

# CITY OF PRINEVILLE STANDARDS & SPECIFICATIONS

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# Chapter I

## DEVELOPMENT PROVISIONS

### 01 INTRODUCTION

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This document is intended to set minimum standards for public work improvements within the Urban Growth Boundary of the City of Prineville.

City of Prineville Standards and Specifications will be incorporated in and made a part of any contract for the design or construction of a municipal project. The portions of this specification relating to design, materials and workmanship shall be adhered to for private developments where improvements will become part of municipally owned systems. These Standards and Specifications will be updated periodically and as such, all persons should ensure they are working with the current set of Standards and Specifications.

Minimum general standards shall be set forth in the current *Oregon Standard Specifications for Construction*. The following provisions are minimum construction standards for the City of Prineville and are intended as a supplement to the APWA and ODOT standards.

Where the term Design Engineer occurs in this document, it shall mean a private engineering firm retained by the Owner to provide design, construction management or some other service necessary for the construction of the proposed public facility.

### 02 RULES

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No construction or project that requires City inspection shall commence until the appropriate agreements have been signed, construction plans approved, preconstruction conference held and all associated fees have been paid and all payment and performance bonds and insurance certificates have been delivered.

The Owner or agent will be responsible for any faulty material and workmanship for one year from the date of the formal acceptance of the sewer, street or water installation. Said acceptance shall be in writing.

The Owner or agent shall comply with all terms and conditions of applicable governmental rules and regulations pertaining to the work.

The design and construction of all proposed facilities shall be in conformance with the City of Prineville Standards and Specifications

Workmanship and materials not meeting these specifications will be deemed a violation of the agreement and may result in an immediate suspension of the Contractor's activities. When an authorized representative of the City Engineer suspends the Contractor's activities, all work shall cease on the subject project until the violation is corrected.

### **03 TO AND THROUGH REQUIREMENT**

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Streets and City utilities shall be extended for the full length of property frontage being developed. This requirement shall be fulfilled unless it is not practical to extend a street or utility because of topography or being adjacent to a boundary prohibiting development (e.g. UGB, public lands, etc.) as determined by the City Engineer at their sole discretion.

### **04 PLANS AND SPECIFICATIONS**

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#### **GENERAL**

Plans and specifications for sewer, street (including alleys) or water facilities must be submitted by the person or firm requiring the work to the City of Prineville Engineering Division for approval before construction is started. The Contractor shall not start work until they have plans signed and approved by the City Engineer and Public Works Superintendent. A copy of any construction requirements or development conditions levied by any public agency, such as City of Prineville Planning Department Staff Reports, shall be attached to plans submitted for review. Without the above submittal, the Engineering Division will be unable to adequately review the plans.

The final plan is to be submitted by the Owner or their Design Engineer to the City of Prineville Engineering Division for approval. The final design shall be prepared, stamped and signed by a Registered Professional Engineer licensed in the State of Oregon.

#### **REVIEW PLAN**

Three copies of the plan showing the proposed facilities shall be submitted to the City of Prineville Engineering Division for review. One copy of the preliminary plan will be returned indicating any modifications required.

Any final design for developments requiring postal delivery service shall, at time of submittal, have on the cover sheet the signature of an appropriate official of the United States Postal Service indicating that the design is approved by the United States Postal Service. A copy of the signed and negotiated Mode of Postal Delivery form shall be attached to the final plan.

Any final plan having fire hydrants or facilities for the suppression of fires shall, at time of submittal, have on the cover sheet the signature of an appropriate official of the Crook County Fire and Rescue indicating that the design is approved by the Crook County Fire and Rescue.

**Plans requiring approved fire flows determined by Crook County Fire and Rescue or Land Use action will not be accepted for review unless documentation verifying compliance is attached to the submittal.** Re-submitted plans shall be accompanied by any and all Department comments to facilitate review.

A water and sewer analysis shall be required for all developments consisting of 20 equivalent dwelling units (edus) or larger or, developments requiring fire flows of 1,500 gpm or greater. A traffic study is required if the development consists of 20 or more lots or it is estimated to have 20 or more PM peak trips.

For plans that contain improvements that are not covered under any City of Prineville review exemption agreement, the developer will be responsible to submit drawings and required fees to Health Division of Oregon DHS (for water facilities) and/or to Oregon Department of Environmental Quality (for sewer facilities and NPDES stormwater discharge/mass grading), and/or any other agency having jurisdiction over the proposed work for review and approval prior to the issuance of a notice to proceed from the City of Prineville.

#### **FINAL PLAN**

Once all revisions have been made to the Review Plan and accepted by the Engineering Division, the final (mylar) plan is to be submitted for signatures. No changes will be made by the City to the mylar reproducible copy stamped by the Design Engineer. The City Engineer signature indicates that the design is approved. Other affected agencies/persons indicate their approval by signature, such as, but not limited to, the United States Postal Service, Crook County Fire and Rescue, Ochoco Irrigation District and Crook County Road Department. The final signatory is the Public Works Superintendent which indicates that all fees have been paid. The owner or their Design Engineer shall provide one complete set of Mylar reproducible (or equal) drawings and six blueprint or bond copies of the drawings. Cloudy, dark or otherwise illegible drawings are not acceptable. The information (minus standard details and title block) shall also be submitted in AutoCAD format (compatible with version 2008 on compact disk)

Final plan approval is effective for the duration of the associated land use approval period and/or improvement agreement schedule of work. Extension of final plan approval may be granted at the discretion of the City Engineer and will be subject to fee retainage and adherence to the most current City of Prineville Standards and Specifications and Fee Schedule. However, unless an extension is granted the final plan approval shall be declared void, and the final plans must be resubmitted to the City for review and approval if either of the following occur:

- 1) Construction has not been initiated within eighteen (18) months of the final plan approval date.
- 2) Land use approval and/or improvement agreement expire or are modified prior construction completion or City acceptance.

## **PRE-CONSTRUCTION MEETING**

A pre-construction meeting shall be held after the plans have been approved and before construction can begin. Items to be covered are outlined in Section 12 of the Development Provisions. Following the pre-construction meeting and the completion of all pre-construction and contractual documents, the Engineering Division will issue a "Notice to Proceed". The "Notice to Proceed" is the document which authorizes construction to begin and inspection services to commence.

## **PLAN REVISIONS**

No design changes or revisions to plans signed by the City Engineer shall be considered effective without the following:

1. The City Engineer shall verify and approve the change in writing and in advance of any additional work being performed. For design changes that affect the scope of work, additional engineering fees will be paid and approved plans signed as per Section 4 above. For design changes that do not change the scope of the work, no additional engineering fees shall be paid.  
The plans will be approved and signed by the City Engineer. For changes that do not change the design content, such as changing the location of water or sewer services, these changes may be approved by the Inspector in the field and noted on the As-Built drawings. Changing the location of a fire hydrant changes the design content.
2. Within two working days after City Engineer approval, three bond copies of the revised plans and new Mylar drawings with revisions noted in the Revision Box shall be submitted to the Engineering Division for distribution.
3. Upon completion of the project, the Design Engineer shall submit AutoCAD formatted disks of design changes that required new or substantially altered drawings for approved design changes, with revisions noted in the Revision Box.

## **FINAL PLAT**

A final plat showing complete information shall be submitted to the Community Development Department for routing. Prior to the Public Works Superintendent signing the plat the following conditions must be met; the County Surveyor has signed the plat; improvements to public facilities have been built, bonded or guaranteed per the Development Code; and any fees or assessments for the plat required by the land-use process have been paid.

## **05 AGREEMENTS**

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All agreements shall be signed prior to commencing construction on the associated facility. These agreements are generally prepared by the City's Community Development Department. It is the responsibility of the Owner or their agent to coordinate with the offices to ensure all agreements have been completed prior to start of construction.

## **06 INSURANCE**

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The person or firm doing the work shall maintain Construction Public Liability Insurance during the life of the Contract. The coverage shall be maintained in the amount of the City's tort liability limits set by the Oregon Legislature (ORS 30.270) for bodily injury liability and property damage applying to their own work and that of any subcontractor performing work under this contract.

All contractors performing work on public improvements must be registered with the Construction Contractors Board or licensed with the State Landscape Contractor Board, HB 2043, and Amendment to ORS 279.025 June 11, 1991.

City of Prineville shall be held harmless from any liability of any kind resulting from or in connection with activities connected with the project. City of Prineville shall be named as additional insured and a certificate of insurance with ten day cancellation notice shall be filed with the City of Prineville prior to start of construction.

## **07 EASEMENTS, DEDICATIONS, AND PERMITS**

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When portions of the utility or structure will be located on private property, permanent easements for location, maintenance and operation shall be obtained. Easements shall provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements (including a copy of the easement in relation to the site plan) will be made available to the City for review prior to construction. Easements shall be recorded prior to City acceptance of the public facility. The City accepts no liability for actions of the Contractor not in conformance with written easements.

Current City easement and dedication agreement templates shall be used unless otherwise authorized by the City Attorney, Public Works Director and City Engineer.

All City Easements and dedications conveyed separately from the final plat shall require the following to be submitted to the Engineering Department:

- 1) Exhibit "A" - property/parcel legal description.
- 2) Exhibit "B" - easement map.
- 3) Exhibit "C" - easement legal description.
- 4) Current property title report or equivalent ownership verification.
- 5) Recording fee as established by the City of Prineville Fee Schedule.



All exhibits shall be letter size (8.5x11) and stamped by a registered professional engineer (PE) or land surveyor (PLS) if prepared by the PE or PLS. Copies of these easements (including a copy of the easement in relation to the site plan) will be made available to the City for review prior to construction. Easements shall be recorded prior to City Engineer's acceptance of the public facility. Easements that impact property located beyond an established or approved development boundary, plat or site plan shall be recorded prior to construction. Easements for public facilities identified in City Transportation, Water or Wastewater System Plans shall be recorded prior to construction unless otherwise approved by the City Engineer.

Any required outside agency Permits shall be obtained by the developer/owner, and copies of said permits shall be provided to the City of Prineville prior to any construction activities.

## **08 PERFORMANCE AND PAYMENT BOND**

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**Public Contracts:** ORS 279C.380 If the contract is for a publicly bid improvement, the successful bidder shall execute and deliver to the City of Prineville a good and sufficient bond, to be approved by the City, in a sum equal to the contract amount for the faithful performance of the contract. In lieu of a surety bond, the City may permit the Contractor to submit a cashier's check or certified check payable to the City of Prineville in an amount equal to one hundred (100) percent of the contract amount.

**Private Contracts:** A performance bond or surety, cash deposit or other approved security shall be provided by the Developer as project security for all work proposed in existing public right-of-way, or upon existing City facilities. The approved project security shall be in the amount of one hundred twenty (120) percent of the estimated public improvement cost. The performance bond/surety shall be submitted with the current City approved performance bond form. A City approved improvement agreement that specifies construction schedule and completion date shall accompany said performance bond.

## **09 WARRANTY**

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Prior to acceptance of the construction by the City of Prineville Engineering Division, a minimum one (1) year warranty bond on materials and workmanship shall be executed between the City of Prineville and the Developer.

The warranty shall be comprised of a bond or other approved security in a minimum value of 12% of the original improvement construction costs.

## **10 PUBLIC NOTIFICATION**

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Any construction activity that impedes or interrupts any existing public service shall require that the public be notified of that interruption at least 24 hours prior to such impediment or interruption. Each notification shall be the responsibility of the Contractor performing the work for the Owner and shall be coordinated with the Engineering Division to ensure adequate notification. Failure to adequately notify the public may result in an immediate suspension of the contractor's activities.

## **11 INTERGOVERNMENTAL JURISDICTION**

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Public improvements often times fall within the jurisdiction of several governmental agencies, i.e., Crook County and Ochoco Irrigation District and Oregon Dept of Transportation.

When multiple jurisdictions are involved, it is the responsibility of the Developer or agent to coordinate with and gain the appropriate approval from the appropriate governmental agency.

It shall be the responsibility of the construction contractor to verify said approval with agencies prior to commencing work. Failure to verify said approval may result in the total project work being suspended until approval is issued.

## **12 PRE-CONSTRUCTION MEETING**

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A pre-construction meeting shall be held following construction drawing approval and prior to 'Notice to Proceed' for construction. Before the meeting can be held, agreements must be signed and the Engineering Division must have Mylar reproducible of the signed construction plans and 3 complete sets of blue-line drawings. Items to be discussed are:

1. Initiating construction
2. Contractor's work schedule in writing
3. Inspector assignment
4. Traffic Control/Public Notification/Sidewalk Closures
5. Subcontractors and suppliers
6. Materials furnished (i.e. type, brand, etc.)
7. Safety requirements
8. Sampling and testing program
9. Project Closeout
10. Insurance
11. Easements
12. Notifying Emergency Services
13. Building Permits
14. Procedure for changes
15. Sidewalk construction plan
16. Contract document requirements
17. Notice to proceed.

For plans covering work in areas that will impede traffic flow on established streets, the Contractor shall submit a construction schedule and Traffic Control Plan (TCP) specifically for that work for review by the City. Work which impedes traffic flow shall not proceed until the schedule and TCP is approved by the City.

No inspections shall be performed until a pre-construction meeting has been held with the City of Prineville Engineering Division. At this time, an inspector will be assigned to the project and all communications, changes and field decisions will be coordinated through

this inspector. If the inspector is unaware of the change or field decision, then no change or field decision has occurred and the plans as approved are binding.

## **13 UTILITIES**

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The construction drawing shall show the location of all existing and proposed utilities.

The owner shall provide all Cities maintained facilities associated with the proposed development, including but not limited to sewer and water systems, storm drainage, streets, street and traffic control signs, street lights, bikeways and associated facilities. The owner is responsible for the coordination of this work with any other agencies, individuals and utility companies that may be involved with the construction.

## **14 INSPECTIONS**

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### **GENERAL**

Authorized representatives of the City Engineer will be appointed as inspectors for any or all phases of the work at the expense of the person or firm for whom the work is being done to ensure that the sewer/water facilities installation or street construction will conform to City Standards. Engineering will be provided by the Owner. Contractors may call for the City Engineer or representative to check the work when deemed necessary. The inspections listed below will be established at the Pre-Construction Conference based on individual project requirements.

At that time, the inspections requiring 24 hour notice and approvals before proceeding will be outlined. Listed below the numbered inspections are performance standards that the inspector will observe.

### **ADVANCED NOTIFICATION FOR INSPECTION**

The City will provide periodic, ongoing inspection, however the Contractor shall be responsible to notify the City Engineer's office at least 24 hours in advance of required inspections. The City will not be responsible to conduct inspections without sufficient notice, nor will the City be responsible for any cost incurred because of insufficient notification times.

No inspections will be performed without 24 hour notification. Any work performed without a required inspection will be subject to removal at inspector's discretion.

