOWING STANDARD NOTES ARE REQUIRED FOR USE IN EROSION AND SEDIMENT CONTROL PLANS. PLANS SHOULD ALSO IDENTIFY WITH PHONE NUMBERS THE PERSON OR FIRM RESPONSIBLE FOR THE PREPARATION OF AND MAINTENANCE OF THE EROSION CONTROL PLAN.

1. NO CONSTRUCTION RELATED ACTIVITY SHALL CONTRIBUTE TO THE DEGRADATION OF THE ENVIRONMENT, ALLOW MATERIAL TO ENTER SURFACE OR GROUND WATER, OR ALLOW PARTICULATE EMISSIONS TO THE ATMOSPHERE, WHICH EXCEED STATE OR FEDERAL STANDARDS. ANY ACTION THAT POTENTIALLY ALLOW A DISCHARGE TO STATE WATERS MUST HAVE PRIOR APPROVAL.
2. A CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL) IS REQUIRED FOR ALL CONSTRUCTION PROJECTS. THE NAMED PERSON OR FIRM SHALL BE ON-SITE OR ON-CALL AT ALL TIMES. FOR THIS SITE, THE PERSON/FIRM IS _____ AND THEIR OFFICE AND CELL TELEPHONE NUMBERS ARE _____.
3. APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STREET OR DRAINAGE DESIGN (E.G. SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
4. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
5. STORMWATER FACILITY INFILTRATIVE SURFACES SHALL BE PROTECTED FROM SEDIMENTATION AND COMPACTION THROUGHOUT CONSTRUCTION. NOTE THAT POST-CONSTRUCTION VERIFICATION TESTING IS REQUIRED FOR ALL STORMWATER INFILTRATION FACILITIES. STORMWATER INFILTRATION FACILITIES THAT FAIL TO PERFORM AS DESIGNED MUST BE RECONSTRUCTED OR EXPANDED TO SUBSTANTIALLY MEET THE DESIGNED PERFORMANCE.
6. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE APPLICANT/CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
8. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
9. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
10. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
11. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 48 HOURS FOLLOWING A MAJOR STORM EVENT.
12. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE HIGH VELOCITY CLEANED AND PRESSURE TESTED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
13. ROADS SHALL BE CLEANED THOROUGHLY AS NEEDED TO PROTECT DOWNSTREAM WATER RESOURCES OR STORMWATER INFRASTRUCTURE. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR PICKUP SWEEPING AND SHALL BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA.
14. FROM OCTOBER 15 THROUGH APRIL 1, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN 2 DAYS. FROM APRIL 2 TO OCTOBER 14, NO SOILS SHALL REMAIN EXPOSED AND UNWORKED FOR MORE THAN 7 DAYS. SOILS SHALL BE STABILIZED AT THE END OF THE SHIFT BEFORE A HOLIDAY OR WEEKEND IF NEEDED BASED ON THE WEATHER FORECAST. LINEAR CONSTRUCTION ACTIVITIES, SUCH AS RIGHT-OF-WAY AND EASEMENT CLEARING, ROADWAY DEVELOPMENT, PIPELINES, AND TRENCHING FOR UTILITIES, SHALL COMPLY WITH THESE REQUIREMENTS. THESE STABILIZATION REQUIREMENTS APPLY TO ALL SOILS ON SITE, WHETHER AT FINAL GRADE OR NOT. THE LOCAL PERMITTING AUTHORITY MAY ADJUST THESE TIME LIMITS IF IT CAN BE SHOWN THAT A DEVELOPMENT SITE'S EROSION OR RUNOFF POTENTIAL JUSTIFIES A DIFFERENT STANDARD.
15. FROM OCTOBER 15 THROUGH APRIL 1, CLEARING, GRADING, AND OTHER SOIL-DISTURBING ACTIVITIES SHALL ONLY BE PERMITTED IF SHOWN TO THE SATISFACTION OF THE LOCAL PERMITTING AUTHORITY THAT THE TRANSPORT OF SEDIMENT FROM THE CONSTRUCTION SITE TO RECEIVING WATERS WILL BE PREVENTED.
16. SOIL STOCKPILES MUST BE STABILIZED AND PROTECTED WITH SEDIMENT-TRAPPING MEASURES.
17. ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS, THAT OCCUR ON SITE DURING CONSTRUCTION SHALL BE HANDLED AND DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF STORMWATER. WOODY DEBRIS MAY BE CHOPPED AND SPREAD ON SITE.
18. MAINTENANCE AND REPAIR OF HEAVY EQUIPMENT AND VEHICLES AND OTHER ACTIVITIES WHICH MAY RESULT IN DISCHARGE OR SPILLAGE OF POLLUTANTS TO THE GROUND OR INTO STORMWATER RUNOFF MUST BE CONDUCTED USING SPILL PREVENTION MEASURES, SUCH AS DRIP PANS. REPORT ALL SPILLS TO 911.
19. WATER FROM MOST DEWATERING OPERATIONS SHALL BE DISCHARGED INTO A SEDIMENT TRAP OR POND. CLEAN, NOT-TURBID WATER MAY BE DISCHARGED TO STATE SURFACE WATERS, PROVIDED THE DISCHARGE DOES NOT CAUSE EROSION OR FLOODING. HIGHLY TURBID OR CONTAMINATED DEWATERING WATER FROM CONSTRUCTION EQUIPMENT OPERATION, CLAMSHELL DIGGING, CONCRETE TREMIE POUR, OR WORK INSIDE A COFFERDAM SHALL BE HANDLED SEPARATELY FROM STORMWATER AND PROPERLY DISPOSED.

WATER MAIN CONSTRUCTION:

1. ALL LINES WILL BE CHLORINATED AND TESTED IN CONFORMANCE AMERICAN WATER WORKS ASSOCIATION STANDARDS.
2. ALL WATER MAINS WILL BE STAKED FOR GRADES AND ALIGNMENT BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK. STAKING WILL BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. ALL WATER SYSTEM CONNECTIONS TO SERVE BUILDINGS OR PROPERTIES WITH DOMESTIC POTABLE WATER, FIRE SPRINKLER SYSTEMS, OR IRRIGATION SYSTEMS WILL COMPLY WITH THE MINIMUM BACKFLOW PREVENTION REQUIREMENTS AS ESTABLISHED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH AND THURSTON COUNTY IN ITS CROSS CONNECTION PROGRAM.
4. THE COUNTY REQUIRES 10 WORKING DAYS WRITTEN NOTICE TO SCHEDULE SHUTDOWNS. THE WRITTEN NOTICE WILL BE COORDINATED WITH THE COUNTY INSPECTOR. THE THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION OR COUNTY INSPECTOR WILL PERFORM THE SHUTDOWN.
5. AT ANY CONNECTION TO AN EXISTING LINE WHERE A NEW VALVE IS NOT INSTALLED, THE EXISTING VALVE MUST BE PRESSURE TESTED TO COUNTY STANDARDS BY THE CONTRACTOR PRIOR TO CONNECTION. IF AN EXISTING VALVE FAILS TO PASS THE TEST, THE CONTRACTOR WILL INSTALL A NEW VALVE.
6. AT ANY WATER MAIN TAP TO EXISTING COUNTY MAINS WHERE THE CONTRACTOR ENCOUNTERS A COUPLING OR EXISTING ASSEMBLIES, THE CONTRACTOR WILL PROVIDE A MINIMUM OF 18 INCHES OF CLEARANCE FROM COUPLING OR ASSEMBLIES TO EDGE OF TAPPING SLEEVE.
7. ANY WATER MAIN TAP OR CONNECTION WILL BE BLOCKED ACCORDING TO THE COUNTY'S STANDARD DRAWINGS.
8. ANY EXCAVATION THAT EXPOSES AN ASBESTOS CEMENT (AC) WATER MAIN SHALL BE BEDDED WITH CONTROLLED DENSITY FILL (CDF) PURSUANT TO THE WSDOT SPECIFICATIONS FOR CDF. AS AN OPTION THE CONTRACTOR MAY CHOOSE TO REPLACE THE AC PIPE AT ANY CROSSING WITH DUCTILE IRON PIPE BENCHED INTO BOTH TRENCH WALLS. THE CONTRACTOR WILL COORDINATE WITH THE COUNTY INSPECTOR TO HAVE A THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION STAFF MEMBER ON SITE BEFORE CONSTRUCTION BEGINS.
9. BEFORE CUTTING OR REMOVING ANY EXISTING AC PIPE, THE CONTRACTOR WILL SUPPLY THE COUNTY INSPECTOR A COPY OF THE WORKMAN'S CERTIFICATIONS TO WORK WITH AC PIPE. THE CONTRACTOR WILL CONFORM TO ALL REGULATIONS AND GUIDANCE RELATED TO ASBESTOS WORK PROVIDED BY THE OLYMPIC REGION CLEAN AIR AGENCY.

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

SANITARY SEWER CONSTRUCTION:

1. 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.
2. THE COUNTY CONSTRUCTION INSPECTOR SHALL BE NOTIFIED A MINIMUM OF 48 HOURS (TWO WORKING DAYS) IN ADVANCE OF A TAP CONNECTION TO AN EXISTING MAIN. THE INSPECTOR SHALL BE PRESENT AT THE TIME OF THE TAP.
3. ALL SEWER MAINS SHALL BE FIELD STAKED FOR GRADES AND ALIGNMENT BY A LICENSED ENGINEERING OR SURVEYING FIRM QUALIFIED TO PERFORM SUCH WORK. STAKING SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
4. WHEN TEMPORARY STREET PATCHES ARE ALLOWED BY THE COUNTY, COLD MIX ASPHALT SHALL BE PLACED AND COMPACTED TO A MAXIMUM DEPTH OF 2 INCHES. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE AS REQUIRED BY THE COUNTY.
5. AFTER BACKFILLING, BUT PRIOR TO PAVING, ALL MAINS AND APPURTENANCES SHALL BE INSPECTED AND APPROVED BY THE COUNTY CONSTRUCTION INSPECTOR. APPROVAL DOES NOT CONSTITUTE FINAL ACCEPTANCE OF THE SEWER LINE. THE CONTRACTOR SHALL RETAIN THE RESPONSIBILITY TO REPAIR ALL DEFICIENCIES AND FAILURES REVEALED DURING ALL REQUIRED TESTING FOR ACCEPTANCE AND THROUGH THE DURATION OF THE WARRANTY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE COUNTY FOR THE REQUIRED INSPECTIONS. ANY MAIN OR APPURTENANCE BACKFILLED PRIOR TO INSPECTION SHALL BE RE-EXCAVATED FOR INSPECTION.
6. ALL LINES WILL BE HIGH-VELOCITY CLEANED AND SUBJECTED TO A LOW-PRESSURE AIR TEST PURSUANT TO CURRENT WSDOT STANDARD SPECIFICATIONS AFTER BACKFILLING, BUT PRIOR TO PAVING. HYDRANT FLUSHING OF LINES IS NOT AN ACCEPTABLE CLEANING METHOD.
7. TESTING OF THE SANITARY SEWER MAIN WILL INCLUDE TELEVISION INSPECTION, COMPATIBLE WITH GNET SOFTWARE, AT THE CONTRACTOR'S EXPENSE. ADDITIONAL TEVLEVISING THAT IS DEEMED NECESSARY WILL ALSO BE AT THE CONTRACTOR'S EXPENSE. ALL TELEVISION INSPECTIONS SHALL BE COMPLETED IN THE MANNER REQUIRED BY THE PACP. IMMEDIATELY PRIOR TO TELEVISION INSPECTION, ENOUGH WATER WILL BE RUN DOWN THE LINE SO IT COMES OUT THE LOWER MANHOLE AND THE LINE IS FLUSHED CLEAN. ACCEPTANCE OF THE LINE WILL BE MADE AFTER THE TELEVISION INSPECTION TAPE HAS BEEN REVIEWED AND APPROVED BY THE COUNTY INSPECTOR.
8. A TEST OF ALL MANHOLES IN ACCORDANCE WITH THURSTON COUNTY STANDARD IS ALSO REQUIRED. TESTING WILL TAKE PLACE AFTER ALL UNDERGROUND UTILITIES ARE INSTALLED AND COMPACTION OF THE ROADWAY SUBGRADE IS COMPLETED.

IN ADDITION, THE FOLLOWING SPECIFIC NOTES PERTAINING TO STEP SYSTEMS AND LIFT STATIONS AND FORCE MAINS WILL BE INCLUDED WHEN THESE UTILITIES ARE PART OF THE PROJECT.

STEP SEWERS:

1. ALL BURIED POWER FOR STEP SYSTEMS WILL BE INSTALLED WITH CONTINUOUS TRACER TAPE INSTALLED 12 INCHES ABOVE THE BURIED POWER. THE MARKER WILL BE PLASTIC NON-BIODEGRADABLE METAL-CORE BACKING MARKED "POWER". TAPE WILL BE FURNISHED BY CONTRACTOR.
2. ALL STEP MAINS WILL BE HYDROSTATICALLY TESTED AT 200 PSI AND ACCORDING TO THE METHODS FOR HYDROSTATIC TESTING OF WATER LINES IN THE CURRENT VERSION OF THE WSDOT SPECIFICATIONS.

LIFT STATION, FORCE MAIN, AND VACUUM SEWERS:

1. CONTRACTORS SHALL BE RESPONSIBLE FOR CLEANUP OF ANY DEBRIS IN THE WET WELL, TANKS, VAULTS AND SITE ASSOCIATED WITH THE PROJECT PRIOR TO START UP.
2. PRIOR TO BACKFILL, ALL MAINS, DRY WELL, WET WELL AND VAULTS SHALL BE INSPECTED AND APPROVED BY THE COUNTY'S CONSTRUCTION INSPECTOR. 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 COUNTY FOR THE REQUIRED INSPECTIONS.
3. ALL WORK SHALL BE DONE PER NATIONAL ELECTRICAL CODE (NEC) AND THE THURSTON COUNTY STANDARDS. THE THURSTON COUNTY STANDARDS MAY EXCEED THE NEC. THE DEVELOPER SHALL OBTAIN ALL PERMITS AND ARRANGE INSPECTIONS.
4. THE DEVELOPER SHALL COORDINATE POWER SERVICE WITH SERVING UTILITIES AND MAKE ARRANGEMENTS FOR POWER SERVICE CONNECTION.
5. PRIOR TO TESTING AND START-UP OF THE LIFT STATION OR VACUUM STATION, FIVE (5) COPIES OF THE OPERATION AND MAINTENANCE MANUAL, TOGETHER WITH THE NUMBER OF APPROVED COPIES REQUIRED BY THE DEVELOPER, SHALL BE SUBMITTED TO THE COUNTY FOR REVIEW AND APPROVAL.
6. THE DEVELOPER, AT ITS OWN EXPENSE, WITH THE DESIGN ENGINEER, SHALL ARRANGE FOR AN AUTHORIZED FACTORY-TRAINED REPRESENTATIVE OF THE COMPANY OR COMPANIES SUPPLYING THE VARIOUS ITEMS OF EQUIPMENT TO CHECK THE INSTALLATION, AND TO ADJUST AND TEST THE EQUIPMENT FURNISHED BEFORE THE ACCEPTANCE OF THE WORK BY THE COUNTY. THE FACTORY REPRESENTATIVE SHALL BE RESPONSIBLE TO CHECK AND RESOLVE ANY UNACCEPTABLE VIBRATION OF THE PUMP ASSEMBLIES. FURTHERMORE, THE DEVELOPER SHALL ASSIST AND INSTRUCT THE COUNTY'S OPERATING STAFF IN ADJUSTING AND OPERATING THE EQUIPMENT DURING INITIAL START-UP PERIOD. SAID REPRESENTATIVE SHALL BE EXPERIENCED AND KNOWLEDGEABLE OF THE EQUIPMENT BEING TESTED.
7. THE DEVELOPER AT ITS OWN EXPENSE SHALL CONDUCT AN INSTRUCTION PROGRAM FOR UP TO FIVE (5) PERSONNEL DESIGNATED BY THE COUNTY. DEVELOPER SHALL FURNISH THE SERVICES OF QUALIFIED INSTRUCTORS FROM THE VARIOUS EQUIPMENT MANUFACTURERS. PROGRAM SHALL INCLUDE INSTRUCTION COVERING BASIC SYSTEM OPERATION THEORY, ROUTINE MAINTENANCE AND REPAIR, AND "HANDS ON" OPERATION OF EQUIPMENT. TRAINING SHALL NOT PROCEED UNTIL ALL OPERATION MAINTENANCE MANUALS ARE COMPLETE AND ACCEPTED BY THE COUNTY.
8. ALL EQUIPMENT SHALL BE TESTED AND DEVELOPER SHALL DEMONSTRATE TO COUNTY PERSONNEL THAT PROPER OPERATION AND CAPACITY HAVE BEEN FULLY OBTAINED. THE COUNTY WILL NOT ACCEPT ANY FACILITY UNTIL SUCCESSFUL FULL OPERATION OF ALL COMPONENTS HAS BEEN DEMONSTRATED BY THE DEVELOPER.
9. IT IS THE DEVELOPER'S RESPONSIBILITY TO CONSTRUCT AND START-UP A COMPLETE AND TROUBLE-FREE SYSTEM. THE DEVELOPER SHALL BE RESPONSIBLE FOR CORRECTING ALL DESIGN ERRORS AND/OR CONSTRUCTION DEFECTS THAT ARE DISCOVERED IN THE START-UP OR DURING THE WARRANTY PERIOD OF THE AGREEMENT WITH THE COUNTY.
10. LIFT/VACUUM STATION AND GENERATOR SITE, DRIVEWAY, ACCESS, CONCRETE AREAS, LIGHTING AND WATER SERVICE SHALL ALL BE COMPLETED PRIOR TO START UP REQUEST AND INSPECTION.
11. TELEMETRY SHALL CONSIST OF A RUGID PLC AND OTHER ACCESSORIES LISTED IN DSWSS SECTION 4.330. PRIOR TO ORDERING THE ABOVE EQUIPMENT, THE DEVELOPER WILL CONTACT THE PUMP STATION'S SUPERVISOR, THURSTON COUNTY PUBLIC WORKS, FOR COMPLETE ORDERING SPECIFICATIONS FOR THE ABOVE TELEMETRY. NOMINAL LEAD TIME IS 12 WEEKS.
12. SPARE PARTS SHALL BE PROVIDED FOR THE STATION AT TIME OF START UP ACCEPTANCE.
    - ONE SET MECHANICAL SEALS, FILTERS AND VULUTE GASKETS.
    - ONE SET OF PUMP WEAR RINGS.
    - FOUR SETS OF OPERATION AND MAINTENANCE MANUALS.
    - A LIST OF THE NEAREST DEALERS FOR SPARE PARTS AND REPAIR WILL BE PROVIDED.

    ADDITIONALLY, ANY SPECIAL TOOLS SPECIFIC TO THE PUMP MANUFACTURER SHALL BE PROVIDED TO THE COUNTY AT START UP.
19. A 6-INCH THICK CONCRETE COLLAR SHALL BE INSTALLED AROUND ALL VALVES. STANDARD DRAWING SS-35, STANDARD VALVE BOX, DETAIL SHALL BE USED.
20. ALL FORCE MAINS SHALL BE HYDROSTATIC TESTED AT 200 PSI AND ACCORDING TO THE METHODS FOR HYDROSTATIC TESTING OF WATER LINES IN THE CURRENT VERSION OF THE WSDOT SPECIFICATIONS.
21. PRIOR TO FINAL ACCEPTANCE, THE COMPLETE VACUUM SEWER SYSTEM INCLUDING THE VACUUM COLLECTION STATION SHALL BE SUBJECTED TO A VACUUM OF 22" MERCURY AND ALLOWED TO STABILIZE FOR 15 MINUTES. THERE SHALL BE NO LOSS GREATER THAN 1% PER HOUR OVER A FOUR-HOUR TEST PERIOD. THIS TEST MUST BE COMPLETED PRIOR TO INSTALLATION OF ANY VACUUM VALVES AND MUST BE WITNESSED THE COUNTY.

GENERAL NOTES CONTINUED

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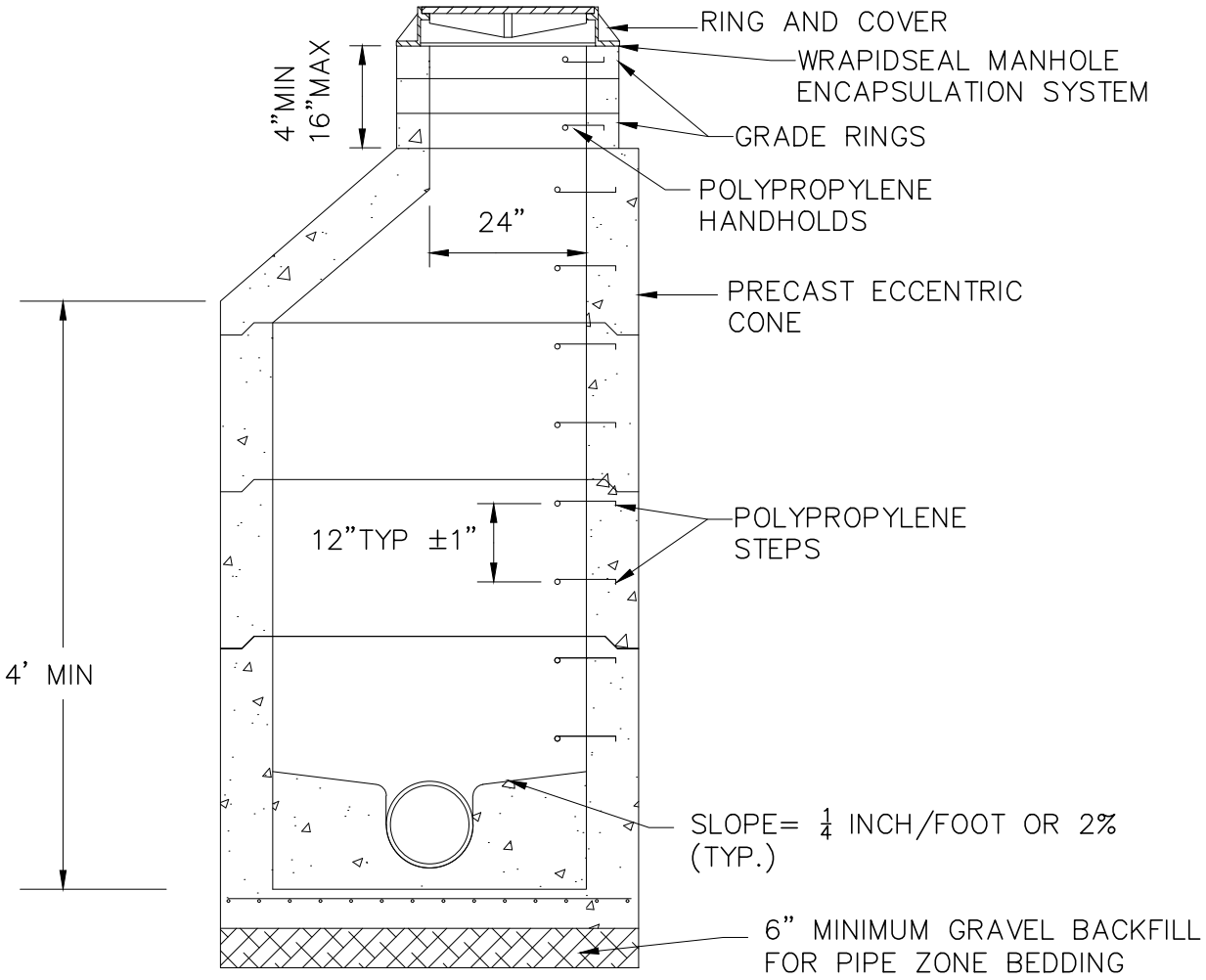
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

1. THIS DETAIL OUTLINES THE THURSTON COUNTY MODIFICATIONS TO THE WSDOT TYPE 1–48 INCH, 54 INCH AND 60 INCH MANHOLE.
2. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. JOINTS SHALL BE RUBBER GASKETED, CONFORMING TO ASTM C443 AND SHALL BE GROUTED FROM THE INSIDE. LIFT HOLES SHALL BE GROUTED FROM THE OUTSIDE AND INSIDE OF THE MANHOLE.
3. THE FIRST STEP OR HANDHOLD SHALL BE A MAXIMUM OF 12 INCHES FROM THE TOP OF THE COVER.
4. CONNECTION TO MANHOLE SHALL BE MADE BY KOR–N–SEAL FITTING, OR APPROVED EQUAL ONLY. FITTING SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. KNOCKOUTS WILL NOT BE ALLOWED.
5. SEE THURSTON COUNTY STANDARD DRAWING SS–03 FOR MANHOLE COLLAR INSTALLATION.
6. A WATERTITE CASTING SHALL BE INSTALLED IN ANY MANHOLE SUBJECT TO FLOODING.
7. ALL MANHOLES SHALL HAVE RAVEN 405 OR APPROVED EQUAL APPLIED TO ALL INTERIOR SURFACES.
8. WRAPIDSEAL MANHOLE ENCAPSULATION SYSTEM OR APPROVED EQUAL SHALL BE APPLIED TO MANHOLE EXTERIOR.

TYPE 1 MANHOLE

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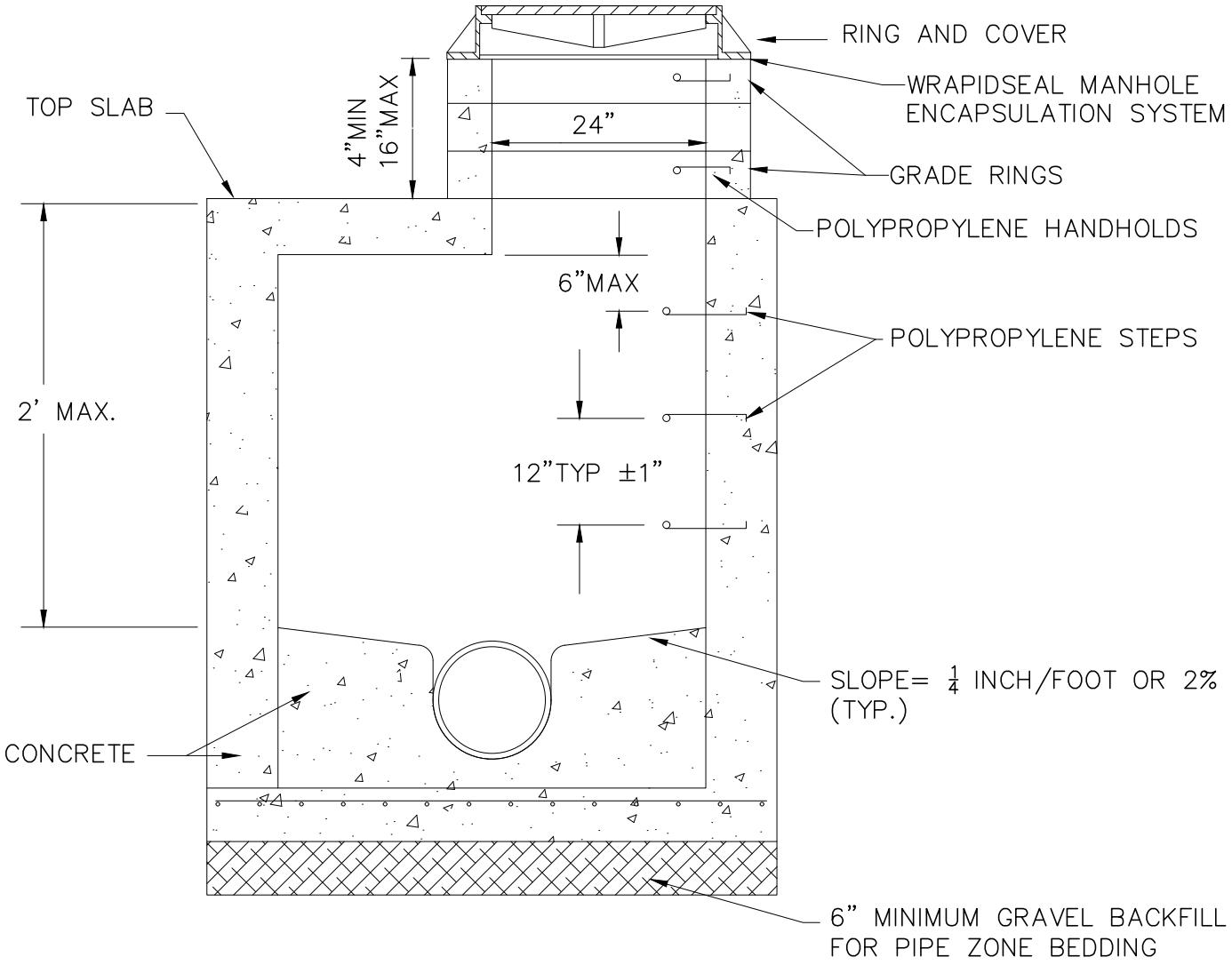
Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

1. THIS DETAIL OUTLINES THURSTON COUNTY'S MODIFICATIONS TO THE WSDOT TYPE 3 MANHOLE FOR SHALLOW INSTALLATIONS.
2. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. JOINTS SHALL BE RUBBER GASKETED, CONFORMING TO ASTM C443 AND SHALL BE GROUTED FROM THE INSIDE. LIFT HOLES SHALL BE GROUTED FROM THE OUTSIDE AND INSIDE OF THE MANHOLE.
3. THE FIRST STEP OR HANDHOLD SHALL BE A MAXIMUM OF 12 INCHES FROM THE TOP OF THE COVER.
4. CONNECTION TO MANHOLE SHALL BE MADE BY KOR-N-SEAL FITTING, OR APPROVED EQUIL ONLY. FITTING SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. KNOCKOUTS WILL NOT BE ALLOWED.
5. SEE THURSTON COUNTY STANDARD DRAWING SS-03 FOR MANHOLE COLLAR INSTALLATION.
6. A WATERTITE CASTING SHALL BE INSTALLED IN ANY MANHOLE SUBJECT TO FLOODING.
7. ALL MANHOLES SHALL HAVE RAVEN 405 OR APPROVED EQUAL APPLIED TO ALL INTERIOR SURFACES OF THE MANHOLE.
8. WRAPIDSEAL MANHOLE ENCAPSULATION SYSTEM OR APPROVED EQUAL SHALL BE APPLIED TO ALL EXTERIOR SURFACES.

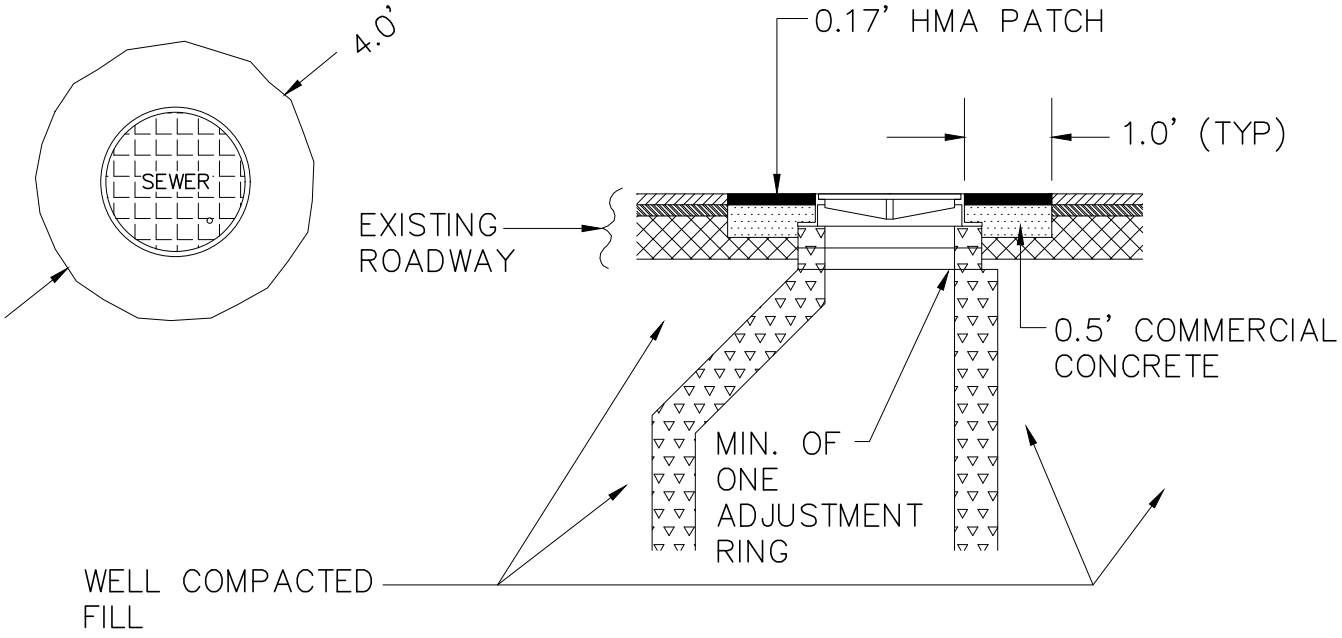
SHALLOW MANHOLE

APPR. DATE: DATE	REF:	FIG NO: SS-02

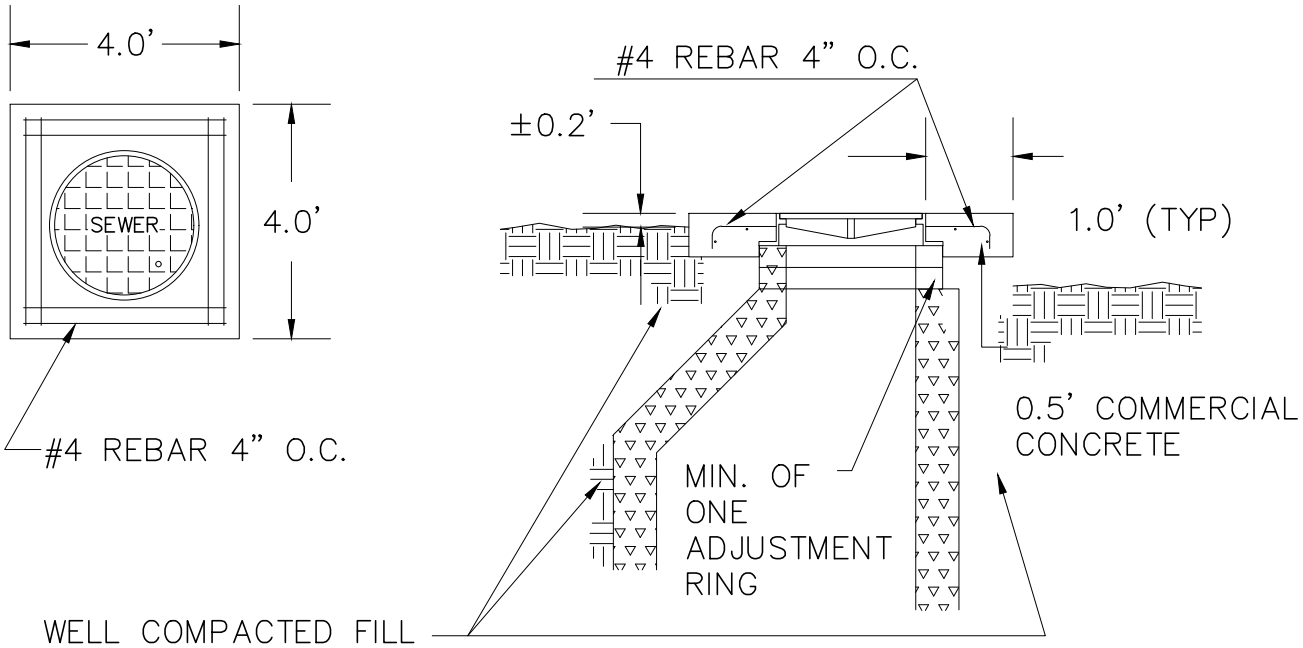
Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

MANHOLE IN PAVED AREA



MANHOLE OUTSIDE PAVED AREA



NOTES:

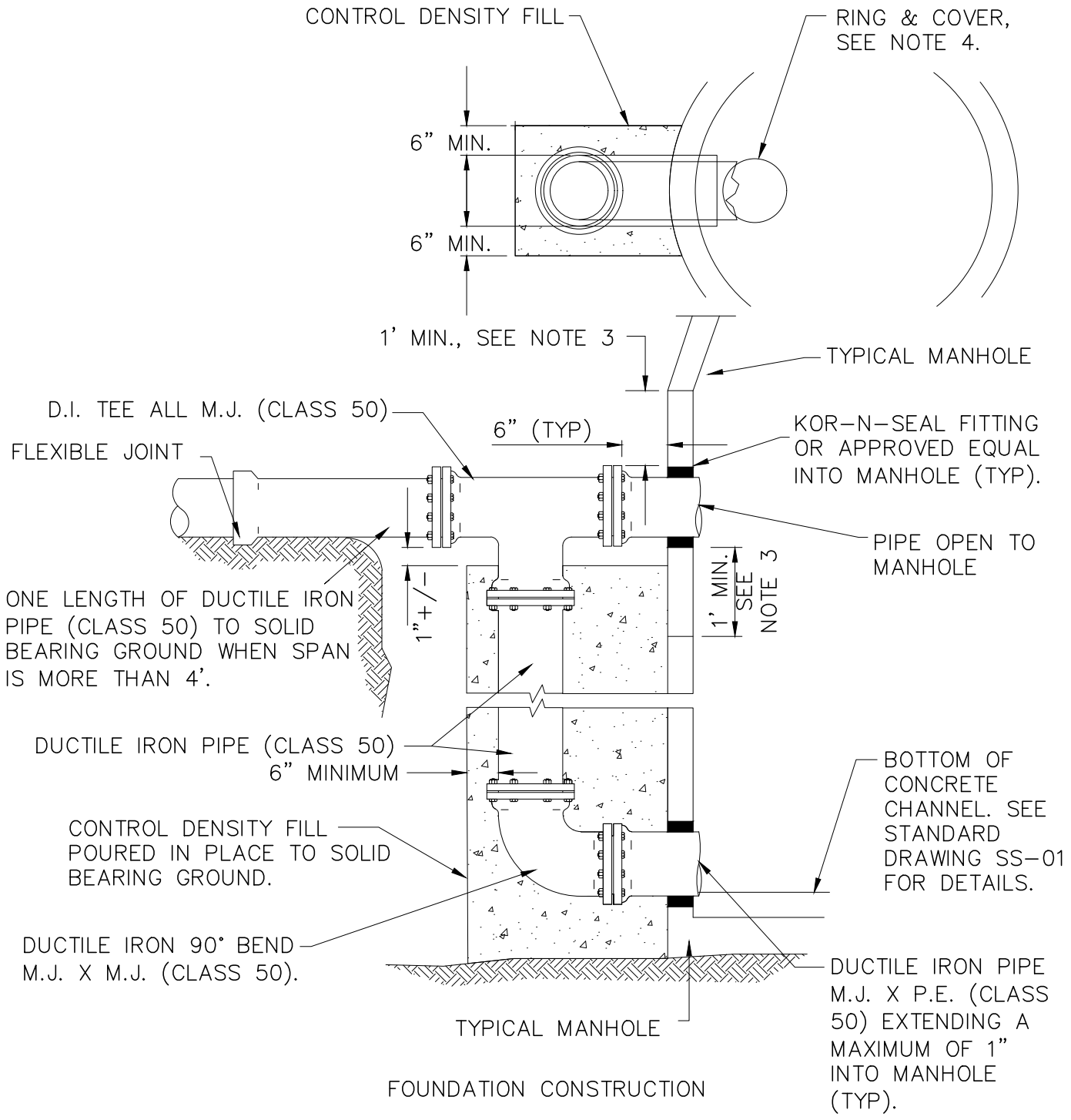
1. ON MANHOLE OUTSIDE ASPHALT, ADD REINFORCING STEEL AS SHOWN ABOVE. DEFORMED BAR TO MEET ASTM A615 GRADE 60, FY=60,000 P.S.I.
2. OPENING IN LID FOR USE OF MANHOLE HOOK IS REQUIRED.

MANHOLE COLLAR

APPR. DATE: DATE	REF:	FIG NO: SS-03

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



FOUNDATION CONSTRUCTION

NOTES:

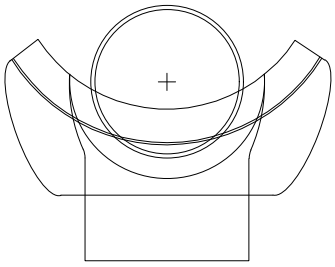
1. THE INTERIOR OF ALL DUCTILE IRON SHALL BE COATED WITH RAVEN 405, OR APPROVED EQUAL.
2. MAINTAIN A MINIMUM OF 1' BETWEEN MANHOLE JOINTS AND TEE.
3. IN NEW MANHOLES, MANHOLE COVER SHALL BE POSITIONED DIRECTLY ABOVE OUTSIDE DROP PIPE.
4. STEPS SHALL BE LOCATED NEXT TO DROP PIPE, AS NEAR TO LID & COVER AS POSSIBLE.

OUTSIDE DROP CONNECTION

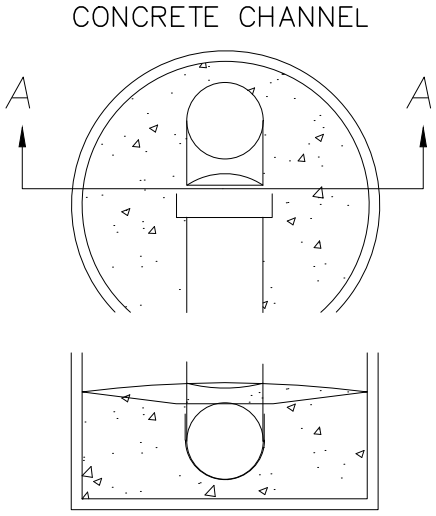
APPR. DATE: DATE	REF:	FIG NO: SS-04

Source; City of Olympia

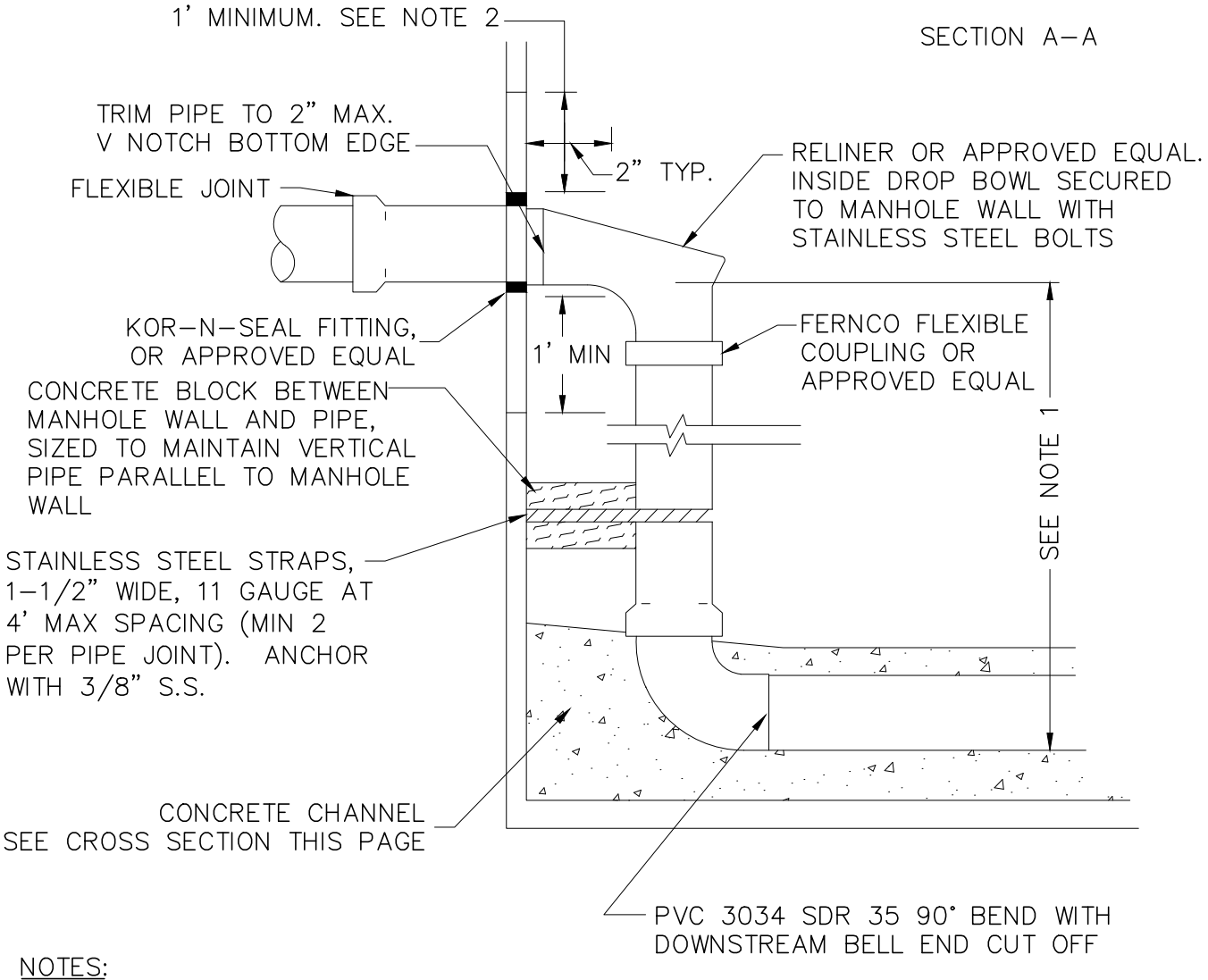
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



DROP BOWL
MOUNTING POSITION



SECTION A–A



NOTES:

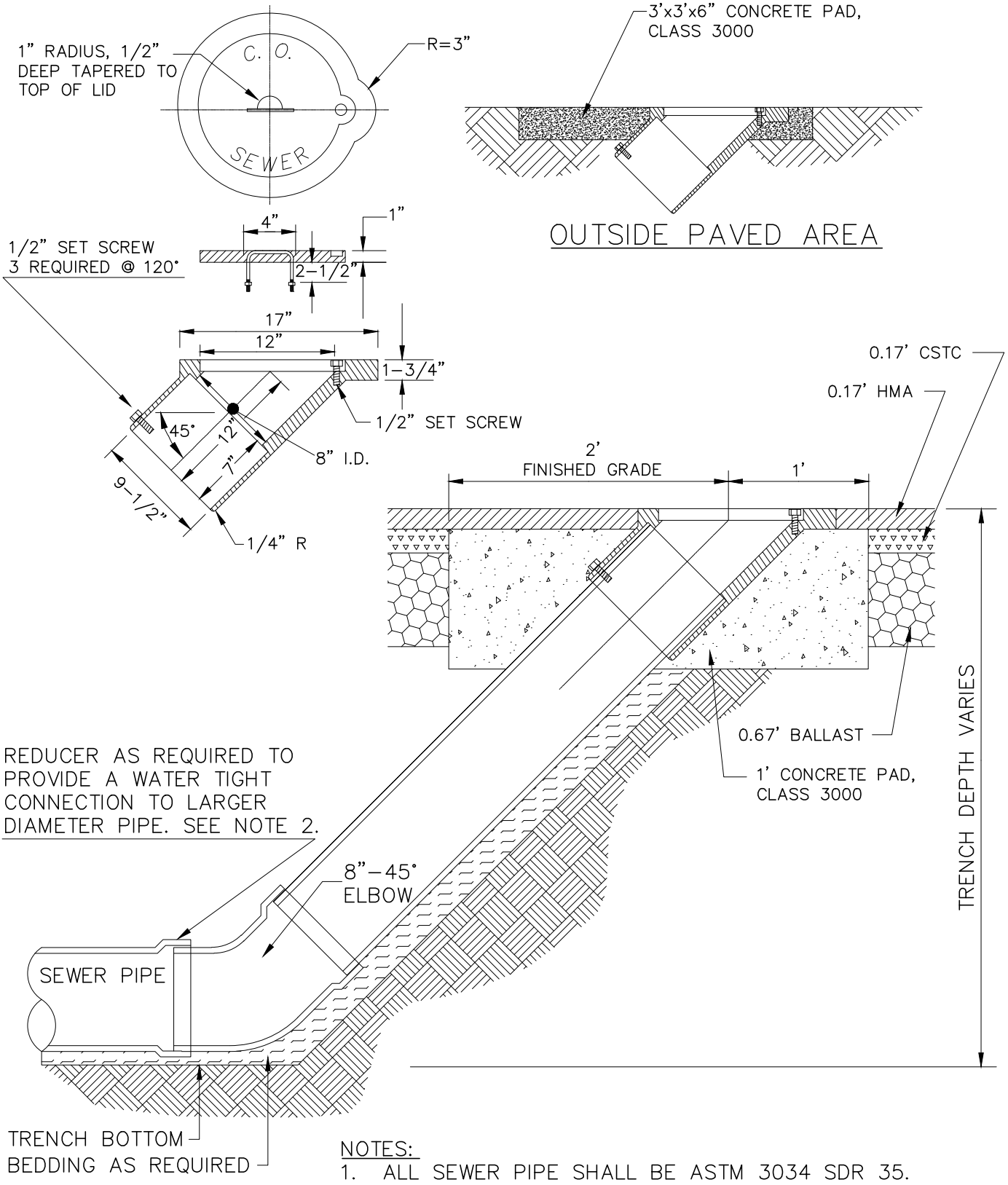
1. MAINTAIN A MINIMUM SEPARATION OF 1 FOOT BETWEEN MANHOLE JOINTS AND PIPE PENETRATIONS.
2. IN NEW MANHOLES, MANHOLE LID & COVER SHALL BE POSITIONED AT A RIGHT ANGLE FROM INSIDE DROP PIPE.

INSIDE DROP CONNECTION

APPR. DATE: DATE	REF:	FIG NO: SS-05

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

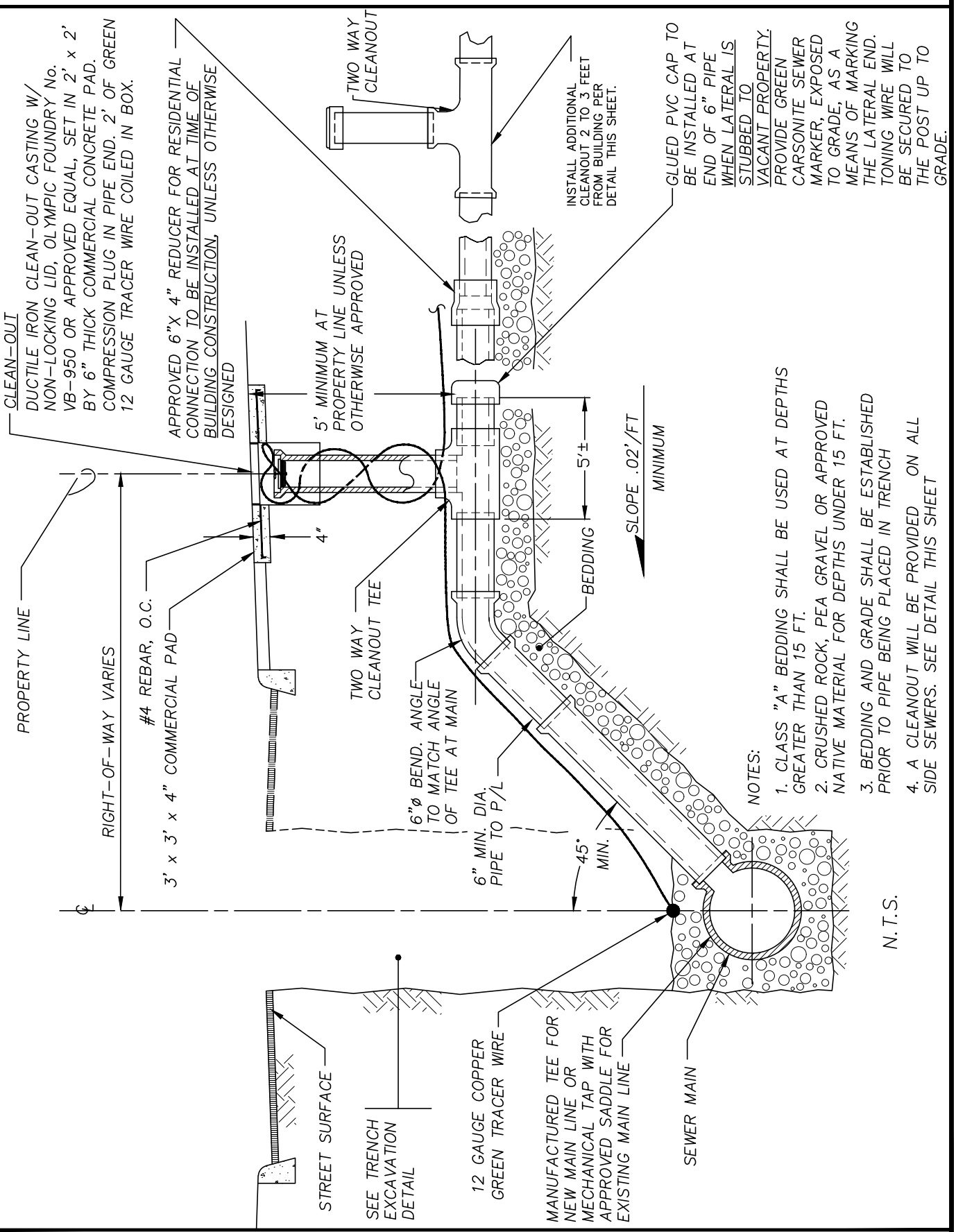
1. ALL SEWER PIPE SHALL BE ASTM 3034 SDR 35.
2. CLEANOUTS SHALL NOT BE INSTALLED ON SEWER MAINS LARGER THAN 8" DIAMETER, UNLESS APPROVED BY THE THURSTON COUNTY.

