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July 6, 2026

Richard Nova
Wolf Creek Property Owners Assn.
PO Box 152
Winthrop, WA 98862

RE: Wolf Creek Distribution Replacement

Mr. Nova,

Attached are the designs and bid documents for the Wolf Creek Distribution Replacement project.

While working through the designs of the distribution system, the following items were noted:

- Low pressures may be experienced along lower portions of Left Wolf Creek Rd.
- There are reports of low pressure along Winding Road.
- The source pump controls have been changed from their original settings and are no longer consistent with the original design.
- The chlorine injection is located near the reservoir using a fixed rate injection.
- The transmission lines from Well 2 to Well 3 were glued 4" PVC.
- The distribution mains between Well 2 and Well 3 were 2" thin-walled plastic pipe.
- The location of the transmission and distribution mains in the Transmission Line Replacement Project from Well 2 to Well 3 were altered from the engineering designs to avoid the Okanogan County right of way along Wolf Creek Rd.

The system is required to maintain a minimum of 30 psi to all connections. A water system is responsible to maintain at least 30 psi to the meter. Beyond this point, it is the responsibility of the homeowner to maintain the water system between the meter and the point of use.

Modeling assuming a 4" distribution main shows lower portions of Left Wolf Creek Rd. will likely experience pressures below 30 psi during periods of heavy use while this section remains on the gravity fed portion of the system. Therefore, a dedicated main will be installed from the Green Meadows Reservoir down Left Wolf Creek Rd. that will pressurize homes along the southern portion of the Green Meadows Community.

It was also reported that complaints of low pressure have been received by individual(s) living near Winding Rd. in the Virgina Hills community. A model using the assumed 4" distribution main showed pressures at the meter to be above 30 psi at all connections. It was assumed that the low-pressure homes were fed from mains along Winding Rd. However, it is possible the distribution mains throughout Green Meadows community are undersized (see below). The potentially undersized distribution main may be increasing pressure loss between the reservoir and the Winding Rd. community. Upon replacement of the distribution mains, if the low-pressure issue remains, it is likely caused by the line between the meter and the home. Small diameter piping can increase pressure loss from friction. Alternatively large elevation changes between the meter and the point of use can create pressure losses. The owner(s) could either upsize the connection from the meter to their residence to reduce pressure loss during high use times or install a private booster pump downstream of the meter to increase the water pressure.

Based on information provided by the community, the source pumps were originally designed as alternating sources. This means that when the system called for water, only one source would turn on to provide water. Upon receiving the shutoff signal, the pump would then turn off, and the other source would be brought online during the next call for water. Only one source could be active at the same time. At some point these controls were adjusted so that both wells can run simultaneously, if needed. Typically, an alternating lead lag system is highly recommended. However, in this case, running both wells at the same time exceeds the instantaneous withdrawal limits of the water rights held by the community. These controls should be returned to their original settings.

The chlorine injection is located near the reservoir. Whenever the reservoir calls for water and turns the source pumps on, the chlorine injection also starts up. The chlorine injection pump is set at a fixed rate, which is typical of most systems. However, based of the WFI, each source has a different capacity. Injecting at a fixed rate at different flows will alter the concentration of chlorine throughout the system making it more difficult to maintain a target residual. This issue is compounded when both sources come on at the same time (see above). It is best practice to chlorinate each source individually as water chemistry may vary between the sources. However, moving the chlorine injection would require a treatment report to be submitted to, and approved by the Department of Health. At minimum a pulse meter should be installed to adjust the injection rate based on the flow from the sources at the reservoir. The pulse meter will allow the injection rate to adjust based on the flow into the reservoir. The flexible injection rate will help maintain a more

consistent chlorine residual in the distribution system. Alternatively, the system could install a second fixed rate pump. One chlorine pump would be tied to Well 2, while the other would be tied to Well 3. The chlorine pumps would activate only when their respective pump was activated.

During the replacement of the transmission line from Well 2 to Well 3, the existing transmission line was found to be glued 4" PVC. Photos of failed joints suggest that the installer of the original transmission line did not follow best practices when installing the transmission line. This may have led to excessive leakage and premature failure. Northwest Water Systems recommends 4" and larger mains or transmission lines be either HDPE or C900 PVC. 4" and larger PVC glues are specially made for each pipe size; and the instructions must be followed exactly. Failure to follow all manufacturer instructions is likely to lead to premature leaks and/or failure of the joint. If the rest of the transmission line was installed by the same installer, it is likely that more leaks will develop throughout the transmission line. Transmission line leaks in the Geen Meadows Community will be slower to develop because the joints are under less pressure.

The Transmission Line Replacement from Well 2 to Well 3 also revealed the distribution mains between Well 2 and Well 3 were 2" thin-walled PVC. This finding suggests the distribution mains throughout the Cottonwood Community are of the same material. It is also likely the 2" thin-walled pipe was also installed in the other communities. The reduced pipe size will increase pressure losses across the system during high usage times. The distribution mains are likely from the original installation and have mostly held up thus far, suggesting the distribution piping can handle the pressure demands for the near future. However, of bigger concern, is how easily thin-walled pipe breaks. SCHD 80 even SCHD 40 can withstand some impact and shear forces. Tree roots or any underground work nearby the thin-walled pipe could potentially collapse or rupture the thin-walled pipe. The thin wall pipe may also rupture from the vibration of nearby heavy machinery or heavy trucks. Therefore, thin-walled mains near other existing underground utilities are at a higher risk of developing leaks during routine repairs or replacement of those other utilities.

The installation location of the transmission line and distribution mains between Well 2 and Well 3 were different from the location specified in the engineer designs submitted to the community. When the community was asked about the Okanogan County Road Right of Way, Northwest Water Systems was informed that all roads within the community were community roads and were therefore not subject to franchise agreements. When the community was notified that the proposed transmission line and distribution mains would indeed be inside the County Road right-of-way, the community chose to alter the location with the contractor. It is best practice to install distribution mains and transmission lines in an existing road right-of-way to provide access for maintenance and repair. Altering the location of transmission lines and distribution mains can affect the hydraulics of the system, which may cause the system to not operate as intended.

Additionally, for all components of the water system, it is strongly recommended that easements be filed with the county to protect the ability of the future water system owners to maintain, repair and replace water infrastructure. Should the Association that governs the community dissolve for any reason, the blanket easements put forth in the bylaws would also be dissolved. While the buried utilities would likely have a prescriptive easement, it may become difficult to properly maintain the system depending on how the easements are interpreted.

In the future, it is strongly recommended that the distribution mains and transmission line replacement be installed as designed. If the community wishes to install water system components in a different location, the engineer should be consulted prior to bidding the project out.

A proposed booster station upgrade has been proposed as part of the replacement. Prior to upgrading the booster station, a design report will need to be submitted to, and approval of the design granted by the Washington State Department of Health.

Please let me know if you have any questions.

Thank You,
Northwest Water Systems

Chip Roth
Design Engineer

CC: Alpine Environmental
File: Project 250912\Cover Letter_DistributionReplacement_WolfCreek
Encl: Distribution Replacement Construction Documents
Distribution Replacement Bid Documents

Distribution Replacement
for
Wolf Creek Property Owners Assn
State ID# 11476H

August 3, 2026

PROJECT NUMBER
250912

Prepared for:

Wolf Creek Property Owners Association
Richard Nova
P.O. Box 152
Winthrop, WA 98862

Prepared by:

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WOLF CREEK PROPERTY OWNERS ASSN

Construction Document Cover Sheet

Distribution Main Replacement
Transmission Line Replacement
Left Wolf Creek Booster Station Upgrade

Project Site:
Wolf Creek Property Owners Assn Water System Service Areas:
Wolf Creek Road, Cottonwood Dr., Aspen Ln., Green Meadows Dr., Left Wolf Creek Rd.
Virginia Hills Rd., Sundance Ln., Winding Rd., Park Ln., Goshawk Ln.
Okanogan County, WA

Office Address:
PO Box 152
Winthrop, WA 98862

Owner:
Wolf Creek Property Owners Assn.

Owner Contact:
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Association President
wolfcreekfacilitiesmanager@gmail.com

Engineering / Project Management:
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Colfax, WA 99111

Engineering / Project Management Contact:
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Wolf Creek Property Owners Association
Construction Package
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SECTION 1: DISTRIBUTION AND TRANSMISSION WATER PIPE SPECIFICATIONS

PART 1: GENERAL

1.1 DESCRIPTION OF WORK

A. Install distribution piping, fittings, valves, and appurtenances, in accordance with the "SITE MAP" drawing and the Bid Package.

B. Replace transmission piping, fittings, valves, and appurtenances from Wolf Creek Property Owners Assn. water system Aspen Ln. to Wolf Creek Property Owners Assn. water system Left Wolf Creek Drive Reservoir in accordance with the "Site Map" drawing.

C. Replace distribution piping, fittings, valves, and appurtenances from Wolf Creek Property Owners Assn. water service area in accordance with the "Site Map" drawing.

D. Install piping, fittings, and valves necessary to support transitioning from the existing piping distribution to new piping distribution in accordance with the "Transition Piping" drawing and the Bid Package. Cap and retire in place the existing distribution system in accordance with the "Transition Piping" drawing and the Bid Package.

1.2 STANDARDS AND SPECIFICATIONS

A. Contractor shall have one (1) copy of the Standards and Specifications and all amendments therein, and applicable WSDOT Standard Plans (latest revision) at job.

B. Standards and Specifications apply only to performance and materials and how they are to be incorporated into the work. Legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

C. All work shall conform to the specifications listed in WAC 246-290 (Group A Public Water Supplies) and the latest editions of the following references: The Washington State Department of Health Water System Design Manual, Washington State Department of Transportation (WSDOT) standard specifications including the "Standard Specifications for Road, Bridge, and Municipal Construction", APWA standard specifications, AWWA standards, UPC, and the applicable county rules, regulations, and ordinances. The standards are listed in order of preference in the event that a conflict in standard arises.

D. The Contractor shall always comply with all Federal, State, Tribal or Local laws, ordinances, and regulations that affect Work under the Contract.

1.3 QUALITY ASSURANCE

A. The Contractor is responsible for all effort necessary to complete work in a timely manner in accordance with drawings and standards, until certified by the Engineer and state and local agencies for correct installation and satisfactory operation of all equipment.

B. The Contractor shall be responsible for the quality of workmanship, timeliness, and professionalism of any Subcontractors.

C. Any worker (including subcontractors) on any part of the work shall be competent to perform the task to which they are assigned. Supervision for each crew shall be done by a foreman or superintendent that is capable of directing the work. Conditions which require the constant presence of the Engineer to assure the quality of the work will not be tolerated. Any worker who does not produce quality workmanship through lack of cooperation or incompetence shall be removed from the job.

D. Any questions regarding the specified plans, or desire to deviate from said plans, shall be directed to the Engineer. The Contractor must receive approval for all substituted material in writing from the Engineer before installation of the substituted material or method.

E. In no case shall the following scope of work and specifications supersede common sense, quality workmanship, or safe and secure practices.

1.4 SAFETY

A. The Contractor shall be responsible for the safety of all workers, inspectors, and the general public and shall comply with all appropriate State safety and health standards, codes, rules, and regulations, including, but not limited to, those promulgated under the Washington Industry Safety and Health Act RCW Chapter 49.17 (WISHA) and as set forth in Title 296 WAC (Department of Labor and Industries). The Contractor shall likewise be obligated to comply with all Federal safety and health standards, codes, rules, and regulations that may be applicable to the Contract Work. The Contractor shall be responsible for the safety of the site during all hours, regardless of whether or not work is in progress.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, standard drawings, and catalog cuts for the following:

1. Pipe and pipe fittings
2. Valves
3. All miscellaneous components and appurtenances

B. Shop Drawings: Supplier shall submit shop drawings. Shop drawings shall include material descriptions, specifications, dimensional and assembly drawings, installation instructions, parts lists, and job specific drawings.

C. Approval by the Engineer under this section is based on a general review only and in no way constitutes final approval of equipment, nor waives any requirement of these specifications, nor relieves the Contractor or Manufacturer of any degree of responsibility for compliance with specific requirements of other portions of these specifications.

1.6 PERMITS

A. It shall be the responsibility of the Contractor to follow all permits and/or permit exemption requirements. The Contractor shall conform to all applicable rules and regulations including, but not limited to: OSHA, L&I, EPA, DOE, and DOH regulations. Right of Way use permit, traffic control arrangements, and site tests are the responsibility of the Contractor. It shall be the responsibility of the Contractor for final determination of which permits and other governmental submittals are necessary.

B. The project is exempt from the State Environmental Policy Act (SEPA) via the utility exemption, specifically WAC 197-11-800(23)(b).

1.7 DELIVERY, STORAGE, AND HANDLING

A. All equipment and materials shall be new and shall bear the manufacturer's name and trade name. In cases where the standard has been established for the particular material, the material shall be so labeled. The equipment to be furnished shall essentially be the standard product of a manufacturer regularly engaged in the production of the required type of equipment for this type of work and shall be the manufacturer's latest approved design. Equipment and material shall be

suitably delivered and stored and shall be readily accessible for inspection. All items subject to moisture damage shall be stored in dry spaces. Photo sensitive materials shall be stored out of direct sunlight. All material and equipment shall be protected against dirt, dust, water and chemical or mechanical injury, vandalism, and theft. Materials shall not be dropped, subjected to heavy impacts, bent, or subjected to abrasion. Any physical damage to the components shall be repaired or replaced by the Contractor at the Contractor's expense.

B. Contractor shall practice the preventive and corrective measures during construction specified in Section 4 of AWWA Standard C651 which covers requirements for protecting the pipe and fittings from contamination and describes disinfection procedures to be followed during pipe installation.

1.8 WARRANTIES

A. All guarantees implied or stated by the component manufacturer shall be passed in full force to the Owner.

1.9 COORDINATION

A. Coordinate schedule and sequence of work with other trades where conflict or interferences occur. Coordinate deliveries of materials and equipment to minimize construction site congestion.

B. Acceptable hours of work are any time 8am-7pm Monday through Friday. The Contractor (and any Subcontractors) shall maintain a regular schedule and inform the Owner and Engineer of start and finish dates for either of their work, to include, delivery of materials, beginning of each section of trenching, water outages, and switching components over.

C. Coordinate transitioning from the existing to the new distribution system with the Wolf Creek Homeowners ASSN water system and Northwest Water Systems, Inc. Coordination includes notifying the water system of project schedule, including updates to the schedule, for the work in the Bid Package to the affect the water system can establish transition notification dates for the water system customers. Coordination includes transition valve(s) operation as needed until system turnover.

1.10 INSPECTION OF WORK AND MATERIALS

A. All required inspections to be done by the Engineer or other applicable agency shall be secured by the Contractor. The Contractor shall provide timely notice (at least 48 hours) of the inspection date to the relevant parties including the Engineer and the Owner (if applicable).

B. Inspections by the Engineer shall be promptly conducted as to not delay work and shall be an onsite, in-person inspection, where applicable. If the inspected work is covered up before approval of the Engineer or inspection party, the Contractor shall uncover (if required) all necessary areas at the Contractor's expense.

C. If the Engineer (or another representative) does not complete the requested inspection in a timely manner when proper notification has been provided by the Contractor, the Contractor may continue to complete work. The absence of an inspector does not relieve the Contractor of any responsibility to provide photographic documentation and to install the system according to the plans and specifications. Similarly, the presence of an inspector does not imply acceptance of the work being performed. It is the Contractor's responsibility to install all components according to the plans and specifications.

D. Additional incurred expenses as a result of inspections outside of the normal 40-hour work week or during holidays; or additional inspections as a result of specifications or plans not followed; or specified work not being complete at the time of initial inspection; or any inspections after construction of completion shall be covered in full by the Contractor unless otherwise specified.

E. The Contractor shall cover the cost of all re-inspections resulting from unsatisfactory installation or workmanship or as a result of failed acceptance testing. Any inspections called by the Contractor outside normal business hours (8-5 M-F), or on Federal Holidays, shall be charged to the contractor at 2.0 times the standard rate.

1.11 EXISTING UNDERGROUND UTILITIES AND STRUCTURES

A. Location of utilities and underground structures shown on the plans are approximate and those shown are not necessarily all of the existing utilities and structures. It is the Contractor's responsibility to determine the exact location and existence of all utilities and underground structures. The contractor must perform a utility locate prior to any excavation activities.

1.12 WATER OUTAGE

A. The Contractor shall notify the Wolf Creek Homeowners Association, Alpine Environmental, and Northwest Water Systems, Inc. a minimum of one week as to the general time of an upcoming water outage and schedule the outage to reduce impact to the water system. The Contractor shall notify the Owner (who will then notify affected customers), Alpine Environmental, and Northwest Water Systems, Inc. within 24 hours of the agreed upon day to confirm the specific time and duration of the outage. If the entire system is to be affected, reader boards should also be stationed at the community entry points. All preliminary work shall be completed, and all tools and materials necessary to complete the job shall be on site to minimize the time of the outage.

1.13 TRAFFIC CONTROL

A. Section 1-10 of the Standard Specifications (latest version) are supplemented and amended by the following:

B. Flagmen, Barricades, Signs and Traffic Control furnished or provided by the Contractor shall conform to the standards established in the latest edition of the "Manual on Uniform Traffic control Devices," published by the U.S. Department of Transportation as needed for the project.

C. The Contractor, at his own expense shall provide such flagmen, signs, and other devices not otherwise specified as being furnished by the Owner, and shall erect and maintain signs and detour signs, as are necessary to warn and protect the public at all times from injury or damage as a result of the Contractor's operations which may occur on or near highways, roads, or streets affected by such operations. All persons working on or near roadways shall wear hard hats and safety vests at all times.

D. Access shall be maintained at all times to properties adjoining the construction sites, including roadways permanently or temporarily closed to through traffic. Access to private properties may be restricted temporarily for the installation of a specific utility or construction activity. If the property has significant improvements such as a home or cabin, the property owner shall be notified by the Contractor in writing at least twenty-four hours in advance of the restriction and shall be given the time and duration of the restriction. In no event shall access to full-time residences be denied overnight or for more than eight consecutive hours. Metal plates covering excavations are acceptable until full restoration is possible.

E. The Contractor shall notify the Fire Department, Police Department, and any other applicable agencies by phone or in writing before the beginning of any operations which will require traffic control, so that these agencies may re-route their emergency and service vehicles around the construction zone.

F. In work requiring normal routes of traffic be interrupted, all materials and tools shall be located on-site. In addition, all preliminary work shall be completed such that the time required to disrupt traffic shall be minimized.

G. The traffic control plan shall be prepared and supplied by the Contractor a minimum of 21 days prior to the start of construction.

1.14 CLEANUP

A. The construction area shall be maintained in a professional manner. The Contractor shall promptly remove and properly dispose of all rubbish and excess material. The project site shall be left in a safe and presentable condition at the end of each workday.

PART 2: PRODUCTS

2.1 GENERAL

A. All products in substantial contact with potable water shall be NSF 61 certified.

B. Products must have the characteristics and capacities of the specified components in the provided drawings, or engineer equivalent as approved.

C. Apply, install, and connect manufactured items or materials according to the recommendations and instructions of the manufacturer.

2.2 PIPE AND FITTINGS

A. Pipe size and material is specified on construction documents. Water mains equal to or over 4-inch diameter shall be Polyvinyl Chloride (PVC) Pressure Class 235 DR 18 pressure rated pipe per AWWA C900 unless otherwise specified. Pipe under 4-inch diameter shall be Schedule 80 PVC or DR11 HDPE or better, unless otherwise specified.

B. All fittings for mains equal to or over 4-inch diameter shall be Class D, Cast Iron, according to AWWA Standard C110 or AWWA Standard C153. Fittings shall be either Cast Iron Fittings, Flange End (FL), with flange adapters suitable for joining PVC pipe to Ductile Iron Fittings, or Mechanical Joint (MJ) End.

C. All undesignated fittings and appurtenances shall be of the in-line size of the pipe and all PVC fittings shall be Schedule 80 or better. All female threaded PVC fittings shall have stainless steel reinforcement. Components that are undesignated and not "in-line" shall be sized to adequately perform their function according to the sizing criteria listed in the standards governing this specification (AWWA, UPC, etc). The project Engineer shall clarify any sizing concerns expressed by the Contractor.

D. Pipe joints shall use elastomeric-gasket couplings and fittings. Gaskets shall be by the same manufacturer as the pipe and intended for use with the exact pipe installed herein.

E. All pipe within 10 feet of a septic component shall be sleeved with Schedule 40 PVC or equivalent, per detail drawing.

2.3 VALVES

A. Gate valves 2-inch and larger in size shall conform to the latest AWWA Standard Specifications for gate valves for ordinary water service No. C509. Such valves shall be iron body, bronze mounted, resilient wedge, non-rising stem, 150-pound valves compatible with PVC pipe or DIP. Such valves shall have O-ring stem seals rated for 200 psi without leaking.

2.4 DETECTABLE WARNING TAPE

A. Detectable marking tape shall be blue, 2 inches wide, metallic, with wording to the effect "Caution Buried Waterline".

2.5 TRACER WIRE

A. Tracer wire shall be Type UF, 14-gauge insulated copper wire suitable for direct burial in the earth.

2.6 SERVICE LATERALS

A. Tapping sleeves shall be Romac Style SST or equivalent.

B. Saddle taps shall be Romac Style 202S or equivalent.

C. Corporation Stops shall be Mueller H-10283 or equivalent.

D. Compression fittings with stainless sleeve shall be Mueller 110 or equivalent.

E. Service lateral shall be 1-inch HDPE for single service or 1.25-inch HDPE for double service. Pipe shall conform to AWWA C901, Class 200.

F. Fittings for tie-in of laterals to 2-inch water main shall be Schedule 80 PVC and female threaded fittings shall have stainless steel reinforcement.

2.7 BLOW-OFF ASSEMBLIES

A. Blow-off assemblies shall consist of a suitable reducing coupling from the water main (where applicable), a 2-inch AWWA non-rising stem gate valve, a cast iron valve box and lid cast with the word "water", a galvanized steel riser pipe with 2-inch x 2-½-inch reducing bell, a fire cap adapter and a 2-½-inch fire hydrant cap and chain.

PART 3: EXECUTION

3.1 GENERAL

A. All safety equipment and practices per state and local requirements shall be followed.

B. All materials and equipment to be installed in a neat, workmanlike manner and shall result in an installation consistent with the best practices of trades.

C. All equipment specified shall be installed in accordance with the manufacturer's recommendations and constructions drawings. Conflicts of information shall be called to the attention of the certifying Engineer for their clarification.

D. Work is shown only in diagrammatic form and does not necessarily indicate every required fitting, box, conduit, etc. The Contractor shall provide and be responsible for fittings, appurtenances, and miscellaneous materials required to complete the job. Omission of fittings, appurtenances, and miscellaneous materials from the specifications shall not constitute a change order or additional charge. Change included in the base bid shall be interpreted as including any change of up to ten feet from the locations indicated on the drawings. Verify all dimensions by field measurements.

E. Follow manufacturers' directions and recommendations in all cases where the manufacturers of articles used on this Contract furnish directions covering points not shown on the Drawings or covered in these Specifications.

3.2 PIPES AND FITTINGS

A. When specified in the drawing, pipe joints shall use elastomeric-gasket couplings and fittings. Gaskets shall be by the same manufacturer as the pipe and intended for use with the exact pipe installed herein. Contractor shall assemble couplings by cleaning all debris from the bell end of

the pipe, making sure that the gasket is completely and properly seated in the groove. The spigot end shall be lubricated immediately prior to assembly using a lubricant intended for such service and rated for use in potable water systems (NSF 61). Maximum pipe deflection shall follow manufacturer's specification or 4 inches of deflection for 20-foot pipe length, whichever is less.

B. When allowed on the drawing, solvent cemented joints shall be made in accordance with ASTM D 2855 Standard Recommended Practice for Making Solvent-Cemented Joints in Poly Vinyl Chloride (PVC) Pipe Fittings". Pipe ends shall be cut square and burrs and dirt removed. Both surfaces of cemented joints shall be solvent cleaned, primed and coated with PVC Cement conforming to the requirements of ASTM D2564. The solvent, primer, and cement shall be products of the same manufacturer intended for use as a system. Pipe joints shall not be cemented at temperatures below 45° F or above 85° F. Joints shall not be pressure tested until the cement is fully cured in accordance with the manufacturer's instructions.

C. Pipe joints for HDPE shall be fusion welded and completed by individuals who hold a current HDPE welding certification. All welds shall be inspected by the foreman before they enter the ground.

D. Plugs, caps, tees, bends and valve bodies installed with pipe 4-inches and over in size or when specified on the drawing shall be restrained with concrete reaction blocking or tie-downs as shown on the detail drawing "Horizontal Restraint Blocking" which forms a part of the specification. The concrete blocking shall be cast in place and bear directly against undisturbed trench wall. Blocking shall not obstruct access to fittings or pipe joints.

E. After assembly, pipes and fittings shall be flushed through a wide open discharge valve. Each valved section of newly laid pipe shall be flushed independently.

F. All piping circuits, valves, meters, and capped connections shall conform to the system diagram. Component placements and piping routing shall conform to the layout. The Contractor may choose to modify the layout in order to more efficiently complete the project. However, any Contractor initiated changes to the layout must be approved by the Engineer prior to installation. Any such changes shall not constitute a change order and any additional expenses or savings associated with the changes will not affect the contract price.

G. The Contractor shall be responsible for installing the pipes and fittings within the service area of the Wolf Creek Homeowners Assn. water system.

H. Prior to backfilling the trench, a tracer wire shall be laid in the trench and firmly attached to the pipe at a minimum of 10-foot intervals. The tracer wire shall be Type UF, 14-gauge insulated copper wire suitable for direct burial in the earth. Cable splicing is permissible provided that the splice shall be made using staked connectors and commercial potting or heat shrink splicing kits intended for below grade or submerged applications. The ends of the wire shall be brought to the surface at points designated in the engineering drawing and at all valve boxes along the pipe route. An excess length of 36 inches shall be provided at points where the wire is brought to the surface and valve boxes.

I. All distribution pipe within 10 feet of a septic component shall be sleeved with schedule 40 PVC or equivalent, per detail drawing.

J. Marked up "red-line" drawings shall be provided by the Contractor to the Owner and Engineer of the approved and installed location of all distribution and associated valves and appurtenances.

3.3 CLEARING, EXCAVATION, BACKFILL, AND COMPACTION

A. The Contractor shall provide all materials and services for excavation, backfilling, and compaction of the waterline trenches per the construction drawings.

B. Existing facilities, improvements and trees, shrubbery and native materials on the site shall be protected from damage caused by the trench excavation, backfilling, and compaction. Where significant root damage to trees and shrubbery is unavoidable, the plants shall be staked and tied, or other measures shall be taken to minimize the consequences of such unavoidable damage. Large trees with significant root damage shall be removed if there is a safety concern. The Owner or Engineer shall be notified to make final decision on tree removal. While excavating, every reasonable effort will be made to minimize the disturbance of natural vegetation, structures, and other improvements. Any damages to improvements shall be the responsibility of the Contractor.

C. Trenching may be accomplished by a trenching machine, excavator, backhoe, or hand digging, as appropriate.

D. Under normal conditions, cover over all water mains shall be not less than 36 inches or more than 42 inches without the express approval of the Engineer. Where topography has a 2-foot or less rise, the trench shall be deepened to facilitate a level or continuously sloping pipe and avoid additional air-vac installations. Areas of burial over 42 inches for any reason shall be indicated on the "red-lined" drawings with notes regarding depth in 6-inch elevation increments.

E. Unless otherwise specified, excavations for buried pipe shall be open cut. The minimum allowable trench width at the depth of the pipe shall be a minimum of 24 inches plus pipe diameter. Trench width shall be sufficient to accommodate pipe blocking and tie-downs where applicable.

F. Except as permitted by the Owner or their representative, no open trench excavated to final grade for more than 5 feet ahead of pipe laying shall be left at the end of the day without adequate trench support and safety covers. Any open excavations left unattended shall be flagged with the appropriate safety flagging and/or barriers.

G. During excavation, material suitable for bedding and backfilling shall be stockpiled in an orderly manner at a distance from the trench to avoid cave-ins of the trench. Material unsuited for backfill shall be promptly removed as construction refuse at the discretion of the Owner. Weather conditions may cause previously approved native backfill material to be rejected.

H. The Contractor shall be responsible for dewatering, trench stability, and control of all excavations. The Contractor shall also be responsible for all surface water and storm water flows in the immediate vicinity of construction. All de-watering and storm water shall be directed and disposed of according to the standards and regulations of the authority having jurisdiction. Drainage of any surface or storm water though potable water pipe is strictly prohibited.

I. Unless otherwise shown, trenches shall be excavated at least 6 inches below any part of the pipe or fitting to provide space for adequate bedding material. If native soil is adequate bedding for the lines, pipe may be laid directly on trench floor.

J. Native soils except clays and hardpans may be used for bedding and backfilling of 2-inch lines as long as they are free of sharp rocks, larger cobbles (greater than 3 inches), and debris. Silts, loams, sands, gravels, or any combination thereof are suitable soil types for backfilling.

K. If native soils are not allowed as described above, the pipe shall be bedded in clean sandy soil, free of all foreign debris and stones over ¾ inches in diameter, extending from at least 6 inches below the pipe to a level at least 6 inches above the crown of the pipe. 6 inches of bedding shall be placed in the trench before the pipe is installed (where applicable) and shall be spread smoothly to provide uniform support to the pipe. Subsequent filling shall be deposited in stages working the bedding under the pipe by slicing with a shovel, vibration, or other procedure, except that water settling is prohibited.

L. Backfill shall not be deposited in the trench in any manner that could damage or disturb the pipe, blocking, or bedding. Backfill material shall be clean and free of foreign material, hazardous substances (chemicals, hydrocarbons, etc), and vegetation. Compaction in unimproved areas by two or more passes of hauling equipment is permissible where each pass completely spans the width of the backfill. Under roadbeds and driveways, the backfill shall be compacted by mechanical tamper in lifts not exceeding 8 inches to obtain 95% compaction.

M. The Contractor shall be responsible for having the areas under roadways and driveways tested for adequate compaction by an independent third party. The testing party shall be approved by the Owner and results of their testing shall be provided to the Engineer.

3.4 VALVES

A. When required for wet tap installation on an existing water main, the valve shall be of the resilient wedge type conforming to AWWA Standard C509 and providing full port opening to accommodate a full tapping cutter. Such valves shall be iron body, bronze mounted, resilient seated with non-rising stem and compatible with PVC pipe.

B. Each valve shall be installed in a cast iron valve box of the slip extension type with cast iron cover marked "WATER" according to attached installation standard. Valve boxes shall be aligned with and concentric to the valve stem axis and comply with standard drawings for Gate Valves which form a part of this specification. The taps in the lid shall be in-line with the water main.'

C. The valve shall be supported with a concrete block at the base of the pipe tee, and the valve box shall be supported with a concrete collar around the outside at the road surface per the detail drawing.

D. Blue fiberglass valve markers shall be installed marking all valves, with marker located as directed by the construction inspector(s). The markers shall be 4 inches wide, 72 inches long, and buried two feet into the ground. The distance and direction of the valves shall be indicated near the top of the marker in permanent lettering 1-inch high or greater.

3.5 DETECTABLE WARNING TAPE

A. Warning tape shall be buried 1-½ to 2 feet below finished grade, or per detail drawing.

3.6 TRACER WIRE

A. Tracer wire shall be laid in the trench and taped to the pipe at a minimum of 10-foot intervals. Cable splicing is permissible provided that the splice shall be made using staked connectors and commercial potting or heat shrink splicing kits intended for below grade or submerged applications. The ends of the wire shall be brought to the surface at points designated in the engineering drawing and at all valve boxes along the pipe route. An excess length of 36 inches shall be provided at points where the wire is brought to the surface and valve boxes.

3.7 SERVICE LATERALS

A. Service laterals shall be installed per detail drawings.

3.8 BLOW-OFF ASSEMBLIES

A. The blow-off assembly shall be oriented in a direction to avoid property damage from effluent, include a provision from draining itself, and positioned to preclude the possibility of backflow into the system.

3.9 DISPOSAL OF USEABLE MATERIALS AND DEBRIS

A. The Contractor shall meet all requirements of State, County, and Municipal regulations regarding health, safety, and public welfare in the disposal of all debris. All handling, removal, and disposal of asbestos cement pipe shall be in accordance with WAC 296-65, 296-62-077 and RCW 49.26 and OSHA regulations.

B. Any natural refuse is the property of the Contractor, as there is no approved or available disposal location on site. Refuse from clearing and grubbing operations shall be removed from the site by the Contractor. Burning is not permissible on site. All debris shall be removed within seven days of completion of construction, or upon a timeline arranged with the Owner, and disposed of at a site obtained by the Contractor. All other refuse (plastic, treated wood, galvanized metal) must be temporarily stockpiled and then removed.

C. All reusable existing water system equipment is the property of the Owner.

D. All personal debris and garbage associated with the Contractor or any Subcontractor shall be disposed of off-site.

3.10 SITE RESTORATION

A. All roads or driveways in which the surface is removed, broken or damaged, or in which the ground has caved or settled due to this construction shall be promptly restored to their original condition.

B. All road shoulders and drainage ditches disturbed by this construction shall be restored to their original condition. All surplus construction material and refuse shall be removed by Contractor.

C. The Contractor shall replace all damaged survey monuments in accordance with RCW 332-120.

D. Trenching in and along roadways and parking lots shall be backfilled, compacted to 95%, rolled and graveled with ¾-inch minus crushed rock and/or completed with asphalt or concrete per the specifications to match existing surfacing. Trenching through lawn and improved areas shall be

backfilled and compressed to 95%. Three inches of topsoil shall be added and rolled such that the rolled surface is level with the existing lawn. Affected areas shall be hydroseeded.

E. All unexcavated pipe and fittings taken out of service may be abandoned in place. All excavated pipe, fittings, scraps, construction debris, and other material not suitable for backfill shall be disposed of off-site.

F. All natural excavated materials unsuitable for backfill shall be disposed off-site. All cleared areas without gravel shall be either hydroseeded, spread with straw, or replanted with native vegetation.

END OF SECTION

SECTION 2: PUMPHOUSE AND CONTROLS SPECIFICATIONS

PART 1: GENERAL

1.1 DESCRIPTION OF WORK

A. Replace and upgrade piping and appurtenances at Reservoir Booster Station, in accordance with the "Booster Station" drawing and the Bid Package, to support the system modifications.

B. Reinstall existing chlorination treatment on new 4" transmission line, in accordance with the "Booster Station" drawing and the Bid Package, to support the system modifications.

1.2 STANDARD SPECIFICATIONS

A. All work shall conform to the specifications listed in the International Building Code (IBC) Chapter 23 (latest revision) and local jurisdiction requirements.

B. Standard Specifications apply only to performance and materials and how they are to be incorporated into the work. Legal/contractual relationship sections and the measurement and payment sections do not apply to this document.

C. The Contractor shall always comply with all Federal, State, Tribal or Local laws, ordinances, and regulations that affect Work under the Contract.

1.3 QUALITY ASSURANCE

A. The Contractor is responsible for all effort necessary to complete work in a timely manner in accordance with drawings and standards, until certified by the Engineer and state and local agencies for correct installation and satisfactory operation of all equipment.

B. The Contractor shall be responsible for the quality of workmanship, timeliness, and professionalism of any Subcontractors.

C. Any worker (including subcontractors) on any part of the work shall be competent to perform the task to which they are assigned. Supervision for each crew shall be done by a foreman or superintendent that is capable of directing the work. Conditions which require the constant presence of the Engineer to assure the quality of the work will not be tolerated. Any worker who does not produce quality workmanship through lack of cooperation or incompetence shall be removed from the job.

D. Any questions regarding the specified plans, or desire to deviate from said plans, shall be directed to the Engineer. The Contractor must receive approval for all substituted material in writing from the Engineer before installation of the substituted material or method.

E. In no case shall the following scope of work and specifications supersede common sense, quality workmanship, or safe and secure practices.

1.4 SAFETY

A. The Contractor shall be responsible for the safety of all workers, inspectors, and the general public and shall comply with all appropriate State safety and health standards, codes, rules, and regulations, including, but not limited to, those promulgated under the Washington Industry Safety and Health Act RCW Chapter 49.17 (WISHA) and as set forth in Title 296 WAC (Department of Labor and Industries). The Contractor shall likewise be obligated to comply with all Federal safety and health standards, codes, rules, and regulations that may be applicable to the Contract Work.

The Contractor shall be responsible for the safety of the site during all hours, regardless of whether or not work is in progress.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, standard drawings, and catalog cuts for the following:

1. Reservoir Booster Station Equipment
2. All Miscellaneous Components and Appurtenances

B. Approval by the Engineer under this section is based on a general review only and in no way constitutes final approval of equipment, nor waives any requirement of these specifications, nor relieves the Contractor or Manufacturer of any degree of responsibility for compliance with specific requirements of other portions of these specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

A. All equipment and materials shall be new and shall bear the manufacturer's name and trade name. In cases where the standard has been established for the particular material, the material shall be so labeled. The equipment to be furnished shall essentially be the standard product of a manufacturer regularly engaged in the production of the required type of equipment for this type of work and shall be the manufacturers latest approved design. Equipment and material shall be suitably delivered and stored and shall be readily accessible for inspection. All items subject to moisture damage shall be stored in dry spaces. Photo sensitive materials shall be stored out of direct sunlight. All material and equipment shall be protected against dirt, dust, water and chemical or mechanical injury, vandalism, and theft. Materials shall not be dropped, subjected to heavy impacts, bent, or subjected to abrasion. Any physical damage to the components shall be repaired or replaced by the Contractor at the Contractor's expense.

B. Contractor shall practice the preventive and corrective measures during construction specified in Section 4 of AWWA Standard C651 which covers requirements for protecting the pipe and fittings from contamination and describes disinfection procedures to be followed during pipe installation.

1.7 WARRANTIES

A. All guarantees implied or stated by the component manufacturer shall be passed in full force to the Owner.

1.8 COORDINATION

A. Coordinate schedule and sequence of work with other trades where conflict or interferences occur. Coordinate deliveries of materials and equipment to minimize construction site congestion.

B. Acceptable hours of work are any time 8am-7pm Monday through Friday. The Contractor (and Subcontractor) shall maintain a regular schedule and inform the Engineer of start and finish dates for both their work. This will include delivery of materials, beginning of each section of trenching, water outages, and switching components over.

1.9 EXISTING UNDERGROUND UTILITIES AND STRUCTURES

A. Location of utilities and underground structures shown on the plans are approximate and those shown are not necessarily all the existing utilities and structures. It is the Contractor's responsibility to determine the exact location and existence of all utilities and underground structures. The contractor must perform a utility locate prior to any excavation activities.

1.10 CLEANUP

A. The construction area shall be maintained in a professional manner. The Contractor shall promptly remove and properly dispose of all rubbish and excess material. The project site shall be left in a safe and presentable condition at the end of each workday.

PART 2: PRODUCTS

2.1 GENERAL

A. All products in substantial contact with potable water shall be NSF 61 certified.

B. Products must have the characteristics and capacities of the specified components in the provided drawings, or engineer equivalent as approved.

C. Apply, install, and connect manufactured items or materials according to the recommendations and instructions of the manufacturer.

PART 3: EXECUTION

3.1 GENERAL

A. All safety equipment and practices per state and local requirements shall be followed.

B. All materials and equipment to be installed in a neat, workmanlike manner and shall result in an installation consistent with the best practices of trades.

C. All equipment specified shall be installed in accordance with the manufacturer's recommendations and constructions drawings. Conflicts of information shall be called to the attention of the certifying Engineer for their clarification.

D. Install work uniform, level and plumb, in relationship to lines of building. Do not install any diagonal, or otherwise irregular work unless so indicated on Drawings or approved by the Engineer.

E. Construction shall be in accordance with the pumphouse drawing. Work is shown in diagrammatic form and does not necessarily indicate all required hardware. Contractor is required to provide omitted hardware, as necessary.

F. Features shall conform to the drawing.

G. Follow manufacturers' directions and recommendations in all cases where the manufacturers of articles used on this Contract furnish directions covering points not shown on the Drawings or covered in these Specifications.

END OF SECTION

SECTION 3: ACCEPTANCE

PART 1: ACCEPTANCE CRITERIA

1.1 INSPECTION

A. Connection of new pipe installations to existing water mains shall be subject to the explicit approval of the Engineer or the Owner. Notification of 48 hours shall be provided in advance of the work. All equipment and materials required for the connection shall be on site at the time of inspection and authorization of the work. Once started, such work shall not be interrupted and shall be accomplished with all reasonable haste.

B. All required inspections to be done by the Engineer or other applicable agency shall be secured by the Contractor. The contractor shall provide timely notice (at least 48 hours) of the inspection date to the relevant parties including the Engineer and the Owner (if applicable).

C. Inspections by the Engineer shall be promptly conducted, as to not delay work and shall be an onsite, in-person inspection, where applicable. If the inspected work is covered up before approval of the Engineer or inspection party, the Contractor shall uncover (if required) all necessary areas at the Contractor's expense.

D. If the Engineer (or another representative) do not complete the requested inspection in a timely manner when proper notification has been provided by the Contractor, the Contractor may continue to complete work. The absence of an inspector does not relieve the Contractor of any responsibility to provide photographic documentation and to install the system according to the plans and specifications. Similarly, the presence of an inspector does not imply acceptance of the work being performed. It is the Contractor's responsibility to install all components according to the plans and specifications.

E. Additional incurred expenses as a result of inspections outside of the normal 40-hour work week or during holidays; or additional inspections as a result of specifications or plans not followed; or specified work not being complete at the time of initial inspection; or any inspections after construction of completion shall be covered in full by the Contractor unless otherwise specified.

F. The Contractor shall cover the cost of all re-inspections resulting from unsatisfactory installation or workmanship or as a result of failed acceptance testing. Any inspections called by the Contractor outside normal business hours (8-5 M-F), or on Federal Holidays, shall be charged to the contractor at 2.0 times the standard rate.

1.2 GENERAL TESTING

A. The Contractor shall provide an acceptance schedule indicating the order in which testing, training, operation, and commissioning will occur.

B. The Contractor shall provide a complete description of all testing to be completed at each test interval and submit a minimum of two weeks prior to initiating test interval for Engineer and Owner approval.

C. The contractor is responsible for all aspects of testing, including temporary facilities and connections.

D. Tests and inspections, unless otherwise specified or accepted, are in accordance with the recognized standards of the industry.

1.3 SYSTEM TESTING AND OPERATION

A. Distribution:

Pressure testing. After the pipe is laid, the joints are completed, and trench partially backfilled, leaving the joints exposed for examination, the pipe installation shall be inspected and tested under the supervision of the Engineer or authorized representative. For PVC and ductile iron pipe, test pressure shall not in any case be less than 150% of the working pressure at the lowest elevation point of the segment tested. See trench detail drawing for complete hydrostatic testing procedures.

1.4 DISINFECTION

A. Prior to using the installation for potable water service, all pipe valves, and other appurtenances shall be disinfected, flushed, and shall be shown to be free of bacteriological contamination by laboratory test of one or more water samples. See trench detail drawing for complete disinfection and flushing procedures.

END OF SECTION

SECTION 4: APPENDICES

PART A: FORMS REQUIRED FOR SUBMITTAL WITH BID

- List of Subcontractors
- List of Authorized Agents
- Bid Sheets

1. LIST OF SUBCONTRACTORS

This sheet must be included in the bid package, even if no subcontractors will be hired. If no subcontractors are to be utilized, indicate such by initialing below and writing "NONE" for the name of the first subcontractor.