### **STREET INSPECTION**

#### Traffic Control

- a. Signs and cones are in accordance with MUTCD.

#### Excavation

- a. Construction staking meets requirements.
- b. Construction area cleared and grubbed to mineral soil.
- c. Fill construction and material meets specification.

### Sub grade

- a. All underground utility work is complete, inspected and approved.
- b. All fill and backfill is compacted to 95% of maximum.
- c. Sub grade is within tolerances.
- d. Sub grade is uniform and free from irregularities.

### Curb

- a. Construction staking meets requirements.
- b. Sub grade has been approved.
- c. Drop curb areas have been located.

### Curb Backfill

- a. Construction staking is in place.
- b. Finished curb matches staking.
- c. Curb backfill material meets specification.
- d. Finished surface is level, uniform and free from irregularities.

### Sidewalks

- a. Curb backfill is in place and compacted.
- b. Water meter & meter boxes set to grade per City Specifications.
- c. Fire hydrants set to grade.
- d. Sewer clean outs set to grade.

### Drainage Structures

- a. Inlets are set as designated on the plans or at low point in field.
- b. Inlet grate frame is set to appropriate street grade and slope.
- c. In addition to mechanical compaction, pipe and catch basins backfill shall be proved by water jetting.
- d. Drain cross pipes are inspected per pipe construction requirements. Specifications.
- e. Pond testing (if applicable).
- f. Storm drains shall be pressure tested, flushed and TV'ed as per City sanitary sewer specs.

### Base

- a. Base material meets specification prior to placement.
- b. Sub grade is fine bladed to meet specified crown and curb exposure.
- c. Water valve boxes have been set to sub grade and can be raised to grade.
- d. All water compaction has been completed at least 48 hours previously.
- e. Manhole rings and lids to be raised to grade.

### Paving and AC Patching Preparation

- a. Base rock is tight and free from raveled areas or areas prone to raveling.
- b. Base rock is watered, uniform to grade and slope and free from irregularities.
- c. Water valves boxes are set to the top of the base.
- d. All manholes have been set and grouted to grade for at least 24 hours.
- e. Base has not been contaminated by dirt or other such substances.
- f. Asphalt areas to be matched are cut square, straight and uniform for AC patching.
- g. Tack coat applied to concrete and asphalt surfaces to be matched or overlaid.

### Paving Operation

- a. Paving operation to be closely monitored by City Representatives.
- b. Water valve boxes are set to finish grade.
- c. Manhole lids set to finish grade.
- d. All joints are to be raked and coarse stone removed from the pavement surface.
- e. The uncompacted A.C. shall be set 1/2 inch - 3/4 inch above drainage and manhole structures so that the roller will bridge such structure and no dimpling of the finished mat adjacent to the structure will occur.
- f. There shall be a minimum of at least four (4) passes of the breakdown roller to achieve compaction of the mat.
- g. Finish rolling shall continue until no roller marks remain.
- h. All access devices i.e.: manholes, catch basins, water valves, sewer and manhole lids to be cleaned and accessible and is set to final grade.

## **SANITARY AND STORM SEWER INSPECTION**

### Before Construction

- a. Inspection of material and storage area.
- b. Protection of existing systems.
- c. Assurance of proper traffic control.
- d. Utilities located and marked.
- e. Construction staking meets requirements.

### Subgrade

- a. Subgrade of proposed road established.

### Pipe Trench and Bedding

- a. Inspection immediately prior to pipe installation.
- b. No rock point in pipe zone.
- c. Bedding material is in specification.

### Pipe Installation

- a. Services provided to each lot as shown on plans.
- b. Pipe alignment is true.
- c. Compaction under pipe haunches.
- d. Fittings tight.
- e. Water grade pipe and couplers installed where required.

### Pipe Backfill

- a. Compaction Inspection and testing will be required during backfill operation.

### Manhole Invert

- a. Distance between manholes matches distance on construction plans.
- b. Inspection during base construction to assure compact base.
- c. Required fall between incoming and outflow pipe inverts.
- d. Rough channel has appropriate shape. Sidewalks come to top of uppermost pipe.

### Completed Manhole

- a. Lamp the lines. A "full moon" must be visible on each pipe run. If a full moon is not visible, the Contractor shall choose whether to relay the line or have it televised to prove proper construction. In addition, the Contractor shall prove there is the designed fall from manhole to manhole before proceeding in construction.

- b. All sewers will be televised by the Contractor. Runs showing ponding shall be re-laid.
- c. In addition to standard compaction practice, manhole backfill shall be proved by water jetting.
- d. Barrel not cracked or spalled.
- e. Barrel joint grouted and barrel completely wrapped.
- f. Concrete encasement of external drop manhole.
- g. Invert channel grouted to smooth finish.
- h. Frame in place set to finish grade and grouted.
- i. Vacuum test according to section 470.71 B

#### Sewer Testing

- a. Sewer is flushed, prior to T.V. inspection
- b. All backfill is completed.
- c. Observation during air test.
- d. Observation during deflection test at 92% of i.d. required for both rigid and flexible pipe.
- e. All sewers will be TV inspected. Maximum allowable ponding of water is 1/2 inch.

#### Connection to Live Facilities

- a. Inspection during connection.
- b. No obstructions in line.
- c. Fittings tight.

### **WATER INSPECTION**

#### Before Construction

- a. Inspection of material and storage area. Unless otherwise specified, all pipe shall be domestic class 52 ductile iron pipe or C-900 PVC.
- b. Protection of existing systems.
- c. Assurance of proper traffic control.
- d. Utilities located and marked.
- e. Construction staking meets requirements.

#### Sub grade

- a. Sub grade of proposed road established with adequate control.

#### Pipe Trench and Bedding

- a. Inspection immediately prior to pipe installation.
- b. No rock point in pipe zone.
- c. Bedding material is in specification.

#### Pipe Installation

- a. Pipe alignment is true.
- b. Fittings tight.
- c. Ductile iron required or C-900 PVC.

#### Service Installation

- a. Services complete and provided to each lot as shown on plans.
- b. Services set to finish grade per City of Prineville Standard Specifications.
- c. Power, telephone and television lines require a minimum ten (10) foot separation.

#### Fitting Location and Installation

- a. Fittings torqued to specification.
- b. Fittings witnessed for As Built before covered up.

#### Preparation and Pouring of Thrust Blocks

- a. Inspection of forms before pouring.
- b. Forms placed at appropriate positions so blocks will be against undisturbed earth.

#### Pipe Backfill

- a. Compaction Inspection and testing will be required during backfill operation.
- b. Backfill is in 8 inch (loose) lifts

#### Connection to Live Facilities

- a. Inspection during hot tap.
- b. No obstructions in line.
- c. Fittings and taps are tight and set plumb.

#### Setting of Valve Boxes

- a. Plumb, centered over nut and bottom flange not resting on pipe.

#### Pressure Testing

- a. Testing completed according to testing procedure. (See Water Facilities Field Testing 1140.51 Hydrostatic Testing and 1140.52 Disinfecting)

#### Chlorination Testing and Flushing

- a. Thrust blocks have cured for five days minimum.
- b. Completed according to testing procedure. (See Water Facilities Field Testing 1140.51 Hydrostatic Testing and 1140.52 Disinfecting)
- c. Tracing wire to be tested after pressure testing completed.

#### Flow Testing

- a. Services checked, flow measured and noted.
- b. Hydrants checked, flow measured and pressures noted.

### **STRUCTURES**

#### Before Construction

- a. Inspection of material and storage area.
- b. Protection of existing systems.
- c. Assurance of proper traffic control.
- d. Utilities located and marked.
- e. Construction staking meets requirements.
- f. Building permits if applicable.

#### Excavation

- a. Excavation sufficient for structure.
- b. Bedding adequate and compacted.

#### Foundation

- a. Steel placed in accordance with plans and specifications.
- b. Form work in accordance with plans and specifications.

#### Form Work & Reinforcement

- a. Steel placed in accordance with plans and specifications.
- b. Form work in accordance with plans and specifications.

#### Concrete Pour

- a. Air and soil temperature requirements met.
- b. Concrete placed within 90 minutes of mixing.

- c. Interval between batches not to exceed 20 minutes.
- d. Testing as required.
- e. Continuous pour or cold joints as specified.
- f. Mechanical vibration of concrete.
- g. Laitance removed.
- h. Cure applied to exposed surfaces.
- i. Work protected from elements.

#### Form Removal & Concrete Finish

- a. Forms in place for required time.
- b. Wire and snap ties removed as per specifications.
- c. Open or honeycombed areas cut out and grouted.
- d. Surface finished per specifications.

#### Backfill

- a. Compaction Inspection and testing will be required during backfill operation.

### **SUBDIVISION/SITE GRADING AND EROSION CONTROL**

#### **i) Grading**

- (1) Site graded to maintain or contain run off within development boundary and per approved plan and/or 1200-C permit requirements.
- (2) Drainage facilities staked and constructed per approved design.
- (3) All earth fill areas located outside of public right-of-way require certification by a licensed Registered Professional Engineer.
- (4) Measures in place to prevent soil from washing off site, into storm facilities or irrigation canals.

#### **1) Drainage Facilities**

- a) Inlets, grates, and drain pipes are set to appropriate grade and slope as designated on the plans or at low points staked in field.
- b) Sedimentation manholes are installed with correct fittings in accordance with City and DEQ standards and specifications.
- c) Storm drainage facilities constructed per approved design (location, geometry, slope, soil depth, filtering, surfacing, etc.).
- d) Storm drainage facility performance tests in accordance with City Standards and Specifications.
- e) Drain pipes crossing public right-of-way are inspected per City Standards and Specifications for material, construction and grouting.
- f) Temporary drainage and erosion control measures in place and operational per plan.

## **15 CONSTRUCTION STAKING**

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See Chapter III- General Conditions, Section 150.15 CONSTRUCTION STAKES, LINES AND GRADES



## **16 MATERIALS**

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Materials shall conform to the City of Prineville Standard Specifications.

## **17 WATERING**

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Watering shall conform to Section 340 in Standard Specifications.

Watering shall be performed at any hour of the day and on any day of the week that the City Engineer or authorized designee may determine necessary for proper performance or protection of the work and for adequate alleviation of dust nuisance.

The Owner is responsible for the cost of watering. If the Owner is unable or unwilling the City will water and charge the Owner.

### **TEMPORARY WATER**

Water is available from hydrants through a bulk water permit from City of Prineville Public Works (541) 447-5627 from October 16<sup>th</sup> to April 14<sup>th</sup> for dust abatement (construction water). Contractor shall make arrangements and pay all costs for obtaining and transporting the water from the hydrants to the area of usage for the construction and testing of the facilities. From April 15<sup>th</sup> to October 15<sup>th</sup> dust abatement (construction water) can be purchased through Ochoco Irrigation District (541) 447-6449.

## **18 WORKMANSHIP**

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### **GENERAL**

The work shall be done by responsible and qualified workers. Should the Inspector deem any worker to be unqualified, said worker shall be immediately replaced by the Contractor.

### **CONTRACTORS RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICES**

The Contractor shall notify the public and local service organizations, i.e. Police, Crook County Fire and Rescue, in advance of any construction activity that may impede their daily activities and functions. For work in areas that will impede traffic flow on established streets, the Contractor shall adhere to the construction schedule required in Development Provisions Section 12, PRE-CONSTRUCTION MEETING. Any paved surfaces removed or damaged to the extent affecting the driving surface by trenching or other activities shall be restored with a hard surface within 48 hours of pavement removal or damage. If the Contractor should, in the opinion of the City Engineer, neglect to prosecute the work properly or in accordance with the approved schedule, then the City of Prineville shall notify the Surety of the condition and after ten (10) days written notice or without notice if an emergency or danger to the public exists and without prejudice to any other right which the City of Prineville may have, take over that portion of the work which has been improperly executed and make good the deficiencies and charge the Contractor for the costs.

At points where the Contractor's operations could cause damage which might result in considerable expense, loss and inconvenience when adjacent to or near railway, telephone, television, power, oil, gas, water irrigation systems or other private or municipal systems, the Contractor's working operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor.

The Contractor shall notify, at least 48 hours in advance, by the one-call number **1-800-332-2344** all utility offices including the City of Prineville which are affected by the construction operation. Under no circumstances shall the Contractor expose any utility without first requesting permission and being granted to do so from the affected agency.

It shall be the Contractor's responsibility, once permission has been granted, to locate if necessary and expose all of the existing underground utilities in advance of the trenching operation.

It shall be the Contractor's responsibility to protect from damage all power and telephone poles. If interfering power poles, telephone poles, guy wires or anchors are encountered, the Contractor shall notify the owner at least 48 hours in advance of construction operations to permit the necessary arrangements with the affected utility company for protection or relocation of the interfering structure. The Contractor shall be solely and directly responsible to the owner and operators of such utilities/properties for any damage, injury, expense, loss or inconvenience, delay, suits, actions or claims of any kind brought because of injuries or damage which may result from the carrying out of the work to be done under the Contract.

In the event of interruption to domestic water or to other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority. Contractor shall cooperate with the said authority in restoration of service as promptly as possible and shall bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is received.

Neither the owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the location of the underground utilities being other than that shown on the plans or for the existence of underground utilities not shown on the plans.

In the event the Contractor encounters any utility service lines that interfere with trenching, Contractor may by obtaining prior approval of the owner and governing authority, cut the service, dig through and cause the service to be restored with similar and equal materials at the Contractor's expense.

### **FIELD RELOCATION**

During the progress of construction, it is expected that minor relocations of the work may be necessary. Such relocations shall be made only by direction of the Design Engineer or representative, with the consensus of the City. Unforeseen obstructions encountered as a result of such relocations will not be subjects for claims for additional compensation by

the Contractor to any greater extent than would have been the case had the obstructions been encountered along the original location.

### **BARRICADES, GUARDS AND SAFETY PROVISIONS**

To protect persons from injury and to avoid property damage, adequate barricades, construction signs, warning lights and guards, as required, shall be placed and maintained during the progress of the work and until it is safe for use.

Rules and regulations of the local State and Federal authorities regarding safety provisions shall be observed. The Contractor will be solely responsible for accidents caused by inadequate or insufficient safety provisions.

### **PAVEMENT REMOVAL AND REPLACEMENT**

All bituminous and concrete pavements shall be cut with a saw or other approved device prior to asphalt patching or concrete replacement, such that the patching material abuts a smooth uniform, vertical face at least twice the depth of the maximum particle size in the patching medium. Uneven pavement edges shall be trimmed smooth before patching the pavement.

The width of the pavement cut for trenching shall be at least 12 inches wider either side than the finished width of the trench at the ground surface. Pavement removed during excavation shall be kept separate from native backfill material and removed from the site. Pavement shall not be used for excavation backfill material.