TERMINAL CLEANOUT

APPR. DATE:		FIG NO:	SS-06

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

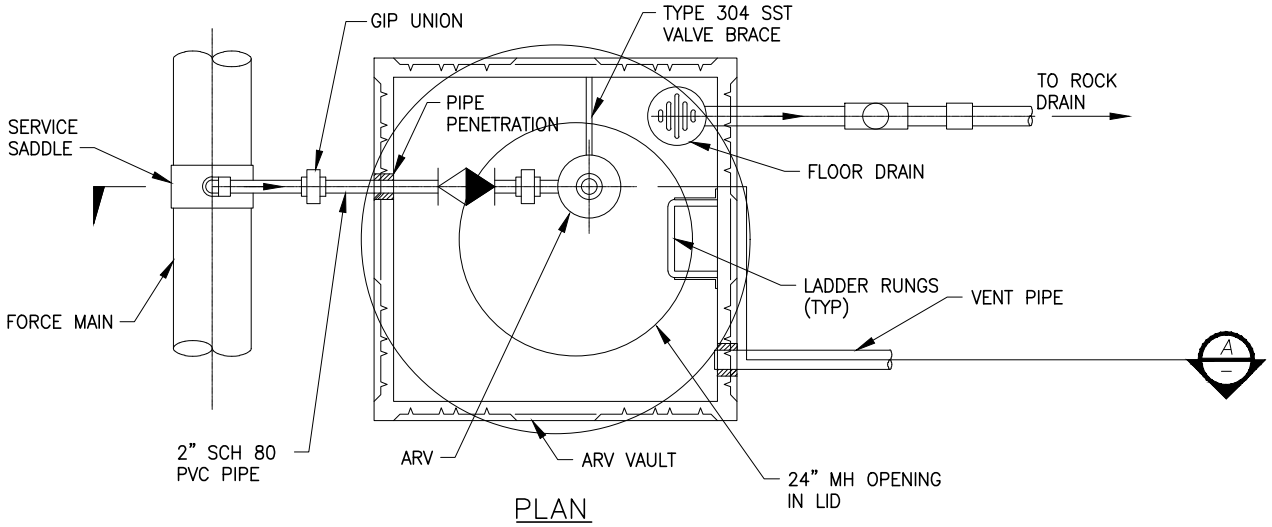


SANITARY SEWER SERVICE CONNECTION

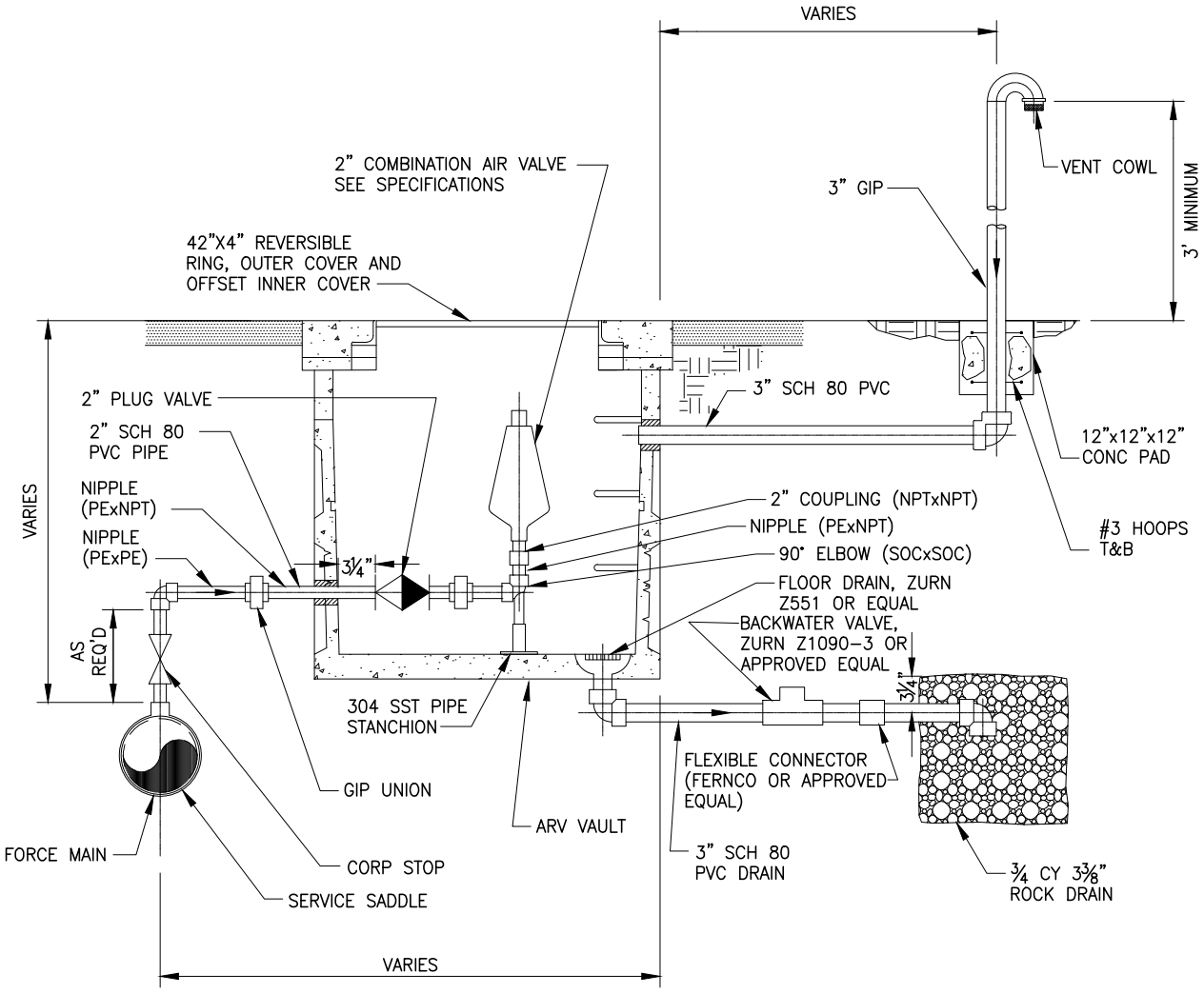
APPR. DATE:		FIG NO:	SS-07

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



PLAN



ELEVATION

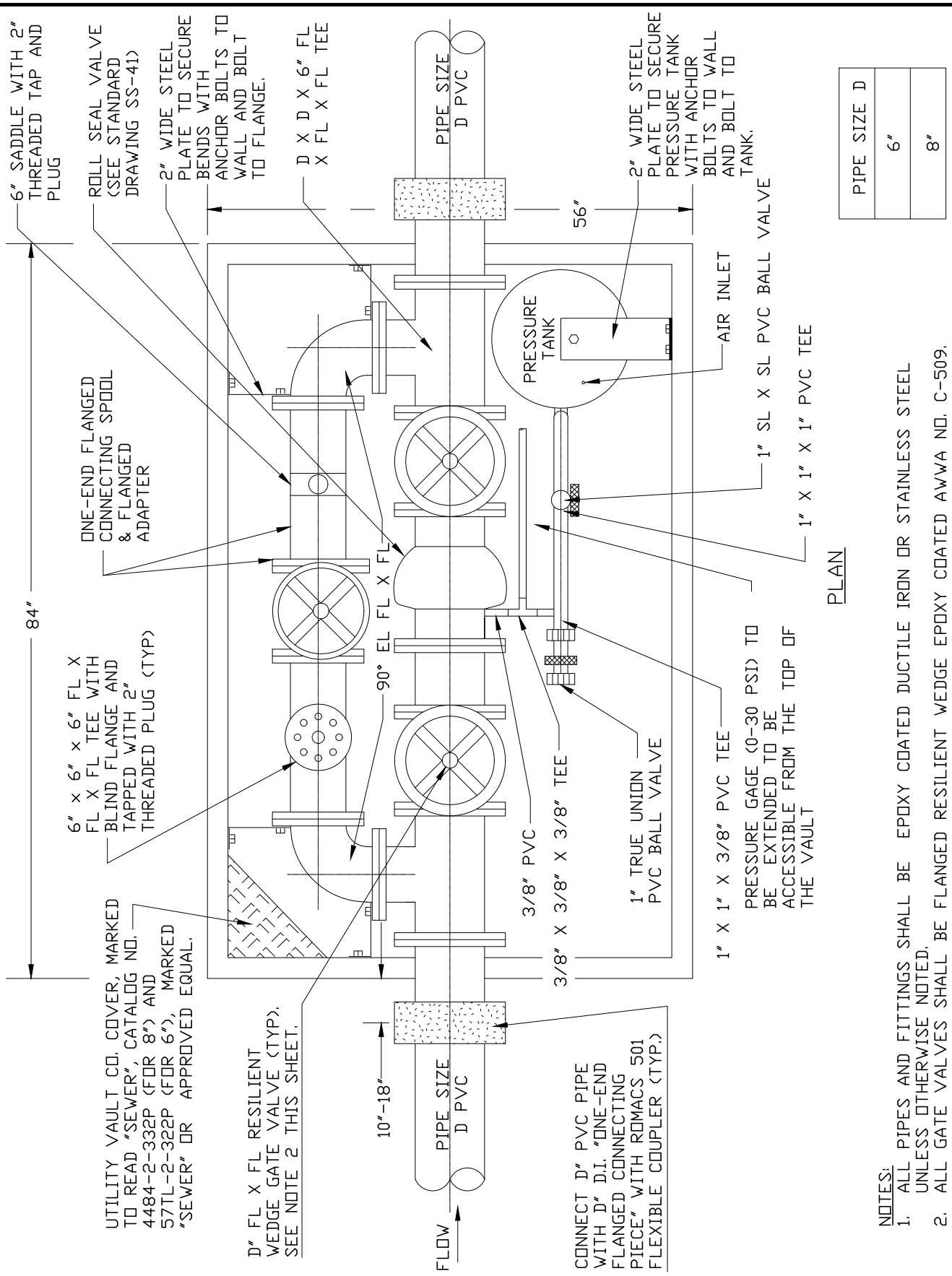
NOTE:
COMBINATION AIR VALVE ASSEMBLY SHALL INCLUDE ALL CONNECTIONS, WORK AND MATERIALS (SERVICE SADDLE TO VENT COWL) FOR A COMPLETE AND FULLY OPERATIONAL COMBINATION AIR VALVE ASSEMBLY

COMBINATION AIR VALVE ASSEMBLY AND VAULT

APPR. DATE: DATE	REF:	FIG NO: SS-08

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

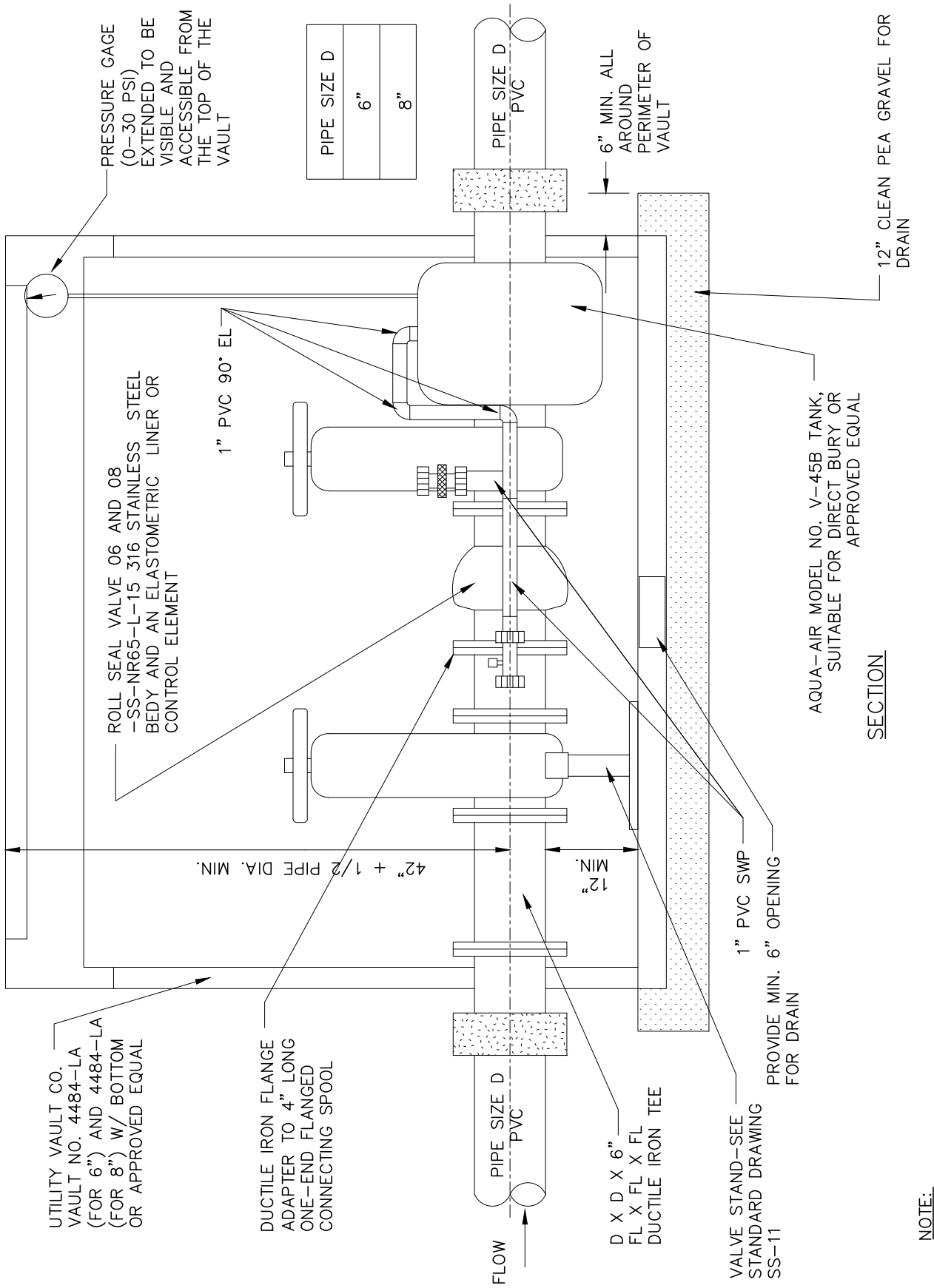


6" & 8" PRESSURE SUSTAINING DEVICE PLAN VIEW

APPR. DATE: DATE	REF:	FIG NO: SS-09

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



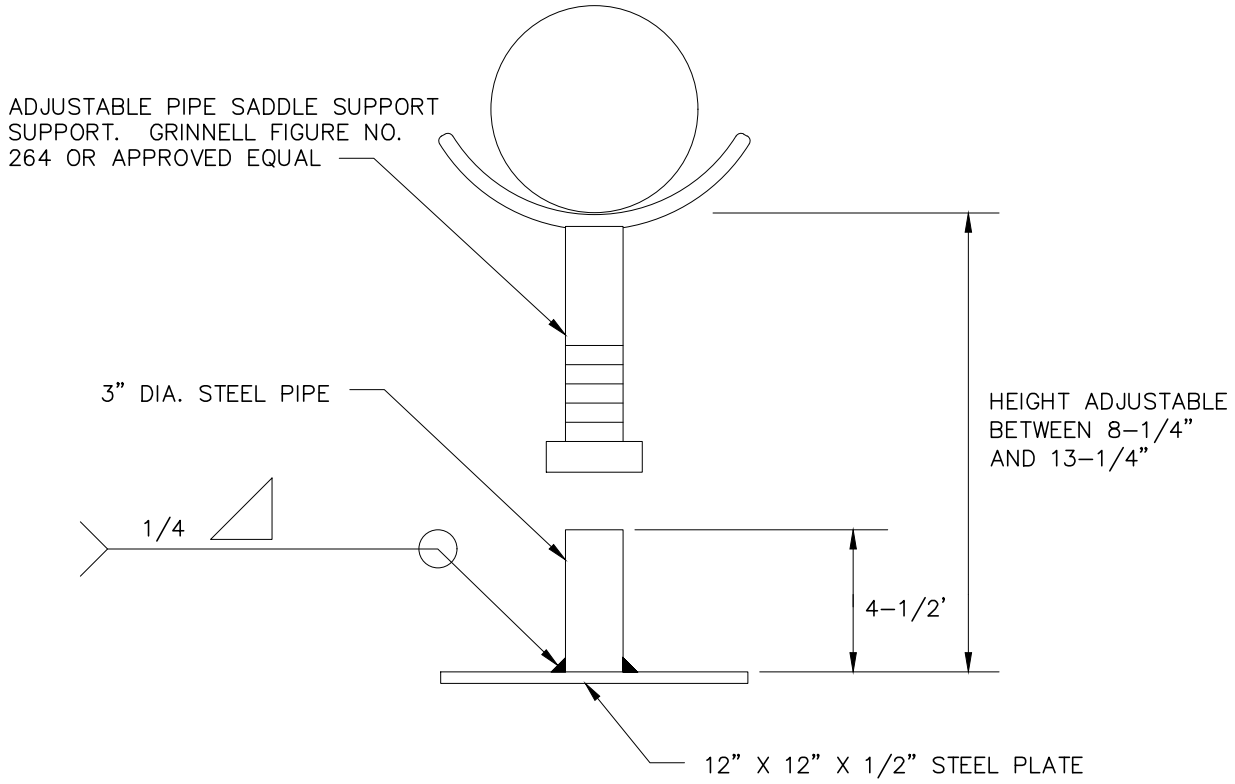
NOTE:
1. ALL PIPES AND FITTINGS SHALL BE EPOXY COATED DUCTILE IRON OR APPROVED STAINLESS STEEL UNLESS OTHERWISE NOTED.
2. ALL GATE VALVES SHALL BE FLANGED RESILIENT WEDGE EPOXY COATED, AWWA NO. C–509.

6" & 8" PRESSURE SUSTAINING DEVICE SECTION VIEW

APPR. DATE: DATE	REF:	FIG NO:	SS-10

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTE:

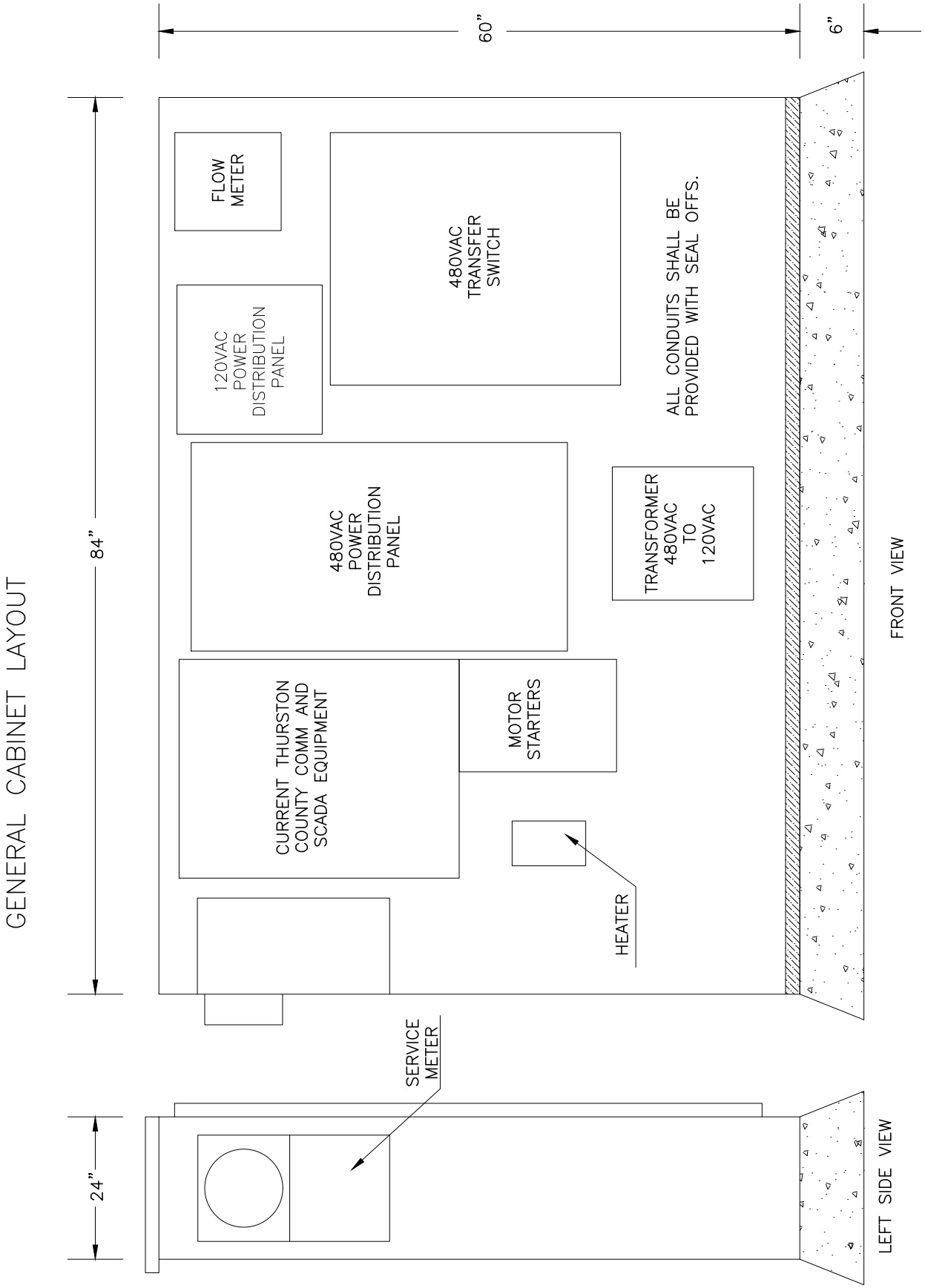
1. AFTER FABRICATION, THE VALVE STAND BASE SHALL BE CLEANED, PRIMERED WITH FULLER O'BRIEN 621–04 BLOX–RUST ALKYD METAL PRIMER OR APPROVED EQUAL AND THEN PAINTED WITH FULLER O'BRIEN 612–XX HEAVY DUTY ALKYD ENAMEL OR APPROVED EQUAL.

TYPICAL VALVE STAND

APPR. DATE: DATE	REF:	FIG NO: SS-11

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



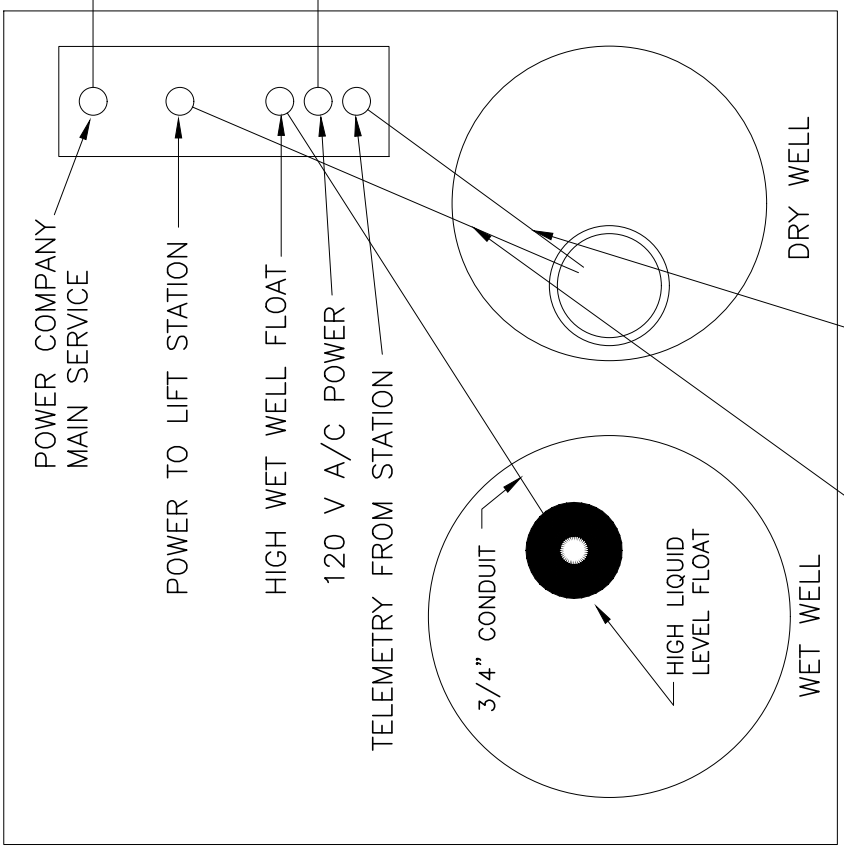
NOTE:
1. SEE STANDARD DRAWING SS-13 FOR TOP SLAB PLAN.

STANDARD LIFT STATION CONTROL LAYOUT

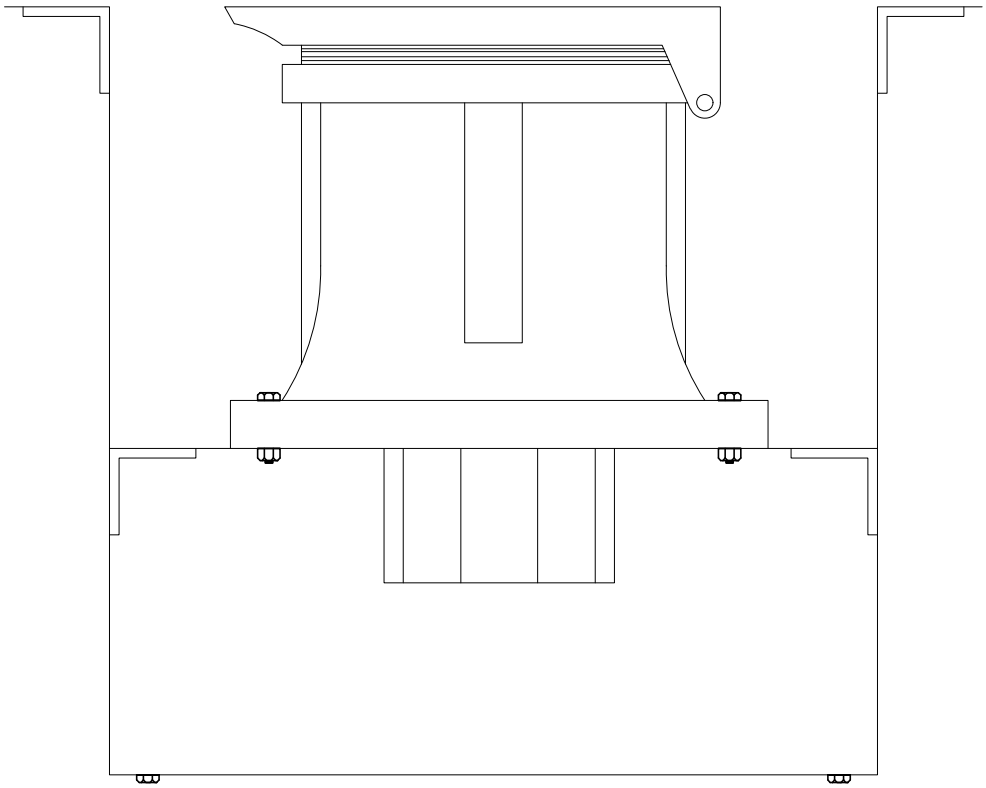
APPR. DATE: DATE	REF:	FIG NO: SS-12

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



TOP SLAB PLAN



GENERAL RECEPTACLE
REFER TO STANDARD
DRAWING SS-36

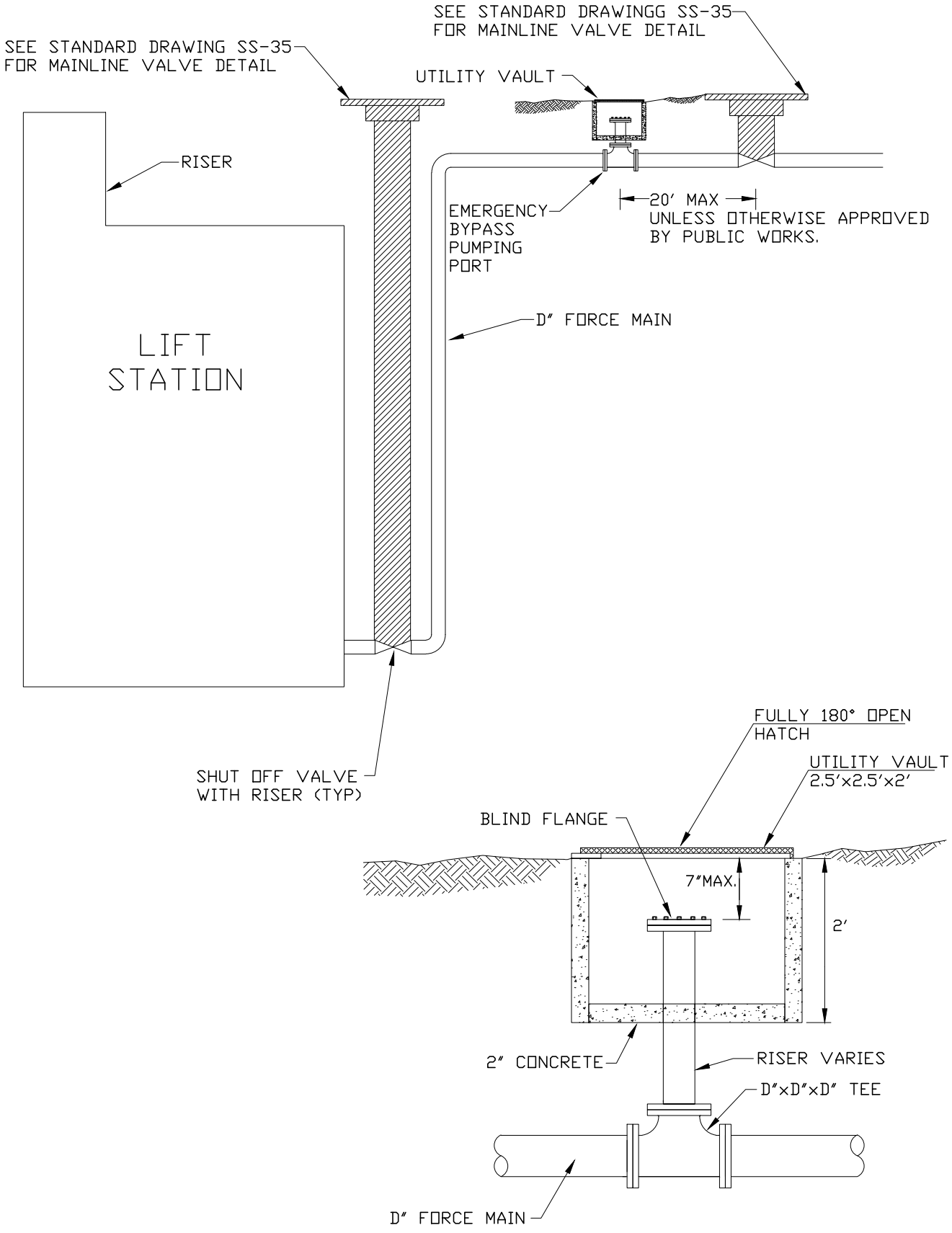
NOTE:
1. OTHER LAYOUTS MAY BE APPROVED TO MEET SPECIFIC NEEDS PROVIDING ALL ELEMENTS ARE PROVIDED.

STANDARD LIFT STATION LAYOUT

APPR. DATE: DATE	REF:	FIG NO: SS-13

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

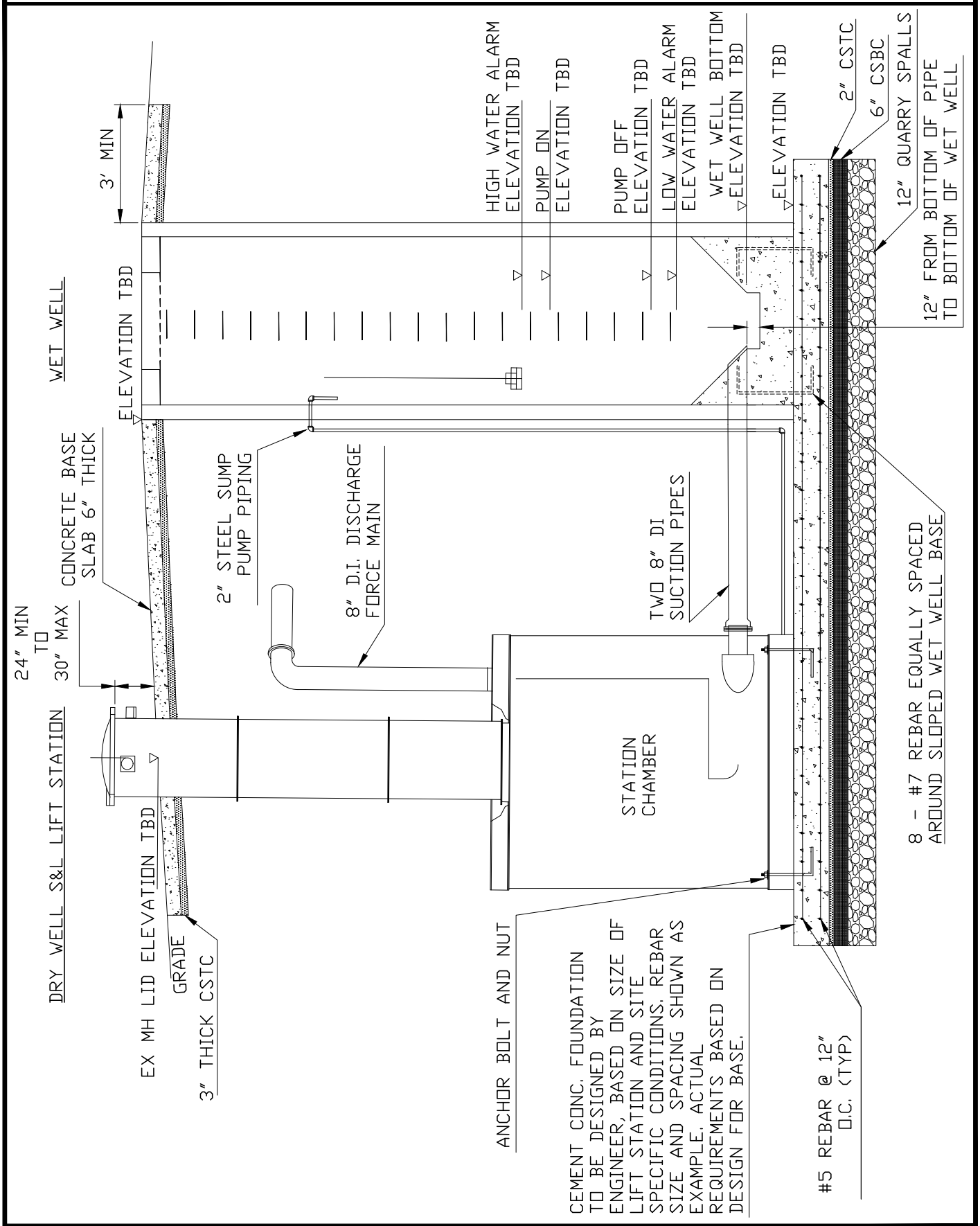


LIFT STATION EMERGENCY BYPASS PUMPING PORT

APPR. DATE: DATE	REF:	FIG NO: SS-14

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

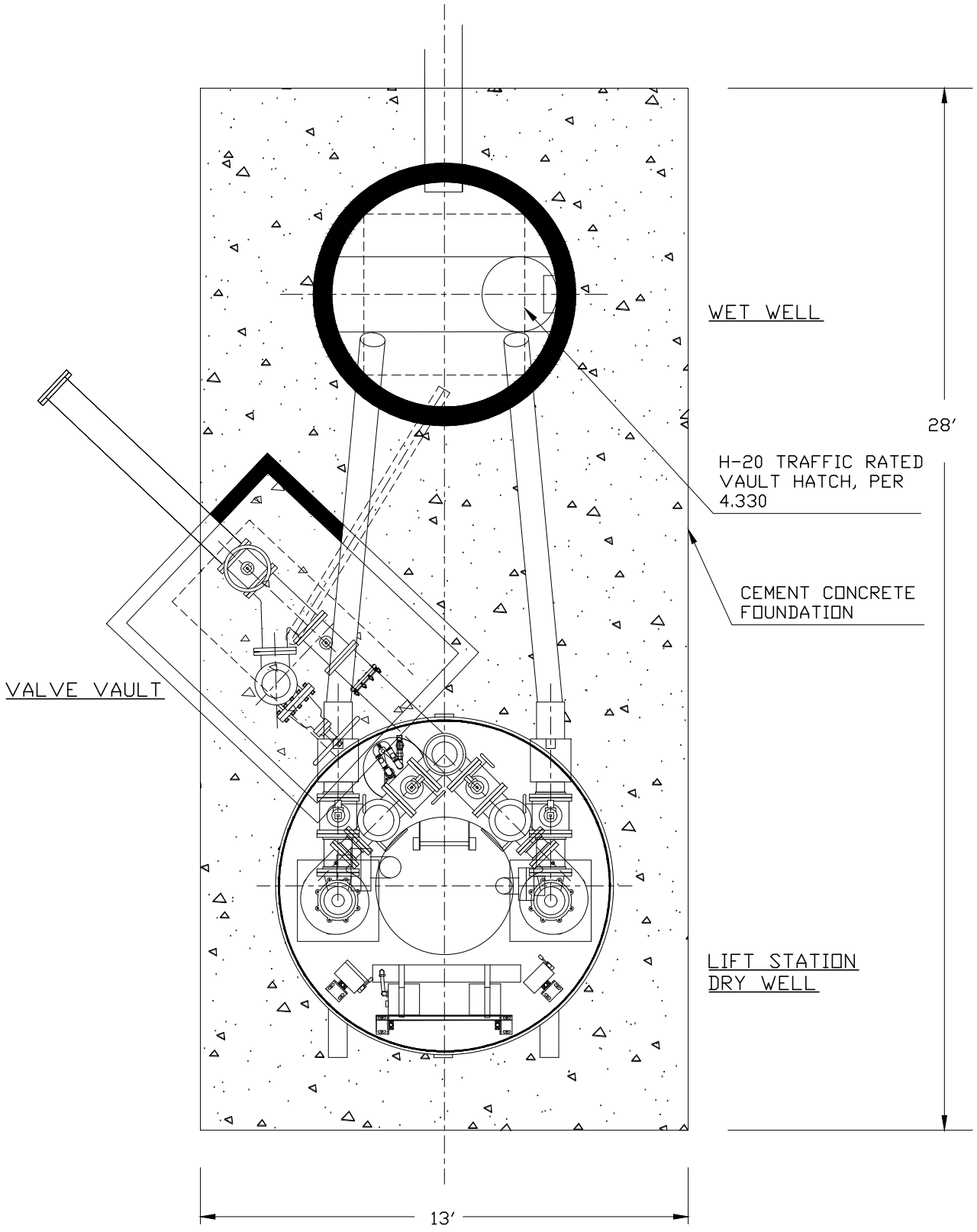


LIFT STATION DRY WELL AND WET WELL PROFILE

APPR. DATE: DATE	REF:	FIG NO: SS-15

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

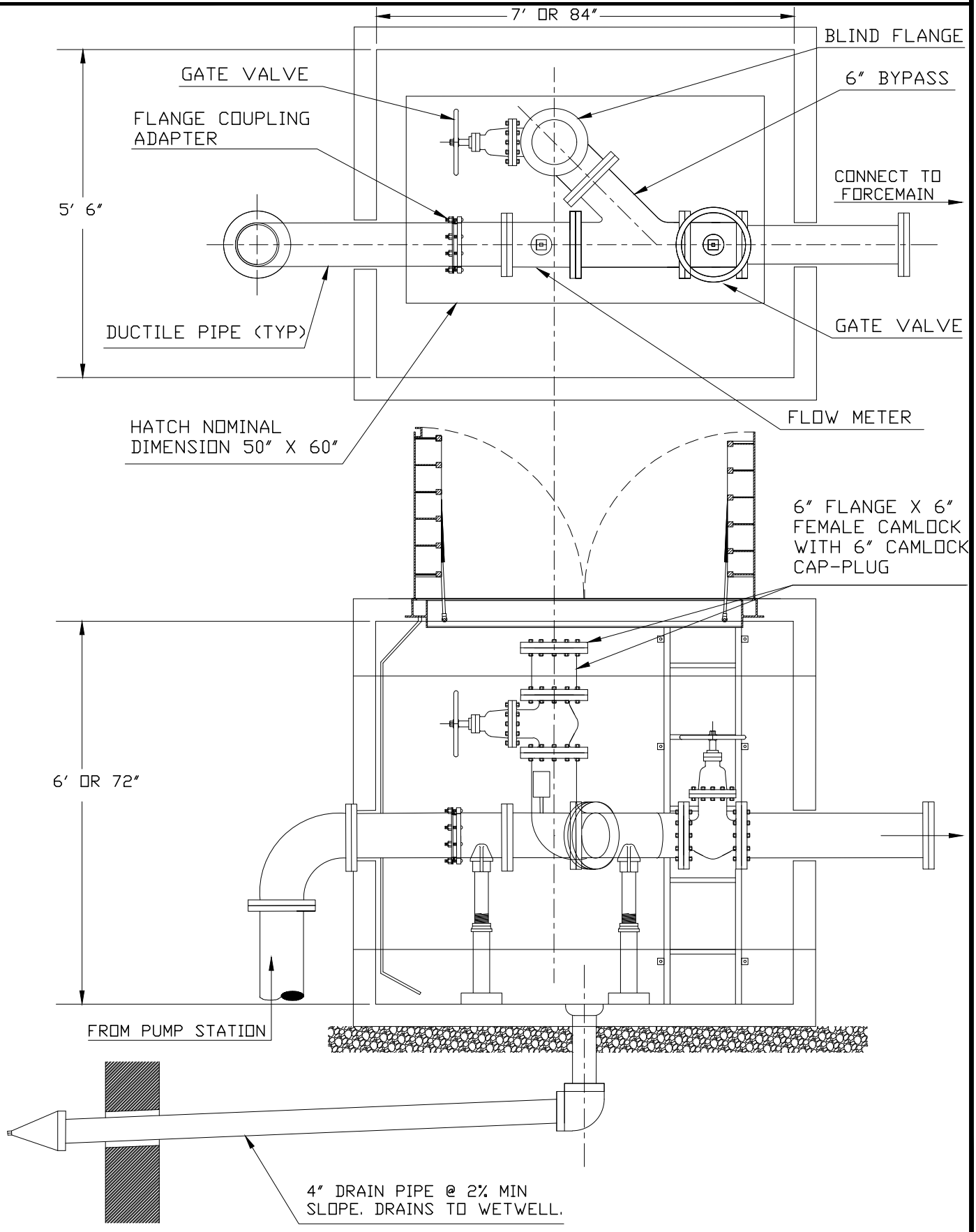


LIFT STATION, TOP VIEW

APPR. DATE: DATE	REF:	FIG NO: SS-16

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

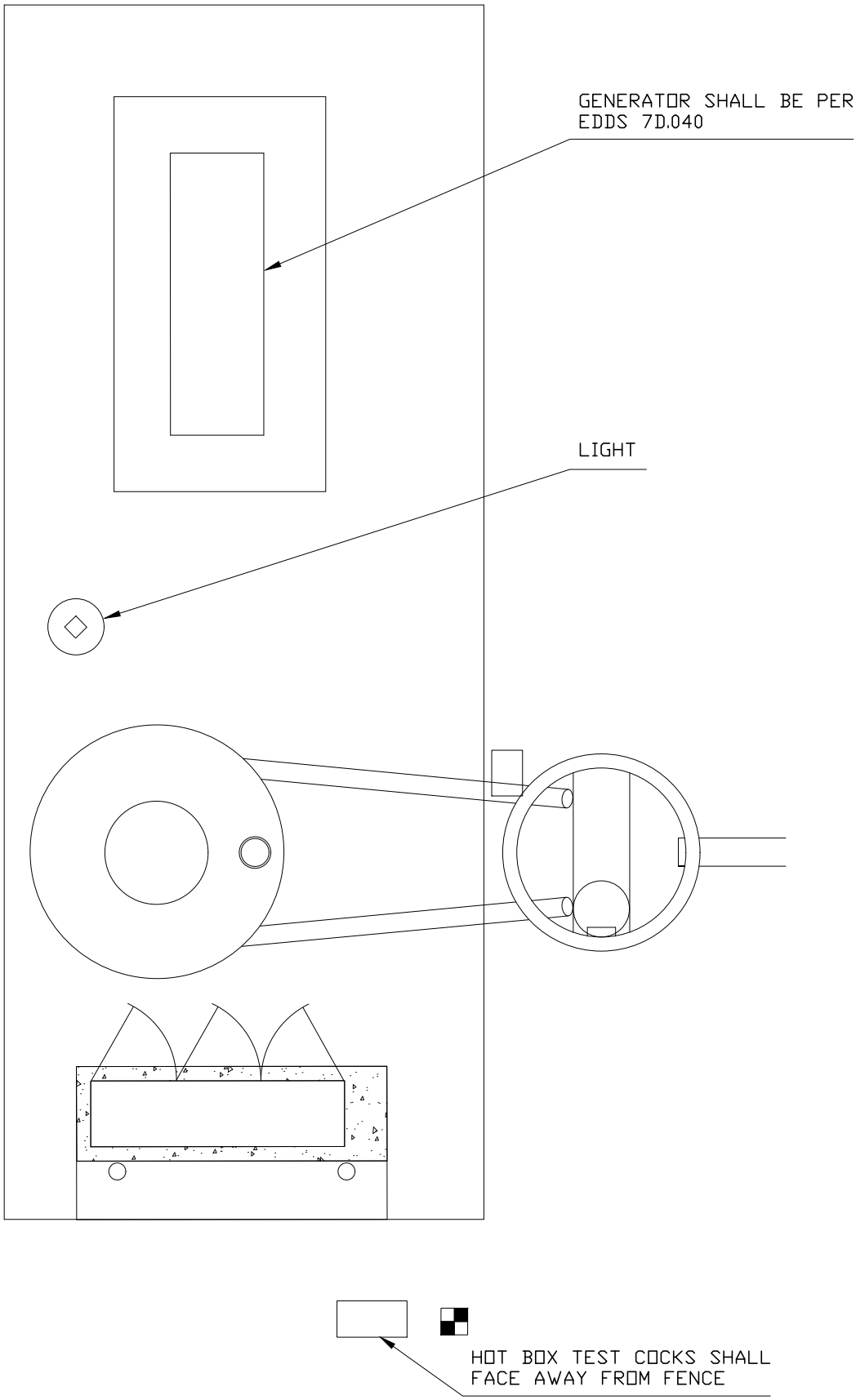


LIFT STATION VALVES VAULT

APPR. DATE: DATE	REF:	FIG NO: SS-17

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

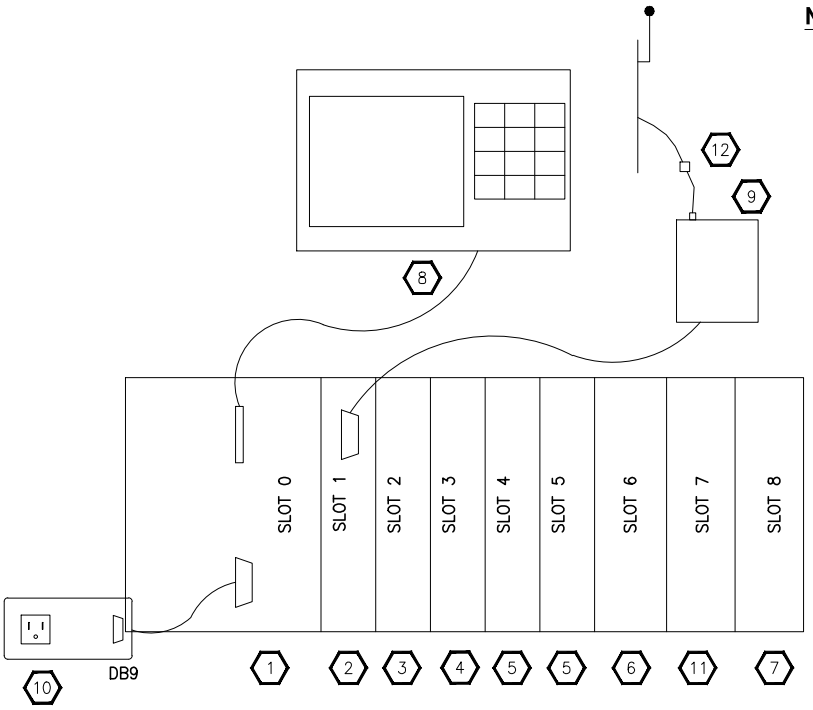


LIFT STATION ELECTRICAL LAYOUT

APPR. DATE: DATE	REF:	FIG NO: SS-18

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

1. INTRUSION DETECTION: MOUNT LIMIT SWITCHES TO ACTUATE WHEN DOOR OR HATCH HAS BEEN OPENED MORE THAN ¼"

PLC I/O CARD TABLE			
I/O	CARD/ POINT	FUNCTION	TYPE
	3/0	0 COMMON	
AI	3/1	WET WELL LEVEL	STATUS
	3/2	FLOW	STATUS
	3/3	P-30610 SPEED	STATUS
	3/4	P-30620 SPEED	STATUS
	3/5	SPARE	
	3/6	GEN FUEL LEVEL	STATUS
	3/7	SPARE	
	3/8	SPARE	
	4/0	COMMON 24V-	
DI	4/1	P-30610 AUTO	STATUS
	4/2	P-30620 AUTO	STATUS
	4/3	P-30610 CHECK VALVE OPEN	STATUS
	4/4	P-30620 CHECK VALVE OPEN	STATUS
	4/5	FIRE DRY WELL	ALARM
	4/6	INTRUSION	ALARM
	4/7	DRY WELL FLOOD	ALARM
	4/8	HIGH WET WELL	ALARM
	5/0	COMMON 24V-	
DI	5/1	GEN AUTO	STATUS
	5/2	GEN RUNNING	STATUS
	5/3	GEN FAIL	ALARM
	5/4	GEN LOW FUEL	ALARM
	5/5	GEN WARNING	ALARM
	** 5/6	ATS NORMAL POSITION	STATUS
	* 5/7	ATS GEN POSITION	STATUS
	5/8	PSE AVAILABLE	STATUS
	6/0	COMMON 24V-	
DO	6/1	P-30610 CALL	CONTROL
	6/2	P-30620 CALL	CONTROL
	6/3		
	6/4		
	6/5		
	6/6	GEN TEST	CONTROL
	6/7		
	6/8		
	7/0	COMMON 24V-	
ISO DI	7/1	VFD 1 FAIL	ALARM
	7/2	VFD 2 FAIL	ALARM
	7/3	P-30610 VFD RUNNING	STATUS
	7/4	P-30620 VFD RUNNING	STATUS
	7/5	DRY WELL LOW AIR FLOW	STATUS
	7/6	FLOW PULSE	STATUS
	7/7		
	7/8		
AO	8/1	P-30610 SPEED REF	CONTROL
	8/2	P-30620 SPEED REF	CONTROL
	8/3		
	8/4		

PLC COMPONENT		
ITEM	DESCRIPTION	PART NUMBER
1	32 BIT CPU, 256K RAM, 512K FLASH, DISPLAY INTERFACE (RUG 9D)	R9CPU
2	MODEM	R9MDM
3	ISOLATED LOOP PWR SUPPLY/CHARGER/DIAGNOSTIC BOARD 24VDC, 160 mA	R9LOOP
4	ANALOG INPUT 8 CHANNEL, 12 BIT	R9AI8
5	DISCRETE INPUT 24VDC	R9DI8
6	DISCRETE OUTPUT 24VDC	R9D08
7	ANALOG OUTPUT 4 CHANNEL 12 BIT	R9A04
8	LCD AND KEY BOARD	2CD2-XX
9	902-928MHZ RADIO, RS232, 12VDC	LANDIS-GYR
10	PANEL FACE SERIAL/POWER W/ FEMALE DB9 CONNECTOR	GRACE PORT
11	DISCRETE INPUT OPTICALLY ISOLATED 24VDC	R9D18ISO
12	SURGE ARRESTOR	POLY PHASER

NOTES:

1. THE FOLLOWING NOTE SHALL BE ADDED TO ALL LIFT STATION PLANS:

   CAGE#-CARD#-POINT# IS REQUIRED LABELING. LABELS MUST BE INSTALLED AT BOTH ENDS OF EACH WIRE: AT THE PLC AND AT THE TERMINAL BLOCKS. AN EXAMPLE LABEL FOR A WIRE HAVING AN INPUT NUMBER OF 7 AND TS SLOT/CARD NUMBER IS 4 WOULD BE LABELED "SLOT4 POINT7" IN TWO LINES OF TEXT.

2. PRIOR TO ORDERING AND WIRING OF TELEMETRY COMPONENTS, THE CONTRACTOR WILL CONTACT THURSTON COUNTY'S DEPARTMENT OF PUBLIC WORKS AT 360-867-2300.