Percentage of work performed by general contractor: _____

_____ No Subcontractors Shall Be Utilized in This Project (initial)

1. Name: _____ Phone: _____

   Work Subcontracted:

2. Name: _____ Phone: _____

   Work Subcontracted:

3. Name: _____ Phone: _____

   Work Subcontracted:

4. Name: _____ Phone: _____

   Work Subcontracted:

5. Name: _____ Phone: _____

   Work Subcontracted:

2. LIST OF AUTHORIZED AGENTS

The following persons have authority to convey official information and make decisions on behalf of their respective entities. The decisions, instructions, or information conveyed by any other persons shall not be considered binding or authoritative and do not modify, confirm, or affect the project described in this project.

System Owner: Wolf Creek Property Owners Assn

Authorized Persons: Richard Nova
Jim Segaar
James Conover

Project Manager: James Conover
Jim Segaar

Project Engineer/Manager: Northwest Water Systems Inc.

Authorized Persons: Todd Krause, P.E.
Chip Roth

Contractor: _____

Authorized Persons: _____

_____

_____

_____

Any additions or deletions to this list must be provided in writing by an authorized agent of the respective entity and copies provided to all other parties.

3. BID SHEETS

- Schedule A: Replacement of Distribution Main on Cottonwood Rd.
- Schedule B: Transmission Line and Distribution Main Replacement Green Meadows Rd., Sundance Rd., and Aspen Lane
- Schedule C: Replacement of Distribution Main and Transmission Line from Green Meadows Vault to Booster Station
- Schedule D: Replacement of Distribution Lines on Left Fork Wolf Creek Rd. Virginia Hills Rd., and Goshawk Ln.
- Schedule E: Distribution Replacement Aspen Ln. to Winding Rd.
- Schedule F: Left Wolf Creek Booster Station Upgrade
- Total Summary

Bid sheet items are not all-inclusive, although it does include all major items. It is assumed the Contractor will take into account accessory supplies required, some examples are tape, stakes, pipe supports, repair couplings, misc. fittings, etc. Space is available for additional items to be shown on the bid sheets.

MJ=Mechanical Joint, FL=Flanged, SW=Solvent Weld, TH=Threaded, CO=Compression

LS=Lump Sum, EA=Each, LF=Linear Feet

Schedule A: Replacement of Distribution Main on Cottonwood Rd.

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	4,320	LF	Ditching, compaction, tracer wire, warning tape, backfill		
A-3	4,320	LF	C900 DR18 PVC pipe, and thrust blocking (Distribution)		
A-4	3	EA	4" AWWA gate valve assy Flanged x MJ		
A-5	1	EA	4" C900 90° Elbow		
A-6	3	EA	4" C900 45° Elbow		
A-7	8	EA	4" C900 22.5° Elbow		
A-8	6	EA	4" C900 11.25° Elbow		
A-9	1	EA	4" DIP Tee Flanged		
A-10	3	EA	4" Romac Coupling		
A-11	14	EA	Service laterals (distribution to meter and/or meter setter, Meter Box, Meter Setter, Water Meter)		
A-12	14	EA	1.25" Water Meter Assembly (Water Meter, Meter box, Meter Setter)		
A-13	21	EA	1.25" Water Meter		
A-14	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-15	1	LS	Cap Abandoned Existing Distribution Main.		
A-16	45	YD	Gravel for under road or driveway		
A-17	7	YD	Export native soils		
A-18	1	LS	Temporary traffic control		
A-19	1	LS	Site Restoration		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch C-900 PVC pipe can be replaced with 4-inch DR-11 HDPE.
4-inch C-900 PVC pipe can be replaced with 4-inch ductile iron pipe.
2-inch DR-11 HDPE can be replaced with 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Schedule B: Transmission Line and Distribution Main Replacement Green Meadows Rd., Sundance Rd., and Aspen L

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	5,460	LF	Ditching, compaction, tracer wire, warning tape, backfill		
A-3	1,840	LF	4" C900 DR18 PVC pipe, and thrust blocking (Transmission)		
A-4	4,640	LF	4" C900 DR18 PVC pipe, and thrust blocking (Distribution)		
A-5	780	LF	2" SCHD 80 PVC (Distribution)		
A-6	6	EA	4" AWWA gate valve assy Flanged x MJ		
A-7	1	EA	2" AWWA gate valve assy Flanged x MJ		
A-8	5	EA	4" C900 90° Elbow		
A-9	1	EA	4" C900 45° Elbow		
A-10	7	EA	4" C900 22.5° Elbow		
A-11	16	EA	4" C900 11.25° Elbow		
A-12	5	EA	4" DIP Tee Flanged		
A-13	3	EA	2" SCHD 80 PVC Tee		
A-14	4	EA	4" Romac Coupling		
A-15	1	EA	Air/Vac assy (includes gate valve)		
A-16	1	EA	Blowoff assy (includes gate valve)		
A-17	18	EA	Service laterals (distribution to meter and/or meter setter, Meter Box, Meter Setter, Water Meter)		
A-18	34	EA	1.25" Water Meter Assembly (Water Meter, Meter box, Meter Setter)		
A-19	22	EA	1.25" Water Meter		
A-20	2	EA	2" Water Meter Assembly (Water Meter, Meter box, Meter		
A-21	2	EA	2" Water Meter		
A-22	2	EA	Check Valve		
A-23	2	EA	Bollards, Decorative Rock or Other Vehicular Barier		
A-24	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-25	1	LS	Cap Abandoned Existing Transmission Line		
A-26	1	LS	Cap Abandoned Existing Distribution Main.		
A-27	85	YD	Gravel for under road or driveway		
A-28	17	YD	Export native soils		
A-29	1	LS	Temporary traffic control		
A-30	1	LS	Site Restoration		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch C-900 PVC pipe can be replaced with 4-inch DR-11 HDPE.
4-inch C-900 PVC pipe can be replaced with 4-inch ductile iron pipe.
2-inch DR-11 HDPE can be replaced with 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Schedule C: Replacement of Distribution Main and Transmission Line from Green Meadows Vault to Booster Station

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	680	LF	Ditching, compaction, tracer wire, warning tape, backfill		
A-3	340	LF	4"C900 DR18 PVC pipe, and thrust blocking (Transmission)		
A-4	340	LF	6" C900 DR18 PVC pipe, and thrust blocking (Distribution)		
A-5	1	EA	6" C900 22.5° Elbow		
A-6	1	EA	4" C900 90° Elbow		
A-7	1	EA	4" C900 22.5° Elbow		
A-8	1	EA	Check Valve		
A-9	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-10	1	LS	Cap Abandoned Existing Transmission Line		
A-11	1	LS	Cap Abandoned Existing Distribution Main.		
A-12	30	YD	Gravel for under road or driveway		
A-13	2	YD	Export native soils		
A-14	1	LS	Temporary traffic control		
A-15	1	LS	Site Restoration		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch C-900 PVC pipe can be replaced with 4-inch DR-11 HDPE.
4-inch C-900 PVC pipe can be replaced with 4-inch ductile iron pipe.
2-inch DR-11 HDPE can be replaced with 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Schedule D: Replacement of Distribution Lines on Left Fork Wolf Creek Rd. Virginia Hills Rd., Park Ln., and Goshawk L

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	5,480	LF	Ditching, compaction, tracer wire, warning tape, backfill		
A-3	1,220	LF	4" C900 DR18 PVC pipe, and thrust blocking (Distribution)		
A-4	3,580	LF	2" SCHD 80 PVC (Distribution)		
A-5	1	EA	4" AWWA gate valve assy Flanged x MJ		
A-6	3	EA	2" AWWA gate valve assy Flanged x MJ		
A-7	1	EA	4" C900 22.5° Elbow		
A-8	1	EA	4" C900 11.25° Elbow		
A-9	3	EA	2" SCHD 80 90° Elbow		
A-10	2	EA	4" DIP Tee Flanged		
A-11	10	EA	2" SCHD 80 Tee		
A-12	10	EA	Service laterals (distribution to meter and/or meter setter, Meter Box, Meter Setter, Water Meter)		
A-13	13	EA	1.25" Water Meter Assembly (Water Meter, Meter box, Meter Setter)		
A-14	11	EA	1.25" Water Meter		
A-15	1	EA	Check Valve		
A-16	4	EA	Blowoff assy (includes gate valve)		
A-17	8	EA	Bollards, Decorative Rock or Other Vehicular Barier		
A-18	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-19	1	LS	Cap Abandoned Existing Transmission Line		
A-20	1	LS	Cap Abandoned Existing Distribution Main.		
A-21	100	YD	Gravel for under road or driveway		
A-22	14	YD	Export native soils		
A-23	1	LS	Temporary traffic control		
A-24	1	LS	Site Restoration		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch C-900 PVC pipe can be replaced with 4-inch DR-11 HDPE.
4-inch C-900 PVC pipe can be replaced with 4-inch ductile iron pipe.
2-inch DR-11 HDPE can be replaced with 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Schedule E: Distribution Replacement Aspen Ln. to Winding Rd.

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	1,300	LF	Ditching, compaction, tracer wire, warning tape, backfill		
A-3	1,300	LF	2" SCHD 80 PVC (Distribution)		
A-4	1	EA	2" SCHD 80 45° Elbow		
A-5	1	EA	Air/Vac assy (includes gate valve)		
A-6	4	EA	Service laterals (distribution to meter and/or meter setter, Meter Box, Meter Setter, Water Meter)		
A-7	5	EA	1.25" Water Meter Assembly (Water Meter, Meter box, Meter Setter)		
A-8	4	EA	1.25" Water Meter		
A-9	2	EA	Bollards, Decorative Rock or Other Vehicular Barier		
A-10	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-11	1	LS	Cap Abandoned Existing Transmission Line		
A-12	1	LS	Cap Abandoned Existing Distribution Main.		
A-13	20	YD	Gravel for under road or driveway		
A-14	6	YD	Export native soils		
A-15	1	LS	Temporary traffic control		
A-16	1	LS	Site Restoration		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch C-900 PVC pipe can be replaced with 4-inch DR-11 HDPE.
4-inch C-900 PVC pipe can be replaced with 4-inch ductile iron pipe.
2-inch DR-11 HDPE can be replaced with 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Schedule F: Left Wolf Creek Booster Station Upgrade

It #	Quantity	Unit	Item	Unit Price	Total Price
A-1	1	LS	Mobilization/Demobilization		
A-2	10	LF	Ditching, compaction, tracer wire, warning tape, backfill, 2" PVC Schedule 40 pipe and Schedule 80 fittings		
A-3	10	LF	Ditching, compaction, tracer wire, warning tape, backfill, 4" C900 DR18 PVC pipe, fittings, and thrust blocking		
A-4	10	LF	Ditching, compaction, tracer wire, warning tape, backfill, 6" C900 DR18 PVC pipe, fittings, and thrust blocking		
A-5	2	EA	GRUNDFOS 2 hp pump CRI 5-5		
A-6	2	EA	Grundfos VFD CUE 100-20		
A-7	1	EA	Badger M55 Water Meter		
A-8	1	EA	Badger M35 Water Meter		
A-9	1	LS	Badger M120 Water Meter		
A-10	1	EA	Badger Turbo Series 200 Water Meter		
A-11	1	EA	Watts LF223 LP 1.25" Pressure Reducing Valve		
A-12	3	EA	Glycerin Filled Pressure Guage rated for 0-100 psi		
A-13	1	EA	2" Gate Valve		
A-14	7	EA	4" Rising Stem Gate Valve		
A-15	2	EA	6" Rising Stem Gate Valve		
A-16	2	EA	4" Check Valve		
A-17	4	EA	Globe Valve Hose Bib, Smooth Nose		
A-18	2	EA	Transducer		
A-19	4	LF	2" SCHD 80 PVC		
A-20	32	LF	4" SCHD 80 PVC		
A-21	5	LF	6" SCHD 80 PVC		
A-22	1	EA	6x4x6 SCHD 80 PVC Tee		
A-23	1	EA	4x2x4 SCHD 80 PVC Tee		
A-24	2	EA	4" Tee SCHD 80 PVC		
A-25	8	EA	4" 90 Degree Elbow SCHD 80 PVC		
A-26	2	EA	2" 90 Degree Elbow SCHD 80 PVC		
A-27	1	EA	Watts LF3L Pressure Relief Valve		
A-28	1	EA	Well-X-Trol Wx-201 14 Gallon Bladder Tank.		
A-29	1	LS	Disinfection, pressure testing, coliform sampling of all new water lines.		
A-30	1	LS	Install "TRANSITION" and cap existing distribution.		
A-31	1	LS	Crushed rock import for bedding pipe		
A-32	1	LS	Export native soils		
A-33	1	LS	Temporary traffic control		
A-34	1	LS	Restore site to existing conditions		

Schedule A Subtotal: _____

Total _____

Notes:
All items shall be supplied and installed by contractor, unless otherwise specified.
See soils assesement, septic as-builts, and existing utility maps provided to aid in estimating unit prices.
4-inch SCHD 80 PVC can be replaced with 4-inch Ductile Iron Pipe
2-inch SCHD 40 GIP can be replaced for 2-inch Sch 80 PVC pipe.
Contractor is responsible for disposal of debris and/or proper disposal of existing replaced items.

Totals Summary

Schedule A:	Replacement of Distribution Main on Cottonwood Rd.	$ _____
Schedule B:	Transmission Line and Distribution Main Replacement Green Meadows Rd., Sundance Rd., and Aspen Ln.	$ _____
Schedule C:	Replacement of Distribution Main and Transmission Line from Green Meadows Vault to Booster Station	$ _____
Schedule D:	Replacement of Distribution Lines on Left Fork Wolf Creek Rd. Virginia Hills Rd., Park Ln., and Goshawk Ln.	$ _____
Schedule E:	Distribution Replacement Aspen Ln. to Winding Rd.	$ _____
Schedule F:	Left Wolf Creek Booster Station Upgrade	$ _____

Permits and Fees:	$ _____
Taxes:	$ _____
Project Total:	$ _____

PART B: EXISTING SITE CONDITION

Utilities:

- Existing Distribution Map ("Wolf Creek Property Owner Association Water System Improvements")
- Okanogan County Electric Co-Operative ("GreenWood Development")
- Okanogan County Electric Co-Operative ("Green Meadows Development")

KEY TO LOT NO. PREFIXES

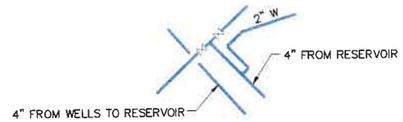
CM – COTTONWOOD MEADOWS
VH – VIRGINIA HILLS
GM – GREEN MEADOWS

LEGEND

EXISTING VALVE
DISTRIBUTION SYSTEM UPGRADE NEAR TERM
DISTRIBUTION SYSTEM UPGRADE LANG TERM

NOTE

ALL PIPING LOCATIONS ARE APPROXIMATE



DETAIL 1 – SCALE: NTS

DETAIL 2 – SCALE: NTS

DESIGNED LMC DRAWN KLS CHECKED	PACE An Engineering Services Company 104 East 9th Street Wenatchee, WA 98801 p. 509.662.1762 Civil | Structural | Planning | Survey www. paceengrs.com	DATE OCT 2013 SCALE –	**WOLF CREEK PROPERTY OWNERS ASSOCIATION WATER SYSTEM SYSTEM IMPROVEMENTS**	FIGURE **1**

FILE NAME: P:\P13\13458.00 – WCPOA – SYSTEM ASSESSMENT\CAD\FIGURES\SHEETS\F_13458 F1.DWG
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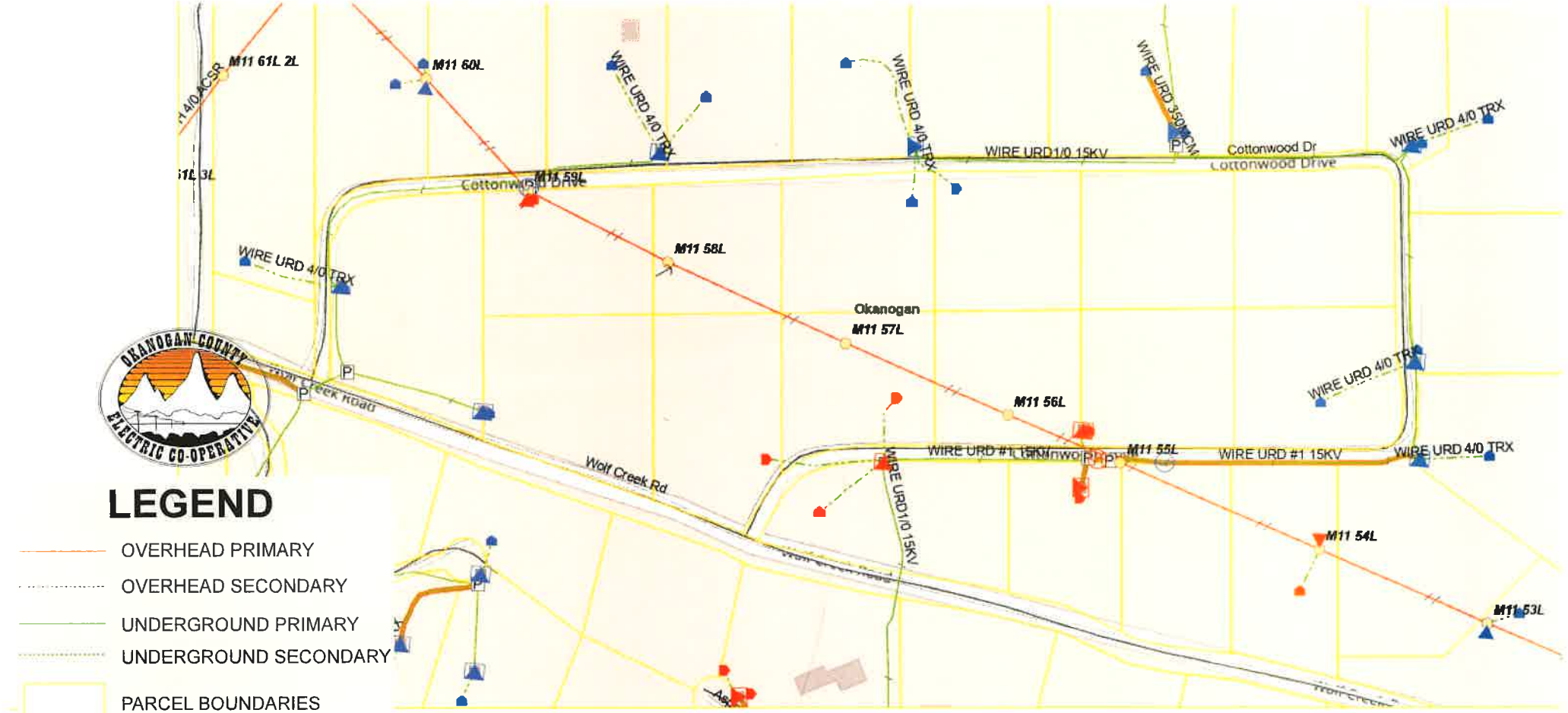
PLOT TIME: 10/10/2013 10:43 AM
USER NAME: KAREN SCOTT
XREF FILES: ####



LEGEND

- OVERHEAD PRIMARY
- OVERHEAD SECONDARY
- UNDERGROUND PRIMARY
- UNDERGROUND SECONDARY
- PARCEL BOUNDARIES
- POWER POLE
- TRANSFORMER
- METER

GREENWOOD DEVELOPMENT

LEGEND

- OVERHEAD PRIMARY
- OVERHEAD SECONDARY
- UNDERGROUND PRIMARY
- UNDERGROUND SECONDARY
- PARCEL BOUNDARIES
- POWER POLE
- TRANSFORMER
- METER

GREEN MEADOWS DEVELOPMENT

PART C: COMPONENT SPECIFICATIONS

- AWWA C900 Pipe
- C900 Pipe Restraint Harness
- Resilient Wedge Gate Valve
- Air/Vac
- Service Saddle 4"
- Water Meter, Disc Meter, 5/8" -1"
- Water Meter, Disc Meter, 1½" – 2"
- 2 HP VFD Grundfos CUE 100
- Grundfos CRI 5-5 2 HP Booster Pump
- Watts LF223LP 1.25" Pressure Reducing Valve
- Water Meter, Turbine Meter 1½"-12"

VINYLTECH AWWA C900 BLUE

TECHNICAL DATA SUBMITTAL (4" – 12")

VINYLTECH VT PVC • PIPE

CONFORMANCE

These specifications designate the requirements for manufacturing and installing Vinyltech AWWA C900 PVC Pressure Pipe for potable water (4"-12").

ANSI/AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4" Through 60" (100mm Through 1,500mm)

AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

NSF/ANSI 61, Annex G - Drinking Water Systems Components-Health Effects

FM 1612 - Approval Standard for Polyvinyl Chloride (PVC) Pipe and Fittings for Underground Fire Protection

UL 1285 - Standard for Pipe and Couplings, Polyvinyl Chloride (PVC), and Oriented Polyvinyl Chloride (PVCO) for Underground Fire Service

PIPE COMPOUND

The pipe shall be extruded from compounds meeting (PVC 1120) the requirements of Cell Classification 12454, as defined in ASTM D1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds. The PVC shall also be listed by the National Sanitation Foundation (NSF) for use in potable water.

PIPE

Vinyltech pipe shall be manufactured in accordance with AWWA C900.

GASKET JOINT

The gasket shall be reinforced with a steel band and meet the requirements of ASTM F477. Vinyltech pipe shall have an integral bell end with a locked-in factory installed gasket and shall meet the joint requirements of ASTM D3139.

MARKING

The pipe shall be marked in accordance with AWWA C900.

QUALITY CONTROL

Each length of the pipe including the bell shall be hydrostatically tested in accordance with AWWA C900. The pipe shall meet all additional test requirements as described in AWWA C900. Our full-time quality assurance staff continually administers a rigid program of tests to maintain the production of the best pipe products available.

INSTALLATION

Recommended installation procedures of Vinyltech Corporation are outlined in AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water. The AWWA Manual M23, PVC Pipe Design and Installation, is also an invaluable resource guide for design and installation.

TAPPING

The consistent success of tapping PVC pressure pipe is contingent upon the use of proper procedures and equipment. Vinyltech recommends strict compliance with the requirements as specified in AWWA C605.

ASSEMBLING THE PIPE

Assembly of Vinyltech PVC water pipe is easily accomplished. A depth of entry mark is on each spigot end to serve as a visual check for rapid, accurate joint inspection. **Do not over insert.**

1) Remove any mud, sand, or other foreign matter from the belled and spigot ends of the pipe. Carefully clean the gasket area.
2) With a clean applicator (a brush or hand) lubricate the entire surface of the pipe from the spigot end to the depth of entry mark and the contact surface of the gasket with **Vinyltech Brand Lubricant.**
3) Brace the bell to avoid disturbing the already installed joints. Align the pipe, insert the spigot into the bell and push.
4) **Do not insert past the entry mark line.**

ASTM INTERNATIONAL · FM APPROVED · NSF · UL Underwriters Laboratories Inc.® LISTED

VINYLTECH • 201 S. 61st Avenue • Phoenix, AZ 85043 • 602 233-0071 • Fax: 602 272-4847 • www.vtpipe.com

VINYLTECH AWWA

C900 BLUE TECHNICAL DATA SUBMITTAL (4" – 12")

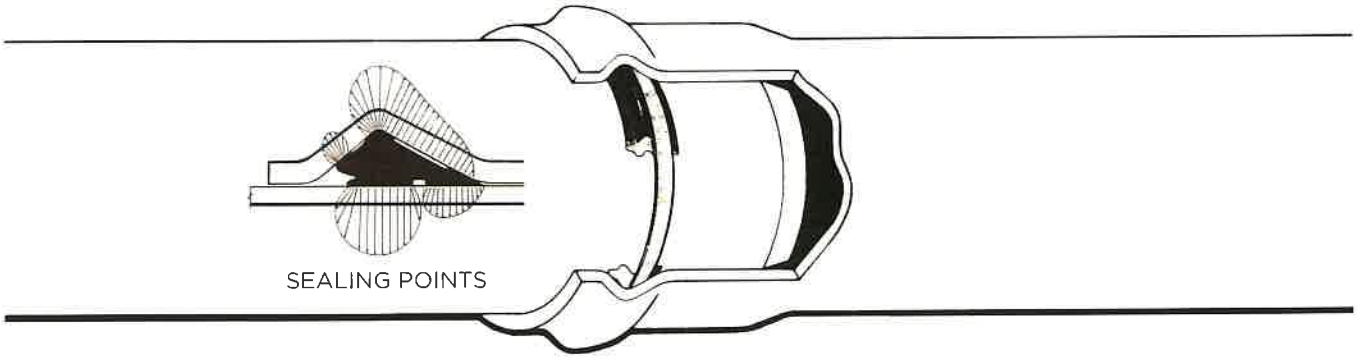
05/2024

C900 DR 18 Pressure Class 235

NOMINAL SIZE		OUTER DIAMETER (IN)	MINIMUM WALL (IN)	FEET PER LIFT	LIFTS PER TRUCK	APPROX WEIGHT (LB/100')
(IN)	(mm)					
4	100	4.800	0.267	1020	16	251.6
6	150	6.900	0.383	440	16	521.2
8	200	9.050	0.503	200	20	903.0
10	250	11.100	0.617	240	12	1364.4
12	300	13.200	0.733	60-80	28	1935.8

C900 DR 14 Pressure Class 305

NOMINAL SIZE		OUTER DIAMETER (IN)	MINIMUM WALL (IN)	FEET PER LIFT	LIFTS PER TRUCK	APPROX WEIGHT (LB/100')
(IN)	(mm)					
4	100	4.800	0.343	1020	16	317.5
6	150	6.900	0.493	440	16	658.7
8	200	9.050	0.646	200	20	1139.7
10	250	11.100	0.793	240	12	1722.3
12	300	13.200	0.943	60-80	28	2445.5



The Rieber Sealing System

The Rieber system provides a proven pipe joint with an excellent track record in the field. It is the fastest growing system in the world because of its many advantages.

- Factory installed, locked-in gasket
- The pipe bell forms over the gasket, making a perfect fit
- Avoids the possibility of installing the wrong gasket
- Reduces installation problems
- The locked-in gasket eliminates gasket roll-out during joining
- The gasket is molded vs. extruded and spliced
- Works equally well under pressure or vacuum
- Three sealing points achieved vs. two
- **LEAK-PROOF JOINTS**
- **"THE WORLDS BEST JOINT"**

201 S. 61st Avenue • Phoenix, AZ 85043
602 233-0071 • 602 272-4847 Fax • www.vtpipe.com

ROMAC INDUSTRIES, INC.

STYLE XR501
EXTENDED RANGE COUPLING

MATERIAL SPECIFICATIONS

CENTER RINGS: The center rings are cast from ductile (nodular) iron meeting or exceeding ASTM A536, Grade 65-45-12.

END RINGS: The end rings are cast from ductile (nodular) iron meeting or exceeding ASTM A536, Grade 65-45-12.

GASKETS: Made from virgin Ethylene Propylene Diene Monomer Rubber (EPDM) compounded for water and sewer service in accordance with ASTM D2000, NSF 61 Certified. Other compounds available upon request.

COATINGS: Shop coat applied to cast parts for corrosion protection in transit.

BOLTS AND NUTS: 5/8 inch, high strength low alloy steel trackhead bolts. National coarse rolled thread and heavy hex nuts. Steel meets AWWA C111 composition specifications. Stainless steel bolts and nuts available on request.

OPTIONS: Romacoat fusion bonded epoxy, NSF 61 certified. Liquid epoxy and other coatings available on request. Stainless steel bolts and nuts available on request.

PRESSURE: When properly installed on standard steel pipe and larger, the Romac XR501 can be used at working pressures up to 260 psi.

MADE IN U.S.A.

ALSO AVAILABLE WITH REMOVABLE END-CAP

NSF61 certified. | **MEETS AWWA C219**

NOM. PIPE SIZE	ONE END GASKET RANGE	ONE END APPROX. USE	BY ×	OTHER END GASKET RANGE	OTHER END APPROX. USE	BY ×	CR LGTH	LIST PRICE SHOPCOAT w/STD B&N	SHOPCOAT w/304 SS B&N	SHOPCOAT w/316 SS B&N	FUSION EPOXY w/STD B&N	FUSION EPOXY w/304 SS B&N	FUSION EPOXY w/316 SS B&N	APPROX WT. (lbs)
4"	4.215[1] - 5.00[2] 4.215[1] - 5.60	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	4.215[1] - 5.00[2] 4.215[1] - 5.60	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	7" 12"	$317.25 476.62	$410.71 598.15	$583.33 910.74	$386.78 523.43	$480.25 644.97	$652.86 957.34	27# 40#
6"	6.275[1] - 7.20[2] 6.275[1] - 7.60	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	6.275[1] - 7.20[2] 6.275[1] - 7.60	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	7" 12"	451.10 626.76	567.98 778.67	783.68 1,169.15	539.23 674.31	656.08 826.21	871.86 1,216.70	34# 47#
8"	8.40[1] - 9.30[2] 8.40[1] - 9.75	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	8.40[1] - 9.30[2] 8.40[1] - 9.75	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	7" 12"	529.67 735.01	669.90 917.32	928.80 1,370.89	640.31 782.17	780.52 964.45	1,039.91 1,433.02	50# 64#
10"	10.50[1] - 11.41[2] 10.50[1] - 12.15	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	10.50[1] - 11.41[2] 10.50[1] - 12.15	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	8" 12"	671.94 889.49	835.53 1,071.74	1,104.03 1,540.32	844.82 971.89	1,008.41 1,154.18	1,121.73 1,610.20	72# 79#
12"	12.50[1] - 13.56[2] 12.50[1] - 14.41	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	12.50[1] - 13.56[2] 12.50[1] - 14.41	SDR 35, Std. Stl, DI & CI SDR 35, Std. Stl, DI,CI & AC	×	8" 13"	795.32 1,036.01	982.27 1,293.11	1,371.41 1,969.71	988.96 1,138.54	1,175.91 1,395.65	1,383.43 2,072.26	87# 106#

[1] Pipe O.D.s smaller than Standard Steel Size, NOT TO EXCEED 20 PSI.
[2] Optional Gasket for SDR 35 through CI D Cast Iron Pipe

TO ORDER: Determine O.D. of pipes to be coupled. Select proper gasket range for each pipe from above table. Insert high range of each gasket into catalog number as follows: XR501 - one end x other end.
EXAMPLE: To couple 8" DI and 8" std. steel, order **XR501-9.75 x 9.75 X 7**

Flexible couplings do not provide protection against possible pullout of pipe ends in unrestrained conditions.

XR501 PARTS LIST

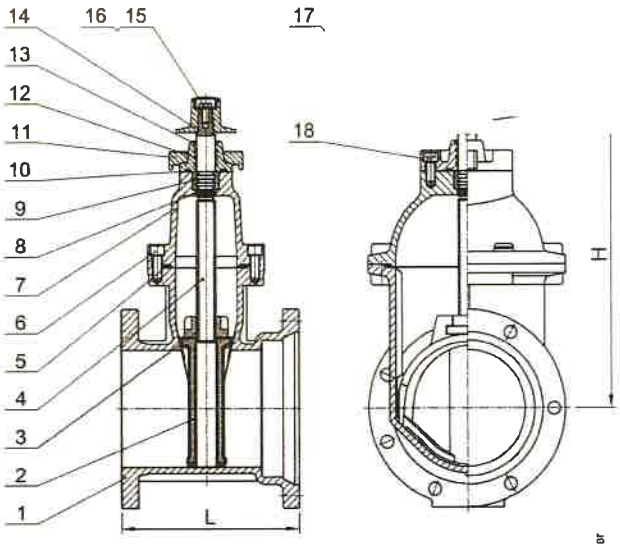
XR501 End-Caps are also available. Contact Romac for information.

NOM. PIPE SIZE	CENTER RING SHOPCOAT	CENTER RING EPOXY	EXTRA-LONG CENTER RING SHOPCOAT	EXTRA-LONG CENTER RING EPOXY	END RING SHOPCOAT	END RING EPOXY	GASKET	TRACKHEAD BOLT w/NUT PRICE EACH NUMBER:LENGTH	CORTEN	304 S.S.	316 S.S.
4"	$138.31	$213.09	$278.87	$381.97	$29.45	$39.16	$45.29	Std. Length: 4: ⅜ x 1½ Extra Long: 4: ⅜ x 17	$19.55 24.24	$44.06 58.59	$89.98 144.49
6"	158.34	239.23	310.47	426.21	52.65	70.81	54.40	Std. Length: 5: ⅜ x 1½ Extra Long: 5: ⅜ x 17	19.55 24.24	44.06 58.59	89.98 144.49
8"	184.57	267.38	361.69	486.51	62.00	91.11	70.38	Std. Length: 6: ⅜ x 1½ Extra Long: 6: ⅜ x 17	19.55 24.24	44.06 58.59	89.98 144.49
10"	222.71	304.60	434.58	534.76	78.54	119.65	101.81	Std. Length: 6: ⅝ x 13 Extra Long: 6: ⅝ x 17	23.31 24.24	52.03 58.59	99.63 144.49
12"	239.09	345.79	460.49	637.31	92.87	133.80	126.79	Std. Length: 8: ⅝ x 13 Extra Long: 8: ⅝ x 18	23.31 25.72	52.03 62.04	99.63 155.09

DUCTILE IRON GATE VALVES

VALVES

NRS RESILIENT SEATED GATE VALVE
FL x MJ ENDS, 300PSI



PART#	SIZE	WEIGHT	CASE	
9600FJ3	3"	54.3	16	---
9600FJ4	4"	65.5	16	---
9600FJ6	6"	107.5	9	---
9600FJ8	8"	181.9	6	---
9600FJ10	10"	297.4	2	---
9600FJ12	12"	431.4	2	---

*STANDARD CONFIG IS OP NUT ONLY
*MJ=MECHANICAL JOINT

ITEM	DESCRIPTION	MATERIAL	ASTM SPEC.
1	Body	Ductile Iron	A536 65-45-12
2	Wedge	Ductile Iron, EPDM Encapsulated	A536 65-45-12
3	Wedge Nut	Bronze	B148 C95200
4	Stem	Stainless Steel	A276 Type 304SS
5	Gasket	Rubber	D2000 NBR
6	Bolts	Stainless Steel	A276 Type 304SS
7	Bonnet	Ductile Iron	A536 65-45-12
8	O-Ring	Rubber	D2000 NBR
9	Thrust Collar	Bronze	B148 C95200
10	O-Ring	Rubber	D2000 NBR
11	Gland	Ductile Iron	A536 65-45-12
12	O-Ring	Rubber	D2000 NBR
13	Dust Ring	Rubber	D2000 NBR
14	Operating Nut (Optional)	Ductile Iron	A536 65-45-12
15	Bolts	Stainless Steel	A276 Type 304SS
16	Washers	Stainless Steel	A276 Type 304SS
17	Handwheel (Optional)	Ductile Iron	A536 65-45-12
18	Bolts	Stainless Steel	A276 Type 304SS

MAIN DIMENSIONS								
SIZE	3"	4"	6"	8"	10"	12"	10"	12"
L	8.8"	9.5"	11.0"	12.0"	14.0"	14.5"	13"	14"
H	11.0"	11.8"	16.4"	20.7"	24.5"	28.0"	44-1/2"	52"
D	10.0"	10.0"	12.0"	14.0"	16.0"	16.0"	34-3/4"	40-1/6"

AL SERIES AIR & VACUUM VALVE

AL SERIES ADVANTAGES

- Available in Sizes 1/2"-24"
- AWWA C512 Compliant
- NSF 61 and NSF 372 Certified
- Vents large quantities of air from systems being filled with liquid.
- Features Vacuum Function
- Peripheral Guide System for unobstructed closure
- Drip-tight closure
- Buna-N Seating Standard

AL SERIES OPTIONS

- Both NPT Screwed and ANSI Flanges Available
- Available in AIS, BA, BAN and BB Configurations
- Fusion Bonded Epoxy
- 304 or 316 Stainless Steel Trim
- 3 Pressure Ranges Offered

The Crispin Air and Vacuum Unit, with its orifice the same diameter as its inlet, allows large quantities of air to be vented from systems being filled with liquid. The same holds true in reverse for vacuum conditions when the system is drained.

Its design is such that the velocity of air passing through the valve will not blow the float shut at normal design volumes. It will not close until the arrival of liquid in the valve, and will not open to vent accumulating air as long as the system is under pressure and in operation.

Air and Vacuum Valves are available with stainless steel floats and either a standard top or protectop in sizes up to and including 24." All Crispin Air and Vacuum Valves also have guides which direct the float onto the seat upon closure. These guides are peripheral to the float, and fixed to the body or the cup and hanger assembly.

This peripheral guide system allows unobstructed closure because there are no guide bushings to collect dirt and then bind, and there are no shafts to bend or deform, which would prevent a drip tight seal.

All Crispin Air and Vacuum Valves have standard Buna-N seating material with a Shore durometer of 70-80. This standard seat allows drip tight closure beyond 4-5 PSIG. Occasionally, however, a gravity system operates at pressures less than 10 PSIG. These applications require a soft seating material which will prevent leakage down to 2 PSIG. This soft seating material should not be applied to systems with operating pressures greater than 50 PSIG, or high pressure leaks may occur around the seat.

All Crispin valves are designed for a working pressure of 300 PSIG.

Materials and prices are subject to change without notice. Metric and special class flange ratings are available.

Crispin Valve, 600 Fowler Ave., Berwick, PA 18603 • 1-800-247-VALV
T: (570)752-4524 • F: (570) 752-4962 • WWW.CRISPINVALVE.COM • info@crispinvalve.com

AL Series Air & Vacuum Valve, Sizes 1/2"-24" Dimensional Data

AL Series Dimensional Data

MODEL	INLET	OUTLET	TRIM	HT (B)	WD (A)	WT (LBS)
A5	1/2" NPT	1/2" NPT	IBBT	4 9/11"	4 3/4"	8
*AL10	1" NPT	1" NPT	S/S	6 1/4"	6 1/4"	16
AL20	2" NPT	2" NPT	S/S	9 3/4"	8 3/4"	44
**AL21	2" 125# flg	2" NPT	S/S	13 1/4"	8 3/4"	46
**AL22	2" 250# flg	2" NPT	S/S	13 3/8"	8 3/4"	49
AL30	3" NPT	3" NPT	S/S	11 3/4"	11 1/2"	75
AL31	3" 125# flg	3" NPT	S/S	15 3/4"	11 1/2"	89
AL32	3" 250# flg	3" NPT	S/S	16"	11 1/2"	95
AL40	4" NPT	4" NPT	S/S	14 1/2"	14"	154
AL41	4" 125# flg	4" NPT	S/S	17 1/4"	14"	170
AL42	4" 250# flg	4" NPT	S/S	17 56/99"	14"	181
AL61	6" 125# flg	6" NPT	S/S	15 38/99"	15"	174
AL62	6" 250# flg	6" NPT	S/S	16"	15"	197
AL81	8" 125# flg.	8" NPT	S/S	18 8/9"	17 3/4"	265
AL82	8" 250# flg	8" NPT	S/S	19 1/4"	17 3/4"	295

MODEL	INLET	OUTLET	TRIM	HT (B)	WD (A)	WT (LBS)
AL101	10" 125# flg	10" NPT	S/S	21 26/33"	23"	500
AL102	10" 250" flg	10" NPT	S/S	22 1/2"	23"	550
***AL121	12" 125# flg	12" NPT	S/S	28 3/4"	27"	725
***AL122	12" 250# flg	12" HD	S/S	28 3/4"	27"	778
***AL141	14" 125# flg	14" HD	S/S	32 3/4"	30"	970
***AL142	14" 250# flg	14" HD	S/S	33 1/2"	30"	1157
***AL161	16" 125# flg	16" HD	S/S	34	32"	1093
***AL162	16" 250# flg	16" HD	S/S	34 3/4"	32"	1276
***AL181	18" 125# flg	18" HD	S/S	35"	44 1/2"	1725
***AL182	18" 250# flg	18" HD	S/S	35"	46 1/2"	1925
***AL201	20" 125# flg	20" HD	S/S	55"	43"	2150
***AL202	20" 250# flg	20" HD	S/S	55 1/2"	43"	2200
***AL241	24" 125# flg	24" HD	S/S	64 1/3"	53"	5103
***AL242	24" 250# flg	24" HD	S/S	62 1/2"	53"	5364

* Protectop not available
** Includes ANSI Cl. 125 or 250 companion FLG & NPL
***HD=Hooded. For sizes 12" and larger, flanged outlet are available upon request.

Certified dimensions are available upon request.

Crispin's A and AL Series Air & Vacuum Valves are available in pressure ratings of 2-40psi, 20-150psi or 151-300psi

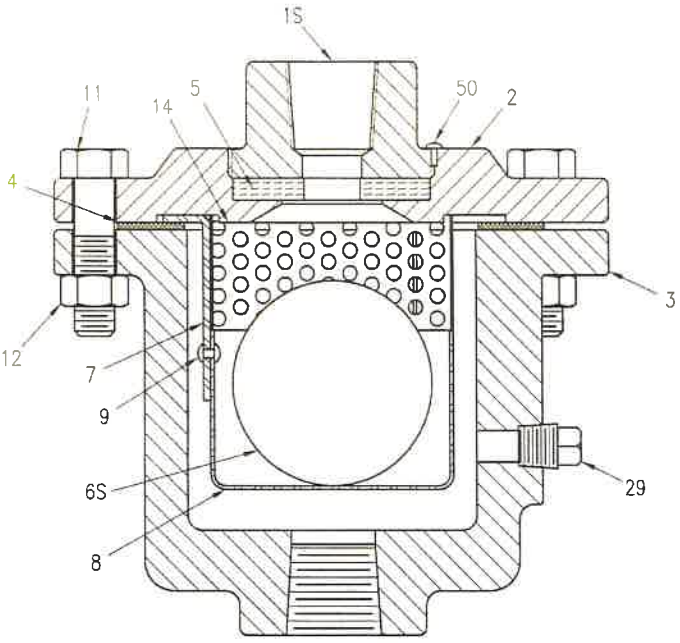
Materials and prices are subject to change without notice. Metric and special class flange ratings are available.