Where existing paved roadways are cut, trench backfill will be Class B backfill as defined in the City of Prineville Standard Specifications and will be placed as specified. The pavement section will be replaced equal to or better than existing, except that in no case shall it be less than the current standard for that classification of street. Base material must meet current City of Prineville Standard Specifications.

### **OBSTRUCTIONS**

Obstructions to the construction such as tree roots, stumps, abandoned pilings, concrete structures, logs, rubbish and debris of all types shall be removed from the right-of-way without additional compensation from the City.

The City Engineer may, if requested, approve changes in alignment to avoid major obstructions if such alignment changes can be made within the perpetual easement or right-of-way and without adversely affecting the intended function of the facility.

### **INTERFERING STRUCTURES, ROADWAYS OR DRIVEWAYS**

The Contractor shall remove, replace and/or repair any damage done by the Contractor during construction to fences, buildings, billboards, irrigation lines, roadways, landscaping, cultivated fields, drainage crossings, driveways and any other properties at Contractor's own expense without additional compensation from the Owner. The Contractor shall replace these structures in a condition as good as or better than their original condition.

## **BLASTING**

Where material is encountered which requires systematic drilling and blasting for removal, the Contractor shall furnish all necessary approved tools, equipment and materials required to carry out the work. The Contractor shall conform to all Federal, State and local laws that may be imposed to the storage, handling, placement and firing of all explosives.

The Contractor shall furnish all additional insurance coverage as required by the City or any agency, in addition to the basic coverage required by these specifications.

No blasting shall be permitted adjacent to any portion of exposed work or structures unless proper precautions are taken to ensure that damage will not occur. All blasting shall be covered with blasting mats or their approved type of protective cover that will prevent the scattering of rock fragments or other foreign material outside the excavation area. The Contractor shall be responsible for any and all damage or injury resulting from the use or handling of explosives or accidental or premature explosion that may occur in connection with Contractors use of explosives.

An ample warning shall be provided to all persons within the danger zone, together with the stationing of personnel at strategic locations to prevent persons and vehicles unaware of the danger from entering the blasting area. Electrical caps shall not be connected to the electrical source until the area is cleared of all personnel and proper signals given.

## **SHORING AND SHEATHING**

It shall be the sole responsibility of the Contractor to use whatever means necessary to maintain safe working conditions and protect adjacent property and structure from damage due to excavation. The Contractor shall conform to all Federal, State and local regulations governing shoring, sheathing and excavations.

## **LOCATION OF EXCAVATED MATERIALS**

During excavation the Contractor shall locate excavated material so as not to block any public right-of-ways, traveled roadways, public or private and unless otherwise approved by the Engineer and City of Prineville, roadways shall be kept open to two-way traffic. The Contractor shall store or waste excavated materials only in designated areas unless otherwise approved by the Engineer. Utmost care shall be taken to prevent spillage or damage to property adjacent to the project. Appropriate erosion control shall be maintained.

## **SITE RESTORATION AND CLEANUP**

At all times during the work, keep the premises clean and orderly and upon completion of the work, leave the project free of rubbish or excess materials of any kind.

During construction, stockpile the excavated trench materials so as to do the least damage to adjacent lawns, grassed areas, gardens, shrubbery or fences, regardless of whether these are on private property, City, State or County rights-of-way. Remove all excavated materials from grassed and planted areas; and leave these surfaces in a condition

equivalent to their original condition and free from all rocks, gravel, boulders or other foreign material. Replace top soiled areas, raked and graded to conform to their original contours. All existing drainage ditches and culverts shall be reopened and graded and natural drainage restored. Restore culverts broken or damaged to their original condition and location.

Upon completion of pipe laying and backfilling operations in any section, hand rake and drag all former grassed and/or planted areas leaving all disturbed areas free from rocks, gravel, clay or any other foreign material. The finished surface shall conform to the original surface and shall be free draining, free from holes, rough spots or other surface features detrimental to a seeded area.

### **STREET CLEANING**

Clean all spilled dirt, gravel or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation.

## **19 TESTING**

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Testing shall conform to the City of Prineville Standard Specifications and be performed by a certified/independent testing laboratory as approved by City Engineer.

Testing criteria shall meet the requirements as established in each sub-section following. Sewer lines and storm drains shall be air tested pursuant to APWA/ODOT standards by the Contractor. All sewer lines and storm drains shall be TV inspected. Waterlines shall be hydrostatically tested pursuant to AWWA Standards and according to City of Prineville Procedures. Street compaction and asphalt testing shall be in accordance with the current *Oregon Standard Specifications for Construction*.

The City Engineer may require additional testing of any portion of the work performed. When additional testing is required by City Engineer, the City may pay the cost of any passing test. The Contractor shall pay the cost of any non-passing test.

Prior to final acceptance for maintenance, the Developer may be required to provide verification testing of any facility that shows evidence of being stressed beyond design limits or capacity.

## **20 CLEAN-UP**

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Final Sewer Cleaning: Prior to final acceptance and final manhole-to-manhole inspection of the sewer system by the Engineer, flush clean and TV inspect all parts of the system.

Remove all accumulated construction debris, rocks, gravel, sand, silt and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

Upon the Engineer's final manhole-to-manhole inspection of the sewer system, if any foreign matter is still present in the system, re-flush and clean the sections and portions of the lines as required.

## **21 AS-BUILT DRAWINGS**

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All drawings will be prepared by the City Engineer or representative, at the expense of the person or firm for whom the work is being done. Any change which would appear on as-built drawings should be immediately brought to the attention of the Inspector at the time the Contractor or Design Engineer discovers such discrepancy.

The Contractor shall provide a marked up set of construction drawings showing any deviations from the original design. For streets, show revisions to curb, ramp and driveway locations. For sewers, show all changes to main alignment and grade, manhole invert and rim elevations, lateral connection points, slope and cleanout location. For water, show changes to horizontal and vertical alignment, location of fittings, additional fittings, thrust block or restraint changes and revised meter locations. For storm drainage, show all changes to main alignment and grade, pipe size, manhole invert and rim elevations, lateral connection points and slope, catch basin type, location, rim and invert elevation, drywell location and elevation, swale dimensions and any other structure location or elevation.

All street improvements shall require detailed witnesses of all property corners and as-builts of all underground utilities.

All sewer facilities shall require detailed as-builts of overall sewer lines.

All water facilities shall require detailed witnesses of all valves and fittings and as-builts of overall waterlines.

## **22 FINAL ACCEPTANCE**

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Final acceptance, for purposes of these specifications, shall mean the date the City of Prineville formally accepts the public improvements for ownership and maintenance.

This acceptance will follow the Engineering Division's acceptance of construction and will involve the completion of the following items (as applicable):

1. Lien or claim release
2. Easements
3. Right-of-way
4. Recorded Plat or Partition
5. Warranty for materials and workmanship, including warranty bond
6. Verification Performance Tests (if required)
7. Resolution of material and workmanship issues, i.e. final punch list
8. Contractor's as-built plans

9. Electronic copies of approved design changes from Design Engineer.
10. City of Prineville Final Acceptance Form
11. Public Facilities Bill of Sale. The Bill of Sale is used as a mechanism to transfer ownership of a newly constructed public utility and or stormwater system, and appurtenances or street improvements from user to City.

## **23 POLICY ON WAIVER OF SIDEWALK REQUIREMENTS**

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**Code:**

*All new development, subdivisions, partitions, significant changes of use or expansions greater than 25% are generally required to construct sidewalks per Design Review criteria 153.020, subdivision criteria 153.157 , and partition criteria 153.160.*

**Policy to waive sidewalk requirements:**

There are times when a sidewalk may not be appropriate or justified at the time of development of existing lots due to site specific criteria or characteristics of surrounding area. Sidewalks in these areas will not be developed or will be developed by the City through street reconstruction or expansion or other funding mechanisms.

- All new subdivisions shall construct sidewalks regardless of location.
- Existing subdivisions designed and constructed without sidewalks may not require them based on criteria below: Baldwin Industrial Park, Tom McCall Phase I, Industrial Park Way, Murphy Court and Studebaker Dr.
- Partitions and other development shall be subject to the criteria below.

The following criteria shall be considered:

- The property has no connecting sidewalks or sidewalks within the general area.
- There is no foreseeable potential for connectivity in the future.
- The proposed development is such that a sidewalk serves no purpose for the site itself. *(some multifamily developments will require sidewalks regardless of location due to residential activity).*
- The property is along a street that will be subject to expansion or reconstruction in the future.
- The property is not of such a size that construction of sidewalks along its frontage would provide a significant portion of the sidewalks within the area.

# Chapter II

## DESIGN STANDARDS

### 01 GENERAL

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Minimum general specifications for construction shall be as set forth in the current edition of the *Oregon Standard Specifications for Construction (American Public Works Association/Oregon Department of Transportation)*, the *American Association of State Highway and Transportation Officials Geometric Design of Highways and Streets (AASHTO)*, and the *American Water Works Association Standards*.

The following are the minimum design standards for the City of Prineville. The following standards shall be adhered to unless an exception is granted in writing from the City. Exceptions to these standards may be approved by the Public Works Superintendent, upon recommendation of the City Engineer. Exceptions will be based upon a design that is the functional equivalent of the design parameters listed herein.

### 02 DESIGN PARAMETERS

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#### A. STREET

##### 1. GENERAL

Materials and procedures for street improvements shall conform to the City of Prineville Specifications, Ordinances of the City of Prineville and APWA/ODOT *Oregon Standard Specifications for Construction*. Street alignment and placement shall meet the requirements of the City of Prineville ordinances. Street centerline intersections shall be as near right angles as possible except where topography requires a lesser angle, but in no case shall the acute angle be less than 80°, excepting design of facilities in existing rights of way, where that design is approved by the City Engineer.

##### 2. SLOPE

Minimum longitudinal slope for drainage control at the gutter line for all streets is 0.5%. Maximum longitudinal slope shall be limited by roadway classification as follows:

Arterial, Major and Industrial Collectors	6%
Minor Collectors, Industrial Streets	8%
Local Street	10%

Maximum Street Grades may be increased up to 2% in select cases, as directed by the City Engineer.

Detailed slope and elevation information shall be provided for sidewalk ramps and curb returns and shall conform to Draft Public Rights of Way Accessibility Guidelines



(PROWAG) published by the Department of Justice. Note that the minimum continuous and unobstructed clear width of a pedestrian access route shall be four feet (PROWAG R301.3.1). The maximum cross slope of the walkway shall be two percent (PROWAG R301.4.1). Pedestrian access routes running parallel to a street may run at the same grade as the street, but cannot exceed the street grade (PROWAG R301.4.2). Options for ramp layout at intersections are provided in the standard drawings. Slopes and widths of landings, wings and other components must comply with Section 303 of PROWAG. It is recommended that design slopes be set lower than the PROWAG maximum to allow for discrepancies during construction.

**3. SUPERELEVATION RATE**

Superelevation is to be used only as a design element to enhance drivability of horizontal curves on Arterial and Collector streets. The use of superelevation for other purposes or on local streets will require the special approval of the City Engineer and will be handled on a case by case basis.

Superelevation will generally not be appropriate on local streets. The maximum design superelevation shall be 0.060 ft/ft and minimum superelevation shall be 0.020 ft/ft, with 0.040 ft/ft the preferred rate. Plans incorporating superelevation shall show left and right gutter on the profile and the scale shall be such that these can be distinguished.

**4. SUPERELEVATION RUNOFF-RUNOUT**

The designer must be concerned with three profiles in the development of a superelevated section: left gutter, centerline and right gutter. Superelevation shall be obtained by rotating two of these profiles around the third stable profile (typically the centerline). This results in a gradual change in roadway cross slope that minimizes lateral forces. The length of this transition is measured as runoff and runout. The effect superelevation has on drainage characteristics of the roadway shall be carefully considered in the resulting design.

The minimum runoff transition section lengths are tabulated in **AASHTO** Table 3-17. Typical design practice will place no more than 25% of a transition section on the horizontal curve. Some common design values from Table 3-17 are:

<b>DESIGN SPEED</b>	<b>e</b>	<b>MIN. LENGTH</b>
50 mph	4%	96'
40 mph	4%	83'
30 mph	4%	73'

The Minimum Length of Runout is determined by the amount of adverse cross slope to be removed, and is calculated by ASSHTO equation 3-24:

$$L_t = \frac{E_{nc}}{E_d} \times L_r$$

Where:  $E_{nc}$  = Normal cross slope, %  
 $E_d$  = Design Super Rate, %  
 $L_r$  = Minimum Runoff, Ft.  
 $L_t$  = Minimum Tangent Runout

**5. SIGHT DISTANCE**

All streets shall be designed to the following values for adequate safe stopping sight distance at the design speed, according to **AASHTO**, Table 3-1 and 3-2

**Per 3-1, Level Roadways**

25 MPH	155'
30 MPH	200'
35 MPH	250'
40 MPH	305'
45 MPH	360'
50 MPH	425'

**6. VERTICAL CURVES**

The minimum centerline vertical curve length shall be as determined by AASHTO formulas as given below. Where Algebraic Difference in grade is > 1, the minimum vertical curve length shall be:

Cul-de-sac	100 feet
Local	100 feet
Collector	125 feet
Arterial	150 feet

Otherwise, the minimum lengths of vertical curves shall be calculated from the following relationships.

	<b><u>CREST CURVES</u></b>	<b><u>SAG CURVES</u></b>
<b>S &gt; L</b>	$L = 2S - \frac{200(\sqrt{h_1} + \sqrt{h_2})^2}{A}$	$L = 2S - \frac{200[2.0 + S(\tan 1 \square)]}{A}$
<b>S &lt; L</b>	$L = \frac{AS^2}{100(\sqrt{h_1} + \sqrt{h_2})^2}$	$L = \frac{AS}{200[2.0 + S(\tan 1 \square)]}$

- Where A = Algebraic difference in grades, percent
- S = Design sight distance, feet
- L = Length of Vertical curve, feet.
- H = Height of: eye (1), object (2)

Maximum K value for vertical curves is 100 where drainage is a factor.

**K=L/A** where  
**L** = Length of vertical curve and **A** = Total change in grade, %

**7. HORIZONTAL CURVES**

The minimum horizontal curve radius shall be designed using AASHTO's "Side Friction Factor" formula:

$$R = V^2 / 15(e + f)$$

where: e = rate of roadway superelevation, ft/ft  
 f = side friction factor (see table below)  
 V = vehicle speed, mph  
 R = radius of curve, ft

The following horizontal curve radius chart is based on the AASHTO procedure, Method 2, and is an excerpt of **Table 3-13b. Minimum Radii and Superelevation for Low-Speed Urban Streets:**

e(%)	V <sub>d</sub> =25mph R <sub>min</sub> =(ft)	V <sub>d</sub> =35mph R <sub>min</sub> =(ft)	V <sub>d</sub> =45mph R <sub>min</sub> =(ft)
-2.0	198	510	1039
+2.0	167	408	794
+4.0	154	371	711
+6.0	144	340	643

Note: The use of superelevation above 0.04 ft./ft. will require special approval of the City Engineer and be handled on a case by case basis.