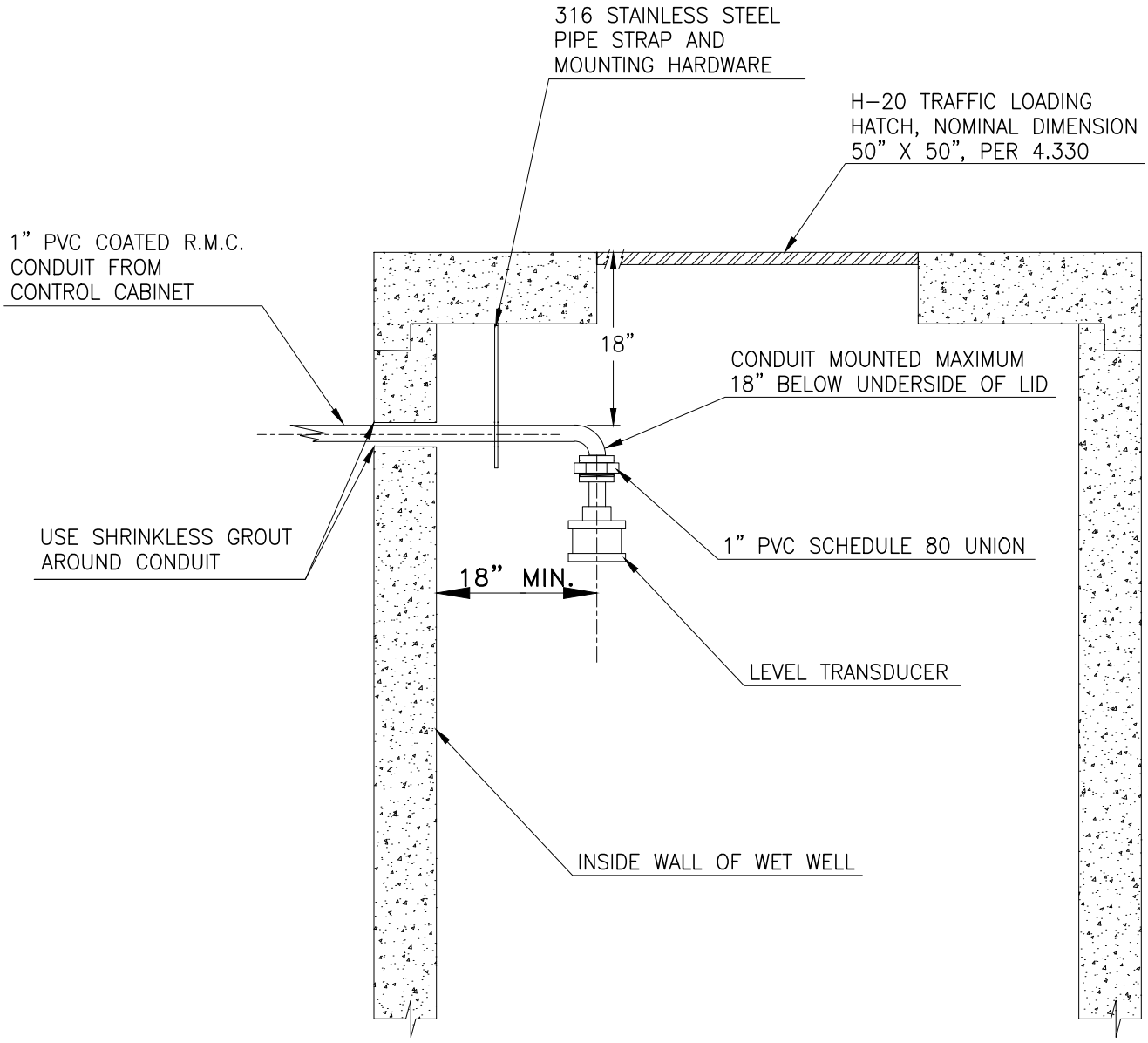
* GENERATOR POWER AVAILABLE
** STATION POWER AVAILABLE

LIFT STATION PLC TELEMETRY PANEL

APPR. DATE: DATE	REF:	FIG NO: SS-19

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

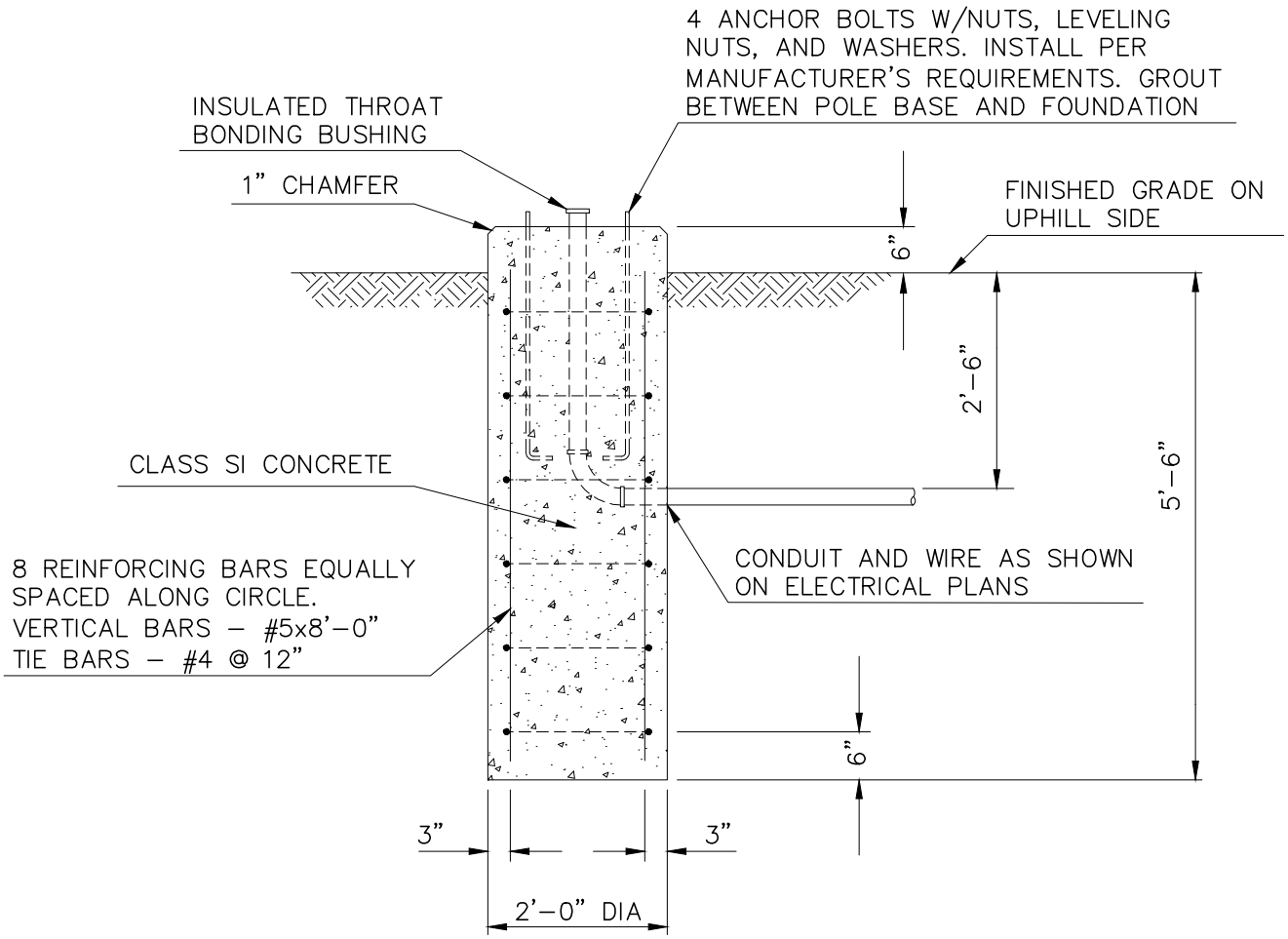


ULTRASONIC LEVEL SENSOR AND MOUNTING

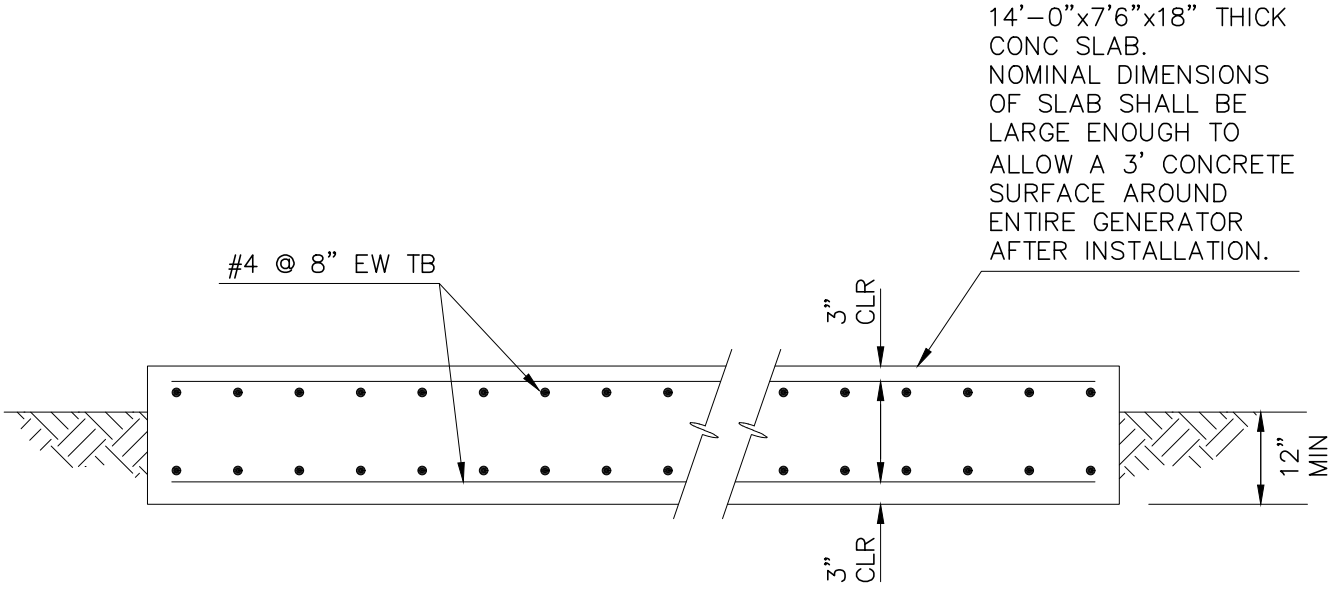
APPR. DATE: DATE	REF:	FIG NO: SS-20

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



LIGHTING FIXTURE FOUNDATION DETAIL



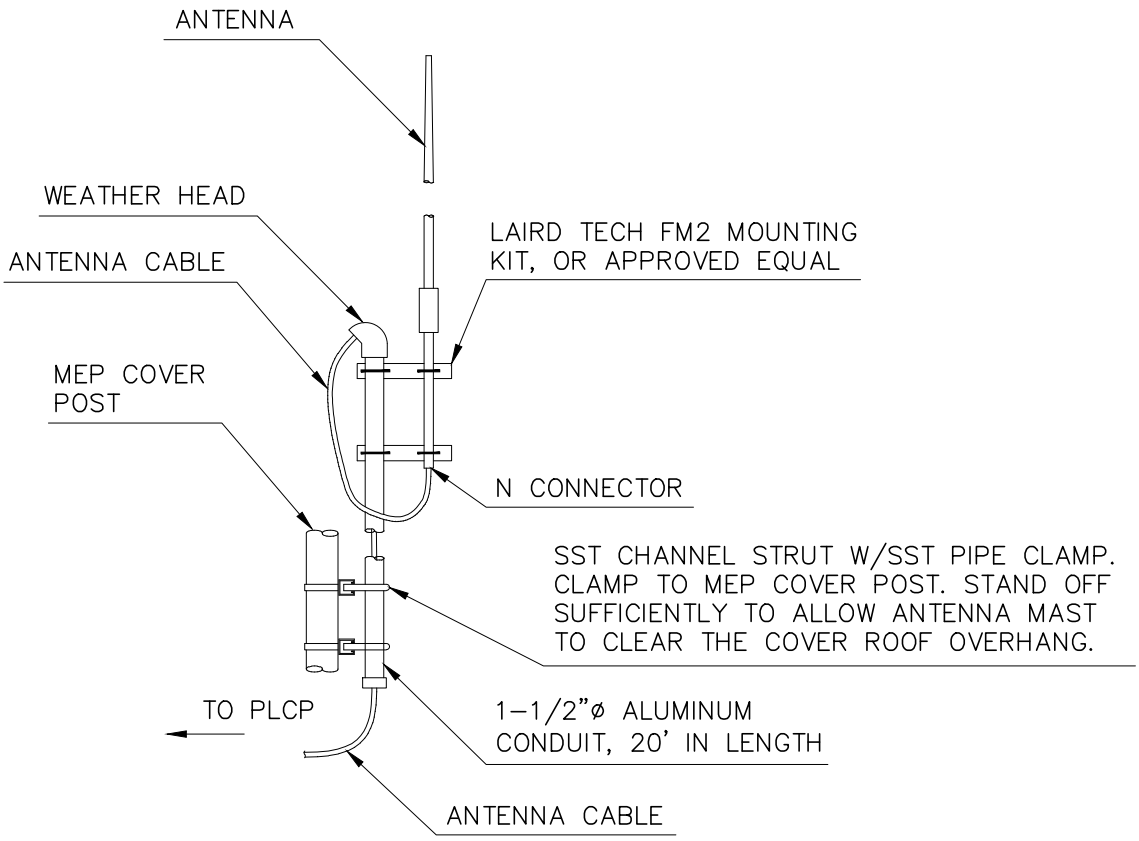
GENERATOR PAD DETAIL

LIFT STATION MISC DETAILS

APPR. DATE: DATE	REF:	FIG NO: SS-21

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



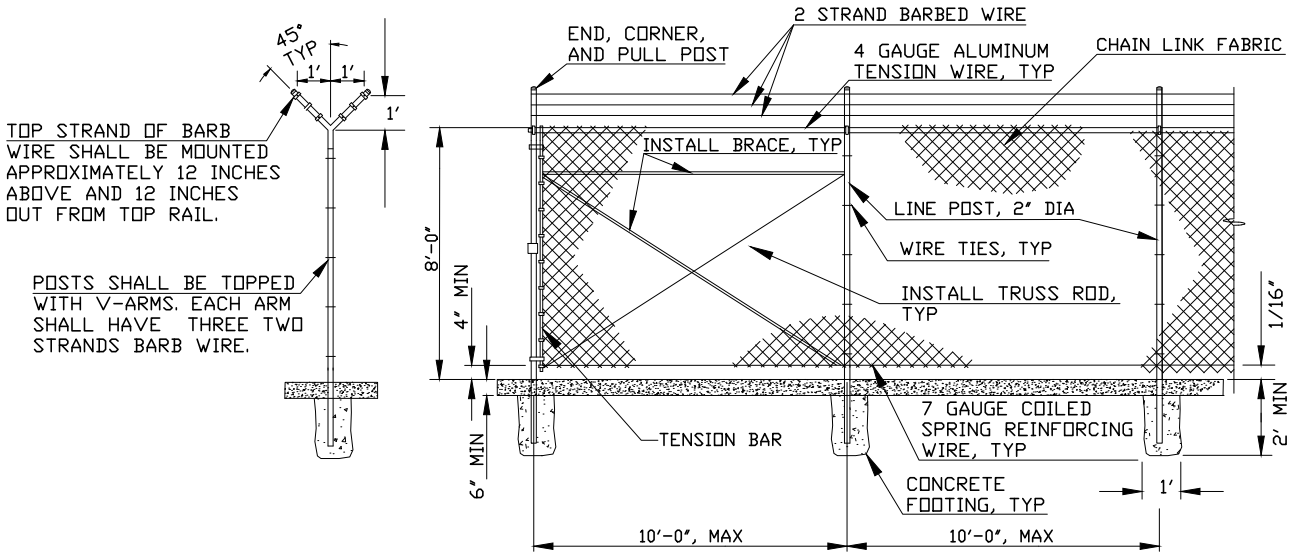
ANTENNA DETAIL

LIFT STATION ANTENNA DETAIL

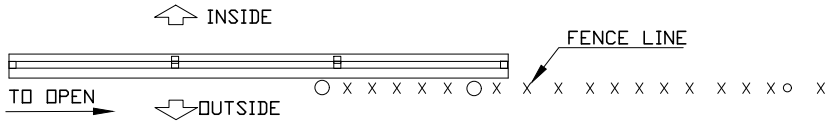
APPR. DATE: DATE	REF:	FIG NO: SS-22

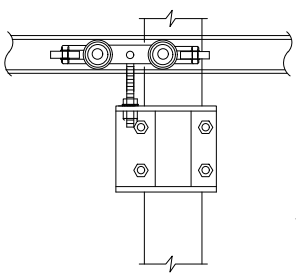
Source; City of Olympia

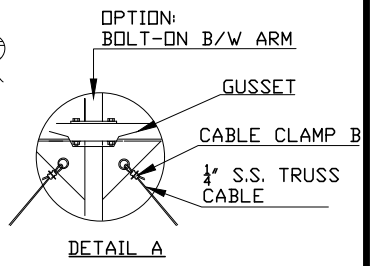
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

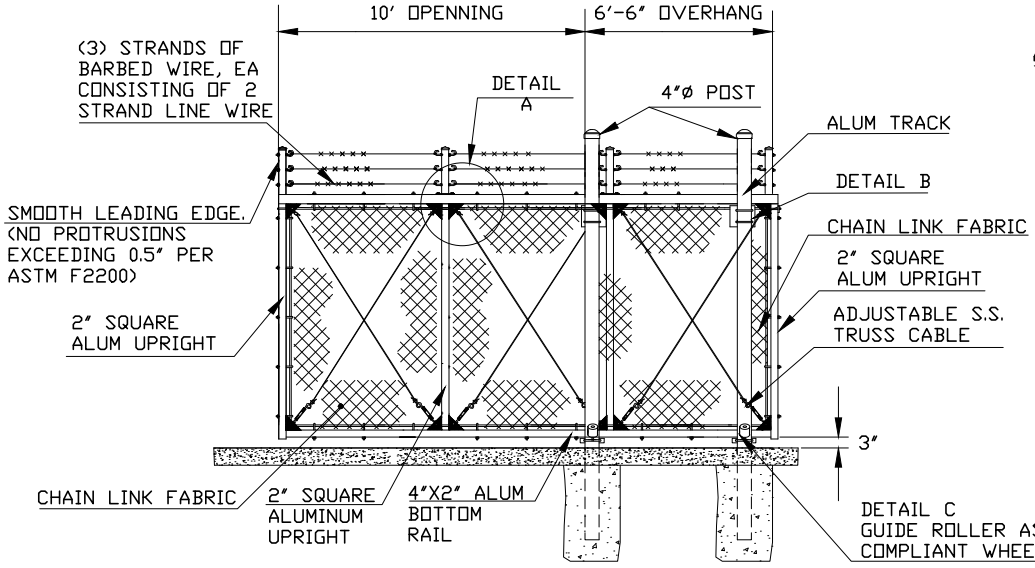


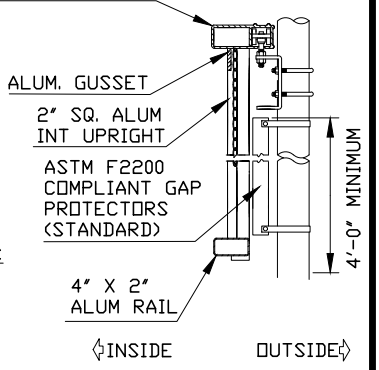
CHAIN LINK FENCE DETAILS











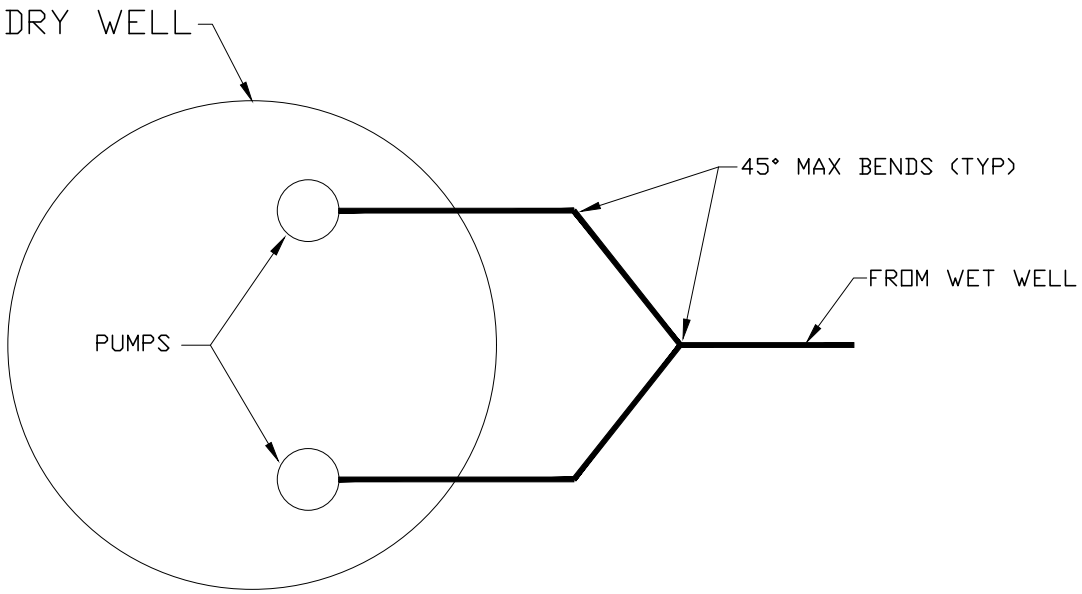
CANTILEVER SLIDING GATE DETAILS

LIFT STATION FENCE DETAILS

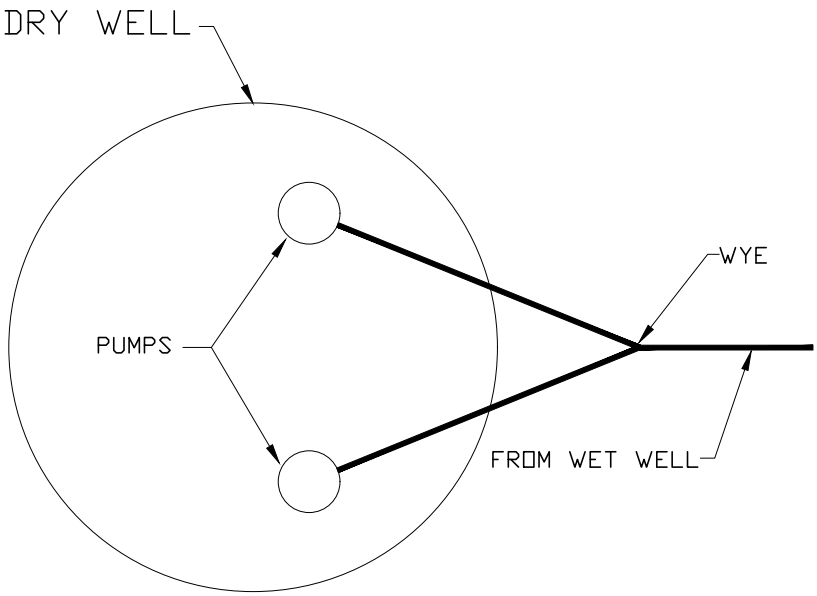
APPR. DATE: DATE	REF:	FIG NO: SS-23

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



ALTERNATIVE "B"



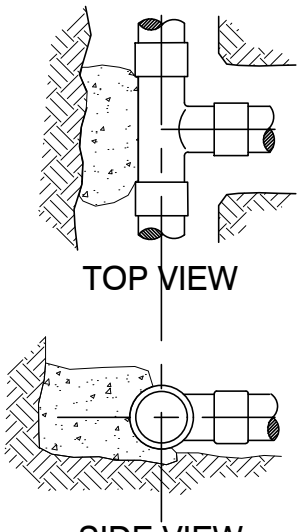
ALTERNATIVE "A"

LIFT STATION INLET LAYOUT

APPR. DATE: DATE	REF:	FIG NO: SS-24

Source; City of Olympia

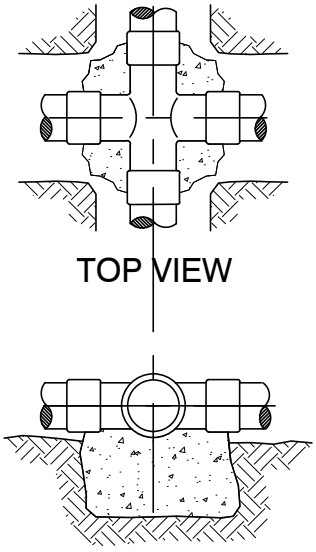
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



TOP VIEW

SIDE VIEW

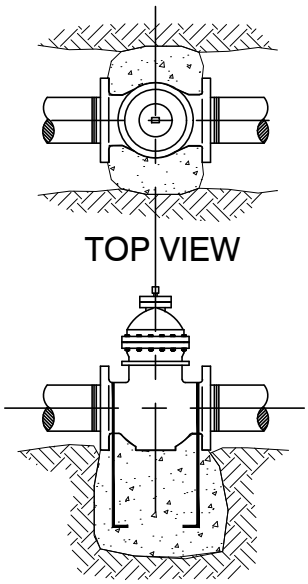
TEE



TOP VIEW

SIDE VIEW

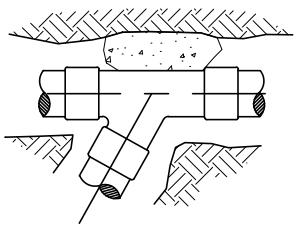
CROSS



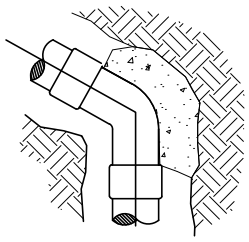
TOP VIEW

SIDE VIEW

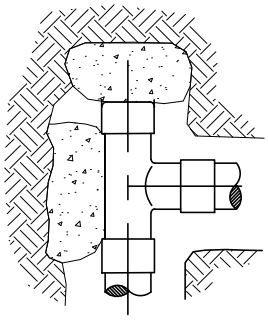
GATE VALVE



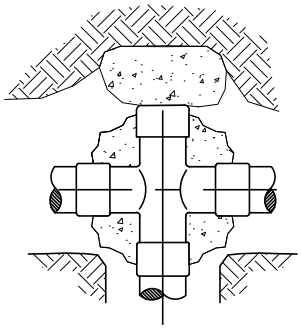
WYE



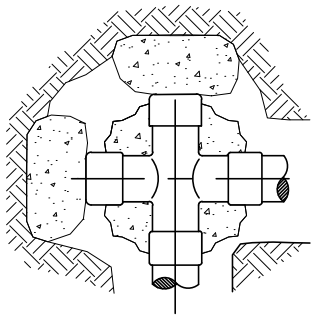
HORIZ. BEND



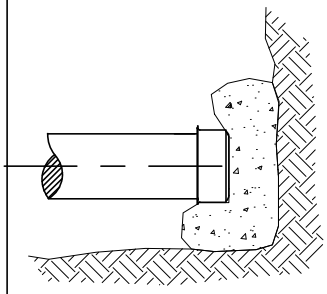
TEE WITH PLUG



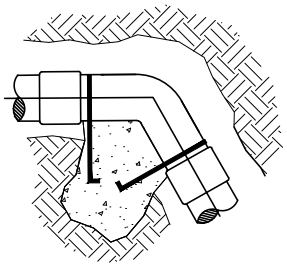
CROSS WITH PLUG



CROSS WITH PLUGS



PLUG OR CAP



45° - 90° VERTICAL BEND

NOTES:

1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. PLASTIC BARRIER SHALL BE PLACED BETWEEN ALL CONC THRUST BLOCKS & FITTINGS.
3. ANCHOR REBAR SHALL BE #5 ON 12" DIA AND LESS IMBEDDED 30", #5 ON 16"–24" DIAMETER IMBEDDED 36".
4. PLUGS TO BE MINIMUM OF 5' FROM TEE, WYE, CROSS ON VALVE.

STANDARD BLOCKING DETAIL

APPR. DATE: DATE	REF:	FIG NO: SS-25

Source; City of Olympia

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22–1/2° BEND	11–1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:

1. BLOCKING SHALL BE COMMERCIAL CONCRETE POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.

2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):

   EXAMPLE : 12" – 90° BEND IN SAND AND GRAVEL
   32,000 LBS ÷ 3000 LB/S.F. = 10.7 S.F. OF AREA

3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.

4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

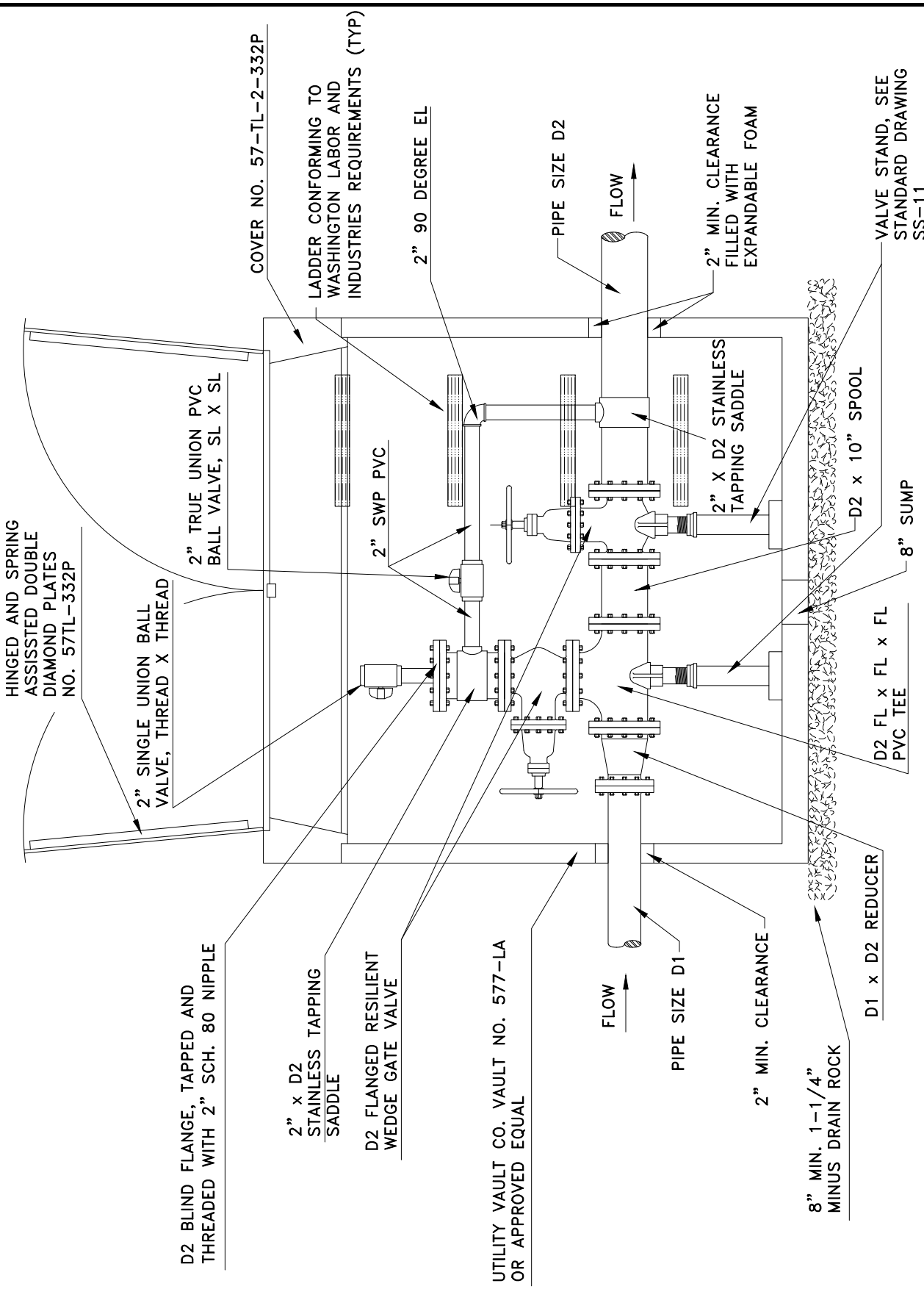
SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

THRUST LOADS

APPR. DATE: DATE	REF:	FIG NO: SS-26

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



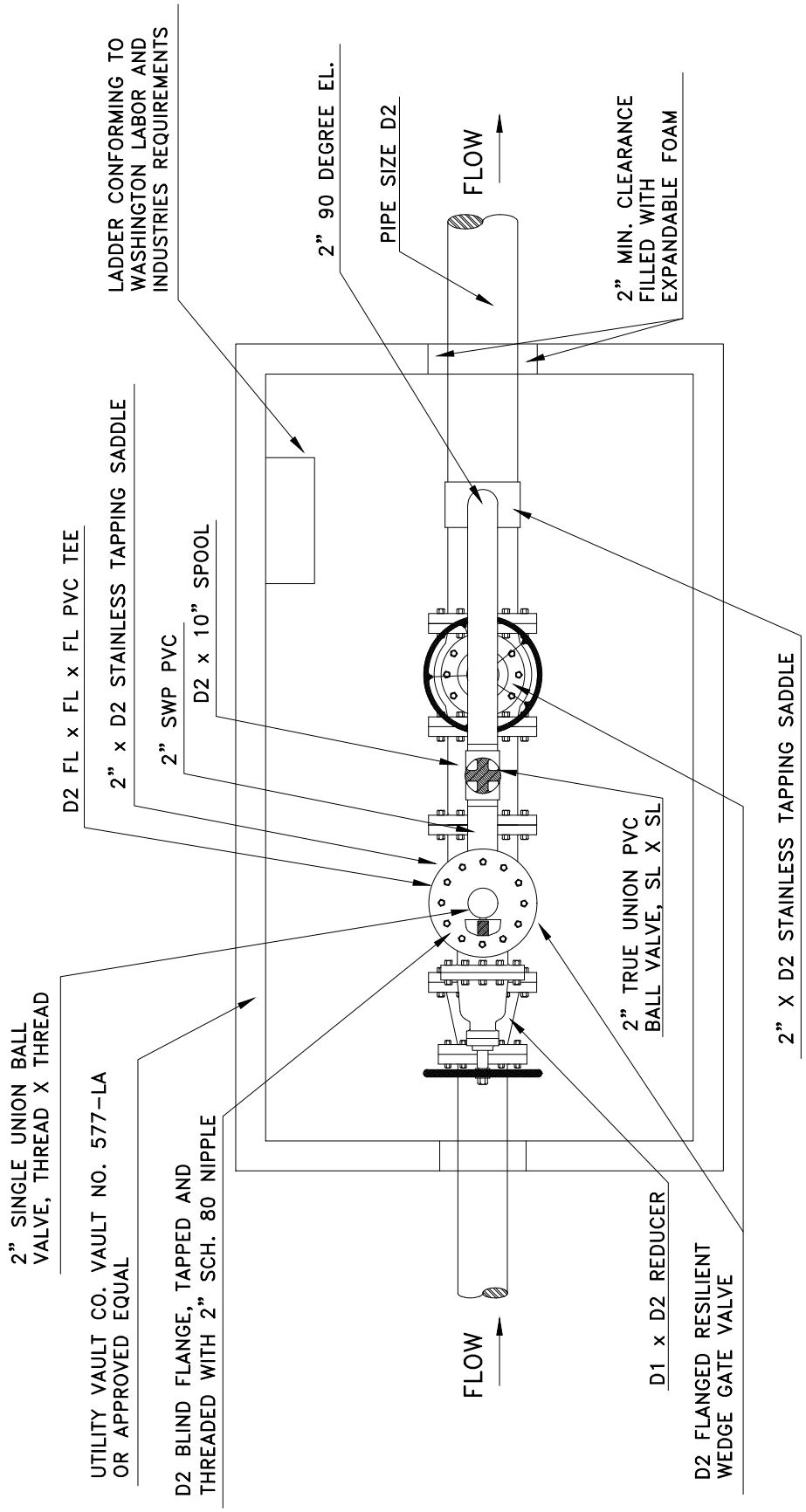
NOTES:
1. THE GATE VALVES SHALL BE RESTRAINED TO VAULT TO PREVENT MOVEMENT DUE TO THRUST FORCE.
2. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE EPOXY COATED.

PIG PORT CROSS SECTION

APPR. DATE:		FIG NO:	SS-27

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

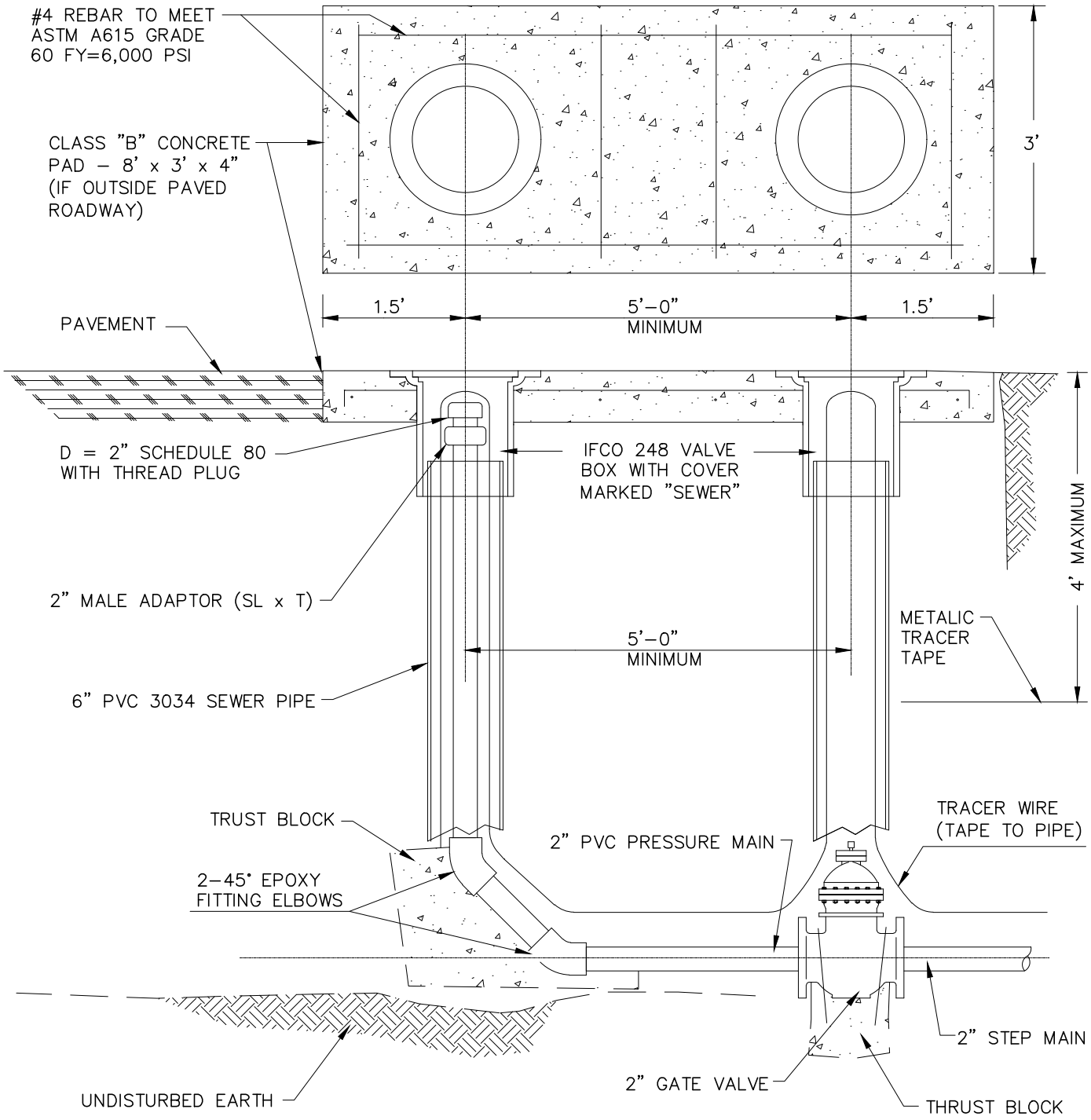


PIG PORT PLAN VIEW

APPR. DATE:		FIG NO:	SS-28

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

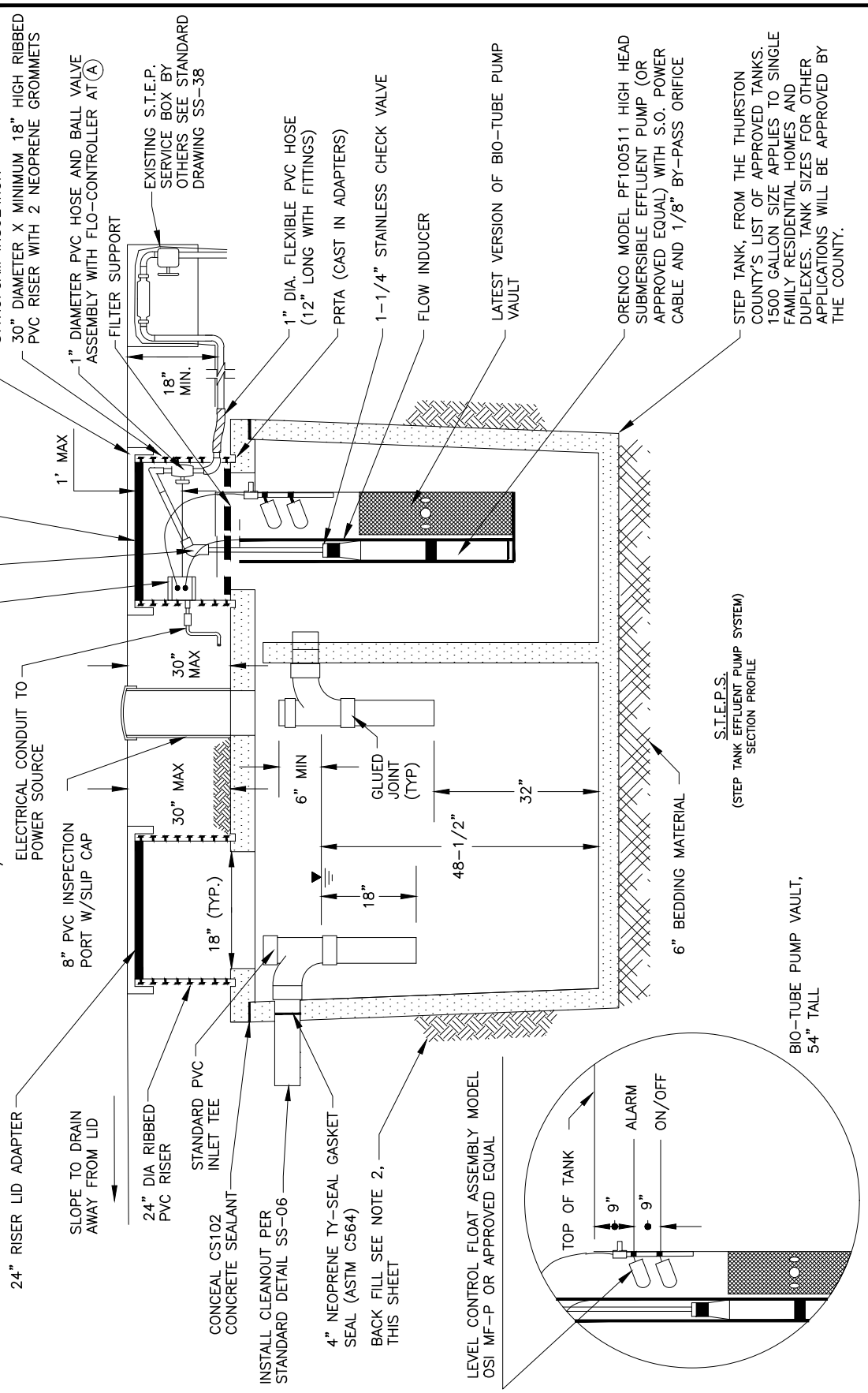
1. A PIG PORT DETAIL SHALL BE SUBMITTED TO THE COUNTY FOR APPROVAL BY THE DIRECTOR OF PUBLIC WORKS WHEN USED WITH STEP MAINS LARGER THAN 2".
2. FOR STEP MAINS LARGER THAN 2", INSTALL BLIND FLANGE WITH A 2" TAP AND PLUG.

TERMINUS PIG LAUNCH PORT

APPR. DATE:		FIG NO:	SS-29

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



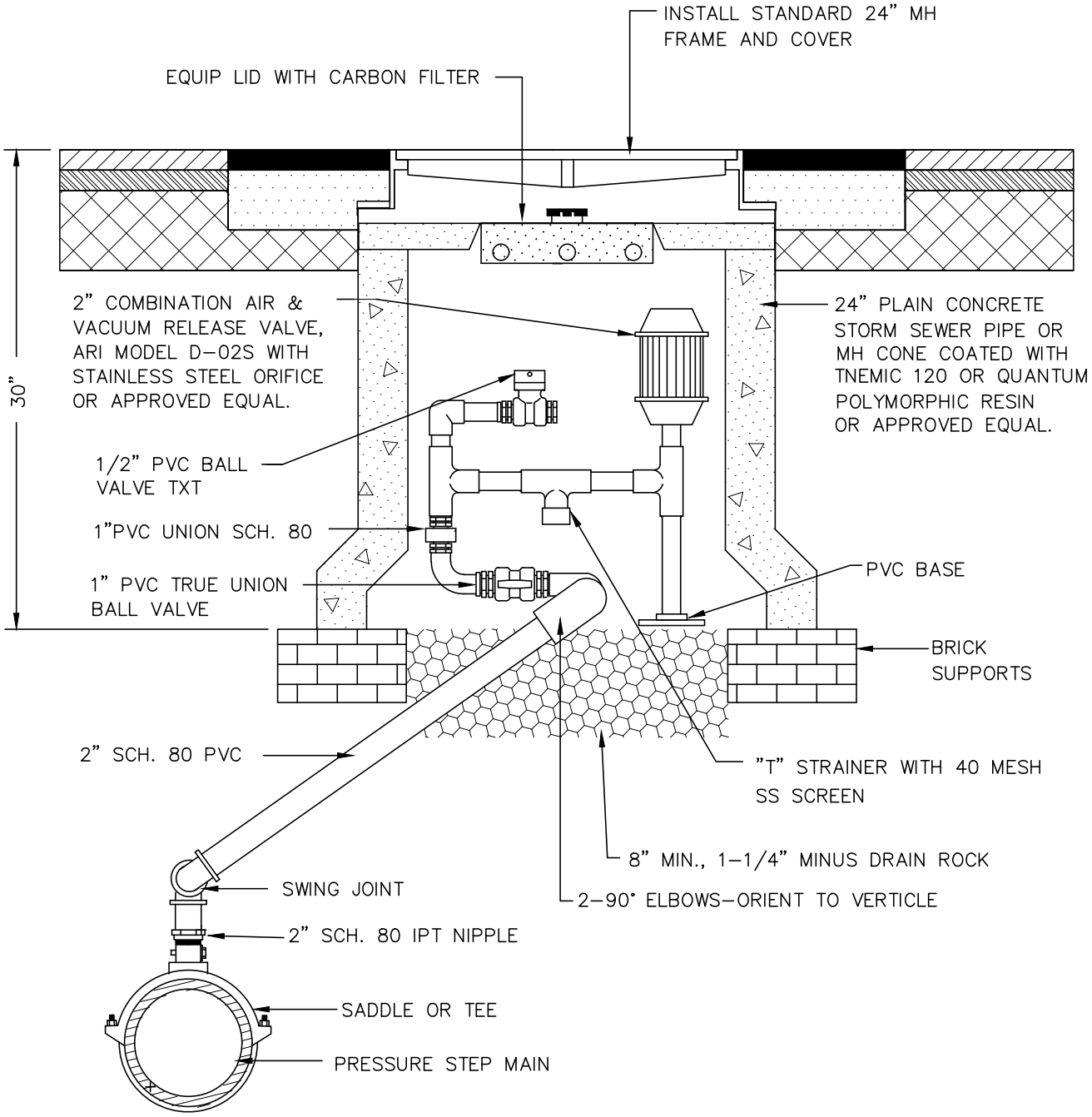
NOTES:
1. TANK SHALL BE BEDDED ON 6" SAND OR PEA GRAVEL.
2. BACK FILL AGAINST SIDE SHALL BE COMPACTED IN 6" LIFTS TO THE SAME OR GREATER COMPACTION THAN THE SURROUNDING AREA.
3. RATIO OF TANK COMPARTMENT VOLUMES SHALL BE 2:1 (INLET:OUTLET).
4. THE TANKS SHALL BE DESIGNED WITH FOR THE FOLLOWING LOADING: TOP SLAB-1000 P.S.F., WHEEL LOAD-400 P.S.F., SOIL LOAD LATERAL LOAD-62.4 P.C.F., HYDROSTATIC SOIL BEARING-1000 P.S.F. ASSUMED.
5. THESE REQUIREMENTS MAY CHANGE FOR H-20 LOADING. SEE SECTION 4.460 FOR TANK DESIGN.

1500 GALLON S.T.E.P. SEPTIC TANK

APPR. DATE:		FIG NO: SS-30

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTE:

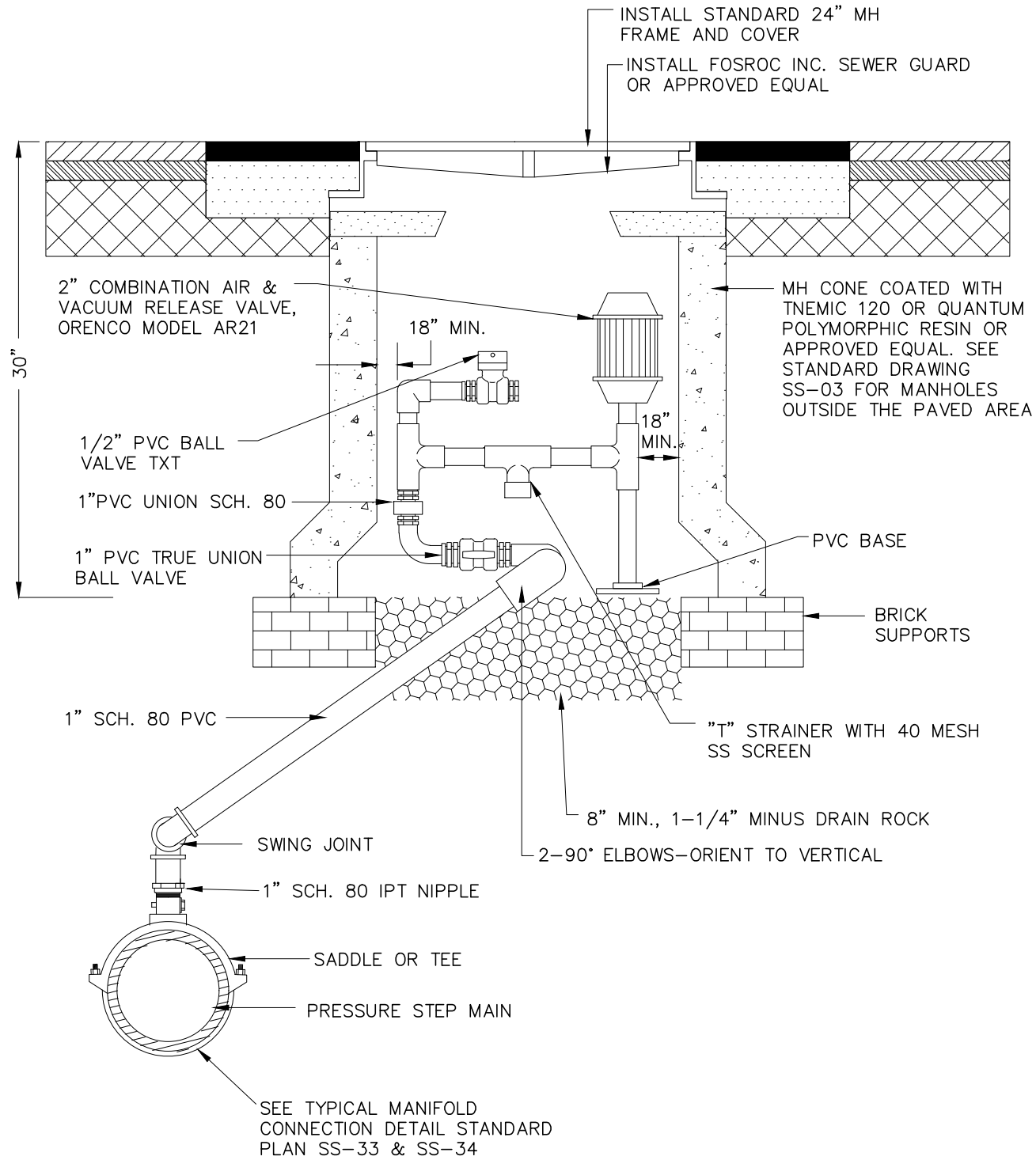
1. LOCATE AIR RELEASE ASSEMBLY IN SIDEWALK WHEN POSSIBLE.

2" AIR RELEASE ASSEMBLY

APPR. DATE: DATE	REF:	FIG NO: SS-31

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



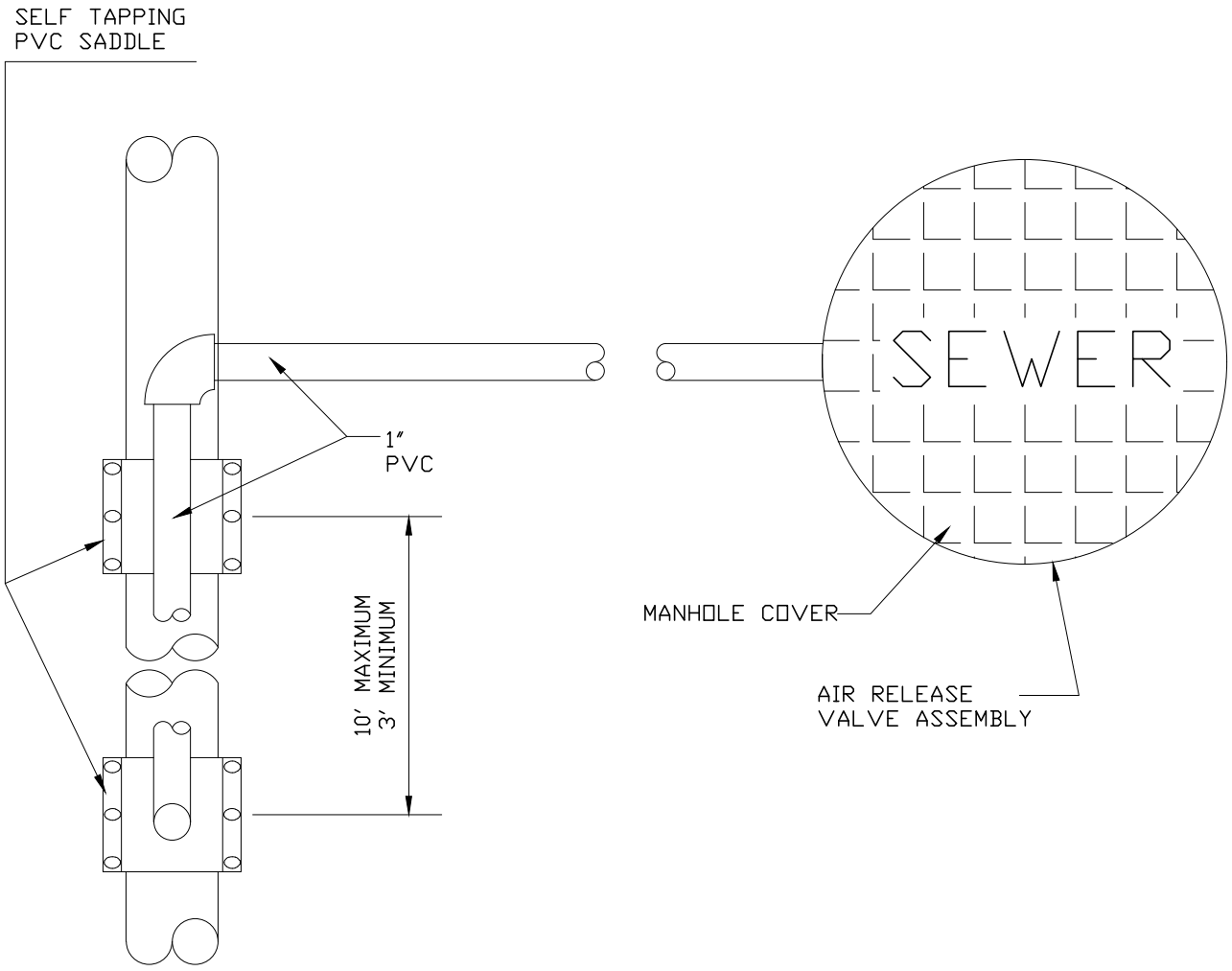
NOTE:
1. SEE ALSO STANDARD DRAWINGS SS-33 AND SS-34.