Crispin Valve, 600 Fowler Ave., Berwick, PA 18603 • 1-800-247-VALV
T: (570)752-4524 • F: (570) 752-4962 • WWW.CRISPINVALVE.COM • info@crispinvalve.com

A5: 1/2" A Series Air & Vacuum Valve, AWWA C512

Parts List		
ITEM	DESCRIPTION	MATERIAL
1S	TOP	Cast Iron (A126 Cl. B)
2	FLANGE	Cast Iron (A126 Cl. B)
3	BODY	Cast Iron (A126 Cl. B)
4	GASKET	Armstrong N-8092
5***	SEAT	Buna-N Rubber (D2000)
6S	FLOAT	Stainless Steel (A240)
7	HANGER	Stainless Steel (A240)
8	CUP	Stainless Steel (A240)
9	RIVET	Stainless Steel (A582)
11	BOLT	Steel (A307)
12	NUT	Steel (A563)
14	DIFFUSER	Stainless Steel (A240)
29	PLUG	Brass (B505)
50	INTERFERENCE PIN	Stainless Steel (A582)

The A Series is available with a Bronze, Brass, Stainless Steel or Alloy Body



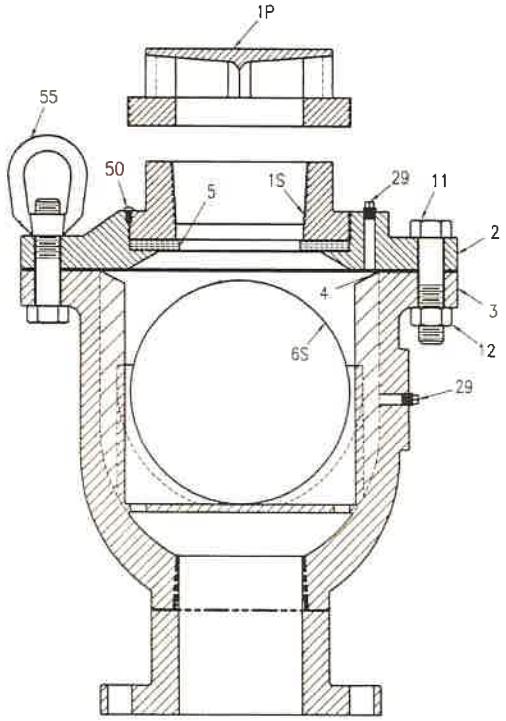
1"-4" Air & Vacuum Valves, AWWA C512

Parts List		
ITEM	DESCRIPTION	MATERIAL
1S*	TOP	Cast Iron (A126 CL B)
1P**	PROTECTOP	Cast Iron (A126 CL B)
2	FLANGE	Cast Iron (A126 CL B)
3F	BODY	Cast Iron (A126 CL B)
4	GASKET	Armstrong N-8092
5***	SEAT	Buna-N Rubber (D2000)
6S	FLOAT	Stainless Steel (A240)
11	BOLT	Steel (A307)
12	NUT	Steel (A563)
29	PLUG	Brass (B505)
50	INTERFERENCE PIN	Stainless Steel (A582)
55	EYE BOLT	Steel (A563)

* Parts are interchangeable and optional at customer's request.

** Includes ANSI Cl. 125 or 250 companion Flg. and NPL

*** Durometer changes when operating pressure is below 20psig or above 150psig.



Materials and prices are subject to change without notice. Metric and special class flange ratings are available.

Crispin Valve, 600 Fowler Ave., Berwick, PA 18603 • 1-800-247-VALV
T: (570)752-4524 • F: (570) 752-4962 • WWW.CRISPINVALVE.COM • info@crispinvalve.com

ROMAC INDUSTRIES, INC. MADE IN U.S.A.

BRONZE SINGLE/DOUBLE STRAP SERVICE SADDLES

STYLE 101B
BRONZE SADDLE
WITH BRONZE STRAP

STYLE 101BS
BRONZE SADDLE
WITH STAINLESS STRAP

STYLE 202B
BRONZE SADDLE
WITH BRONZE STRAPS

STYLE 202BS
BRONZE SADDLE
WITH STAINLESS STRAPS

NOM. PIPE SIZE	O.D. SIZE RANGE	PIPE TYPE	SINGLE STRAP ½" I.P., ¾" & 1" I.P. or C.C. 101B	SINGLE STRAP ½" I.P., ¾" & 1" I.P. or C.C. 101BS	SINGLE STRAP APPROX. WEIGHT EA. (lbs.)	DOUBLE STRAP ½" I.P., ¾" & 1" I.P. or C.C. 202B	DOUBLE STRAP ½" I.P., ¾" & 1" I.P. or C.C. 202BS	DOUBLE STRAP 1¼", 1½", 2" I.P. or C.C. 202B	DOUBLE STRAP 1¼", 1½", 2" I.P. or C.C. 202BS	DOUBLE STRAP APPROX. WEIGHT EA. (lbs.)
	4.50	IPS PVC	$196.97	$160.26	2.9	$329.75	$290.56	$408.31	$338.94	7.0
4"	4.50–4.80	DI / PVC C900 / STL	196.97	160.26	2.9	329.75	290.56	408.31	338.94	7.0
	4.80–5.40	AC / DI	196.97	160.26	3.0	329.75	290.56	408.31	338.94	7.3
5"	5.56	IPS PVC / STEEL	223.18	189.29	3.0	N/A				
	6.63	IPS PVC	234.72	194.90	3.2	409.77	342.32	416.73	391.32	7.3
6"	6.63–6.90	DI / PVC C900 / STL	234.72	194.90	3.2	409.77	342.32	416.73	391.32	7.3
	6.90–7.50	AC / DI	234.72	194.90	3.5	409.77	342.32	416.73	391.32	7.6
	8.63	IPS PVC	246.39	248.45	3.7	469.06	423.64	476.02	446.02	8.4
8"	8.63–9.05	DI / PVC C900 / STL	246.39	248.45	3.7	469.06	423.64	476.02	446.02	8.4
	9.05–9.62	AC / DI	246.39	248.45	3.8	469.06	423.64	476.02	446.02	8.7
	10.75	IPS PVC	322.29	325.01	4.6	549.18	524.89	556.19	576.57	9.6
10"	10.75–11.10	DI / PVC C900 / STL	N/A			549.18	524.89	556.19	576.57	9.6
	11.10	DI / PVC C900	322.29	325.01	4.6	N/A				
	11.10–12.12	AC / DI	322.29	325.01	4.6	549.18	524.89	556.19	576.57	9.9
	12.75	IPS PVC	343.24	346.09	4.8	578.44	583.58	615.73	658.32	10.5
12"	12.75–13.20	DI / PVC C900 / STL	343.24	346.09	4.8	578.44	583.58	615.73	658.32	10.5
	14.00	IPS PVC / STL	343.24	346.09	5.0	578.44	583.58	615.73	658.32	11.1
	13.20–14.38	AC / DI	343.24	346.09	5.0	578.44	583.58	615.73	658.32	11.1
14"	14.40–15.30	DI / PVC C900	N/A			636.28	648.23	679.45	735.38	11.3
	14.40–16.00	DI / IPS PVC / STL				636.28	648.23	679.45	735.38	11.3
16"	16.00–17.40	DI / PVC C900	N/A			730.37	773.51	794.56	867.71	12.8
	17.32–17.45	AC/ DI				730.37	773.51	794.56	867.71	12.9

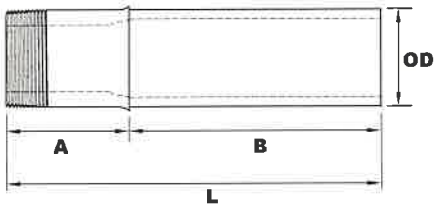
TO ORDER: Add tap size to the upper range of the saddle.

EXAMPLE:	STYLE	UPPER RANGE	TAP SIZE	TYPE THREAD
Bronze Saddle w/ Bronze strap ("B"):	**202B** –	**7.50** x	**3/4"**	**IP**
Bronze Saddle w/ Stainless Steel strap ("BS"):	**202BS** –	**7.50** x	**3/4"**	**IP**

For reference only. Actual dimensions may vary.

TRANSITION FITTING HDPE TO MALE NPT THREADED METAL

Accesorio de transición de HDPE a macho de metal roscado NPT



DR	17	11	9	7
Pressure Rating Resistencia a la Presion	125 psi	200 psi	250 psi	333 psi

Nominal Size (in)	OD (in)	A (in)	B (in)	L (in)
1/2	0.840	1.406	4.594	6.000
3/4	1.050	1.750	4.250	6.000
1	1.315	2.500	4.000	6.500
1-1/4	1.660	3.000	4.000	7.000
1-1/2	1.900	3.500	4.000	7.500
2	2.375	4.000	4.000	8.000
3	3.500	4.500	5.000	9.500
4	4.500	4.500	5.000	9.500
6	6.625	5.000	8.000	13.000
8	8.625	7.000	8.000	15.000
10	10.750	8.000	8.000	16.000
12	12.750	9.000	9.000	18.000

1 Available in Brass, Carbon Steel, Epoxy Coated, 304 and 316 Stainless Steel

Recordall
RCDL | Mechanical Flow Meters

Recordall® Disc Meters

Lead-Free Bronze Alloy, Sizes 5/8, 5/8 x 3/4, 3/4 & 1 inch
NSF/ANSI/CAN Standards 61 and 372 Certified


Model 25—5/8 in., 5/8 x 3/4 in.


Model 35—3/4 in.


Model 55—1 in.


Model 70—1 in.

DESCRIPTION

The Recordall Disc Series meters meet or exceed the most recent revision of AWWA Standard C700 and are available in a lead-free bronze alloy. The meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI/CAN Standards 61 and 372 (Trade Designations: M25-LL, M35-LL, M55-LL, M70-LL) and carry the NSF-61 mark on the housing. All components of the lead-free bronze alloy meter (housing, measuring element, seals, and so on) comprise the certified system.

Applications: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

Operation: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register or encoder face.

Operating Performance: The Recordall Disc Series meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates (100 ±1.5%), and maximum continuous operation flow rates as specifically stated in AWWA Standard C700.

Construction: Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber and permanently sealed register or encoder. The meter is available in a lead-free bronze alloy with externally threaded spuds. A corrosion-resistant engineered polymer material is used for the measuring chamber.

Magnetic Drive: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading or AMR/AMI meter reading options.

Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Maintenance: Badger Meter Recordall Disc Series meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters and meter models also minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

Connections: Tailpieces/Unions for installations of meters on various pipe types and sizes, including misaligned pipes, are available as an option.

Meter Spud and Connection Sizes

Model	Size Designation (in.)	×	"L" Laying Length (in.)	"B" Bore Dia. (in.)	Coupling Nut and Spud Thread (in.)	Tailpiece Pipe Thread (NPT) (in.)
25	5/8	×	7-1/2	5/8	3/4 (5/8)	1/2
	5/8 x 3/4	×	7-1/2	5/8, 3/4	1 (3/4)	3/4
35	3/4	×	7-1/2	3/4	1 (3/4)	3/4
	3/4	×	9	3/4	1 (3/4)	3/4
	3/4 x 1	×	9	3/4	1-1/4 (1)	1
55	1	×	10-3/4	1	1-1/4 (1)	1
70	1	×	10-3/4	1	1-1/4 (1)	1

SPECIFICATIONS

	Model 25 (5/8 in. & 5/8 × 3/4 in.)	Model 35 (3/4 in.)	Model 55 (1 in.)	Model 70 (1 in.)
Typical Operating Range (100% ±1.5%)	0.5…25 gpm (0.11…5.7 m^3/hr)	0.75…35 gpm (0.17…7.9 m^3/hr)	1…55 gpm (0.23…12.5 m^3/hr)	1.25…70 gpm (0.28…16 m^3/hr)
Low Flow	0.25 gpm (0.057 m^3/hr) Min. 98.5%	0.375 gpm (0.085 m^3/hr) Min. 97%	0.5 gpm (0.11 m^3/hr) Min. 95%	0.75 gpm (0.17 m^3/hr) Min. 95%
Maximum Continuous Operation	15 gpm (3.4 m^3/hr)	25 gpm (5.7 m^3/hr)	40 gpm (9.1 m^3/hr)	50 gpm (11.3 m^3/hr)
Pressure Loss at Maximum Continuous Operation	**5/8 in. size**: 3.5 psi @ 15 gpm (0.24 bar @ 3.4 m^3/hr) **5/8 × 3/4 in. size**: 2.8 psi @ 15 gpm (0.19 bar @ 3.4 m^3/hr)	5 psi @ 25 gpm (0.37 bar @ 5.7 m^3/hr)	3.4 psi @ 40 gpm (0.23 bar @ 9.1 m^3/hr)	6.5 psi @ 50 gpm (0.45 bar @ 11.3 m^3/hr)
Maximum Operating Temperature	80° F (26° C)			
Maximum Operating Pressure	150 psi (10 bar)			
Measuring Element	Nutating disc, positive displacement			
Meter Connections	*Available in NL bronze and engineered polymer to fit spud thread bore diameter sizes:* **5/8 in. size**: 5/8 in. (DN 15 mm) **5/8 × 3/4 in. size**: 3/4 in. (DN 15 mm)	3/4 in. (DN 20 mm)	1 in. (DN 25 mm)	1 in. (DN 25 mm)

MATERIALS

	Model 25 (5/8 in. & 5/8 × 3/4 in.)	Model 35 (3/4 in.)	Model 55 (1 in.)	Model 70 (1 in.)
Meter Housing	Lead-free bronze alloy			
Housing Bottom Plates	Cast iron, lead-free bronze alloy, engineered polymer	Cast iron, lead-free bronze alloy		
Measuring Chamber	Engineered polymer			
Disc	Engineered polymer			
Trim	Stainless steel			
Strainer	Engineered polymer			
Disc Spindle	Stainless steel	Stainless steel	Engineered polymer	Stainless steel
Magnet	Ceramic	Ceramic	Ceramic	Ceramic
Magnet Spindle	Engineered polymer	Engineered polymer	Engineered polymer	Stainless steel
Register Lid and Shroud	Engineered polymer, bronze			

Recordall
RCDL | Mechanical Flow Meters

Recordall® Disc Meters

Lead-Free Bronze Alloy 120 & 170, Sizes 1-1/2 in. (40 mm) & 2 in. (50 mm), NSF/ANSI/CAN Standards 61 and 372 Certified

DESCRIPTION

Recordall Models 120 and 170 Disc Series meters meet or exceed the most recent revision of AWWA Standard C700 and are available in a lead-free bronze alloy. Both meters comply with the lead-free provisions of the Safe Drinking Water Act, are certified to NSF/ANSI/CAN Standards 61 and 372 (Trade Designations: M120-LL and M170LL) and carry the NSF-61 mark on the housing. All components of the lead-free bronze alloy meter (housing, measuring element, seals, and so on) comprise the certified system.

Applications: For use in measurement of potable cold water in residential, commercial and industrial services where flow is in one direction only.

Operation: Water flows through the meter's strainer and into the measuring chamber where it causes the disc to nutate. The disc, which moves freely, nutates on its own ball, guided by a thrust roller. A drive magnet transmits the motion of the disc to a follower magnet located within the permanently sealed register. The follower magnet is connected to the register gear train. The gear train reduces the disc nutations into volume totalization units displayed on the register or encoder face.

Operating Performance: The Recordall Disc Series meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates (100 ± 1.5%), and maximum continuous operation flow rates as specifically stated in AWWA Standard C700.

Construction: Recordall Disc meter construction, which complies with ANSI/AWWA standard C700, consists of three basic components: meter housing, measuring chamber, and permanently sealed register or encoder. The water meter is available in a lead-free bronze alloy. A corrosion-resistant engineered polymer material is used for the measuring chamber.

Magnetic Drive: Direct magnetic drive, through the use of high-strength magnets, provides positive, reliable and dependable register coupling for straight-reading or AMR/AMI meter reading options.

Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Maintenance: Badger Meter Recordall Disc Series meters are designed and manufactured to provide long-term service with minimal maintenance. When maintenance is required, it can be performed easily either at the meter installation or at any other convenient location.

To simplify maintenance, the register, measuring chamber, and strainer can be replaced without removing the meter housing from the installation. No change gears are required for accuracy calibration. Interchangeability of parts among like-sized meters minimizes spare parts inventory investment. The built-in strainer has an effective straining area of twice the inlet size.

Connections: Companion flanges in cast iron or NL bronze are available as options. Straight connection sets are available in NL bronze.

M120 M170

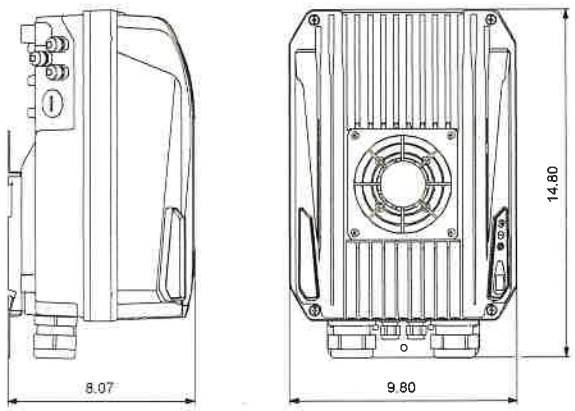
SPECIFICATIONS

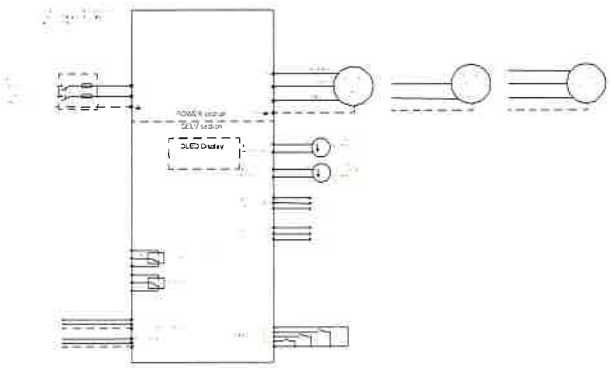
Meter Model	M120	M170
Typical Operating Range (100% ± 1.5%)	2.5…120 gpm (0.57…27 m³/hr)	2.5…170 gpm (0.57…39 m³/hr)
Low Flow (Min. 95%)	1.25 gpm (0.28 m³/hr)	1.5 gpm (0.34 m³/hr)
Maximum Continuous Operation	80 gpm (18 m³/hr)	100 gpm (23 m³/hr)
Pressure Loss at Maximum Continuous Operation	4.8 psi at 80 gpm (0.33 bar at 18 m³/hr)	3.3 psi at 100 gpm (0.23 bar at 23 m³/hr)
Maximum Operating Temperature	80° F (26° C)	80° F (26° C)
Maximum Operating Pressure	150 psi (10 bar)	150 psi (10 bar)
Measuring Element	Nutating disc, positive displacement	Nutating disc, positive displacement
Meter Connections	1-1/2 in. AWWA two-bolt elliptical flange, drilled or 1-1/2…11-1/2 NPT internal pipe threads	2 in. AWWA two-bolt elliptical flange, drilled or 2…11-1/2 NPT internal pipe threads
Test Plugs	Optional 1 in. NPT test plug (TP)	Optional 1 in. NPT test plug (TP)

Materials

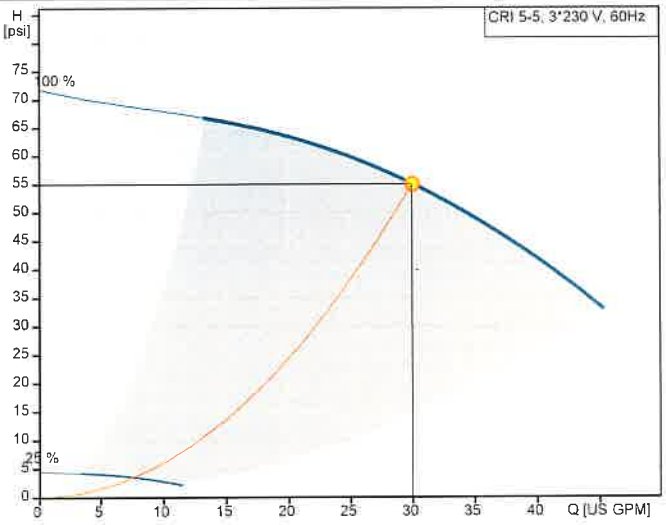
Meter Housing	Lead-free bronze alloy
Housing Top Plates	Lead-free bronze alloy
Measuring Chamber	Engineered polymer
Disc	Engineered polymer
Trim	Stainless steel
Strainer	Engineered polymer
Disc Spindle	Stainless steel
Magnet	Ceramic
Magnet Spindle	Stainless steel
Register Lid and Shroud	Engineered polymer, bronze

Description	Value
General information:	
Product name:	CUE 100 20 1x90-265V IP66 13.5/9.5A F
Product No:	92939786
EAN number:	5715121861908
Price:	
Technical:	
Approvals:	CE,CCSAUS
Installation:	
Range of ambient temperature:	-4 .. 140 °F
Relative humidity:	95 %
Cabinet mounting:	Wall mounting
Electrical data:	
Rated power - P2:	2 HP
Mains frequency:	50 / 60 Hz
Rated voltage AC:	1 x 208-240 V
Rated voltage DC:	120-400 V
Maximum current consumption:	15 A
Enclosure class (IEC 34-5):	IP66
Enclosure type:	4X
Ex-protection standard:	YES
Thermal protection:	Electronic
Length of cable:	984 ft
Rated voltage output AC:	220 V
Rated current output AC:	9.5 A
Controls:	
Pressure sensor:	Y
Others:	
Net weight:	22 lb
Gross weight:	25.6 lb
Shipping volume:	1.02 ft³
Sales region:	US/Canada
Total height:	8.07 in
Total length:	14.8 in
Total width:	9.8 in
Country of origin:	IT
Custom tariff no.:	8504.40.4000
Environmental approvals:	WEEE



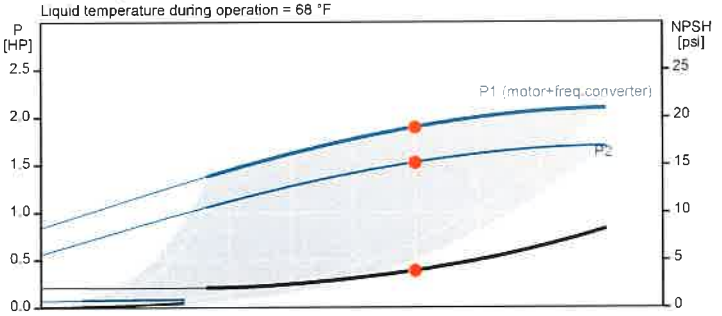


Description	Value
General information:	
Product name:	CRI 5-5 A-CA-A-E-HQQE
Product No:	99916899
EAN number:	5715114116688
Technical:	
Pump speed on which pump data are based:	3543 rpm
Actual calculated flow:	30 US GPM
Resulting head of the pump:	55 psi
Maximum head:	71.7 psi
Stages:	5
Impellers:	5
Number of reduced-diameter impellers:	0
Low NPSH:	N
Pump orientation:	Vertical
Shaft seal arrangement:	Single
Primary shaft seal:	HQQE
Code for shaft seal:	HQQE
Approvals:	CURUS
Approvals for drinking water:	NSF/ANSI 61
Curve tolerance:	ISO9906:2012 3B
Pump version:	A
Model:	A
Cooling:	IC 411
Materials:	
Type key, code for materials:	A
Type key, code for rubber components. E = EPDM, V=FKM:	E
Base:	Stainless steel EN 1.4408 AISI 316
Impeller:	Stainless steel EN 1.4301 AISI 304
Material code:	A
Code for rubber:	E
Bearing:	SIC
Installation:	
Maximum ambient temperature:	104 °F
Maximum operating pressure:	362.59 psi
Max pressure at stated temp:	363 psi / 250 °F 363 psi / -4 °F
Type key, code for pipework connection:	CA
Type of connection:	FlexiClamp
Size of inlet connection:	DN 32 1 1/4 inch
Size of outlet connection:	DN 32 1 1/4 inch
Pressure rating for connection:	PN 25
Flange size for motor:	56C
Connect code:	CA
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	-4 .. 248 °F
Selected liquid temperature:	68 °F
Density:	62.29 lb/ft³
Kinematic viscosity:	1 cSt
Electrical data:	
Motor standard:	NEMA
Motor type:	WEG
Rated power - P2:	2 HP
Power (P2) required by pump:	2 HP
Mains frequency:	60 Hz
Rated voltage:	3 x 230/460 V
Service factor:	1.15
Rated current:	4.94/2.47 A
Starting current:	990 %

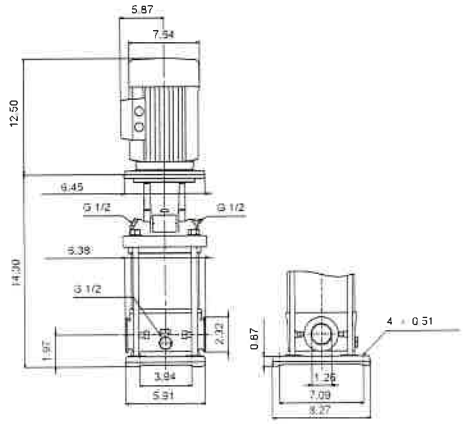


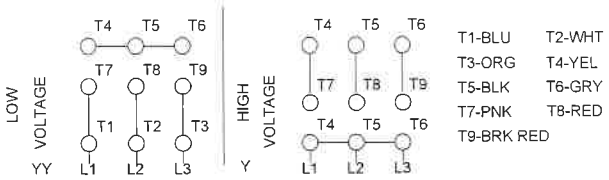
Q = 30 US GPM
n = 100 % (60Hz) / 3543 rpm
Density = 62.29 lb/ft³
Liquid temperature during operation = 68 °F

H = 55 psi
Pumped liquid = Water



P1 (motor+freq.converter) = 1.415 kW
P2 = 1.53 HP
NPSH = 3.87 psi

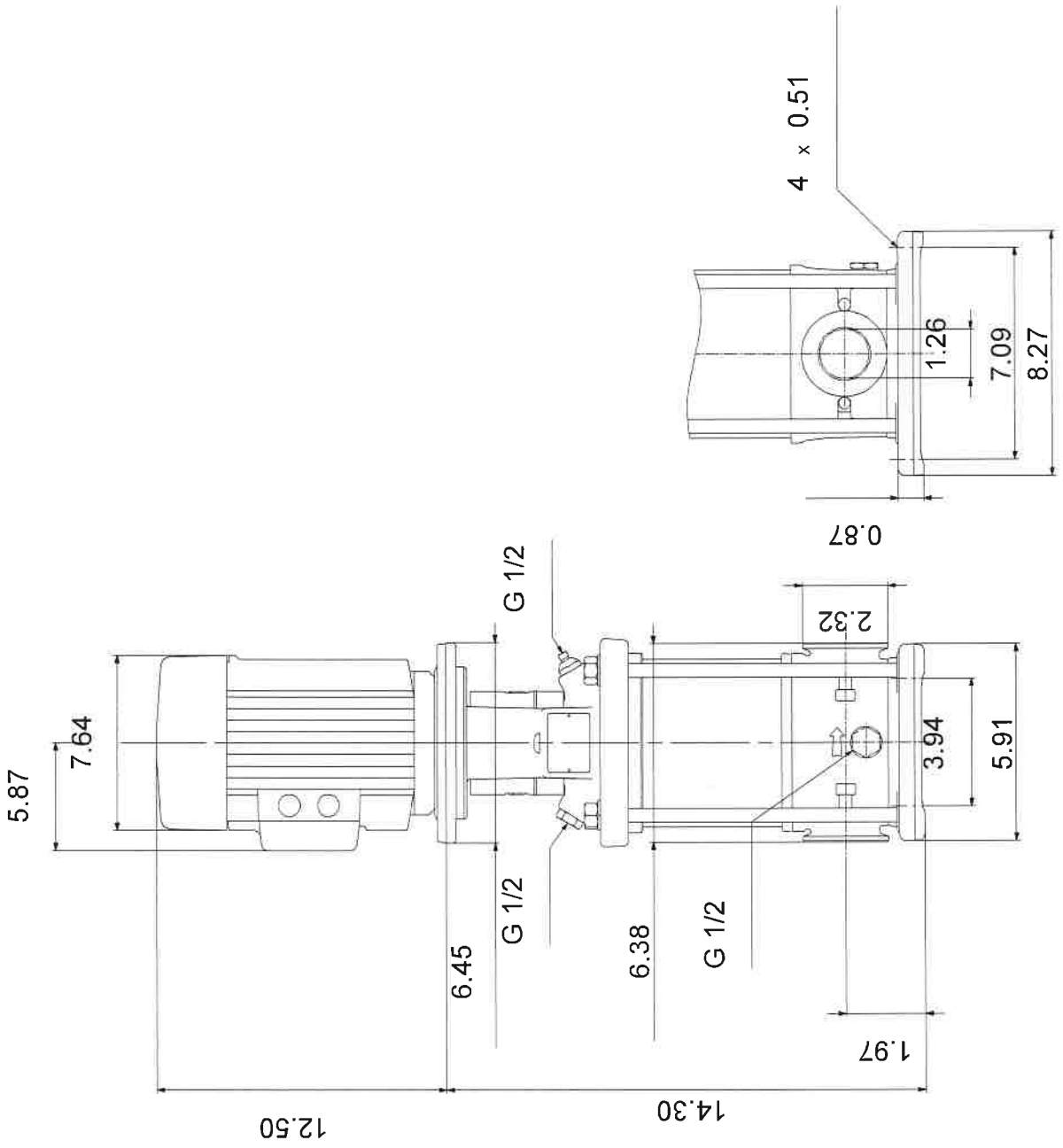




INTERCHANGE ANY TWO LINE WIRES TO REVERSE THE ROTATION

Description	Value
SF current:	5.68/2.84 A
Cos phi - power factor:	0.89
Rated speed:	3520 rpm
IE efficiency:	IE3 85,5%
IE Efficiency class:	IE3 / NEMA Premium
Motor efficiency at full load:	85.5 %
Motor efficiency at 3/4 load:	85.5 %
Motor efficiency at 1/2 load:	82.5 %
Number of poles:	2
Enclosure class (IEC 34-5):	IP55
Insulation class (IEC 85):	F
Built-in motor protection:	NONE
Motor No:	99883241
Controls:	
Frequency converter:	None
Others:	
Net weight:	74.6 lb
Gross weight:	85.6 lb
Shipping volume:	6.11 ft^3
Country of origin:	US
Custom tariff no.:	8413.70.2040

99916899 CRI 5-5 A-CA-A-E-HQQE 60 Hz



Note! All units are in [in] unless others are stated.
Disclaimer: This simplified dimensional drawing does not show all details.

CHARLOTTE
PIPE AND FOUNDRY COMPANY

PVC Schedule 80 Pipe

Product Data Sheet PVC-80-PIPE-225
Effective February 13, 2025
Supersedes Product Data Sheet PVC-80-PIPE-723

NSF C US

>> PVC Schedule 80 Pipe, Type 1, Grade 1 - Plain End

ASTM D 1784 & ASTM D 1785 & CSA B 137.3

PVC SCHEDULE 80 (GRAY)			PLAIN END				PVC 1120
PART NO.	NOM. SIZE	UPC # 611942-	QTY. PER SKID	AVG. OD (IN.)	MIN. WALL (IN.)	MAX WORK PRESSURE AT 23° C OR 73° F	WT. PER 100 FT. (LBS.)
PVC 10002	¼"x20'	04920	15140'	0.540	.119	1130 PSI	10.0
PVC 10003	⅜"x20'	04917	9360'	0.675	.126	920 PSI	13.8
PVC 10005	½"x20'	03968	9000'	0.840	.147	850 PSI	20.3
PVC 10007	¾"x20'	03969	7000'	1.050	.154	690 PSI	27.5
PVC 10010	1"x20'	03970	3540'	1.315	.179	630 PSI	40.5
PVC 10012	1¼"x20'	03973	4240'	1.660	.191	520 PSI	55.9
PVC 10015	1½"x20'	03976	3300'	1.900	.200	470 PSI	67.7
PVC 10020	2"x20'	03977	2220'	2.375	.218	400 PSI	93.6
PVC 10025	2½"x20'	03978	1460'	2.875	.276	420 PSI	142.8
PVC 10030	3"x20'	03979	1000'	3.500	.300	370 PSI	194.2
PVC 10040	4"x20'	03980	1140'	4.500	.337	320 PSI	279.3
PVC 10050	5"x20'	04831	760'	5.563	.375	290 PSI	387.3
PVC 10060	6"x20'	03981	520'	6.625	.432	280 PSI	532.7
PVC 10080	8"x20'	04175	280'	8.625	.500	250 PSI	808.9
PVC 10100	10"x20'	04768	160'	10.750	.593	230 PSI	1199.3
PVC 10120	12"x20'	04770	80'	12.750	.687	230 PSI	1650.1
PVC 10140	14"x20'	04816	60'	14.000	.750	220 PSI	1930.0
PVC 10160	16"x20'	04919	60'	16.000	.843	220 PSI	2544.1

Full pallets are polyethylene wrapped for cleanliness and UV protection.

NSF Listed. Meets All Requirements of ASTM D 1784 and ASTM D 1785 and CSA B 137.3.

All products manufactured by Charlotte Pipe and Foundry Company are proudly made in the U.S.A.

MADE IN U.S.A.

You can't beat the system.®

⚠ WARNING

Testing with or use of compressed air or gas in ABS / CPVC / PVC / Cast Iron pipe or fittings can result in explosive failures and cause severe injury or death.

- NEVER test with or transport/store compressed air or gas in ABS / CPVC / PVC/ Cast Iron pipe or fittings.
- NEVER test ABS / CPVC / PVC / Cast Iron pipe or fittings with compressed air or gas, or air over water boosters.
- ONLY use ABS / CPVC / PVC / Cast Iron pipe or fittings for water or approved chemicals.
- Refer to warnings on PPFA's website and ASTM D 1785.

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CHARLOTTE
PIPE AND FOUNDRY COMPANY®

PVC Schedule 80 Pipe

>> PVC Schedule 80 Pipe, Type 1, Grade 1 - Belled End

ASTM D 1784 & ASTM D 1785 & CSA B 137.3

PVC SCHEDULE 80 (GRAY)			BELLED-END				PVC 1120
PART NO.	NOM. SIZE	UPC # 611942-	QTY. PER SKID	AVG. OD (IN.)	MIN. WALL (IN.)	MAX WORK PRESSURE AT 23° C OR 73° F	WT. PER 100 FT. (LBS.)
PVC 10005B	½"x20'	04924	9000'	0.840	.147	850 PSI	20.3
PVC 10007B	¾"x20'	04925	7000'	1.050	.154	690 PSI	27.0
PVC 10010B	1"x20'	04926	3540'	1.315	.179	630 PSI	40.5
PVC 10012B	1¼"x20'	04927	4240'	1.660	.191	520 PSI	55.9
PVC 10015B	1½"x20'	04928	3300'	1.900	.200	470 PSI	67.7
PVC 10020B	2"x20'	04764	2220'	2.375	.218	400 PSI	93.6
PVC 10025B	2½"x20'	04875	1460'	2.875	.276	420 PSI	142.8
PVC 10030B	3"x20'	04776	1000'	3.500	.300	370 PSI	191.1
PVC 10040B	4"x20'	04774	1140'	4.500	.337	320 PSI	279.3
PVC 10060B	6"x20'	04763	520'	6.625	.432	280 PSI	532.7
PVC 10080B	8"x20'	04766	280'	8.625	.500	250 PSI	808.9
PVC 10100B	10"x20'	04769	160'	10.750	.593	230 PSI	1199.3
PVC 10120B	12"x20'	04771	60'	12.750	.687	230 PSI	1650.1
PVC 10140B	14"x20'	04832	60'	14.000	.750	220 PSI	1930.0
PVC 10160B	16"x20'	09372	60'	16.000	.843	220 PSI	2544.1

Full pallets are polyethylene wrapped for cleanliness and UV protection.

NSF Listed. Meets All Requirements of ASTM D 1784 and ASTM D 1785 and CSA B 137.3.

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- NEVER test ABS / CPVC / PVC / Cast Iron pipe or fittings with compressed air or gas, or air over water boosters.
- ONLY use ABS / CPVC / PVC / Cast Iron pipe or fittings for water or approved chemicals.
- Refer to warnings on PPFA's website and ASTM D 1785.

TERMS AND CONDITIONS OF SALE

Terms and Conditions of Sale can be found at https://charlottepipe.com/terms_and_conditions.aspx

LIMITED WARRANTY

Charlotte Pipe and Foundry Company® (Charlotte Pipe®) Products are warranted to be free from manufacturing defects and to conform to currently applicable ASTM standards for a period of five (5) years from date of delivery. Buyer's remedy for breach of this warranty is limited to replacement of, or credit for, the defective product. This warranty excludes any expense for removal or reinstallation of any product and any other incidental, consequential, or punitive damages. **This limited warranty is the only warranty made by seller and is expressly in lieu of all other warranties, express and implied, including any warranties of merchantability and fitness for a particular purpose.** No statement, conduct or description by Charlotte Pipe or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of Charlotte Pipe.

This Limited Warranty will not apply if:

1) The Products are used for purposes other than their intended purpose as defined by local plumbing and building codes, and the applicable ASTM standard.
2) The Products are not installed in good and workmanlike manner consistent with normal industry standards; installed in compliance with the latest instructions published by Charlotte Pipe and good plumbing practices; and installed in conformance with all applicable plumbing, fire and building code requirements.
3) This limited warranty does not apply when the products of Charlotte Pipe are used with the products of other manufacturers that do not meet the applicable ASTM or CISPI standards or that are not marked in a manner to indicate the entity that manufactured them.
4) In hubless cast iron installations, this warranty will not apply if products are joined with unshielded hubless couplings. Charlotte Pipe requires that its hubless cast iron pipe and fittings be joined only with shielded hubless couplings manufactured in accordance with CISPI 310, ASTM C 1277 and certified by NSF® International or with Heavy Duty Couplings meeting ASTM C 1540.
5) The Products fail due to defects or deficiencies in design, engineering, or installation of the piping system of which they are a part.
6) The Products have been the subject of modification; misuse; misapplication; improper maintenance or repair; damage caused by the fault or negligence of anyone other than Charlotte Pipe; or any other act or event beyond the control of Charlotte Pipe.
7) The Products fail due to the freezing of water in the Products.
8) The Products fail due to contact with chemical agents, fire stopping materials, thread sealant, plasticized vinyl products, or other aggressive chemical agents that are not compatible.
9) Pipe outlets, sound attenuation systems or other devices are permanently attached to the surface of Charlotte® PVC, ABS or CPVC products with solvent cement or adhesive glue.

Charlotte Pipe products are manufactured to the applicable ASTM or CISPI standard. Charlotte Pipe and Foundry **cannot** accept responsibility for the performance, dimensional accuracy, or compatibility of pipe, fittings, gaskets, or couplings not manufactured or sold by Charlotte Pipe and Foundry.

This Limited Warranty will not apply unless written notice of a claim is mailed to Charlotte Pipe at the address below within 30 days of discovery of the allegedly defective product.

Any Charlotte Pipe products alleged to be defective **must** be made available to Charlotte Pipe at the following address for verification, inspection and determination of cause:

Charlotte Pipe and Foundry Company
Attention: Technical Services
2109 Randolph Road
Charlotte, North Carolina 28207

Purchaser must obtain a return materials authorization and instructions for return shipment to Charlotte Pipe of any product claimed defective or shipped in error.

Any Charlotte Pipe product **proved** to be defective in manufacture will be replaced F.O.B. point of original delivery, or credit will be issued, at the discretion of Charlotte Pipe.

5/19/23

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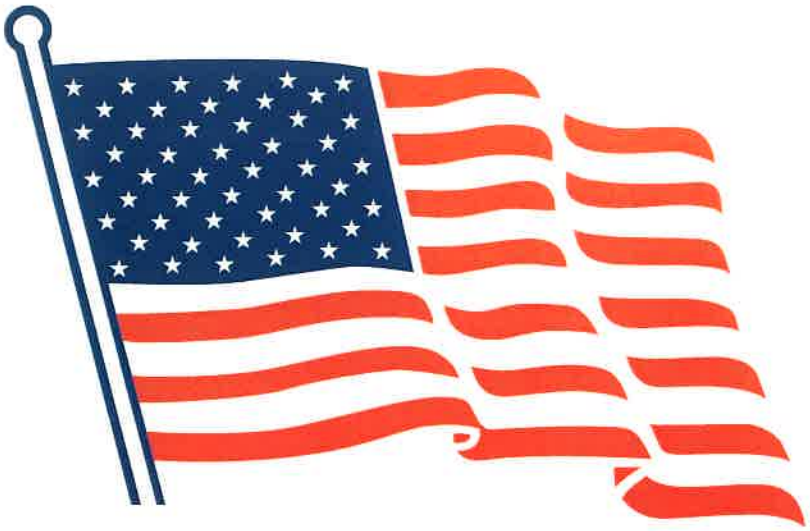


All products manufactured by
Charlotte Pipe and Foundry Company
are proudly made in the U.S.A.

Engineering Specification

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

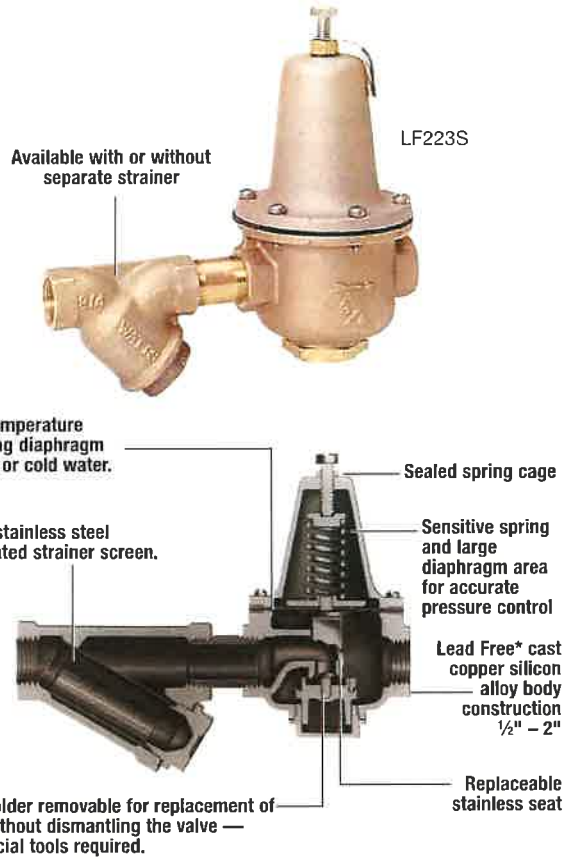
LEAD FREE*

Series LF223, LF223S

High Capacity Water Pressure Reducing Valves**

Sizes: ½" – 2"

Series LF223 and LF223S High Capacity Water Pressure Reducing Valves are designed to reduce incoming water pressure to a sensible level to protect plumbing system components and reduce water consumption. The LF223/LF223S features Lead Free* construction to comply with Lead Free* installation requirements. This series is suitable for water supply pressures up to 300psi (20.7 bar) and may be adjusted from 25 – 75psi (172 – 517 kPa). The standard setting is 50psi (345 kPa). Series LF223 features an enlarged diaphragm, spring cage and seat orifice for high capacity performance. Series LF223S has the same options as the LF223, except it is furnished with a strainer. All parts are quickly and easily serviceable without removing the valve from the line. The optional bypass feature permits the flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply.



Features

- Enlarged diaphragm, spring cage and seat orifice for super capacity performance
- Lead Free* cast copper silicon alloy body construction
- Serviceable in line
- Series LF223S furnished with separate strainer
- Optional bypass feature controls thermal expansion pressure***
- Sealed spring cage on all models for accessible outdoor or pit installations.

Models

LF223	NPT threaded female inlet x NPT threaded female outlet
LF223-S	NPT threaded female inlet with strainer x NPT threaded female outlet

For 2½" – 3" bronze threaded valves, refer to literature ES-LFN223B.

For 3" flanged connections, refer to literature ES-LFN223F.

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

****A water saving test program concluded that reducing the supply pressure from 80-50psi (551-345 kPa) resulted in a water savings of 30%.**

*****The bypass feature will not prevent the pressure relief valve from opening on the hot water supply system with pressure above 150psi (10.3 bar).**

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Specifications

A Lead Free Water Pressure Reducing Valve shall be installed on the water service pipe near its entrance to the building where supply main pressure exceeds 60psi (413 kPa) to reduce it to 50psi (345 kPa) or lower. The water pressure reducing valve shall be constructed using Lead Free* materials. Lead Free* regulators shall comply with state codes and standards, where applicable, requiring reduced lead content. Sill cocks and outside wall hydrants may be left on full main pressure at the option of the owner. Provision shall be made to permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply. Pressure reducing valves with built-in bypass check valves and strainer will be acceptable. Approved valves shall comply with ASSE 1003. Valve shall be a Watts Series LF223 or LF223S (with strainer).