**8. REVERSE CURVES**

All new streets having a design speed of greater than 30 mph shall require a minimum 100 foot tangent section between reverse horizontal curves. Signage for such shall be indicated on the construction plans.

**9. COMPOUND HORIZONTAL CURVES**

Compound horizontal curves should be avoided on streets having a design speed of greater than 30 mph. If a compound curve is necessary, the ratio of the flatter radius to the sharper radius should not exceed the following:

31 - 49 mph design speed 2:1  
 50 + mph design speed 1.5:1

Where the ratio exceeds these limits, a suitable length of spiral or a circular arc of intermediate radius shall be inserted between the two curves.

**10. ROAD CROWN**

Collector and Arterial streets shall be designed with a crowned section and/or a superelevated section through curves. A shed section on these classes of streets is prohibited.

On other street classifications where the design speed is less than 30 MPH, the shed slope shall be 2%, or as approved by the City Engineer, no greater than 4%. Where a non-standard street width is designed, the crown shall be based on a 2% cross slope.

**11. OFFSET INTERSECTION**

Minimum distance between offset intersections shall be 150 feet, measured from center line to centerline of the intersection.

**12. ALL WEATHER SERVICE ROAD STANDARD**

All weather service roads shall meet requirements of Standard Drawing 2-4.

**13. CURB RETURN RADII**

The minimum curb return radii shall be:

Arterial-Arterial	35'
Arterial-Collector	35'
Arterial-Local	25'
Collector-Collector	25'
Collector-Local	20'
Local-Local	15'
Industrial-Arterial/Collector	35'*
Industrial-Local	20' *

\*Parking prohibited 40' from end of curb return on Industrial leg

Where a radius larger than 35 feet is required, a 3-centered symmetric compound curve shall be used. Three-centered symmetric compound curves shall be designed only on right-of-way sufficiently large to accommodate 12 feet minimum between curb face and the property line. The radii of the 3-centered symmetric compound curve shall be 120'-40'-120'. The offset of the 40' radius shall be determined by the design vehicle as follows:

<u>Design Vehicle</u>	<u>Offset</u>
SU	2'
BUS	3'
WB-40	4'
WB-50	5'

**14. STREET STRIPING**

Street striping shall be designed in accordance with the current ODOT Traffic Line Manual. See Standard Drawing 2-1 for lane requirements by road classification.

In general, Arterial and Collector streets and all legs of signalized intersections will require striping plans. Streets in the downtown core area or in the vicinity of schools and public gathering may require striping and crosswalks as directed by the City Engineer. The preferred crosswalk design is "Continental" in these areas.

**15. STREET SIGNAGE**

Street signage must conform with the latest edition of the Manual on Uniform Traffic Control Devices. Sign posts shall meet requirements of Standard Drawing 2-15. The Contractor shall verify the correctness of all street sign legends and names immediately prior to installation.

## 16. CLUSTER POSTAL DELIVERY BOXES

Cluster box locations shall be shown on the plans. US Postal Service must agree on location and type of delivery boxes. Cluster Postal Delivery Boxes should be constructed on residential streets in an area that minimizes impact on abutting properties.

Accessibility: Cluster mailboxes shall meet accessibility requirements in the Americans with Disabilities Act (ADA) and Public Right of Way Accessibility Guidelines (PROWAG):

- a. Provide a 72 inch wide concrete pad adjacent to cluster mailboxes with turning space that conforms to Section 304 of the 2010 ADA Standards for Accessible Design.
- b. Provide a pedestrian access route to adjacent sidewalk complying with PROWAG Section R301.
- c. Provide a pedestrian access route to on street parking complying with PROWAG Section R301 within 25 feet of the mailbox.

Cluster Postal Delivery Boxes desired along arterial or collector streets should be constructed off public right of way on common ground dedicated to that purpose and provided with appropriate driveway access. Cluster Postal Delivery Boxes shall not be constructed on arterial street right of way. Cluster Postal Delivery Boxes may be constructed on collector street right of way provided that a turnout meeting the following requirements is constructed.

- a. The center of the turnout shall be located in the center of a tangent section of the Collector.
- b. This tangent section shall have a length of not less than two times the stopping sight distance for the design speed.
- c. The required right of way width shall be increased to provide for the parking bay.
- d. The bay shall not be located less than the design stopping sight distance from any intersection.
- e. The bay of the turnout shall be a minimum of 40' in length and not less than 10' in depth.
- f. Tapered approach sections into the bay shall be not less than 10:1.
- g. Curb radius in the bay shall be not less than 50' radius.
- h. There shall be adequate stopping sight distance on either end of the turnouts into the parking bay.
- i. The bay shall be signed with the following:  
    *"10 Minute Parking"*  
    *"No U-turns" (MUTCD # R3-4a or R3-4 with R3-4p)*

## 17. STREET LIGHTING

Street lights shall be shown on the plans and provided at the following locations:

- Intersections
- Cul de sac bulbs if over 200 feet from the intersection
- Mid-block for blocks longer than 400 feet from center of intersection to center of intersection
- High-use driveways and other locations designated by the City Engineer.

Poles and fixtures shall conform to the power provider standards. Standard cobra head fixtures shall be used unless decorative design is approved by the City Engineer or required for downtown areas.

**18. ASPHALT CONCRETE PAVEMENT**

Asphalt concrete pavement depth shall conform to Standard Drawing 2-1. Pavement Classification and asphalt binder shall be approved by Public works prior to placement on a case by case basis:

**19. DEAD END STREETS AND ALLEYS**

A turnaround must be provided on all dead end streets, alleys and all weather access roads. Cul-de-sac requirements for public streets are provided in Standard Drawing 2-4. Through alleys are encouraged, but where they cannot be provided and the alley is a required emergency access, either a standard cul-de-sac or alternate turnaround meeting the requirements of the Oregon Fire Code must be provided. Dead end alleys not required for emergency access shall have a hammerhead turnaround, but it is not required to meet Oregon Fire Code requirements.

## **B. DRAINAGE CONTROL**

### **1. GENERAL**

All drainage control shall be designed in accordance with the specifications described in the adopted City of Prineville Stormwater Pollution Reduction Plan and all applicable state (Department of Environmental Quality) and Federal regulations. Except as modified or amended by these Standards and Specifications, storm sewers shall be designed according to the current ODOT Hydraulics Manual (2011). Storm sewers shall conform to the same specifications as sanitary sewers. In the ODOT specifications, any references to "mainline" shall apply to all storm sewers serving City streets. All references to "highway" shall also mean City streets.

Runoff from Public roadways shall be disposed of by utilizing the existing storm water collection system or by conveyance to publicly controlled detention and retention areas.

Privately held properties shall contain stormwater runoff on site to the greatest degree practicable, and design facilities to accommodate the "Detention Storm" prior to any discharge to the public right of way or public drainage system. All new development and redevelopment shall manage all storm water runoff onsite. Some developed lots in the urban core may not be practicably developed in accordance with this requirement. In these instances, the City Engineer may allow development to discharge stormwater offsite. Any impacts to the public system shall be identified and mitigated.

### **2. DESIGN STORM**

- The Water Quality Storm shall be the 2 year 24 hour storm. Verify the facilities can hold the water quality storm without considering infiltration.
- The Detention Storm shall be the 50 year 24 hour storm. Verify the facilities can hold the detention storm with infiltration factored in.
- The Overflow Storm shall be the 100 year 24 hour storm. Verify the facilities can hold the overflow storm with infiltration factored in. If the facilities are predicted to overflow, verify the excess water is maintained onsite without causing any damage to the site. If the site overflows to the public right of way, design outlet control to minimize the impact on existing facilities. If the overflow exceeds the capacity of existing downstream facilities, determine required improvements to maintain the existing service level of the public system.

A summary of the precipitation depths for different frequency events are summarized below.

<u>Frequency Events</u>	<u>Rainfall Accumulated Depth</u>
2-yr, 24-hour	1.2 inches
5-yr, 24-hour	1.5 inches
10-yr, 24-hour	1.7 inches
25-yr, 24-hour	2.0 inches
50-yr, 24-hour	2.2 inches
100-yr, 24-hour	2.4 inches

The following methods may be used for the design of flow control and conveyance systems, or as approved by the City Engineer.

- National Resource Conservation Service (NRCS) Urban Hydrograph Method (TR-55)
- Santa Barbara Urban Hydrograph Method
- Level Pool Routing Method
- Rational Method

The Prineville Urban Area is located in zone 10. The following five minute rainfall intensities occurring within a 24 hour period shall apply:

25-year	2.14 inches/hr.
50-year	3.2 inches/hr.

In lieu of the Kinematic Wave Equation , the designer may use the following formulas to determine time of concentration:

<u>Average Slope</u>	<u>T<sub>c</sub></u>
<2%	2L+2
2%-4%	1.5L+2
>4%	L+2

where: L is in stations

T<sub>c</sub> shall be not less than 5 minutes

A Stormwater Analysis shall be submitted for review and approval, and include the ultimate service area, including upstream contributors, of the design. For public street systems, all right of way and any adjacent surface area that may contribute stormwater runoff to the system shall be considered.

### 3. STORM SEWER DESIGN

Inlets shall be provided at intersections of collectors or arterials. Inlets should be provided at intersections of local streets as design conditions dictate. These inlets shall be placed at the low point of the return, or so arranged that water is not directed through the intersection or past a curb return. Inlets should be provided in any area where icing could create a hazard. Valley gutters across intersections are discouraged, and may only be allowed where existing conditions limit alternative treatments.

Flanking inlets at sags will not be required provided that the primary inlet is adequate to capture the design flow. A City standard single catch basin corresponds to an ODOT type G inlet. A City standard double catch basin corresponds to an ODOT type G-2 inlet.

Inlets locations shall be designed for a 25-year storm, except sag inlets shall be designed for a 50-year storm. Double catch basins are normally required for all street inlets. A single catch basin is acceptable for the collection of water where design capacities are minimal. Curb inlet catch basins shall be installed in all arterial and major collector streets.



The responsibility for the design shall be borne by the developer and shall provide for the control of all upstream contributory area. The design shall be reviewed and approved by the City. The cost for the approved system shall be wholly borne by the developer, including any offsite system that is required.

## **C. SEWER**

### **1. GENERAL**

Sewer/Water line separation and construction is established by the Health Division of Oregon DHS. Materials and procedures for sewer facilities shall conform to the City of Prineville Standards and Specifications, D.E.Q. Specifications and APWA/ODOT ***Oregon Standard Specifications for Construction***, including Department of Environmental Quality, Oregon Standards for design and construction of waste water pump station May 2001.

The Contractor shall secure and comply with applicable State, County or City street cutting permits; provide barricades, lights and flaggers, maintain traffic at all times; notify effected property owners, water users, gas and utility companies; comply with blasting regulations; and restore pavement to original design. The Contractor shall comply with all City, County, State and Federal Highway Construction Safety and Health Standards. Any and all engineering field checks performed by the City will be done at the expense of the person or firm for whom the work is being done.

Sewer facilities shall be installed in public right-of-ways except in those situations where, in the determination of the City Engineer, drainage basins will be better served by an alternate design. In those cases an on-site easement may be used.

Engineering firms submitting sewer facilities plans for private contracts shall include a profile with their plan. The profile will include the existing ground elevation, proposed sub-grade, pipe and trench depth information. The Engineer is also required to provide the Contractor with cut and alignment stakes.

### **2. SEWER MAIN**

#### **A. DESIGN PARAMETERS**

##### **1) LOCATION**

Sewer mains should be located in accordance with the Department of Environmental Quality and ORS Chap.340, Div 52.

Sewer Mains shall be located on roadway centerline on tangent sections and as close as practicable to this configuration on curves.

Design and construction of gravity sewer along horizontal or vertical curves shall only be permitted with prior approval of City Engineer.

**2) SEWER MAIN STUB**

Stub outs for the future continuation of the sewer shall terminate at a manhole unless special conditions warrant otherwise. In phased subdivisions the sewer should be extended to the next adjacent manhole as shown on the master plan to minimize the number of manholes required.

**3) DEPTH**

Minimum cover for all standard sewer lines except sewer services shall be 36 inches.

**4) MINIMUM DIAMETER:**

For gravity sewer, the minimum size shall be 8 inches. Minimum size for pressure lines will be determined by the City Engineer.

**5) MINIMUM VELOCITY**

2 fps for gravity sewers. 3 fps for pressure and inverted siphons

**6) MAXIMUM VELOCITY**

Velocity shall be kept to a minimum for pressure sewers.

**7) MINIMUM GRADE (GRAVITY) From DEQ design criteria:**

Pipe I.D.	Slope (ft/100 ft, n =0.013)	PVC Slope (ft/100 ft, n = 0.010)
6"	0.60	0.30
8"	0.40	0.20
10"	0.25	0.15
12"	0.19	0.12
15"	0.14	0.09
18"	0.11	0.07
21"	0.09	0.06
24"	0.08	0.05

**8) FLOW CALCULATION**

**a. Gravity**

Flow calculations will be based on Manning's equation using the following values for **n**:

DEQ Standard	0.013	PVC Standard	0.010
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**b. Pressure**

Flow calculations will be based on the Hazen and Williams equation using the following values for **C**:

Concrete	120
Cast iron/steel	125
PVC	135

## 9) FLOW ESTIMATION

<b>Domestic waste:</b>	100 gallons per person per 16 hr day
	240 gallons per equivalent dwelling unit per 16 hr day
<b>Commercial and Industrial:</b>	1000 gallons per acre per day
<b>Schools:</b> Elementary:	10 gallons per student per day
Secondary:	15 gallons per student per day
High School:	20 gallons per student per day
<b>Infiltration:</b>	225 gallons per acre per day

## 10) PEAK FACTOR

3.0 for flows less than 1 MGD
2.5 for flows from 1 MGD to 10 MGD
2.0 for flows greater than 10 MGD

## 11) MANHOLES

<b>Spacing:</b>	Not more than 300 feet apart
<b>Design Fall:</b>	Not less than 0.1 feet
<b>External Drop Manhole:</b>	Required when fall exceeds 24 inches
<b>Dead-end Lines:</b>	Shall end with a manhole, clean out are not acceptable.

## 12) WET WELLS

**Operating Capacity:** The minimum operating capacity of the wet well, from first pump on to pumps off, shall be not less than 5 minutes times one pump flow rate.

**Emergency Capacity:** The emergency capacity, from alarm on to an overflow condition, shall be determined on a case by case basis, but in no case shall be less than 30 minutes times the peak flow rate.

This 30 minute response time shall generally apply to areas not adjacent to water courses and within 10 road miles of the Treatment Facility.