S.T.E.P. SYSTEM AIR RELEASE ASSEMBLY

APPR. DATE:		FIG NO:	SS-32

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



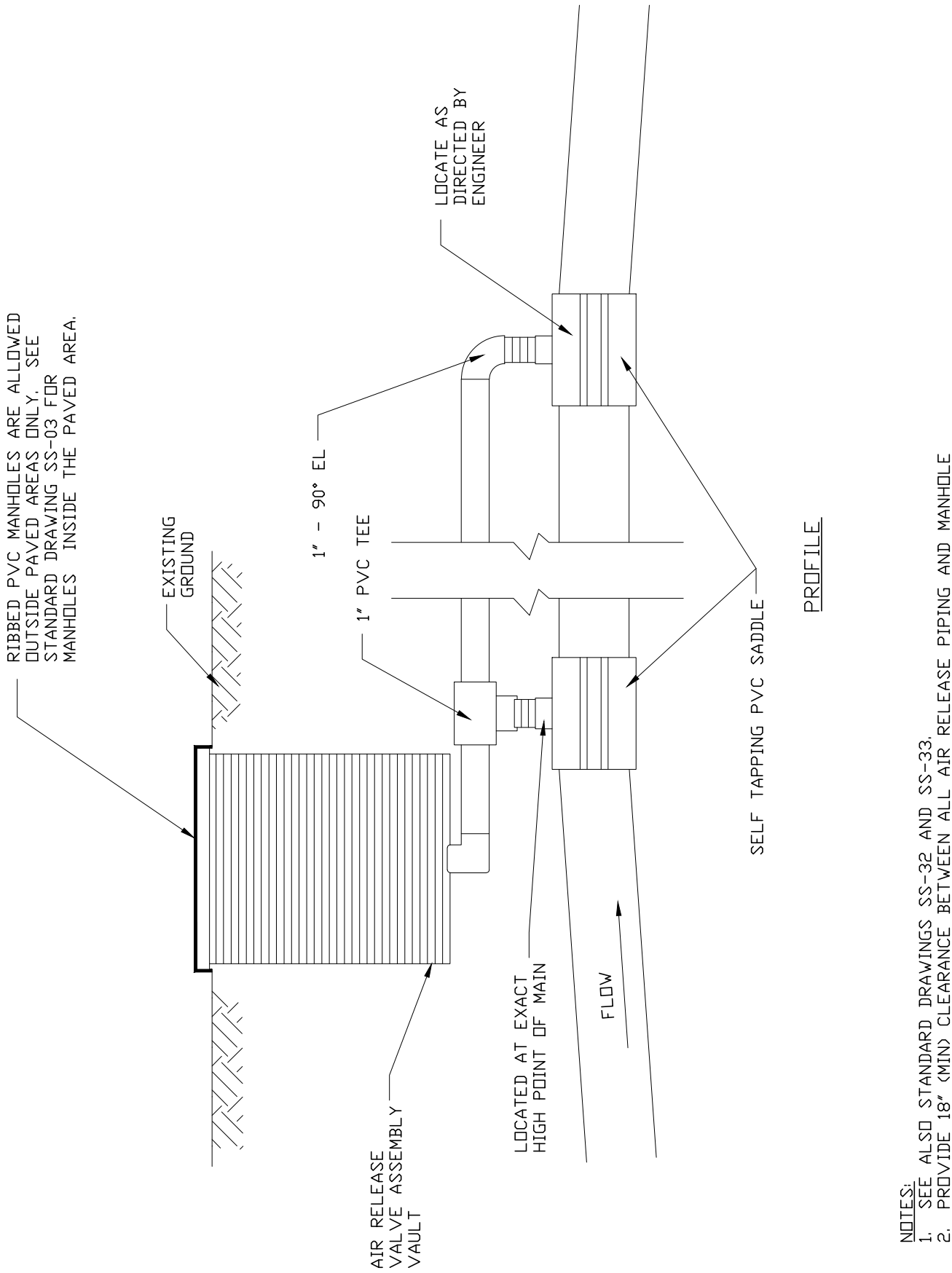
NOTE:
1. SEE ALSO STANDARD DRAWINGS SS-32 AND SS-34

TYPICAL S.T.E.P. AIR RELEASE MANIFOLD CONNECTION PLAN DETAIL

APPR. DATE:		FIG NO:	SS-33

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

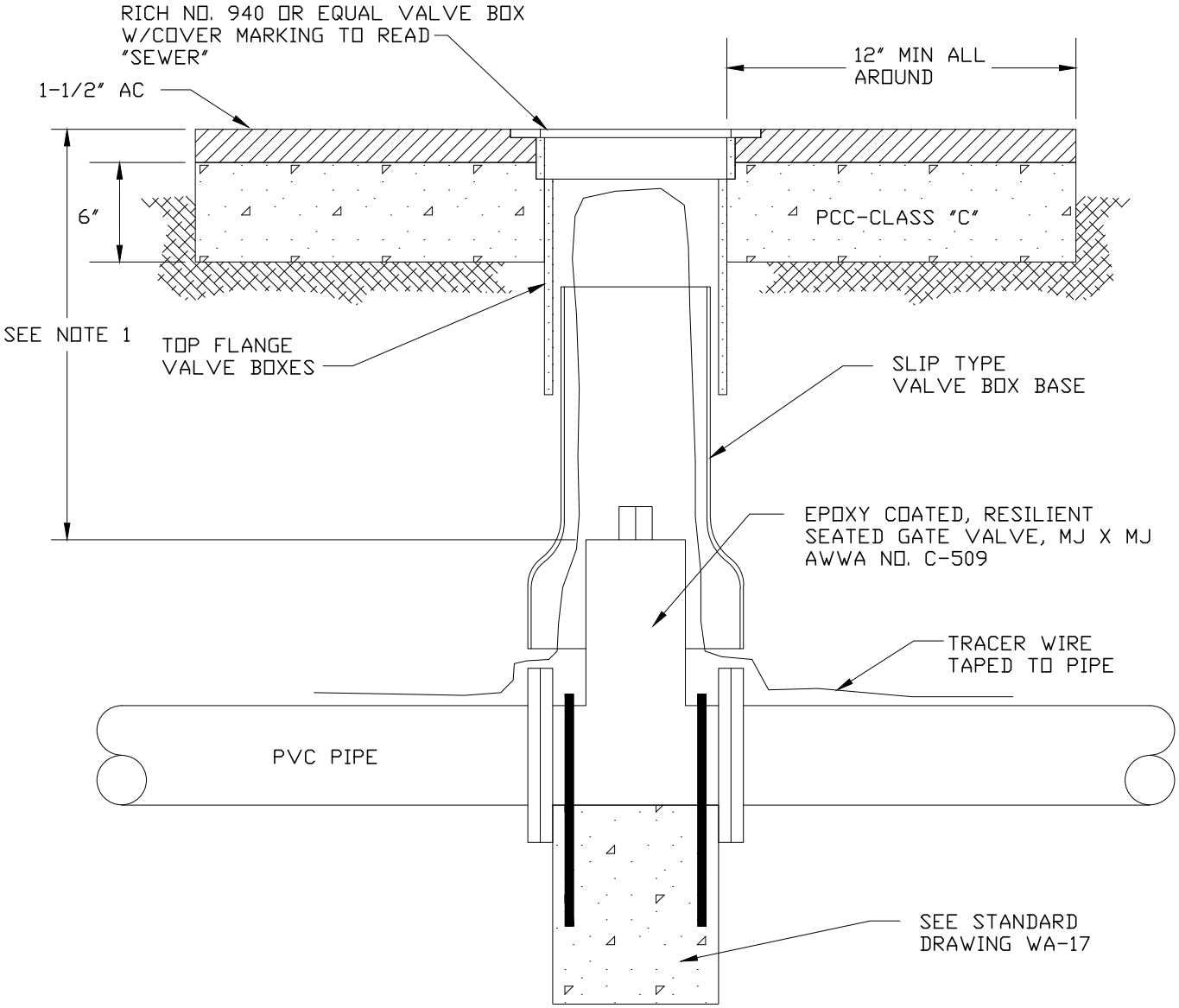


TYPICAL S.T.E.P. AIR RELEASE MANIFOLD CONNECTION SECTION VIEW

APPR. DATE:		FIG NO:	SS-34

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



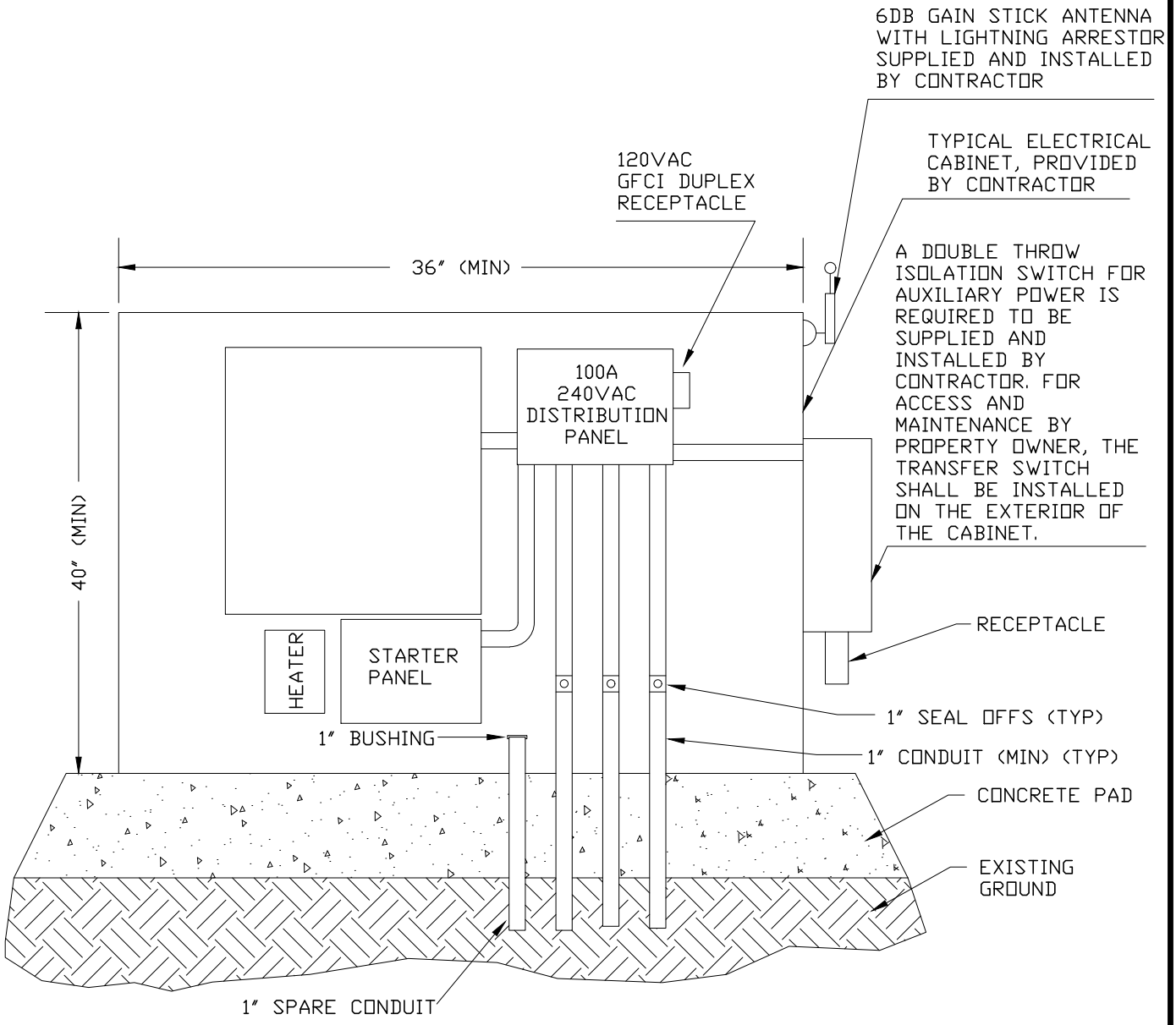
NOTE:
1. DEPTHS GREATER THAN 4' MUST BE APPROVED BY THE COUNTY

TYPICAL S.T.E.P. MAIN/FORCE GATE VALVE 2" OR GREATER

APPR. DATE:		FIG NO:	SS-35

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



NOTES:

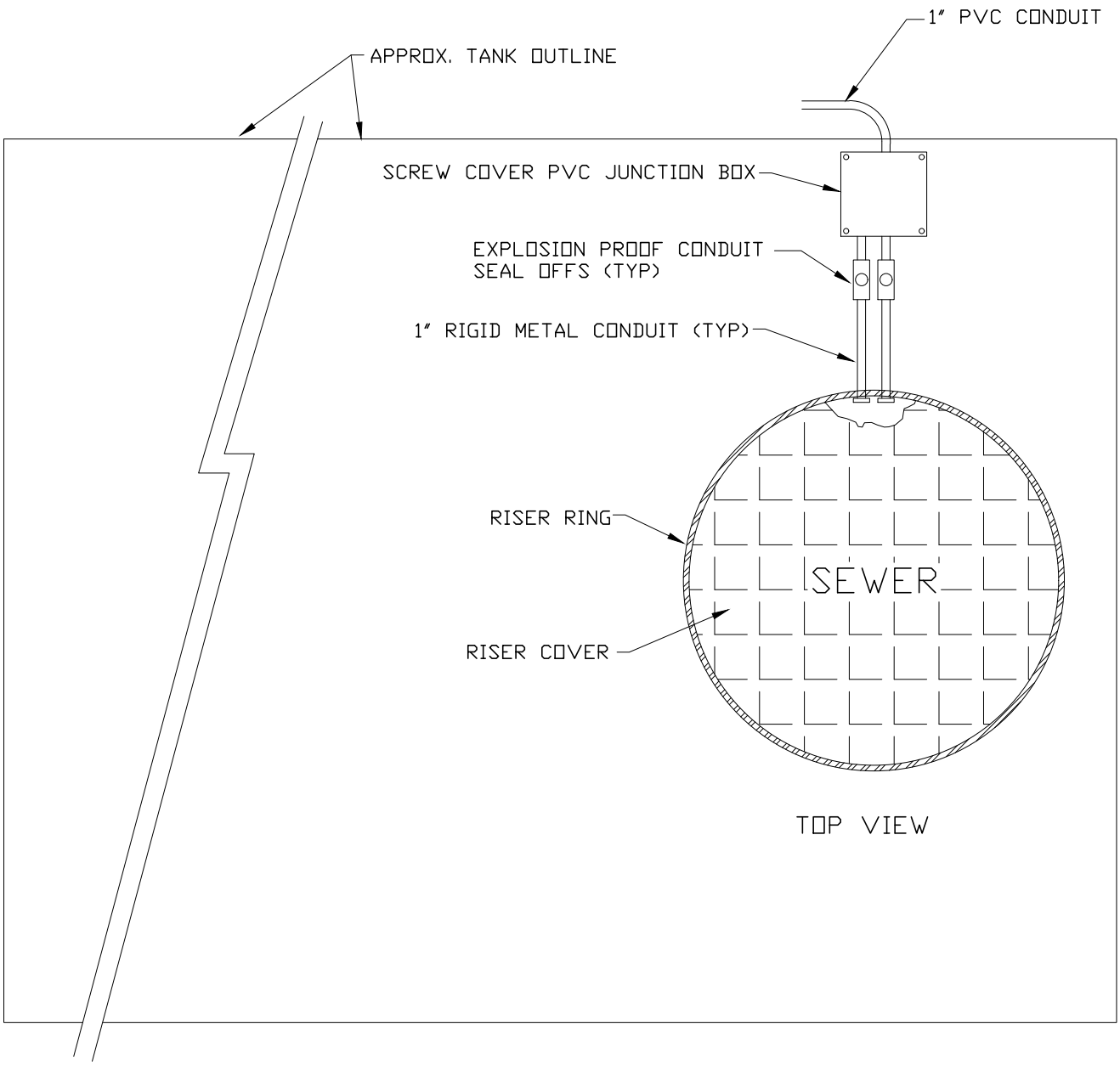
1. THE CONTRACTOR SHALL CONTACT THURSTON COUNTY DEPARTMENT OF PUBLIC WORKS FOR COMPLETE ORDERING SPECIFICATIONS FOR PUMP CONTROL SYSTEM AND TELEMETRY.

COMMERCIAL/MULTI-FAMILY S.T.E.P. SYSTEM ELECTRICAL CABINET LAYOUT

APPR. DATE:		FIG NO:	SS-36

Source; City of Olympia

THURSTON COUNTY SANITARY SEWERSTANDARD DETAIL



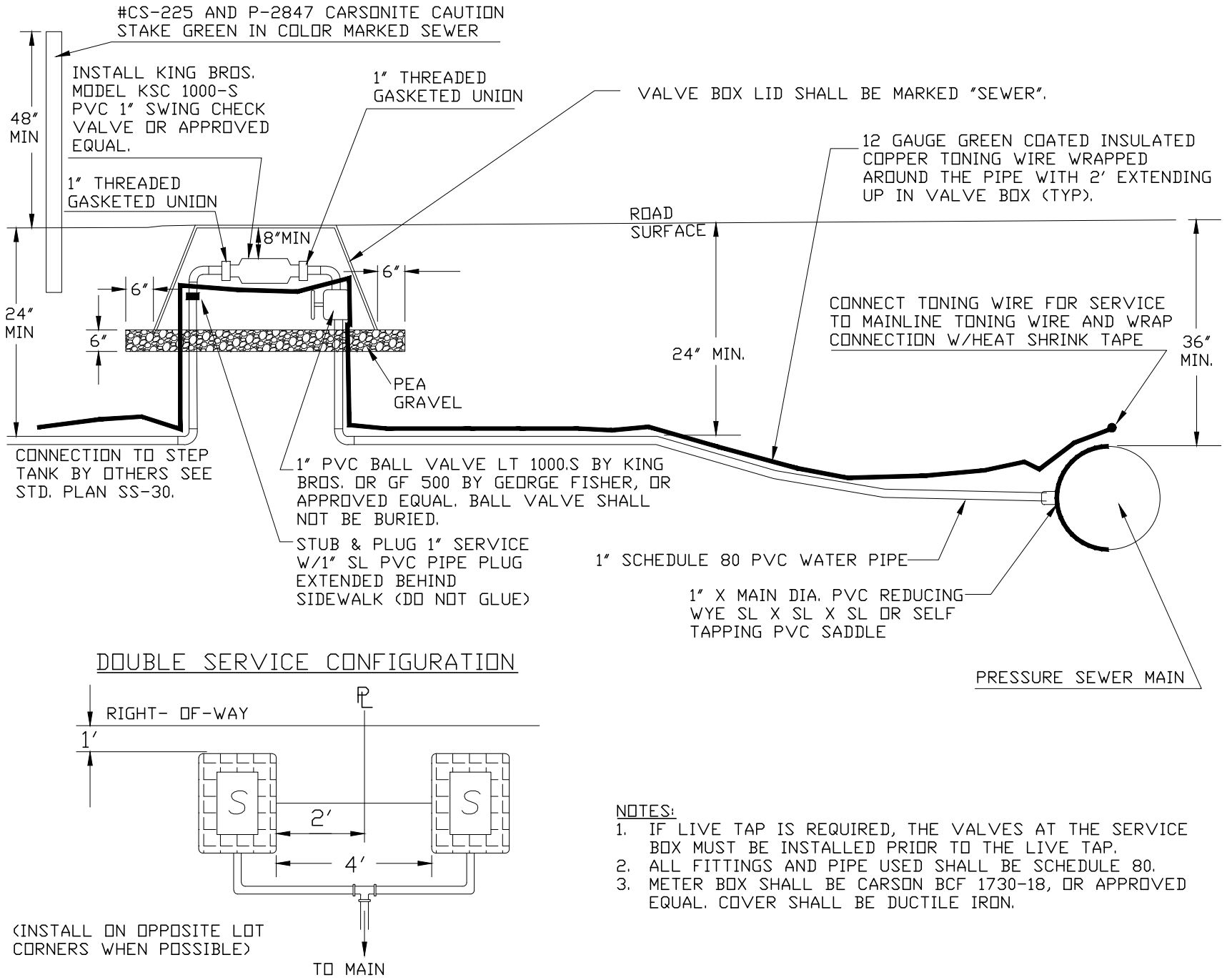
TYPICAL RISER CONDUIT PLAN FOR
COMMERCIAL/MUTI-FAMILY STEP SYSTEM

APPR. DATE:		FIG NO: SS-37

Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

TYPICAL S.T.E.P. SYSTEM SERVICE CONNECTION



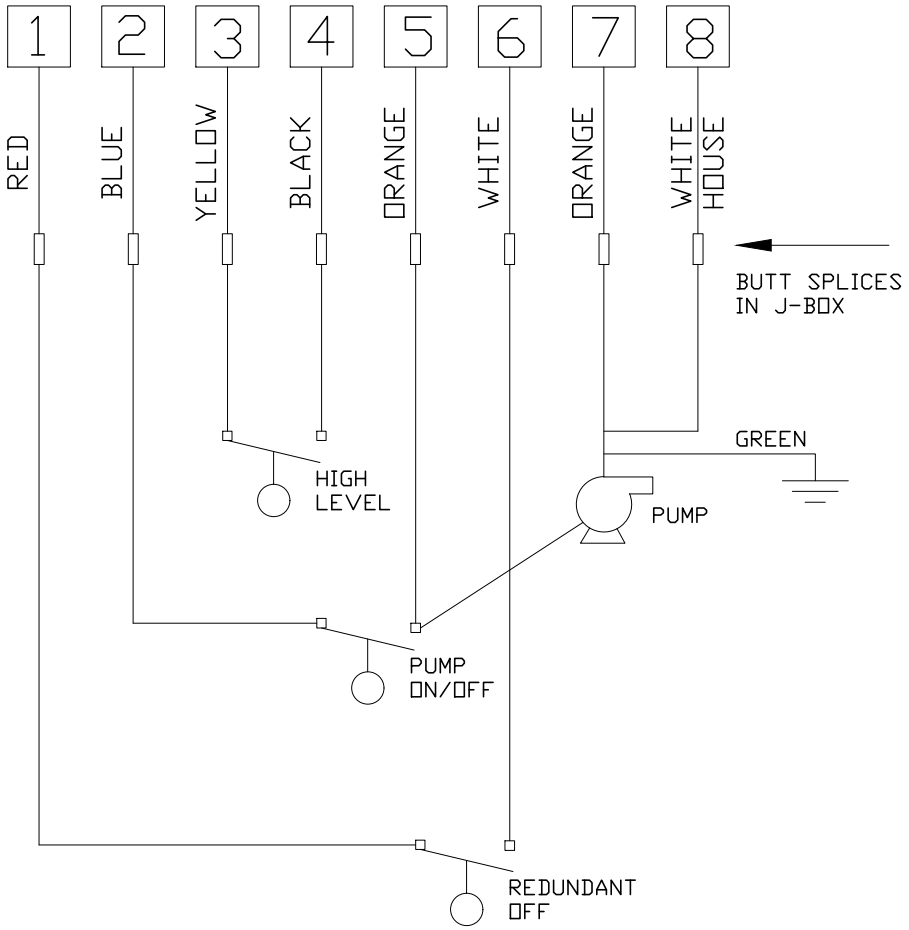
DOUBLE SERVICE CONFIGURATION

NOTES:
1. IF LIVE TAP IS REQUIRED, THE VALVES AT THE SERVICE BOX MUST BE INSTALLED PRIOR TO THE LIVE TAP.
2. ALL FITTINGS AND PIPE USED SHALL BE SCHEDULE 80.
3. METER BOX SHALL BE CARSON BCF 1730-18, OR APPROVED EQUAL. COVER SHALL BE DUCTILE IRON.

APPR. DATE:
DATE
REF:
FIG NO: SS-38

Source: City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



..\..\..\Users\mskinner\Desktop\WIRING.JPG

SAMPLE WIRING (PRINT IN COLOR)

NOTE:
1. CONTRACTOR SHALL PULL WIRES FROM JBOX TO PANEL FOR A REDUNDANT OFF FLOAT, BUT NOT CONNECT A FLOAT.

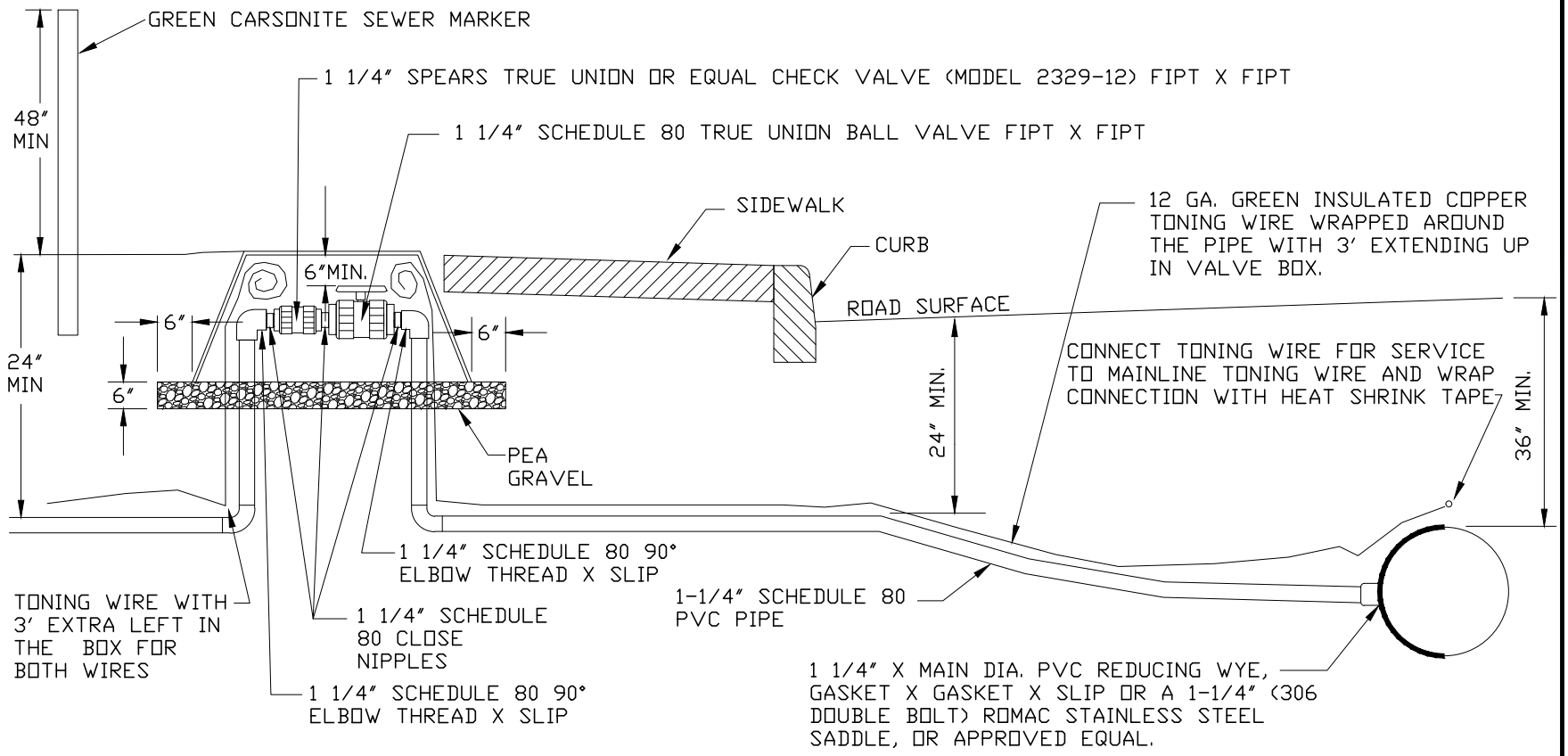
1500 GALLON STEP STATION SYSTEM WIRING

APPR. DATE: DATE	REF:	FIG NO: SS-39

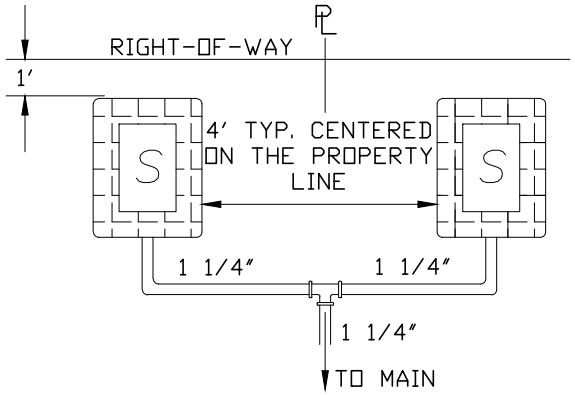
Source; City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

TYPICAL GRINDER SYSTEM SERVICE CONNECTION



DOUBLE SERVICE CONFIGURATION



NOTES:

1. FILL SERVICE BOX WITH FIBERGLASS INSULATION AT TIME OF ON-SITE CONNECTION TO THE STUB.
2. AFTER THE HYDRO-STATIC TESTS HAVE BEEN APPROVED BY THE CITY INSPECTOR THE CHECK VALVE SHALL BE INSTALLED.
3. FUTURE LOT CONNECTIONS SHALL BE MADE AT THE 90° ELBOW WITH THE TONING WIRE INCLUDED IN THE INSTALLATION.
4. ALL FITTINGS AND PIPE SHALL BE SCHEDULE 80.
5. THE SERVICE BOX SHALL BE CARSON INDUSTRIES/MIDSTATES PLASTICS MODEL NO. 1324, (GREEN CARSON FOR EARTH BURY AND 1324 MIDSTATES W/DUCTILE IRON TRAFFIC RATED LID) OR APPROVED EQUAL.

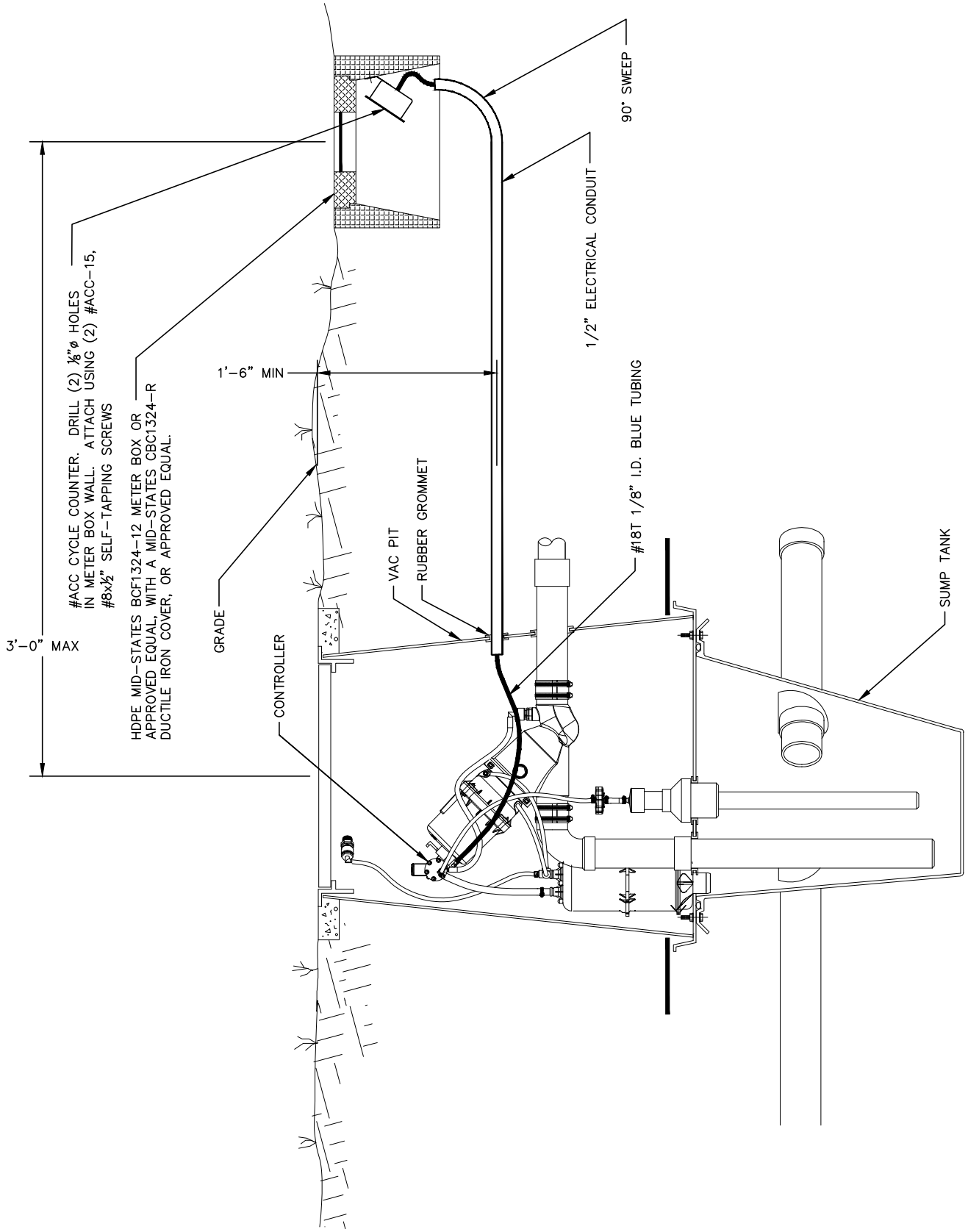
APPR. DATE:
DATE

REF:

FIG NO: SS-40

Source: City of Olympia

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

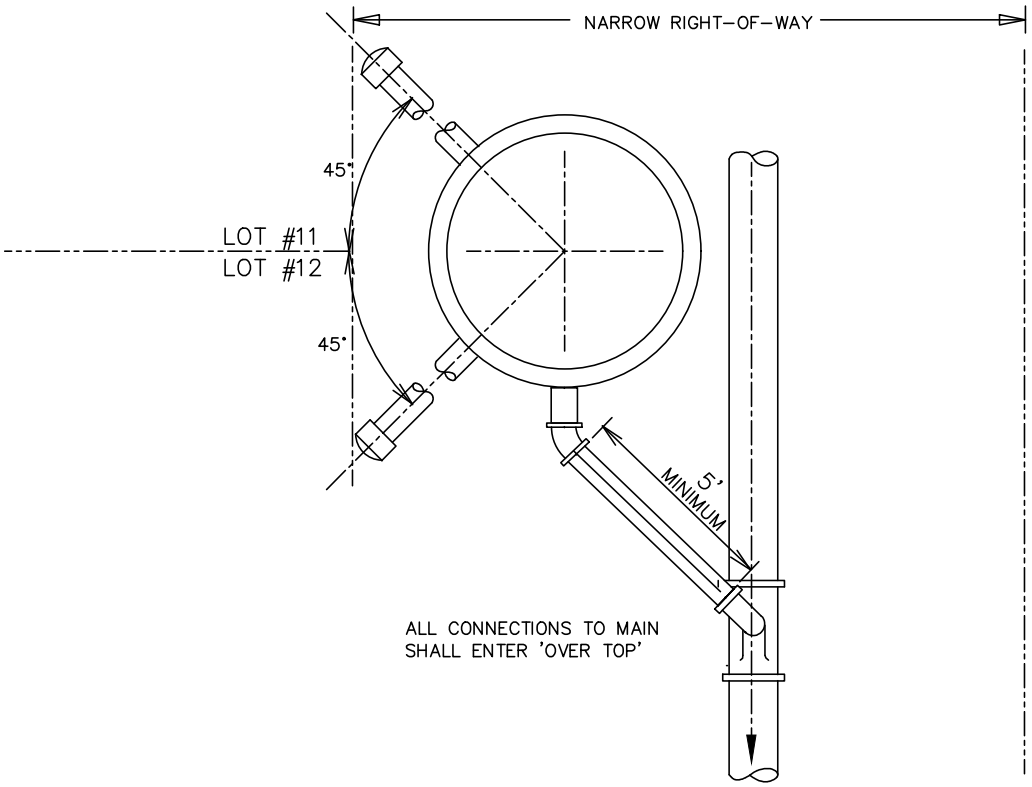


CYCLE COUNTER MOUNTED ON METER BOX WALL

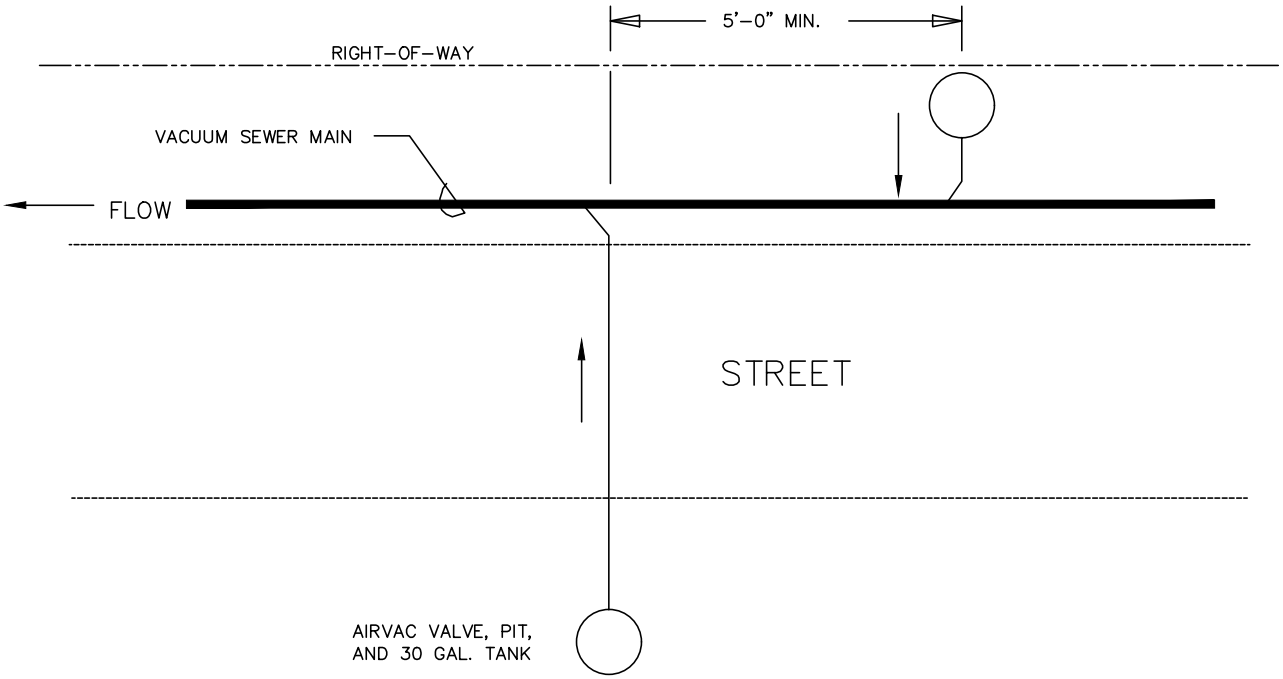
APPR. DATE: DATE	REF:	FIG NO: SS-41

SOURCE; AIRVAC

THURSTON COUNTY SANITERY SEWER STANDARD DETAIL



VALVE PIT IN NARROW RIGHT-OF-WAY -- SD-14



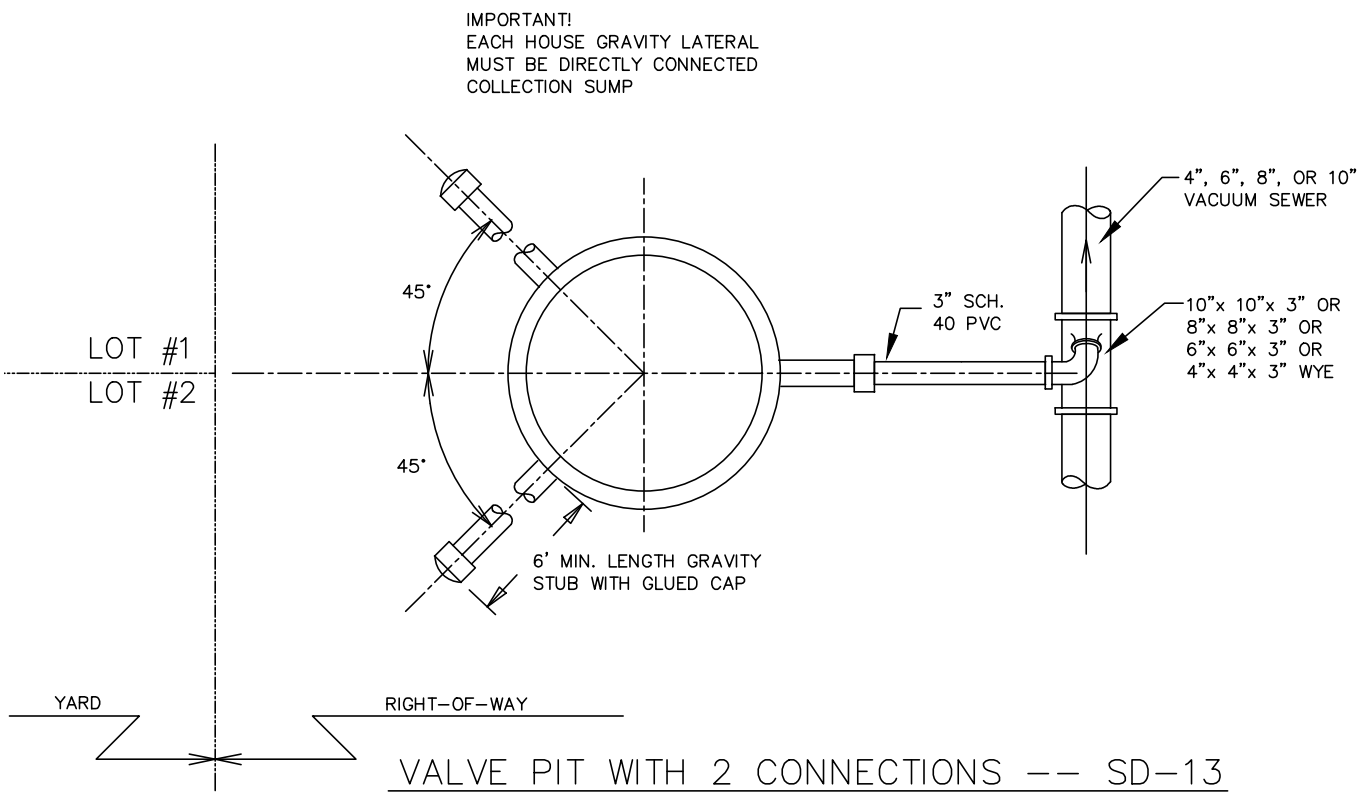
MINIMUM SPACING BETWEEN CONNECTIONS -- SD-15

VACUUM SEWER VALVE PIT IN NARROW R/W

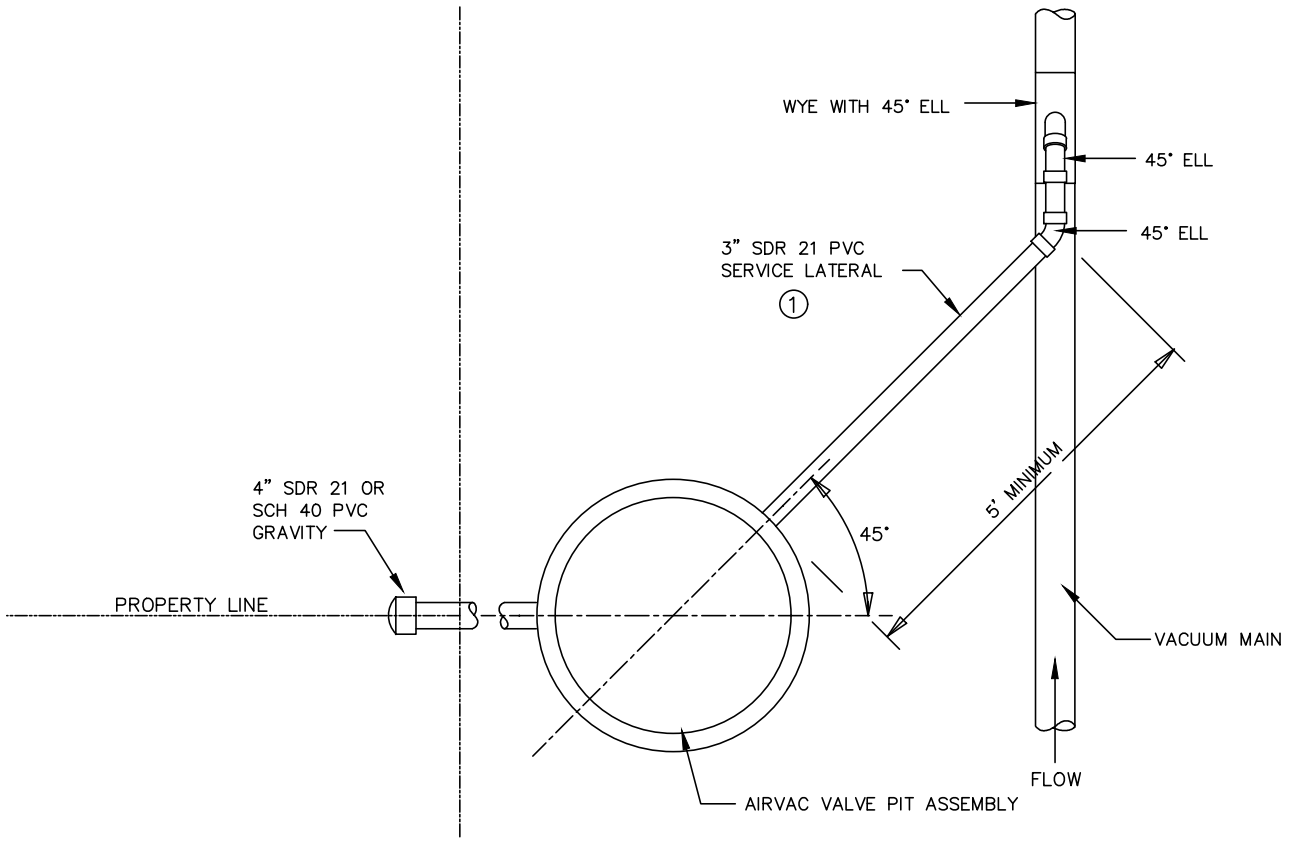
APPR. DATE: DATE	REF:	FIG NO: SS-42

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VALVE PIT WITH 2 CONNECTIONS -- SD-13



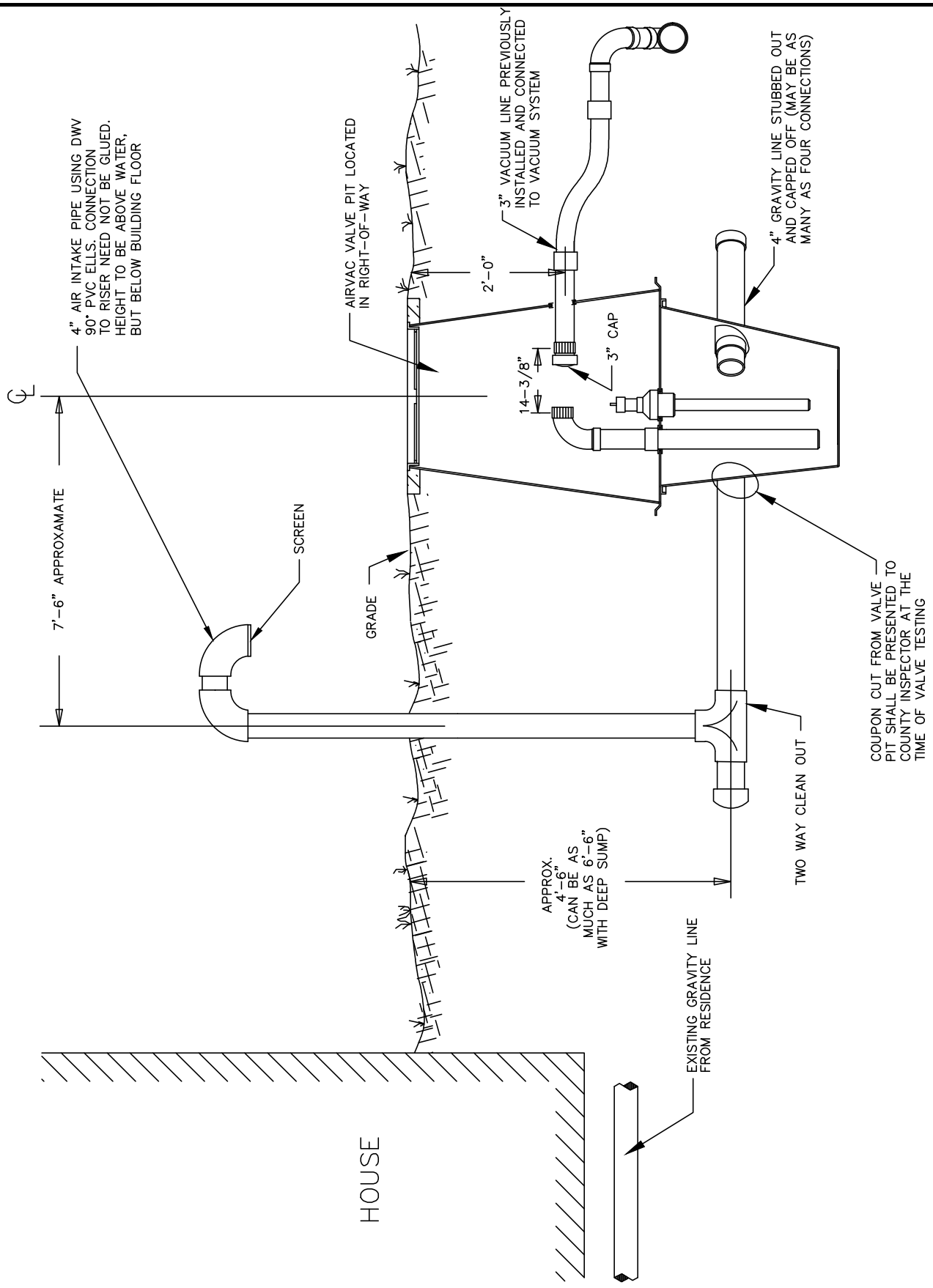
VALVE PIT WITH SINGLE CONNECTION -- SD-16

VACUUM SEWER VALVE PIT WITH 1 & 2 CONNECTIONS

APPR. DATE: DATE	REF:	FIG NO: SS-43

SOURCE; AIRVAC

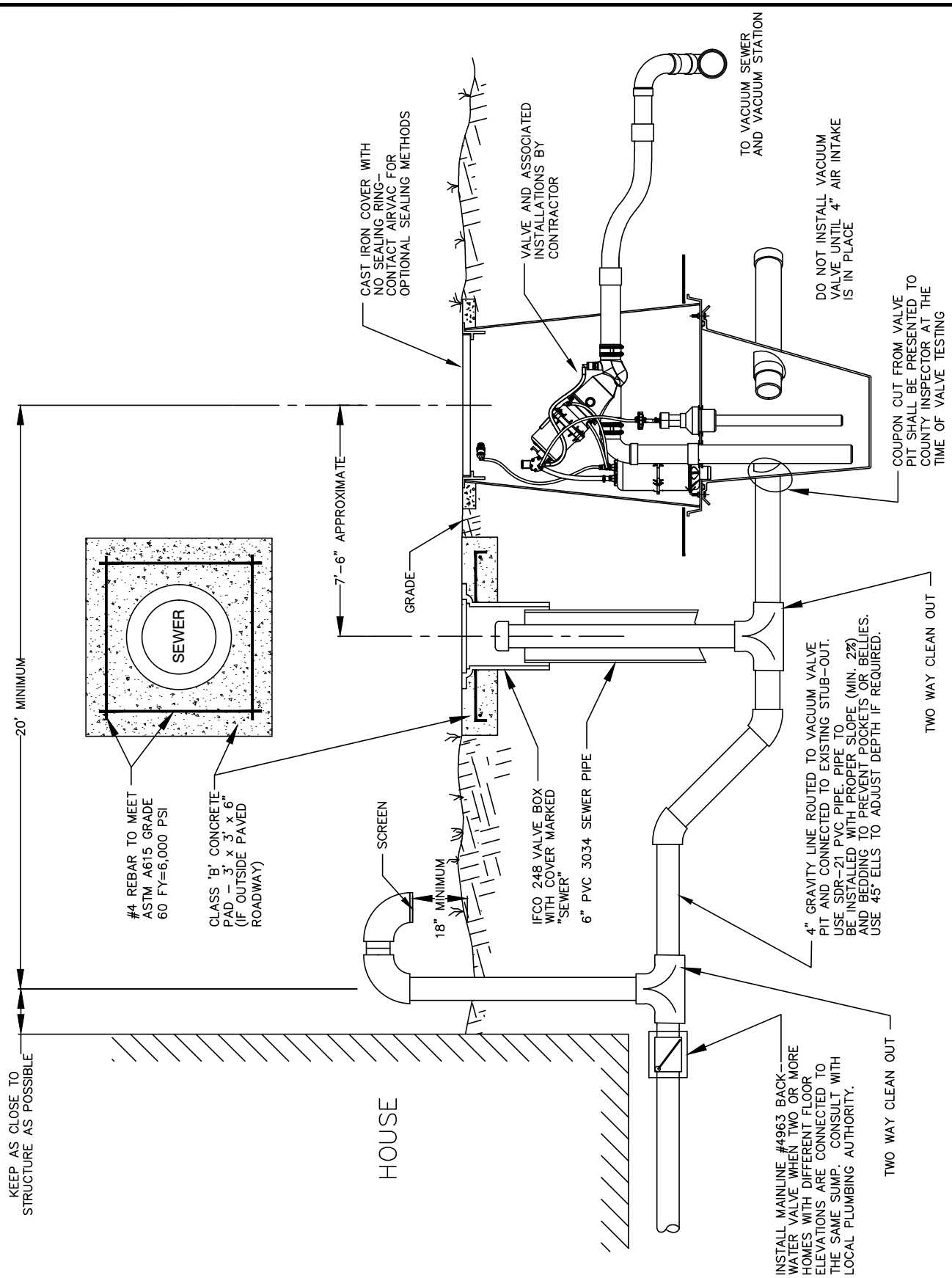
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VACUUM SEWER VALVE PIT PRIOR TO HOME HOOKUP

APPR. DATE: DATE	REF:	FIG NO: SS-44

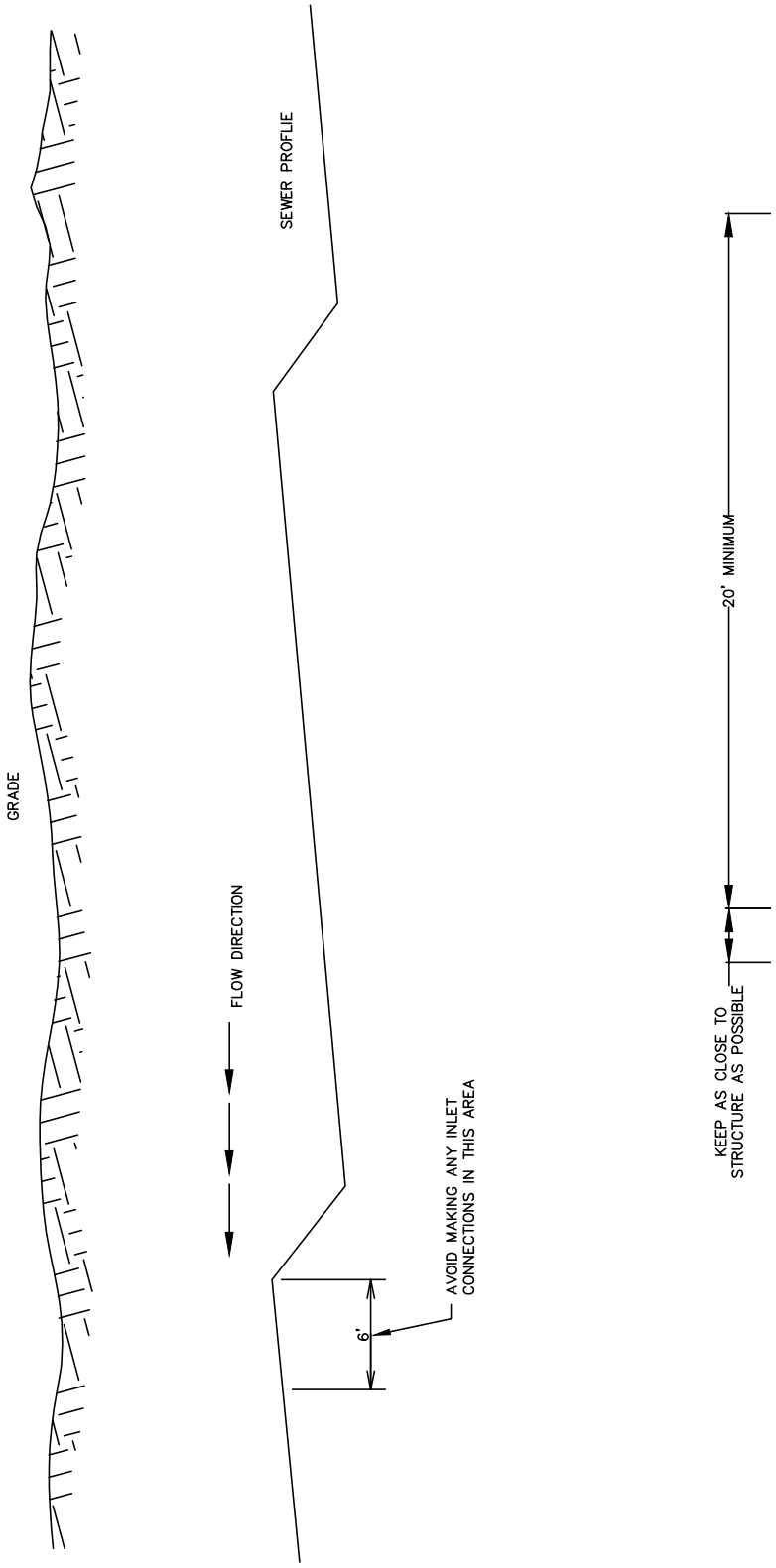
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VACUUM SEWER VALVE PIT AFTER HOME HOOKUP

APPR. DATE: DATE	REF:	FIG NO: SS-45

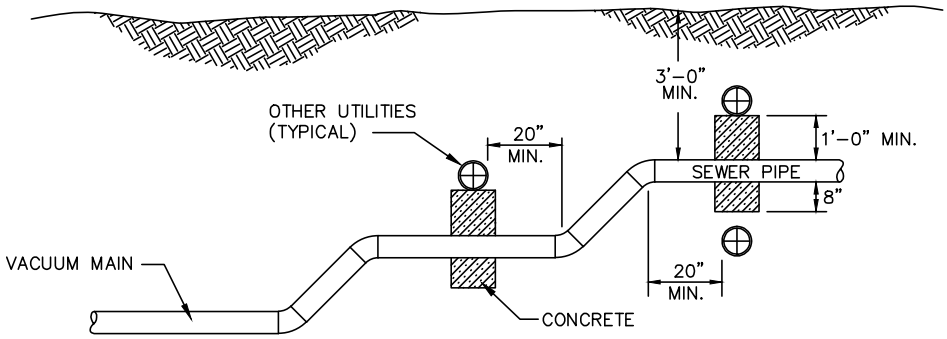
THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VACUUM SEWER CONNECTION LOCATIONS TO AVOID

APPR. DATE: DATE	REF:	FIG NO: SS-46

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



TYPICAL UTILITY CROSSING
SD-4

GENERAL NOTES:

LIFTS:

1. MINIMUM SLOPE BETWEEN LIFTS 0.20% X LENGTH OR 0.25 FT. FALL, WHICHEVER IS GREATER (FOR 4" AND LARGER VACUUM LINES).
2. FOR 3" SERVICE LATERALS, MINIMUM SLOPE BETWEEN LIFTS = 0.2% X LENGTH OR 0.20 FEET FALL, WHICHEVER IS GREATER.
3. MINIMUM SPACING BETWEEN LIFTS – 20'-0".
4. MAXIMUM ELEVATIONS IN ANY ONE LIFT – 3'-0".