NOTICE

Inquire with governing authorities for local installation requirements.

WATTS®

Materials

Body:	½" – 2" Lead Free* cast copper silicon alloy
Spring cage:	Iron
Bottom plug:	Lead Free* cast copper silicon alloy
Bottom plug gasket:	Buna-N
Seat:	Stainless steel
Seat gasket:	Buna-N
Adjusting screw:	Steel
Locking nut:	Brass
Spring button:	Cast Iron
Spring:	Zinc-plated wire
O-Ring:	Buna-N
Diaphragm plate:	Cast Iron
Diaphragm:	Reinforced Buna-N
Disc holder:	Lead free copper silicon alloy
Nameplate:	Aluminum

Pressure – Temperature

Temperature Range: 33°F – 180°F (0.5°C – 82°C)
Maximum Working Pressure: 300psi (20.7 bar)
Adjustable Reduced Pressure Range: 25-75psi (172 – 517 kPa)
Standard Reduced Pressure Setting: 50psi (345 kPa)

Standards

½" – 2" meets requirements of ASSE Standard 1003; (ANSI A112.26); CSA Standard B356; Southern Standard Plumbing Code, Military Standard MIL-V-18146B. Listed by IAPMO and NSF 61 Commercial Hot.

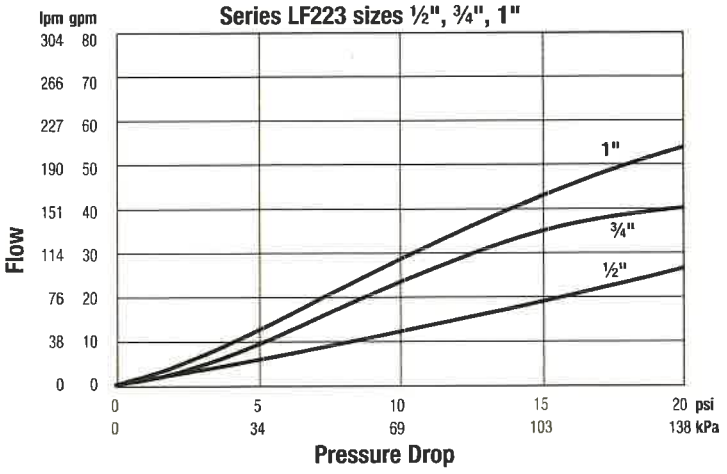
Options

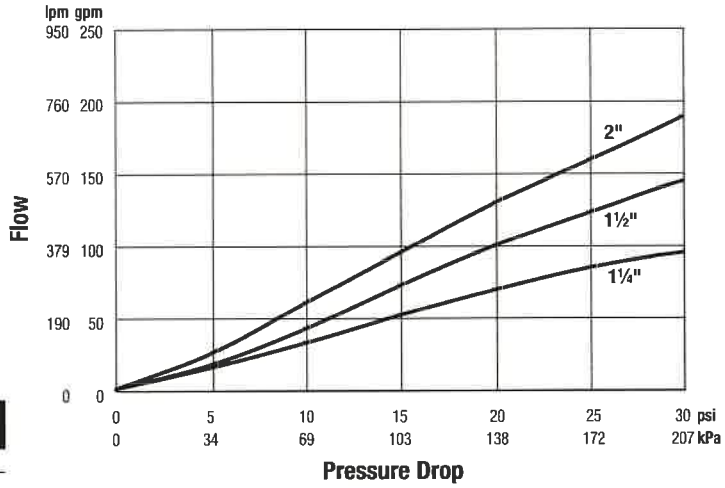
B	Built in bypass feature
LP	Low pressure range 10-35psi (69 – 241 kPa)
HP	High pressure range* reduced range shown below:

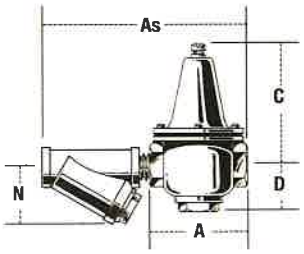
SIZE	REDUCED PRESSURE RANGE - SUFFIX HP RANGE	
in.	*psi*	*bar*
½	50-145	3.4-10.0
¾	50-145	3.4-10.0
1	50-145	3.4-10.0
1¼	50-125	3.4-8.6
1½	50-125	3.4-8.6
2	50-125	3.4-8.6

*LF223-HP models are not ASSE listed

Capacity







Dimensions — Weights

SIZE	DIMENSIONS										WEIGHT			
	A (LF223)		As (LF223S)		C		D		N (LF223S)		LF223		LF223S	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs*	*lbs.*	*kgs*
½	4¼	108	9	229	6¼	159	2	50	2½	64	4.5	2.0	6	2.7
¾	4¼	108	9	229	6¼	159	2	50	2½	64	5	2.3	6.5	2.9
1	4¾	121	10 15/16	262	6½	165	2⅛	54	2 15/16	75	7	3.2	9.5	4.3
1¼	5	127	11 15/16	287	6¾	172	2¾	70	3	76	9	4.1	12	5.4
1½	6¾	171	14¾	375	9⅞	251	2¾	70	3 7/16	87	19.5	8.8	23.5	10.7
2	8	203	16¾	425	10¾	273	3⅜	86	4	102	30	13.6	37.5	17.0

USA: T: (978) 689-6066 • Watts.com
Canada: T: (888) 208-8927 • Watts.ca
Latin America: T: (52) 55-4122-0138 • Watts.com

Recordall
RCDL | Mechanical Flow Meters

Recordall® Turbo Series Meters

Models 160 (1-1/2 in.), 200 (2 in.), 450 (3 in.), 1000 (4 in.), 2000 (6 in.), 3500 (8 in.), 5500 (10 in.) and 6200 (12 in.)
NSF/ANSI/CAN Standards 61 and 372 Certified

DESCRIPTION

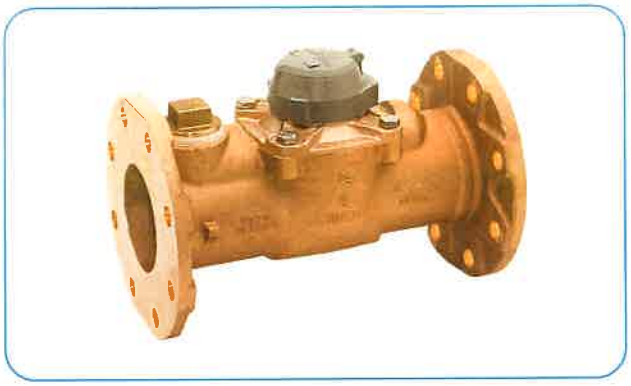
Recordall Turbo Series meters meet or exceed the most recent revision of AWWA Standard C701 Class II Standards and are available in a lead-free bronze alloy for sizes 1-1/2 in. through 10 in. and cast iron for 12 in. meters. Turbo Series meters comply with the lead-free provisions of the Safe Drinking Water Act. Sizes 1-1/2 in. through 12 in. meters are also certified to NSF/ANSI/CAN Standards 61 and 372 (Trade Designation: Turbo Series LL-NS) and carry the NSF-61 mark on the housing. All components of the lead-free alloy meter (housing, measuring element, seals and so on) comprise the certified system.

Models 160 through 6200 are designed for 1-1/2 in. through 12 in. applications. These meters feature:

- Direct coupled turbine based on an exclusive "floating rotor" design that reduces bearing friction—and associated wear and tear.
- Low pressure loss for improved system efficiency.
- Exceptional registration accuracy across low flow rate, normal operating flow rate and maximum continuous operation flow.
- Permanently sealed, tamper-resistant register or encoder.
- Integral strainer helps protect your system from damaging debris and related downtime. Integral strainer is standard on 1-1/2 in. meter, and optional on 2 in. through 4 in. meters.
- Meters and encoders are compatible with Badger Meter AMR/AMI meter reading systems and other approved reading technologies.

Applications: Recordall Turbo Series meters are designed for cold water, commercial and industrial applications where flows are consistent medium to high flows. Applications include hotels, apartment buildings, irrigations centers and manufacturing and processing plants. Turbo Series meters help reduce day-to-day maintenance costs while delivering accurate and efficient performance.

Operation & Performance: Direct magnetic drive is achieved when the magnet carrier is driven by a gear train coupled to the rotor. The gear train consists of two sets of gears connected by a vertical transmission shaft. One gear set is at the magnet carrier, the other is a worm gear set at the rotor shaft. When water flows into the Turbo Series meter measuring element, it contacts the multi-vaned rotor. The resulting rotor rotation is then transmitted by magnetic coupling to a sealed register or encoder. The direct magnetic drive is built to provides a reliable meter-to-registration coupling.



Tamper-Proof Features: Unauthorized removal of the register or encoder is inhibited by the option of a tamper detection seal wire screw, TORX® tamper-resistant seal screw or the proprietary tamper-resistant keyed seal screw. Each can be installed at the meter site or at the factory.

Construction: The Recordall Turbo Series meter is constructed in compliance with ANSI and AWWA C701 standards. It consists of the following basic components: meter housing, interchangeable, unitized measuring element and permanently sealed direct reading registers or encoders.

The measuring element consists of the transmission coupling, rotor, inlet and outlet straightening vanes with nose cones, and calibration ring assembly. The unique inlet and outlet straightening vanes minimize swirl from piping arrangements upstream as well as downstream.

A strainer is recommended to help ensure optimal flow conditioning and protection for the measuring element. The integral strainer is standard on the 1-1/2 in. meter and an available option on the 2 in. through 4 in. meters. The stainless steel strainer is built into the inlet end and includes a removable cover plate to permit easy access for routine cleaning. External strainers are available in sizes 2 in. through 12 in.

To simplify maintenance, the registers or encoders and measuring elements can be removed without removing the meter housing. Interchangeability of certain parts between meters also minimizes spare parts inventory investment.

Meter Installation: The meter is designed for installations where flow is in one direction only. Companion flanges for installation of meters on various pipe types and sizes are available in cast iron or NL bronze as an option. See the *Recordall Turbo Series Meters User Manual* available at *badgermeter.com* for specific instructions.

SPECIFICATIONS

Turbo Series Model	160 1-1/2 in. (40 mm)	200 2 in. (50 mm)	450 3 in. (80 mm)	1000 4 in. (100 mm)	2000 6 in. (150 mm)	3500 8 in. (200 mm)	5500 10 in. (250 mm)	6200 12 in. (300 mm)
Meter Flanges AWWA 125 Pound Class	Elliptical	Elliptical or Round	Round	Round	Round	Round	Round	Round AWWA 125 lb class
Typical Operating Range (100% ± 1.5%)	4…200 gpm (0.9…45.4 m^3/h)	4…310 gpm (0.9…70.4 m^3/h)	5…550 gpm (1.1…124.9 m^3/h)	10…1250 gpm (2.3…284 m^3/hr)	20…2500 gpm (4.5…568 m^3/h)	30…4500 gpm (6.8…1022 m^3/h)	50…7000 gpm (11.4…1590 m^3/h)	90…8800 gpm (20.5…1998 m^3/h)
Typical Low Flow (95% min.)	2.5 gpm (0.6 m^3/h)	2.5 gpm (0.6 m^3/h)	4 gpm (0.9 m^3/h)	6 gpm (1.4 m^3/h)	12 gpm (2.7 m^3/h)	20 gpm (4.5 m^3/h)	30 gpm (6.8 m^3/h)	65 gpm (14.8 m^3/h)
Max. Continuous Flow	160 gpm (36 m^3/h)	200 gpm (45.4 m^3/h)	450 gpm (102.2 m^3/h)	1000 gpm (227.1 m^3/h)	2000 gpm (454 m^3/h)	3500 gpm (795 m^3/h)	5500 gpm (1250 m^3/h)	6200 gpm (1408 m^3/h)
Maximum Intermittent Flow	200 gpm (45.4 m^3/h)	310 gpm (70.4 m^3/h)	550 gpm (124.9 m^3h)	1250 gpm (284 m^3h)	2500 gpm (568 m^3/h)	4500 gpm (1022 m^3/h)	7000 gpm (1590 m^3h)	8800 gpm (1988 m^3/h)
Pressure Loss at Max. Continuous Flow	3.8 psi (0.26 bar)	3.1 psi (0.21 bar)	1.8 psi (0.12 bar)	7.3 psi (0.50 bar)	4.8 psi (0.33 bar)	2.5 psi (0.17 bar)	1.6 psi (0.11 bar)	0.8 psi (0.05 bar)
Pressure Loss at Max. Continuous Flow: With Integral Strainer	9.9 psi (0.68 bar)	8.3 psi (0.57 bar)	5 psi (0.43 bar)	17.8 psi (1.2 bar)	—			
Max. Operating Pressure	150 psi (10 bar)							
Max. Operating Temperature	120° F (49° C)							
Integral Strainer	Optional on 2 in. through 4 in. meters. Built into inlet end. Removable cover plate permits access to strainer for cleaning.				—			
Optional External Strainer	—	Available for Models 200, 450, 1000, 2000, 3500, 5500 and 6200.						
NPT Test Port	Standard with integral strainer						—	

MATERIALS

Meter Housing	Lead-free alloy (**EXCEPTION**: Model 6200 meter housing is blue epoxy-coated cast iron)
Turbo Head	Lead-free alloy
Nose Cone & Straightening Vanes	Thermoplastic
Rotor	Thermoplastic
Rotor Radial Bearings	Lubricated thermoplastic
Rotor Thruster Bearing	Sapphire jewels
Rotor Bearing Pivots	Passivated 316 stainless steel
Calibration Mechanism	Stainless steel & thermoplastic
Magnet	Ceramic
Trim	Stainless steel
Register Housing & Cover	Thermoplastic or bronze
Integral Strainer & Trim	Stainless steel

CHARLOTTE
PIPE AND FOUNDRY COMPANY®

PVC Schedule 40 DWV and Pressure Pipe

Product Data Sheet PVC-40-PE-PIPE-124
Effective January 1, 2024
Supersedes Product Data Sheet
PVC-40-PE-PIPE-322

>> PVC Schedule 40 Pipe - Plain End

PVC SCHEDULE 40 (WHITE)			PLAIN END		PVC 1120		ASTM D 1785
PART NO.	NOM. SIZE	UPC # 611942-	QTY. PER SKID	AVG. OD (IN.)	MIN. WALL (IN.)	MAX WORK PRESSURE AT 23° C OR 73° F	WT. PER 100 FT. (LBS.)
PVC 4005	½"x10'	06658	4500'	.840	.109	600 PSI	15.9
PVC 4005	½"x20'	03922	9000'	.840	.109	600 PSI	15.9
PVC 4007	¾"x10'	06661	3500'	1.050	.113	480 PSI	21.1
PVC 4007	¾"x20'	03925	7000'	1.050	.113	480 PSI	21.1
PVC 4010	1"x10'	06664	3000'	1.315	.133	450 PSI	31.3
PVC 4010	1"x20'	03928	6000'	1.315	.133	450 PSI	31.3
PVC 7100*	1¼"x10'	03945	2120'	1.660	.140	370 PSI	42.4
PVC 7100*	1¼"x20'	03946	4240'	1.660	.140	370 PSI	42.4
PVC 7112*	1½"x10'	03947	1650'	1.900	.145	330 PSI	51.8
PVC 7112*	1½"x20'	03948	3300'	1.900	.145	330 PSI	51.8
PVC 7200*	2"x10'	03949	1110'	2.375	.154	280 PSI	69.5
PVC 7200*	2"x20'	03950	2220'	2.375	.154	280 PSI	69.5
PVC 4025‡	2½"x20'	04205	1460'	2.875	.203	300 PSI	110.0
PVC 7300*	3"x10'	03951	1130'	3.500	.216	260 PSI	144.2
PVC 7300*	3"x20'	03952	1000'	3.500	.216	260 PSI	144.2
PVC 7400†	4"x10'	03953	670'	4.500	.237	220 PSI	205.5
PVC 7400†	4"x20'	03954	1340'	4.500	.237	220 PSI	205.5
PVC 7500†	5"x20'	04837	760'	5.563	.258	190 PSI	272.5
PVC 7600†	6"x10'	03955	330'	6.625	.280	180 PSI	361.2
PVC 7600†	6"x20'	03956	660'	6.625	.280	180 PSI	361.2
PVC 7800†	8"x10'	13087	140'	8.625	.322	160 PSI	543.6
PVC 7800†	8"x20'	03958	280'	8.625	.322	160 PSI	543.6
PVC 7910†	10"x20'	03959	220'	10.750	.365	140 PSI	770.7
PVC 7912†	12"x20'	03961	120'	12.750	.406	130 PSI	1019.0
PVC 7914†	14"x20'	04862	60'	14.000	.437	130 PSI	1205.0
PVC 7916†	16"x20'	04918	60'	16.000	.500	130 PSI	1575.7

*** Dual marked ASTM D 1785 and ASTM D 2665.**
† Triple Marked ASTM D 1785 & ASTM D 2665 & ASTM F 480.
‡ Dual marked ASTM D 1785 and ASTM F 480.

NSF Listed. Meets All Requirements of ASTM D 1784 and ASTM D 1785.

All products manufactured by Charlotte Pipe and Foundry Company are proudly made in the U.S.A.

MADE IN U.S.A.

You can't beat the system.®

⚠ WARNING

Testing with or use of compressed air or gas in ABS / CPVC / PVC / Cast Iron pipe or fittings can result in explosive failures and cause severe injury or death.

- NEVER test with or transport/store compressed air or gas in ABS / CPVC / PVC/ Cast Iron pipe or fittings.
- NEVER test ABS / CPVC / PVC / Cast Iron pipe or fittings with compressed air or gas, or air over water boosters.
- ONLY use ABS / CPVC / PVC / Cast Iron pipe or fittings for water or approved chemicals.
- Refer to warnings on PPFA's website and ASTM D 1785.

PO BOX 35430 CHARLOTTE, NORTH CAROLINA 28235
SALES PHONE (704) 348 6450 (800) 572 4199
TECHNICAL PHONE (800) 438 6091 FAX (800) 553 1605
WWW.CHARLOTTEPIPE.COM

TERMS AND CONDITIONS OF SALE

Terms and Conditions of Sale can be found at https://charlottepipe.com/terms_and_conditions.aspx

LIMITED WARRANTY

Charlotte Pipe and Foundry Company® (Charlotte Pipe®) Products are warranted to be free from manufacturing defects and to conform to currently applicable ASTM standards for a period of five (5) years from date of delivery. Buyer's remedy for breach of this warranty is limited to replacement of, or credit for, the defective product. This warranty excludes any expense for removal or reinstallation of any product and any other incidental, consequential, or punitive damages. **This limited warranty is the only warranty made by seller and is expressly in lieu of all other warranties, express and implied, including any warranties of merchantability and fitness for a particular purpose.** No statement, conduct or description by Charlotte Pipe or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of Charlotte Pipe.

This Limited Warranty will not apply if:

1) The Products are used for purposes other than their intended purpose as defined by local plumbing and building codes, and the applicable ASTM standard.
2) The Products are not installed in good and workmanlike manner consistent with normal industry standards; installed in compliance with the latest instructions published by Charlotte Pipe and good plumbing practices; and installed in conformance with all applicable plumbing, fire and building code requirements.
3) This limited warranty does not apply when the products of Charlotte Pipe are used with the products of other manufacturers that do not meet the applicable ASTM or CISPI standards or that are not marked in a manner to indicate the entity that manufactured them.
4) In hubless cast iron installations, this warranty will not apply if products are joined with unshielded hubless couplings. Charlotte Pipe requires that its hubless cast iron pipe and fittings be joined only with shielded hubless couplings manufactured in accordance with CISPI 310, ASTM C 1277 and certified by NSF® International or with Heavy Duty Couplings meeting ASTM C 1540.
5) The Products fail due to defects or deficiencies in design, engineering, or installation of the piping system of which they are a part.
6) The Products have been the subject of modification; misuse; misapplication; improper maintenance or repair; damage caused by the fault or negligence of anyone other than Charlotte Pipe; or any other act or event beyond the control of Charlotte Pipe.
7) The Products fail due to the freezing of water in the Products.
8) The Products fail due to contact with chemical agents, fire stopping materials, thread sealant, plasticized vinyl products, or other aggressive chemical agents that are not compatible.
9) Pipe outlets, sound attenuation systems or other devices are permanently attached to the surface of Charlotte® PVC, ABS or CPVC products with solvent cement or adhesive glue.

Charlotte Pipe products are manufactured to the applicable ASTM or CISPI standard. Charlotte Pipe and Foundry **cannot** accept responsibility for the performance, dimensional accuracy, or compatibility of pipe, fittings, gaskets, or couplings not manufactured or sold by Charlotte Pipe and Foundry.

This Limited Warranty will not apply unless written notice of a claim is mailed to Charlotte Pipe at the address below within 30 days of discovery of the allegedly defective product.

Any Charlotte Pipe products alleged to be defective **must** be made available to Charlotte Pipe at the following address for verification, inspection and determination of cause:

Charlotte Pipe and Foundry Company
Attention: Technical Services
2109 Randolph Road
Charlotte, North Carolina 28207

Purchaser must obtain a return materials authorization and instructions for return shipment to Charlotte Pipe of any product claimed defective or shipped in error.

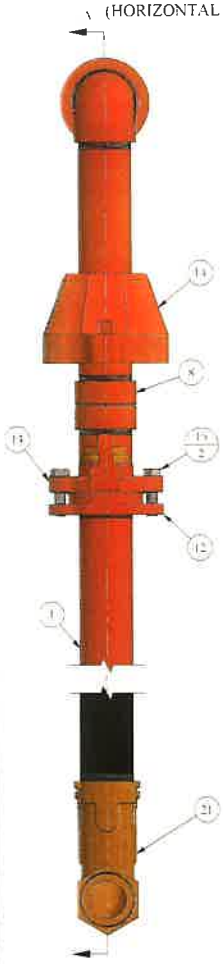
Any Charlotte Pipe product **proved** to be defective in manufacture will be replaced F.O.B. point of original delivery, or credit will be issued, at the discretion of Charlotte Pipe.

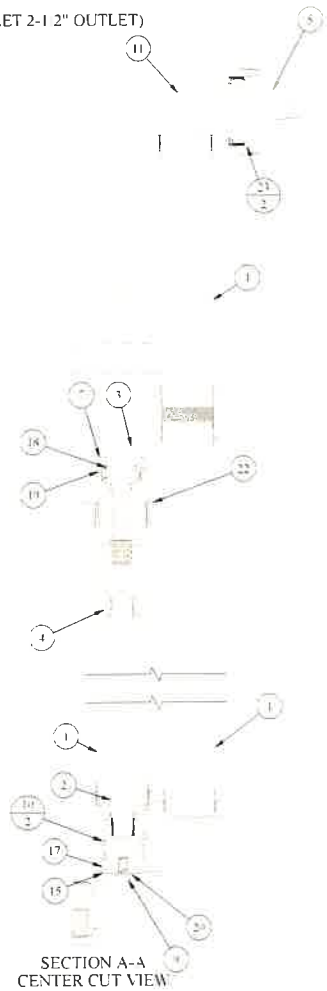
5/19/23

PO BOX 35430 CHARLOTTE, NORTH CAROLINA 28235
SALES PHONE (704) 348 6450 (800) 572 4199
TECHNICAL PHONE (800) 438 6091 FAX (800) 553 1605
WWW.CHARLOTTEPIPE.COM

#77 CUT SHEET

(HORIZONTAL INLET 2-1 2" OUTLET)





SECTION A-A
CENTER CUT VIEW

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTES
1	86.000 in	2P	2" BLACK IRON PIPE	B C
2	32.250 in	3/4GAL	3/4" GALVANIZED PIPE	B C
3	1	4B	SLOTTED TOP SCREW	
4	1	510	CONNECTING NUT	C
5	1	592-C	2-1/2" NST SIDE CAP- SMALL "SQUARE"	
6	1	595	PEARL RING CHAIN W/HOOK ASSEMBLY	A
7	1	721	MAINGUARD PACKING NUT	
8	1	77A	TRAFFIC BREAKAWAY COUPLING	C S
9	1	77C	SEAT RUBBER BOLT	
10	2	77D	PLUNGER O-RING	C
11	1	77F	BRASS NOZZLE 2-1/2 NST	C
12	1	77F	NECK	C
13	1	77GA	TOP CAP	
14	1	77H	LOCKING COVER	C S
15	1	77I	SEAT WASHER	C
16	2	77K	TOP CAP BOLT	C
17	1	77L	PLUNGER	
18	1	77M	O-RING OR SLOTTED SCREW	C
19	1	77MG	PACKING NUT GASKET	C
20	1	77W	WASHER FOR PLUNGER	
21	1	79V	BRASS 2" SIDE INLET VALVE	C
22	1	A1	TOP CAP GASKET	C
23	2	A16	NOZZLE CAP GASKET	C

OPTIONS / REPAIR PARTS ONLY

24	0	2MJG	2" MECHANICAL JOINT GLAND	
25	0	2TG	2" TRANSITION GLAND	
26	0	707	2" MJ IRON ADAPTER	
27	0	77CI	IRON CLAMP	C
28	0	77J	BRASS 2" STRAIGHT INLET VALVE	C
29	0	77P	BOLT FOR CLAMP	C
30	0	77Q	NUT FOR CLAMP	C
31	0	79WIRON	IRON VALVE 2" MJ 90°	A
32	0	85LHW	LONG HANDLE WRENCH	A
33	0	CORTEN	MJ BOLT AND NUT	

OLD STYLE PARTS LIST

34		4-77	"OLD STYLE" SQUARE TOP SCREW	A
35		4A	"OLD STYLE" SLOTTED TOP SCREW	A
36		520	"OLD STYLE" PACKING NUT	A
37		521	"OLD STYLE" PACKING NUT	A
38		77N	O-RING FOR TOP SCREW	A C
39		77NG	"OLD STYLE" PACKING NUT GASKET	A C

REPAIR KITS

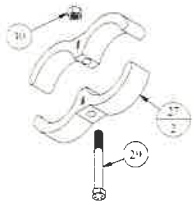
PART NUMBER	DESCRIPTION	PARTS INCLUDED	NOTES
X4B	"NEW STYLE" SLOTTED TOP SCREW COMPLETE	4B SCREW (1), 77M O-RING (1)	DUE TO COMPATIBILITY, IT IS RECOMMENDED THAT X1B BE ORDERED WITH 510 - CONNECTING NUT
X592C	NOZZLE CAP COMPLETE 2-1/2" NST	592-C SIDE CAP (1), A16 GASKET (2), 595 CHAIN ASSEMBLY (1)	
X707	2" MJ BRASS ADAPTER	707 2" BRASS MJ ADAPTER (1), 2MJG GLAND (1), 2TG 2" TRANSITION GASKET (1), CORTEN MJ BOLT AND NUT (2)	
X721	"NEW STYLE" PACKING NUT WITH GASKET	721 PACKING NUT (1), 77MG GASKET (1)	SEE X770PASSY
X77EXT--	MAINGUARD EXTENSION - FIRST 6"	2P EXTERIOR PIPES (2), 3/4GAL OPERATING ROD (1), 3/4C COUPLING (1), 77A COUPLING (1), 77F NECK (2), 629A-B-SS BOLT (2), 857 GASKET (1)	
X77EXT-XX	MAINGUARD EXTENSION - EACH ADDITIONAL 6"	2P EXTERIOR PIPES (2), 3/4GAL OPERATING ROD (1), 3/4C COUPLING (1), 77A COUPLING (1), 77F NECK (2), 629A-B-SS BOLT (2), 857 GASKET (1)	
X77GA	IRON TOP CAP COMPLETE	77GA TOP CAP (1), A1 GASKET (1), 77K BOLT (2)	SEE X770PASSY
X77I	PLUNGER COMPLETE	77L PLUNGER (1), 77D O-RING (2), 77I SEAT WASHER (1), 77W WASHER (1), 77C BOLT (1)	
X770PASSY	77" OPERATING ASSEMBLY - RED NOTE 4)	4B SCREW (1), 510 CONNECTING NUT (1), 721 PACKING NUT (1), 77MG GASKET (1), 77GA TOP CAP (1), A1 GASKET (1), 77K BOLT (2)	RECOMMENDED FOR ALL REPAIRS
X77R	RISER FOR 77	77L NOZZLE (1), 2P PIPE (12"), 592-C SIDE CAP (1), A16 GASKET (2), 595 CHAIN ASSEMBLY (1)	
X77RK	REPAIR KIT	77D O-RING (2), 77I SEAT WASHER (1), 77W WASHER (1)	

OLD STYLE REPAIR KITS

X4-77	"OLD STYLE" SQUARE TOP SCREW COMPLETE	4-77 SCREW (1), 77N O-RING (1)	USED BEFORE APRIL 1995
X4A	OLD STYLE" SLOTTED TOP SCREW COMPLETE	4A SCREW (1), 77M O-RING	USED APRIL 1995 TO JANUARY 2012
X520	"OLD STYLE" PACKING NUT WITH GASKET	520 PACKING NUT (1), 77O GASKET (1)	USED BEFORE APRIL 1995
X521	BRASS PACKING NUT COMPLETE	521 PACKING NUT (1), 77MG GASKET (1)	USED APRIL 1995 TO JANUARY 2012
X77RK-OLD	"OLD STYLE" REPAIR KIT	77D O-RING (2), 77I-1/2 "OLD STYLE" SEAT WASHER (1), 77W WASHER (1)	USED BEFORE APRIL 1995

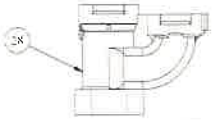
OPTIONAL CLAMP ASSEMBLY

(STANDARD ON D.O.B.'S OVER 5')

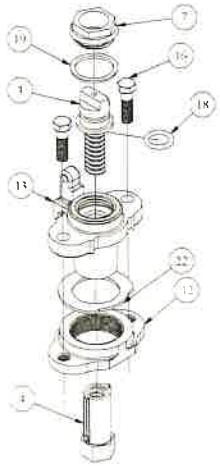


OPTIONAL MJ ADAPTER

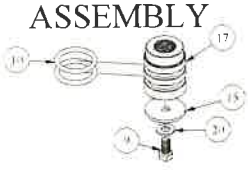
OPTIONAL STRAIGHT INLET VALVE



TOP CAP ASSEMBLY



PLUNGER ASSEMBLY



NOTE	DESCRIPTION
A	NOT SHOWN
B	PIPE LENGTH DEPENDENT ON DEPTH OF BURY, SHOWN AS 3'
C	SOLD AS REPLACEMENT PART
S	SPECIFY COLOR ON ORDER

DISCLAIMER
THIS DRAWING IS THE PROPERTY OF THE KUPPERLE FOUNDRY COMPANY. IT IS NOT TO BE USED OR DUPLICATED WITHOUT THE PERMISSION OF THE OWNER

LEGEND

X → STANDARD TAG

X / Y → TAG WITH Y QUANTITY

DRAWN	SMS	5/15/2017
CHECKED	DCL	9/10/2017
MODIFIED	KJW	12/29/2020
SIZE	C	SCALE 1:4
DWG NO	#77 Cut_Rev 0.1	SHEET 1 OF 1
REV	0.1	

KUPPERLE FOUNDRY
2511 NORTH 9TH ST
ST. LOUIS MO 63102
1-800-231-3990

PART D: CONSTRUCTION DRAWINGS

- Construction Drawings Cover Sheet
- System Diagram
- Transition Line and Distribution Main Details
- Booter Station Schematic
- Transition Piping Detail and Green Meadow Vault Detail
- Standards and Details

END OF SECTION

WOLF CREEK ASSN. DISTRIBUTION AND TRANSMISSION REPLACEMENT

SYSTEM CONTACT INFORMATION

SYSTEM OWNER
WOLF CREEK PROPERTY OWNERS ASSN
P.O. BOX 152
WINTHROP, WA 98862

WOLFCREEKFACILITIESMANAGER@GMAIL.COM

PROJECT ENGINEER
NORTHWEST WATER SYSTEMS
ATTN: TODD KRAUSE, P.E.
512 MANNING ROAD
COLFAX, WA 99111

TODD@NWWATERSYSTEMS.COM

SATELITE MANAGEMENT AGENCY
ALPINE ENVIRONMENTAL
ATTN: DOUG HALE
4 NORWAY PINE DR.
TONASKET, WA 98855

ALPENVIRO@YAHOO.COM

DESCRIPTION OF PROJECT

INSTALL DISTRIBUTION PIPING, FITTINGS, VALVES AND APPURTENANCES, IN ACCORDANCE WITH THE "SITE MAP" DRAWING AND BID PACKAGE

REPLACE TRANSMISSION PIPING, FITTINGS, VALVES, AND APPURTENANCES , IN ACCORDANCE WITH THE "SITE MAP" DRAWING AND BID PACKAGE.

INSTALL PIPING, FITTINGS, AND VALVES NECESSARY TO SUPPORT TRANSITIONING FROM THE EXISTING PIPING DISTRIBUTION TO NEW PIPING DISTRIBUTION IN ACCORDANCE WITH THE "TRANSITION PIPING" DRAWING AND THE BID PACKAGE. CAP AND RETIRE IN PLACE THE EXISTING DISTRIBUTION SYSTEM IN ACCORDANCE WITH THE "TRANSITION PIPING" DRAWING AND THE BID PACKAGE.

INSTALL PIPING, FITTINGS, AND VALVES NECESSARY TO SUPPORT TRANSITIONING FROM THE EXISTING TRANSMISSION PIPING TO NEW TRANSMISSION PIPING IN ACCORDANCE WITH THE "TRANSMISSION PIPING" DRAWING AND THE BID PACKAGE. CAP AND RETIRE IN PLACE THE EXISTING DISTRIBUTION SYSTEM IN ACCORDANCE WITH THE "TRANSITION PIPING" DRAWING AND THE BID PACKAGE.

LIST OF SYMBOLS

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- METER BOX SEE WATER — SERVICE METER

PROJECT NOTES

THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

ACTUAL LOCATION OF EXISTING INFRASTRUCTURE IS UNKNOWN. LOCATIONS OF EXISTING INFRASTRUCTURE SHOWN ARE BASED ON HISTORICAL DOCUMENTATION AND SITE VISIT. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF EXISTING INFRASTRUCTURE.

CONTRACTOR TO LOCATE AND VERIFY ANY EXISTING BURIED UTILITIES. CALL 811 BEFORE YOU DIG.

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE.SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE TRENCH DETAIL DRAWING.

ALL TRANSMISSION LINE SHALL BE 4" DR11 HDPE OR C900 DR 18

ALL DISTRIBUTION MAINS SMALLER THAN 4" SHALL BE DR11 HDPE OR SHED 40 PVC

ALL DISTRIBUTION MAINS 4" OR LARGER SHALL BE DR11 HDPE OR C900 DR 18

ALL SOURCES SHALL HAVE A SOURCE METER INSTALLED SIZED TO MEASURE PEAK FLOW FROM THE SOURCE

ALL ACTIVE SERVICE CONNECTIONS SHALL HAVE A SERVICE METER INSTALLED

ALL CONNECTIONS TO UNDEVELOPED LAND SHALL HAVE A SERVICE LATERAL AND METER BOX INSTALLED.

SERVICE METER IS NOT REQUIRED FOR UNDEVELOPED LAND.

ALL PIPES AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED ACCORDING TO MANUFACTURER INSTRUCTIONS

ALL PLUMBING ELECTRICAL AND EQUIPMENT SHALL BE INSTALLED BY QUALIFIED PROFESSIONALS ACCORDING TO ALL LOCAL CODES AND REQUIREMENTS

EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER APPROVED EQUIVALENT.

SEPTIC LINES AND WATER LINES SHALL CROSS AT 90 DEGREE ANGLE WITH WATER LINE ABOVE SEPTIC LINES.

ALL WATER LINES WITHIN 10' OF SEPTIC LINES, DRAIN FIELDS, SEPTIC TANK, OR OTHER SEPTIC COMPONENTS SHALL BE SLEEVED.

CONTRACTOR SHALL NOTIFY THE COMMUNITY OF THE PRESENCE OR ABSENCE OF THRUST BLOCKING AT JOINTS OF EXISTING INFRASTRUCTURE.

CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND ACQUIRING ALL RELEVANT FRANCHISE AGREEMENTS AND/OR PERMITS PRIOR TO CONSTRUCTION.

SECTION 9 OF THE WOLF CREEK ASSOCIATION COVENANTS CONDITIONS AND RESTRICTIONS GRANTS A UTILITY EASEMENT ON ALL PROPERTY WITHIN THE AREA GOVERNED BY THE ASSOCIATION. DISTRIBUTION MAIN AND TRANSMISSION LINE LOCATION MAY CHANGE BASED LEGAL ACTION TAKEN BY PROPERTY OWNERS.
RECENT WORK ON MAIN ALONG WOLF CREEK SUGGEST EXITING DISTRIBUTION PIPING IS RESTRAINED JOINT. IT IS LIKELY THE REMAINDER OF THE DISTRIBUTION SYSTEM IS ALSO RESTRAINED JOINT AND DOES NOT HAVE THRUST BLOCKING. POTENTIAL THRUST BLOCKS HAVE BEEN PLACED IN AREAS OF LIKELY THRUST BLOCK LOCATION IF THRUST BLOCKS DO EXIST.

THRUST BLOCKS ARE REQUIRED FOR UNRESTRAINED JOINTS ONLY. IF ALL JOINTS ARE HDPE OR OTHER RESTRAINED JOINTS THEN THRUST BLOCKS ARE NOT REQUIRED.

SHEET INDEX

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

MAPS

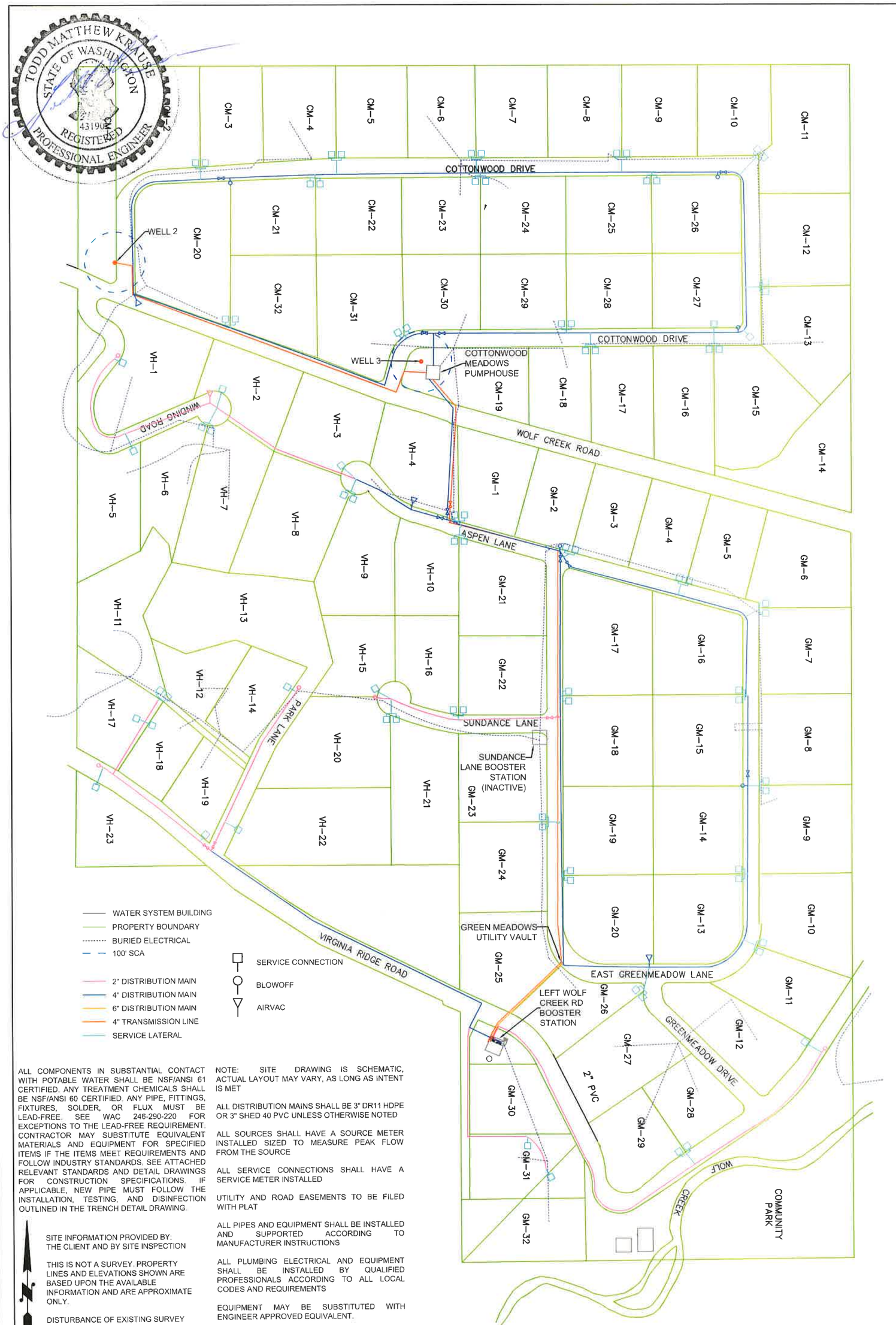
AREA

SYSTEM SERVICE AREA

DRAWN BY:	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912
FILE NAME	DISTRIBUTION REPLACEMENT
SHEET NO	1
DATE	JULY 1, 2026

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE TRENCH DETAIL DRAWING.

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

NOTE: SITE DRAWING IS SCHEMATIC, ACTUAL LAYOUT MAY VARY, AS LONG AS INTENT IS MET

ALL DISTRIBUTION MAINS SHALL BE 3" DR11 HDPE OR 3" SHED 40 PVC UNLESS OTHERWISE NOTED

ALL SOURCES SHALL HAVE A SOURCE METER INSTALLED SIZED TO MEASURE PEAK FLOW FROM THE SOURCE

ALL SERVICE CONNECTIONS SHALL HAVE A SERVICE METER INSTALLED

UTILITY AND ROAD EASEMENTS TO BE FILED WITH PLAT

ALL PIPES AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED ACCORDING TO MANUFACTURER INSTRUCTIONS

ALL PLUMBING ELECTRICAL AND EQUIPMENT SHALL BE INSTALLED BY QUALIFIED PROFESSIONALS ACCORDING TO ALL LOCAL CODES AND REQUIREMENTS

EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER APPROVED EQUIVALENT.

CONTRACTOR TO CONFIRM ELECTRICAL SERVICE CAPACITY WILL BE SUFFICIENT TO OPERATE PUMP EQUIPMENT AND CONTROLS.