**Pump Flow Rate:** A single pump flow rate should sufficiently exceed the peak inflow rate to be effective.

**Pump Cycle Times:** Pump cycle time, from "pump off" to "pump on" shall not be less than 10 minutes at peak flow and shall take into consideration any line back draining requirements.

### Given:

$Q_i$	=	Peak inflow rate
$Q_p$	=	Design pumping rate
$v_w$	=	Working capacity
$v_b$	=	Back drain volume
$v_e$	=	Emergency volume for response time

**Conditions:**

$$Q_p \gg Q_i$$

$$\text{For 3" line: } 66 \text{ gpm} < Q_p < 150 \text{ gpm}$$

$$\text{For 4" line: } 118 \text{ gpm} < Q_p < 270 \text{ gpm}$$

$$\text{For 6" line: } 265 \text{ gpm} < Q_p < 600 \text{ gpm}$$

$$v_e > (30)(Q_i) \text{ (minimum)}$$

$$v_w > (5)(Q_p)$$

$$v_w > (10)(Q_i) + v_b$$

See Chapter VII Sewer, Section Sewage Lift Stations for additional design information and equipment specifications.

**B) WATERLINE CROSSINGS**

When the sewer line is located above or less than 18 inches below a crossing waterline, the sewer line shall be constructed of pipe conforming to water pipe standards. AWWA C-900 is acceptable. The minimum length of this strengthened sewer is 20 feet. It is intended that a section of the water class pipe be centered over the water main and connected to the sewer line with approved flexible couplings.

**C) DETECTION TAPE AND WIRE**

Detection tape shall be installed on all sewer mains and services. Detection tape shall be as manufactured by Allen Systems or an approved equal. One course of detection tape is required at the top of the pipe zone. Detection wire shall be installed on all pressure sewer mains, all gravity sewer mains and all service connections.

The wire shall be a green clad 18 gauge UF bury copper wire. The wire shall be attached to the top of each length of pipe by duct tape or other equal fastener. As required by inspector to the top of the pipe.

**D) MATERIALS**

Materials shall conform to the current Standard Specifications of the City of Prineville.

**E) CONSTRUCTION**

Construction shall conform to the City of Prineville current Standard Specifications and applicable Standard Drawings.

Prior to installing a sewer facility in an unimproved street, the street must be brought to sub-grade to ensure that adequate bury, depth of cover and utility separation is acquired. In the event the street is to be improved at a later date, the street shall be properly staked to the approved design prior to the commencement of sewer line construction.

**3. SEWER SERVICES**

All single family residential sewer service laterals shall be a minimum of four (4) inches in diameter and have a clean out at the property line. Except where residential services are located at a common lot line, a six (6) inch service, including clean out and 6x4x4 wye with clean out, may be used as an option to serve two separate lots.

All service laterals with approved clean out at the property line shall be maintained from the clean out to the sewer mainline by the City of Prineville. (Homeowners may install clean out on existing sewer services if they desire City maintenance for that portion of the pipeline.)

All new duplex and multi-family service laterals shall be a minimum of six (6) inches in diameter, except as determined by sewer flows or the City Engineer. However, existing 4-inch service laterals with clean out may be used to serve duplex or multi-family lots, except as determined by sewer flows or the City Engineer.

Commercial and industrial service laterals shall be a minimum of six (6) inches in diameter. However, existing four (4) inch service laterals with clean out may be used except as determined by sewer flows or the City Engineer.

Separate and independent building sewers shall be provided for buildings on separate lots or parcels.

Sewer services shall be extended at minimum grade or as required to provide gravity service to each building. Sewer services shall not have less than 24 inches of cover at the property line, three (3) feet minimum cover in street and shall be located as required to provide gravity service to each lot or parcel.

Pressure sewer services shall be designed by a competent professional. The pump curve with the operating point indicated shall be submitted to the City of Prineville Engineering Division so it may be ascertained that the proposed installation will not conflict with the operation of the City system.

The City has no size requirements for the Pressure service line except that the check valve, gate valve and associated piping from this equipment to the main will not be less than 3 inches in diameter. It is considered prudent to specify the service line one size larger than the pump outlet.

After installation, the maintenance of a pressure sewer services will be the responsibility of the property owner from the structure to the City main, except for those which have locatable clean out. The City will maintain the pressure service line between the sewer mainline and clean out. Information regarding the location of services on the public right-of-way will be provided by the City, if available.

#### **4. SANITARY SEWER MANHOLES**

Manholes shall be located as shown on the Plans or as directed by the City Engineer or representative, in a manner to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. Where manholes lie away from paved right of way, an access road conforming to all weather surface road standards, including right of way shall be constructed to provide all weather access to the access pad. This access road shall meet all weather service road standards (See Standard Drawing 2-4) or be paved. Support facilities, such as, but not limited to drainage structures, vehicular turnaround or a pad-lockable gate may be required on any manhole location.

Location of the center of manholes in a vehicle wheel track is not acceptable. Location of the center of manholes within 5 feet of the curb line is not acceptable. Location of manholes outside of paved areas is not generally acceptable. Pipe stub-outs in manholes for 4 inches Service Connections will not be allowed, except for manholes at end of line.

Angle between inlet and outlet lines of sewer manholes less than 90° shall be avoided, but if necessary, the invert of the inlet line shall be at or above the crown of the outlet line, but not to exceed 2 feet.

## **5. CLEAN OUT**

Clean outs shall not be acceptable on sewer main lines.

## **6. ACCESS TO SEWER FACILITIES**

Where manholes lie outside of the paved right of way, an access road, with dedicated right of way or easement, shall be constructed to provide all weather access to the manhole. This access road shall meet all weather service road standards (See Standard Drawing 2-5) or be paved. Support facilities such as, but not limited, to drainage structures, vehicular turnaround with 38 foot turning radius, or a pad-lockable gate may be required on any manhole location outside of the paved right of way. An exception to the requirement for an access road will be made when no manholes are located in the easement area.

## **7. SAMPLING MANHOLES**

A sanitary sewer sampling manhole located at a point accessible at all hours to City personnel is required for each commercial, industrial, or institutional user's service lateral. This manhole must have a minimum depth of 48", be privately owned/maintained, and when possible be located adjacent to the public ROW. If manholes can not be located in the pavement, then a six inch thick concrete pad 5 foot square centered on the manhole cover must be provided.

## **8. GREASE INTERCEPTOR**

A grease interceptor compliant with the Uniform Plumbing Code (UPC) is required for all facilities where commercial or institutional food preparation is performed. New construction and tenant improvement construction for usage as food service establishments are required to include the installation of an outside gravity grease interceptor with a minimum capacity of 750 gallons, compliant with the UPC. All plumbing fixtures draining grease bearing waste shall be routed to the interceptor, including kitchen sinks, bar sinks, mop sinks, and kitchen area floor drains. Restroom connections to the interceptor are prohibited. Contact the City of Prineville Wastewater Division for specific connection information.

## **D. WATER**

Materials and procedures for water facilities shall conform to the current Standard Specifications of the City of Prineville, Oregon Health Division Administrative Rules and AWWA standards. Water facilities shall be installed in Public Right of Ways except in those situations where, in the determination of the City Engineer, service areas and/or pressure levels will be better served by an alternate design. In those cases an on-site easement may be used.

**1. MAIN LINE**

**a. MINIMUM SIZE**

The standard minimum size pipe for mainline shall be 8 inches, and 12” in industrial zones. Systems must be designed to provide the minimum required fire flow to the subject properties and vicinity. Typical design flows for general zoning designations are:

Residential	1,500 gpm
Commercial	2,500 gpm
Industrial	3,500 gpm

Hydrant lines may be 6 inches and have a 100 feet maximum length. Hydrant runs longer than 100 feet may require 8 inches line. All main lines shall end with a fire hydrant for maintenance purposes.

**b. DEFLECTION DESIGNATION ON DRAWINGS**

All drawings that include water and sewer mains submitted for review by the City Engineer shall have the size, number and type (90°, 45°, 22 ½°, 11° 1/4°) of fittings specified at the location they occur. Specifying only the deflection angle of the line, e.g. 30°, is not acceptable.

**c. LOCATION**

Water mains are normally located 12 feet from roadway centerline with a minimum 10 foot horizontal separation from parallel underground utilities unless written approval of the City Engineer provides otherwise. Separation to sewer lines and construction is as established by Oregon State Law.

**d. SERVICE LINES**

A separate water service, including meter, shall be required for each lot of record. As an option, where residential services are located at a common lot line, a one (1) inch service line may be extended from the main, then separated into a wye or tee and a meter installed for each lot.

Service lines are to terminate in an approved meter box. Service lines shall be constructed, complete and with all incidentals to the terminus of the meter box as shown in Drawing 4-5, to be located directly behind the sidewalk or, if there is no sidewalk, directly behind the curb. An approved meter shall be installed in the meter box. Any services larger than 1 inch shall be provided with a saddle or tee at the main.

A back flow prevention device, as approved by the Health Division of Oregon DHS and the City of Prineville, shall be installed on all new services larger than 1 inch diameter and all fire service lines. Backflow devices shall be installed at the property line unless otherwise approved by the City Engineer.

**e. VALVES**

Valves in water mains shall be located in the street right-of-way, lines extended, preferably in intersections unless otherwise shown on the Plans. Maximum distance

between valves is 1,000 feet on transmission mains and 500 feet on distribution mains. A "cross" will normally be designed with 4 valves and a "tee" with 3 valves. Valves are required on the end of lines for future extension.

Valves shall be installed on flanged tees or crosses, unless otherwise approved by City Engineer or their representative. No valve shall be located closer than 3 feet from existing or proposed gutter line.

All other valving shall conform to AWWA Standards and be approved under the Sewer section of the current Design Standards. All intersections shall have approved valving.

Butterfly valves shall be used on all waterlines 10 inches or larger; or where 18 inches of cover to the top of a gate valve body cannot be obtained.

Where valves are located outside of paved areas they shall be provided with a concrete collar not less than 30 inches square. Valve clusters may be set in a single collar provided there is not less than 12 inches from the edge of the valve to the edge of the collar.

**f. DETECTION TAPE AND WIRE**

Detection wire and tape shall be installed on all main lines. Detection tape shall be as manufactured by Allen Systems or an approved equal. One course of detection tape shall be installed 12 inches above the pipe. Detection wire shall be a Blue 18 gauge UF bury solid copper wire located within 6 inches of the top of the pipe. The wire shall be continuous in continuity and a lead shall be brought to within 6 inches of each valve stack. Wherever there is a splice, it shall be repaired according to manufacturers' recommendation.

**g. ALL WEATHER ACCESS**

Where water facilities requiring maintenance access lie outside paved right of way, a paved access pad sufficient for service equipment to operate without blocking the traveled way shall be provided. Where water facilities (such as fire hydrants and valves) lie away from paved right of way, an all weather access road shall be constructed to provide all weather access to the facilities. This access road shall meet all weather service road standards (See Standard Drawing 2-4) or be paved. Support facilities such as but not limited to drainage structures, vehicular turnaround or a pad-lockable gate may be required on any water facility location.

**h. THRUST RESTRAINT**

Thrust restraint shall be provided for water fittings. Internal pipe joint restraints, such as Field-Lok gaskets and external joint restrains, such as Mega-lugs, are generally preferred to concrete thrust blocks. Plans shall show the required restrained pipe length in accordance with the table below. When concrete thrust blocks are necessary, plans shall include Standard Drawings for thrust blocks.

**2. METERS**

Approved plastic meter boxes with reader lids and metal hinges with automatic meter read ports shall be installed for each meter and set to the approved grade. Where the meter



location falls in a driveway, a concrete meter box with traffic rated lid must be used in lieu of a plastic box.

### **3. FIRE HYDRANTS**

#### **a. GENERAL**

Each hydrant shall be connected to the main with a 6-inch branch controlled by an independent 6-inch gate valve bolted to the tee by flanged fitting. On hydrant lines over one hundred (100) feet long, a second valve shall be required within 10 feet of the hydrant. No other lines are allowed to be connected to this 6 inch fire hydrant line.

#### **b. LOCATION**

Hydrants are recommended at maximum 450 feet intervals. Any other spacing will have to meet the approval of the Crook County Fire and Rescue and the International Fire Code.

Hydrants shall be located as shown on the Plans or as directed by the City Engineer or their representative, in a manner to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. The hydrant barrel shall be set as shown in the standard drawings.

On hydrant runs exceeding that shown on Drawing 4-10, design and installation shall be such that the hydrant can be excavated and repaired without blowing off the hydrant valve or causing the main line to be taken out of service. This requirement may result in the installation of a second hydrant valve at the mainline tee or longer tie rods from the mainline tee to the hydrant valve. Hydrant valves shall be located reasonably close to the hydrant as indicated in the drawings so as to be obvious in the event of an emergency.

#### **c. STAKING**

All hydrants shall have two reference points (swing ties) indicating the face of hydrant and tops of curb and face of curb. These reference points are the responsibility of the Design Engineer and they shall be responsible for position of such prior to construction.

#### **d. CONCRETE PAD**

A concrete pad shall be installed around the barrel as specified in Section 404.3.00 of the current Standard Specifications of the City of Prineville.

#### **e. BOLLARDS**

All hydrants located in areas vulnerable to traffic shall be protected by bollards as shown in Standard Drawing 4-11 and the design and location shall be approved.

### **E. UTILITIES**

#### **1. PROHIBITION on CUTTING RECENTLY CONSTRUCTED STEETS**

No open cut for utilities will be allowed within 2 years of completion of a street construction project, unless approved by City Engineer. If permitted within two years of pavement installation, additional paving and/or improved backfill will be required. This may include,

removal to centerline or full width of street, full street overlays, grinding and inlay or controlled density backfill.

## **2. NEW CONSTRUCTION AND CONDUIT BANKS**

Where any utility is not completely installed by the time of the sub-grade inspection, provisions, such as utility conduit placed under all areas to be improved, shall be implemented to protect the improvement. This installation shall be acceptable to the affected utility and the City of Prineville. No open cut of utilities will be allowed within 2 yrs of completion of a construction project, unless approved by City Engineer.

Conduit banks shall be spaced not greater than 300 feet apart and not less than one per block.

## **3. SHARED TRENCHES**

Underground utilities shall not be located closer than 10 feet horizontally from any water or sewer main. Under special permission from the City Engineer, this separation may be reduced for gravity sewer, but should never be less than 5 feet. Utility crossings of water or sewer mains shall be as close to perpendicular as practicable.

## **4. UTILITIES IN PUBLIC RIGHT OF WAYS**

### **a. GENERAL**

Utility Companies shall construct facilities in City of Prineville Public Right of Ways in strict accordance with the City of Prineville's current Standards and Specifications. Utility Companies and their agents shall cooperate with the City of Prineville Engineering Division to provide for City inspection of their facilities during construction. The intent of this requirement is to protect City of Prineville facilities. If a city facility is damaged during construction, it shall be repaired or reconstructed to current City standards.