SERVICE LINES

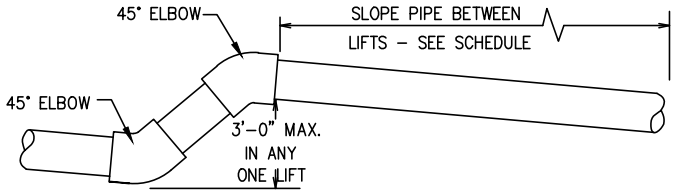
1. MINIMUM LENGTH OF PIPING FROM MAIN TO VALVE PIT = 5'-0".
2. SLOPE FROM VALVE PIT TO MAIN--2" OR 0.20% FALL (WHICHEVER IS GREATER).
3. MINIMUM DISTANCE FROM VALVE PIT TO LIFT IN SERVICE LINE –5'-0".
4. MINIMUM DISTANCE FROM LIFT IN SERVICE LINE TO CROSSOVER CONNECTION–5'-0".

CROSSOVER CONNECTIONS (SERVICE LINE OR BRANCH CONNECTION TO MAIN)

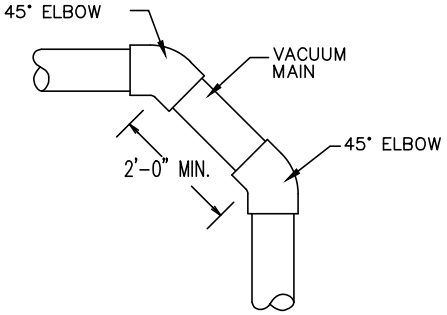
1. MINIMUM SPACING BETWEEN ANY TWO CROSSOVER CONNECTIONS – 5'-0".
2. MINIMUM DISTANCE FROM TOP OF LIFT TO ANY CROSSOVER CONNECTION –– 6'-0".
3. ALL CROSSOVER CONNECTIONS MUST ENTER OVER TOP OF THE MAIN (WYE IN VERTICAL POSITION OR 45° ALTERNATE ALIGNMENT
4. LONG TURN 90° PERMITED AS PART OF CROSSOVER TO MAIN CONNECT AT MAIN LINE ONLY.

SLOPE SCHEDULE		
PIPE DIAMETER	MINIMUM FALL	0.2% OF DISTANCE
3"	0.20 FT	0.2% 100 FT ▲
4"	0.25 FT	0.2% 125 FT ▲
6"	0.25 FT	0.2% 125 FT ▲
8"	0.25 FT	0.2% 125 FT ▲
10"	0.25 FT	0.2% 125 FT ▲

USE WHICHEVER SLOPE IS GREATER BETWEEN LIFTS. ABOVE THIS LENGTH ▲ IN DISTANCE, THE 0.2% SLOPE IS GREATER. ANYTHING SHORTER THAN THIS DISTANCE SHOULD USE MINIMUM FALL INDICATED. WHEN NOT BETWEEN TWO LIFTS, USE 0.2% SLOPE.



LIFT DETAIL AND SLOPE SCHEDULE
SD-5



CHANGE IN DIRECTION
SD-6

VACUUM SEWER MAIN DETAILS

APPR. DATE: DATE	REF:	FIG NO: SS-47

SOURCE: AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

VACUUM SEWER LATERAL DETAILS

APPR. DATE:
DATE

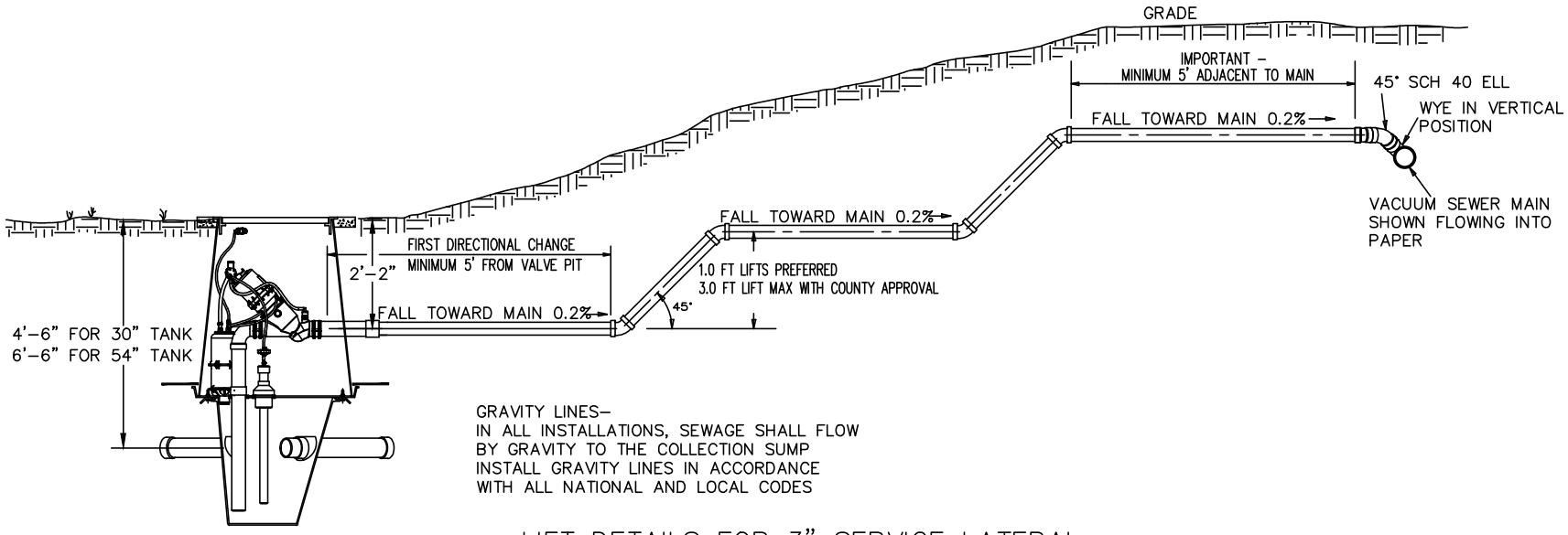
REF:

FIG NO: SS-48

1. CONTRACTOR SHALL SUPPLY ONE SET OF REPLACEMENT COUPLINGS FOR INLET AND OUTLET OF 3" VACUUM VALVE. ALL COUPLINGS SHALL BE 3" FERNCO P1056-33.

NOTES:

1. ALL GROMMETS FOR VALVE PIT AND SUMP ARE SUPPLIED BY AIRVAC.
2. ALL HOLES IN VALVE PIT AND BOTTOM ARE FACTORY CUT. ALL GRAVITY LINE CONNECTION OPENINGS IN THE SUMP ARE FIELD CUT.
3. ONLY HOMES OR APARTMENTS WHOSE LOWER FLOOR ELEVATIONS ARE THE SAME SHOULD BE CONNECTED TO A COMMON VACUUM VALVE PIT INSTALLATION. SOME LOCAL CODES MAY REQUIRE THE INSTALLATION OF A MAINLINE #4963 BACKWATER VALVE IN THE HOME OWNERS GRAVITY LINES. WITH MULTIPLE FLOOR APPARTMENTS EACH FLOOR LEVEL SHOULD BE SERVICED BY ITS OWN VACUUM VALVE PIT PACKAGE.
4. WHEN INSTALLING ANY PIPE THROUGH A GROMMET USE ONLY WATER OR A MILD DETERGENT AS A LUBTICANT, NEVER USE PIPE JOINT GREASE.
5. DO NOT INSTALL VACUUM VALVE UNTIL HOME GRAVITY LINE IS NEAR COMPLETION AND AIR INTAKE PIPING IS IN PLACE.
6. INTERNAL SUMP BREATHER IS TO BE EQUIPPED WITH AUTOMATIC SHUT OFF DEVICES TO PREVENT LIQUIDE CONTAMINATION OF THE CONTROLER AND INTERFACE VALVE DURING AN EMERGENCY HIGH LIQUID LEVEL EVENT. THESE DEVICES SHALL BE POSITIVE SEALING, SHALL NOT INHIBIT THE VALVE'S PREFORMANCE UNDER NORMAL CONDITIONS AND SHALL RESET AUTOMATICALLY WHEN RECOUVERING FROM AM EMERGENCY HIGH LIQUID LEVEL EVENT.

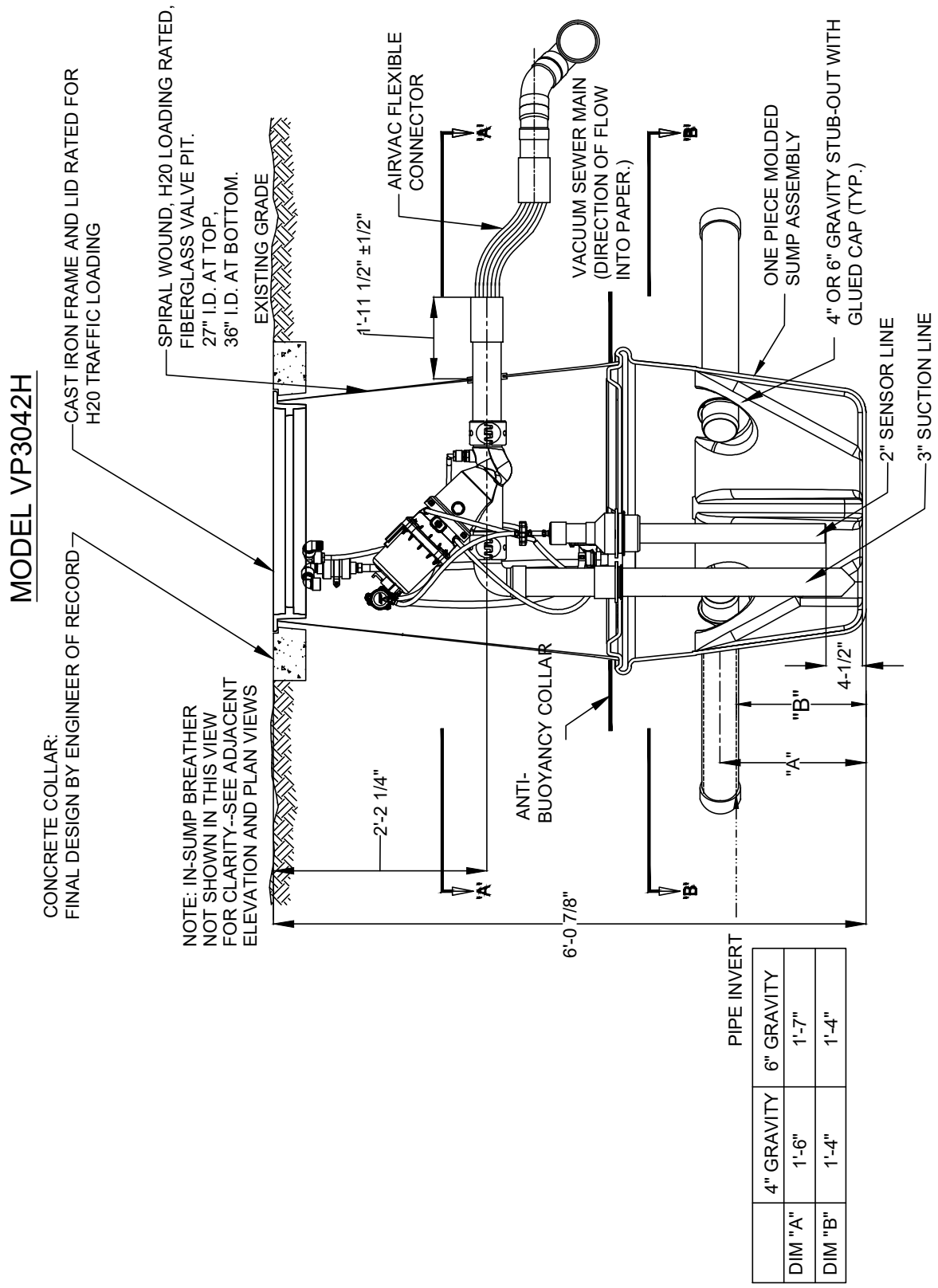


GRAVITY LINES-
IN ALL INSTALLATIONS, SEWAGE SHALL FLOW BY GRAVITY TO THE COLLECTION SUMP INSTALL GRAVITY LINES IN ACCORDANCE WITH ALL NATIONAL AND LOCAL CODES

LIFT DETAILS FOR 3" SERVICE LATERAL

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



	4" GRAVITY	6" GRAVITY
DIM "A"	1'-6"	1'-7"
DIM "B"	1'-4"	1'-4"

VACUUM SEWER 6 FT. VALVE PIT DETAIL

APPR. DATE: DATE	REF:	FIG NO: SS-49

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

INSTALLING PIPE THROUGH A GROMMET

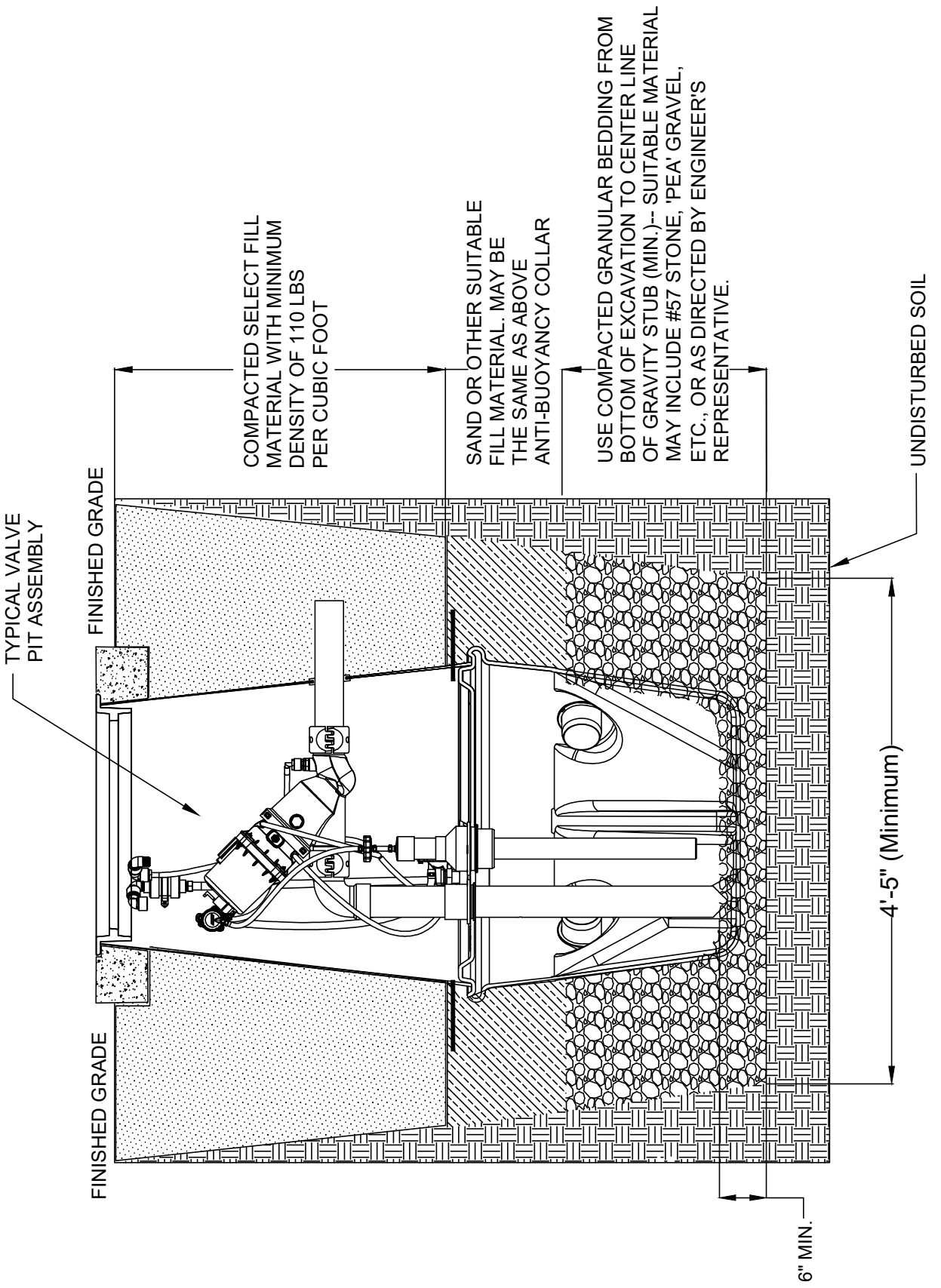
TYPE OF LUBRICANT	PERMITTED	WHERE USED
PIPE LUBRICANT PER ANSI/NSF STANDARD #61	EITHER WATER SOLUBLE OR NON-WATER SOLUBLE IS PERMITTED	GROMMETS FOR GRAVITY STUB-OUTS AND VACUUM SERVICE LATERALS (ALL VALVE PITS)
LIQUID DISHWASHING DETERGENT DILUTED 10-20% IN WATER	PIPE LUBRICANT NOT PERMITTED	GROMMETS FOR SUCTION & SENSOR PIPES AND IN-SUMP BREATHER (2-PIECE PITS ONLY)

VACUUM SEWER 6' VALVE PIT SECTIONS

APPR. DATE: DATE	REF:	FIG NO: SS-50

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



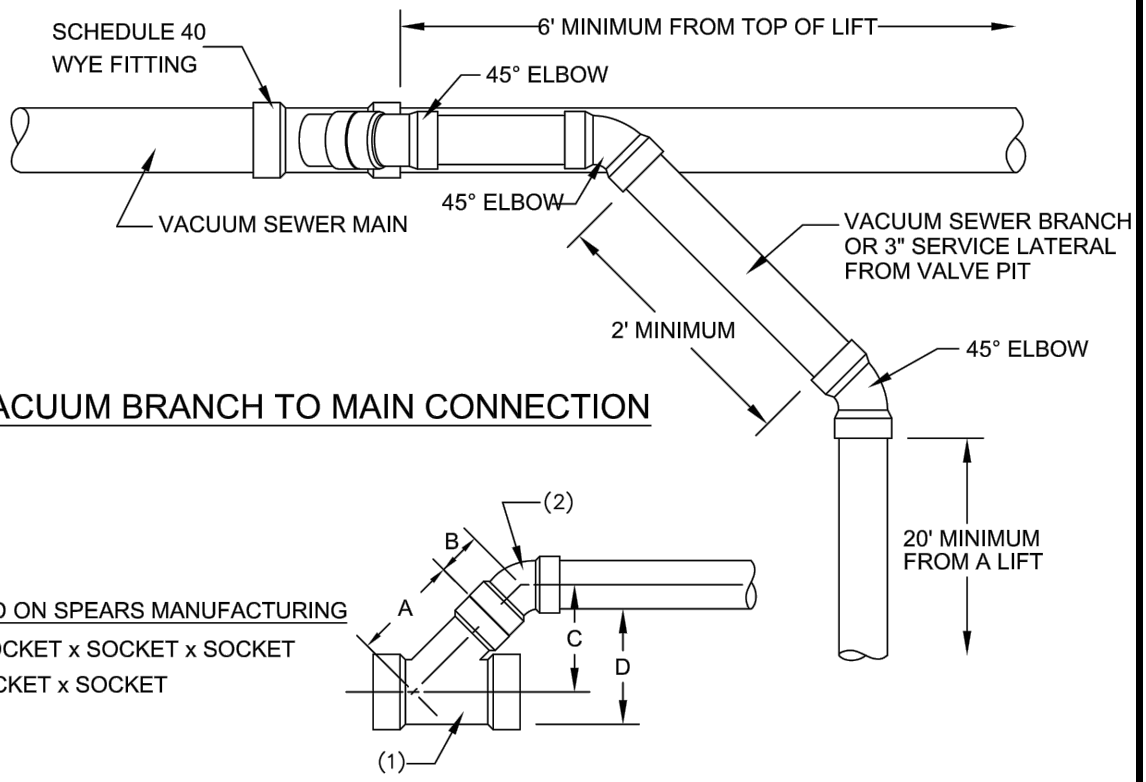
VALVE PIT BEDDING & BACKFILL DETAIL

VACUUM SEWER 6' VALVE PIT BEDDING & BACKFILL

APPR. DATE: DATE	REF:	FIG NO: SS-51

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VACUUM BRANCH TO MAIN CONNECTION

DIMENSIONS BASED ON SPEARS MANUFACTURING

(1) 45 DEG WYE, SOCKET x SOCKET x SOCKET

(2) 45 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D- INVERT
4 x 4 x 4	8 1/4"	3 3/32"	8.02"	0.67'
4 x 4 x 3	8 7/8"	2 7/8"	8.30"	0.63'
6 x 6 x 6	11 21/32"	5 7/8"	12.40"	1.03'
6 x 6 x 4	10 1/4"	3 3/32"	9.44"	0.78'
6 x 6 x 3	10 1/4"	2 7/8"	9.28"	0.77'
8 x 8 x 8	15 1/4"	6 7/16"	15.34"	1.28'
8 x 8 x 6	16 1/8"	5 7/8"	15.55"	1.30'
8 x 8 x 4	14 1/4"	3 3/32"	12.26"	1.02'
8 x 8 x 3	13"	2 7/8"	11.22"	0.94'
10 x 10 x 10	22 1/8"	8 1/8"	21.34"	1.78'
10 x 10 x 8	16 25/32	6 7/16"	16.42"	1.37'
10 x 10 x 6	15 7/8"	5 7/8"	15.38"	1.28'
10 x 10 x 4	15 1/2"	3 3/32"	13.15"	1.10'
10 x 10 x 3	14 5/8"	2 7/8"	12.37"	1.03'

VACUUM BRANCH TO MAIN LINE CONNECTION

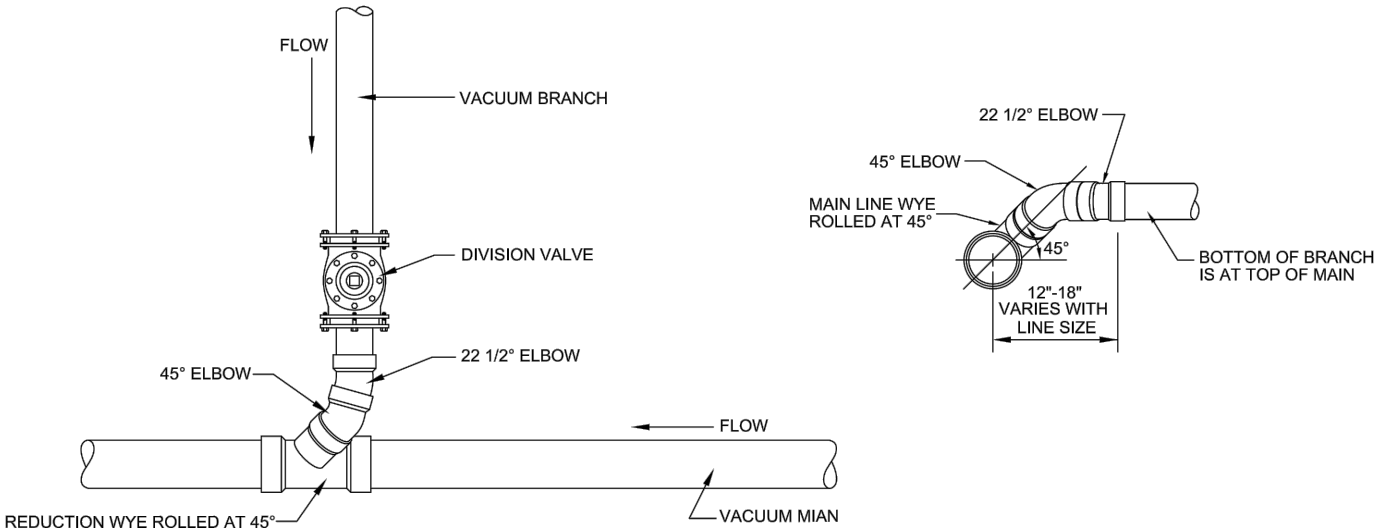
SD-8

VACUUM BRANCH TO MAIN LINE CONNECTION

APPR. DATE: DATE	REF:	FIG NO: SS-52

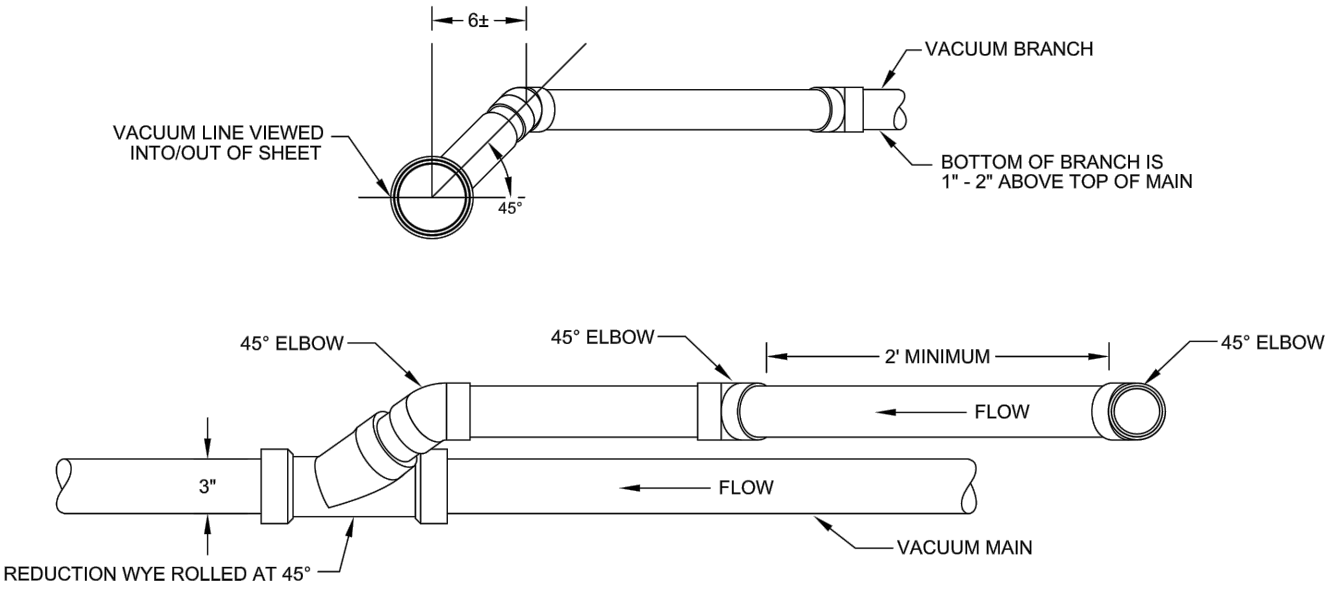
SOURCE; AIRVAC

THURSTON COUNTY SANITARYSEWER STANDARD DETAIL



ALTERNATE VACUUM BRANCH TO MAIN LINE CONNECTION

SD-11



ALTERNATE VACUUM BRANCH TO MAIN LINE CONNECTION

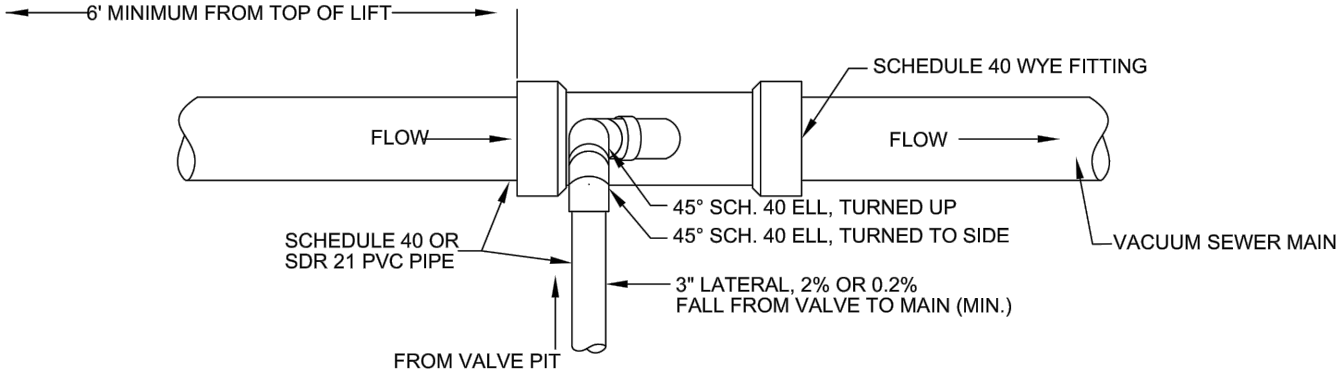
SD-12

ALTERNATE VACUUM BRANCH TO MAINLINE CONNECTIONS

APPR. DATE: DATE	REF:	FIG NO: SS-53

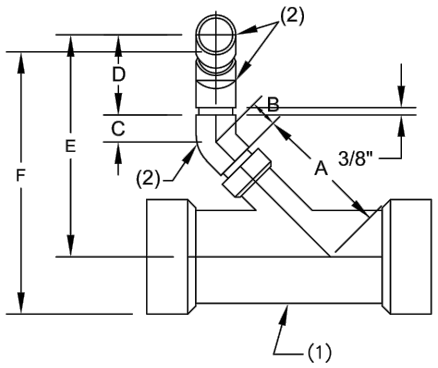
SOURCE; AIRVAC

THURSTON COUNTY SANITARYSEWER STANDARD DETAIL



VALVE PIT TO MAIN CONNECTIONS

SD-9



DIMENSIONS BASED ON SPEARS MANUFACTURING

(1) 45 DEG WYE, SOCKET x SOCKET x SOCKET

(2) 45 DEG ELL, SOCKET x SOCKET

WYE SIZE	A	B	C	D	E	F- INVERT
4 x 4 x 3	8 7/8"	2 7/8"	2 7/8"	3 23/32"	14.93"	1.24'
6 x 6 x 3	10 1/4"	2 7/8"	2 7/8"	3 23/32"	15.35"	1.32'
8 x 8 x 3	13"	2 7/8"	2 7/8"	3 23/32"	17.82"	1.48'
10 x 10 x 3	14 5/8"	2 7/8"	2 7/8"	3 23/32"	18.97"	1.58'

VALVE SERVICE CONNECTIONS

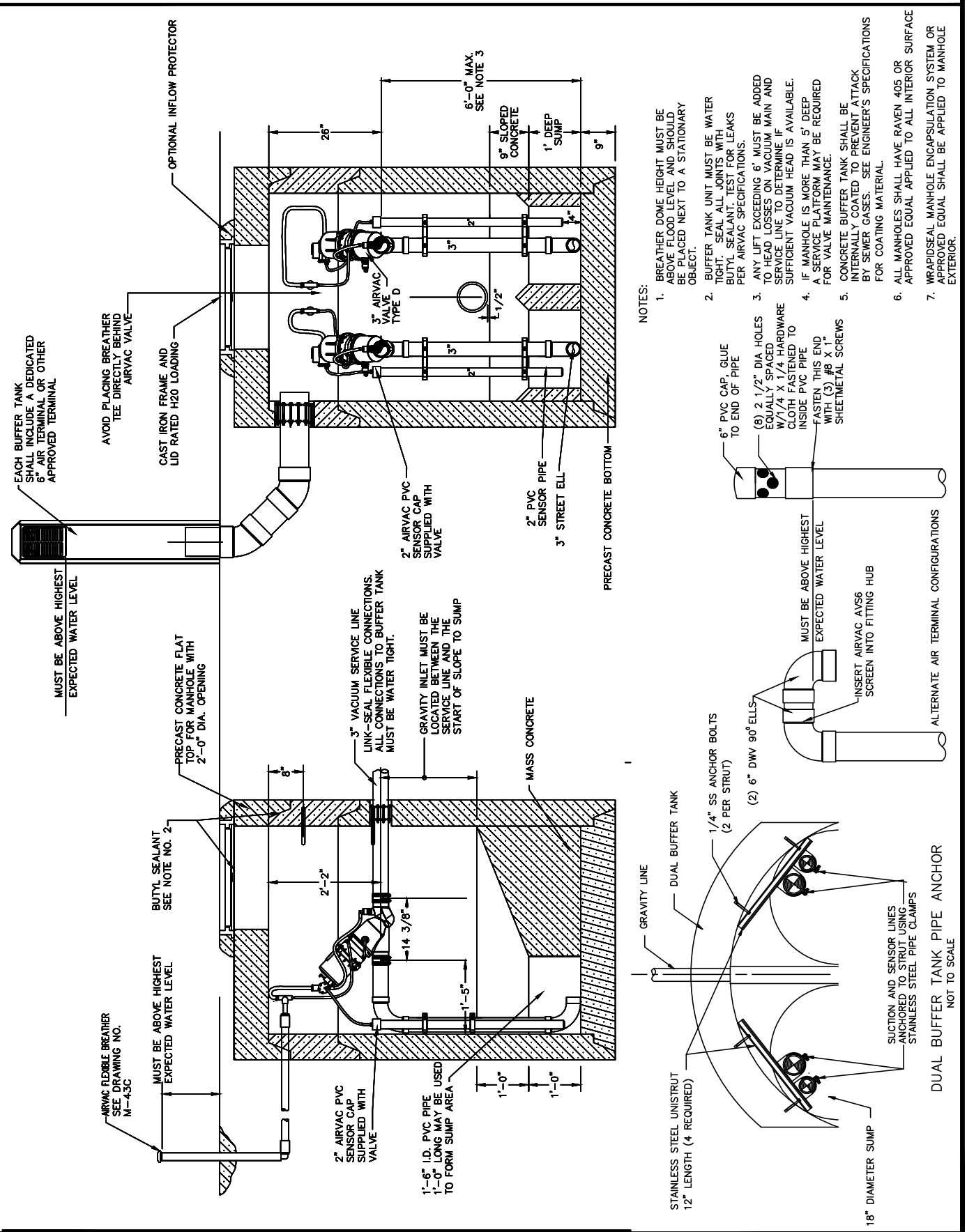
SD-10

VACUUM SEWER VALVE SERVICE CONNECTION

APPR. DATE: DATE	REF:	FIG NO: SS-54

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

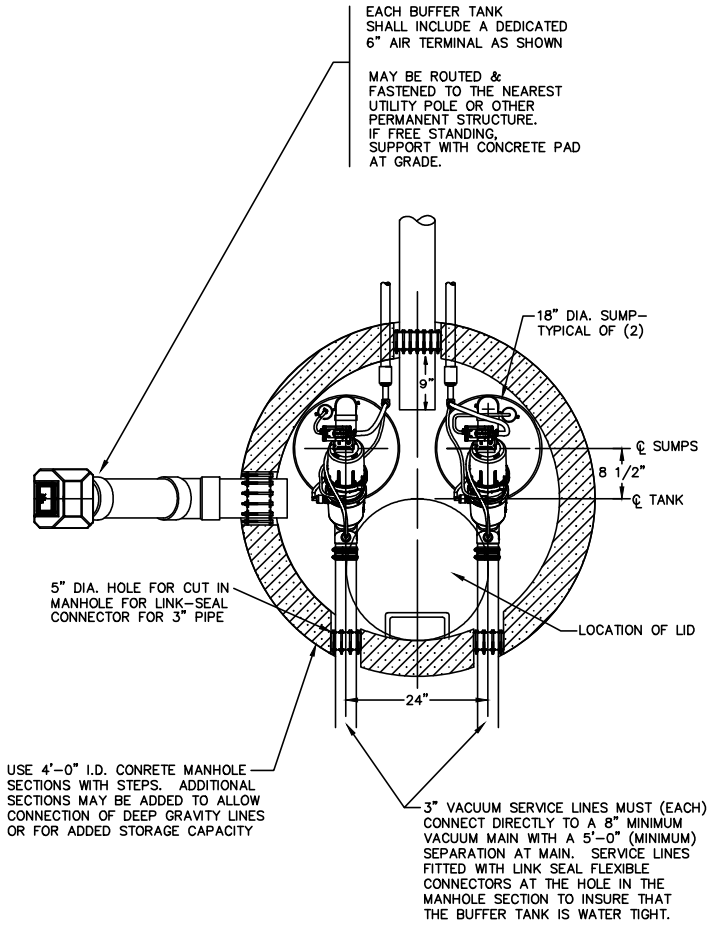


VACUUM SEWER CONCRETE DUAL BUFFER TANK SECTIONS

APPR. DATE:		FIG NO: SS-55

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL



VACUUM SEWER CONCRETE DUAL BUFFER TANK PLAN

APPR. DATE:		FIG NO: SS-56

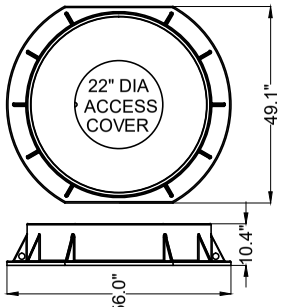
SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

VACUUM SEWER FIBERGLASS DUAL BUFFER TANK PLAN

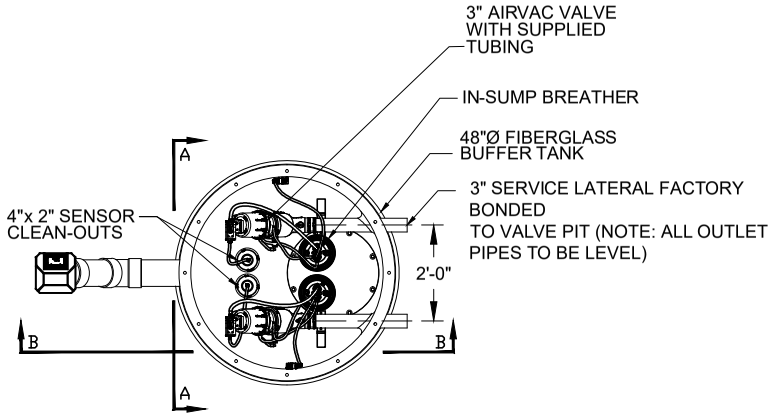
NOTES:

1. ALL GRAVITY LINES CONNECTED TO BUFFER TANK MUST INCLUDE A 4" (MIN.) AIR-INTAKE.
2. DO NOT CONNECT GRAVITY LINES DIRECTLY BEHIND SUCTION PIPES.
3. THE HOLE CUT OUT SIZE FOR VARIOUS PIPE GROMMETS:
   6" GROMMET = 6 7/8" HOLE
   4" GROMMET = 5" HOLE
   3" GROMMET = 3 7/8" HOLE
   3/4" GROMMET = 1 1/4" HOLE
   (ALL GROMMETS ARE SOIL PIPE TYPE)

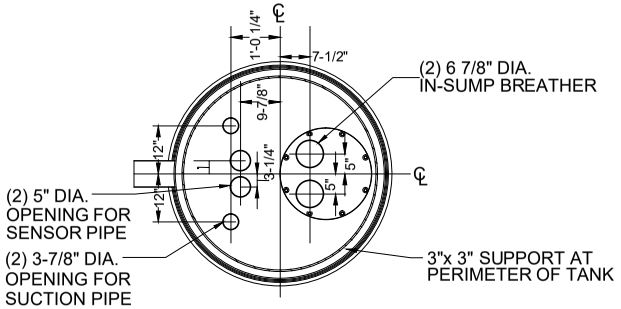


NOTE: CAST IRON FRAME & COVER SHALL NOT BE SUPPORTED BY FIBERGLASS BASIN

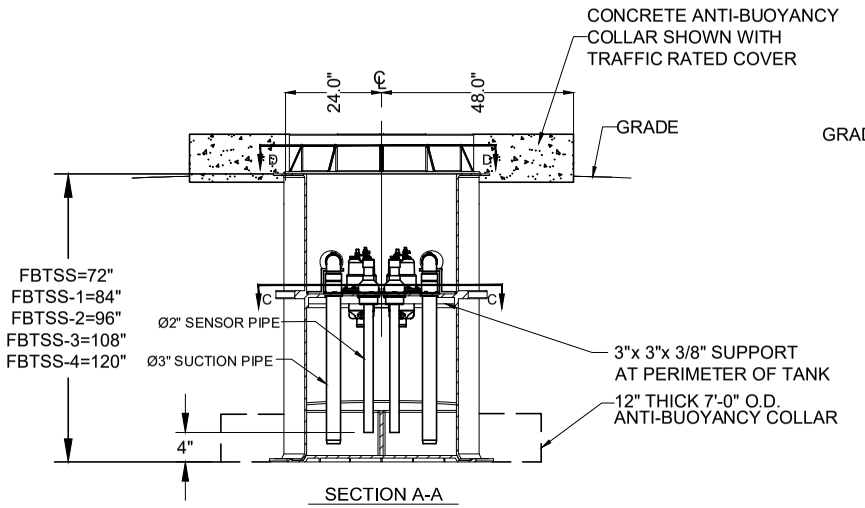
TRAFFIC RATED CAST IRON FRAME & COVER



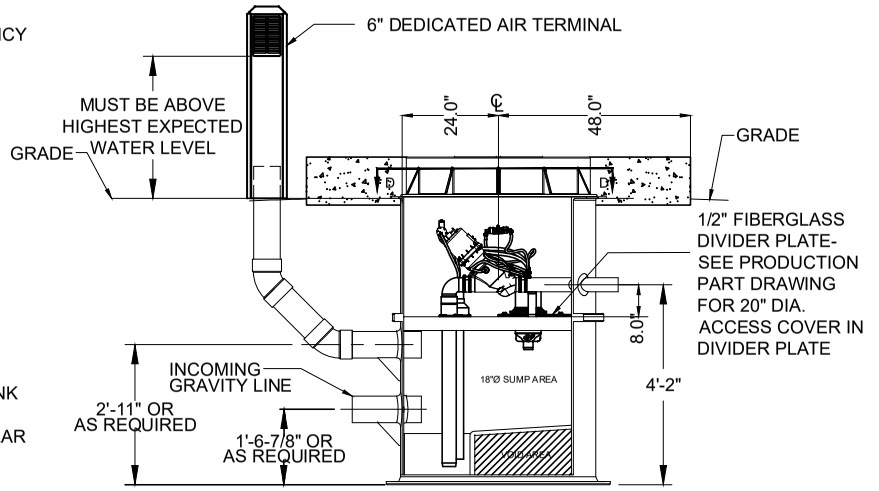
SECTION D-D
PLAN VIEW OF TANK EQUIPMENT ASSEMBLY



SECTION C-C
PLAN VIEW OF INTERMEDIATE PLATFORM



SECTION A-A

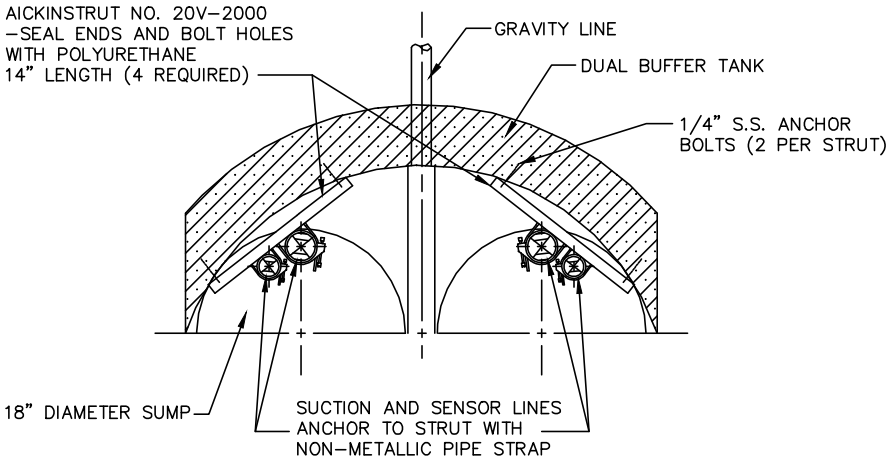


SECTION B-B

APPR. DATE:

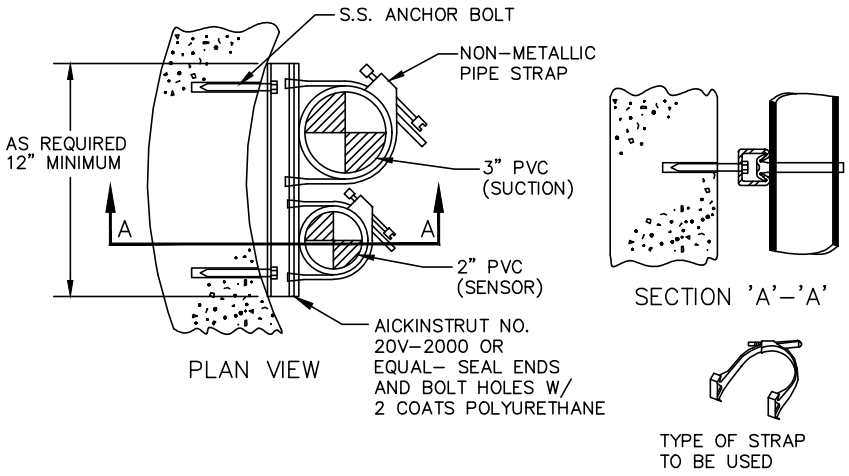
FIG NO: SS-57

SOURCE; AIRVAC



DUAL BUFFER TANK PIPE ANCHOR

NOT TO SCALE



SINGLE BUFFER TANK PIPE ANCHOR

N.T.S.

VACUUM SEWER BUFFER TANK PIPE ANCHORS

APPR. DATE:		FIG NO: SS-58

SOURCE; AIRVAC

THURSTON COUNTY SANITARY SEWER STANDARD DETAIL

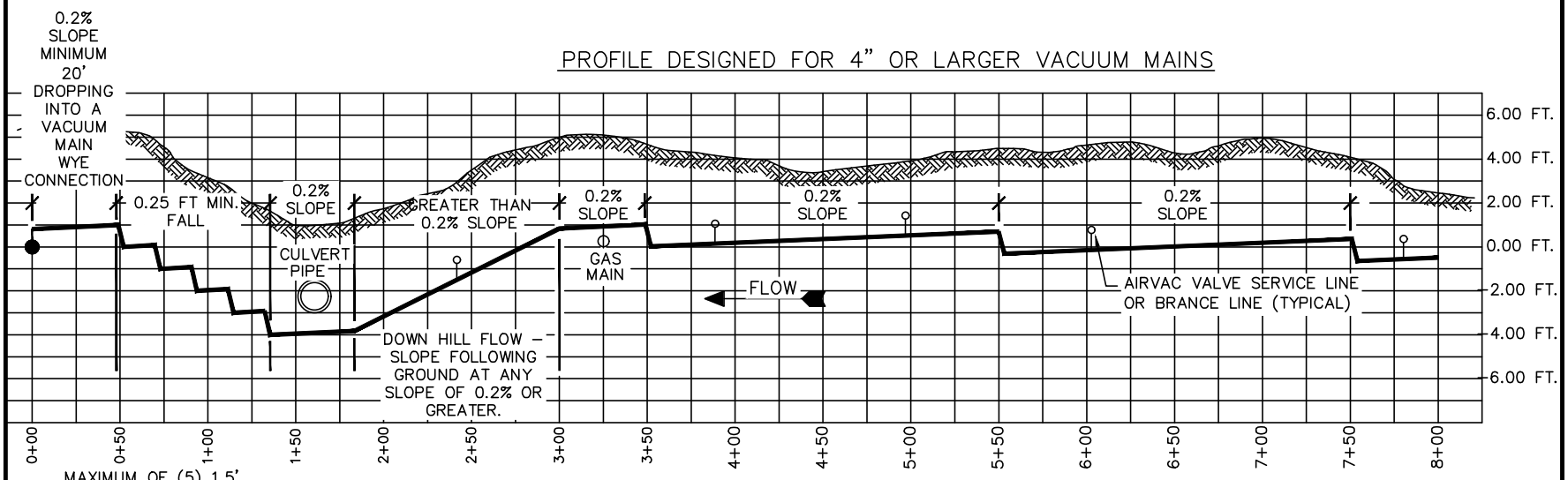
APPR. DATE:
DATE

REF:

FIG NO: SS-59

VACUUM SEWER MAIN PROFILE DETAILS

PROFILE DESIGNED FOR 4" OR LARGER VACUUM MAINS



MAXIMUM OF (5) 1.5' LIFTS CONSECUTIVELY SPACED AT A MINIMUM OF 20' APART WITH 0.25 FT (MIN) OF FALL BETWEEN LIFTS

50' MINIMUM SLOPED AT 0.2% COMING INTO A LIFT

LEVEL AND UPGRADE TRANSPORT
MINIMUM FALL BETWEEN LIFTS:

PIPE DIA.	MIN. FALL	0.2% OF DISTANCE
3"	0.20'	0.2% 100' ▲
4"	0.25'	0.2% 125' ▲
6"	0.25'	0.2% 125' ▲
8"	0.25'	0.2% 125' ▲
10"	0.25'	0.2% 125' ▲

USE WHICHEVER SLOPE IS GREATER BETWEEN ANY 2 LIFTS, ▲ – ABOVE THIS LENGTH IN DISTANCE, THE 0.02% SLOPE IS GREATER. ANYTHING SHORTER THAN THIS DISTANCE SHOULD USE MINIMUM FALL INDICATED. WHEN NOT BETWEEN TWO LIFTS, USE 0.02% SLOPE.