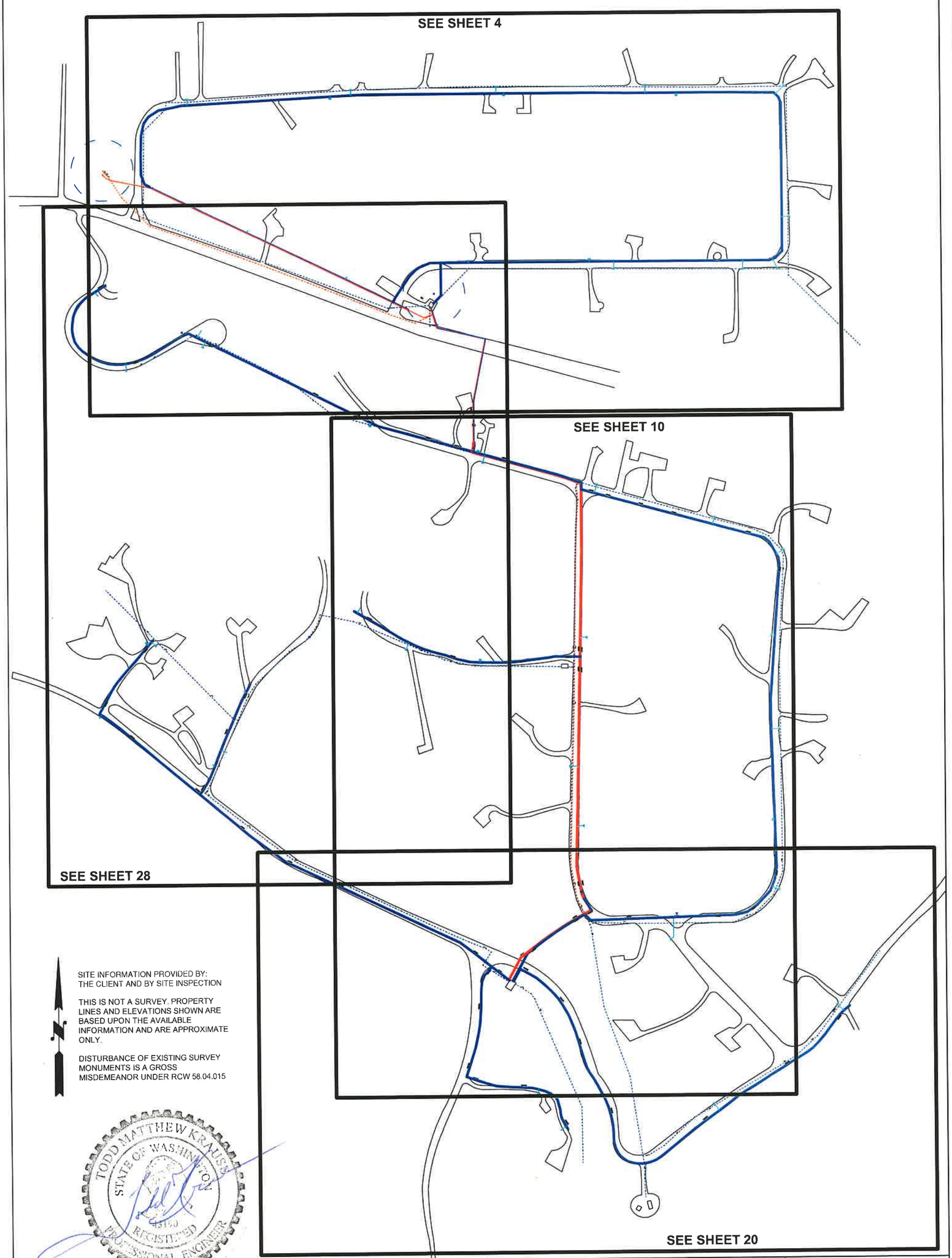
SEPTIC LINES AND WATER LINES SHALL CROSS AT 90 DEGREE ANGLE WITH WATER LINE ABOVE SEPTIC LINES.

ALL WATER LINES WITHIN 10' OF SEPTIC LINES SHALL BE SLEEVED.

CONTRACTOR TO LOCATE AND VERIFY ANY EXISTING BURIED UTILITIES. CALL 811 BEFORE YOU DIG

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO: 250912	FILE NAME: SYSTEM DIAGRAM
REVISION			SHEET NO: 2
DESCRIPTION	DATE	DATE: JUNE 29, 2026	SCALE: 1" = 300'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



SITE INFORMATION PROVIDED BY:
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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

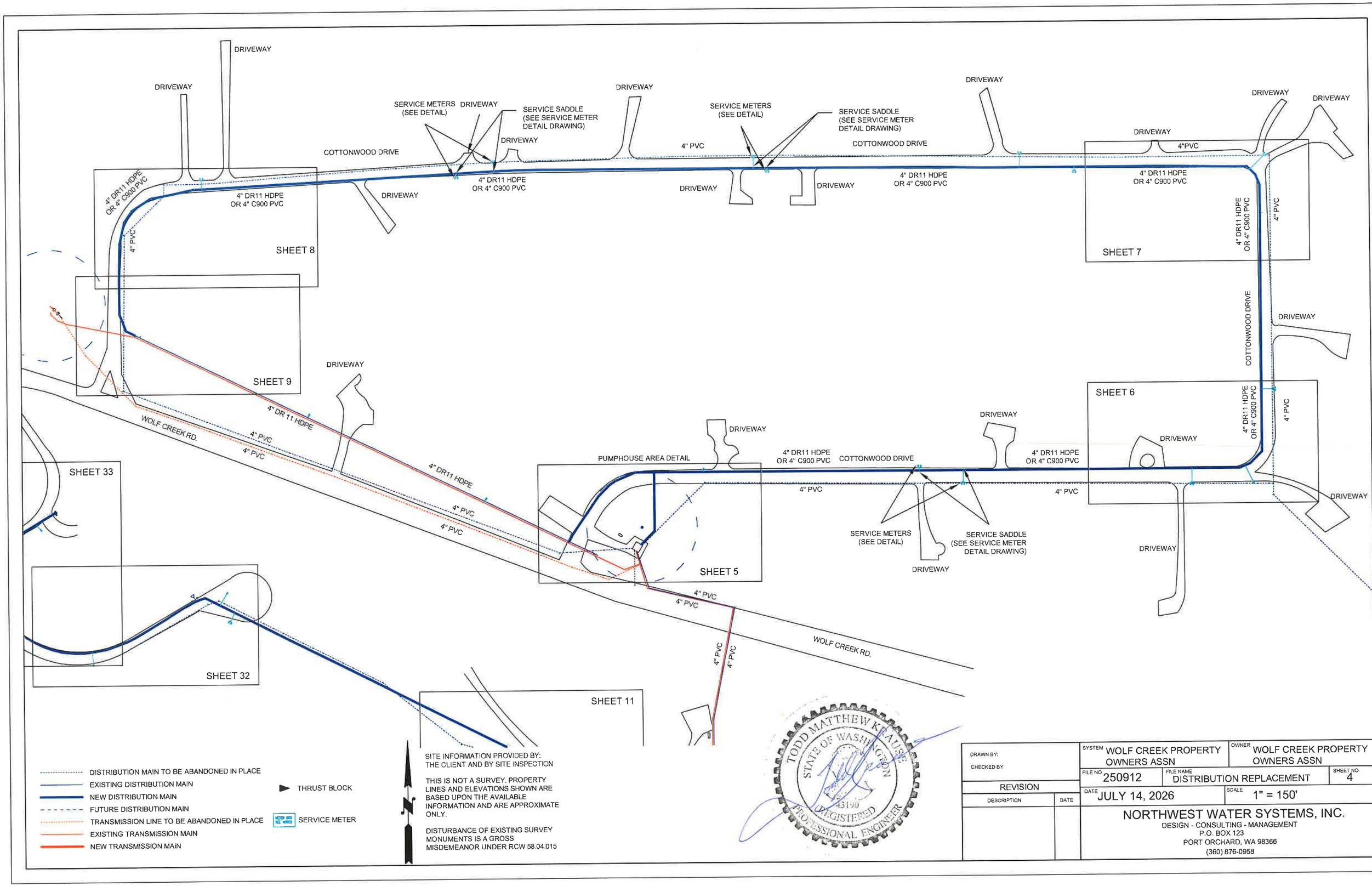
TODD MATTHEW KRAUSE
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- METER BOX SIZE NOTED — SERVICE METER

DRAWN BY:	
CHECKED BY:	
REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN	
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT	SHEET NO: 3
DATE: JULY 14, 2026	SCALE: 1" = 300'	

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY:	
CHECKED BY:	
REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
DATE: JULY 14, 2026	SCALE: 1" = 150'
SHEET NO: 4	

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

DRIVEWAY

SERVICE METERS
(SEE DETAIL)

4" 22.5° ELBOW
MJ X MJ)

SERVICE SADDLE
(SEE SERVICE METER DETAIL DRAWING)

4" 11.25° ELBOW
MJ X MJ)

4" 11.25° ELBOW
MJ X MJ)

4" 11.25° ELBOW
MJ X MJ)

4" DR11 HDPE
OR 4" C900 PVC

NEW PUMPHOUSE TO MAIN CONNECTION
(SEE DETAIL 5A)

COTTONWOOD DRIVE

4" PVC

4" DR11 HDPE
OR 4" C900 PVC

4" DR11 HDPE
OR 4" C900 PVC

NEW 4" DR11 HDPE INSTALLED
IN 2026, BURIED, BUT NOT
CONNECTED TO ACTIVE OLD
DISTRIBUTION MAIN

NOTE: LOCATION OF PROPANE TANK GAS LINE UNKNOWN. CONTRACTOR TO LOCATE PRIOR TO DIGGING.

4" 45° ELBOW
(MJ X MJ)

WELL 3

4" PVC

PROPANE TANK

4" DR11 HDPE

4" DR11 HDPE

EXISTING PUMPHOUSE
TO MAIN CONNECTION
(SEE DETAIL 5B)

COTTONWOOD
PUMPHOUSE

NEW DISTRIBUTION MAIN 4"
GATE VALVE WITH BLIND
FLANGE AND BLOWOFF

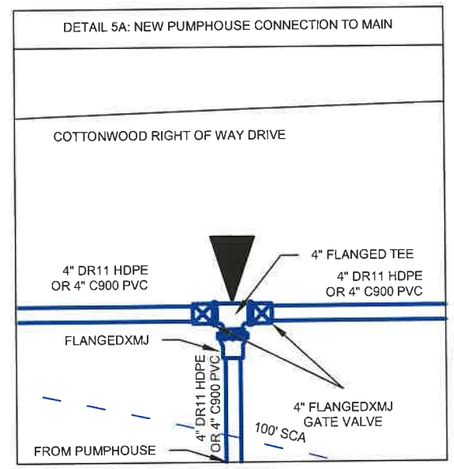
DISTRIBUTION METER AND PRESSURE
REDUCING VALVE LOCATED INSIDE
PUMPHOUSE

COTTONWOOD DRIVE

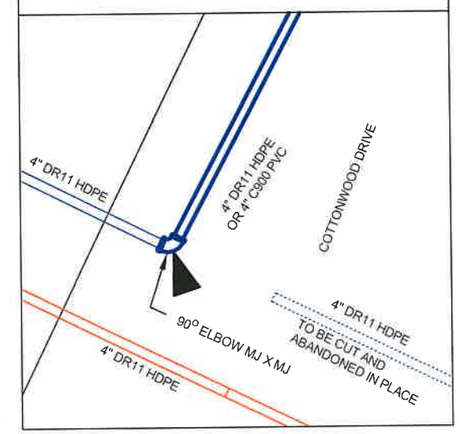
WOLF CREEK RD.

WOLF CREEK RD.

DETAIL 5A: NEW PUMPHOUSE CONNECTION TO MAIN



DETAIL 5B: EXISTING PUMPHOUSE CONNECTION TO MAIN



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
13190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY:		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT
REVISION			SHEET NO 5
DESCRIPTION	DATE	DATE JULY 14, 2026	SCALE 1" = 25'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
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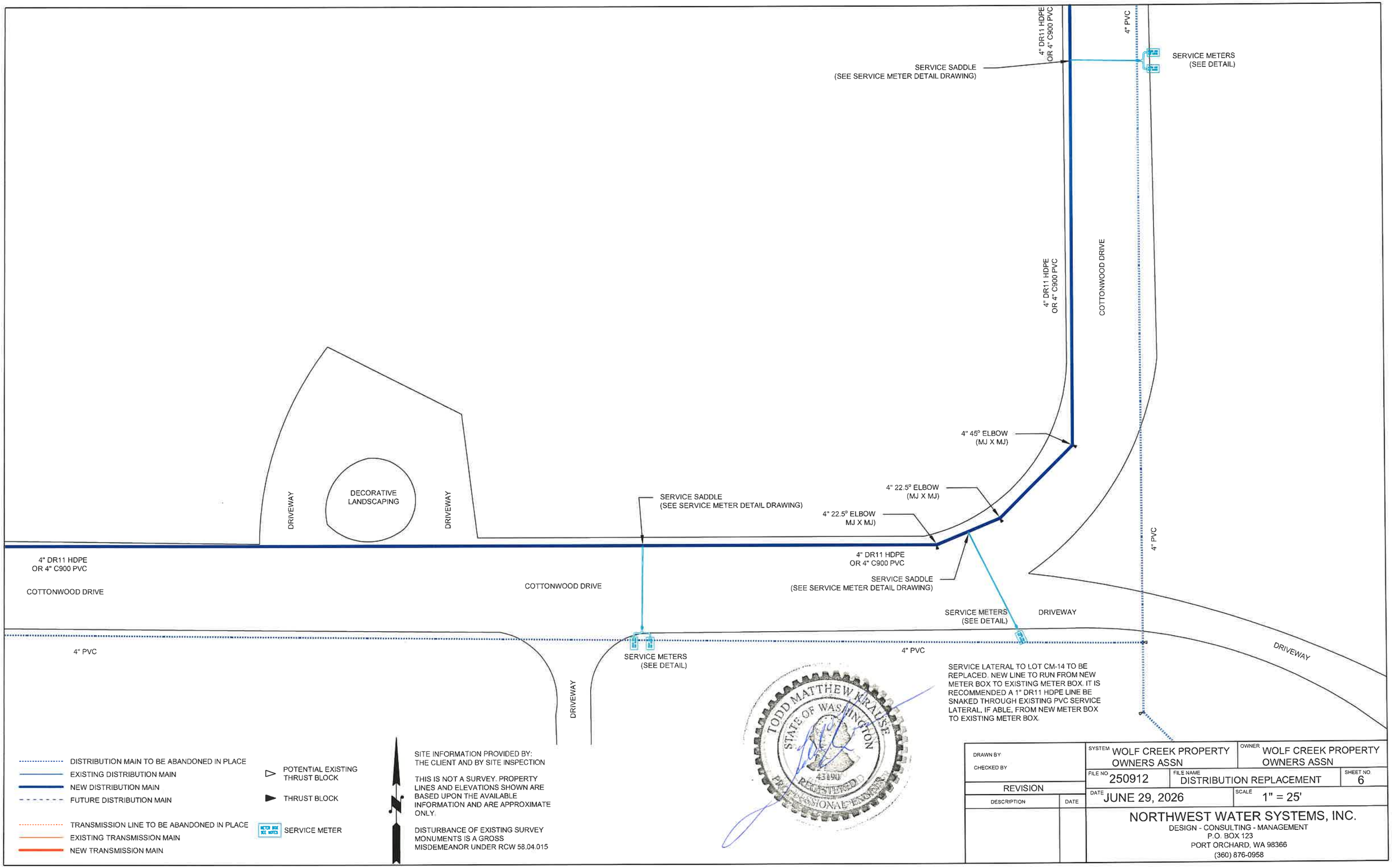
(360) 876-0958


4" DR11 HDPE
OR 4" C900 PVC
4" PVC
SERVICE METERS
(SEE DETAIL)
SERVICE SADDLE
(SEE SERVICE METER DETAIL DRAWING)
4" DR11 HDPE
OR 4" C900 PVC
COTTONWOOD DRIVE
4" 45° ELBOW
(MJ X MJ)
4" 22.5° ELBOW
(MJ X MJ)
4" 22.5° ELBOW
MJ X MJ)
DRIVEWAY
DECORATIVE
LANDSCAPING
DRIVEWAY
SERVICE SADDLE
(SEE SERVICE METER DETAIL DRAWING)
4" DR11 HDPE
OR 4" C900 PVC
4" DR11 HDPE
OR 4" C900 PVC
COTTONWOOD DRIVE
COTTONWOOD DRIVE
SERVICE SADDLE
(SEE SERVICE METER DETAIL DRAWING)
4" PVC
SERVICE METERS
(SEE DETAIL)
DRIVEWAY
4" PVC
SERVICE METERS
(SEE DETAIL)
4" PVC
DRIVEWAY
DRIVEWAY
DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN
TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN
POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES
SERVICE METER
SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION
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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015
TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER
SERVICE LATERAL TO LOT CM-14 TO BE REPLACED. NEW LINE TO RUN FROM NEW METER BOX TO EXISTING METER BOX. IT IS RECOMMENDED A 1" DR11 HDPE LINE BE SNAKED THROUGH EXISTING PVC SERVICE LATERAL, IF ABLE, FROM NEW METER BOX TO EXISTING METER BOX.
DRAWN BY
CHECKED BY
REVISION
DESCRIPTION
DATE
SYSTEM WOLF CREEK PROPERTY OWNERS ASSN
OWNER WOLF CREEK PROPERTY OWNERS ASSN
FILE NO. 250912
FILE NAME DISTRIBUTION REPLACEMENT
SHEET NO. 6
DATE JUNE 29, 2026
SCALE 1" = 25'
NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

DRIVEWAY

DRIVEWAY

SERVICE METERS
(SEE DETAIL)

DRIVEWAY

4" PVC

4" PVC

COTTONWOOD DRIVE

COTTONWOOD DRIVE

4" DR11 HDPE
OR 4" C900 PVC

4" DR11 HDPE
OR 4" C900 PVC

4" 45° ELBOW
(MJ X MJ)

COTTONWOOD BLOWOFF LOCATION
(SEE DETAIL 7A)

SERVICE SADDLE
(SEE SERVICE METER DETAIL DRAWING)

4" 22.5° ELBOW
(MJ X MJ)

4" 22.5° ELBOW
(MJ X MJ)

4" DR11 HDPE
OR 4" C900 PVC

COTTONWOOD DRIVE

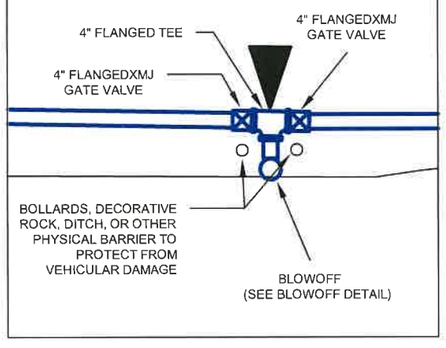
4" DR11 HDPE
OR 4" C900 PVC

COTTONWOOD DRIVE

4" PVC

DETAIL 7A: COTTONWOOD BLOWOFF LOCATION DETAIL

BLOWOFF TO BE PLACED AT DISTRIBUTION LOW POINT



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX NOT NOTED SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM WOLF CREEK PROPERTY OWNERS ASSN		OWNER WOLF CREEK PROPERTY OWNERS ASSN
FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 7
DATE JULY 1, 2026	SCALE 1" = 25'	

NORTHWEST WATER SYSTEMS, INC.
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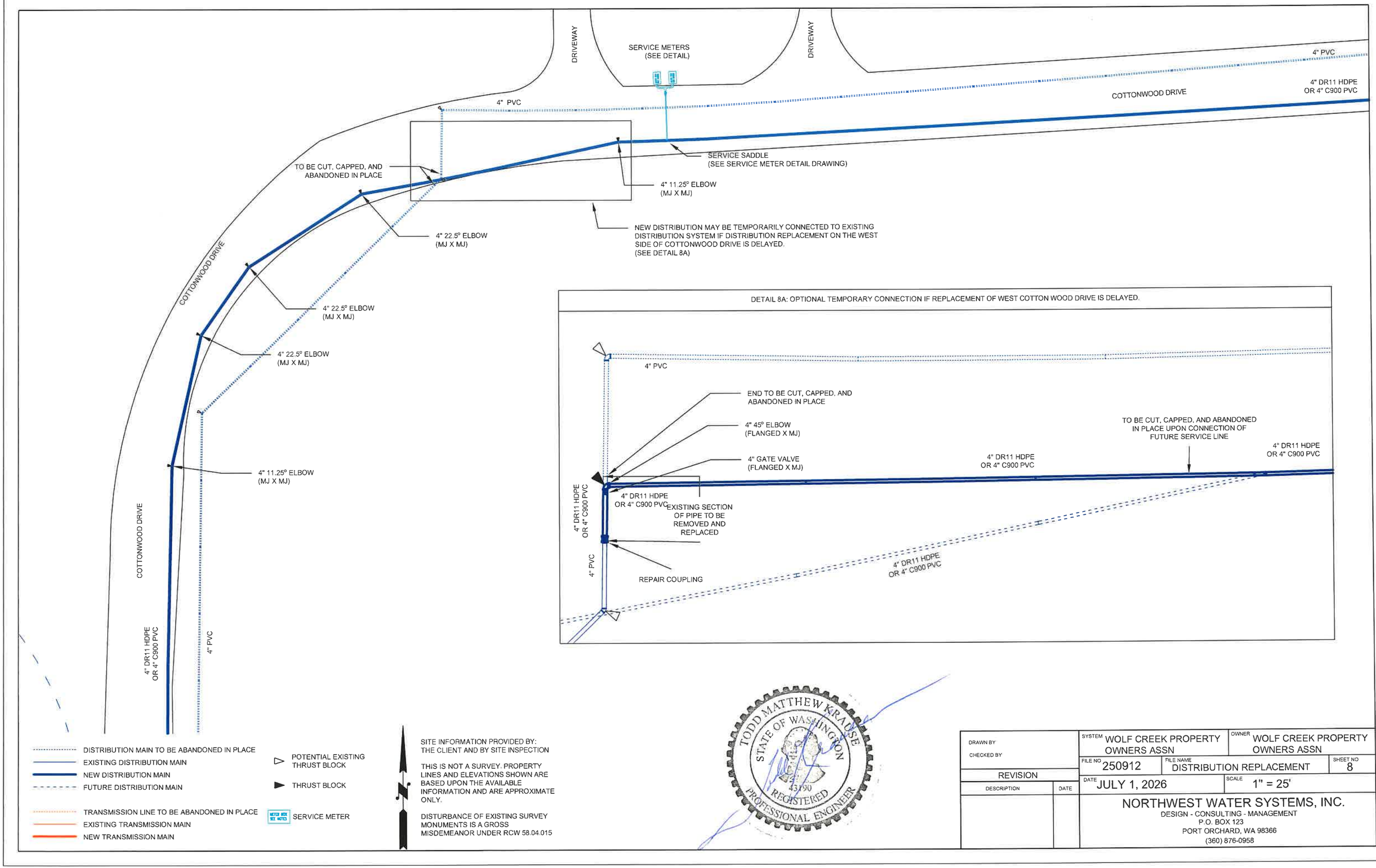
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
SHEET NO: 8	
DATE: JULY 1, 2026	SCALE: 1" = 25'

NORTHWEST WATER SYSTEMS, INC.
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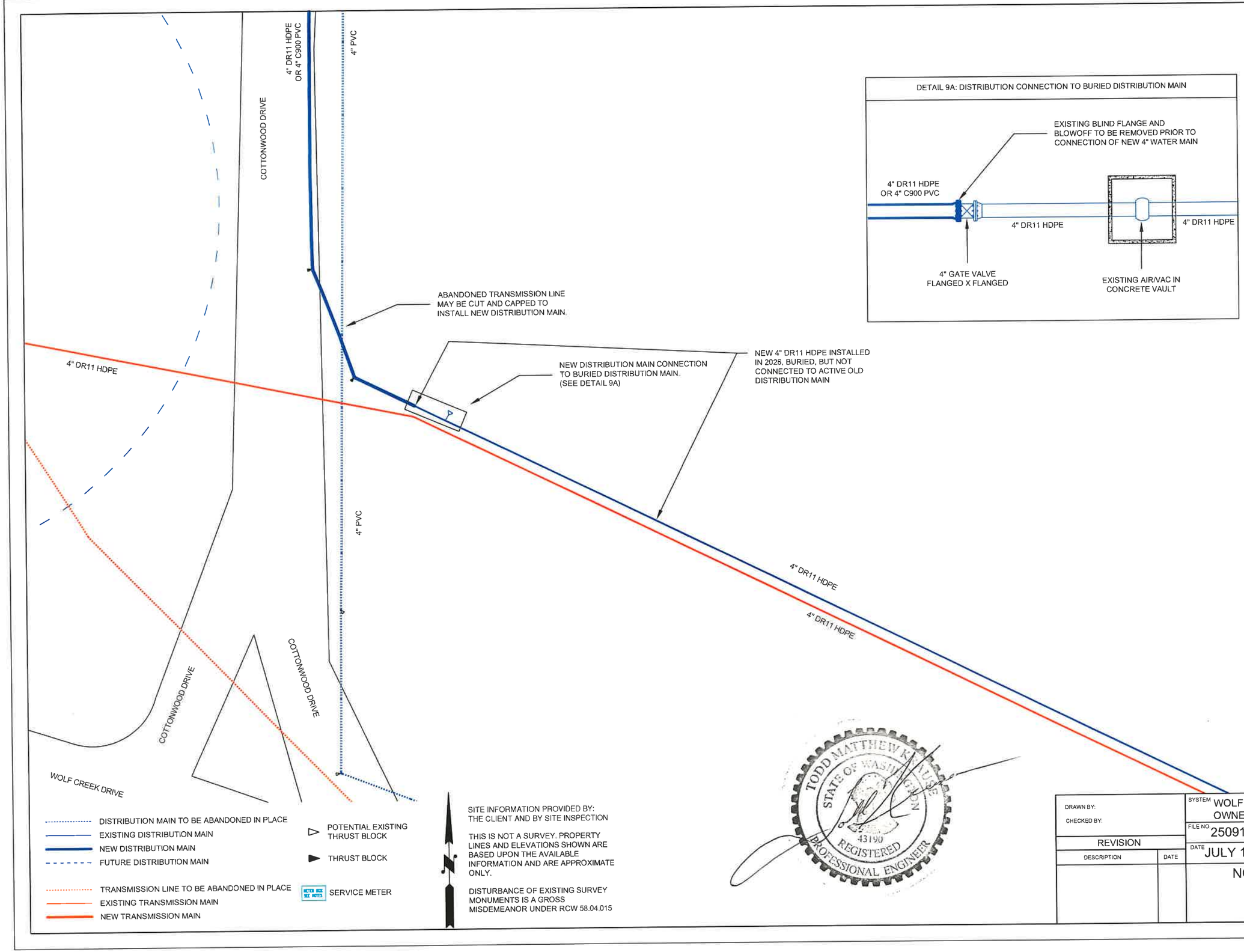
PORT ORCHARD, WA 98366
(360) 876-0958



DETAIL 9A: DISTRIBUTION CONNECTION TO BURIED DISTRIBUTION MAIN

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
REVISION			SHEET NO: 9
DESCRIPTION	DATE	DATE: JULY 14, 2026	SCALE: 1" = 25'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
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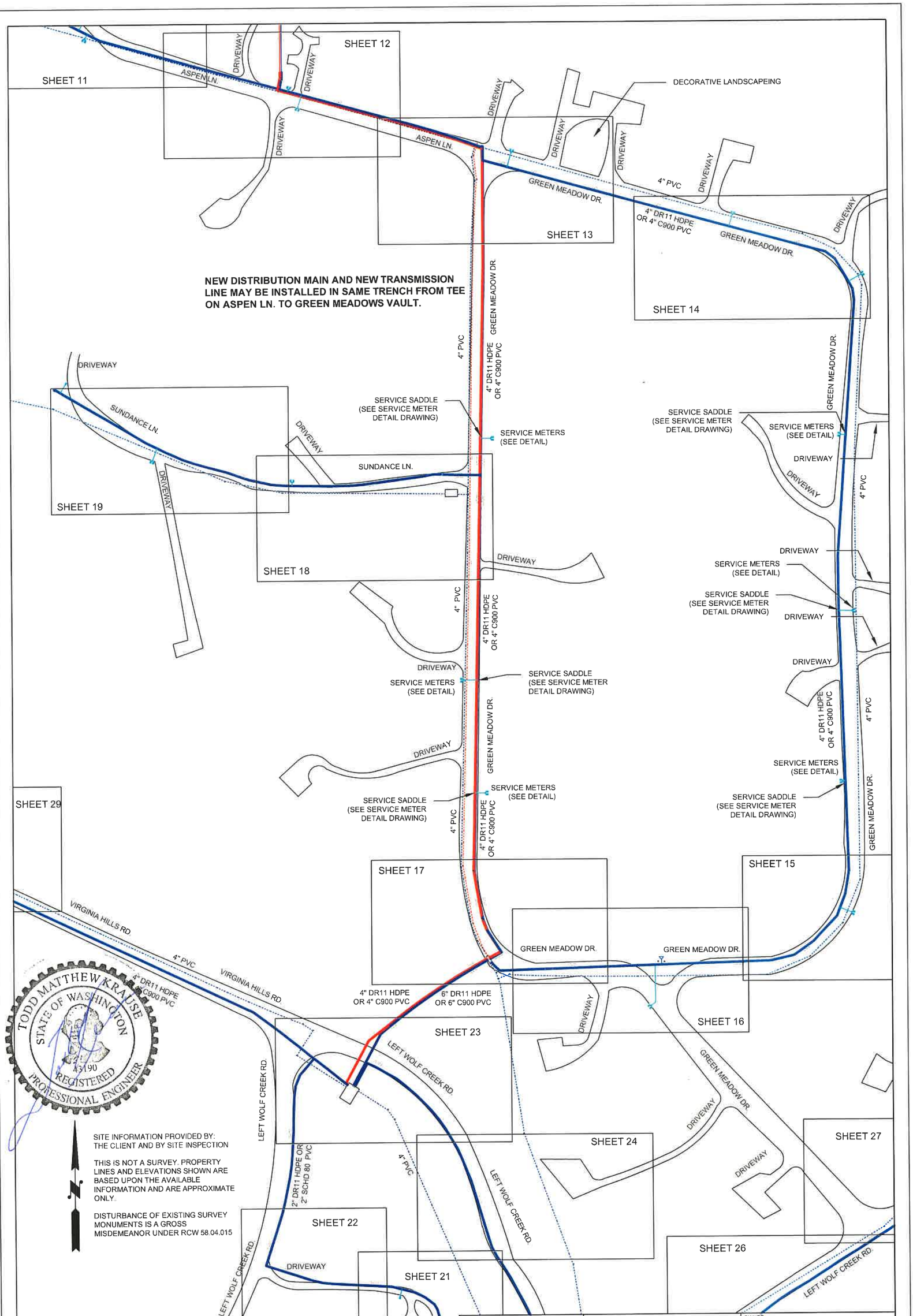
(360) 876-0958


SHEET 11
SHEET 12
SHEET 13
SHEET 14
SHEET 15
SHEET 16
SHEET 17
SHEET 18
SHEET 19
SHEET 21
SHEET 22
SHEET 23
SHEET 24
SHEET 26
SHEET 27
SHEET 29
ASPEN LN.
DRIVEWAY
DECORATIVE LANDSCAPEING
GREEN MEADOW DR.
SUNDANCE LN.
LEFT WOLF CREEK RD.
VIRGINIA HILLS RD
4" PVC
4" DR11 HDPE OR 4" C900 PVC
6" DR11 HDPE OR 6" C900 PVC
2" DR11 HDPE OR 2" SCHD 80 PVC
SERVICE SADDLE (SEE SERVICE METER DETAIL DRAWING)
SERVICE METERS (SEE DETAIL)
NEW DISTRIBUTION MAIN AND NEW TRANSMISSION LINE MAY BE INSTALLED IN SAME TRENCH FROM TEE ON ASPEN LN. TO GREEN MEADOWS VAULT.
TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER
SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION
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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015
DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN
TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN
THRUST BLOCK
SERVICE METER
DRAWN BY
CHECKED BY
REVISION
DESCRIPTION
DATE
SYSTEM WOLF CREEK PROPERTY OWNERS ASSN
OWNER WOLF CREEK PROPERTY OWNERS ASSN
FILE NO 250912
FILE NAME DISTRIBUTION REPLACEMENT
SHEET NO 10
DATE JULY 1, 2026
SCALE 1" = 150'
NORTHWEST WATER SYSTEMS, INC.
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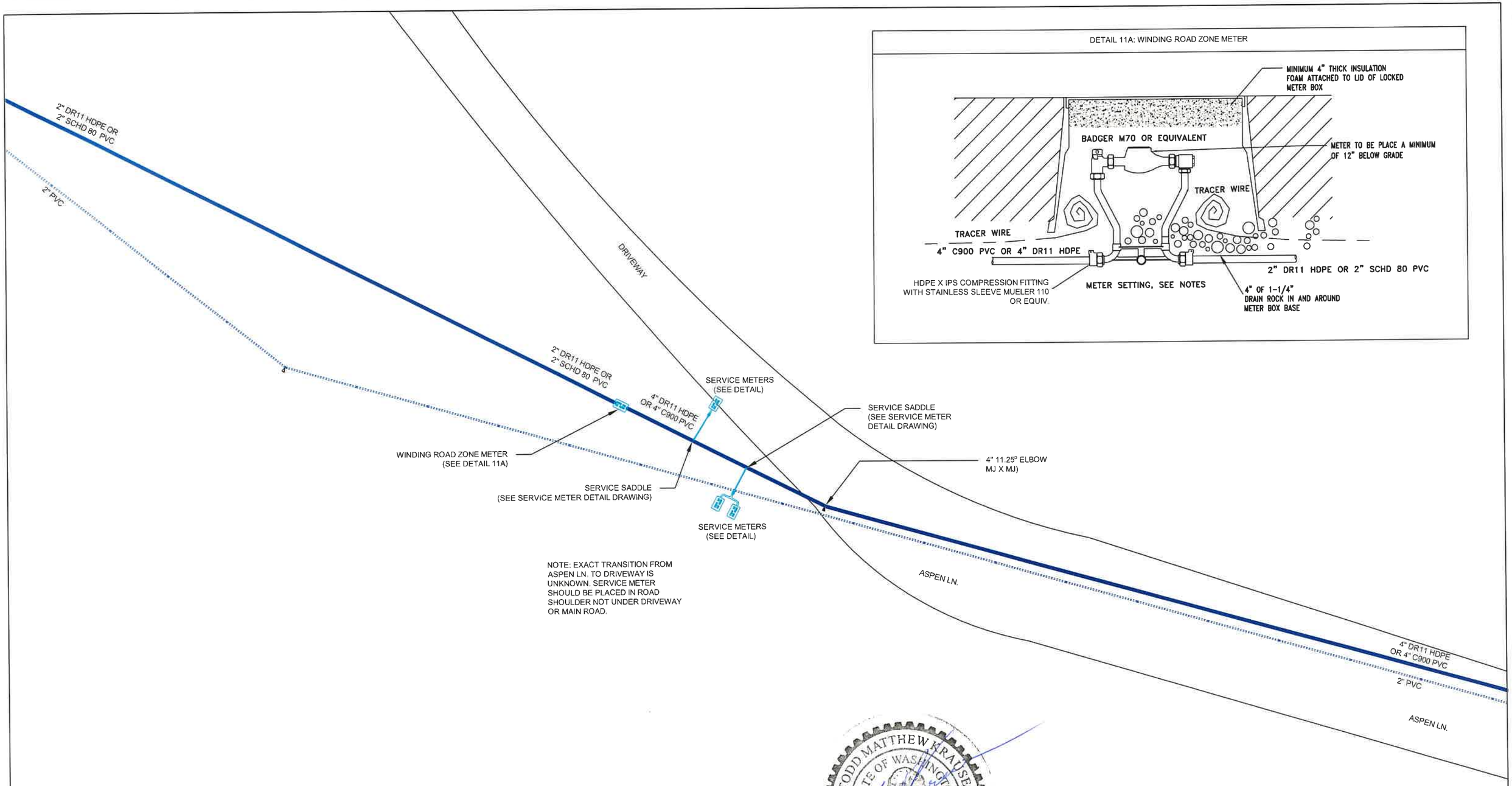
PORT ORCHARD, WA 98366
(360) 876-0958



NOTE: EXACT TRANSITION FROM ASPEN LN. TO DRIVEWAY IS UNKNOWN. SERVICE METER SHOULD BE PLACED IN ROAD SHOULDER NOT UNDER DRIVEWAY OR MAIN ROAD.

DETAIL 11A: WINDING ROAD ZONE METER

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

DRAWN BY:		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT — SHEET NO 11
REVISION		DATE JUNE 29, 2026	SCALE 1" = 50'
DESCRIPTION	DATE		

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

ASPEN LN.

4" DR11 HDPE OR 4" C900 PVC

2" PVC

4" DR11 HDPE OR 4" C900 PVC

2" PVC

DRIVEWAY

4" PVC

4" PVC

TRANSMISSION AND DISTRIBUTION TRANSITION (SEE DETAIL 12 C)

SERVICE METERS (SEE DETAIL)

DRIVEWAY

SERVICE SADDLE (SEE SERVICE METER DETAIL DRAWING)

BRANCH TO COTTONWOOD COMMUNITY (SEE DETAIL 12A)

SERVICE SADDLE (SEE SERVICE METER DETAIL DRAWING)

MAY BE LOCATED IN SAME DITCH

4" DR11 HDPE OR 4" C900 PVC

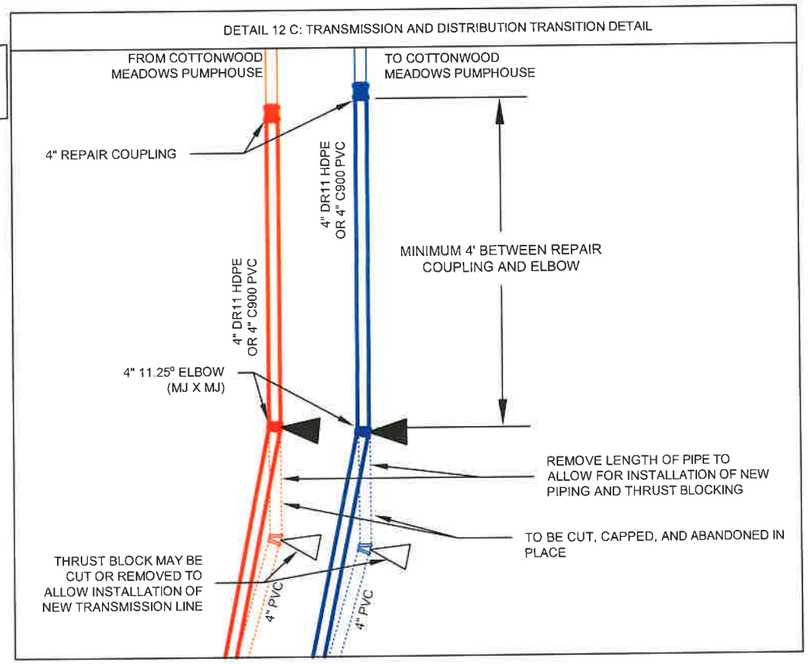
4" PVC

SERVICE METERS (SEE DETAIL)

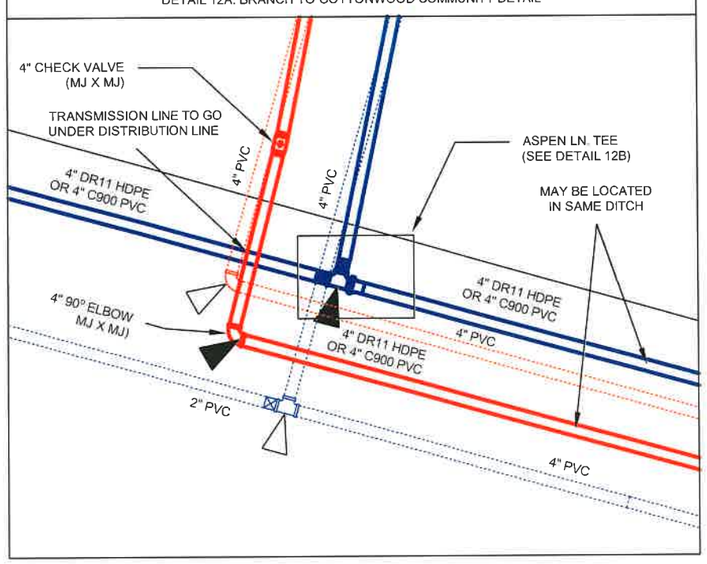
DRIVEWAY

ASPEN LN.

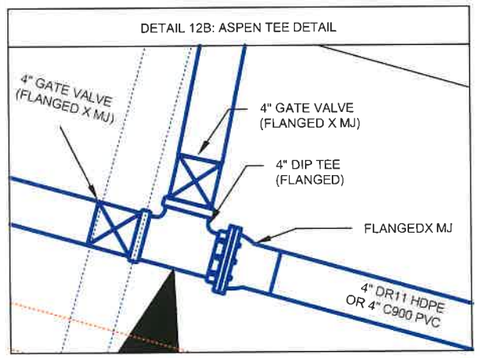
DETAIL 12 C: TRANSMISSION AND DISTRIBUTION TRANSITION DETAIL



DETAIL 12A: BRANCH TO COTTONWOOD COMMUNITY DETAIL



DETAIL 12B: ASPEN TEE DETAIL



TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- SERVICE METER

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE
SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912
FILE NAME	DISTRIBUTION REPLACEMENT
SHEET NO	12
DATE	JULY 1, 2026
SCALE	1" = 50'

NORTHWEST WATER SYSTEMS, INC.
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P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

ASPEN LN.

NEW TRANSMISSION LINE AND DISTRIBUTION MAIN MAY BE LOCATED IN SAME DITCH

EXISTING TRANSMISSION AND DISTRIBUTION MAINS MAY BE REMOVED TO INSTALL NEW DISTRIBUTION AND TRANSMISSION MAINS. THE END OF THE EXISTING DISTRIBUTION AND TRANSMISSION MAINS SHALL BE CUT CAPPED AND ABANDONED IN PLACE.

ASPEN LN.

ASPEN LN. BRANCH (SEE DETAIL 13A)

DRIVEWAY

SERVICE METERS (SEE DETAIL)

DRIVEWAY

DECORATIVE LANDSCAPING

GREEN MEADOW ASPEN LN. INTERSECTION TEE (SEE DETAIL 13B)

4" DR11 HDPE OR 4" C900 PVC

GREEN MEADOW DR.

4" DR11 HDPE OR 4" C900 PVC

SERVICE SADDLE (SEE SERVICE METER DETAIL DRAWING)

4" PVC

GREEN MEADOW DR.

4" DR11 HDPE OR 4" C900 PVC

DRIVEWAY

GREEN MEADOW DR.

GREEN MEADOW DR.

NEW TRANSMISSION LINE AND DISTRIBUTION MAIN MAY BE LOCATED IN SAME DITCH

DETAIL 13A: ASPEN LN. BRANCH DETAIL

4" PVC

4" DR11 HDPE OR 4" C900 PVC

4" PVC

4" 22.5° ELBOW (MJ X MJ)

EXISTING THRUST BLOCK MAY NEED TO BE CUT AND/OR REMOVED TO INSTALL NEW MAIN. WHILE STILL IN USE, THE PIPE SHALL BE TEMPORARILY SUPPORTED TO PREVENT JOINT SEPARATION.

4" DR11 HDPE OR 4" C900 PVC

4" PVC

4" 90° ELBOW (MJ X MJ)

EXISTING DISTRIBUTION MAIN

EXISTING TRANSMISSION LINE

EXISTING TRANSMISSION AND DISTRIBUTION MAINS MAY BE REMOVED TO INSTALL NEW DISTRIBUTION AND TRANSMISSION MAINS. THE END OF THE EXISTING DISTRIBUTION AND TRANSMISSION MAINS SHALL BE CUT CAPPED AND ABANDONED IN PLACE.