### **b. PLAN SUBMITTAL**

Utility Companies must submit plans and profiles of any proposed work in City of Prineville Public Right of Ways for review by the City of Prineville Engineering Division. These plans must be approved by the City of Prineville before start of construction. Emergency work requiring immediate action shall be exempted from this requirement. Existing culture, including other underground utilities, shall be shown on these plans and shall have been field located by the appropriate utility company through the "one call" network. Failure to field locate existing utilities on the plans will be cause for the City to deny permission to work in the Public Right of Way.

## **5. TRENCH PATCHING IN PAVED RIGHT OF WAY AREAS**

Trench backfill and patching in pavement areas shall conform to Chapter V Streets, Section Asphalt Patching.

## **6. RAILROAD UNDER CROSSINGS**

### **a. SCOPE**

This section covers the work necessary for the pipeline under crossing of the City of Prineville Railway. The under crossing permit must be obtained from City of Prineville Railway.

**b. MATERIALS**

Sewer Pipe: Conform to Chapter VII- Sewer.

Water Pipe: Conform to Chapter VIII- Water Facilities.

Casing: Casing shall be steel pipe conforming to AWWA C200. Minimum yield strength shall be 35,000 psi. Diameter and wall thickness shall be as indicated on drawings.

The Contractor shall be responsible for selecting the size and wall thickness of the casing required to permit construction to the required lines and grades consistent with the operation and as approved by the Permitter. However, in no case shall the casing diameter and wall thickness be less than those shown. If a casing diameter larger than the minimum is used, wall thickness must be increased accordingly. Submit wall thickness design calculations and revised pipe support and blocking details to the Engineer for approval.

Excavation or Boring: Excavation or boring shall be unclassified and shall include whatever materials are encountered. The Contractor shall make an estimate of the kind and extent of the various materials which will be encountered to complete the work.

Stainless Steel Bands: One-half inch wide by 0.020 inch thick, 304 stainless steel bands or equal.

Supports (Skids): Lumber for supports shall be of No.2 pressure treated Douglas Fir, cedar or redwood graded in accordance with the WWPA Current Grading Rules for Western Lumber. Blocking shall be sized adequately to prevent flotation or lateral movement of the carrier pipe in the event the casing should be inundated by ground water.

Supports (Hangers): Hangers shall be fabricated from plate steel, size as indicated on the drawings.

Alternative Supports: In lieu of the hangers and skids as shown on the drawings, the Contractor may elect to fabricate a support structure for both water and sewer lines which can be installed inside the casing. Details and design calculations shall be submitted for the Engineer's review should an alternative be desired.

**c. WORKMANSHIP**

General: Prior to the start of the work, submit satisfactory evidence to the Engineer that all insurance coverage requirements called for by the Permitter have been complied with. All proposed construction methods and materials for each under crossing shall be approved by the Engineer and Permitter prior to the crossing operation and no construction shall be started until written approval to proceed from the Permitter has been submitted to the Engineer.

Casing: Casings shall be continuously welded at joints. Bored installations shall have a hole diameter that shall not exceed the outside diameter of the casing pipe. Boring operations shall be conducted in such a manner as not to be detrimental to the facility being crossed. If excessive voids or too large a bored hole results, prompt remedial measures shall be taken by the Contractor, subject to approval by the Engineer and the Permitter.

Installation Of Pipe: Provide strapped timber skids around the barrel of sewer pipe as shown on the Drawings, join pipe and slide into casing. Pipe barrel shall bear continuously on cradles. Provide temporary supports for the water pipe prior to welding hangers in place. Conform to any additional requirements of the pipe manufacturer.

Pipe installation shall conform to applicable portions of Chapter VII- Sewer and Chapter VIII- Water Facilities, including hydrostatic or air testing and line and grade.

Seals: Place 2 inch timber seals at the ends of the under crossing casing to prevent foreign material from entering the casing after it is backfilled. Shape and notch timbers to fit around pipe to provide a tight seal.

**d. MEASUREMENT AND PAYMENT**

Payment for each crossing will be based upon the lump sum price stated in the Proposal. Payment on the lump sum basis shall constitute full compensation for all labor, materials and equipment required to complete the installation, within the limits shown in addition to the amount per linear foot for each pipeline.

Payment to the Contractor for any services provided by the Permittee shall also be included in this item.

**F. IRRIGATION LATERALS**

**1. GENERAL**

Irrigation laterals shall be installed in culvert to outside the limits of public and utilities improvements in right of ways. The construction shall conform to the requirements of the irrigation company and the City of Prineville. Where requirements may conflict or differ, the requirement providing the highest level of control, security and/or integrity shall govern the construction.

**2. MATERIALS**

Pipe used for irrigation piping in City right of way shall conform to the requirements of Section 445 **Sanitary, Storm, Culver, Siphon and Irrigation Pipe** of the current Standard Specifications. Corrugated metal pipe (CMP) may be used only where the piping requirements necessitate arch culvert pipe. CMP shall be traffic rated and shall be the heaviest gage produced for the size specified. Connections shall be made watertight by encasement in 12 inches of structural concrete for 1.5 pipe diameters each side of the joint.

**3. TESTING**

All pipes other than CMP shall be tested per the requirements in Section 445.70.

## **03 DRAWINGS**

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### **A. SUBMITTAL**

For information concerning the process of submitting plans, see Section 04 of the Development Provisions.

### **B. PLAN SCALE AND SIZE**

The drawing scale shall be such as to clearly show the proposed improvements and any conflicts with existing or proposed improvements. Where clarity is not compromised, it is preferred that street, sewer and water be combined on one drawing to better disclose the potential for utility conflicts. Plan views shall incorporate a grid to assist in the determination of distance and elevation of improvements. The preferred scale for combined drawings showing multiple facilities is 1 inch = 20 feet. Depending on the amount of information shown on the drawings, the scale may be increased to 1 inch = 50 feet. Smaller scales will be typically unacceptable.

All construction drawings submitted shall be 24 inches x 36 inches overall size, preferably to ANSI (American National Standards Institute) standard.

### **C. INFORMATION REQUIRED ON PLANS**

#### **1. General**

- a. Vicinity map
- b. North arrow, preferably to top or right of each sheet
- c. Project title or name
- d. Sheet Index
- e. Quantities for Engineering Fees
  - (1) size and total lineal feet of sewer main
  - (2) size and total lineal feet of water main
  - (3) size and total lineal feet of fire service lines
  - (4) size and total number of water services/sewer services
  - (5) size and total number of water meters
  - (6) size and total number of manholes
  - (7) total number of fire hydrants
  - (8) lineal feet of all streets and alleys
- f. Approval signature block
- g. Owner/Developer name, address and phone number
- h. Consulting Engineer/Surveyor name, address and phone number
- i. Any associated City or County Land Use application number
- j. Indicate City benchmark used to establish control
- k. Existing topography
- l. Location of all utilities and roads, existing and proposed
- m. Right Of Way, property lines and any easements, drainage with calculations.
- n. Attached copy of land use approval
- o. Plans shall include the following note: All materials and construction shall conform to the City of Prineville's current Standards and Specifications.

**Note:** An approved tentative plat may be submitted to fulfill any of the above requirements.

## **2. Streets**

- a. North arrow, preferably to top or right of page
- b. Vertical and horizontal curve data
- c. Indicate roadway centerline and stationing along centerline
- d. Indicate slopes of centerline and gutter lines if necessary
- e. Indicate curb return radius
- f. Indicate grades at the ends and midpoint of the curb returns
- g. Indicate drainage system and location and size, in square foot, of drainage area served by every retention area.
- h. Indicate the location of utilities, existing and proposed
- i. All relevant street system details
- j. Demonstrate that streets may be extended thru adjacent properties if so desired
- k. Show location, direction, size and type of MUTCD number of all permanent street signing
- l. Show location and size of any Postal delivery boxes to be placed on public right of way
- m. Note on plans, stating "Street lights to be located by local power company".

## **3. Storm Drains**

- a. Location of manholes, inlets and storm line
- b. Stationing of structures relative to street stationing
- c. Invert and rim elevations at junction and sediment manholes and inlets
- d. Inlet type, size, rim elevation
- e. Swale and pond edge, slope, contours, inlets, outlets, surfacing, overflow, outlet protection
- f. All relevant storm system details.
- g. A profile demonstrating that sufficient cover will be maintained and showing finished street where applicable.
- h. Drainage report including narrative, basin map and other figures, calculations, downstream analysis and other required submittals as appropriate
- i. Wellhead protection areas within project.

## **4. Sewer**

- a. Location of manholes and sewer line
- b. Stationing along sewer line
- c. Entering and exiting invert elevations at manholes
- d. Sewer is designed and extended to provide service to adjacent properties
- e. All relevant sewer system details.
- f. A profile demonstrating that sufficient cover will be maintained and showing finished street grades where applicable.

## **5. Water**

- a. Location of valves, fittings and fire hydrants and water lines
- b. Stationing along waterline
- c. Water system is designed to provide service to adjacent properties
- d. All relevant water system details.
- e. A profile demonstrating that sufficient cover will be maintained and showing finished street grade where applicable.

## **04 MATERIALS**

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### **1. SIGNS AND SIGN POSTS**

All signing material shall conform to the City of Prineville’s current standards and the requirements of the **Manual of Uniform Traffic Control Devices**. Sign posts shall be metal, 12 feet minimum in length and 2 inches in diameter. (See Drawing 2- 15) Street name signs shall conform to the City of Prineville Standards.

### **2. STREET LIGHTS**

All street lights shall be of the type approved by the City of Prineville and the jurisdictional electric company.

### **3. BARRICADES**

Any and all required barricades shall conform to the requirements of the **Manual of Uniform Traffic Control Devices**.

## **05 AWNING STANDARDS**

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### **DESCRIPTION**

#### **05.00 SCOPE**

This section covers the standards for constructing awnings supported by posts within the public right-of-way. It does not apply to self-supporting awnings extending over the public right-of-way which are preferred and allowed with minimal review for measurement and design review.

### **MEASUREMENT**

#### **05.05 GENERAL**

No portion of any awning shall be closer than 12” from face of curb. Supports within the sidewalk shall be 18” from face of curb to face of post. There shall be a minimum 5’ clear walking space behind the supports. The lowest point of the overhead architectural feature shall be at least 8’ above the sidewalk including any proposed or future signage.

### **DESIGN**

#### **05.10 GENERAL**

New awnings shall be designed to complement awnings on adjoining properties and connect if possible. The design shall be in compliance with the City’s design review standards in section 153.20(A)(1)(2) of the City’s land use code. If street trees are removed the tree wells shall be made part of the sidewalk or approved for an alternative purpose. Post location or vehicle striping may need to be modified to prevent conflict with parking spaces. Clear vision areas at intersections will be reviewed for safety. Awning supports shall be located so as not to block street signage and any awnings along state highways shall be subject to review by ODOT. Design approval is evident by Planning Department signature on the building permit.

## **CONSTRUCTION**

### **05.20 GENERAL**

Sidewalks shall be replaced as determined by the City Engineer prior to construction of supports within the sidewalk. Utilities may need to be relocated within the right-of-way, a utility locate shall be completed and utility partners notified if there is a conflict. A building permit shall be required and signed by the City Planning Department.

## **AGREEMENTS**

### **05.30 LIABILITY**

The property owner shall enter into a License Agreement with the City that, in addition to other provisions, requires the owner to indemnify the City from any liability associated with the awning. The License Agreement shall be recorded at the Crook County Clerk's office and shall obligate future owners of the property to the provisions of the License Agreement.

### **1240.35 INSURANCE**

As long as the awning is in existence, the property owner shall carry liability insurance on the awning naming the City as an additional insured and shall provide proof of such insurance to the City.

## **COST**

### **05.40 GENERAL**

Any cost incurred during construction of the structure including reconstruction of the sidewalk, street, parking spaces, utilities or re-location of utilities is the responsibility of the property owner. The City shall incur no cost associated with the structure.



# Chapter III

## GENERAL CONDITIONS

### 110 ORGANIZATION, CONVENTIONS, ABBREVIATIONS AND DEFINITIONS

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#### DEFINITIONS

##### 110.10 ABBREVIATIONS

Wherever in these specifications the initials only of a society or association are used, the following organizations are referred to:

<b>AASHTO:</b>	American Association of State Highway and Transportation Officials
<b>APWA:</b>	American Public Works Association
<b>ASTM:</b>	American Society for Testing and Materials
<b>AWWA:</b>	American Water Works Association
<b>DEQ:</b>	Oregon Department of Environmental Quality
<b>FHWA:</b>	Federal Highway Administration
<b>MUTCD:</b>	Manual on Uniform Traffic Control Devices
<b>NEC:</b>	National Electric Code
<b>NEMA:</b>	National Electrical Manufacturers Association
<b>NFPA:</b>	National Fire Protection Association
<b>ODOT:</b>	Oregon Department of Transportation
<b>ORS:</b>	Oregon Revised Statutes
<b>OSHA:</b>	Occupational Safety and Health Administration
<b>UBC:</b>	Uniform Building Code
<b>UL:</b>	Underwriters Laboratories, Inc.

##### 110.20 DEFINITIONS

Whenever the following terms are used in these specifications, in the Agreement, in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be interpreted as follows, all of which are applicable to both the singular and plural thereof.

**ADDENDUM-** A supplement to any of the Contract Documents issued, in writing, after advertisement of but prior to the opening of bids for an Agreement.

**ADVERTISEMENT-** An announcement inviting bids for work to be performed and materials to be furnished.

**AGREEMENT** -The written agreement between Owner and Contractor covering the work to be performed; other Contract Documents are attached to the Agreement.

**AS APPROVED-** The words "as approved" unless otherwise qualified, shall be understood to be followed by the words "by the City Engineer."

**BIDDER-** Any person, firm, partnership or corporation submitting a proposal on a project.

**BID SECURITY-** The certified check, cashier's check or surety bond which is required to be submitted with the Proposal to ensure execution of the Agreement and the furnishing of the required bonds.

**CHANGE ORDER-** A written order issued after the execution of the Agreement to the Contractor and signed by City of Prineville authorizing an addition, deletion or revision in the work or an adjustment in the Contract Price or the Contract Time issued after execution of the Agreement.

**CITY-** The City of Prineville, including its duly authorized representatives.

**CITY COUNCIL-** The City Council of the City of Prineville.

**CITY ENGINEER-** See Engineer.

**CONTRACT-** See Agreement.

**CONTRACT DOCUMENTS-** The "Contract Documents" consist of the invitation to bid, the instructions to bidders, the proposal, the agreement, the general conditions, the supplementary conditions, the specifications, and the plans including all modifications thereof incorporated into the documents before their execution, and including all other requirements incorporated by specific reference thereto. These form the Agreement.