3" SERVICE LATERAL PROFILE DESIGN

3" VALVE SERVICE LINE – MAXIMUM LENGTH 300', 1 VALVE PIT FLOW LIMIT. USE SCHEDULE 40 OR SDR 21 PVC PIPE.

4" OR LARGER MAIN PROFILE DESIGN

4" VACUUM MAIN – MAXIMUM LENGTH 2000'; 38 GPM MAXIMUM FLOW.
6" VACUUM MAIN – NO MAXIMUM LENGTH; 106 GPM MAXIMUM FLOW.
8" VACUUM MAIN – NO MAXIMUM LENGTH; 210 GPM MAXIMUM FLOW.
10" VACUUM MAIN – NO MAXIMUM LENGTH; 375 GPM MAXIMUM FLOE.

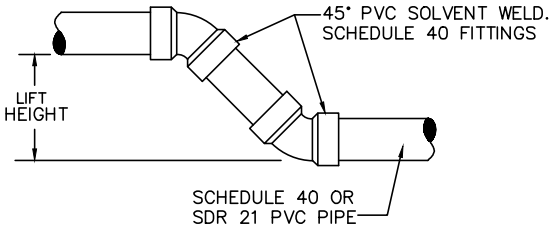
LEVEL AND UPGRADE TRANSPORT

PROFILE CHANGES

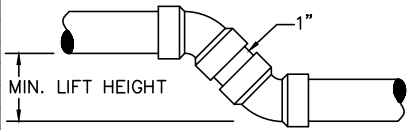
USE 1' LIFTS WHENEVER POSSIBLE. FOR 6" OR LARGER VACUUM LINES USE 1.5' LIFTS IN ANY SERIES OF LIFTS, OTHERWISE 1' LIFTS ARE RECOMMENDED. COSULT AIRVAC REGARDING LIFTS ABOVE 3'.

PROFILE CHANGE CONSTRUCTION

STATIC LIFT FOR CALCULATING LINE LOSSES= LIFT HEIGHT MINUS PIPE DIAMETER, FOR ALL PIPE SIZES.

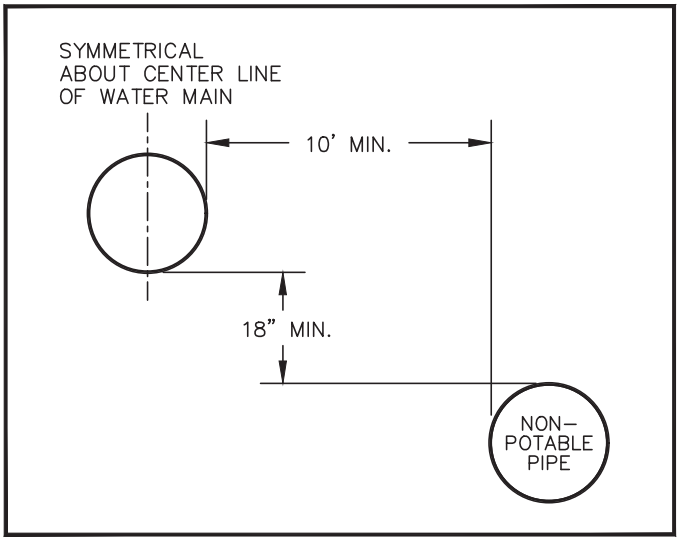


MINIMUM LIFT HEIGHT	
3" PIPE	.42 FT
4" PIPE	.45 FT
6" PIPE	.71 FT
8" PIPE	.86 FT
10" PIPE	1.07 FT

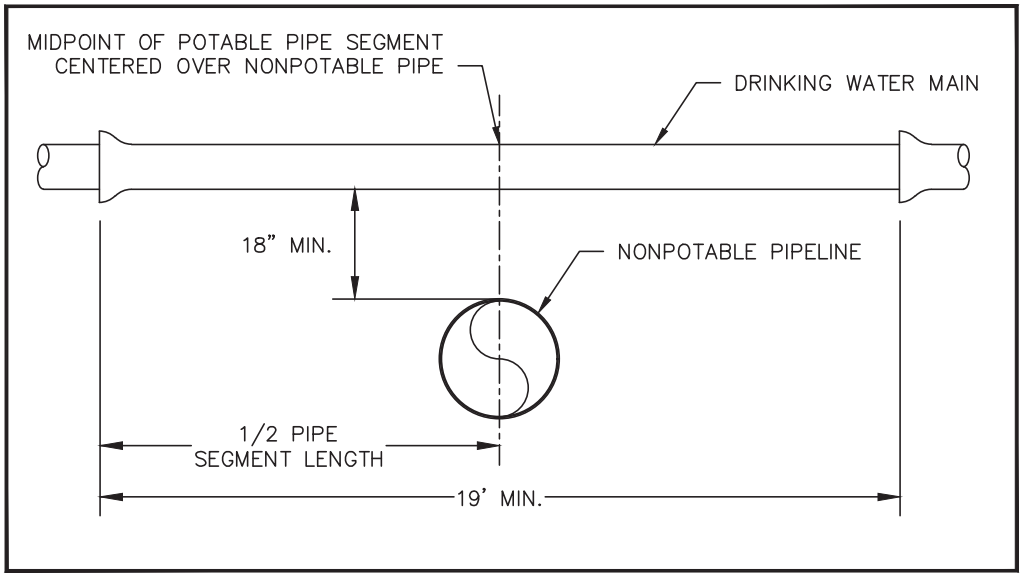


SOURCE: AIRVAC

THURSTON COUNTY WATER STANDARD DETAIL



REQUIRED SEPERATION BETWEEN WATER LINES
AND NON–POTABLE LINES, PARALLEL CONSTRUCTION.



TYPICAL UTILITY PIPE CROSSING

NOTE:

NONPOTABLE PIPELINES INCLUDE ALL PIPES TRANSPORTING NONPOTABLE LIQUIDS INCLUDING, BUT NOT LIMITED TO, SEWER AND RECLAIMED WATER.

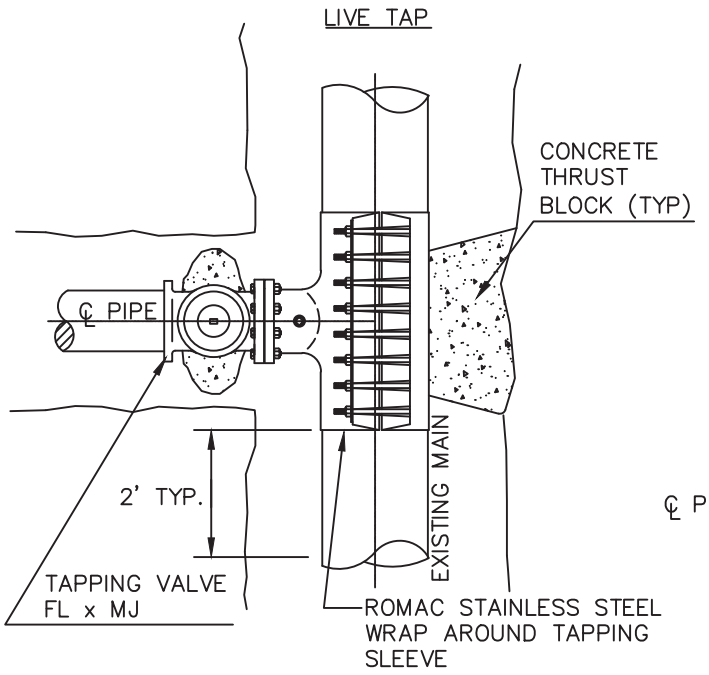
SITUATIONS NOT ADDRESSED ABOVE SHALL FOLLOW THE MORE RESTRICTIVE CRITERIA AS OUTLINED IN "CRITERIA FOR SEWAGE WORKS DESIGN" AND THE "PIPELINE SEPARATION DESIGN AND INSTALLATION GUIDE", DOH, CURRENT EDITION.

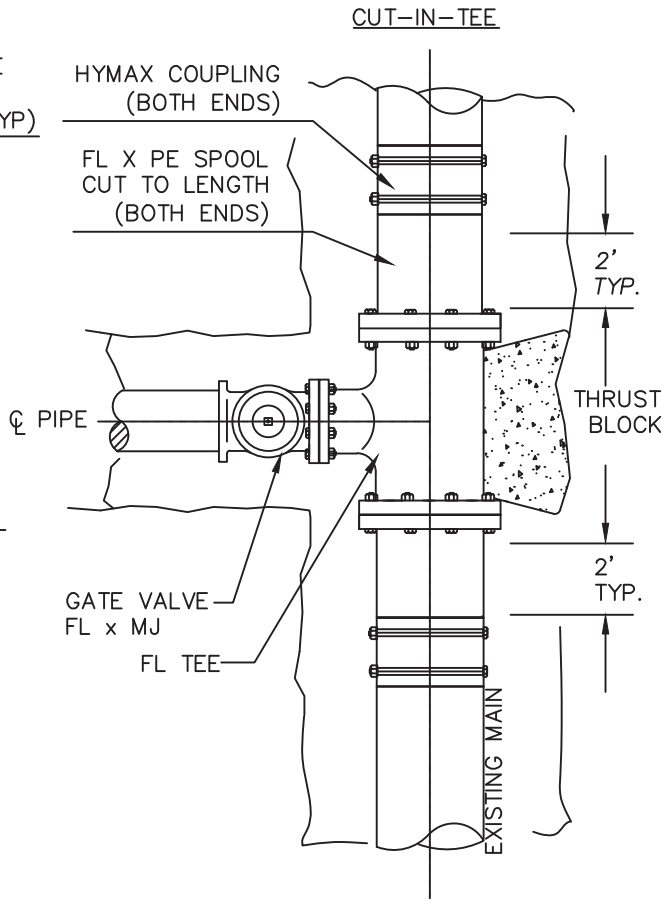
WATER NONPOTABLE SEPARATION

APPR. DATE:	REFER:	FIG NO: WA-01

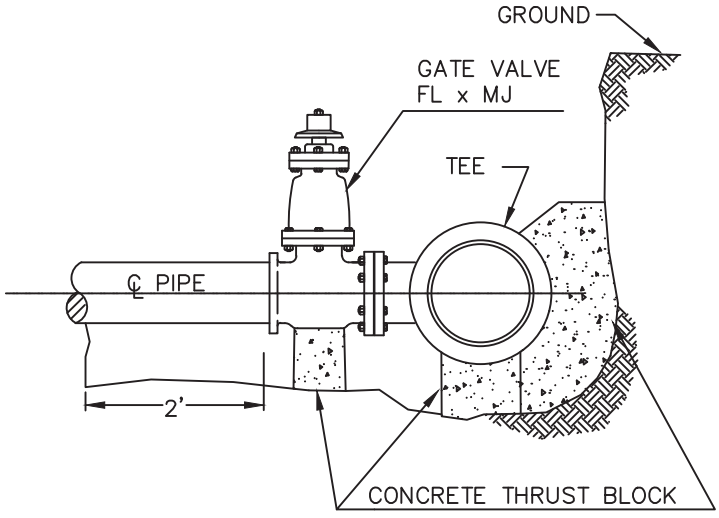
Source; City of Lacey

THURSTON COUNTY WATER STANDARD DETAIL





VALVE AND SLEEVE SHALL BE SUPPORTED AND BACKFILLED AS SHOWN BELOW–RIGHT.



NOTES:
1. 11 MIL PLASTIC OR CONSTRUCTION FABRIC SHALL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCKS ARE POURED.
2. SUPPORT VALVE AND SLEEVE CONTINUOUSLY THROUGH INSTALLATION.

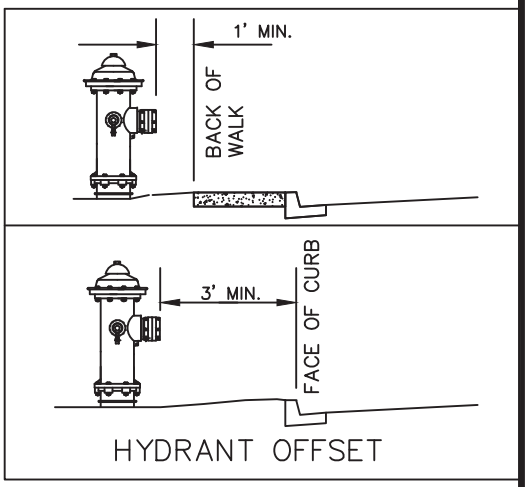
CONNECTION TO EXISTING MAIN

APPR. DATE:		FIG NO:	WA-02

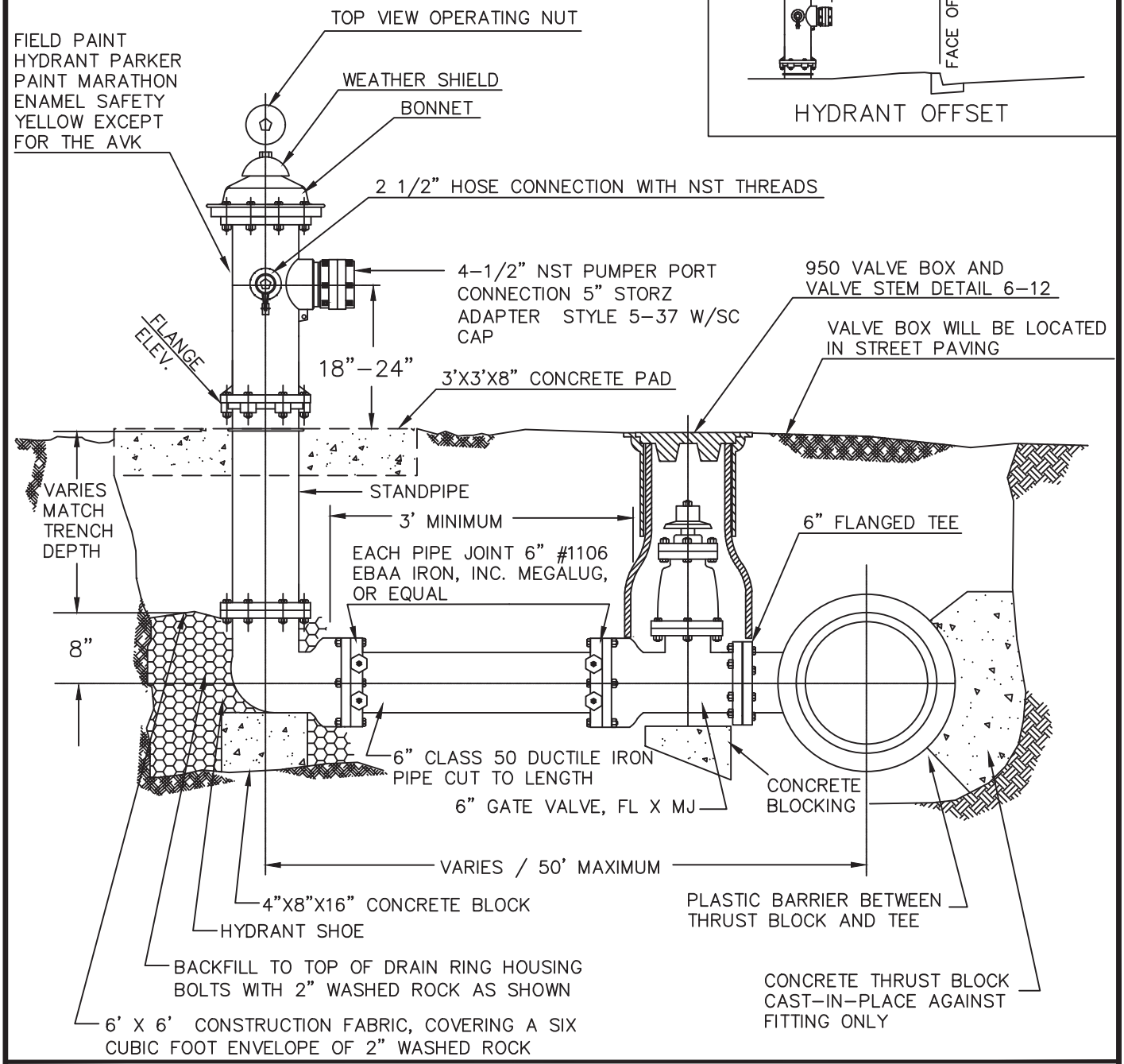
Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

NOTES:
1. HYDRANTS SHALL BE LOCATED WITH A MINIMUM THREE FOOT RADIUS UNOBSTRUCTED WORKING AREA PROVIDED AROUND ALL HYDRANTS, AND IN NO CASE SHALL BE LOCATED IN SIDEWALK.
2. WHEN R/W IS NOT ADEQUATE, A MINIMUM 5' EASEMENT IS REQUIRED ON ALL SIDES OF THE HYDRANT.
3. HYDRANT SHALL BE M&H STYLE 129S OR MUELLER CENTURION.
4. MINIMUM TWO BOLLARDS REQUIRED WHEN HYDRANT LOCATED WITHIN 10 FEET OF VEHICULAR TRAVEL PATH.



HYDRANT OFFSET

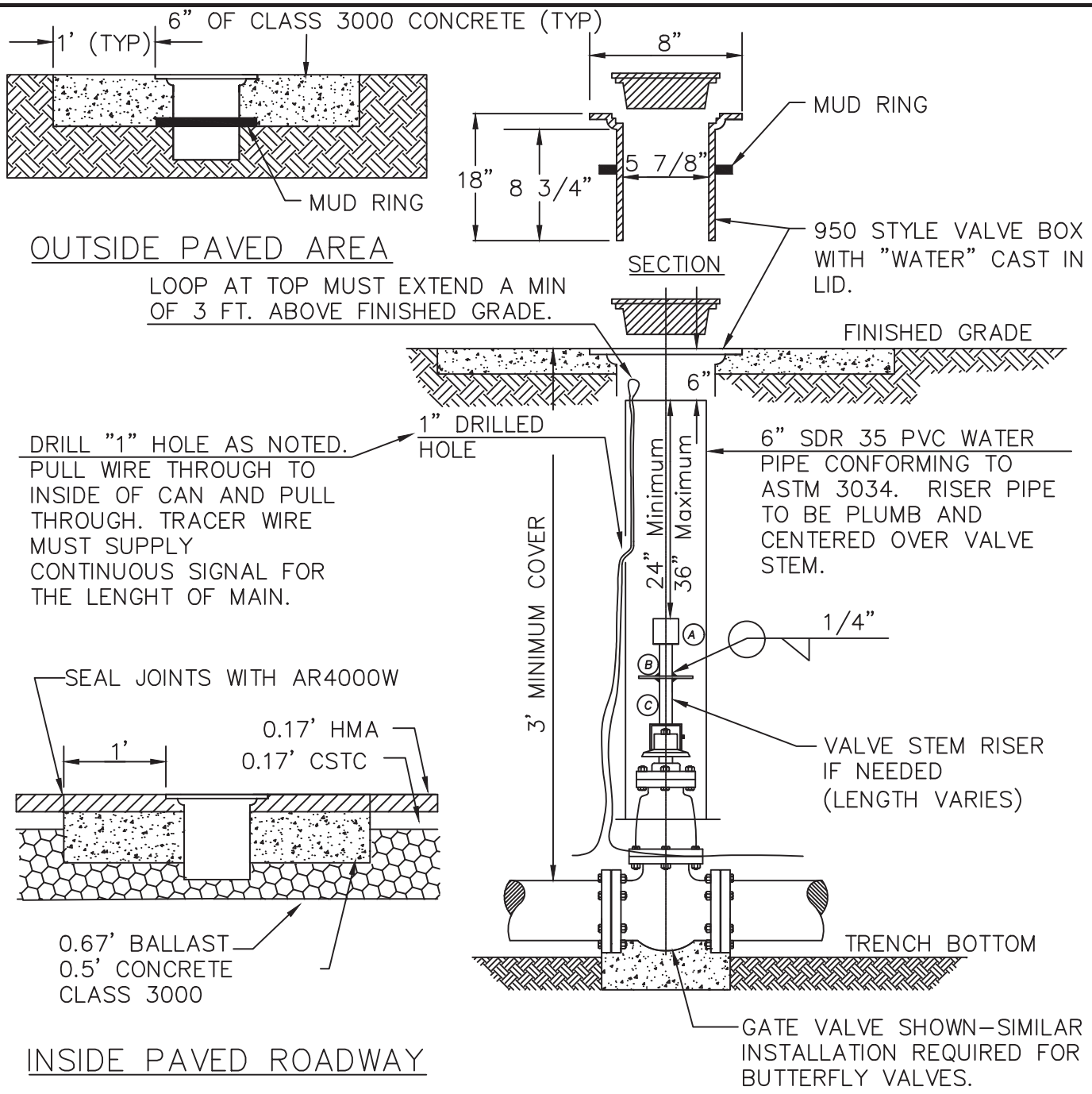


FIRE HYDRANT

APPR. DATE:		FIG NO:	WA-03

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



VALVE STEM EXTENSION LEGEND

A. VALVE OPERATING NUT OR 1 7/8" X 1 7/8" X 2" HIGH GRADE STEEL WELDED TO GUIDE PLATE.

B. 3/16" THICK X 5 1/5" DIA STEEL GUIDE PLATE WELDED TO RISER SHAFT.

C. 2"X2"X 3/16" SQUARE STRUCTURAL STEEL TUBING TO FIT OPERATING NUT. LENGTH AS REQUIRED.

NOTE:

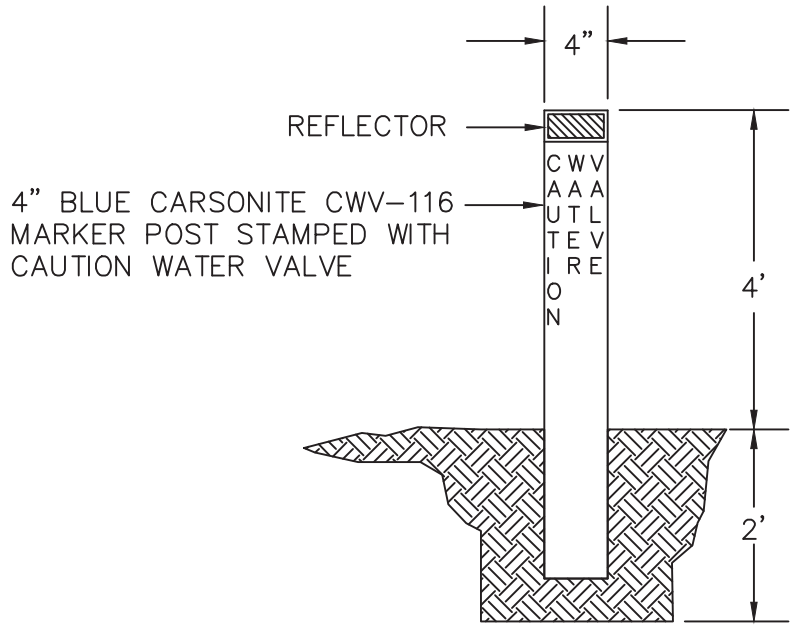
1. ALL WELDS TO SHAFT SHALL BE FILLET WELD ALL AROUND, AS SPECIFIED ABOVE.

STANDARD VALVE BOX

APPR. DATE:		FIG NO:	WA-04

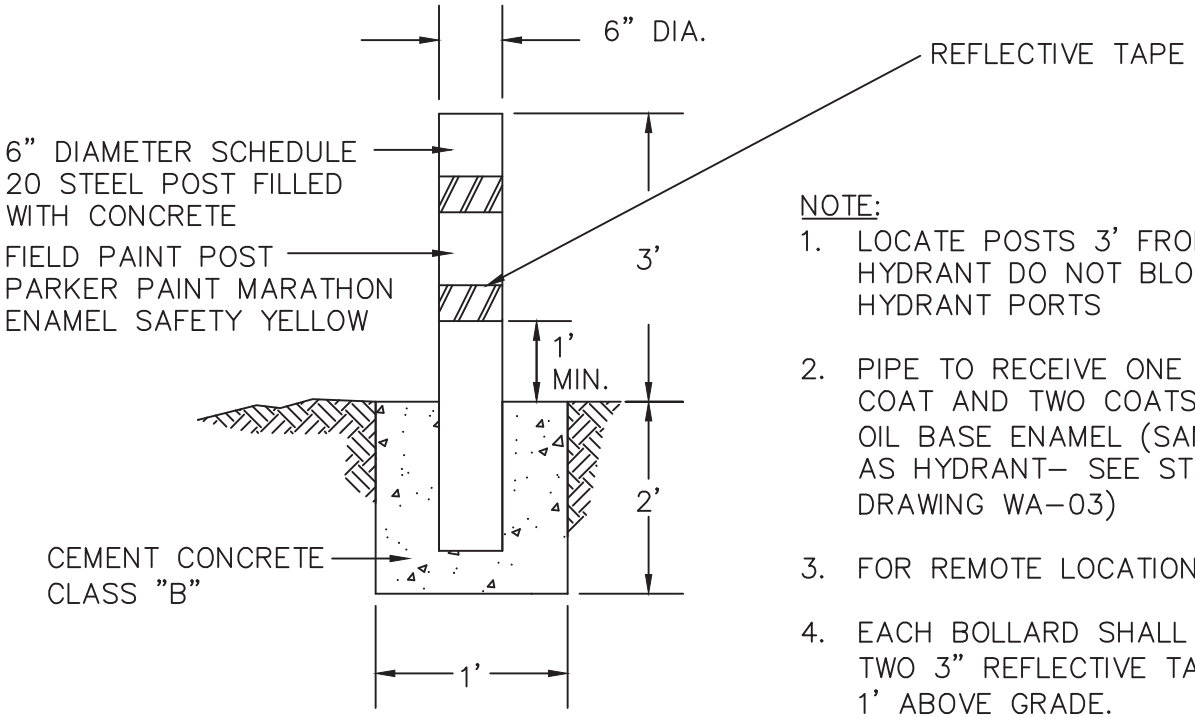
Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



FRONT

VALVE MARKER POST



HYDRANT BOLLARD

NOTE:

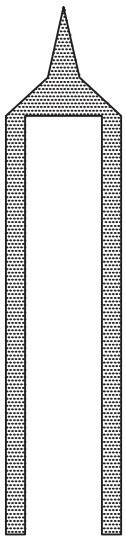
1. LOCATE POSTS 3' FROM HYDRANT DO NOT BLOCK HYDRANT PORTS
2. PIPE TO RECEIVE ONE PRIME COAT AND TWO COATS OUTDOOR OIL BASE ENAMEL (SAME COLOR AS HYDRANT– SEE STANDARD DRAWING WA–03)
3. FOR REMOTE LOCATIONS
4. EACH BOLLARD SHALL HAVE TWO 3" REFLECTIVE TAPE A MIN. 1' ABOVE GRADE.

VALVE MARKER POST & HYDRANT BOLLARD DETAIL

APPR. DATE:		FIG NO: WA-05

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



INSULATED POUCH MANUFACTURED BY DEKORRA PRODUCTS LLC, PART NO. 610 CUSTOM 24" WIDE X 34" TALL PLACED OVER THE ARV TO PROTECT FROM FREEZING.

NOTES:

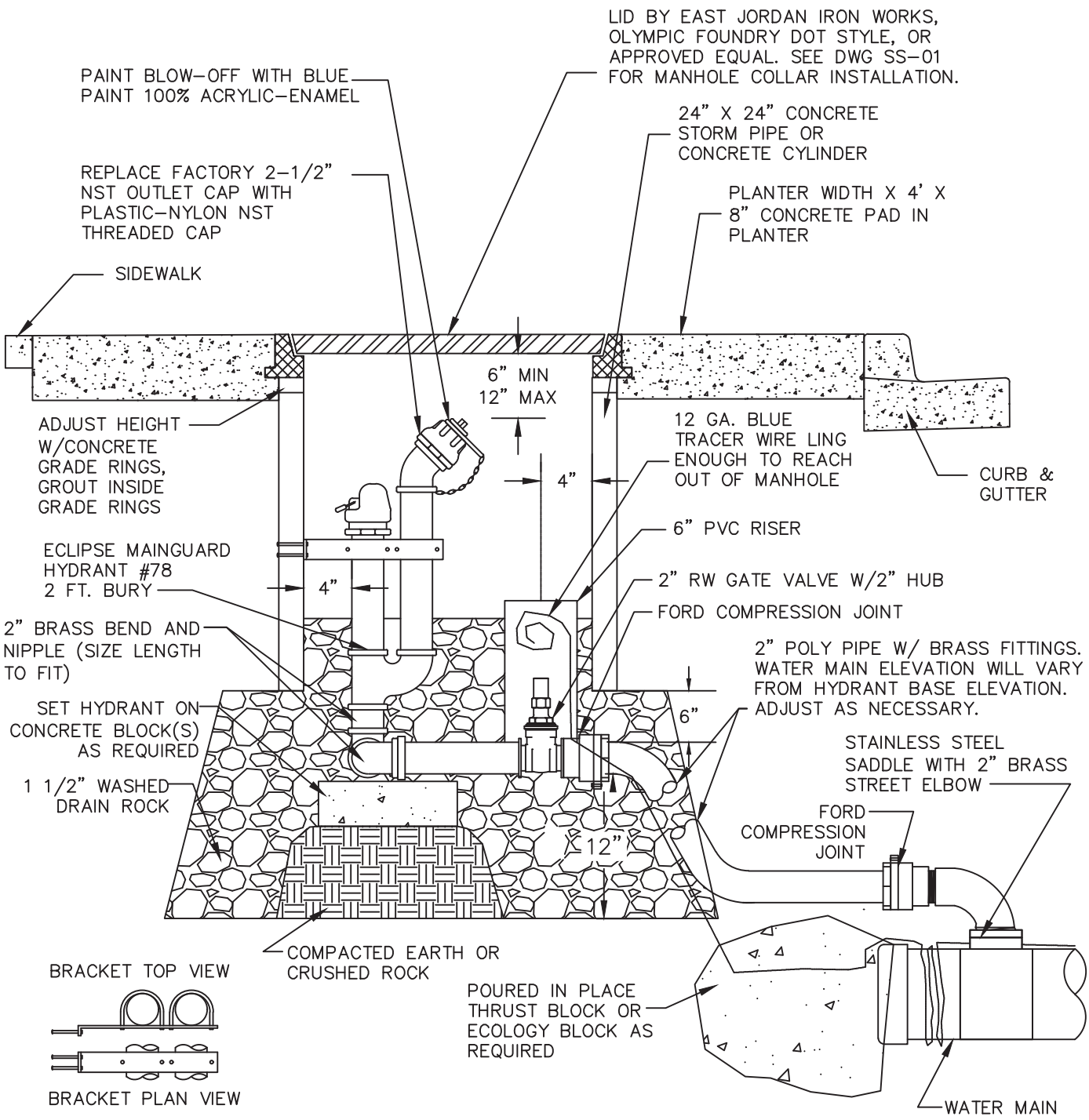
1. VALVE ASSEMBLY SHALL BE SET AT THE HIGH POINT OF THE LINE.
2. ALL AIR/VACUUM RELEASE VALVES SHALL BE INSTALLED BEHIND THE SIDEWALK AT THE NEAREST PROPERTY CORNER AND NOT IN FRONT OF A RESIDENCE.
3. AIR RELEASE VALVES SHALL BE 2" ARI D-040 WITH THERMO PROTECTION ENCASEMENT.
4. ALL FITTINGS AND PIPING SHALL BE DOMESTIC BRASS.
5. CABINET SHALL OPEN TOWARDS THE SIDEWALK.
6. INSTALL THE INSULATED POUCH 602-DT OVER THE ARV UNIT TO PROTECT IT FROM FREEZING.

2" AIR AND VACUUM RELEASE VALVE

APPR. DATE:		FIG NO:	WA-06

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



THE BRACKETS SHOULD BE CUSTOM MADE SINCE THE SPACING OR LOCATION OF THE UNIT MAY VARY. ALL PARTS SHALL BE STAINLESS STEEL A MIN. 3/16" THICK, 1-3/4" HIGH. THE NUTS AND BOLTS SHALL BE 3/8" STAINLESS STEEL.

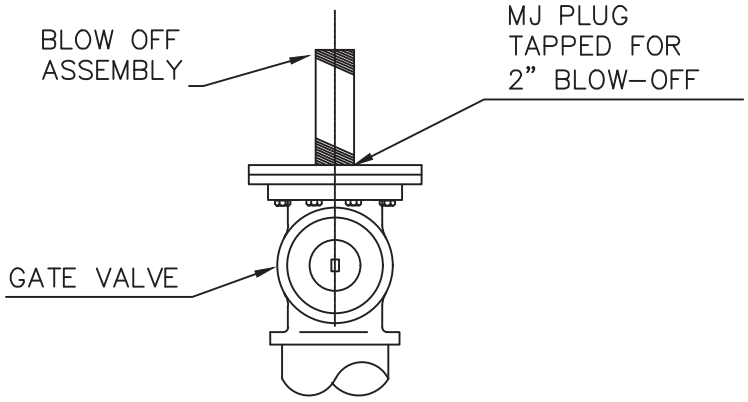
GENERAL NOTES:

1. ALL BRASS PIPING AND FITTINGS SHALL BE DOMESTIC AND MANUFACTURED IN THE U.S.A.
2. IN A CUL-DE-SAC SCENARIO THE BLOW-OFF SHALL END AT THE MIDDLE OF THE SAC.
3. THERE SHALL NOT BE ANY SERVICE CONNECTIONS PAST THE BLOW-OFF

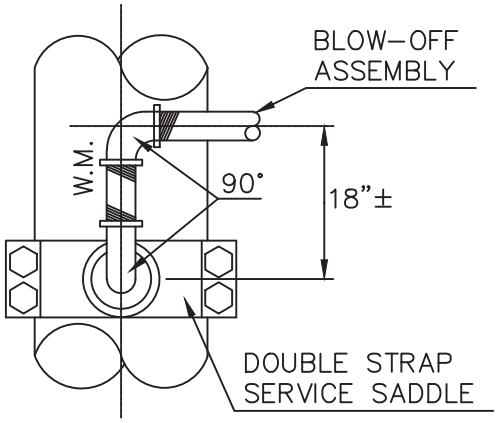
2"-BLOWOFF-ASSEMBLY

APPR. DATE:	REF: CITY OF LACEY	FIG NO: WA-07

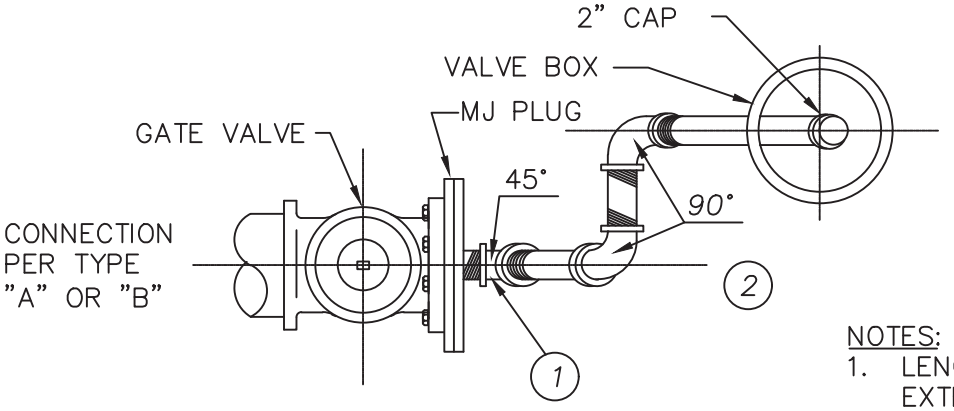
THURSTON COUNTY WATER STANDARD DETAIL



TYPE "A" (END CAP) DEAD END SYSTEM ONLY

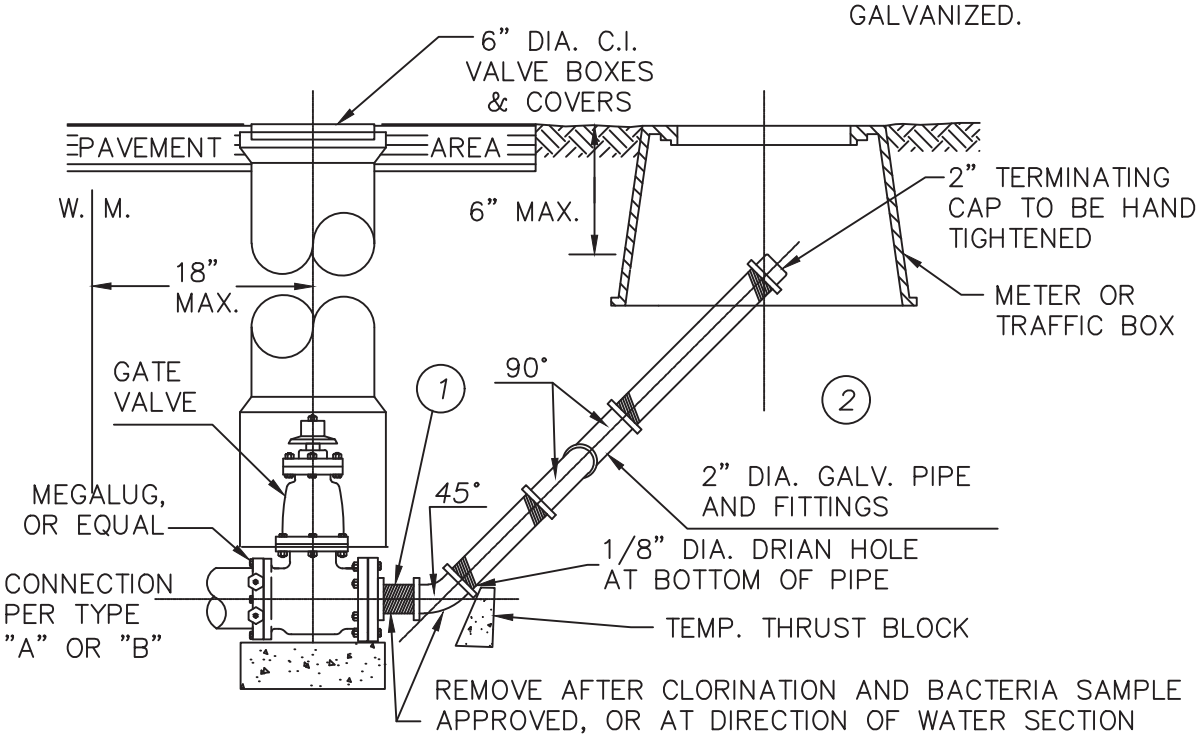


TYPE "B" (TOP/IN-LINE)



PLAN VIEW

NOTES:
1. LENGTH OF PIPE AS DIRECTED TO EXTEND BLOW-OFF TERMINUS BEYOND EDGE OF PAVEMENT.
2. ALL PIPE AND FITTINGS TO BE GALVANIZED.

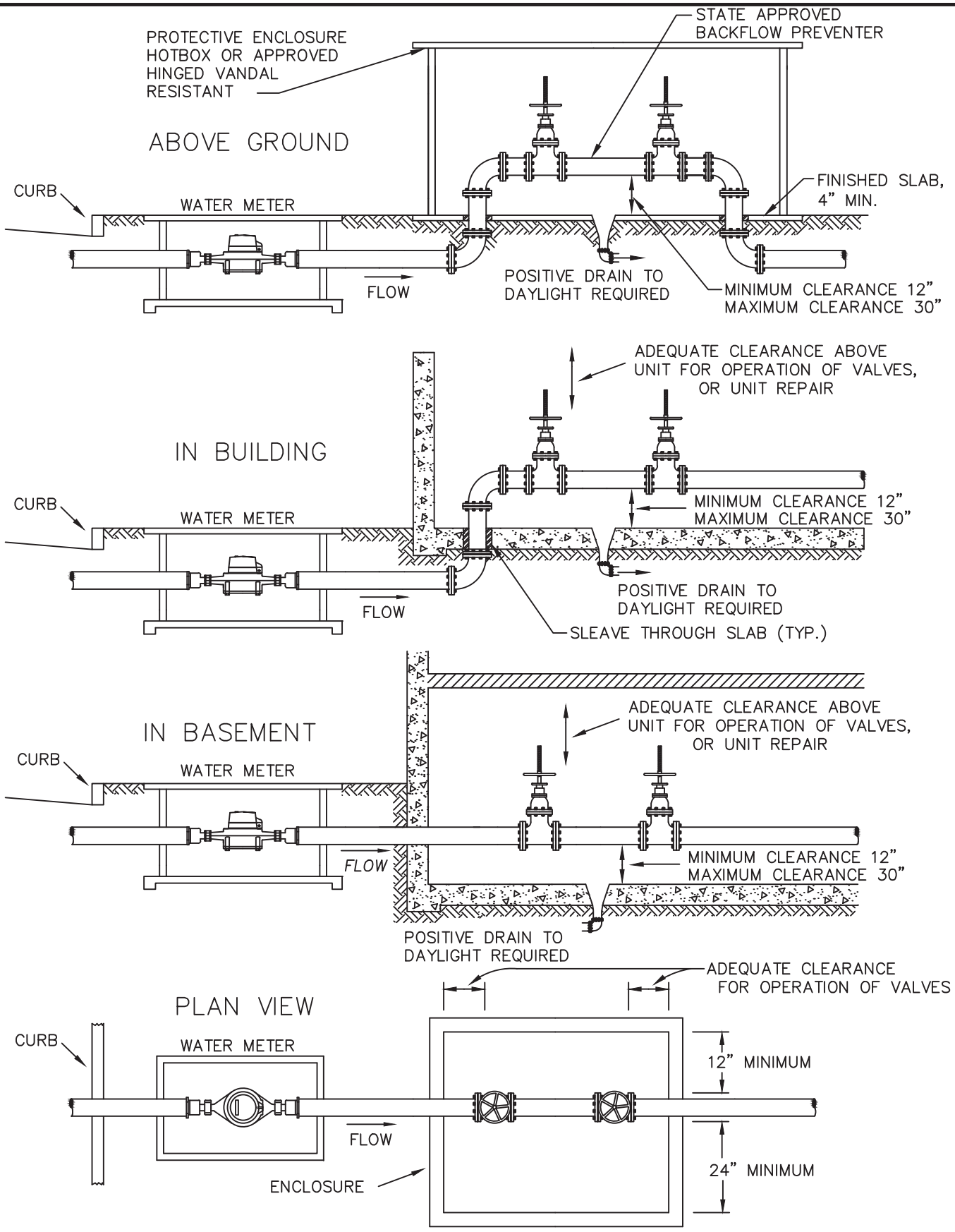


2" TEMPORARY BLOW-OFF ASSEMBLY TYPE "A" AND "B"

APPR. DATE:		FIG NO:	WA-08

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

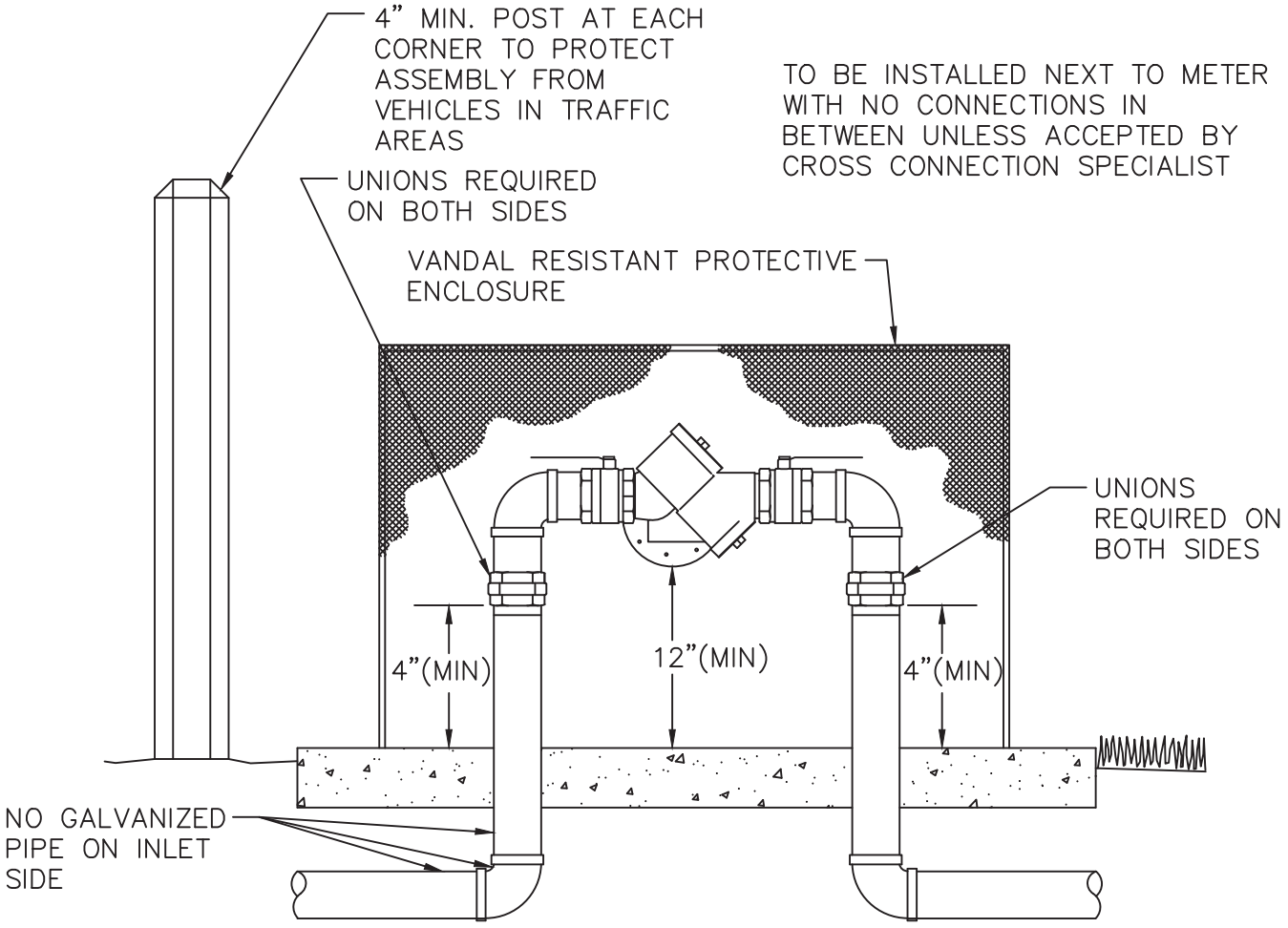


TYPICAL INSTALLATION WITH MINIMUM CLEARANCE & BACKFLOW PREVENTION DEVICE ASSEMBLY

APPR. DATE:		FIG NO:	WA-09

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



(ABOVE GROUND INSTALLATION)

NOTE:
1. ENCLOSURE TO BE LOCATED OUTSIDE OF FENCED AREAS.

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:
1. APPROVED REDUCED PRESSURE BACK FLOW ASSEMBLY SHALL LAY HORIZONTAL ONLY.
2. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACK FLOW PREVENTER.
4. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
5. NO GALVANIZED PIPE BEFORE ASSEMBLY.
6. VALVE SHALL BE PROTECTED FROM FREEZING CONDITIONS.
7. THE BACK FLOW ASSEMBLY SHALL BE A CURRENT WASHINGTON STATE DEPARTMENT OF HEALTH APPROVED MODEL.
8. A PLUMBING PERMIT IS REQUIRED.

2" AND SMALLER REDUCED PRESSURE (RP) INSTALLATION

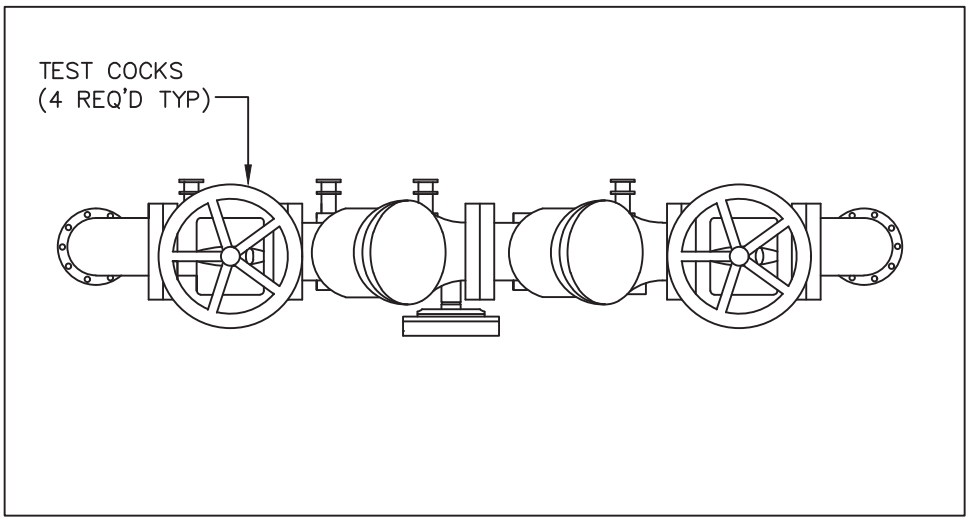
APPR. DATE:		FIG NO: WA-10

Source; City of Olympia

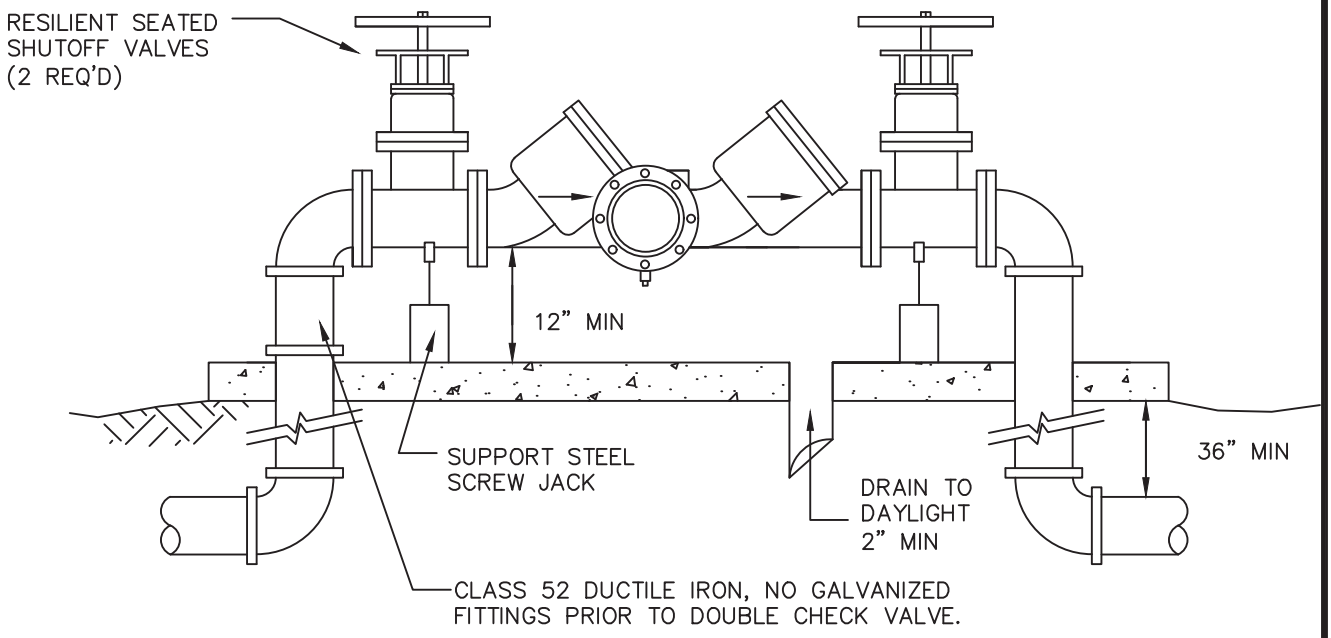
THURSTON COUNTY WATER STANDARD DETAIL

A COUNTY APPROVED VALVE IS REQ'D. BETWEEN THE SUPPLY MAIN AND THE VAULT.

PROVIDE HEAT OR REMOVABLE INSULATED ENCLOSURE ON OUTSIDE APPLICATIONS: PRO–BOX, HOT BOX OR EQUAL INSULATED ENCLOSURES.



TOP VIEW



SIDE VIEW

(ABOVE GROUND INSTALLATION)

NOTES:

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

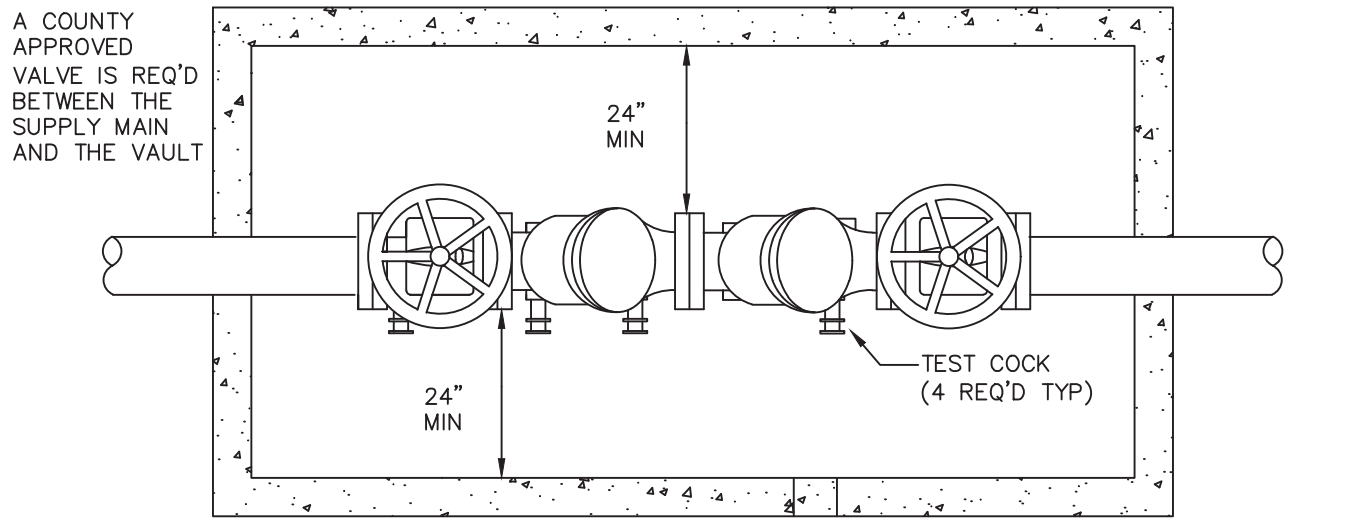
1. APPROVED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH.
2. APPROVED REDUCED PRESSURE BACK FLOW ASSEMBLY TO LAY HORIZONTAL ONLY.
3. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
4. THE WATER LINE SHALL BE DISINFECTED, FLUSHED, AND PRESSURE TESTED PRIOR TO INSTALLING THE BACK FLOW ASSEMBLY. THE BACK FLOW ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND FLOODING.
5. ALL PIPE, VALVES, AND FITTING JOINTS, FROM SUPPLY MAIN, SHALL BE FLANGED AND RESTRAINED.
6. ALL ENCLOSURES AND AIR–GAP DRAINS SHALL BE PRE APPROVED PRIOR TO INSTALLATION.
7. ALL LOCATIONS SHALL BE PRE APPROVED PRIOR TO INSTALLATION.
8. ENCLOSURES SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
9. THE BACK FLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A CERTIFIED BACK FLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE THURSTON COUNTY PUBLIC WORKS WATER RESOURCE DIVISION.
10. FIRE SERVICES REQUIRE DETECTOR TYPE BACK FLOW PROTECTION ASSEMBLIES.