4" DR11 HDPE OR 4" C900 PVC

4" DR11 HDPE OR 4" C900 PVC

DETAIL 13B: GREEN MEADOW ASPEN LN. INTERSECTION TEE DETAIL

4" DR11 HDPE OR 4" C900 PVC

4" DR11 HDPE OR 4" C900 PVC

FLANGED X MJ

4" DIP TEE (FLANGED)

4" 11.25 ELBOW (FLANGED X MJ)

IF TRANSMISSION MAIN AND DISTRIBUTION MAIN ARE IN SAME DITCH, TRANSMISSION LINE MAY BE INSTALLED ABOVE DISTRIBUTION MAIN THRUST BLOCK.

4" DR11 HDPE OR 4" C900 PVC

4" GATE VALVE (FLANGED X MJ)

4" DR11 HDPE OR 4" C900 PVC

4" DR11 HDPE OR 4" C900 PVC

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES — SERVICE METER

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

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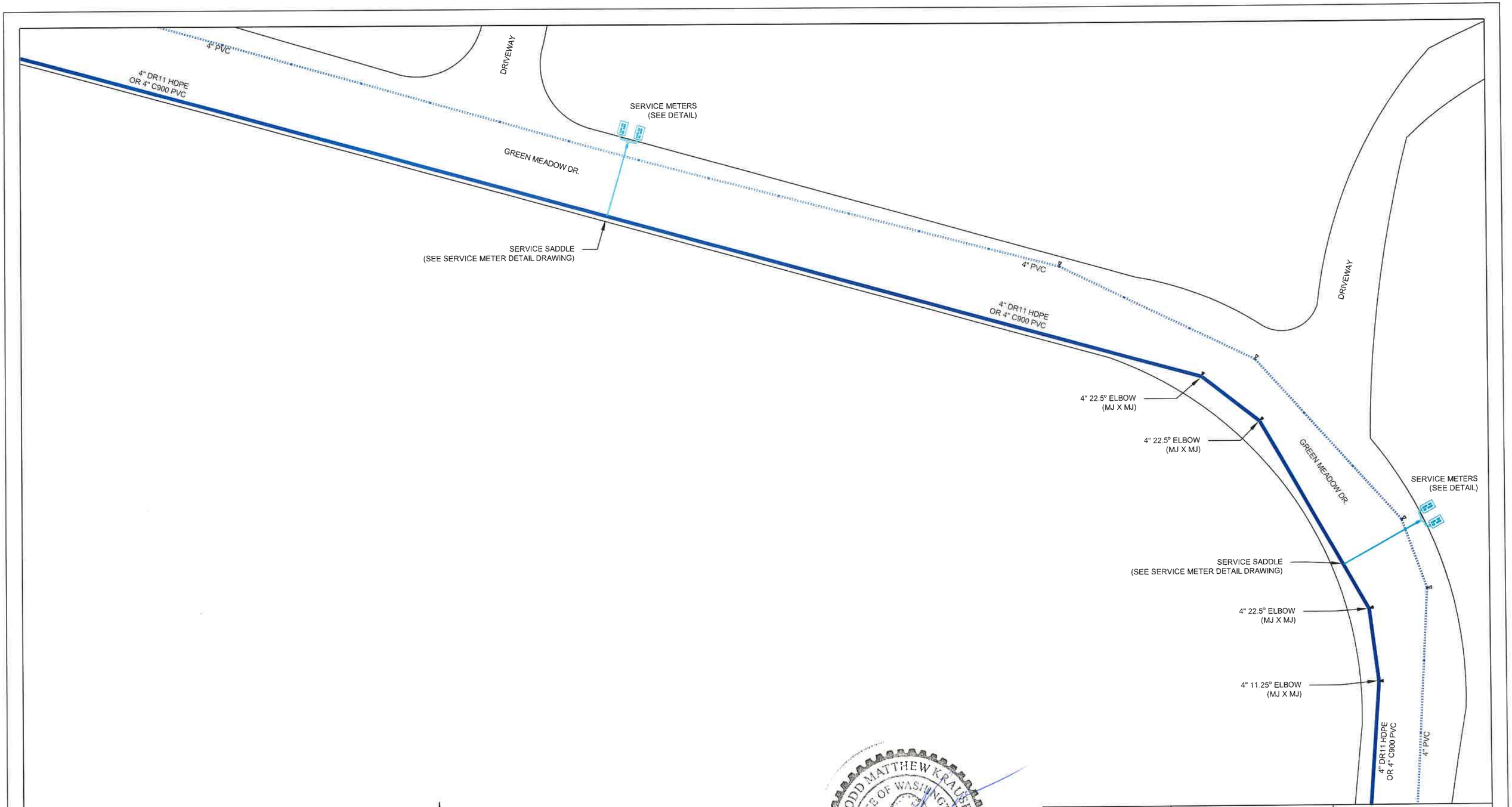
DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO. 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO. 13
REVISION		DATE JUNE 29, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES — SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

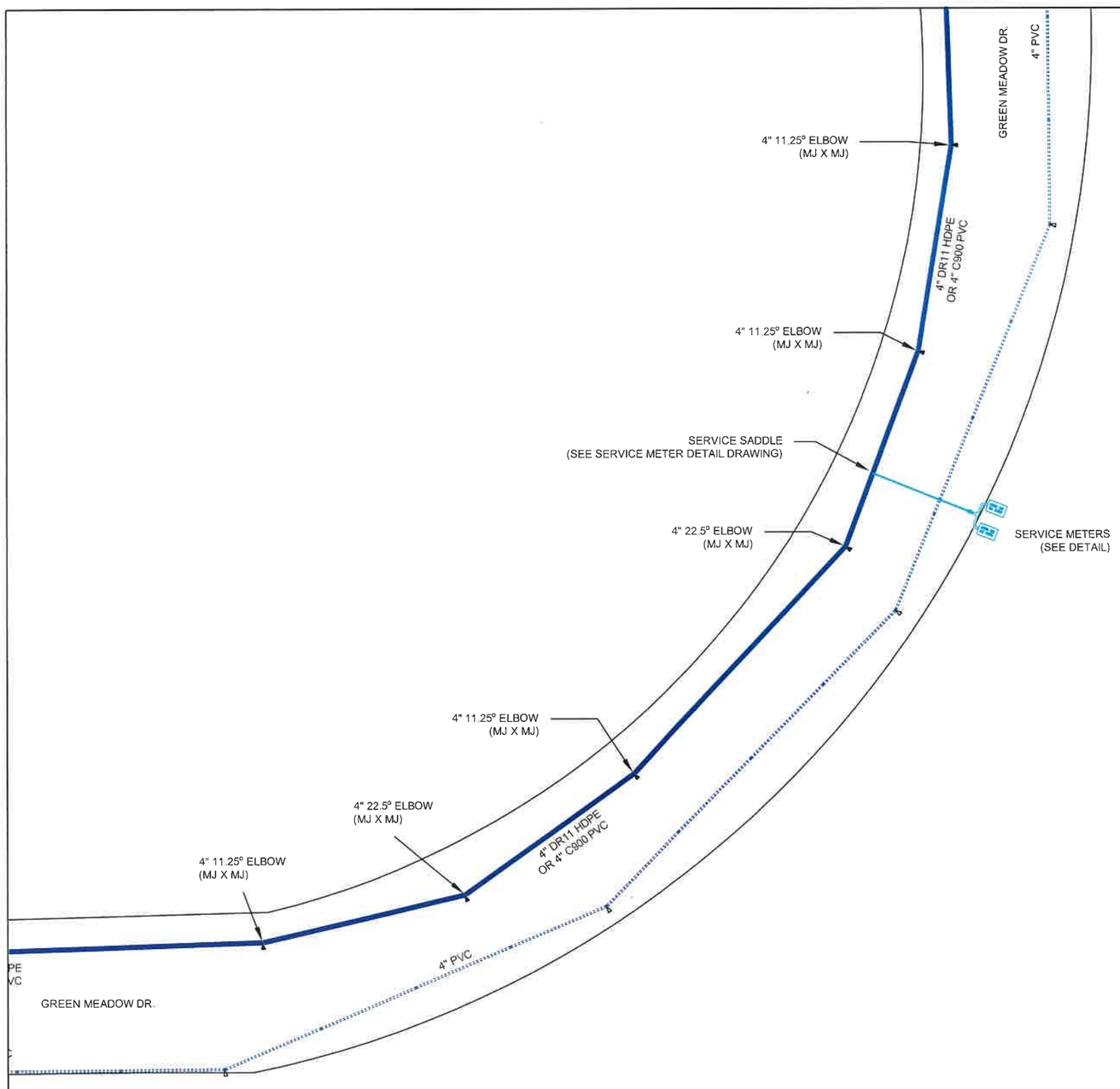
THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT
REVISION		DATE JUNE 29, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		SHEET NO 14

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
REVISION		DATE: JUNE 29, 2026	SCALE: 1" = 25'
DESCRIPTION	DATE		SHEET NO: 15

NORTHWEST WATER SYSTEMS, INC.
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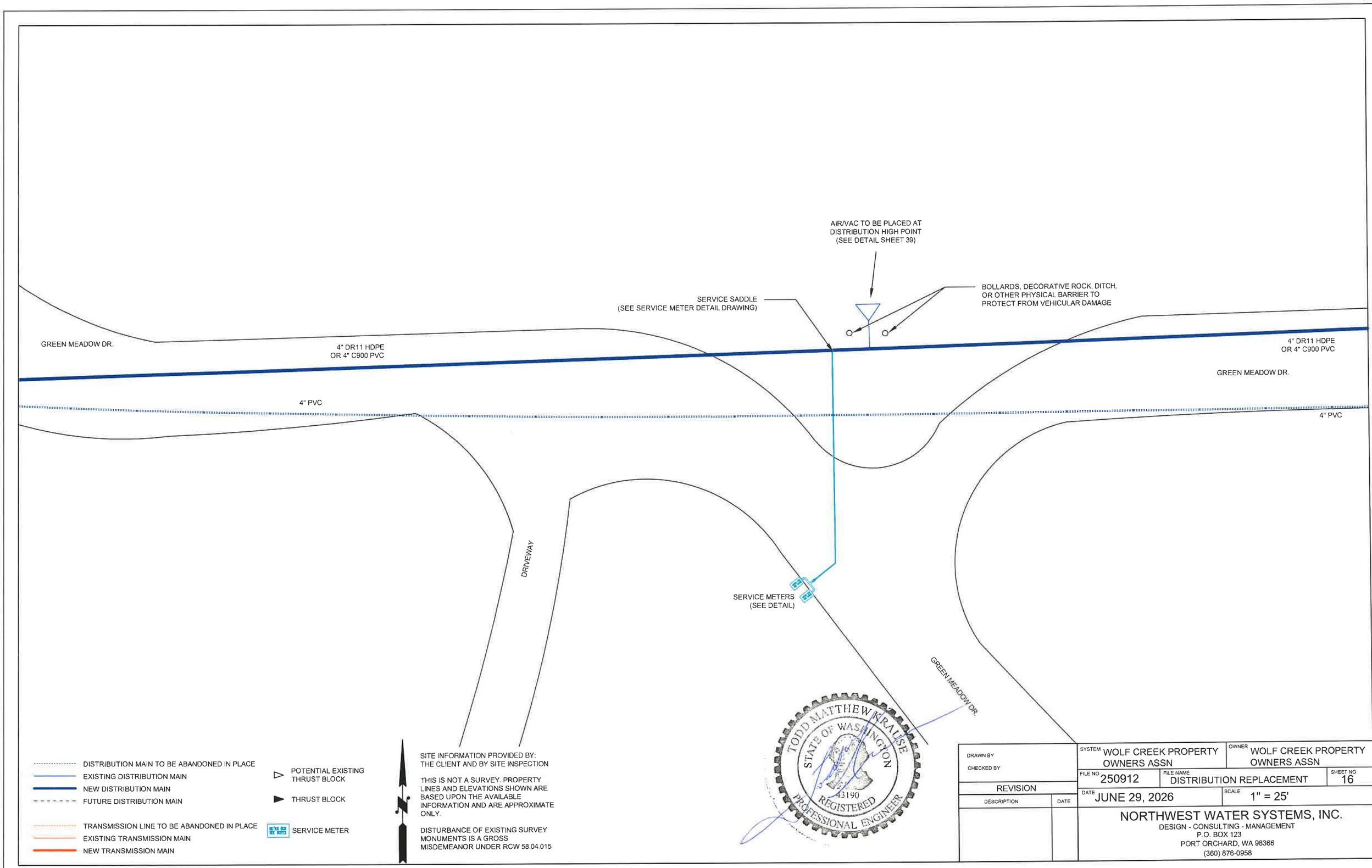

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

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STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN	OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912	FILE NAME	DISTRIBUTION REPLACEMENT
SHEET NO	16		
DATE	JUNE 29, 2026	SCALE	1" = 25'

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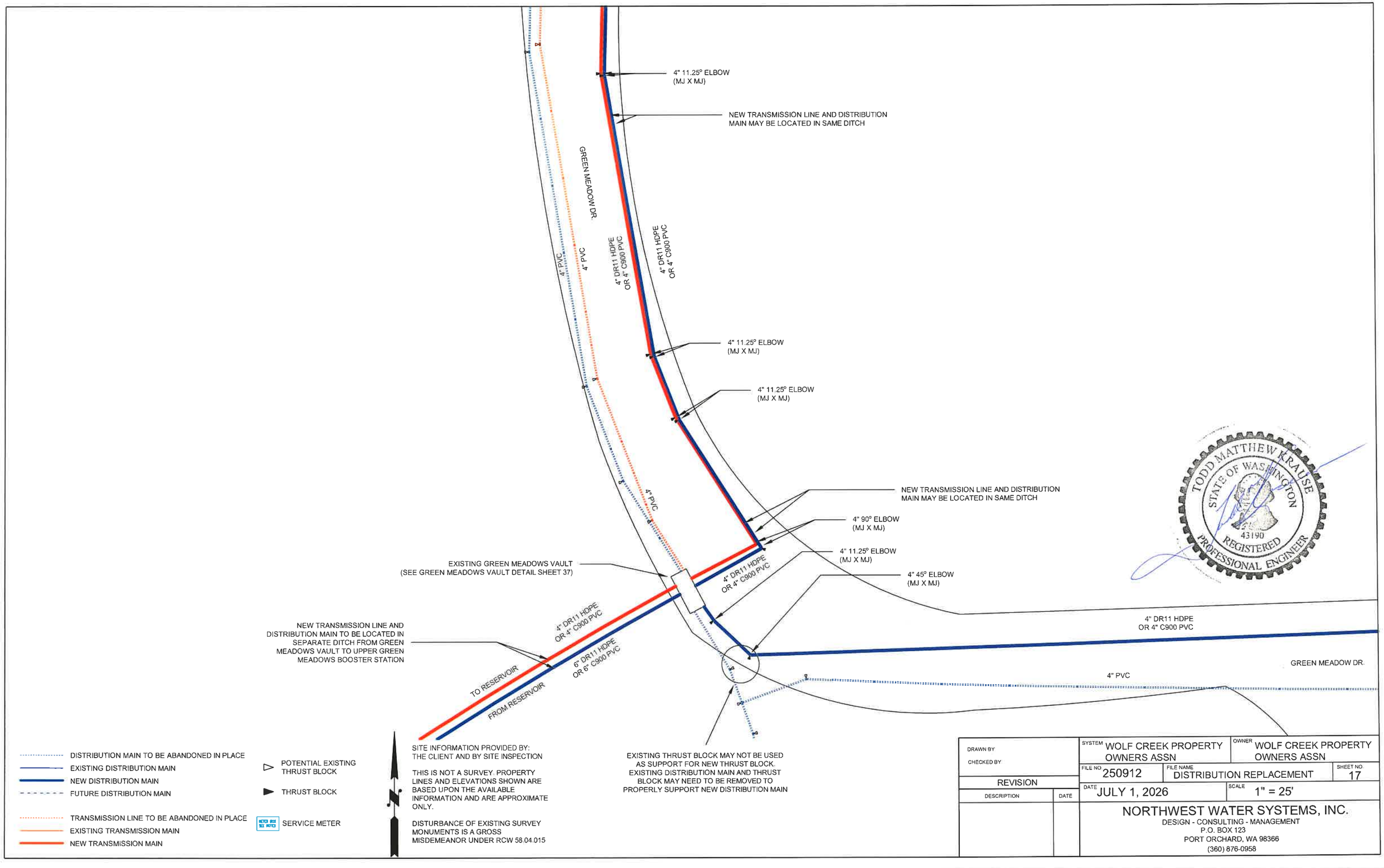
(360) 876-0958



DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO. 17
REVISION		DATE JULY 1, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

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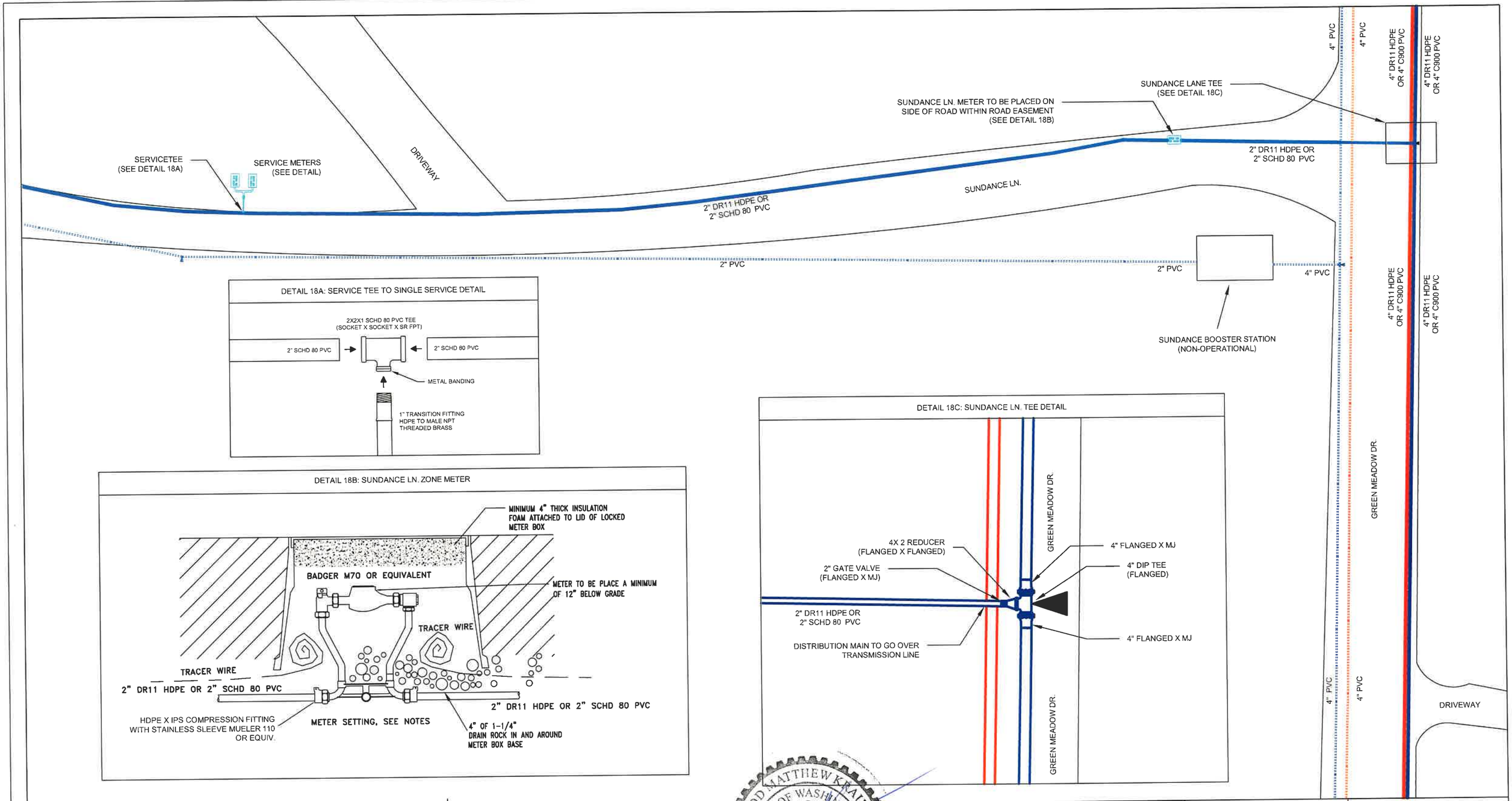

DETAIL 18A: SERVICE TEE TO SINGLE SERVICE DETAIL

DETAIL 18B: SUNDANCE LN. ZONE METER

DETAIL 18C: SUNDANCE LN. TEE DETAIL

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY:
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DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 18
REVISION		DATE JULY 1, 2026	SCALE 1" =25'
DESCRIPTION	DATE	NORTHWEST WATER SYSTEMS, INC.	

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SERVICE METERS
(SEE DETAIL)

DRIVEWAY

SERVICE TEE
(SEE DETAIL 19A)

NOTE: EXACT TRANSITION FROM SUNDANCE LN. TO DRIVEWAY IS UNKNOWN. SERVICE METER AND BLOWOFF SHOULD BE PLACED IN ROAD SHOULDER NOT UNDER DRIVEWAY OR MAIN ROAD.

RUNOFF FROM BLOWOFF SHALL BE DIRECTED SUCH THAT IT PREVENTS EROSION OF SUNDANCE LN. AND THE DRIVEWAY.

BLOWOFF
(SEE BLOWOFF DETAIL

2" DR11 HDPE OR
2" SCHD 80 PVC

2" PVC

SUNDANCE LN.

EXISTING DISTRIBUTION LINE CONTINUES
TO VIRGINA HILLS

SERVICE TEE
(SEE DETAIL 19B)

SERVICE METERS
(SEE DETAIL)

2" PVC

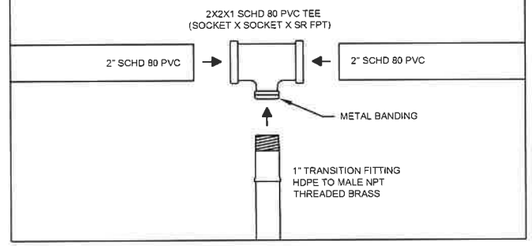
DRIVEWAY

2" DR11 HDPE OR
2" SCHD 80 PVC

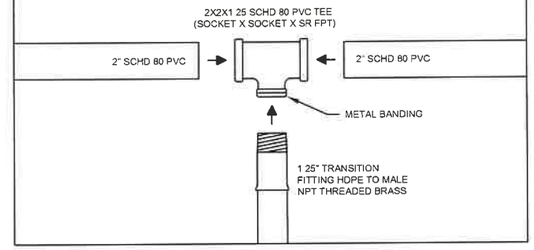
2" PVC

SUNDANCE LN.

DETAIL 19A: SUNDANCE LN. SERVICE TEE TO SINGLE SERVICE DETAIL



DETAIL 19B: SUNDANCE LN. SERVICE TEE TO DOUBLE SERVICE DETAIL



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 19
REVISION		DATE JUNE 30, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

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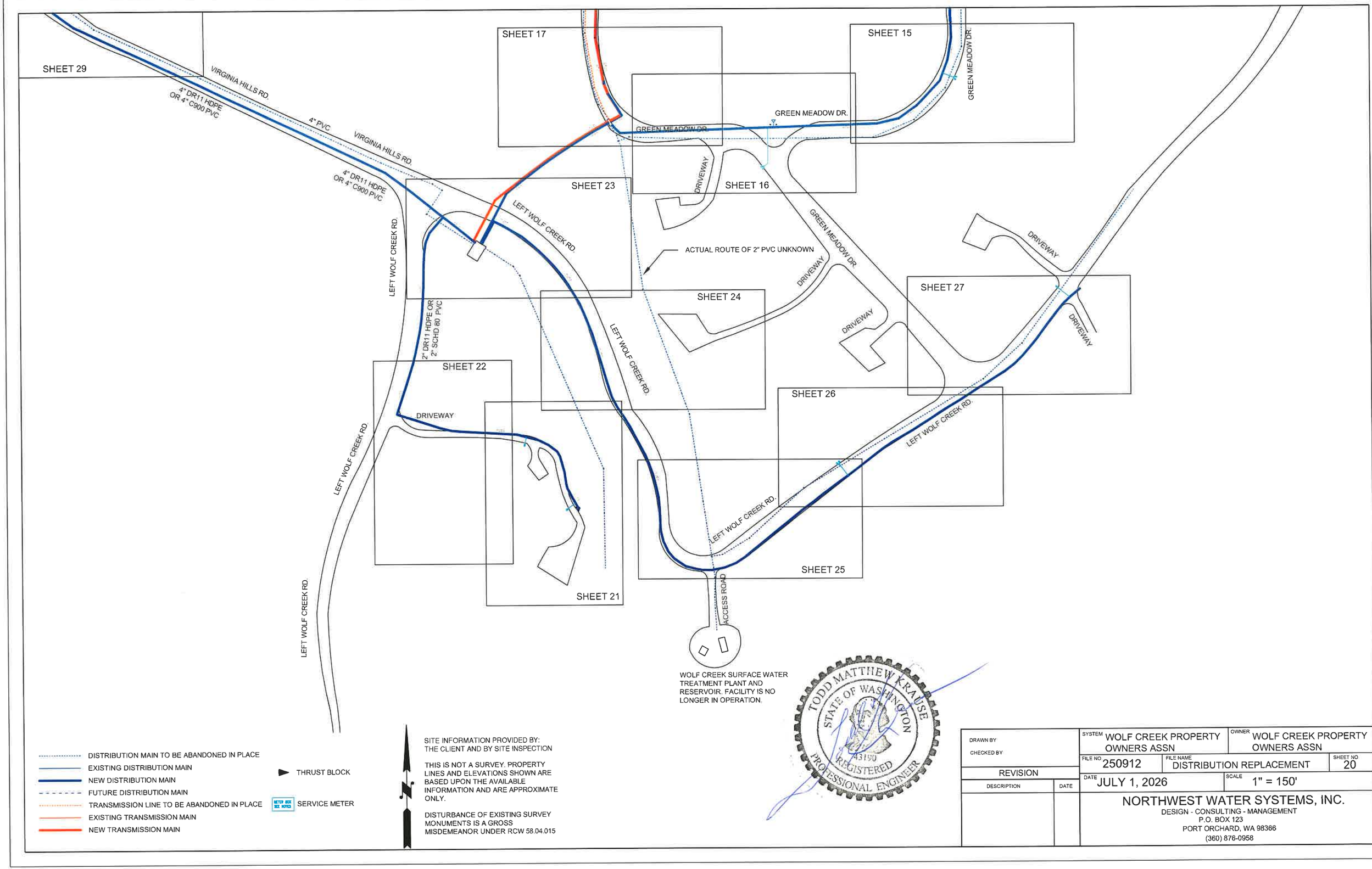

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN
TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

THRUST BLOCK
METER BOX SEE NOTES — SERVICE METER

SITE INFORMATION PROVIDED BY:
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TODD MATTHEW KRAUSE
STATE OF WASHINGTON
23190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT — SHEET NO 20
REVISION		DATE JULY 1, 2026	SCALE 1" = 150'
DESCRIPTION	DATE		

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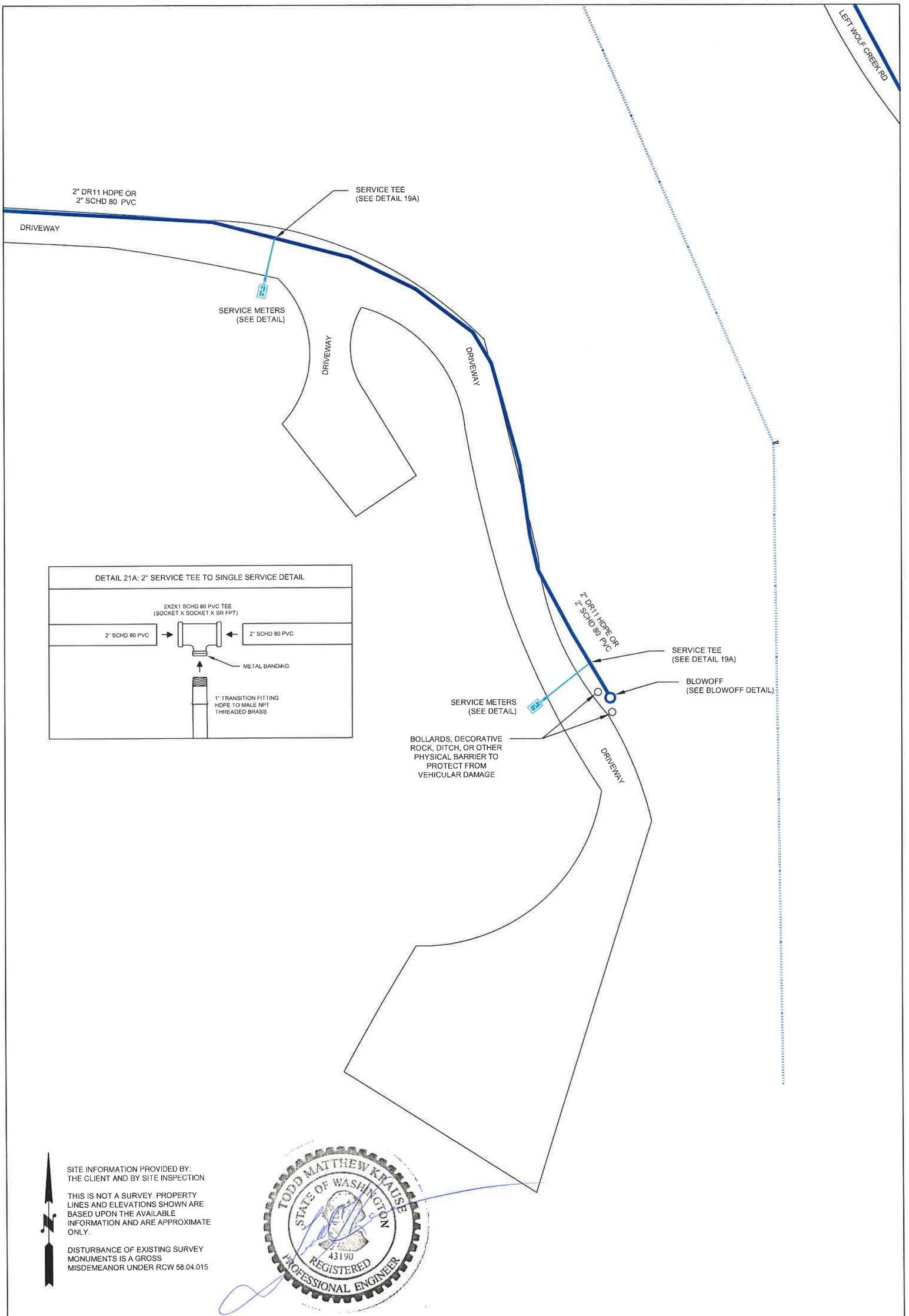

SITE INFORMATION PROVIDED BY:
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TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- SERVICE METER

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
REVISION			SHEET NO: 21
DESCRIPTION	DATE	DATE: JUNE 30, 2026	SCALE: 1" = 25'

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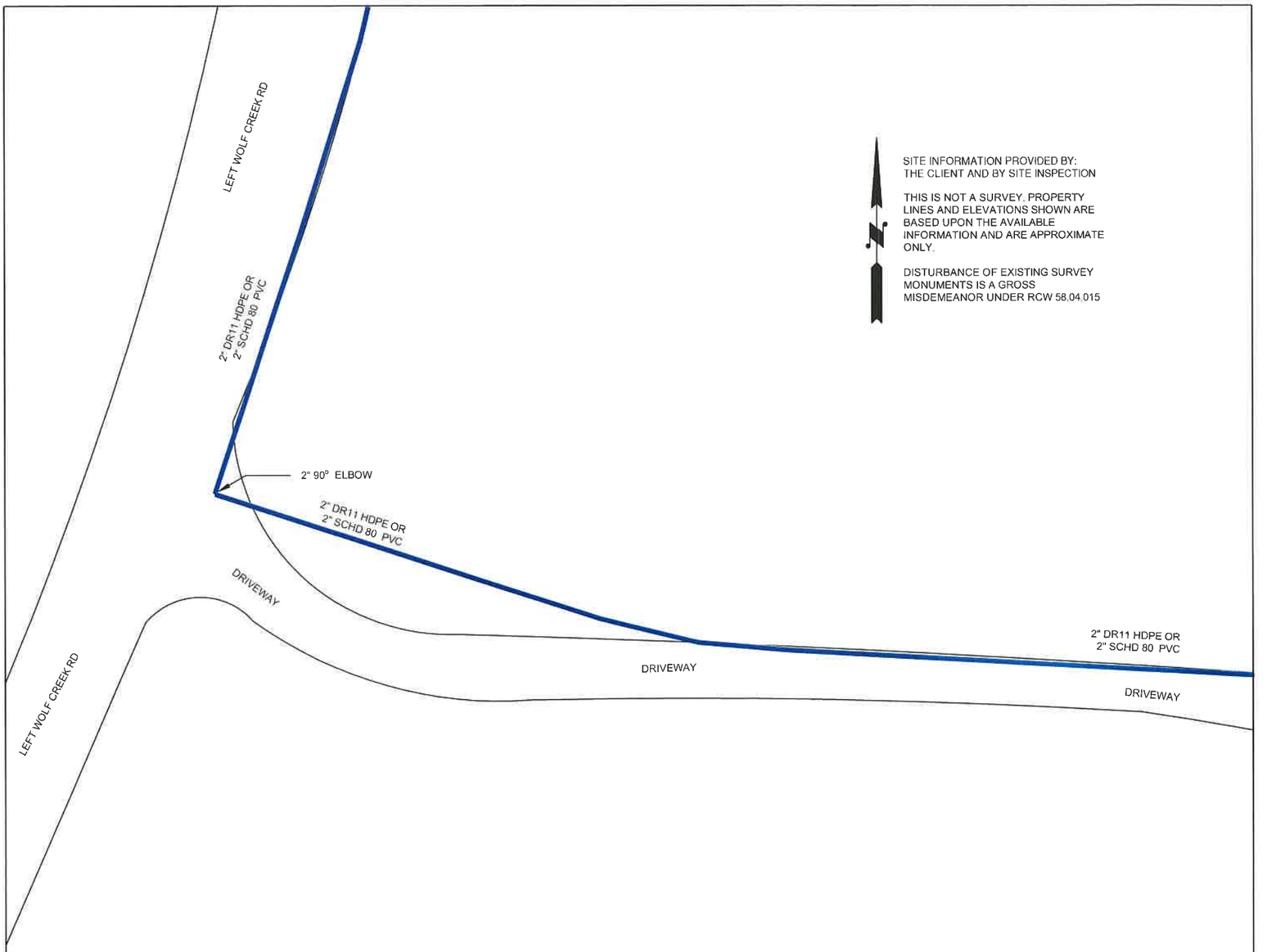

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STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION / DATE	
SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912
FILE NAME	DISTRIBUTION REPLACEMENT
SHEET NO	22
DATE	JUNE 30, 2026
SCALE	1" = 25'

NORTHWEST WATER SYSTEMS, INC.
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(360) 876-0958

VIRGINIA RIDGE RD

4" PVC

4" DR11 HDPE OR 4" C900 PVC

TO UPPER VIRGINA HILLS

UPPER GREEN MEADOWS TEE (SEE DETAIL 23A)

4" DR11 HDPE OR 4" C900 PVC

2" DR11 HDPE OR 2" SCHD 80 PVC

4" PVC

LEFT WOLF CREEK RD

2" DR11 HDPE OR 2" SCHD 80 PVC

TRANSMISSION LINE AND DISTRIBUTION MAIN TO BE PLACED IN SEPARATE DITCHES BETWEEN GREEN MEADOWS VAULT AND UPPER GREEN MEADOWS BOOSTER STATION AND RESERVOIR

FROM GREEN MEADOWS VAULT

TO GREEN MEADOWS VAULT

6" DR11 HDPE OR 6" C900 PVC

4" DR11 HDPE OR 4" C900 PVC

6" 22.5° ELBOW (MJ X MJ)

4" 22.5° ELBOW (MJ X MJ)

2" DR11 HDPE OR 2" SCHD 80 PVC

2" SCHD 40 PVC 90° ELBOW

LEFT WOLF CREEK RD

UPPER GREEN MEADOWS BOOSTER STATION AND RESERVOIR (SEE SHEET 34)

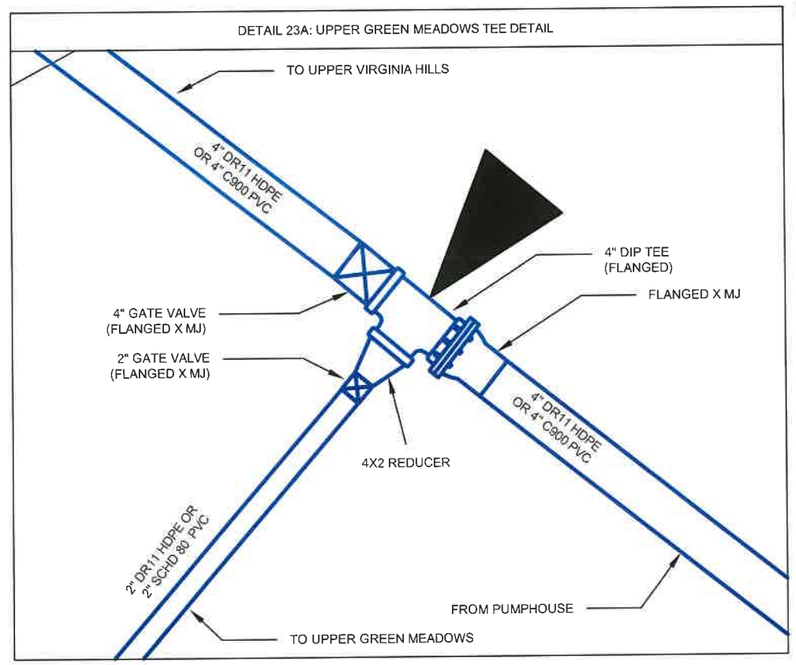
2" PVC

2" PVC

2" DR11 HDPE OR 2" SCHD 80 PVC

LEFT WOLF CREEK RD

DETAIL 23A: UPPER GREEN MEADOWS TEE DETAIL



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES — SERVICE METER

SITE INFORMATION PROVIDED BY: THE CLIENT AND BY SITE INSPECTION

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DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
21790
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT — SHEET NO 23
REVISION		DATE JUNE 30, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

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LEFT WOLF CREEK RD

2" PVC

2" DR11 HDPE OR
2" SCHD 80 PVC

DISTRIBUTION MAIN TO BE
INSTALLED ON UPHILL SIDE
OF LEFT WOLF CREEK RD.

2" PVC

2" PVC

LEFT WOLF CREEK RD

2" PVC

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER MOE SEE NOTES SERVICE METER

SITE INFORMATION PROVIDED BY:
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TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
SHEET NO: 24	
DATE: JUNE 30, 2026	SCALE: 1" = 25'

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LEFT WOLF CREEK RD

2" DR11 HDPE OR
2" SCHD 80 PVC

2" PVC

DISTRIBUTION MAIN TO BE
INSTALLED ON UPHILL SIDE
OF LEFT WOLF CREEK RD.

LOCATION OF EXISTING MAIN ASSUMED.
ACTUAL ROUTE OF 2" PVC UNKNOWN

2" PVC

2" PVC

LEFT WOLF CREEK RD

SERVICE METERS
(SEE DETAIL)

2" PVC

LEFT WOLF CREEK RD

2" DR11 HDPE OR
2" SCHD 80 PVC

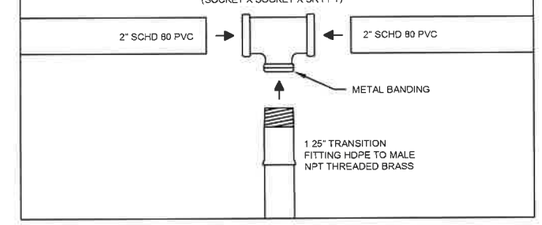
SERVICE TEE
(SEE DETAIL 25A)

2" PVC

FROM WOLF CREEK SURFACE WATER
TREATMENT FACILITY AND RESERVOIR.
LINE TO BE CUT, CAPPED, AND
ABANDONED IN PLACE.

ACCESS ROAD TO RESERVOIR AND
SURFACE WATER TREATMENT PLANT.