**CONTRACT ITEM (PAY ITEM)-** A specific unit of work for which a price is provided in the proposal.

**CONTRACT PRICE-** The total amount payable to Contractor under the Agreement.

**CONTRACTOR-** The person or persons, co-partnership, corporation or joint venture who have entered into an agreement with the City of Prineville as party or parties of the second part or their legal representatives. The word "Contractor", although used herein as terming an individual, shall be taken to mean the Contractor, their agents, employees, officials, subcontractors or anyone connected with the work herein set forth on behalf of the Contractor.

**CONTRACT TIME-** The number of calendar or work days stated in the Contract Documents, allowed for completion of the work, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar days, the contract shall be completed by that date.

**DAY-** Unless otherwise stated, the term "day" shall be taken to mean a calendar day of 24 hours, beginning at 12:00 midnight. Saturday, Sundays and holidays shall be included.

**DEVELOPER-** A private entity who has expressed the intention of providing or who has undertaken the providing, of some facility, structure or like project to be accepted for maintenance and ownership by the City of Prineville.

**DESIGN ENGINEER-** Where the term Design Engineer occurs in this document, it shall mean a private engineering firm retained by the Owner to provide design, construction management or some other service necessary for the construction of the proposed public facility.

**DRAWINGS-** See Plans.

**ENGINEER-** Wherever the word "Engineer" occurs in these Contract Documents, the word shall signify the "City Engineer or their authorized representative" and visa versa.

**EQUIPMENT**-All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

**INSPECTOR**- An authorized representative of the City Engineer assigned to make all necessary inspections and/or test of the work performed or being performed or of the materials furnished or being furnished by the City of Prineville.

**INTENTION OF TERMS**- Whenever, in these specifications or on the plans, the words "require," "permitted," "ordered," "designated," "prescribed" or words of the like import are used, it shall be understood that the requirements, permission, order, designation or prescription of the City Engineer is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import shall mean approved by or acceptable to or satisfactory to the City Engineer, subject in each case to the final determination of the City of Prineville.

**LABORATORY**- The official testing laboratories of the City of Prineville or such other laboratories as may be designated by the City Engineer.

**LEGAL HOLIDAY**- The following subject to subsequent change by law, are legal holidays: Sunday, New Year's, Lincoln's Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving, Christmas, and those days declared as holidays by public proclamation. When a legal holiday, other than Sunday falls on a Sunday, the immediate following Monday is a legal holiday.

**MATERIALS**- Any substance incorporated in the project and equipment and other material consumed in the performance of work.

**MODIFICATION-**

(a) A written amendment of the Contract Documents signed by both parties.(b) A change order.(c) Written clarification or interpretation issued by City Engineer.(d) A written order for a minor change or alteration in the work issued by City Engineer.(e) A modification may only be issued after execution of the Agreement.

**NOTICE OF AWARD**- The written notice by City of Prineville to the apparent successful Bidder stating that upon compliance with the conditions precedent to be fulfilled by him within the time specified, City of Prineville will execute and deliver the Agreement to him.

**NOTICE TO PROCEED**- A written notice to the Contractor fixing the date on which to begin the actual contract work. If applicable, the Notice to Proceed shall state the date on which the Contract Time will commence to run.

**OR EQUAL**- The term "or equal" shall be understood to indicate that the "equal" product is the same or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made by the City Engineer. Such "equal" products shall not be purchased or installed by the Contractor without the City Engineer's written approval.

**OWNER**- The legal entity or contracting agency for which the work is being performed. Where applicable the Developer is the owner until such time as the improvements are accepted by the City Council for maintenance.

**PAYMENT BOND-** The approved form of security furnished by the Contractor and Contractors surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.

**PERFORMANCE BOND-** The approved form of security furnished by the Contractor and Contractors surety as a guaranty that the Contractor will complete the work in accordance with the terms of the Agreement.

**PLANS-** The term "Plans" refers to the official plans, profiles, cross sections, elevations, details and other working drawings and supplementary drawings or reproductions thereof, signed by the City Engineer, which show the location, character, dimensions, and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents regardless of the method of binding.

**PROPOSAL-** The written offer of the bidder submitted on the approved proposal form setting forth the prices for the work to be performed.

**PROPOSAL GUARANTY-** See Bid Security.

**REFERENCE SPECIFICATIONS-** Bulletins, standards, rules, methods of analysis or test, codes and specifications.

#### **SPECIAL PROVISIONS**

See SPECIAL SPECIFICATIONS.

**SPECIAL SPECIFICATIONS-** Requirements peculiar to the project, and changes and modifications to the standard specifications. Special specifications are used interchangeably with special provisions.

**SPECIFICATIONS-** The terms, provisions and requirements contained herein as supplemented by such special conditions as may be necessary, pertaining to either the materials and/or work to be furnished under the Agreement.

**STANDARD SPECIFICATIONS-** Codes, rules and regulations referred to in these specifications by basic name or designation only, shall be considered to be of the latest issue with all amendments as of the date of these specifications. Applicable portions of such shall become a part of these Contract Documents.

**STRUCTURES-** Facilities such as bridges, culverts, catch basins, inlets, retaining walls, cribbing, storm and sanitary sewer lines, water lines, utility cables and pipelines, underdrains, electrical ducts, manholes, handholes, lighting fixtures and bases, transformers, flexible and rigid pavements; buildings, vaults, and other man-made features that may be encountered in the work and not otherwise classified herein.

**SUBCONTRACTOR-** An individual, firm or corporation having a direct contract with the Contractor or any other subcontractor for the performance of a portion of the work on the project or those who furnish material for the project.

**SUPERINTENDENT-** The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the City Engineer, and who shall supervise and direct the construction.

**SURETY-** A corporation, licensed to conduct the business of surety in the State of Oregon, and named in the current list of approved sureties published by the U. S. Treasury Circular 570. All bonds signed on behalf of the Surety must be accompanied by a certified copy of the authority to act.

If the Surety on any bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Oregon or it ceases to meet the requirements outlined above, Contractor shall within five (5) days thereafter, substitute another Bond and Surety, both of which shall be acceptable to City of Prineville.

**WORK-** Wherever the word "work" occurs in these Contract Documents, the word shall signify all materials, labor, tools and all appliances, machinery and appurtenances necessary to perform and complete everything specified in the Contract Documents or shown on the Plans, and such additional items of labor, material, and equipment not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure. As used herein, "provide" shall be understood to mean "furnish and install".

**WORKING DAY-** Any and every calendar day excluding Saturdays, Sundays and legal holidays. Unless otherwise permitted a working day occurs between the hours of 7:00 am and 5:00 pm.

**WRITTEN NOTICE-** Wherever the term "Written Notice" occurs in these Contract Documents, the term shall signify a written communication delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended or, if delivered or sent by registered mail, to the last business address known to him who gives the notice.

## **140 SCOPE OF WORK**

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### **ODOT PROVISIONS AND REQUIREMENTS**

#### **140.00 PURPOSE OF CONTRACT**

The Contract Documents are complimentary, and what is called for by any one shall be as binding as if called for by all. The intent of the Contract Documents is to describe a complete project to be constructed in accordance with the Contract Documents. Any work that may be reasonably inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not it is specifically called for.

Materials or work described in words which so applied have a well known technical and trade meaning shall be held to refer to such recognized standards.

Any inconsistency, conflict, error or omission found in the Contract Documents shall be reported to the City Engineer in writing immediately and before proceeding with the work affected thereby; however, Contractor shall not be liable to City of Prineville or City Engineer for failure to discover any conflict error or inconsistency in the Contract Documents. The City Engineer will clarify inconsistencies or omissions, in writing, within a reasonable time. The decision of the City Engineer shall be final.

In resolving inconsistencies among two or more sections of the Contract Documents, precedence shall be given in the following order:

1. Modifications, the last in time being the first in precedence, including all Addenda to the Contract Documents.
2. Agreements
3. Supplementary Conditions
4. Special Specifications
5. Standard Specifications
6. Instructions to Bidders
7. General Conditions
8. Reference Specifications
9. Plans

Figure dimensions on plans shall take precedence over scale dimensions. Detailed plans shall take precedence over general plans.

#### **140.30 AGENCY-REQUIRED CHANGES IN THE WORK**

The City of Prineville, without invalidating the Agreement, may at any time or from time to time, order extra work or make changes by altering, adding to or deducting from the work. All such work shall be authorized by Change Order and executed under the conditions of the original Agreement, except that claim by either party for time and payment increase or decrease caused thereby shall be adjusted at the time of ordering such change.

The City Engineer may authorize minor changes in the work not involving extra cost and not inconsistent with the overall intent of the Contract Documents.

Additional work performed by Contractor, without authorization of a Change Order, will not entitle Contractor to an increase in the Contract Price except for an emergency endangering life or property.

If the work is reduced by alterations, such action shall not constitute a claim for damages based on loss of anticipated profits.

#### **140.90 FINAL TRIMMING AND CLEANUP**

At all times during the work, the premises are to be kept clean and orderly, and upon completion of the work, the project shall be free of rubbish or excess materials of any kind.

During construction, stockpile the excavated trench materials so as to do the least damage to adjacent lawns, grassed areas, gardens, shrubbery or fences, regardless of whether these are on private property, City, State or County rights-of-way. Remove all excavated materials from grassed and planted areas; and leave these surfaces in a condition equivalent to their original condition and free from all rocks, gravel, boulders or other foreign material. Replace top soiled areas, raked and graded to

conform to their original contours. All existing drainage ditches and culverts shall be reopened and graded and natural drainage restored. Restore culverts broken or damaged to their original condition and location. Upon completion of pipe laying and backfilling operations in any section, hand rake and drag all former grassed and/or planted areas leaving all disturbed areas free from rocks, gravel, clay or any other foreign material. The finished surface shall conform to the original surface and shall be free draining, free from holes, rough spots or other surface features detrimental to a seeded area.

Cleaning up shall be a continuing process from the start of work to final acceptance of the project. The Contractor shall, at all times, at Contractors' own expense and without further order keep property on which work is in progress free from accumulations of waste material or rubbish caused by employees or by the work, and at all times during the construction period shall maintain structure sites, rights-of-way, adjacent property, and the surfaces of streets and roads on which work is being done in a safe condition for the Contractor's workers, and the public. Accumulation of waste materials that might constitute a fire hazard will not be permitted. Spillage from the Contractor's hauling vehicles on traveled public or private roads and parking areas shall be promptly cleaned up. Upon completion of the construction, the Contractor shall, at own expense, remove all temporary structures, rubbish, and waste materials resulting from operations.

Upon failure of the Contractor to provide cleanup within 24 hours of being so directed by the Engineer in writing, the City or an agent retained by the City, may complete the cleanup and the cost thereof plus 10% for handling shall be deducted from any payment due the Contractor.

## **150 CONTROL OF WORK**

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### **ODOT PROVISIONS AND REQUIREMENTS**

#### **150.00 AUTHORITY OF THE ENGINEER**

The City Engineer shall be the City of Prineville's representative during the construction and shall observe the work in progress on behalf of the City of Prineville. This general inspection of the construction will not, however, relieve the construction Contractor(s) from their obligation to conduct comprehensive inspections and to maintain full responsibility for the techniques and sequences of construction, the safety precautions incidental thereto, and for performing the construction work in accordance with the Contract Documents. The City Engineer shall also have authority to reject all work and materials which do not conform to the Agreement. The City Engineer will, within a reasonable time after their presentation, make decisions, in writing, on all claims of the City of Prineville or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents. The City Engineer's estimates and decisions shall be the condition precedent to the right of the Contractor to any action on the Agreement and

to any right to receive additional money under the Agreement. The City Engineer shall have the authority to order changes in the work or extra work, as provided in Section 140.30.

The City Engineer will not be responsible and has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform work.

#### **150.01 PROJECT MANAGER'S AUTHORITY AND DUTIES**

Assistants may be assigned to various portions of the work by the City Engineer. It is understood that such assistants shall have the power, in the absence of the City Engineer, to issue clarifications and make decisions within the limitations of the authority of the City Engineer.

#### **150.02 INSPECTORS' AUTHORITY AND DUTIES**

The City Engineer may appoint assistants to inspect all materials used and all work done. Such inspection may extend to any or all parts of the work and to the preparation or manufacture of the materials to be used. The inspectors will be authorized to revoke, alter, enlarge or relax the provision on the work to check the necessary lines and grades and to keep the engineer informed as to the progress of the work and the manner in which it is being done; also to call the attention of the Contractor to any infringements upon plans or specifications, but failure of the inspector or the engineer to call the attention of the Contractor to faulty work or infringements upon the plans or specifications shall not constitute acceptance of said work.

An inspector will not be authorized to approve or accept any portion of the work or to issue instructions contrary to the plans and specifications. The inspector will have authority to reject defective material and to suspend any work that is being improperly done, subject to the final decision of the engineer. The inspector will exercise such additional authority as may, from time to time, be especially delegated to the inspector by the engineer.

The authority of such assistants Engineer's, representatives and Inspectors shall, however, be limited to the particular portion or phase of the work to which they are assigned and by the particular duties assigned to them. Upon request, the assignment and duties of the inspector or inspectors will be provided in writing.

#### **150.15 CONSTRUCTION STAKES, LINES AND GRADES**

All survey work shall be conducted under the supervision of a Registered Professional Land Surveyor, licensed in the State of Oregon. The Contractor will be responsible for providing all construction staking as required to complete the work. The City will provide bench marks, control points, and reference points as shown on the plans or as required by the Contractor to establish control for construction staking. The Contractor will be responsible for establishing centerline location and elevations.



Lines and grades shall be furnished by the Engineer as provided in these Contract Documents.

All stakes, marks, and other information shall be carefully preserved by the Contractor, and in case of their careless or unnecessary destruction or removal by the Contractor or Contractors' employees, such stakes, marks and other information will be replaced at the Contractor's expense.

Construction stakes and stakes which are reference points for construction work will be conspicuously marked. It shall be the responsibility of the Contractor to inform their employees and their subcontractors of their importance and the necessity for their preservation.

The Contractor will provide vertical and horizontal construction staking in the proximity of the work.

Construction staking will be provided at 50 foot intervals on tangent and 25 foot intervals on curve. The grade stakes at a minimum should contain the following information:

Engineer's station  
Offset from line  
Cut or fill to grade

A color code may be established during the course of the project indicating specific colors for the various kinds of stakes to be set.

#### Sewer

Both gravity and pressure sewer lines will be construction staked by means of an offset line with pipe invert cut information provided. Grades for pressure sewer will be provided by the sub grade stakes for streets. Finish grades will be provided as required.

Manholes will have two reference points (swing-ties) indicating the center of the manhole and, flow invert elevation.

Ends of services will be staked.

#### Water

Water lines will be staked every 50ft. by means of an offset line after the street sub-grade has been constructed. Appurtenances will be staked as required. Fire hydrants will have two reference points (swing ties) indicating the hydrant cap nut location with finished grade pad elevations. Other grades will be provided as required.