STANDARD REDUCED PRESSURE BACKFLOW ASSEMBLY 2 1/2" OR LARGER

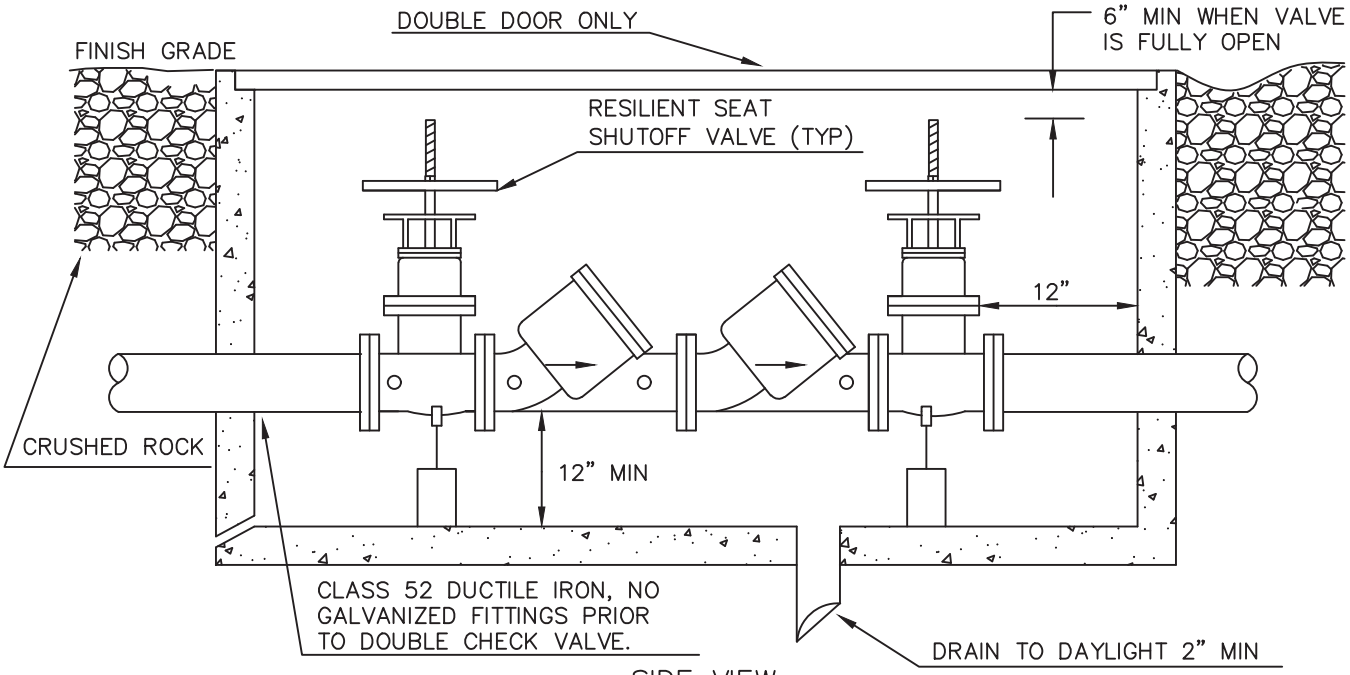
APPR. DATE:		FIG NO:	WA-11

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



TOP VIEW



SIDE VIEW

(ABOVE GROUND INSTALLATION)

NOTE:

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

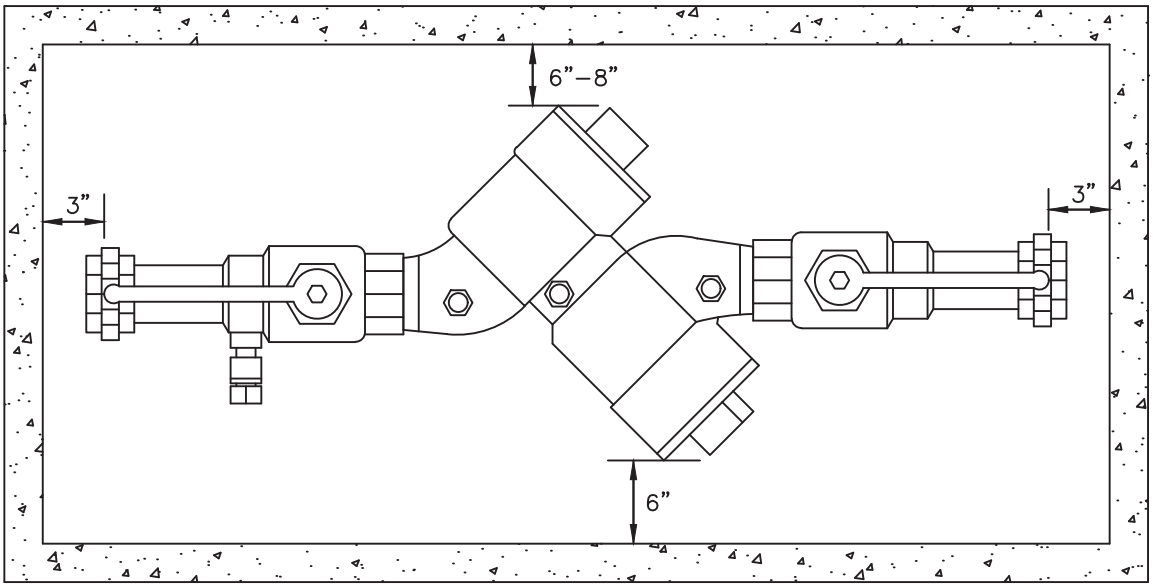
1. DOUBLE CHECK VALVE ASSEMBLY SHALL BE A WASHINGTON STATE DEPT. OF HEALTH APPROVED MODEL.
2. BACK FLOW ASSEMBLY SHALL BE AN APPROVED MODEL W/4 TEST COCKS AND A RESILIENT SEATED SHUT OFF VALVE MOUNTED AT EACH END AND MEET MINIMUM STATE STANDARDS FOR BACK FLOW PROTECTION.
3. THE WATER LINE SHALL BE DISINFECTED, FLUSHED, AND PRESSURE TESTED PRIOR TO INSTALLING THE BACK FLOW ASSEMBLY. THE BACK FLOW ASSEMBLY SHALL BE PROTECTED FROM FLOODING.
4. THE BACK FLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A CERTIFIED BACK FLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION.
5. ALL PIPE VALVE AND FITTING JOINTS, FROM THE SUPPLY MAIN, SHALL BE FLANGED AND RESTRAINED.
6. FIRE DEPT. CONNECTION SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.
7. GROUT PIPE ENTRANCE AND EXIT, IN VAULT, WITH WATERTIGHT GROUT.
8. ALL VAULTS SHALL BE PRE APPROVED PRIOR TO INSTALLATION.
9. VAULTS SHALL BE INSTALLED AT PROPERTY LINE OR EASEMENT LINE AND ON OWNERS PROPERTY.
10. VAULTS SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
11. FIRE SERVICES REQUIRE DETECTOR TYPE BACK FLOW PROTECTION ASSEMBLIES.

2 1/2" AND LARGER DOUBLE CHECK VALVE ASSEMBLY

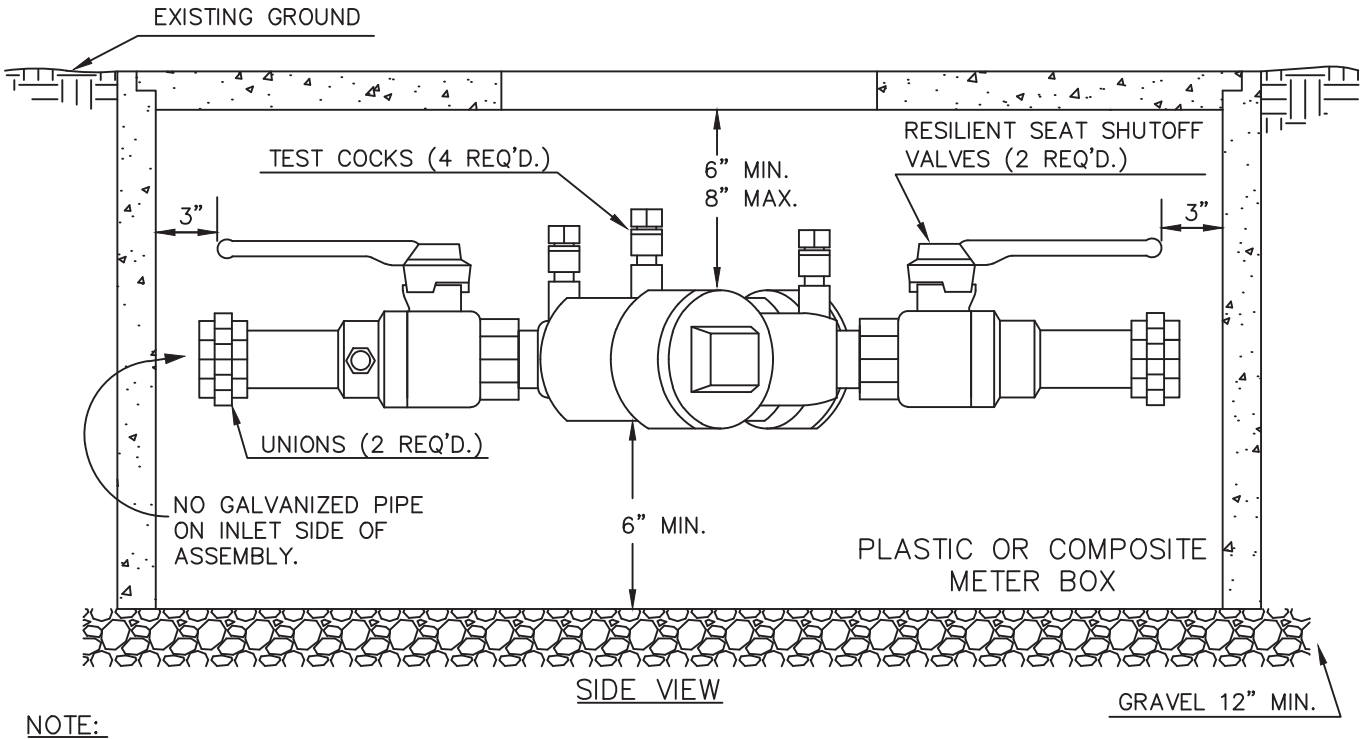
APPR. DATE:		FIG NO:	WA-12

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



TOP VIEW



SIDE VIEW

NOTE:

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

1. APPROVED DOUBLE CHECK VALVE ASSEMBLY SHALL LAY HORIZONTAL WITH GROUND.
2. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACK FLOW PREVENTER.
4. NO GALVANIZED PIPE BEFORE ASSEMBLY.
5. THE DCVA MAY BE INSTALLED ABOVE OR BELOW THE GROUND PROVIDED ALL CLEARANCES ARE MET.
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. VALVE SHALL BE PROTECTED FROM FREEZING CONDITIONS.
8. THE BACK FLOW ASSEMBLY SHALL BE A MODEL CURRENTLY APPROVED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH.
9. A PLUMBING PERMIT IS REQUIRED.

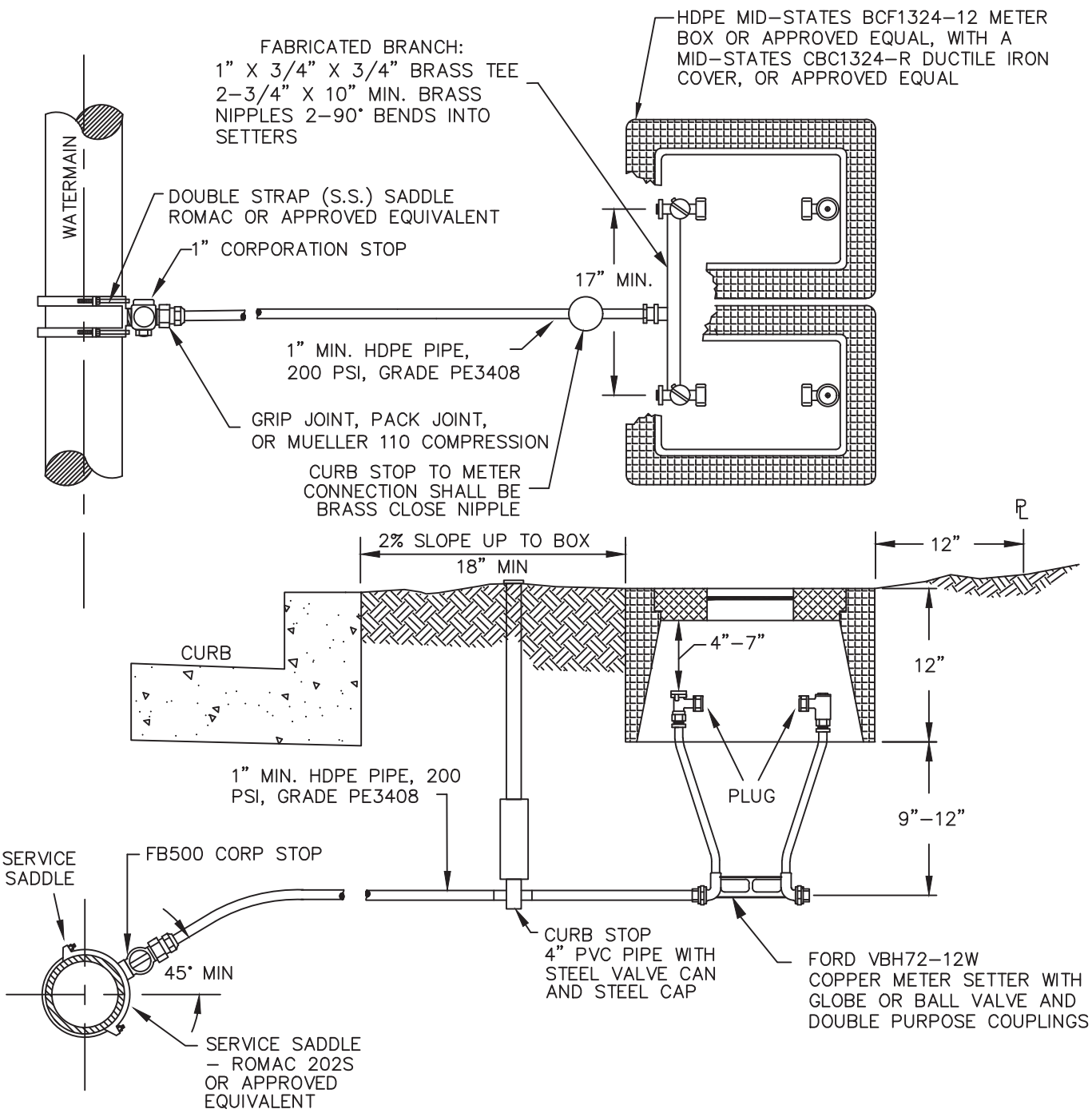
(BELOW GROUND INSTALLATION)

2" AND SMALLER DOUBLE CHECK VALVE ASSEMBLY

APPR. DATE:		FIG NO:	WA-13

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



NOTES:

1. CORPORATION STOPS SHALL BE ALL U.S. BRASS, & SHALL BE FORD, MUELLER, OR A.Y. MCDONALD W/ THREADS CONFORMING TO AWWA C-800.
2. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET, I.P. THREADS, & STAINLESS STEEL DOUBLE STRAPS.
3. ANGLE CHECK VALVE REQUIRED ON ALL WATER METER OUTLETS

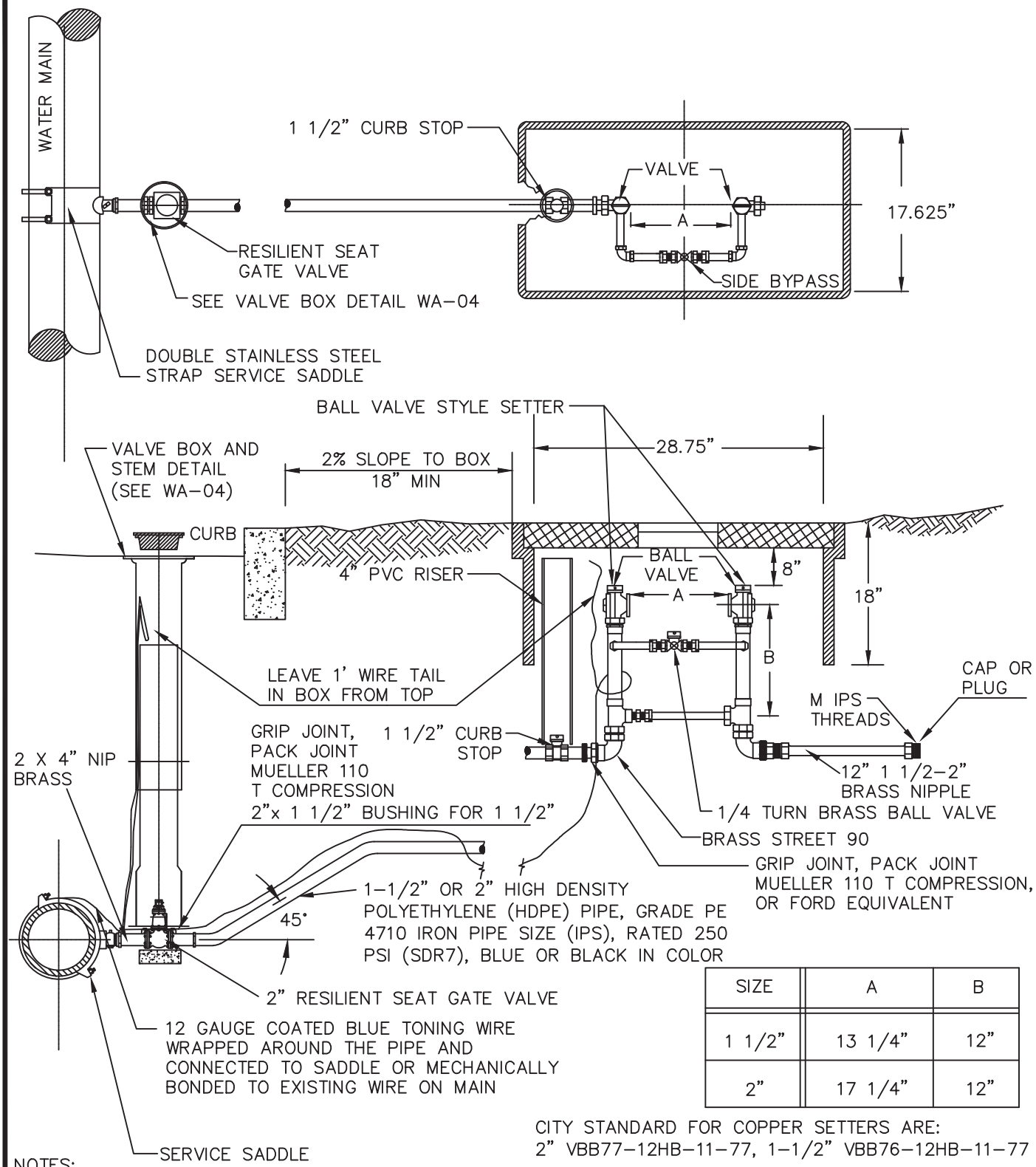
N.T.S.

1" DUAL WATER SERVICE

APPR. DATE:		FIG NO:	WA-14

Source; City of Chehalis

THURSTON COUNTY WATER STANDARD DETAIL



SIZE	A	B
1 1/2"	13 1/4"	12"
2"	17 1/4"	12"

CITY STANDARD FOR COPPER SETTERS ARE:
2" VBB77-12HB-11-77, 1-1/2" VBB76-12HB-11-77

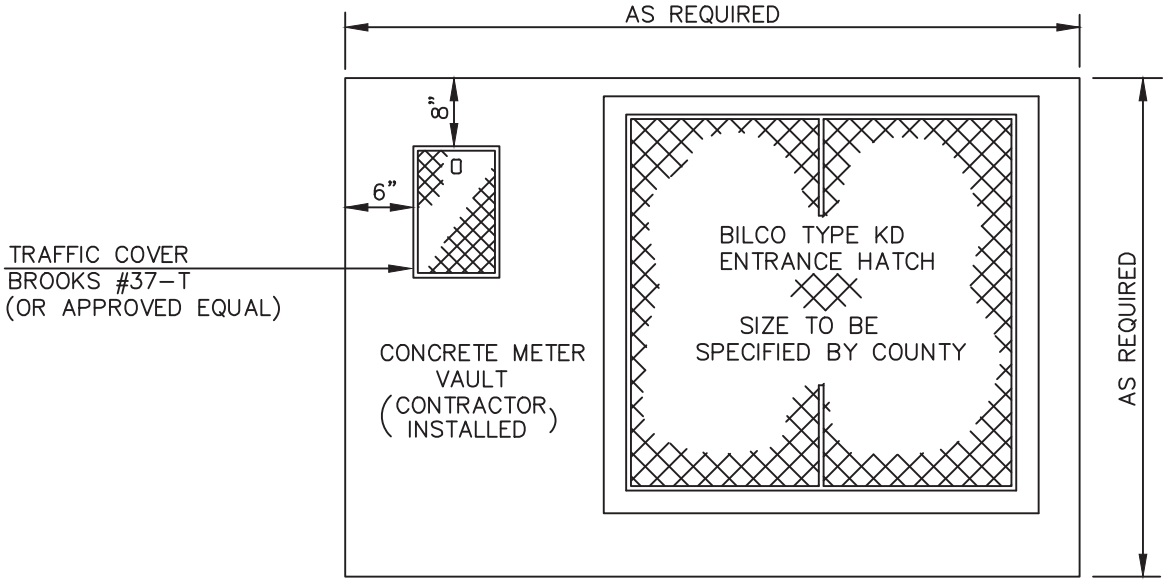
NOTES:
1. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET AND I.P. THREADS.
2. SETTERS SHALL BE CENTERED IN METER BOXES.
3. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS, OR GRIP JOINTS.
4. METER BOX SHALL BE HDPE CARSON BCF1730-18 OR APPROVED EQUAL, WITH DUCTILE IRON COVER OR APPROVED EQUAL.
5. SEE STANDARD DRAWINGS WA-34 AND WA-35 FOR COVER DETAIL.

TYPICAL 1-1/2" AND 2" WATER SERVICE & METER SETTER W/BYPASS

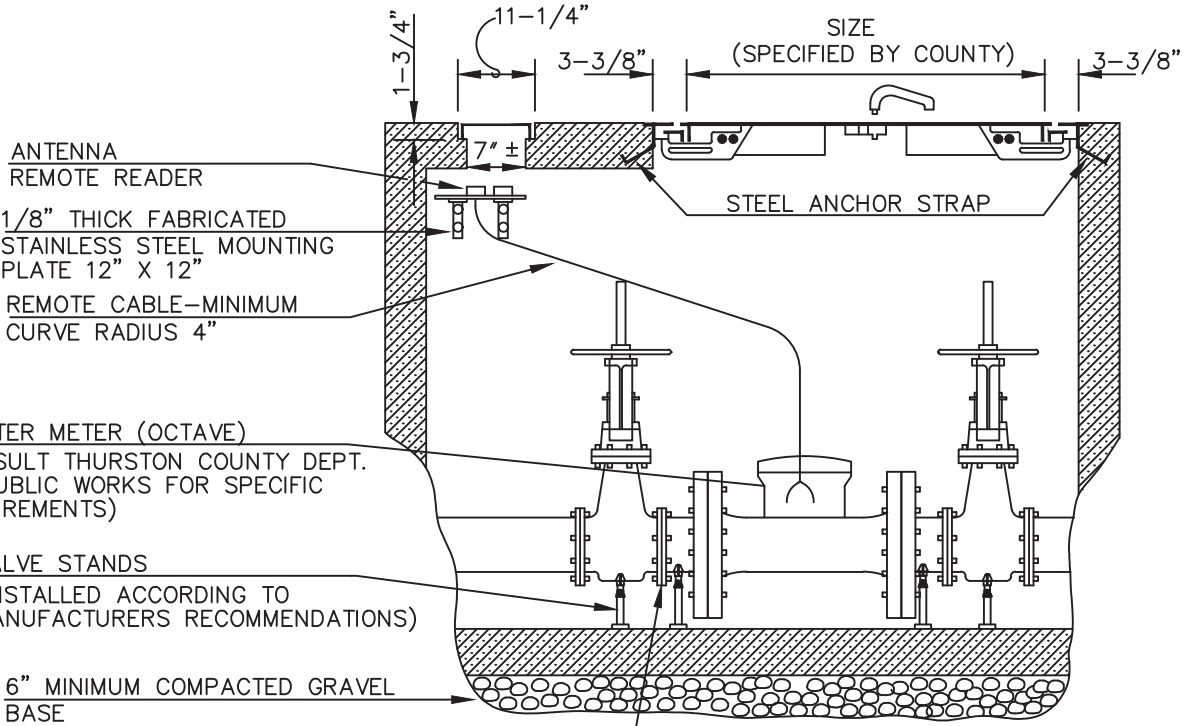
APPR. DATE:		FIG NO:	WA-15

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



PLAN VIEW
N.T.S.



ELEVATION VIEW
N.T.S.

NOTES:

1. VAULT SHALL BE DESIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF WASHINGTON
2. MOUNTING PLATE TO BE INSTALLED BY CONTRACTOR SO THAT ALL READING REGISTERS ARE VISIBLE THROUGH TRAFFIC COVER, AND CABLE(S) DO NOT INTERFERE WITH ACCESS TO METER.

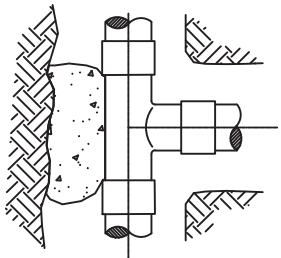
N.T.S.

LARGE METER VAULT

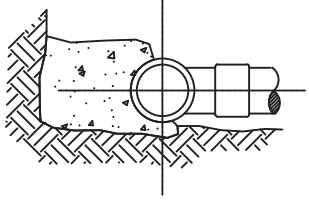
APPR. DATE:		FIG NO:	WA-16

Source; City of Chehalis

THURSTON COUNTY WATER STANDARD DETAIL

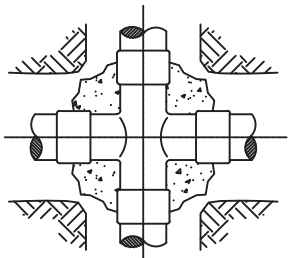


TOP VIEW

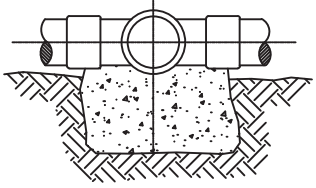


SIDE VIEW

TEE

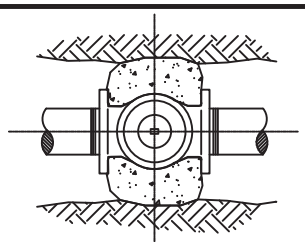


TOP VIEW

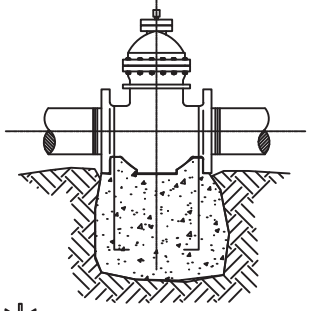


SIDE VIEW

CROSS

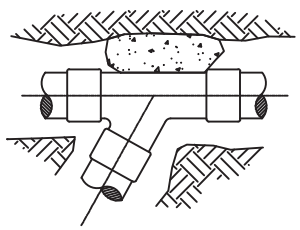


TOP VIEW

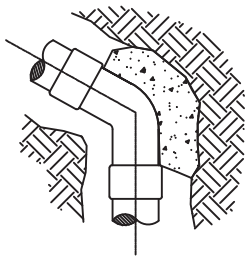


* SIDE VIEW

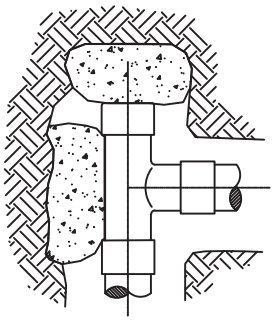
GATE VALVE



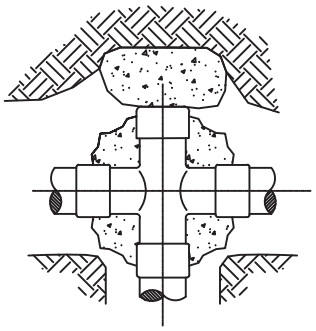
WYE



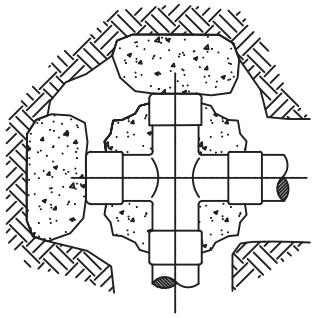
HORIZ. BEND



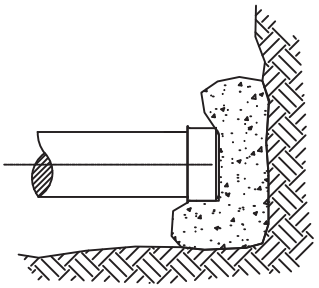
TEE WITH PLUG



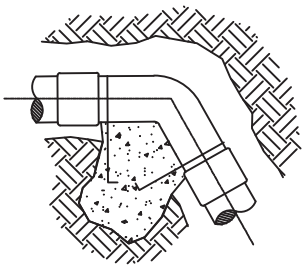
CROSS WITH PLUG



CROSS WITH PLUGS



PLUG OR CAP



45° – 90° VERTICAL BEND

* IF IN THE OPINION OF THE COUNTY ENGINEER THE VALVE IS ON A SLOPE AND/OR THE COVER ON THE PIPE WOULD APPLY UPWARD THRUST, THEN THRUST BLOCKING WILL BE REQUIRED.

NOTES:

1. CONCRETE THRUST BLOCKING TO BE POURED AGAINST UNDISTURBED EARTH.
2. ECOLOGY BLOCKS OR OTHER DRY BLOCKING MAY BE USED WITH COUNTY'S APPROVAL.
3. PLASTIC BARRIER SHALL BE PLACED BETWEEN ALL THRUST BLOCKS & FITTINGS.
4. ANCHOR REBAR SHALL BE #5 ON 12" DIA. AND LESS WITH 30" IMBEDMENT, #5 ON 16"–24" DIAMETER WITH 36" IMBEDMENT.
5. PLUGS TO BE MINIMUM OF 5' FROM TEE, WYE, CROSS ON VALVE.

STANDARD BLOCKING DETAIL

APPR. DATE:		FIG NO: WA-17

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

NOTES:

1. BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH 11 MIL PLASTIC OR SIMILAR MATERIAL.

2. KEEP CONCRETE CLEAR OF JOINTS AND ACCESSORIES.

3. THE REQUIRED THRUST BEARING AREAS FOR SPECIAL CONNECTIONS ARE SHOWN ENCIRCLED ON THE PLANS; e.g. (15) INDICATES 15 SQUARE FEET BEARING AREA REQUIRED.

4. IF NOT SHOWN ON PLANS REQUIRED BEARING AREAS AT FITTINGS SHALL BE PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) STATED IN THE SPECIAL SPECIFICATIONS.

5. BEARING AREAS AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER BEARING AREAS AND BLOCKING DETAILS SHOWN ON THIS STANDARD DETAIL.

BEARING AREA OF THRUST BLOCKS IN SQ. FT.

FITTING SIZE	TEE, WYE PLUG OR CAP	90° BEND PLUGGED CROSS	TEE PLUGGED ON RUN A_1	TEE PLUGGED ON RUN A_2	45° BEND	22-1/2° BEND	11-1/4° BEND
4"	1.0	1.4	1.9	1.4	1.0		
6"	2.1	3.0	4.3	3.0	1.6	1.0	
8"	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10"	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12"	8.5	12.0	17.0	12.0	6.6	3.4	1.7
14"	11.5	16.3	23.0	16.3	8.9	4.6	2.3
16"	15.0	21.3	30.0	21.3	11.6	6.0	3.0
12"	19.0	27.0	38.0	27.0	14.6	7.6	3.8
14"	23.5	33.0	47.0	33.0	18.1	9.4	4.7
16"	34.0	48.0	68.0	48.0	26.2	13.6	6.8

NOTE:

ABOVE BEARING BASED ON TEST PRESSURE OF 150 psi AND AN ALLOWABLE SOIL BEARING STRESS OF 2,00 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURE AND SOIL BEARING STRESSES. USE STANDARD PLAN WA-19

THRUST BLOCK AREAS

APPR. DATE:		FIG NO:	WA-18

Source; City of Lacey

THURSTON COUNTY WATER STANDARD DETAIL

THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:

1. BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH 11 MIL PLASTIC OR SIMILAR MATERIAL.

2. TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
EXAMPLE : 12" – 90° BEND IN SAND AND GRAVEL 32,000 LBS 3000 LB/S.F. = 10.7 S.F. OF AREA

3. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.

4. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

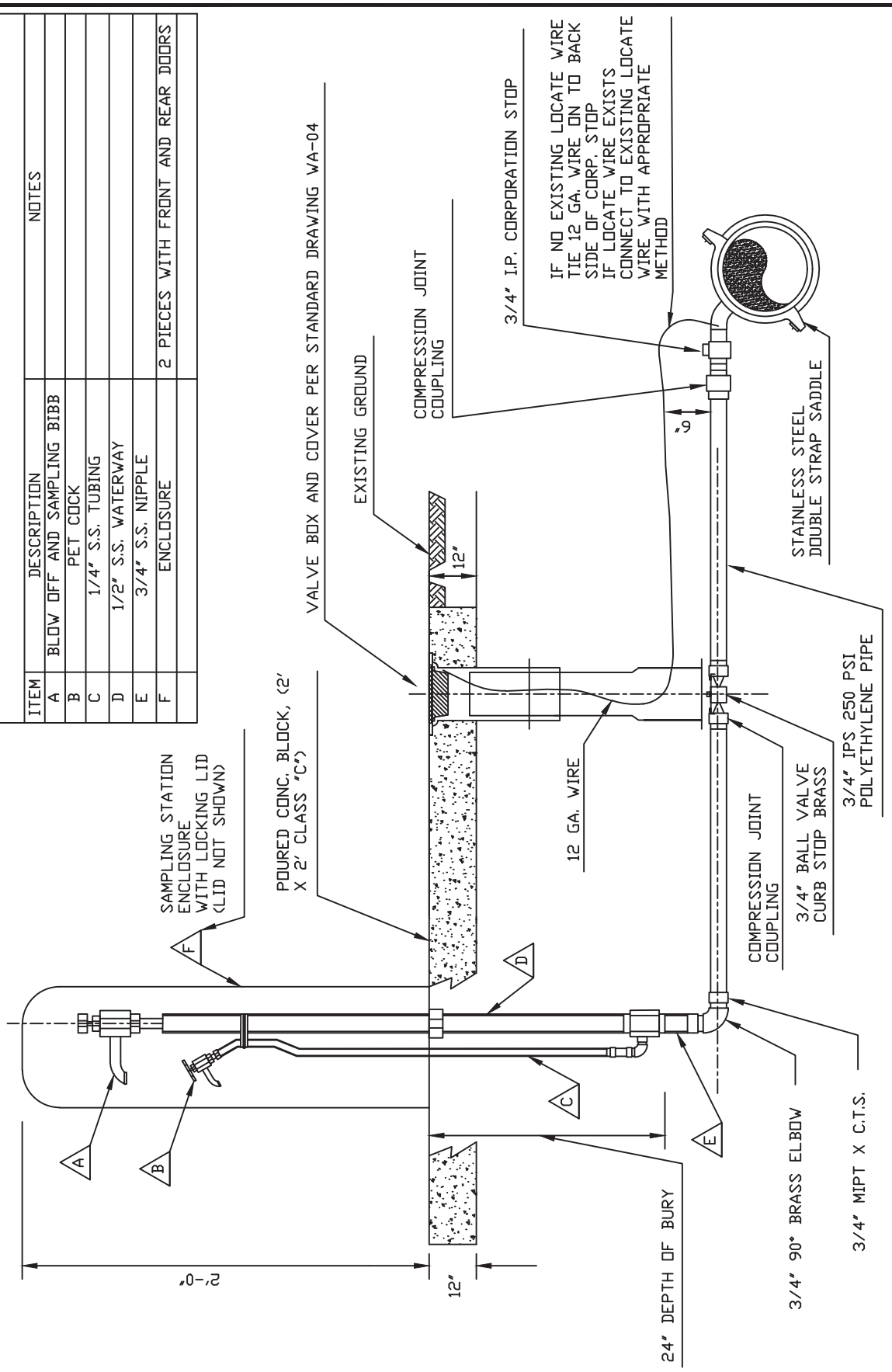
THRUST LOADS

APPR. DATE:		FIG NO:	WA-19

Source; City of Lacey

THURSTON COUNTY WATER STANDARD DETAIL

ITEM	DESCRIPTION	NOTES
A	BLOW OFF AND SAMPLING BIBB	
B	PET COCK	
C	1/4" S.S. TUBING	
D	1/2" S.S. WATERWAY	
E	3/4" S.S. NIPPLE	
F	ENCLOSURE	2 PIECES WITH FRONT AND REAR DOORS



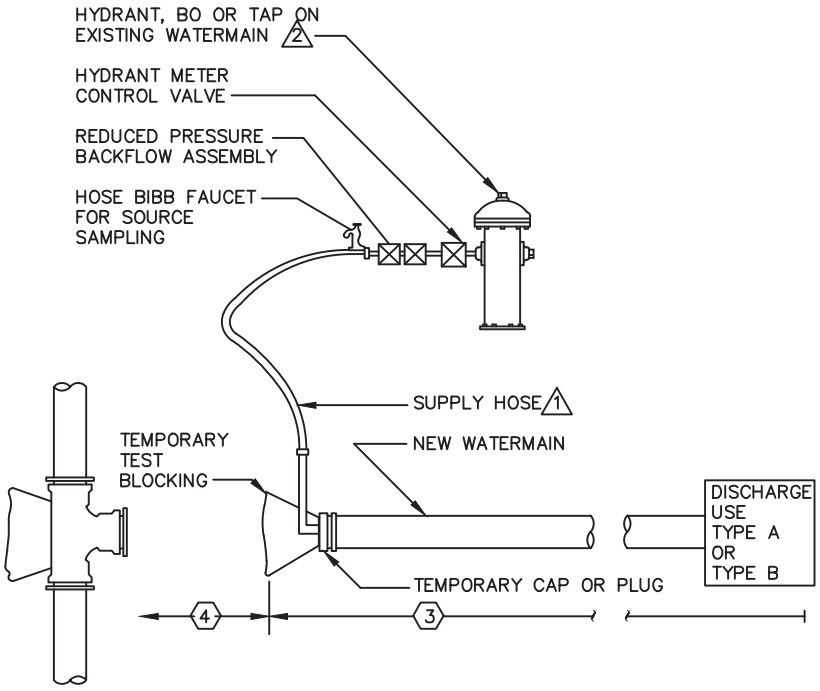
NOTES:
1. SAMPLING STATION SHALL BE MODEL ECLIPSE #88-SS AS MANUFACTURED BY THE KUPFERLE FOUNDRY COMPANY OR APPROVED EQUAL.
2. STAINLESS STEEL PET COCK WILL BE LOCATED BELOW THE SAMPLING BIBB TO ALLOW PUMPING OF REMAINING WATER TO INSURE NON-FREEZING.
3. 1 PUMP SHALL BE FURNISHED WITH EACH STATION.
4. ALL WORKING PARTS SHALL BE OF STAINLESS STEEL AND SERVICEABLE FROM ABOVE GROUND WITH NO DIGGING OR REPLACEMENT NEEDED.
5. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NONREMOVABLE ALUMINUM HOUSING WITH HINGED OPENING.
6. WHEN OPEN, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND WATER WILL FLOW IN AN ALL STAINLESS STEEL WATERWAY.
7. SAMPLING STATION SHALL BE 24" DEPTH OF BURY WITH A 1/2" FIP INLET, AND A 7/16" UNTHREADED BLOW OFF AND SAMPLING BIBB.

WATER QUALITY SAMPLING STATION

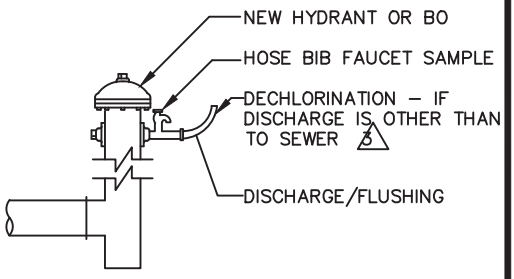
APPR. DATE:	REFER:	FIG NO: WA-20

Source; City of Olympia

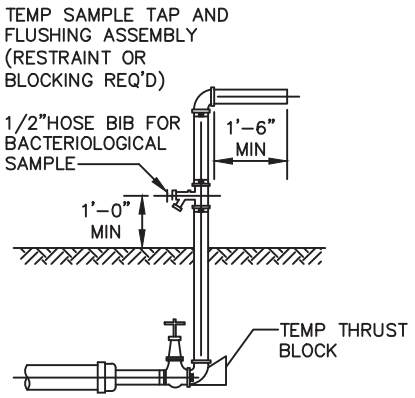
THURSTON COUNTY WATER STANDARD DETAIL



DETAIL 1
TEMPORARY FLUSHING/TESTING CONNECTION



TYPE A



TYPE B

NOTES

1. ALL FITTINGS SHALL BE DUCTILE IRON
2. ALL EXCAVATION SHALL PROVIDE A MINIMUM OF 1'–0" CLEAR AROUND PIPE AND FITTINGS.
3. THESE PLANS ARE FOR DIP AND CIP WATERMAINS 12"OR SMALLER DIA OTHER SIZES AND TYPES SEE PROJECT DRAWINGS
4. REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) SHALL BE INSTALLED AS A UNIT (TWO SHUT–OFF VALVES, RELIEF PORT, TWO CHECK VALVES AND FOUR TEST COCKS). WHEN RPBA IS CONNECTED TO HYDRANT AND THE HOSE BIB FAUCET SAMPLE THEY SHALL BE CAPPED WHEN NOT IN USE. ASSEMBLY SHALL BE TESTED WHEN INSTALLED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER (BAT) AND A CURRENT TEST REPORT SHALL BE ON SITE. FOR INSTALLATION PROCEDURES CALL THE THURSTON COUNTY DEPARTMENT, UTILITY SECTION.
5. WATER MUST BE DE–CHLORINATED UPON DISCHARGE.

LEGEND

1 CLEAN & DISINFECTED POTABLE WATER HOSE ONLY. SIZE FLUSHING RISER PER STD SPEC SEC 7–091.3(23)

△ 2 HYDRANT PERMIT REQUIRED

△ 3 CHECK WITH SEWER UTILITY BEFORE DISCHARGE TO SEWERS

△ 3 INSTALLED BY CONTRACTOR

⬡ 4 CONNECTION PIPE: CONTRACTOR FURNISHED AND INSTALLED

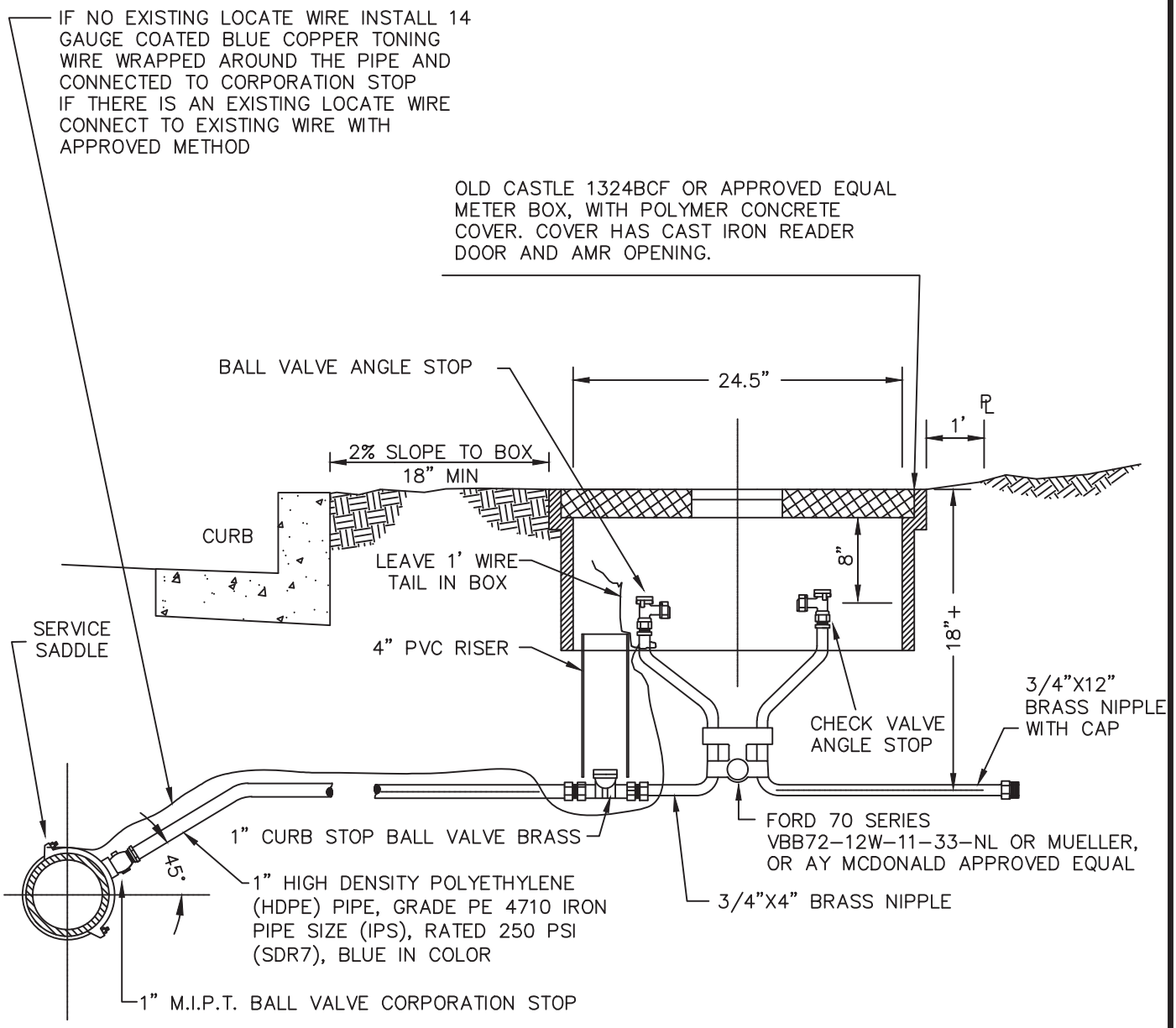
⬡

WATER TESTING – CHARGING & FLUSHING

APPR. DATE:	REFER:	FIG NO: WA-21

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



NOTES:

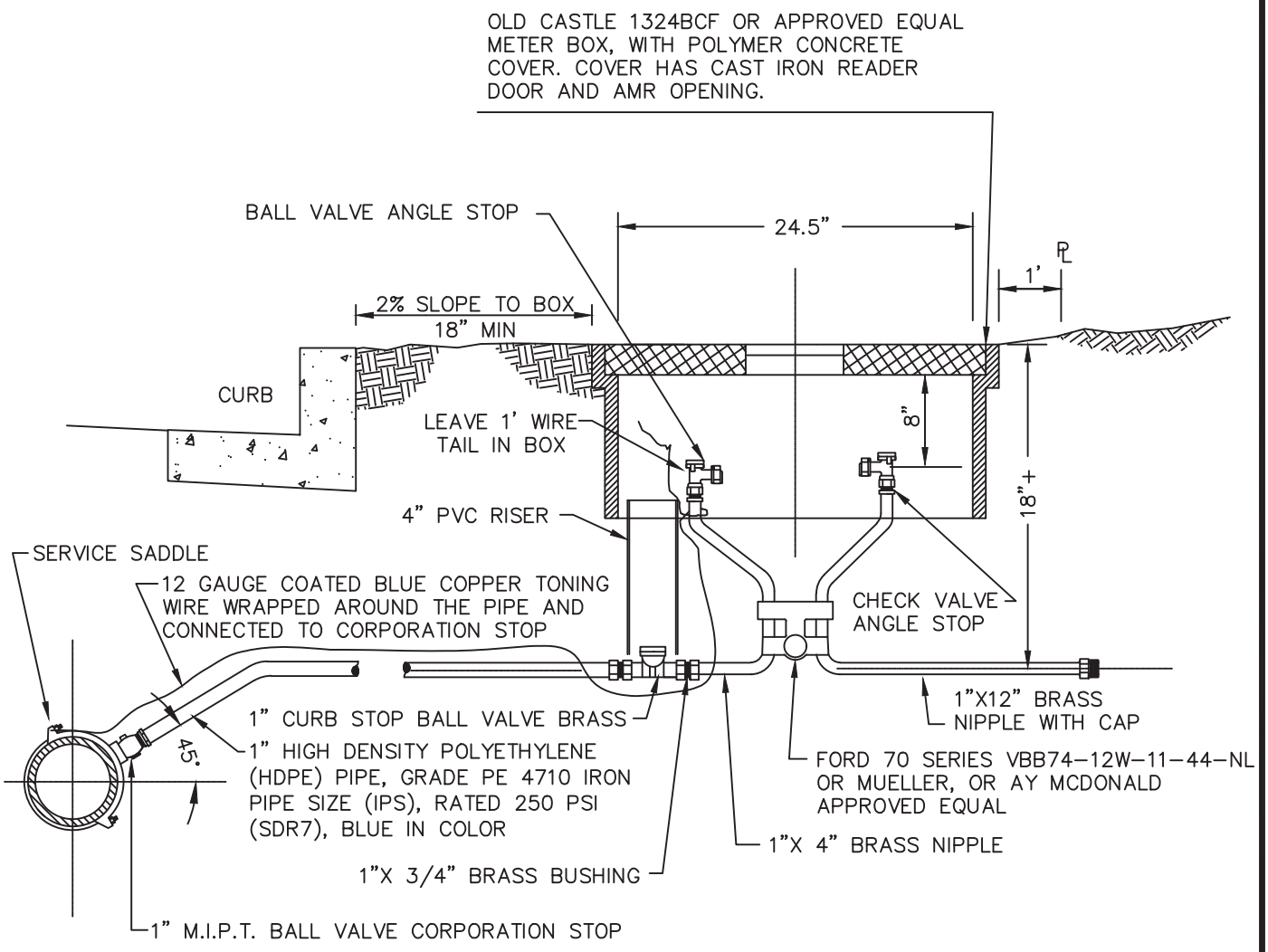
1. THURSTON COUNTY DOES NOT ALLOW THE USE OF RE-SETTERS TO MEET CLEARANCE SPECIFICATIONS.
2. CORPORATION STOPS SHALL BE ALL U.S. BRASS AND SHALL BE FORD, MUELLER, OR AY MCDONALD, WITH THREADS CONFORMING TO AWWA C800. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS OR GRIP JOINTS.
3. SETTER SHALL BE CENTERED IN THE BOX.
4. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET, I.P. THREADS, AND STAINLESS STEEL DOUBLE STRAPS. TORQUE TO MANUFACTURES SPECIFICATIONS.
5. SEE STANDARD DRAWINGS WA-34 AND WA-35 FOR COVER DETAIL.