DETAIL 25A: SUNDANCE LN. SERVICE TEE TO DOUBLE SERVICE DETAIL



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY:
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STATE OF WASHINGTON
23190
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PROFESSIONAL ENGINEER

DRAWN BY	
CHECKED BY:	
REVISION	
DESCRIPTION	DATE

SYSTEM WOLF CREEK PROPERTY OWNERS ASSN		OWNER WOLF CREEK PROPERTY OWNERS ASSN
FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 25
DATE JUNE 30, 2026	SCALE 1" = 25'	

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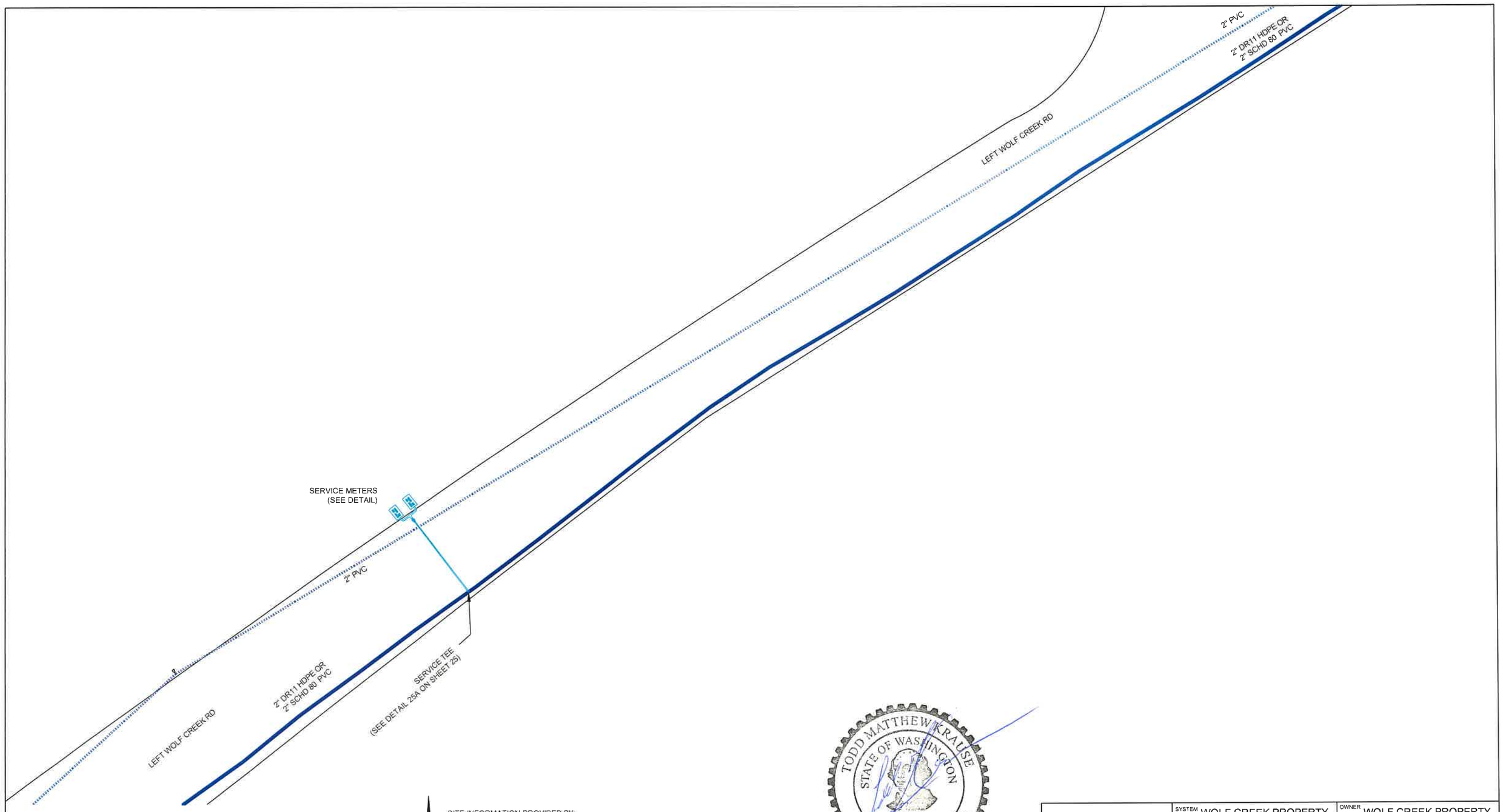

DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY:
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STATE OF WASHINGTON
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DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 26
REVISION		DATE JUNE 30, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

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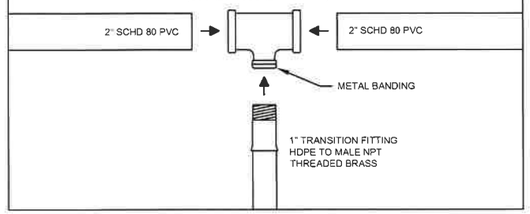
DETAIL 27A: 2" SERVICE TEE TO SINGLE SERVICE DETAIL



DETAIL 27B: LOWER LEFT WOLF CREEK TERMINATION DETAIL

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- SERVICE METER

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DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT	SHEET NO 27
REVISION		DATE JUNE 30, 2026	SCALE 1" = 25'
DESCRIPTION	DATE		

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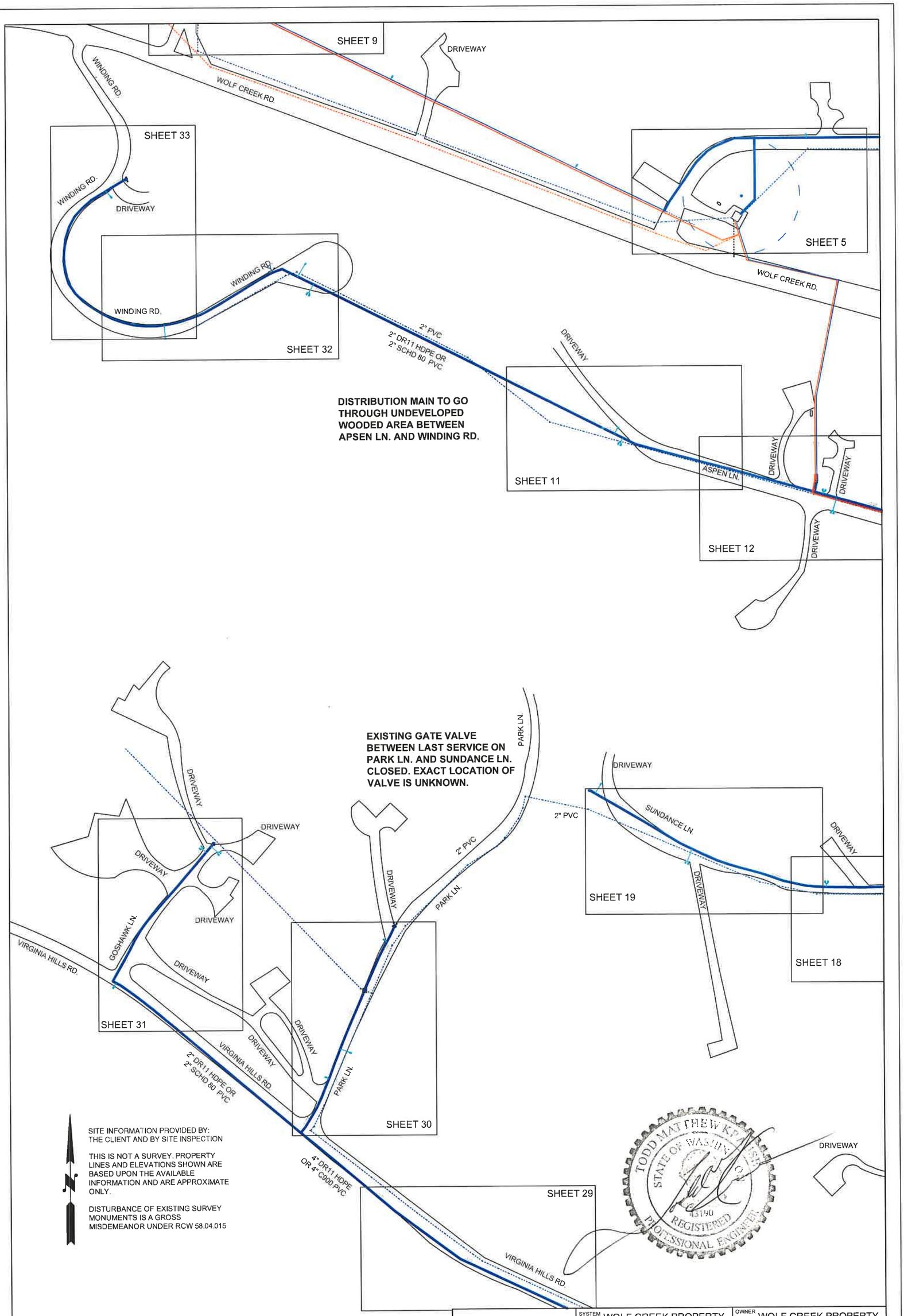

DRAWN BY:	
CHECKED BY:	
REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
SHEET NO: 28	
DATE: JULY 14, 2026	SCALE: 1" = 150'

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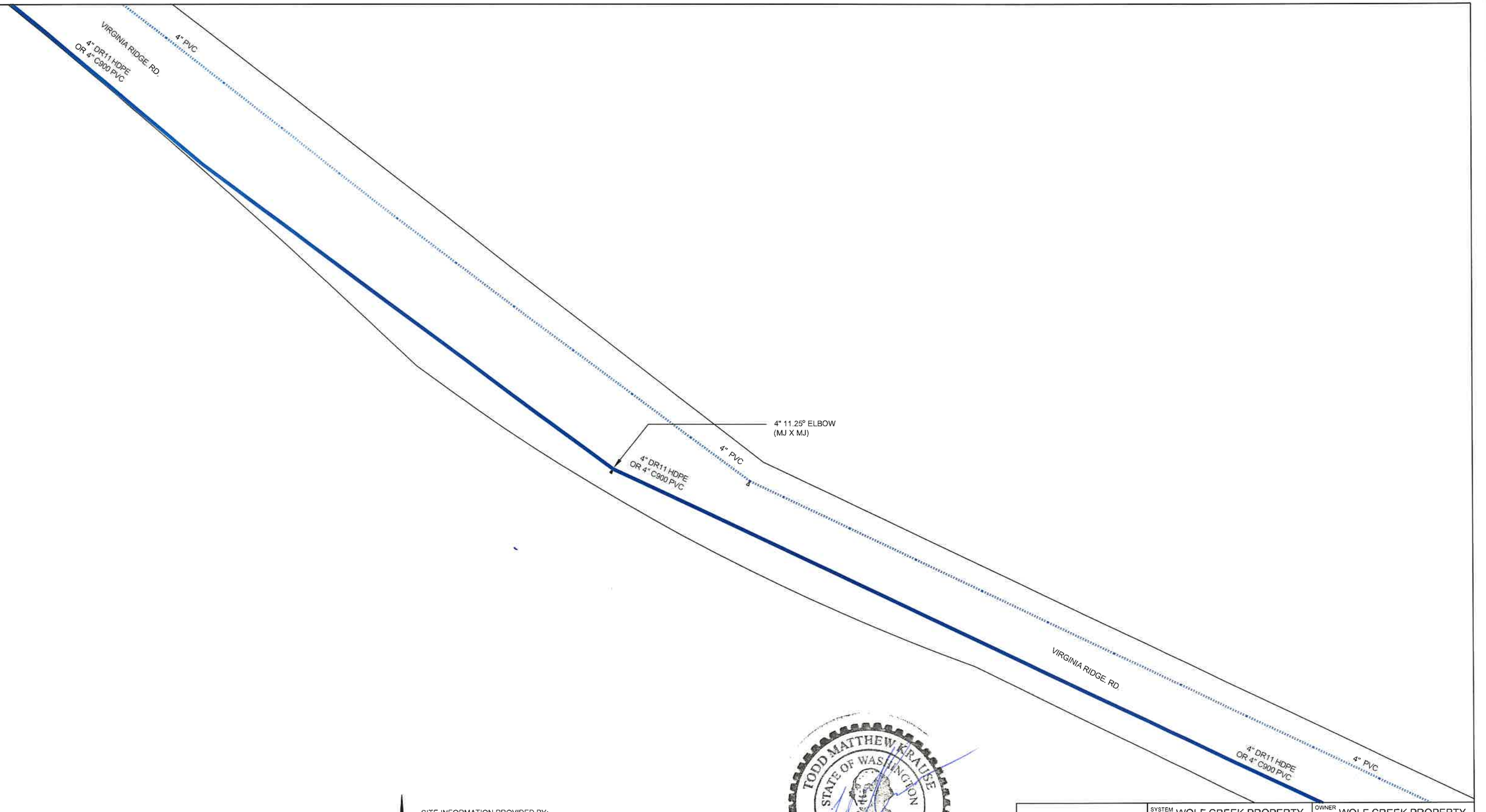
PORT ORCHARD, WA 98366
(360) 876-0958



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
METER BOX SEE NOTES — SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

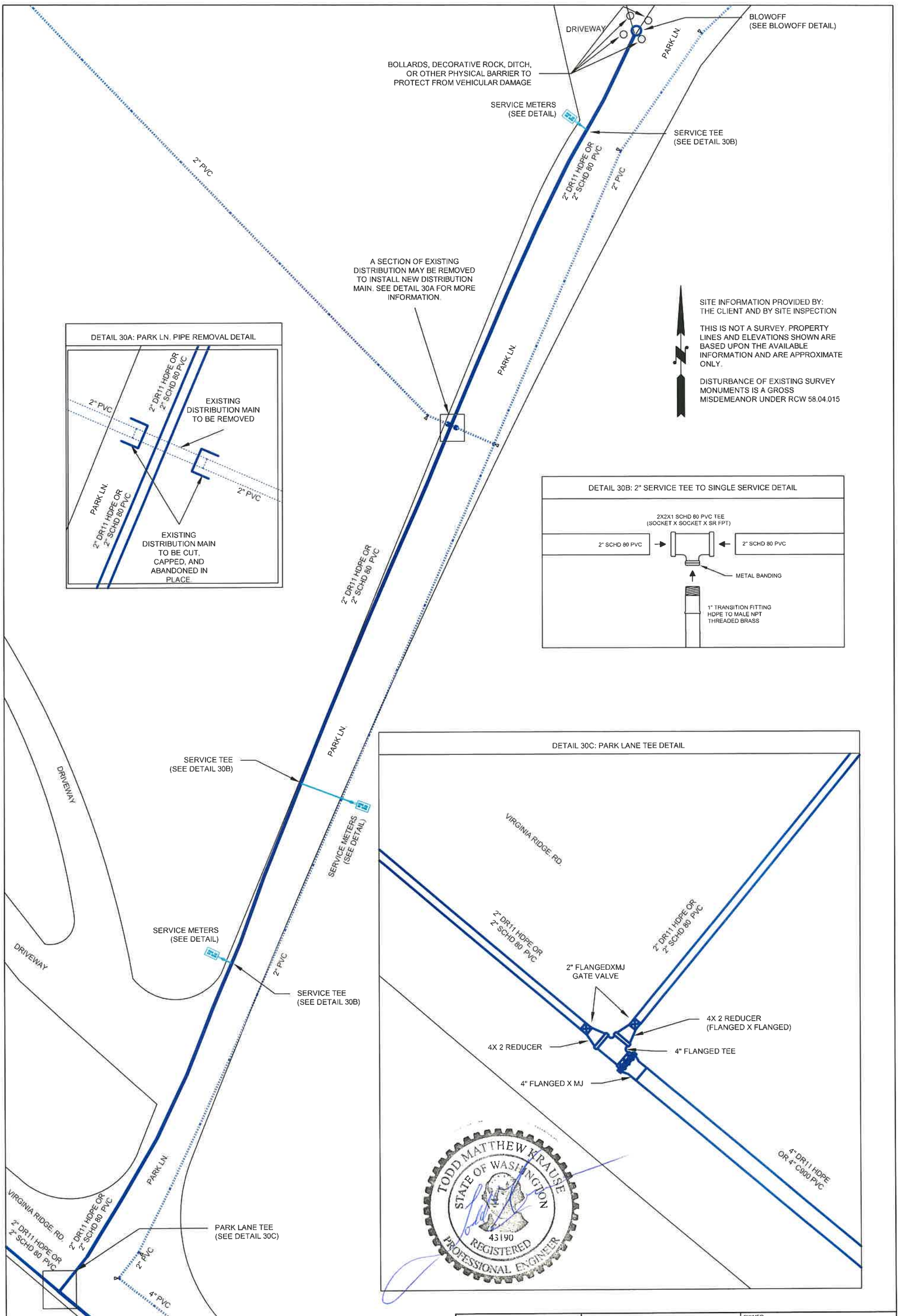
DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

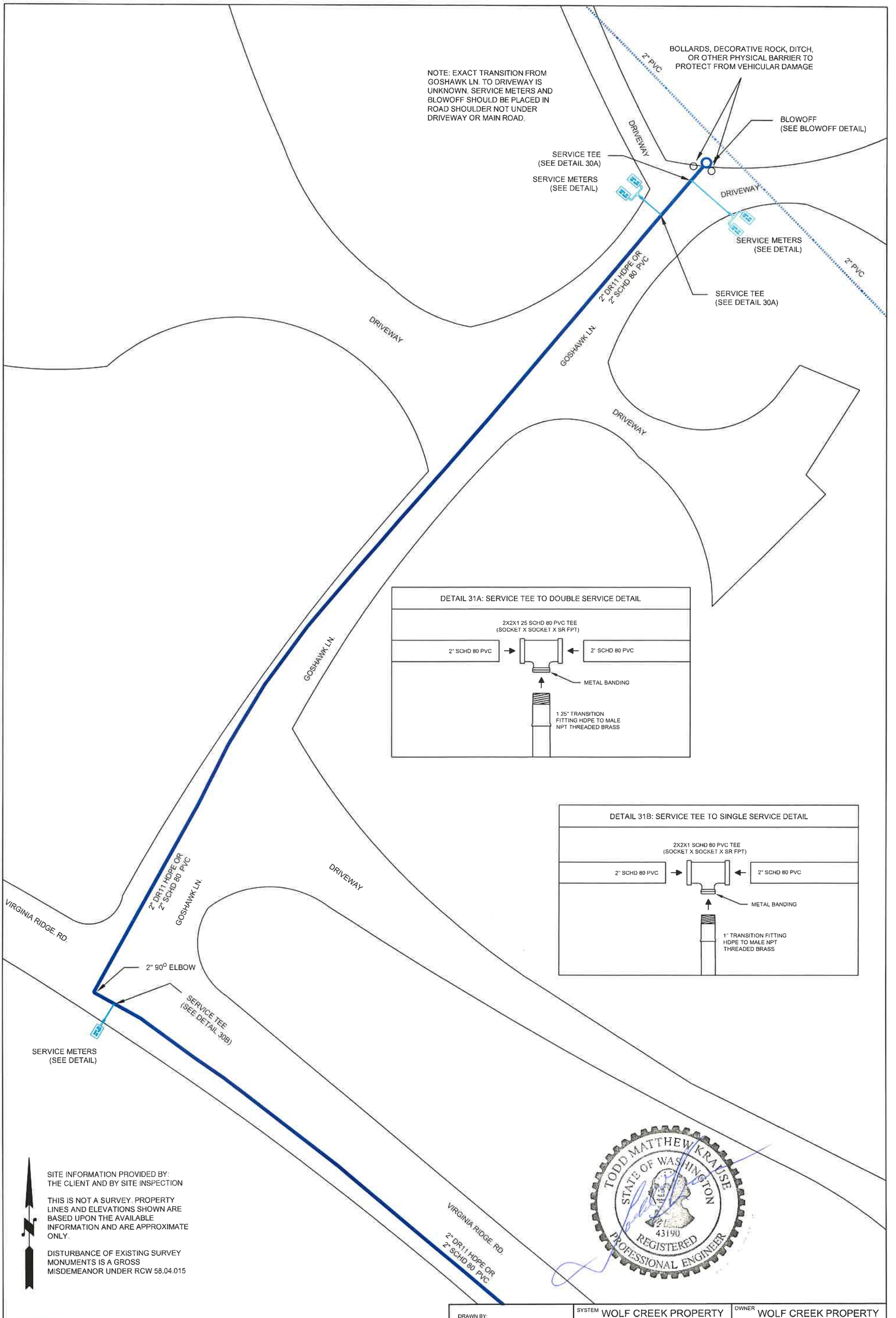
SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
SHEET NO: 29	
DATE: JUNE 30, 2026	SCALE: 1" = 25'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DISTRIBUTION REPLACEMENT
REVISION			SHEET NO 30
DESCRIPTION	DATE	DATE JUNE 30, 2026	SCALE 1" = 25'

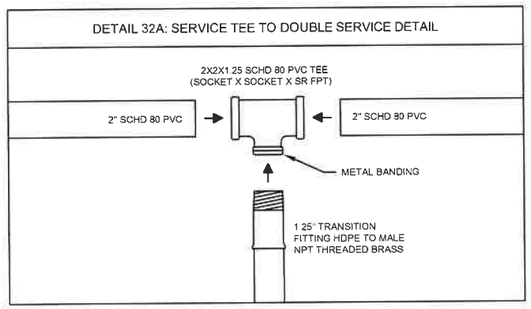
NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



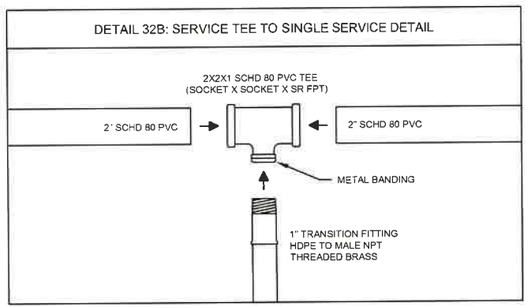
DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT
REVISION			SHEET NO: 31
DESCRIPTION	DATE	DATE: JUNE 30, 2026	SCALE: 1" = 25'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

DETAIL 32A: SERVICE TEE TO DOUBLE SERVICE DETAIL



DETAIL 32B: SERVICE TEE TO SINGLE SERVICE DETAIL



DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
EXISTING DISTRIBUTION MAIN
NEW DISTRIBUTION MAIN
FUTURE DISTRIBUTION MAIN

TRANSMISSION LINE TO BE ABANDONED IN PLACE
EXISTING TRANSMISSION MAIN
NEW TRANSMISSION MAIN

POTENTIAL EXISTING THRUST BLOCK
THRUST BLOCK
SERVICE METER

SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

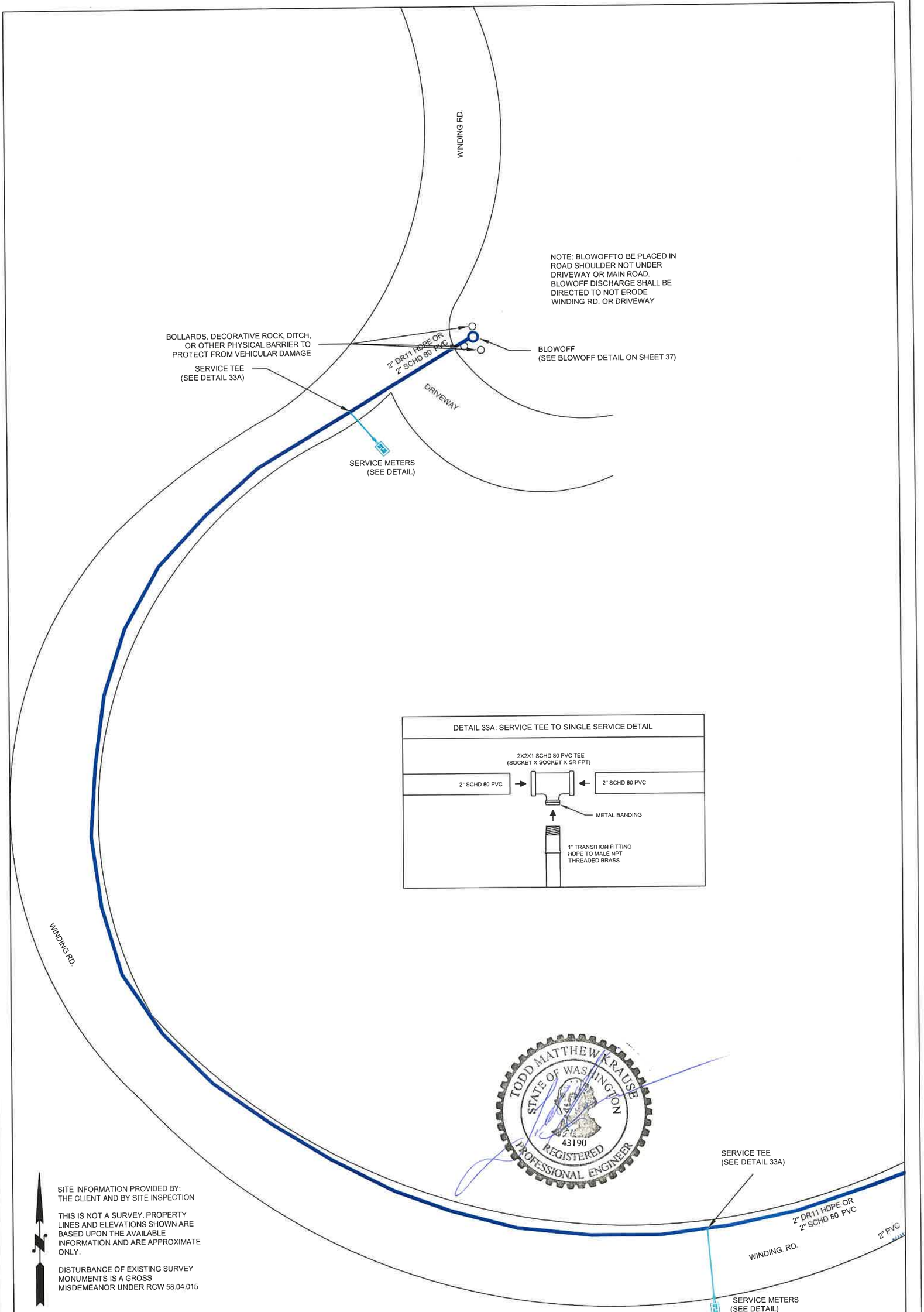
THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO: 250912	FILE NAME: DISTRIBUTION REPLACEMENT	SHEET NO: 32
REVISION		DATE: JUNE 18, 2026	SCALE: 1" = 25'
DESCRIPTION	DATE		

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



SITE INFORMATION PROVIDED BY:
THE CLIENT AND BY SITE INSPECTION

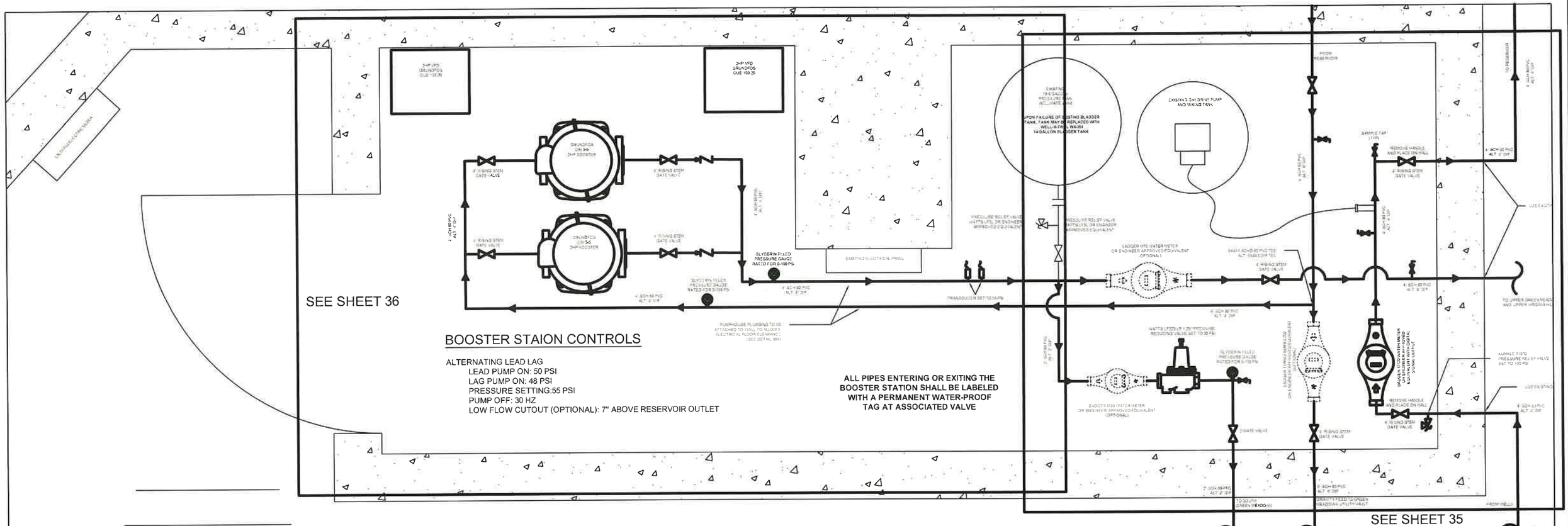
THIS IS NOT A SURVEY. PROPERTY LINES AND ELEVATIONS SHOWN ARE BASED UPON THE AVAILABLE INFORMATION AND ARE APPROXIMATE ONLY.

DISTURBANCE OF EXISTING SURVEY MONUMENTS IS A GROSS MISDEMEANOR UNDER RCW 58.04.015

- DISTRIBUTION MAIN TO BE ABANDONED IN PLACE
- EXISTING DISTRIBUTION MAIN
- NEW DISTRIBUTION MAIN
- FUTURE DISTRIBUTION MAIN
- TRANSMISSION LINE TO BE ABANDONED IN PLACE
- EXISTING TRANSMISSION MAIN
- NEW TRANSMISSION MAIN
- POTENTIAL EXISTING THRUST BLOCK
- THRUST BLOCK
- SERVICE METER

DRAWN BY	
CHECKED BY:	
REVISION	
DESCRIPTION	DATE
SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912
FILE NAME	DISTRIBUTION REPLACEMENT
SHEET NO	33
DATE	JULY 6, 2026
SCALE	1" = 25'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958



BOOSTER STAION CONTROLS

ALTERNATING LEAD LAG
- LEAD PUMP ON: 50 PSI
- LAG PUMP ON: 48 PSI
- PRESSURE SETTING:55 PSI
- PUMP OFF: 30 HZ
- LOW FLOW CUTOUT (OPTIONAL): 7" ABOVE RESERVOIR OUTLET

ALL PIPES ENTERING OR EXITING THE BOOSTER STATION SHALL BE LABELED WITH A PERMANENT WATER-PROOF TAG AT ASSOCIATED VALVE

STEPS DOWN TO BOOSTER STATION FROM ROAD

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE NEW PIPE DISINFECTION AND HYDROSTATIC TESTING STANDARD.

NOTES:
LAYOUT IS SCHEMATIC. DRAWING IS SCHEMATIC, ACTUAL LAYOUT MAY VARY, AS LONG AS INTENT IS MET.

EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER APPROVED EQUIVALENT.

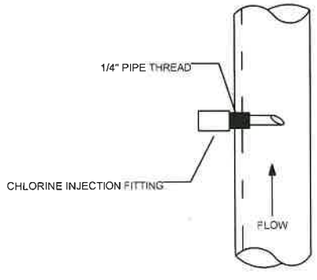
ALL PIPES AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED ACCORDING TO MANUFACTURER INSTRUCTIONS.

ALL PLUMBING ELECTRICAL AND EQUIPMENT SHALL BE INSTALLED BY QUALIFIED PROFESSIONALS ACCORDING TO ALL LOCAL CODES AND REQUIREMENTS.

TREATMENT UNIT SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. ALL RECOMMENDED PROCEDURES FOR TREATMENT UNIT INSTALLATION AND ACTIVATION SHALL BE FOLLOWED.

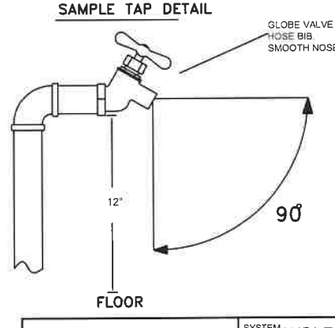
EXISTING EQUIPMENT
NEW EQUIPMENT

CHLORINE INJECTION VALVE DETAIL

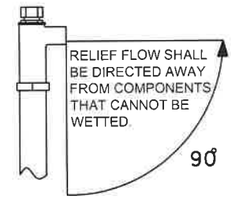


INSTALLATION OF 6" DISTRIBUTION MAIN SHALL INCLUDE PRIMER AND GLUE RATED FOR 6" DIAMETER PIPE AND ALL MANUFACTURER INSTALLATION INSTRUCTIONS SHALL BE FOLLOWED.

SAMPLE TAP DETAIL



PRESSURE RELIEF VALVE DETAIL



DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO. 250912	FILE NAME BOOSTER STATION
REVISION			SHEET NO. 34
DESCRIPTION	DATE	DATE JULY 1, 2026	SCALE 1" = 1'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

EXISTING
19.6 GALLON
PRESSURE TANK
WELLMATE WM-6

UPON FAILURE OF EXISTING BLADDER TANK, TANK MAY BE REPLACED WITH WELL-X-TROL WX-201 14 GALLON BLADDER TANK.

EXISTING CHLORINE PUMP AND MIXING TANK

FROM RESERVOIR

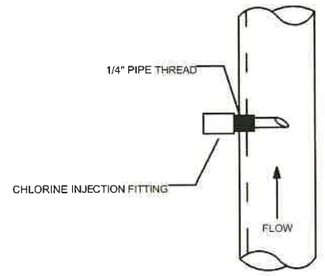
INSTALLATION OF 6" DISTRIBUTION MAIN SHALL INCLUDE PRIMER AND GLUE RATED FOR 6" DIAMETER PIPE AND ALL MANUFACTURER INSTALLATION INSTRUCTIONS SHALL BE FOLLOWED.

TO RESERVOIR

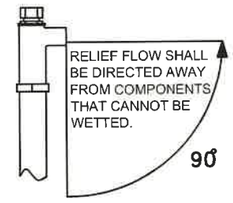
4" SCH 80 PVC
ALT: 4" DIP

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE NEW PIPE DISINFECTION AND HYDROSTATIC TESTING STANDARD.

CHLORINE INJECTION VALVE DETAIL



PRESSURE RELIEF VALVE DETAIL



SAMPLE TAP (TYP)

REMOVE HANDLE AND PLACE ON WALL

4" RISING STEM GATE VALVE

6" SCH 80 PVC
ALT: 6" DIP

4" SCH 80 PVC
ALT: 4" DIP

USE EXISTING KNOCKOUTS

PRESSURE RELIEF VALVE
WATTS LF3L OR ENGINEER
APPROVED EQU VALENT

BADGER M70 WATER METER
OR ENGINEER APPROVED EQUIVALENT
(OPTIONAL)

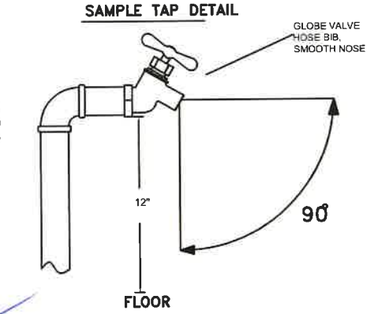
6X4X6 SCHD 80 PVC TEE
ALT: 6X4X6 DIP TEE

4" RISING STEM
GATE VALVE

4" SCH 80 PVC
ALT: 4" DIP

ALL PIPES ENTERING OR EXITING THE UPPER GREEN MEADOWS BOOSTER STATION SHALL BE LABELED WITH A PERMANENT WATER-PROOF TAG AT ASSOCIATED VALVE

SAMPLE TAP DETAIL



TO UPPER GREEN MEADOWS
AND UPPER VIRGINIA HILLS

4" SCH 80 PVC
ALT: 4" DIP

WATTS LF223 LP 1.25" PRESSURE
REDUCING VALVE SET TO 30 PSI

2" SCH 80 PVC
ALT: 2" GIP

GLYCERIN FILLED
PRESSURE GAUGE
RATED FOR 0-100 PSI

BADGER TURBO SERIES 200
OR ENGINEER APPROVED EQUIVALENT
(OPTIONAL)

BADGER M120 WATER METER
OR ENGINEER APPROVED
EQUIVALENT WITH DIGITAL
SIGNAL OUTPUT

KUNKLE 910*G
PRESSURE RELIEF VALVE
SET TO 100 PSI

EXISTING EQUIPMENT
NEW EQUIPMENT

USE EXISTING KNOCKOUTS

BADGER M35 WATER METER
OR ENGINEER APPROVED EQUIVALENT
(OPTIONAL)

REMOVE HANDLE
AND PLACE ON WALL

4" SCH 80 PVC
ALT: 4" DIP

2"GATE VALVE

6" RISING STEM
GATE VALVE

4" RISING STEM
GATE VALVE

2" SCH 80 PVC
ALT: 2" GIP

6" SCH 80 PVC
ALT: 6" DIP

TO SOUTH
GREEN MEADOWS

GRAVITY FEED TO GREEN
MEADOWS UTILITY VAULT

FROM WELLS

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO.: 250912	FILE NAME: BOOSTER STATION
REVISION		DATE: JULY 1, 2026	SCALE: 1/2" = 1'
DESCRIPTION	DATE		SHEET NO.: 35

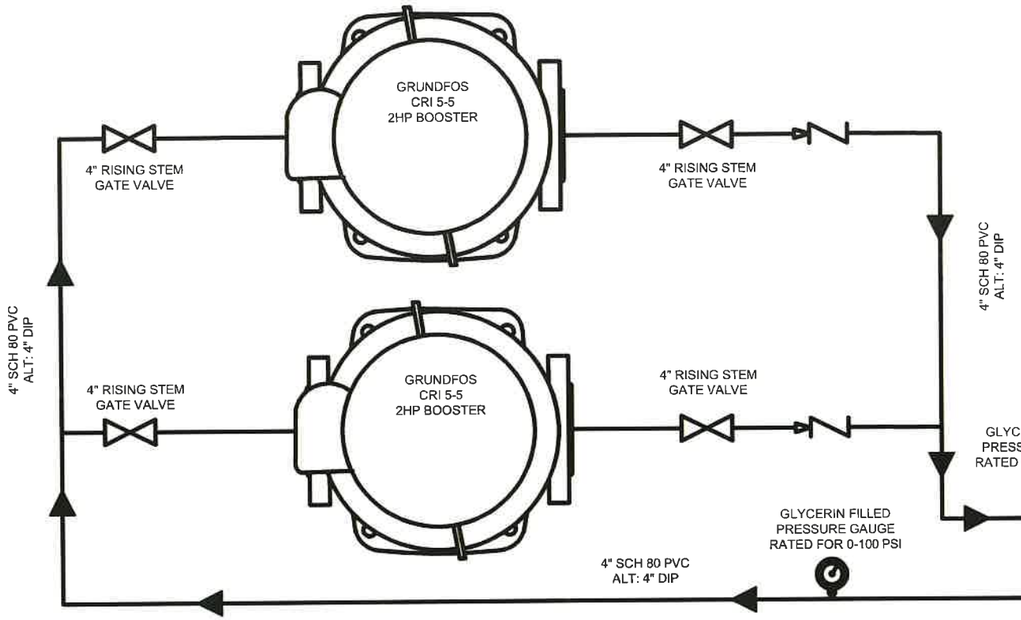
NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

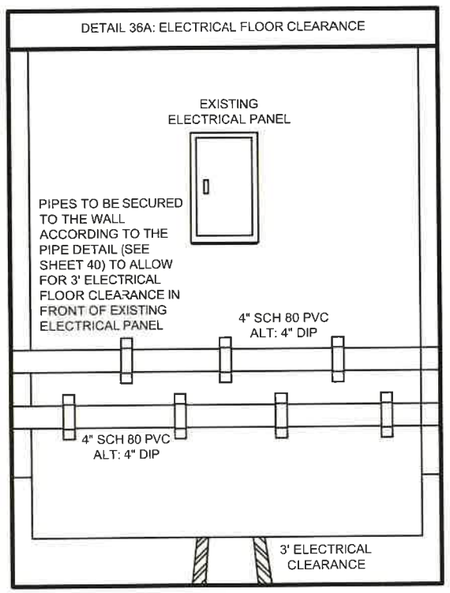
BOOSTER STAION CONTROLS

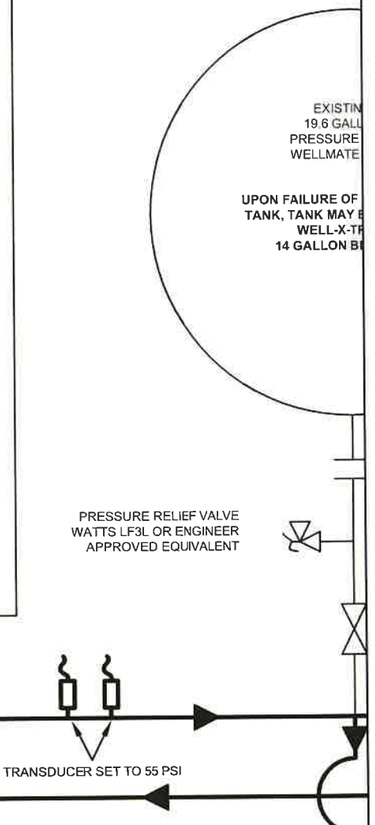
ALTERNATING LEAD LAG
- LEAD PUMP ON: 50 PSI
- LAG PUMP ON: 48 PSI
- PRESSURE SETTING:55 PSI
- PUMP OFF: 30 HZ
- LOW FLOW CUTOUT (OPTIONAL): 7" ABOVE RESERVOIR OUTLET

2HP VFD
GRUNDFOS
CUE 100 20

2HP VFD
GRUNDFOS
CUE 100 20







NOTES:
LAYOUT IS SCHEMATIC. DRAWING IS SCHEMATIC, ACTUAL LAYOUT MAY VARY, AS LONG AS INTENT IS MET.

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ALL PIPES AND EQUIPMENT SHALL BE INSTALLED AND SUPPORTED ACCORDING TO MANUFACTURER INSTRUCTIONS.

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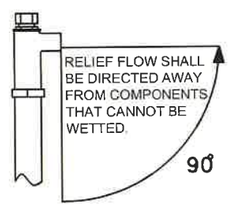
ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE NEW PIPE DISINFECTION AND HYDROSTATIC TESTING STANDARD.

EXISTING EQUIPMENT
NEW EQUIPMENT

PUMPHOUSE PLUMBING TO BE ATTACHED TO WALL TO ALLOW 3' ELECTRICAL FLOOR CLEARANCE (SEE DETAIL 36A)

TODD MATTHEW KRAUSE
STATE OF WASHINGTON
43190
REGISTERED
PROFESSIONAL ENGINEER

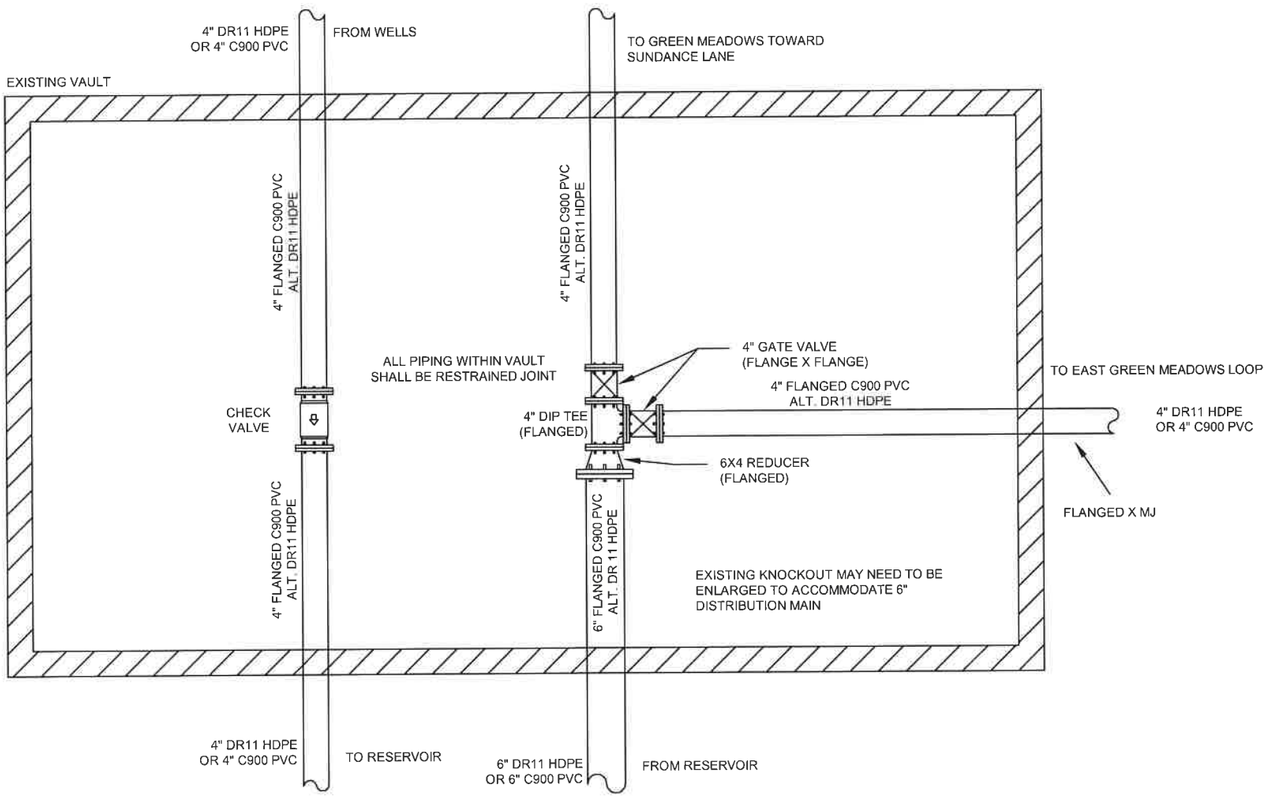
PRESSURE RELIEF VALVE DETAIL



DRAWN BY:	
CHECKED BY:	
REVISION	
DESCRIPTION / DATE	
SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO.	250912
FILE NAME	BOOSTER STATION
SHEET NO.	36
DATE	JUNE 30, 2026
SCALE	1/2" = 1'

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

GREEN MEADOWS VAULT DETAIL



NOTES:

FULLY RESTRAINED MECHANICAL JOINTS ARE REQUIRED FOR 3-INCH AND LARGER PIPE, SOLVENT WELDED JOINTS ARE PROHIBITED

THE NEW MAIN MUST BE DISINFECTED, FLUSHED, TESTED, AND APPROVED FOR SERVICE BEFORE CONNECTION OF SERVICE LATERALS.