SINGLE SERVICE CONNECTION 1" DIAMETER TO 3/4" SETTER

APPR. DATE:		FIG NO: WA-22

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



NOTES:

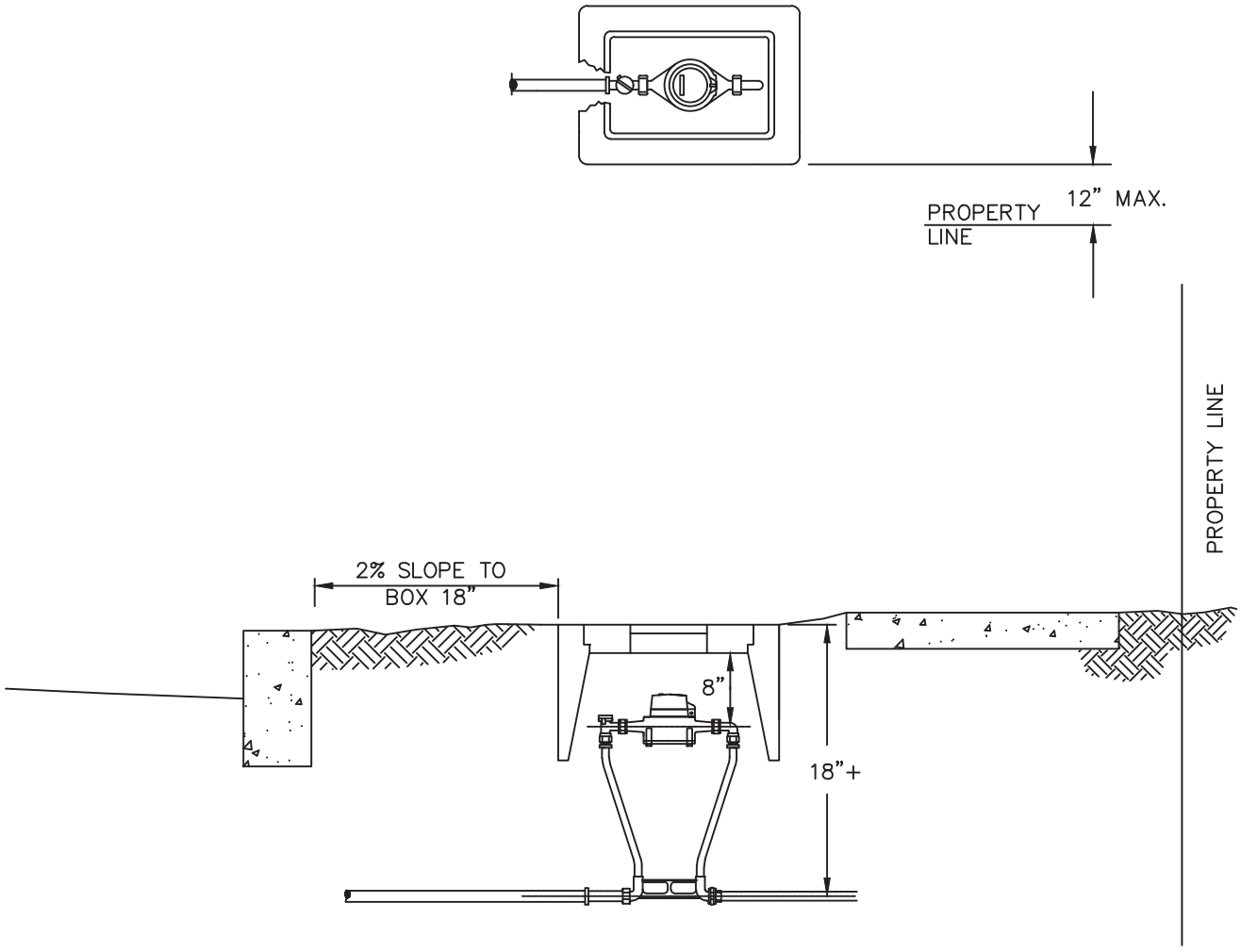
1. THURSTON COUNTY DOES NOT ALLOW THE USE OF RE-SETTERS TO MEET CLEARANCE SPECIFICATIONS.
2. CORPORATION STOPS SHALL BE ALL U.S. BRASS AND SHALL BE FORD, MUELLER, OR AY MCDONALD, WITH THREADS CONFORMING TO AWWA C800. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS OR GRIP JOINTS.
3. SETTER SHALL BE CENTERED IN THE BOX.
4. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET, I.P. THREADS, AND STAINLESS STEEL DOUBLE STRAPS. TORQUE TO MANUFACTURES SPECIFICATIONS.
5. SEE STANDARD DRAWINGS WA-34 AND WA-35 FOR COVER DETAIL.

SINGLE SERVICE CONNECTION 1" DIAMETER TO 1" SETTER

APPR. DATE:		FIG NO:	WA-23

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



TYPICAL METER PLACEMENT

APPR. DATE:		FIG NO: WA-24

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

REQUIRED OPENINGS TO FLUSH PIPELINES* (40–psi Residual Pressure)

Pipe Size in.	Flow Required to Produce 2.5–fps Velocity gpm	Orifice Size in.	Hydrant Outlet Nozzles	
			Number	Size in.
4	100	15/16	1	2 1/2
6	220	1 3/8	1	2 1/2
8	390	1 7/8	1	2 1/2
10	610	2 5/16	1	2 1/2
12	880	2 13/16	1	2 1/2
14	1,200	3 1/4	2	2 1/2
16	1,565	3 5/8	2	2 1/2
18	1,980	4 3/16	2	2 1/2

* With 40 psi residual pressure, a 2 1/2 in. hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4 1/2 in. hydrant nozzle will discharge approx– imately 2,500 gpm.

NOTE:

1. REFER TO SECTION 7–11.3(12) FLUSHING AND SECTION 7–11.3(12)N FINAL FLUSHING AND TESTING, IN THE STANDARD SPECIFICATIONS.

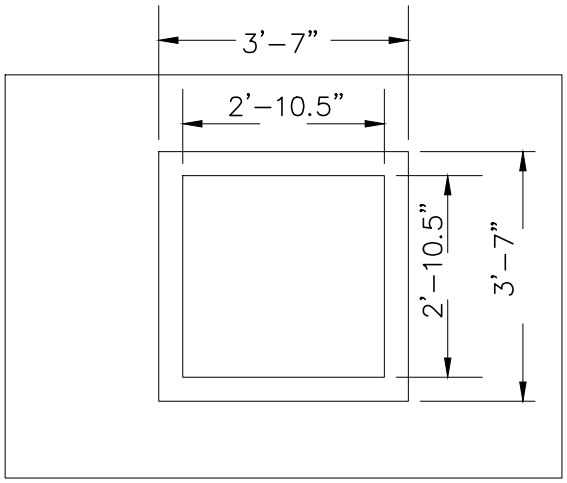
BLOWOFF SIZES FOR FLUSHING PIPELINES

APPR. DATE:

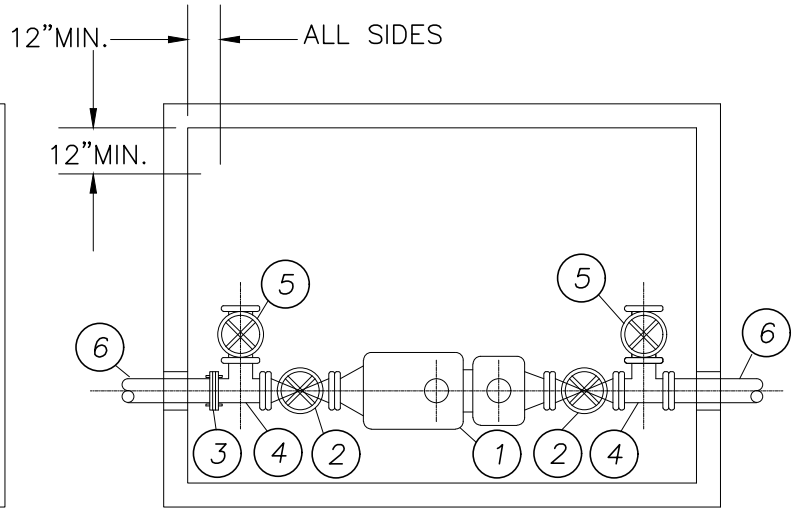
FIG NO: WA-25

Source: City of Olympia

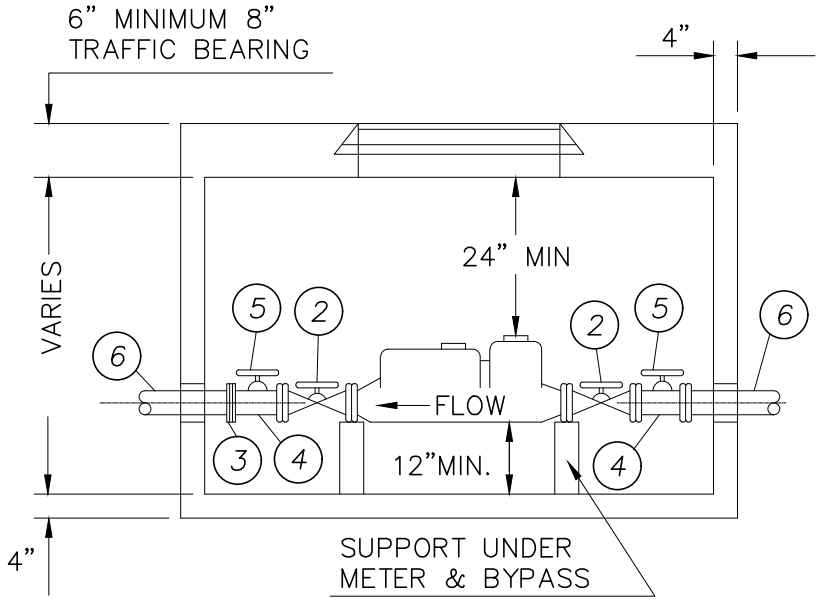
THURSTON COUNTY WATER STANDARD DETAIL



LID COVER



PLAN



ELEVATION

NOTES:

A. FOR 6" & 8" METERS.
B. SEE STANDARD DRAWING WA–27 FOR NOTES.

OCTAVE WATER METER WITH BYPASS FOR 6" AND 8" SIZE

APPR. DATE:		FIG NO:	WA-26

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

6 INCH METER INSTALLATION

1. 6" MASTER METER – OCTAVE OR APPROVED EQUAL METERS WITH REMOTE ANTENNA 3G RADIO.
2. 6" FLANGED VALVE WITH HAND WHEEL R.W.
3. 6" FLEX BY FLANGE COUPLING ALL–THREAD TO VAULT WITH 1/4" STEEL PLATE OR 2X DIAMETER OF HOLE.
4. 6" FLANGE X 6" FLANGE X 4" TAPPED TEE C.I. ALL–THREAD TO VAULT WITH 1/4" STEEL PLATE OR 2X DIAMETER OF HOLE.
5. 4" RESILIENT SEAT GATE VALVE.
6. 6" PLAIN END I.P.
7. 10" SLEEVE.

8 INCH METER INSTALLATION

1. 8" MASTER METER – OCTAVE OR APPROVED EQUAL METERS WITH REMOTE ANTENNA 3G RADIO.
2. 8" FLANGED VALVE WITH HAND WHEEL R.W.
3. 8" FLEX BY FLANGE COUPLING ALL–THREAD TO VAULT WITH 1/4" STEEL PLATE OR 2X DIAMETER OF HOLE.
4. 8" FLANGE X 8" FLANGE X 6" TAPPED TEE C.I. ALL–THREAD TO VAULT WITH 1/4" STEEL PLATE OR 2X DIAMETER OF HOLE.
5. 6" RESILIENT SEAT GATE VALVE.
6. 8" PLAIN END I.P.
7. 12" SLEEVE.

NOTES:

A. DRAINAGE MUST BE PROVIDED FOR METER PIT.
B. PIPE LENGTHS MAY BE CHANGED DUE TO VARYING LENGTHS IN METERS USED.
C. METER PIT MAY BE EXYENDED WHEN P.R.V. IS REQUIRED.
D. ON ALL METERS 3" AND ABOVE, A FLLEX–COUPLING SHALL BE INSTALLED IN THE OUTLET LINE WITHIN THE METER BOX. REFER TO NOTE 4.
E. REMOTE SHALL BE LOCATED IN A READILY ACCESSIBLE AREA OUTSIDE THE VAULT AS APPROVED BY THE COUNTY.
F. REMOTE SHALL BE INSTALLED BY THE THURSTON COUNTY AT THE CONTRACTORS EXPENSE.
G. VAULTS SHALL BE EQUIPPED WITH LADDERS.
H. GROUT ANNULAR SPACE BETWEEN VAULT WALL AND PIPE.
I. VAULT DIMENSIONS TO BE BASED ON CONFIGURATION OF METER, BYPASS AND VALVE ASSEMBLY AND MINIMUM CLEARANCES.

SUBMIT THE FOLLOWING PLANS OR SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

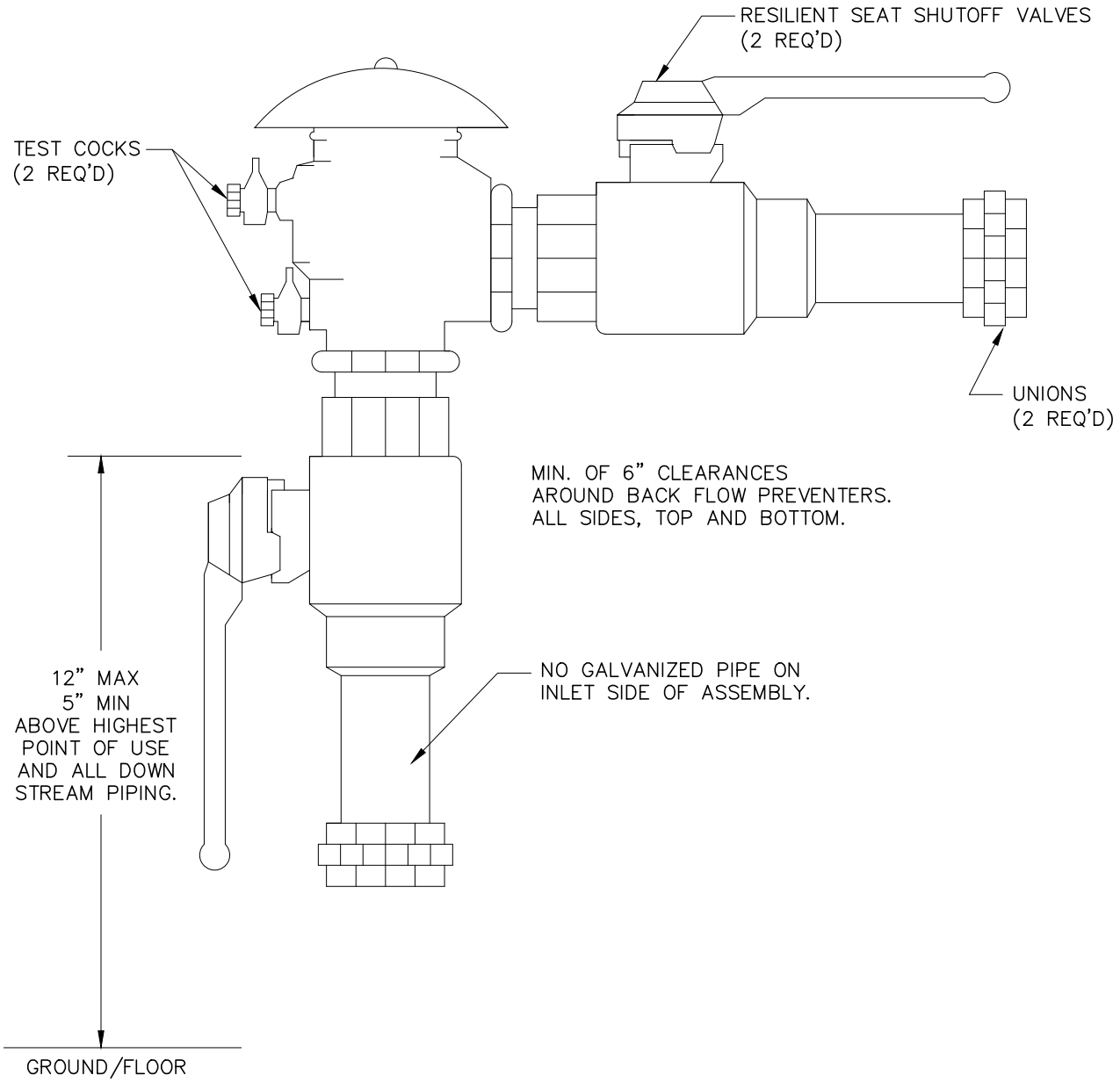
- CONCRETE VAULT: SHOP DRAWINGS FOR PRE–CAST BASE AND VAULT, DESIGNED BY PROFESSIONAL ENGINEER OF THE STATE OF WASHINGTON. A 12 INCH DEEP UNDERDRAIN SYSTEM SHALL BE INSTALLED UNDER THE VAULT. THE CONTRACTOR SHALL INSTALL 12 INCH DEEP ¾" TO 1/2" DRAIN ROCK WRAPPED BY CONSTRUCTION GEOTEXTILE UNDER THE VAULT. THE MINIMUM FOOTPRINT OF UNDERDRAIN AREA SHALL BE 1 FOOT AWAY FROM THE VERTICAL WALL OF THE CONCRETE VAULT. THE CONTRACTOR SHALL FOLLOW VAULT MANUFACTURES GUIDELINES OF INSTRUCTION TO INSTALL THE PRE–CAST VAULT. THE ANNULAR SPACE AND KNOCK–OUTS FOR PIPE GETTING INTO THE VAULT SHALL BE SEALED BEFORE BACKFILL. SEALING SHALL BE MADE WITH MATERIAL APPROVED BY THE ENGINEER AND SHALL EXTEND A MINIMUM OF 8 INCHES INTO THE VAULT WALL IN SUCH A MANNER AS TO FORM A SMOOTH, UNIFORM AND WATERTIGHT JOINT.
- ACCESS HATCHES: PRODUCT DESIGN DRAWINGS TO THE ENGINEER FOR REVIEW AND APPROVAL. VAULT DOORS SHALL BE H–20 TRAFFIC LOADING, NON–SKID, WATERTIGHT, SPRING ASSISTED, OPEN 180°, ALUMINUM HATCH WITH DRAIN CHANNEL. DOUBLE DOORS WILL BE REQUIRED ON LARGER VAULTS AS DETERMINED BY THE ENGINEER.
- POLYPROPYLENE COATED VAULT LADDER: MANUFACTURES CATALOG CUT AND DATA SHEET. STEP HOLE SEALING SHALL BE MADE WITH MATERIAL APPROVED BY THE ENGINEER.

MATERIAL LIST FOR OCTAVE WATER METER WITH BY–PASS FOR 6" AND 8" SIZE

APPR. DATE:		FIG NO: WA-27

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



(ABOVE GROUND INSTALLATION)

NOTE:

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

1. APPROVED PRESSURE VACUUM BREAKER ASSEMBLY, SHALL BE INSTALLED VERTICALLY.
2. DESIGNED FOR BACK SIPHONAGE ONLY, NOT BACK PRESSURE.
3. NO GALVANIZED PIPE BEFORE ASSEMBLY.
4. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACK FLOW PREVENTER.
5. IF A P.V.B.A. IS INSTALLED INDOORS, CONSIDERATION SHALL BE GIVEN TO WATER LEAKAGE IF THE BACK FLOW PREVENTER FAILS. (EXCESSIVE WATER SPILLAGE)
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. VALVE SHALL BE PROTECTED FROM FREEZING CONDITIONS.
8. THE BACK FLOW ASSEMBLY SHALL BE A CURRENT WASHINGTON STATE DEPARTMENT OF HEALTH APPROVED MODEL.
9. A PLUMBING PERMIT IS REQUIRED.
10. SHALL BE TESTED AFTER INSTALLATION AND YEARLY THEREAFTER BY A WASHINGTON STATE CERTIFIED BACK FLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION.

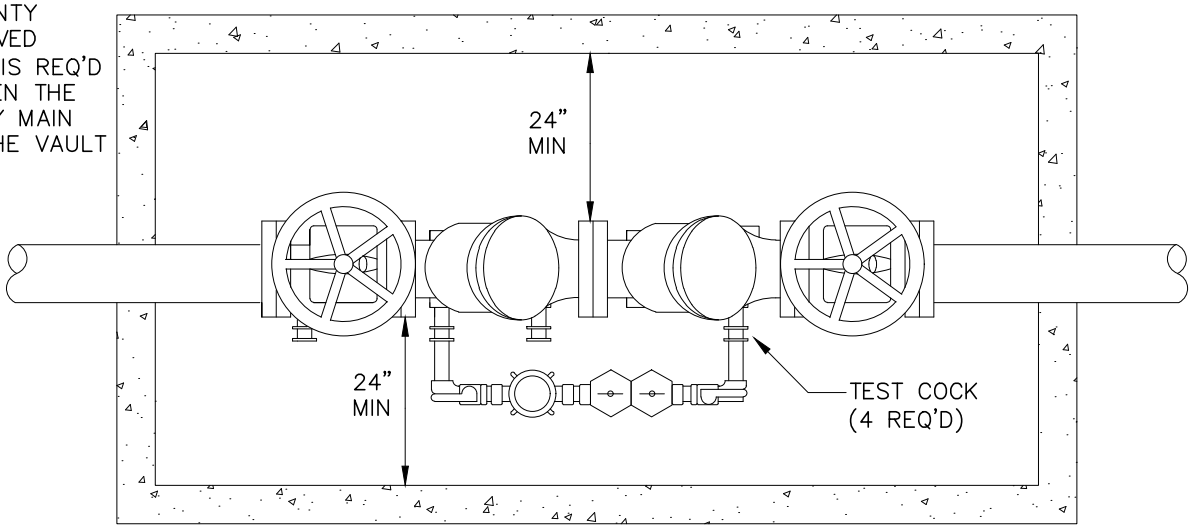
PRESSURE VACUUM BREAKER ASSEMBLY

APPR. DATE:		FIG NO:	WA-28

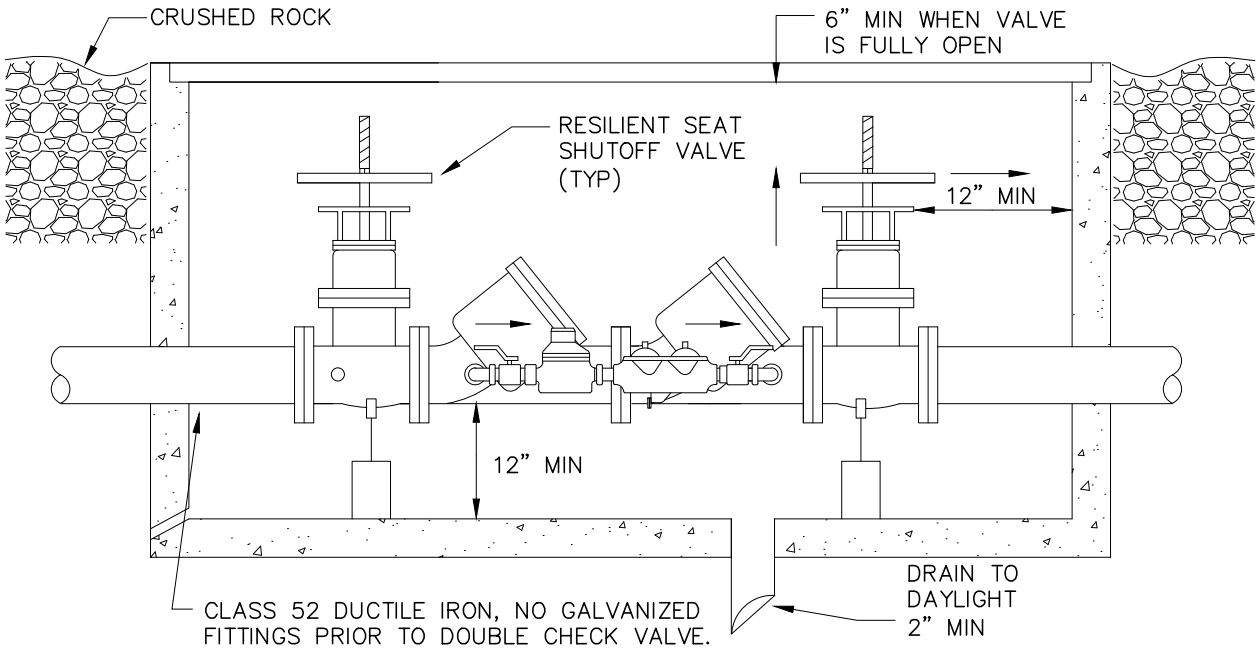
Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

A COUNTY APPROVED VALVE IS REQ'D BETWEEN THE SUPPLY MAIN AND THE VAULT



TOP VIEW



SIDE VIEW

NOTE:

(ABOVE GROUND INSTALLATION)

ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

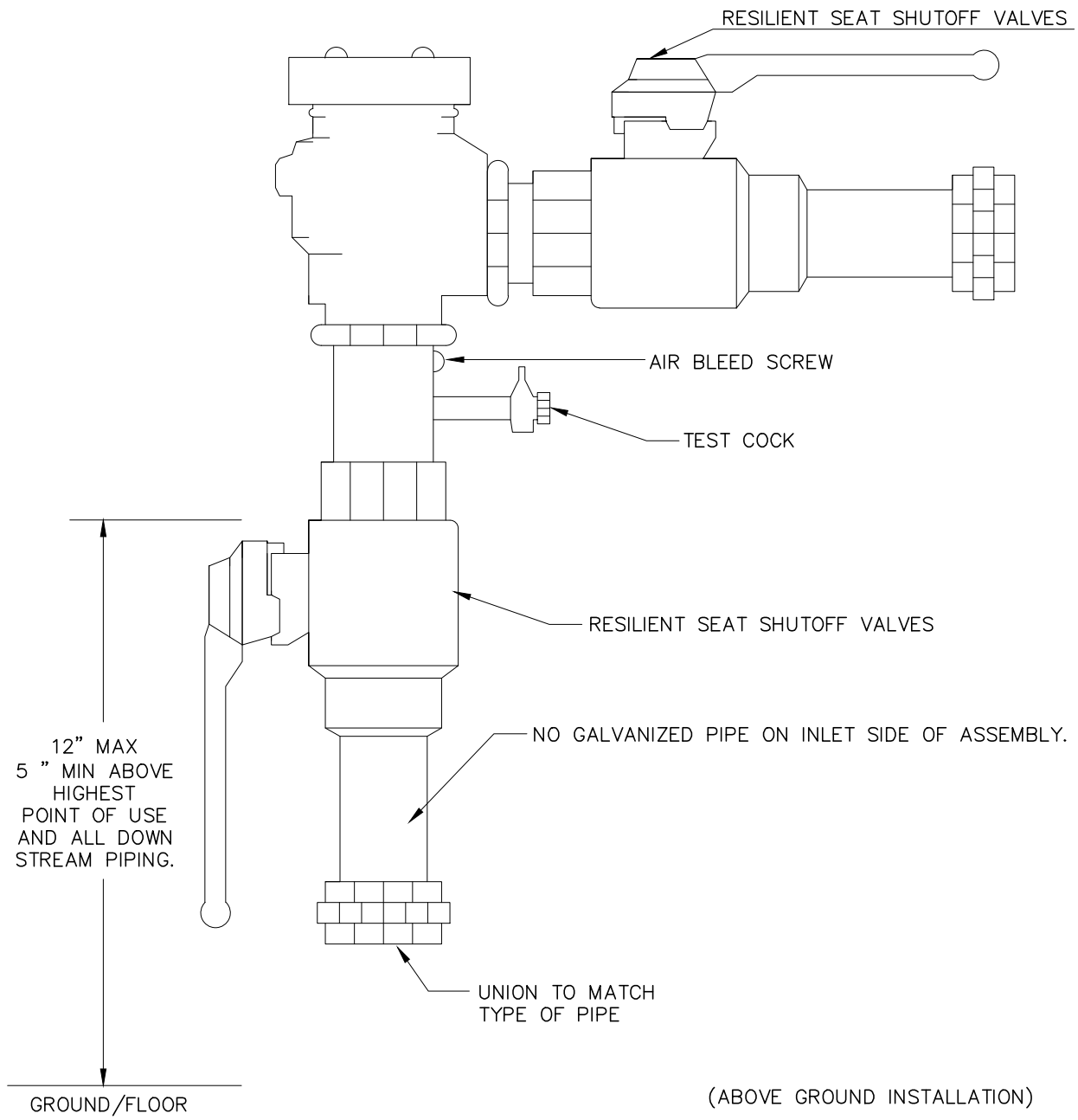
1. DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY SHALL BE A MODEL APPROVED BY THE WASHINGTON STATE DEPARTMENT OF HEALTH.
2. BACK FLOW ASSEMBLY SHALL BE AN APPROVED MODEL W/4 TEST COCKS AND A RESILIENT SEATED SHUT OFF VALVE MOUNTED AT EACH END AND MEET MINIMUM STATE STANDARDS FOR BACK FLOW PROTECTION.
3. THE WATER LINE SHALL BE DISINFECTED, FLUSHED, AND PRESSURE TESTED PRIOR TO INSTALLING THE BACK FLOW ASSEMBLY. THE BACK FLOW ASSEMBLY SHALL BE PROTECTED FROM FLOODING.
4. THE BACK FLOW ASSEMBLY SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A CERTIFIED BACK FLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION.
5. ALL PIPE VALVE AND FITTING JOINTS, FROM THE SUPPLY MAIN, SHALL BE FLANGED AND RESTRAINED.
6. GROUT PIPE ENTRANCE AND EXIT, IN VAULT, WITH WATERTIGHT GROUT.
7. ALL VAULTS SHALL BE PRE-APPROVED PRIOR TO INSTALLATION.
8. VAULTS SHALL BE INSTALLED AT PROPERTY LINE OR EASEMENT LINE AND ON OWNERS PROPERTY.
9. VAULTS SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
10. REQUIRED FOR FIRE SUPPRESSION SYSTEMS.

2 1/2" AND LARGER DOUBLE CHECK DETECTOR CHECK VALVE ASSEMBLY

APPR. DATE:		FIG NO:	WA-29

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



(ABOVE GROUND INSTALLATION)

NOTE:
ALL ITEMS SHALL COMPLY WITH THE FOLLOWING:

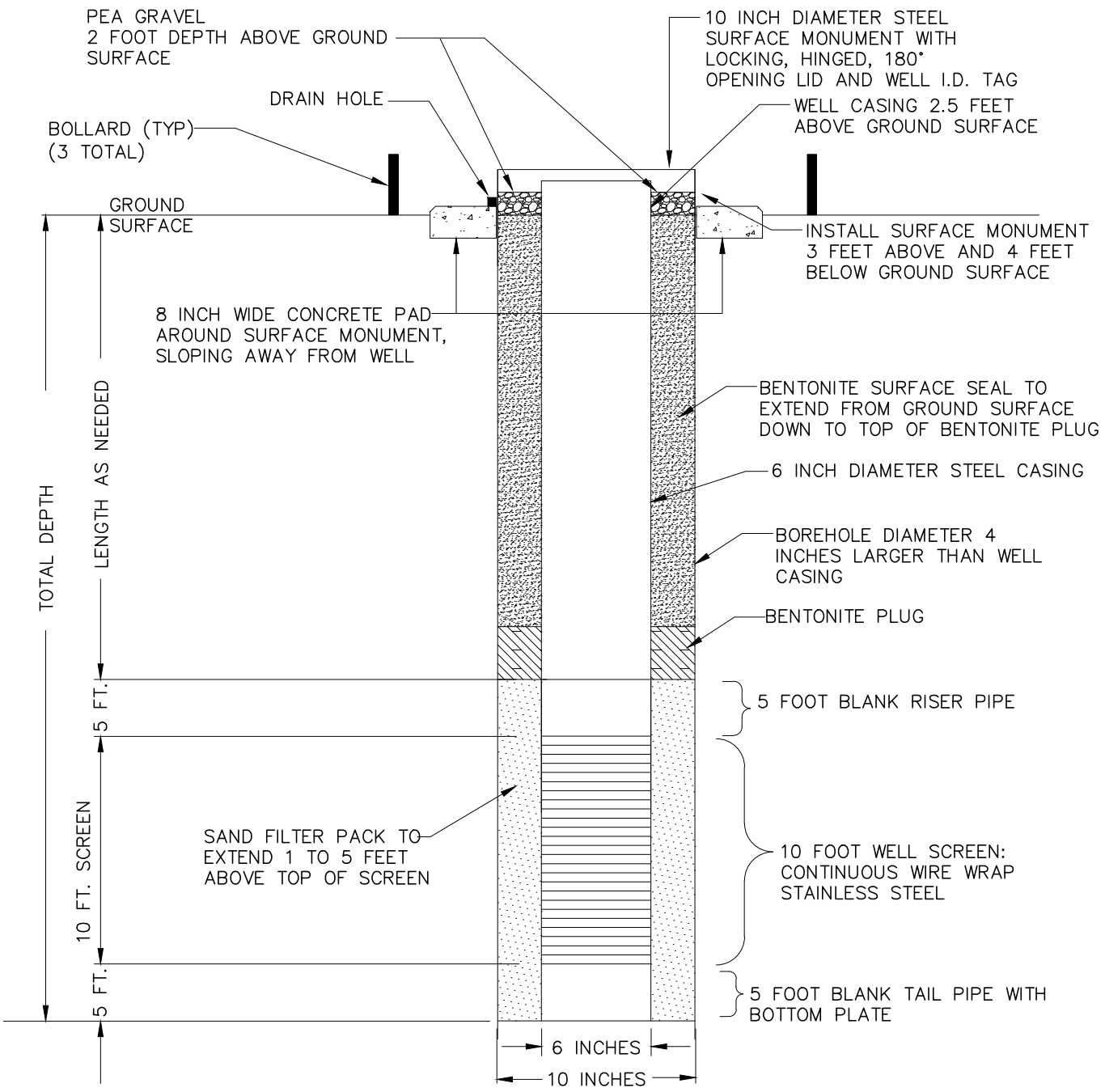
1. NO GALVANIZED ON THE INLET SIDE OF THE ASSEMBLY.
2. SPILL RESISTANT PRESSURE VACUUM BREAKER ASSEMBLY SHALL BE APPROVED PRIOR TO USE.
3. DESIGNED FOR BACK SIPHONAGE ONLY, NOT BACK PRESSURE.
4. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACK FLOW PREVENTER.
5. IF A S.V.B.A. IS INSTALLED INDOORS, CONSIDERATION MUST BE GIVEN TO WATER LEAKAGE IF THE BACK FLOW PREVENTER FAILS. (EXCESSIVE WATER SPILLAGE)
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. SHALL BE PROTECTED FROM FREEZING CONDITIONS.
8. THE BACK FLOW ASSEMBLY SHALL BE A CURRENT WASHINGTON STATE DEPARTMENT OF HEALTH APPROVED MODEL.
9. A PLUMBING PERMIT IS REQUIRED.
10. SHALL BE TESTED AFTER INSTALLATION AND YEARLY THEREAFTER BY A WASHINGTON STATE CERTIFIED BACK FLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THURSTON COUNTY PUBLIC WORKS WATER RESOURCES DIVISION.

SPILL RESISTANT PRESSURE VACUUM BREAKER ASSEMBLY

APPR. DATE:		FIG NO: WA-30

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL



NOTES:

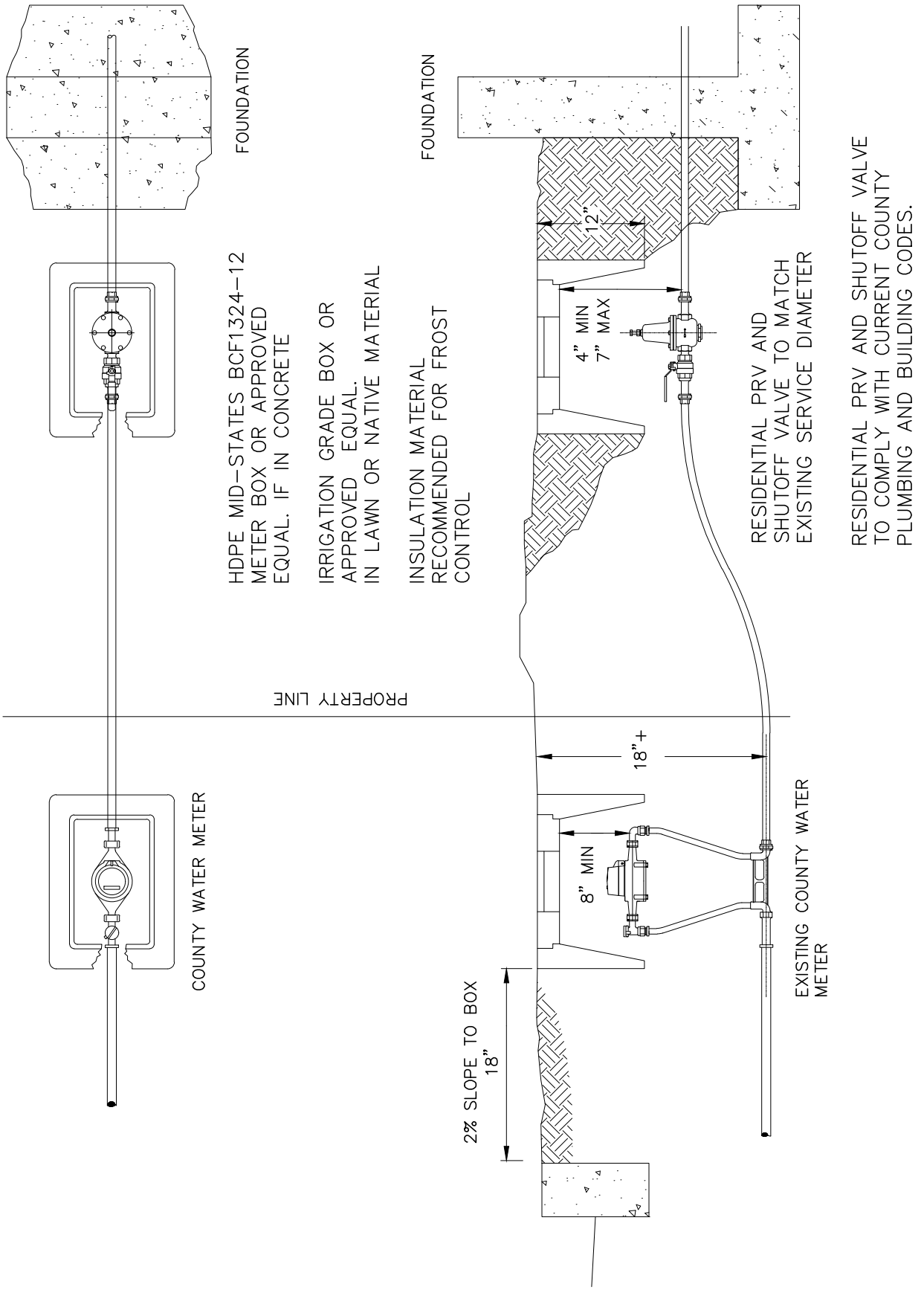
1. THIS WELL DESIGN IS FOR GUIDANCE PURPOSES ONLY. IT MAY BE MODIFIED BY CITY STAFF UPON APPROVAL OF AN EDDS STANDARD DEVIATION REQUEST. FINAL WELL DESIGN MUST COMPLY WITH CHAPTER 173–160 WAC REQUIREMENTS OR BE ACCEPTED BY DEPARTMENT OF ECOLOGY.
2. INSTALL AN INSTRUMENTATION NORTHWEST (INW) DEDICATOR GROUNDWATER SAMPLING SYSTEM WITH GRUNDFOS 20 INCH SUBMERSIBLE PUMP, OR EQUIVALENT AS APPROVED BY DIRECTOR.
3. INSTALL AN AQUISTAR PT2X GROUNDWATER–LEVEL PRESSURE TRANSDUCER WITH DATA LOGGER, CABLING AND SOFTWARE, OR EQUIVALENT AS APPROVED BY COUNTY ENGINEER.
4. MODIFY A 6–INCH WELL SEAL TO ACCOMMODATE THE DEDICATOR GROUNDWATER SAMPLING SYSTEM PLUS TWO ADDITIONAL ACCESS PORTS, WITH DROP TUBES TO BE INSTALLED WITHIN THE WELL CASING. THE TWO ADDITIONAL ACCESS PORTS MUST BE 1/2" DIAMETER (TO ACCOMMODATE A MANUAL WATER LEVEL PROBE) AND 1" DIAMETER (TO ACCOMMODATE A PRESSURE TRANSDUCER).
5. THE SAND FILTER PACK TYPE AND WELL SCREEN SPECIFICATIONS WILL BE DESIGNED AS NEEDED FOR WELL PERFORMANCE AND AQUIFER CHARACTERISTICS.

GROUNDWATER MONITORING WELL DESIGN

APPR. DATE:		FIG NO:	WA-31

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

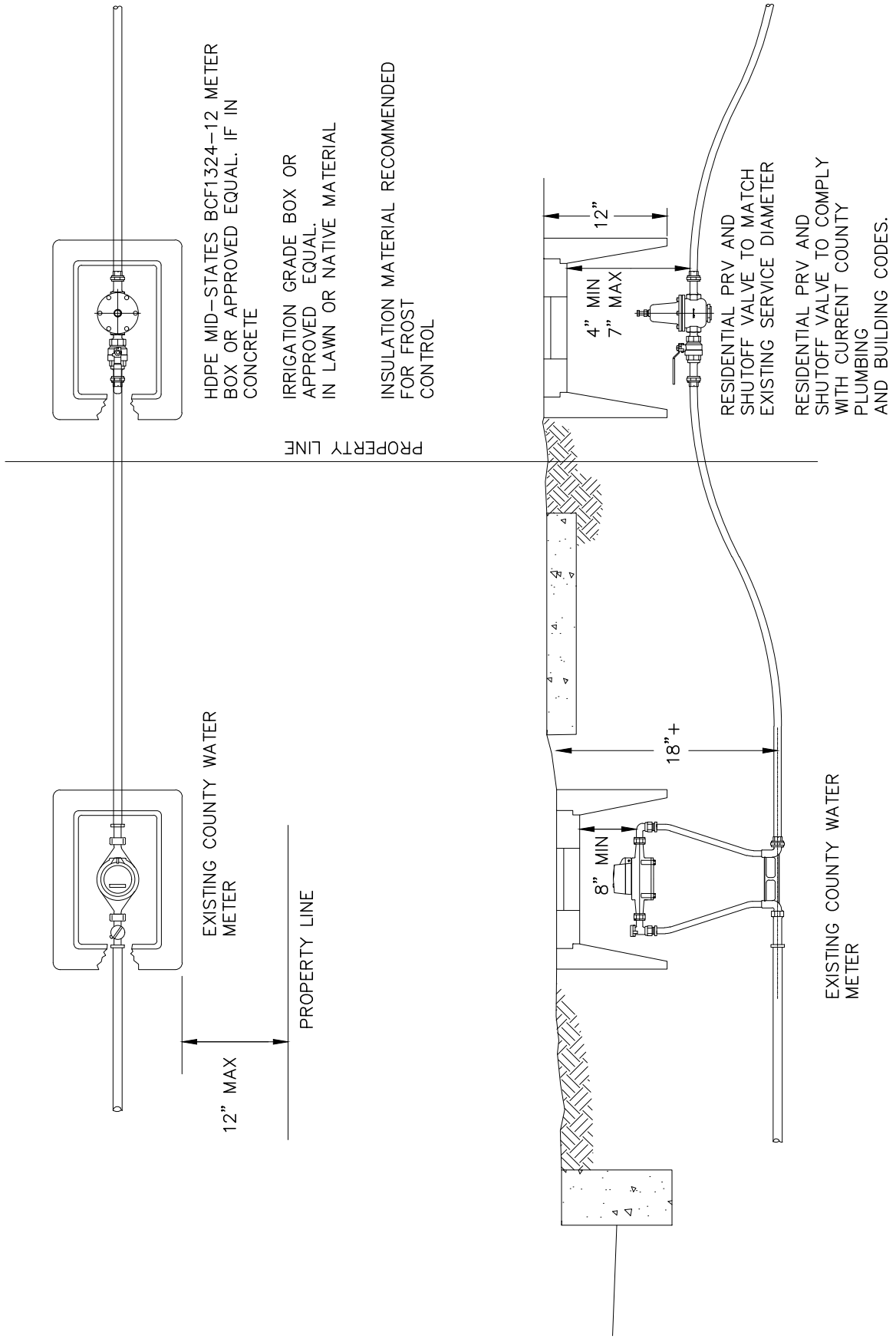


NEAR BUILDING RESIDENTIAL PRV ASSEMBLY

APPR. DATE:		FIG NO:	WA-32

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL

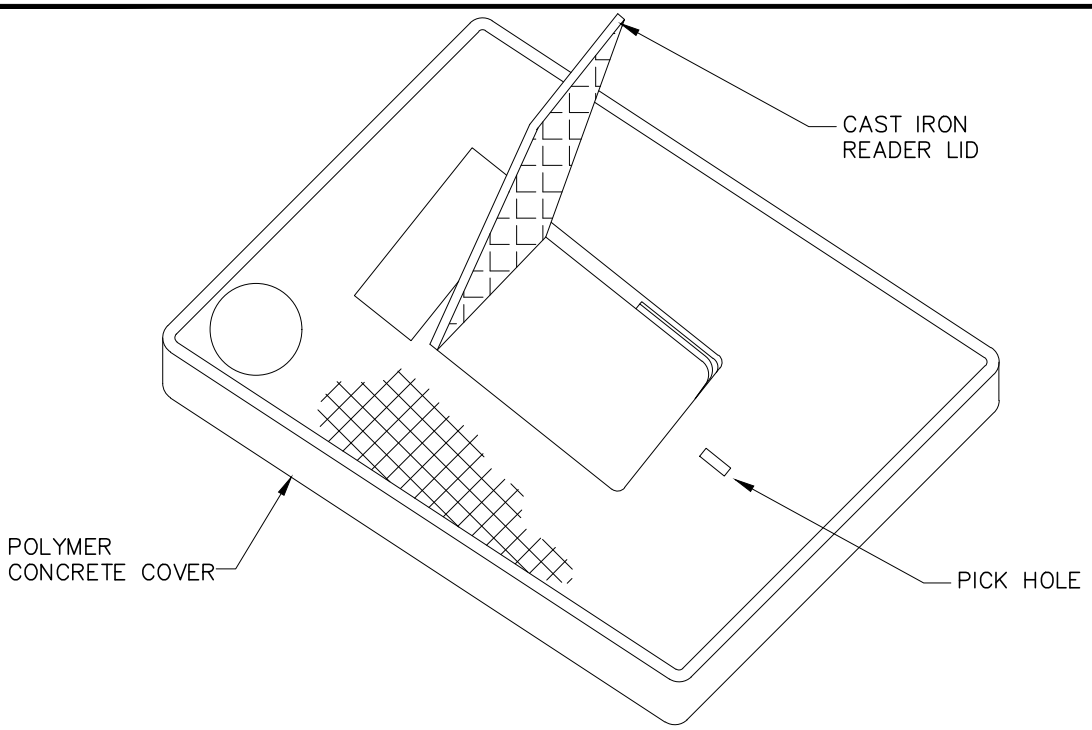


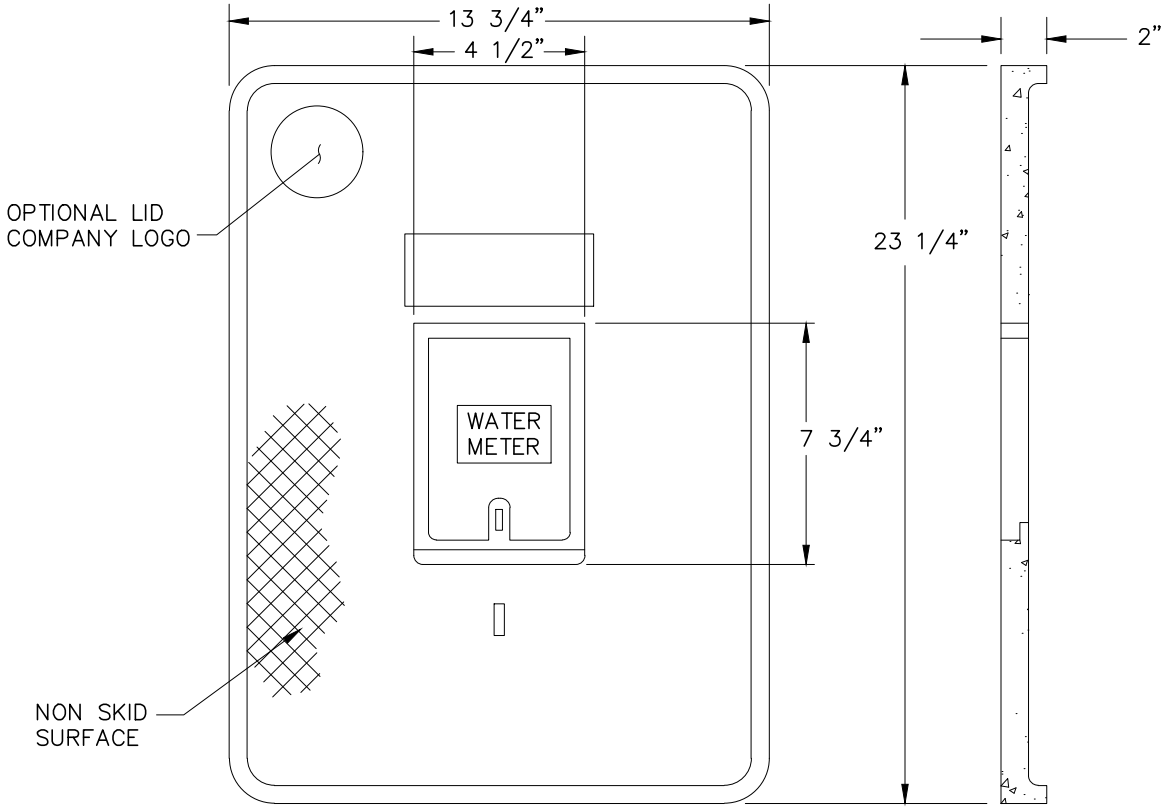
NEAR STREET RESIDENTIAL PRV ASSEMBLY

APPR. DATE:		FIG NO:	WA-33

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL





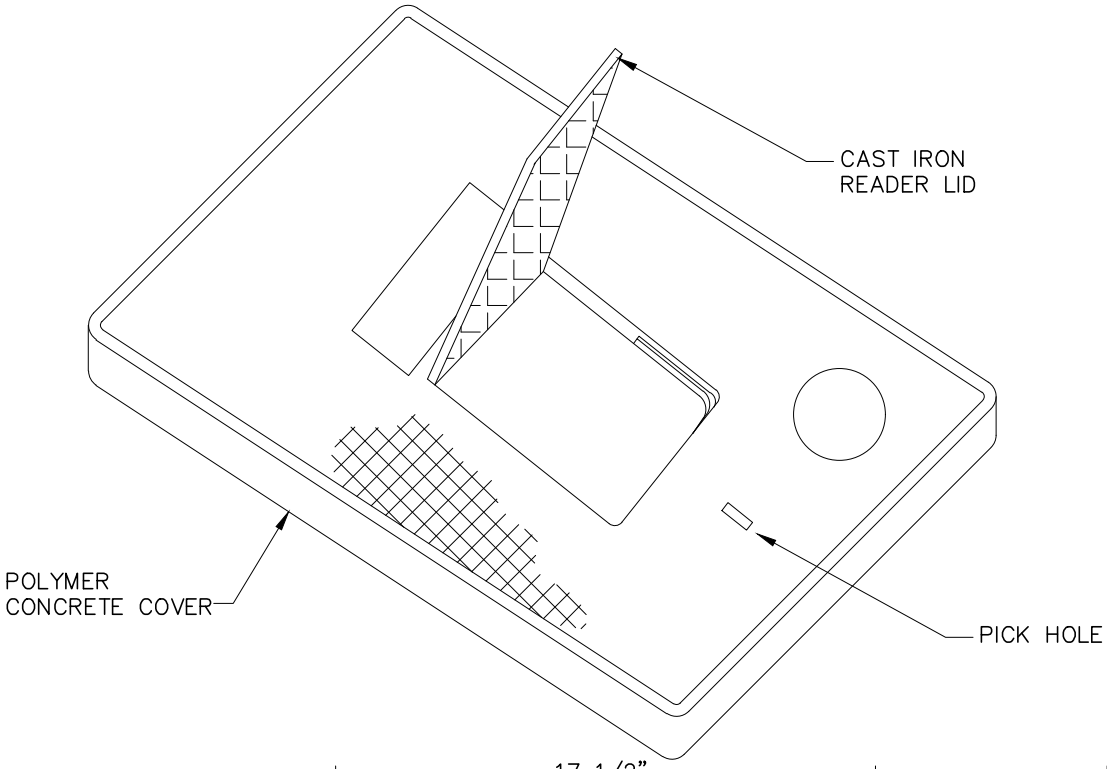
NOTES:
1. LID SHALL HAVE A LOAD RATING OF 20,000 POUNDS WHEN IN TRAFFIC AREA.
2. APPROXIMATE LID WEIGHT 28 POUNDS.

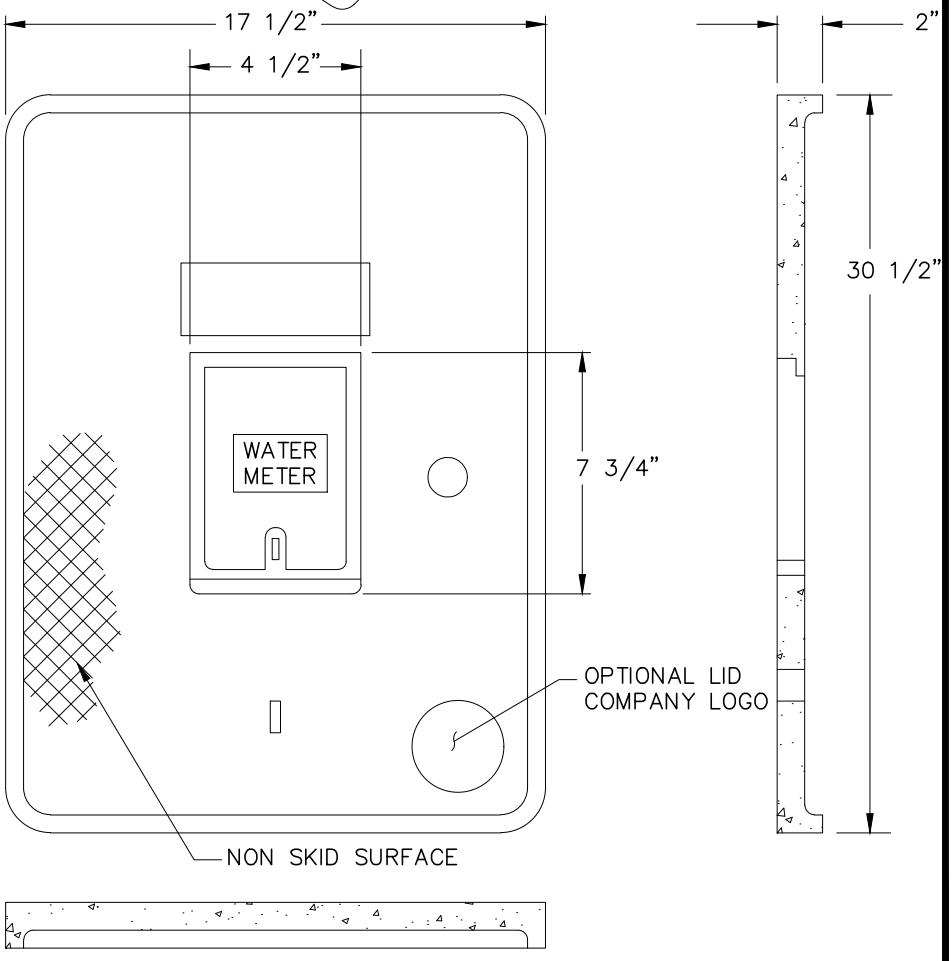
13" X 24" X 2" RPM COVER WITH CAST IRON READ LID

APPR. DATE:		FIG NO:	WA-34

Source; City of Olympia

THURSTON COUNTY WATER STANDARD DETAIL





NOTES:
1. LID SHALL HAVE A LOAD RATING OF 20,000 POUNDS WHEN IN TRAFFIC AREA.
2. APPROXIMATE LID WEIGHT 66 POUNDS.

17" X 30" X 2" RPM COVER WITH CAST IRON READ LID

APPR. DATE:		FIG NO:	WA-35

Source; City of Olympia