OLD TRANSMISSION AND DISTRIBUTION PIPING WITHIN 10' OF VAULT SHALL BE REMOVED. DISTRIBUTION AND TRANSMISSION PIPING OUTSIDE 10' OF VAULT SHALL BE ABANDONED IN PLACE AND CAPPED.

EXISTING PIPE SIZE/MATERIAL ARE BASED ON SYSTEM HISTORICAL DRAWINGS/RECORDS EXISTING OPERATOR KNOWLEDGE AND SITE CONDITIONS. CONTRACTOR SHOULD HAVE AVAILABLE PARTS ON HAND IN THE EVENT ACTUAL PIPE DIFFERS.

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE TRENCH DETAIL DRAWING.

ALL TRANSMISSION LINE SHALL BE 4" DR11 HDPE OR C900

ALL DISTRIBUTION MAINS 4" OR LARGER SHALL BE DR11 HDPE OR C900

ALL PLUMBING ELECTRICAL AND EQUIPMENT SHALL BE INSTALLED BY QUALIFIED PROFESSIONALS ACCORDING TO ALL LOCAL CODES AND REQUIREMENTS

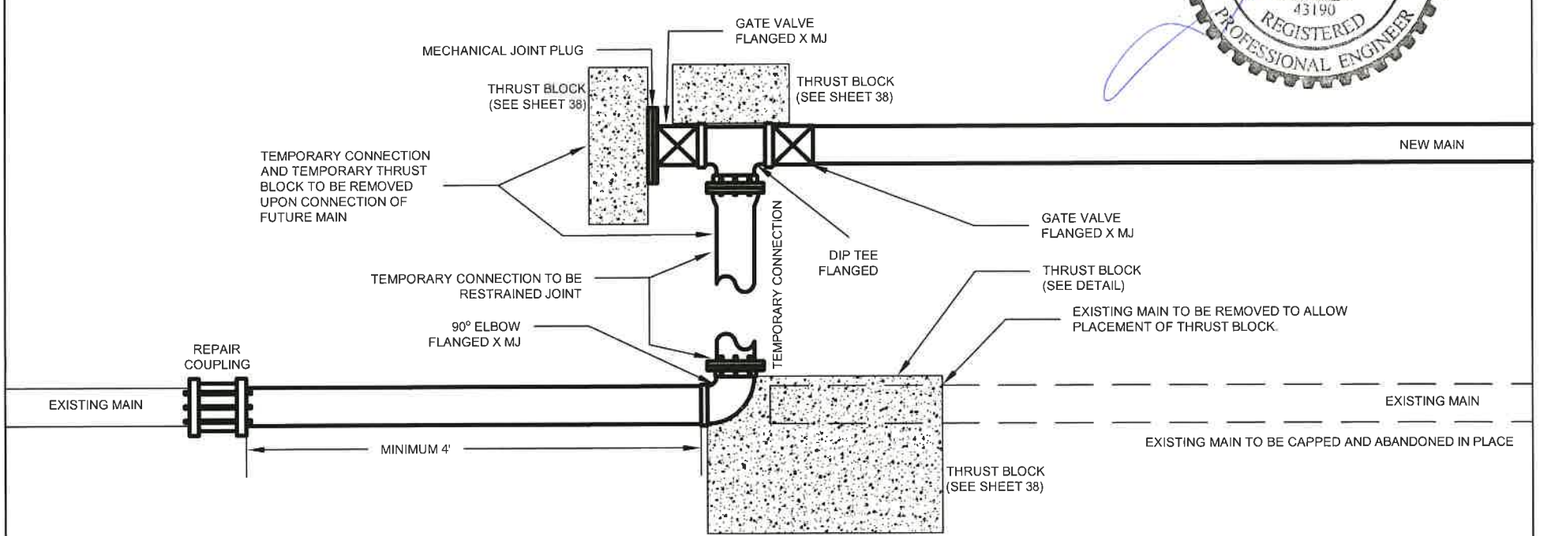
EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER APPROVED EQUIVALENT.

SEPTIC LINES AND WATER LINES SHALL CROSS AT 90 DEGREE ANGLE WITH WATER LINE ABOVE SEPTIC LINES.

ALL WATER LINES WITHIN 10' OF SEPTIC LINES SHALL BE SLEEVED.

CONTRACTOR TO LOCATE AND VERIFY ANY EXISTING BURIED UTILITIES. CALL 811 BEFORE YOU DIG

TRANSITION DETAIL



NOTES:

INSTALL AS SHOWN FOR TRANSITION PERIOD WHILE CONNECTING SERVICE LATERALS TO NEW MAIN.

SOLVENT WELDED JOINTS ARE PROHIBITED

EXISTING MAIN TO BE ABANDONED SHALL BE TEMPORARILY CONNECTED TO DISTRIBUTION SYSTEM VIA AN ENGINEER APPROVED METHOD UNTIL NEW MAIN IS APPROVED FOR SERVICE.

THE NEW MAIN MUST BE DISINFECTED, FLUSHED, TESTED, AND APPROVED FOR SERVICE BEFORE CONNECTION OF SERVICE LATERALS.

AFTER COMPLETION OF TRANSITION, ISOLATE OLD DISTRIBUTION SYSTEM.

OLD DISTRIBUTION SYSTEM TO BE PHYSICALLY DISCONNECTED FROM NEW DISTRIBUTION MAIN, CAPPED, AND ABANDONED IN PLACE.

EXISTING PIPE SIZE/MATERIAL ARE BASED ON SYSTEM HISTORICAL DRAWINGS/RECORDS EXISTING OPERATOR KNOWLEDGE AND SITE CONDITIONS. CONTRACTOR SHOULD HAVE AVAILABLE PARTS ON HAND IN THE EVENT ACTUAL PIPE DIFFERS.

ALL COMPONENTS IN SUBSTANTIAL CONTACT WITH POTABLE WATER SHALL BE NSF/ANSI 61 CERTIFIED. ANY TREATMENT CHEMICALS SHALL BE NSF/ANSI 60 CERTIFIED. ANY PIPE, FITTINGS, FIXTURES, SOLDER, OR FLUX MUST BE LEAD-FREE. SEE WAC 246-290-220 FOR EXCEPTIONS TO THE LEAD-FREE REQUIREMENT. CONTRACTOR MAY SUBSTITUTE EQUIVALENT MATERIALS AND EQUIPMENT FOR SPECIFIED ITEMS IF THE ITEMS MEET REQUIREMENTS AND FOLLOW INDUSTRY STANDARDS. SEE ATTACHED RELEVANT STANDARDS AND DETAIL DRAWINGS FOR CONSTRUCTION SPECIFICATIONS. IF APPLICABLE, NEW PIPE MUST FOLLOW THE INSTALLATION, TESTING, AND DISINFECTION OUTLINED IN THE TRENCH DETAIL DRAWING.

ALL TRANSMISSION LINE SHALL BE 4" DR11 HDPE OR C900 DR18

ALL DISTRIBUTION MAINS SMALLER THAN 4" SHALL BE DR11 HDPE OR SHED 80 PVC

ALL DISTRIBUTION MAINS 4" OR LARGER SHALL BE DR11 HDPE OR C900 DR18

ALL PLUMBING ELECTRICAL AND EQUIPMENT SHALL BE INSTALLED BY QUALIFIED PROFESSIONALS ACCORDING TO ALL LOCAL CODES AND REQUIREMENTS

EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER APPROVED EQUIVALENT.

SEPTIC LINES AND WATER LINES SHALL CROSS AT 90 DEGREE ANGLE WITH WATER LINE ABOVE SEPTIC LINES.

ALL WATER LINES WITHIN 10' OF SEPTIC LINES SHALL BE SLEEVED.

CONTRACTOR TO LOCATE AND VERIFY ANY EXISTING BURIED UTILITIES. CALL 811 BEFORE YOU DIG

DRAWN BY:		SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN	OWNER: WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY:		FILE NO: 250912	FILE NAME: DETAIL DRAWINGS
REVISION			SHEET NO: 37
DESCRIPTION	DATE	DATE: JULY 6, 2026	SCALE: NO SCALE

NORTHWEST WATER SYSTEMS, INC.
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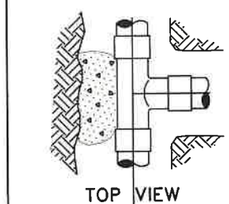
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

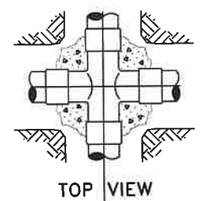
THRUST LOADS

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

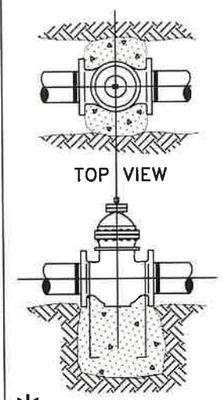
PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800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



TEE



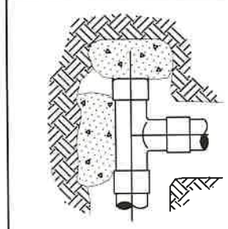
CROSS

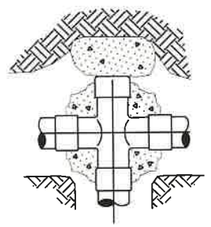


* GATE VALVE


WYE


HORIZ. BEND


TEE WITH PLUG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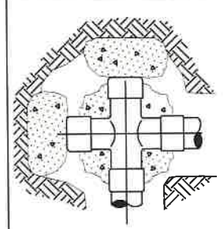
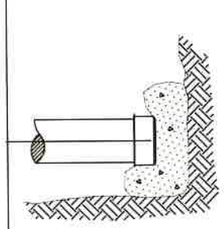
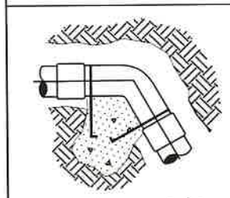

CROSS WITH PLUGS


PLUG OR CAP


45° - 90° VERTICAL BEND

* *IF IN THE OPINION OF THE ENGINEER THE VALVE IS ON A SLOPE AND/OR THE COVER ON THE PIPE WOULD APPLY UPWARD THRUST, THEN THRUST BLOCKING WILL BE REQUIRED.*

HYDROSTATIC TESTING

ALL WATER MAIN INSTALLATIONS SHALL BE INSPECTED AND APPROVED BY NORTHWEST WATER SYSTEMS, INC. NO NEW PIPE OR PIPE EXTENSIONS SHALL BE PUT INTO SERVICE OR CONNECTED TO AN EXISTING WATER SYSTEM WITHOUT A STATE DEPARTMENT OF HEALTH APPROVED BACKFLOW PREVENTER INSTALLED IN THE CONNECTING LINE.

ALL WATER MAIN AND EQUIPMENT INSTALLATIONS SHALL BE HYDROSTATIC AND LEAK TESTED. SUCH TESTING SHALL BE WITNESSED BY NORTHWEST WATER SYSTEMS, INC. ALL WATER MAIN JOINTS MUST BE EXPOSED TO VIEW AND BACKFILL MATERIAL MUST BE ON-SITE AT THE TIME OF THE TEST. ALL THRUST BLOCKING, IF REQUIRED, SHALL BE POURED-IN-PLACE OF TYPE 1 PORTLAND CEMENT. BLOCKING SHALL CURE AT LEAST SEVEN DAYS BEFORE TESTING. THE PRESSURE GAUGE USED IN THE PERFORMANCE OF SUCH TESTS SHALL HAVE MINIMUM DIVISIONS OF 5 PSI.

THE MAINS SHALL BE FILLED SLOWLY (NOT MORE THAN 2 FPS WATER VELOCITY IF USING 50PPM CHLORINATED WATER, 1FPS IF POWDERED CHLORINE WAS ADDED TO EACH PIPE) AND TRAPPED AIR COMPLETELY VENTED THROUGH AIR VENTS OR SERVICES.

AFTER COMPLETELY FILLING THE PIPE WITH WATER IT SHALL BE SUBJECTED TO A HYDROSTATIC TEST PROCEDURE AS FOLLOWS:

FOR PVC AND DUCTILE IRON PIPE TEST PRESSURE SHALL BE 200 PSI, UNLESS THE ENGINEER DETERMINES BASED ON SITE CONDITIONS THAT A LOWER PRESSURE IS APPROPRIATE. PRESSURE SHALL NOT IN ANY CASE BE LESS THAN 150% OF THE WORKING PRESSURE AT THE LOWEST ELEVATION POINT OF THE SEGMENT TESTED. COMPONENTS NOT COMPATIBLE WITH THE TEST OVERPRESSURE (PRESSURE RELIEF VALVES, HYDROPNEUMATIC TANKS, ETC.) MAY BE ISOLATED FROM THE SECTION UNDER TEST. THE TEST PRESSURE SHALL BE APPLIED BY PUMPING AND THE PRESSURE MAINTAINED FOR TWO HOURS. PRESSURE LOSS MAY NOT EXCEED 5 PSI ONCE THE PIPE HAS BEEN FILLED WITH WATER AND AIR EXPELLED; ADDITIONAL PUMPING MAY BE PERFORMED AS REQUIRED TO MAINTAIN THE TEST PRESSURE. LEAKAGE IS DEFINED BY THE VOLUME OF WATER REQUIRED TO MAINTAIN PRESSURE. ALLOWABLE LEAKAGE CAN BE CALCULATED PER AWWA C600-93 AS:

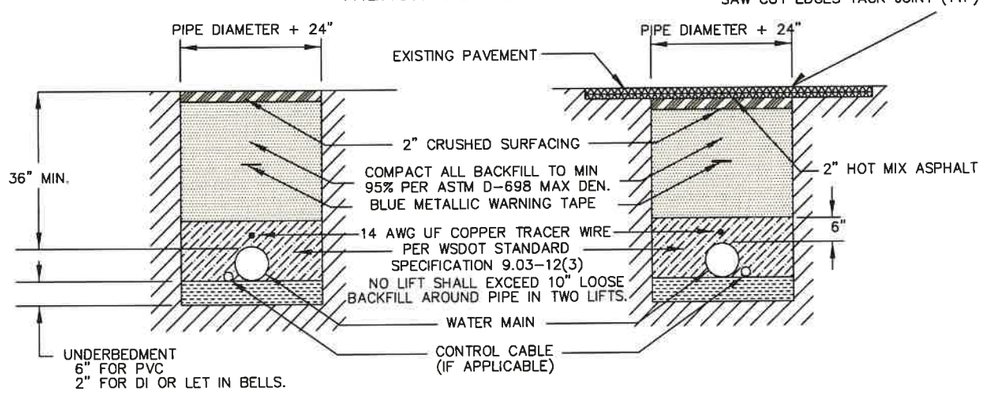
$$L=S*D*[SQRT(P)] / 133,200$$

WHERE L IS THE ALLOWABLE LEAKAGE IN GALLONS PER HOUR, S IS THE LENGTH OF PIPE IN FEET, D IS THE NOMINAL DIAMETER OF THE PIPE IN INCHES, AND P IS THE AVERAGE TEST PRESSURE (PSI).

FOR HDPE PIPING, THE MODIFIED PRESSURE REBOUND METHOD SHALL BE USED PER ASTM F2164. HDPE SHALL BE TESTED AT THE LESSER OF 150% OF DESIGN WORKING PRESSURE, OR THE PRESSURE RATING OF THE LOWEST PRESSURE RATED COMPONENT EXPOSED TO TEST PRESSURE. THE TEST SECTION SHALL BE PRESSURIZED FOR 2 HOURS TO ALLOW FOR EXPANSION; PRESSURE SHALL THEN BE REDUCED BY 10 PSI AND OBSERVED FOR 1 HOUR; SUCCESSFUL TESTING REQUIRES LESS THAN 5% VARIATION IN PRESSURE. HDPE SHALL NOT BE SUBJECT TO PRESSURES ABOVE DESIGN PRESSURE FOR MORE THAN 8 CONTINUOUS HOURS; AFTER DEPRESSURIZING, A MINIMUM 8 HOURS SHALL BE ALLOWED FOR RELAXATION PRIOR TO RETESTING.

DURING THE TEST, THE SECTION BEING TESTED SHALL BE INSPECTED FOR LEAKAGE. NO WATER SYSTEM FACILITY SHALL BE PLACED IN SERVICE WITHOUT A PROPER CERTIFICATE OF COMPLETION EXECUTED BY THE DESIGNER.

TRENCH DETAIL



UNPAVED INSTALLATION PAVED INSTALLATION

WATER MAINS SHALL BE NSF61 CERTIFIED. WATER MAINS LESS THAN 4-IN NOMINAL DIAMETER SHALL BE SCHED. 40 PVC OR BETTER;
WATER MAINS 4-IN NOMINAL DIAMETER AND GREATER SHALL BE DR18 C900 PVC OR BETTER.
IT IS REQUIRED FOR THE CONTRACTOR TO CALL FOR UTILITY LOCATES BEFORE DIGGING, PER RCW. TRACER WIRE SHALL BE TAPED TO WATER MAIN.
DISTRIBUTION SYSTEM SHALL BE DISINFECTED PRIOR TO PLACING IN SERVICE
DISTRIBUTION SYSTEM SHALL BE PRESSURE TESTED IAW DESIGNER'S SPECIFICATIONS PRIOR TO BACKFILLING
ANY TRENCH OVER 4' IN DEPTH SHALL HAVE CAVE IN PROTECTION AS REQUIRED IN CHAPTER 49.17 RCW

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

NOTES:
1. BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTING SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.
2. ANCHOR REBAR SHALL BE #5 ON 12" DIA. AND LESS WITH 30" IMBEDMENT, #5 ON 16"-24" DIAMETER WITH 36" IMBEDMENT
3. PLUGS TO BE MINIMUM OF 5' FROM TEE, WYE, CROSS ON VALVE.
4. TO DETERMINE THE BEARING AREA OF THE THRUST BOCK 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
5. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS
6. BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

WATER MAIN DISINFECTION

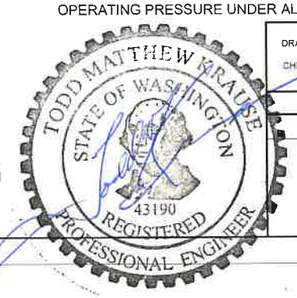
DISINFECTION OF THE WATER MAINS SHALL BE ACCOMPLISHED BY THE SYSTEM INSTALLER IN ACCORDANCE WITH THE REQUIREMENTS OF THE HEALTH DISTRICT, AWWA C651.

DURING CONSTRUCTION, CALCIUM HYPOCHLORITE GRANULES SHALL BE PLACED AT THE UPSTREAM END OF EACH LENGTH OF PIPE LAID SUCH THAT, UPON FILLING THE MAIN , THE INITIAL CONCENTRATION OF CHLORINE WILL BE 50 MG/L. THIS EQUATES TO 1/4 TEASPOON OF 65% HIGH TEST CALCIUM HYPOCHLORITE PER 20 FT OF 2" PIPE, 1 TEASPOON/20FT OF 4" PIPE, 2 TEASPOONS/20FT OF 6" PIPE, AND 4 TEASPOONS/20FT OF 8" PIPE.

WHEN INSTALLATION IS COMPLETE, THE MAINS SHALL BE FILLED SLOWLY WITH WATER SUCH THAT THE MAXIMUM VELOCITY OF FLOW SHALL BE LESS THAN 1 FPS. ALL AIR POCKETS SHALL BE BLED FROM THE SYSTEM DURING THE FILLING PROCESS, AND ALL VALVES SHALL BE OPERATED. FOLLOWING A 24-HOUR SOAKING PERIOD, THE SYSTEM SHALL BE FLUSHED UNTIL NO TRACE OF CHLORINE REMAINS.CHLORINATED WATER SHALL NOT BE DISCHARGED WHERE IT CAN CONVEY TO SURFACE WATERS.

ALTERNATIVELY, PROVISIONS MAY BE MADE IN THE CONSTRUCTION OF THE SYSTEM TO ALLOW FOR EFFICIENT INTRODUCTION OF CHLORINE INTO THE MAINS FOLLOWING CONSTRUCTION TO A CONCENTRATION OF 50 MG/L.

A REPRESENTATIVE OF NORTHWEST WATER SYSTEMS, INC. MUST BE ON-SITE DURING THE INITIAL FLUSHING OF THE SYSTEM AND DURING THE FLUSHING OF THE MAINS AFTER THE SOAKING PERIOD. FOLLOWING THE FLUSHING, A BACTERIOLOGICAL SAMPLE WILL BE TAKEN AND SUBMITTED FOR TESTING. THE SYSTEM MUST PASS BACTERIOLOGICAL TESTING BEFORE IT CAN BE PLACED INTO SERVICE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT NORTHWEST WATER SYSTEMS, INC. 24 HOURS PRIOR TO INITIAL FILLING OF THE SYSTEM.



DRAWN BY:
CHECKED BY:

REVISION	
DESCRIPTION	DATE

SYSTEM: WOLF CREEK PROPERTY OWNERS ASSN
OWNER: WOLF CREEK PROPERTY OWNERS ASSN
FILE NO: 250912
FILE NAME: DETAIL DRAWINGS
SHEET NO: 38
DATE: JULY 1, 2026
SCALE: NO SCALE

NORTHWEST WATER SYSTEMS, INC.
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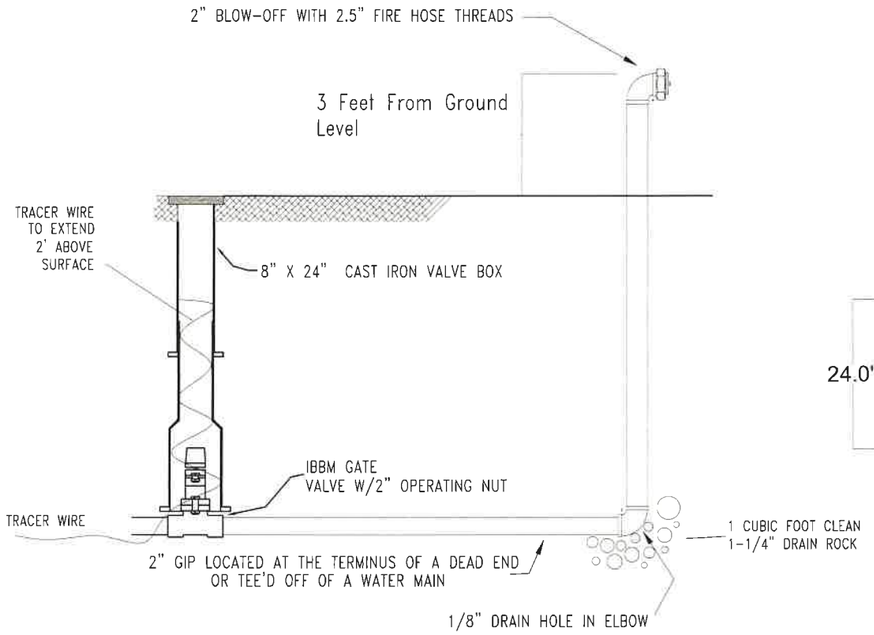
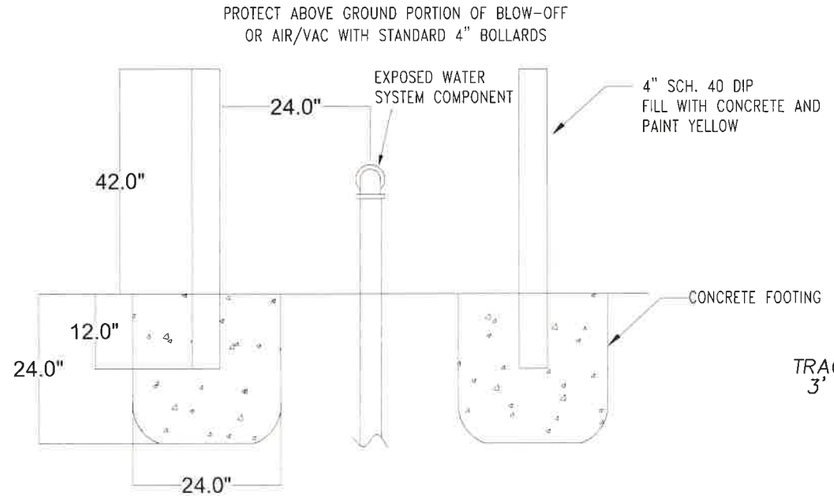
(360) 876-0958

2" BLOWOFF DETAIL

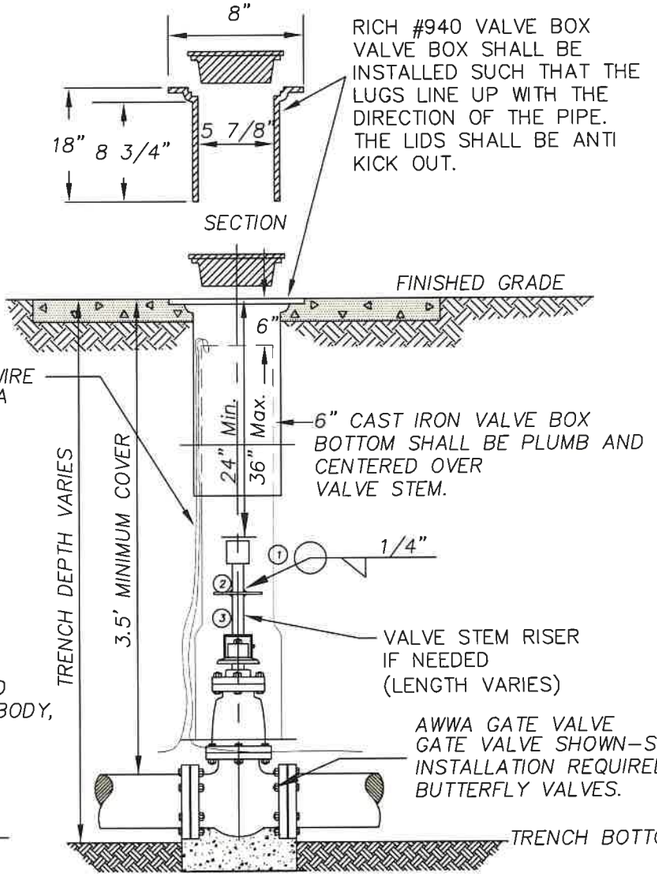


MAINGUARD MODEL #77 (PREFERED) MAY BE SUBSTITUTED FOR THE ABOVE SHOWN SCHEMATIC

BOLLARD PLACEMENT DETAIL



GATE VALVE DETAIL



NOTE:

ALL VALVES SHALL HAVE 14 GAUGE COATED COPPER TRACER WIRE TIED OFF AT VALVE BODY, EXTENDING TO THREE FEET ABOVE TOP OF VALVE BOX BOTTOM BETWEEN VALVE BOX BOTTOM AND VALVE BOX LID.

VALVE STEM EXTENSION LEGEND

① VALVE OPERATING NUT OR 1 7/8" X 1 7/8" X 2" HIGH GRADE STEEL WELDED TO GUIDE PLATE.

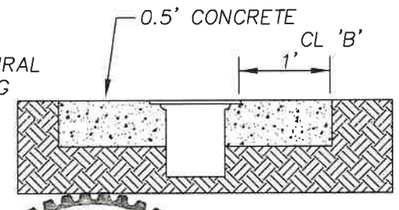
② 3/16" THICK X 5 1/5" DIA STEEL GUIDE PLATE WELDED TO RISER SHAFT.

③ 2"X2"X 3/16" SQUARE STRUCTURAL STEEL TUBING TO FIT OPERATING NUT. LENGTH AS REQUIRED.

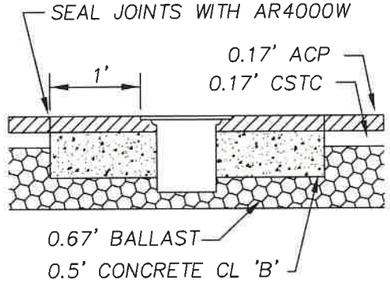
NOTE:

WELD ALL AROUND, AS SPECIFIED ABOVE

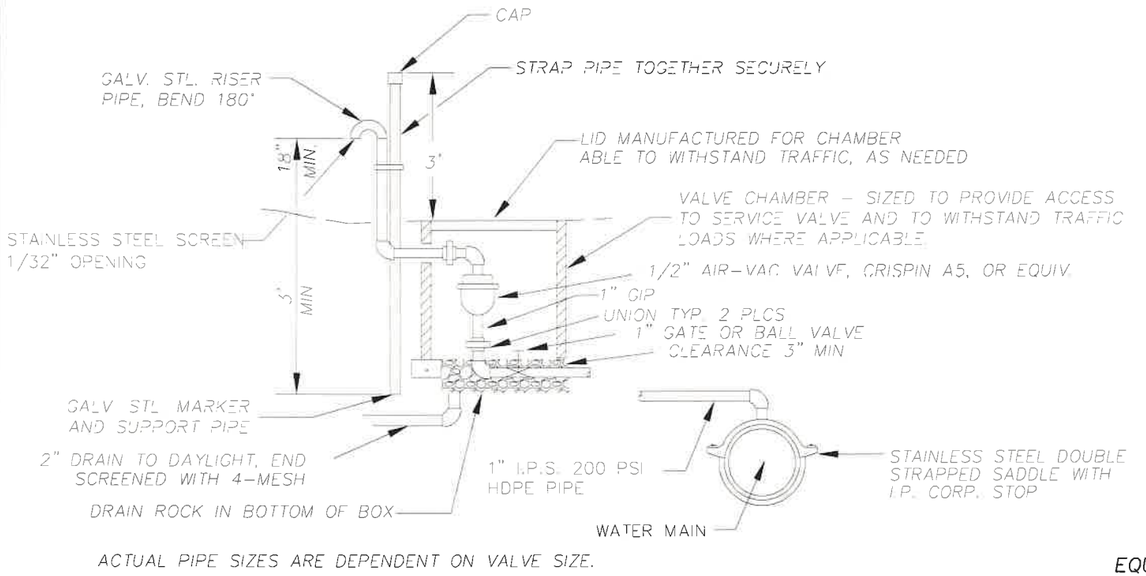
OUTSIDE PAVED AREA



INSIDE PAVED ROADWAY



AIR/VAC DETAIL



ACTUAL PIPE SIZES ARE DEPENDENT ON VALVE SIZE.

BOTTOM OF VAULT SHALL BE FILLED WITH MIN. 4" OF 1.25" DRAIN ROCK

VAULT SHALL BE DRAINED TO DAYLIGHT IF VAULT FLOODING IS A CONCERN. DRAINS SHALL BE DAYLIGHTED AND SCEENED.

EQUIVALENT MATERIALS AND EQUIPMENT MAY BE SUBSTITUTED WITH ENGINEER'S APPROVAL

TODD MATTHEW KRAUSE STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

DRAWN BY		SYSTEM WOLF CREEK PROPERTY OWNERS ASSN	OWNER WOLF CREEK PROPERTY OWNERS ASSN
CHECKED BY		FILE NO 250912	FILE NAME DETAIL DRAWINGS	SHEET NO 39
41140	REVISION	DATE JULY 1, 2026	SCALE NO SCALE
DATE			

NORTHWEST WATER SYSTEMS, INC.
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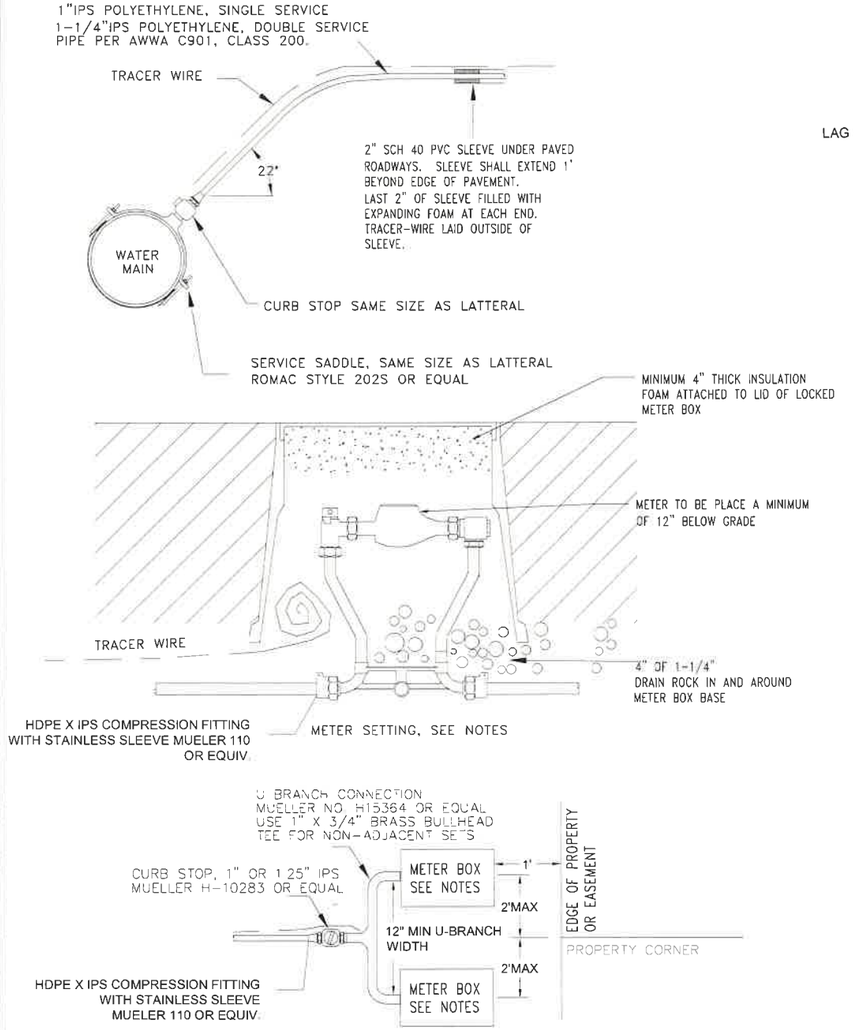
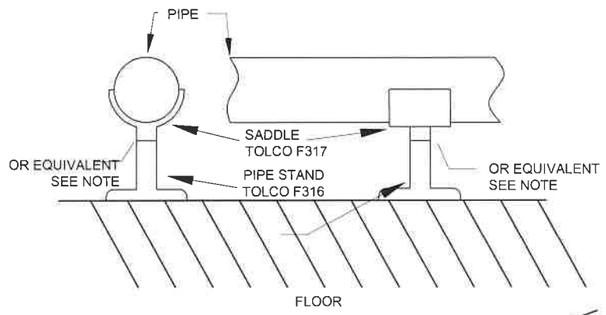
P.O. BOX 123
PORT ORCHARD, WA 98366
(360) 876-0958

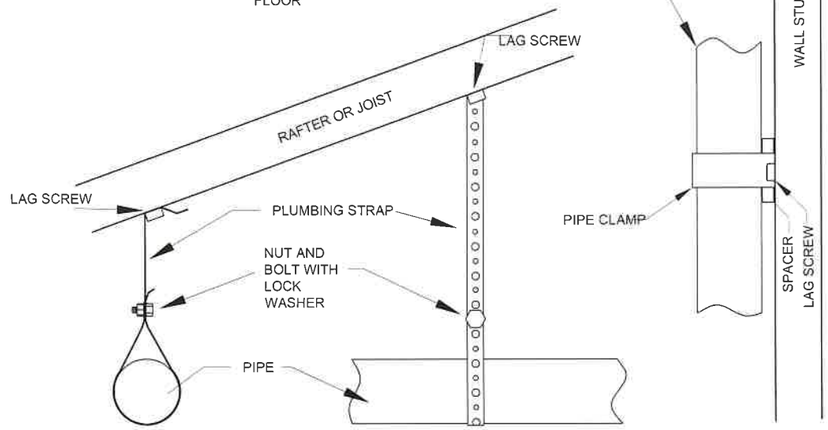
METER CONNECTION DETAIL

1. METER CONFORMING TO AWWA C700, FROST PROOF MODEL WITH MAGNETICALLY DRIVEN REGISTER & STRAIGHT READING REGISTERS MEASURING IN CU. FT. BADGER M25 OR EQUAL.
2. METER SETTING - 12" COPPER METER SETTER INCLUDING METER VALVE WITH LOCKWING AND OUTLET CHECK VALVE. MUELLER OR EQUAL.
3. METER BOX - PARKING STRIP INSTALLATION PRECAST CONCRETE AND STEEL LID, FOG TITE METER SEAL CO 1D OR EQUAL.
4. METER BOX - OFF ROAD INSTALLATION
PLASTIC BOX WITH READER LID COVER, CARSON 1419-15 OR EQUAL.
5. INSTALL METER IN EASEMENT RIGHT OF WAY ADJACENT TO PROPERTY LINE.
6. SET METER HORIZONTALLY IN BOTH AXES WITH METER PORTS MINIMUM 12" BELOW GRADE.
7. SET METER BOX WITH LID AT GRADE (IN TRAFFIC) OR 2" ABOVE GRADE (NON-TRAFFIC) LEVEL AND READER PORT CENTERED OVER METER DIAL.
8. INSTALL COPPER TRACER WIRE IN TRENCH BESIDE POLYETHYLENE PIPE. PROVIDE 36" EXCESS LENGTH ON METER BOX. ELECTRICALLY BOND THE END OF TRACER WIRE TO MAIN LINE TRACER WIRE USING SPLIT NUT CONNECTION.
9. INSTALL PRESSURE REGULATOR WHERE PRESSURE EXCEEDS 80 PSI (RECOMMENDED) AND 100 PSI (REQUIRED). $\frac{3}{4}$" WILKENS 705C OR EQUAL.
10. SCHD 80 PVC TEE MAY BE SUBSTITUTED FOR SADDLE ON 2" WATER MAIN.
11. ALL EQUIPMENT SHALL CONFORM TO THE REDUCTION OF LEAD IN DRINKING WATER ACT



ANCHORING DETAILS





NOTES:

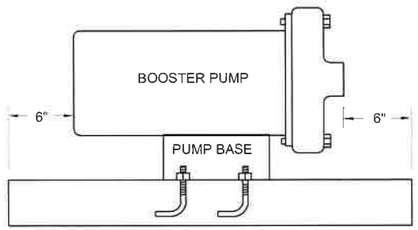
PIPE SUPPORTS SHALL BE SPACED AT A MINIMUM OF EVERY FOUR FEET

BOOSTER PUMPS AND CHEMICAL FEED PUMPS SHALL BE SECURED USING MASONARY OR WOOD LAGS AS APPROPRIATE AND PUMP BRACKETS SUPPLIED BY THE MANUFACTURER

ALL PIPE SUPPORTS SHALL SUPPORT THE WEIGHT OF THE PIPE AND WATER. SUPPORTS SHALL BE CONFIGURED IN SUCH A WAY AS TO PROTECT THE PIPES FROM PHYSICAL DAMAGE.

ALL SUPPORTS SHALL BE CONSTRUCTED OF MATERIAL THAT RESISTS CORROSION.

EQUIVALENT SUPPORTS (MASONARY BLOCKS, PIPE RACKS, COMPRESSION CLAMPS, U-CHANNEL, ETC.) MAY BE USED AS SUPPORTS AND ANCHORS AS LONG AS THEY FOLLOW GENERALLY ACCEPTED INDUSTRY STANDARDS AND WSDOH GUIDELINES.

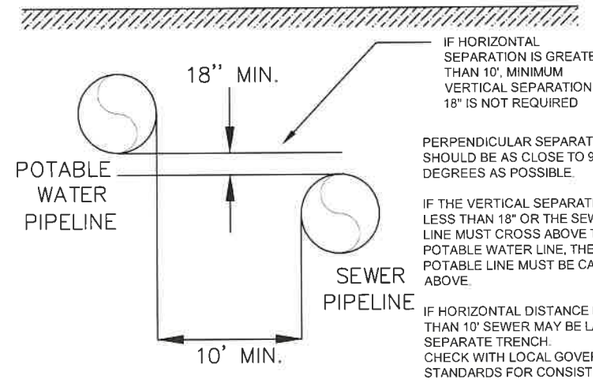


POURED CONCRETE BASE WITH 1/2"-ANCHOR BOLTS (4 MINIMUM). BASE HEIGHT 3.5" EXTENDING A MINIMUM OF 6" PAST LENGTH AND WIDTH OF PUMP

DRILLED HOLES AND CONCRETE ANCHOR LAGS INSTALLED INTO PUMPHOUSE FLOOR MAY BE SUBSTITUTED FOR CONCRETE BASE

SEWER CROSSING DETAIL

PARALLEL SEPARATION



IF HORIZONTAL SEPARATION IS GREATER THAN 10', MINIMUM VERTICAL SEPARATION OF 18" IS NOT REQUIRED

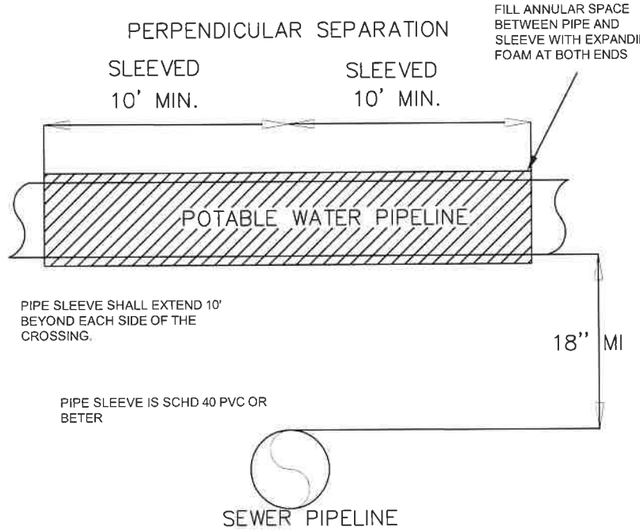
PERPENDICULAR SEPARATION SHOULD BE AS CLOSE TO 90 DEGREES AS POSSIBLE.

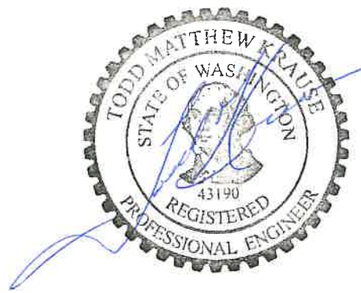
IF THE VERTICAL SEPARATION IS LESS THAN 18" OR THE SEWER LINE MUST CROSS ABOVE THE POTABLE WATER LINE, THE POTABLE LINE MUST BE CASED AS ABOVE.

IF HORIZONTAL DISTANCE IS LESS THAN 10' SEWER MAY BE LAID IN SEPARATE TRENCH.
CHECK WITH LOCAL GOVERNMENT STANDARDS FOR CONSISTENCY

IF OUTSIDE CONFIGURATION AS SHOWN, CONTACT ENGINEER FOR APPROVAL.

PERPENDICULAR SEPARATION





DRAWN BY	
CHECKED BY	
REVISION	
DESCRIPTION	DATE

SYSTEM	WOLF CREEK PROPERTY OWNERS ASSN
OWNER	WOLF CREEK PROPERTY OWNERS ASSN
FILE NO	250912
FILE NAME	DETAIL DRAWINGS
SHEET NO	40
DATE	JULY 1, 2026
SCALE	NO SCALE

NORTHWEST WATER SYSTEMS, INC.
DESIGN - CONSULTING - MANAGEMENT
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