#### Street

Prior to commencing construction, clearing limits shall be established.

Where a significant (greater than 5 feet) cut or fill is required for sub-grade, slope stakes and construction staking for sub-grade will be provided. A permit is required from the City of Prineville Planning Department for a cut or fill exceeding 3 ft on average.

Curb line shall be staked by means of an offset line no more than 6 feet offset from the top face of curb, showing the cut or fill to the finish work. Said stakes shall be protected and saved for a period of five (5) working days after construction of curbs to enable the Inspector to approve the alignment and grade.

Base rock shall be staked by painting an appropriate target on the curb and providing construction stakes (blue tops) on centerline. Blue tops will also be provided at the gutter line for the centerline and gutter lines of any intersecting street.

#### Structures

All structures shall be staked to the line and grade as shown on the plans or as directed by the engineer.

#### **150.20 INSPECTION**

City Engineer and/or Inspector will make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the Contract Documents. The City Engineer and/or inspector will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. Their efforts will be directed toward providing assurance for the City of Prineville that the completed project will conform to the requirements of the Contract Documents. On the basis of their on-site observations as an experienced and qualified professional, she/he will keep City of Prineville informed in the progress of the work and will endeavor to guard City of Prineville against defects and deficiencies in the work of Contractors.

#### **150.25 ACCEPTABILITY OF MATERIALS AND WORK**

All materials to be incorporated in the work shall be subject to sampling, testing, and approval. The City Engineer may select samples in the presence of the Contractor to be delivered and tested as required by the Specifications at a laboratory approved by the City, at no additional cost to the City of Prineville. Testing shall conform to City of Prineville current Standards and Specifications and be performed by a certified/independent testing laboratory as approved by City Engineer.

The City Engineer and representatives and authorized representatives of public agencies shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide facilities for such access and for inspection, including maintenance of temporary and permanent access routes.

Operating equipment and systems shall be performance tested in the presence of the City Engineer to demonstrate compliance with the specified requirements. Performance testing shall be conducted under the specified design operating

conditions or under such simulated operating conditions as recommended or approved by the City Engineer. Such testing shall be scheduled with the City Engineer at least one (1) week in advance of the planned date for testing and include a factory representative on site.

### **150.35 PLANS AND WORKING DRAWINGS**

The City Engineer will furnish to the Contractor, on request, five copies of the Contract Documents and five sets of full scale Plans. Additional copies of Contract Documents or Plans may be obtained on request by paying the actual cost of reproducing the Contract Documents or Plans. The City Engineer will furnish, with reasonable promptness, additional instructions by means of drawings or otherwise, as are necessary for the proper execution of the work. All such drawings and instructions will be consistent with the Contract Documents.

All Plans, Drawings, Specifications and copies hereof furnished by the City Engineer are the City's property and are not to be used on other work and, with the exception of the signed contract set, are to be returned on request at the completion of the work. Any reuse of these materials without specific written verification by the City Engineer will be at the risk of the user and without any liability or legal expense to the City Engineer. All models are the property of the City of Prineville.

#### Shop Drawings and Sample Submittal

The Contractor shall submit, in quadruplicate, to the Engineer for this review, such shop drawings, electrical diagrams, and catalog cuts for fabricated items and manufactured item (including mechanical and electrical equipment) required by the Contract Documents. Drawings shall be submitted in sufficient time to allow the City Engineer not less than ten (10) regular working days for examining the drawings.

The drawings shall be accurate, distinct, and complete, and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the contract drawings and specifications.

Unless otherwise approved by the City Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the drawings or other approved means, that the Contractor has checked the shop drawings, and that the work shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. The practice of submitting incomplete or unchecked shop drawings for the City Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the City Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to the Contractor for resubmission in the proper form.

When the shop drawings have been reviewed by the City Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the drawing may be rejected and one set will be returned

to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit the drawings, in quadruplicate, unless otherwise directed by the City Engineer. No changes shall be made by the Contractor to resubmitted shop drawings other than those changes indicated by the City Engineer.

The review of such drawings and catalog cuts by the City Engineer shall not relieve the Contractor from responsibility for correctness of dimensions, fabrication details and space requirements or for deviations from the contract drawings or specifications, unless the Contractor has called attention to such deviations in writing by a letter accompanying the drawings and the City Engineer approves the change or deviations in writing at the time of submission, nor shall review by the City Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the City Engineer, the Contractor shall state in their letter whether or not such deviations involve any deduction or extra cost adjustments. The approval of a separate item as such will not indicate approval of the assembly in which the item functions.

Contractor shall also submit, to City Engineer for approval with such promptness as to cause no delay in work, all samples required by the Contract Documents. All samples shall be clearly identified as to material, manufacturer and any pertinent catalog number if applicable, and the use for which intended.

Where a shop drawing or sample submittal is required by the Contract Documents, no related work shall be commenced until the submission has been approved by the City Engineer.

#### **150.40 COOPERATION AND SUPERINTENDENCE BY THE CONTRACTOR** **150.40(a) GENERAL**

It is understood and agreed that the Contractor has, by careful examination, been satisfied as to the nature and location of the work; the conformation of the grounds; the character, quality, and quantities needed preliminary to and during the prosecution of the work; the general and local conditions; and all other matters which can in any way affect the work under this Agreement. No verbal agreement or conversation with any officer, agent or employee of the City of Prineville, either before or after the execution of this Agreement, shall affect or modify any of the terms or obligations herein contained.

The Contractor shall keep one copy of the Contract Documents at the work site, in good condition, available to the City Engineer and to City Engineers' representatives.

The Contractor shall maintain on the job site, and make available to the City Engineer upon request, one current marked-up set of the Design Drawings which accurately indicate all approved variations in the completed work that differ from the design information shown on the Drawings.

**150.40(b) SUPERINTENDENCE**

The Contractor shall keep on the project, during its progress, competent supervisory personnel. The Contractor shall designate, in writing, before starting work, an authorized representative who shall have complete authority to represent and to act for the Contractor. The Contractor shall give efficient supervision to the work, using their best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, and procedures, and for providing adequate safety precautions and coordinating all portions of the work under the Agreement. The Contractor shall be responsible to see that the finished work complies accurately with the Contract Documents.

The superintendent or other duly authorized representative of the Contractor, shall represent the Contractor in their absence; and all directions given to them shall be as binding as if given to the Contractor.

**150.50 COOPERATION WITH UTILITIES**

The Contractor is responsible for coordinating with utility owners. Before the Contractor performs any excavation she/he is to contact the Utilities Notification Center at 1-800-332-2344 at least forty-eight (48) hours prior to excavation. The Contractor shall conform to the requirements of ORS 757.541 to 757.571.

**150.55 COOPERATION WITH OTHER CONTRACTORS**

The City of Prineville reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and execution of their work and shall properly connect and coordinate Contractors work with theirs.

If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the City Engineer any defects in such work that render it unsuitable for such proper execution and results. The Contractor's failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of their work, except as to defects which may develop in the other contractor's work after execution of work.

**150.75 PROTECTION AND MAINTENANCE OF WORK DURING CONSTRUCTION**

Clean all spilled dirt, gravel or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation.

**150.95 FINAL ACCEPTANCE**

The City of Prineville shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions which may not have expired. Such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of the work or

delays the completion of the work, the Contractor shall be entitled to extra compensation or an extension of time or both. Should such condition or conditions prevail; the Contractor shall submit a claim for additional compensation or extension of time, in writing, to the City Engineer. The City Engineer will review the claim and determine its validity.

#### **150.97 RESPONSIBILITY FOR MATERIALS AND WORKMANSHIP**

The completed work shall include all necessary permanent safety devices such as machinery guards and similar ordinary safety items required by the state and federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the work (including City of Prineville selected equipment) subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein.

The Contractor shall confine equipment, the storage of materials, and the operation of workmen to limits shown on the plans or indicated by law, ordinances, permits or directions of the City Engineer, and shall not unreasonably encumber the premises with materials.

The Contractor shall do all cutting, fitting or patching of work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonable implied by the plans.

### **160 SOURCE OF MATERIALS**

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#### **ODOT PROVISIONS AND REQUIREMENTS**

##### **160.01 NOTIFICATION OF SOURCE OF SUPPLY AND MATERIALS**

###### **160.01(c) APPROVAL REQUIRED**

If the specifications, law, ordinance or applicable rules or regulations permit Contractor to furnish or use a substitute that is equal to any material or equipment specified and if Contractor wishes to furnish to use a proposed substitute, Contractor shall make written application to City Engineer for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified; stating whether or not its incorporation in or use in connection with the project is subject to the payment of any license fee or royalty; and identifying all variations of the proposed substitute from that specified and indicating available maintenance service. No substitute shall be ordered or installed without the written approval of City Engineer who will be the judge of equality and may require Contractor to furnish such other data about the proposed substitute as he/she considers pertinent. No substitute shall be ordered or installed

without such performance guarantee and bonds as City of Prineville may require which shall be furnished at Contractor's expense.

In selecting and/or approving equipment for installation in the project, the City of Prineville and City Engineer assume no responsibility for injury or claims resulting from failure of the equipment to comply with applicable national, state, and local safety codes or requirements or the safety requirements of a recognized agency or failure due to faulty design concepts or defective workmanship and materials.

#### **160.20 PREFERENCES FOR MATERIALS**

Unless otherwise specified, all materials shall be new, of U.S. Domestic manufacture or as allowed by the North American Free Trade Agreement, and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.

#### **160.30 AGENCY-FURNISHED MATERIALS**

All materials and/or services furnished by the City of Prineville shall be obtained by the Contractor as indicated in these Contract Documents. The cost of handling and placing City of Prineville furnished materials shall be included in the price paid for the Agreement item involving such material.

The Contractor's responsibility for material furnished by the City shall begin upon Contractor's acceptance at the point of delivery to Contractor. All such material shall be immediately examined, and material defective in manufacture and/or otherwise damaged shall be rejected by the Contractor at the time and place of delivery to Contractor, to be replaced by the City. Once accepted by the Contractor, defective and/or damaged material discovered prior to final acceptance of the work shall be removed by the Contractor and shall be replaced, at Contractor's own expense, the defective material. In such case the Contractor shall furnish all labor, equipment and material incidental to replacement and necessary for the completion of the work to the satisfaction of the Engineer.

#### **160.60 CONTRACTOR-FURNISHED MATERIALS AND SOURCES**

##### **160.60(a) GENERAL**

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary for the execution and completion of the work.

The Contractor shall be responsible for all material furnished by Contractor. All such material shall be examined by a City Representative and any material not meeting specifications or that is defective in manufacture or that has been

damaged after delivery, shall be replaced or corrected by the Contractor at Contractor's expense.

## **165 QUALITY OF MATERIALS**

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### **ODOT PROVISIONS AND REQUIREMENTS**

#### **165.01 REJECTED MATERIALS**

Any material condemned or rejected by the City Engineer or their authorized inspector, because of non-conformity with the Contract Documents shall be removed at once from the vicinity of the work by the Contractor at Contractors' own expense, and the same shall not be used on the work.

If any part or portion of the work done or material furnished under this Agreement shall prove defective and not in accordance with the Plans and Specifications, and if the imperfection in the same shall not be of sufficient magnitude or importance as to make the work dangerous or undesirable or if the removal of such work will create conditions which are dangerous or undesirable, the City of Prineville shall have the right and authority to retain such work. In such case, if acceptance occurs after approval of final payment, an appropriate amount shall be paid by Contractor to City of Prineville.

The City Engineer will not be responsible for the acts or omissions of Contractor or any subcontractor or other persons at the site performing any of the work. Any defective work or material that may be discovered by the City Engineer before the final acceptance of work or before final payment has been made or during the guarantee period, shall be removed and replaced by work and materials which shall conform to the provision of the Contract Documents. Failure on the part of the Engineer to condemn or reject bad or inferior work or materials shall not be construed to imply acceptance of such work or materials.

#### **165.04 COST OF TESTING**

The Contractor shall furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the City Engineer.

The City Engineer may require additional testing of any portion of the work. When additional testing is required by City Engineer, the City shall pay cost of any passing test. The Contractor shall pay the cost of any non-passing test.

### **PROVISIONS AND REQUIREMENTS**

#### **165.10 MATERIALS ACCEPTANCE GUIDES**

If the Specifications, laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the City Engineer timely notice



of its readiness for inspection. If the inspection is by authority other than the City Engineer's, the City Engineer shall be given timely notice of the date fixed for such inspection. Inspections by the City Engineer will be promptly made, and where practicable, at the source of supply. If any work should be covered without approval or consent of the City Engineer, it shall, if required by the City Engineer, be uncovered for examination at the Contractor's expense.

Re-examination of questioned work may be ordered by the Engineer; and, if so ordered, the work shall be uncovered by the Contractor. If such work be found not in accordance with the Contract Documents, the Contractor shall correct the defective work at no additional cost to the City of Prineville.

Neither observations by City Engineer nor inspections, tests or approvals by persons other than Contractor shall relieve Contractor from obligations to perform work in accordance with requirements of the Contract Documents.

**165.20 MATERIALS SPECIFICATIONS AND TEST METHOD REFERENCES**

All sampling and testing of materials shall be done in accordance with the latest designated standard methods of AASHTO, ASTM, etc., or in accordance with special methods designated in the Specifications.

**165.30 FIELD-TESTED MATERIALS**

The Contractor shall furnish, without extra charges, the necessary test pieces and samples, including facilities and labor for obtaining the same, as required by the City Engineer.

**165.35 NONFIELD-TESTED MATERIALS**

When required, the Contractor shall furnish certificates of tests of materials and equipment made at the point of manufacture by an independent, certified testing laboratory.

**160.50 AGENCY CONTROLLED LAND; LIMITATIONS AND REQUIREMENTS**

Nothing in the Agreement shall be construed as vesting in the Contractor any right to the property or in the material used after they have been attached or affixed to the work or the soil and accepted by the City of Prineville. All such materials shall become the property of the City of Prineville upon being so attached or affixed and accepted.

## **170 LEGAL RELATIONS AND RESPONSIBILITIES**

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### **DESCRIPTION**

#### **170.00 GENERAL**

When the Contract Documents concern public works for the state or any county, municipality or political subdivision created by its laws, the applicable statutes of the State of Oregon shall apply. For this reason, Sections ORS Chapters 279, 279A, 279B, and 279C of the Oregon Revised Statutes, as amended or superseded, including the latest additions and revisions, are incorporated by reference as part of these Contract Documents.

These sections define the requirements of Oregon law for Public Contracts.

1. Concerning payments of laborers and material, contributions to Workmen's Compensation Board, prevention of liens, payment of withholding taxes.
2. Concerning the maximum hours of labor, payment of medical care and attention to employees, liability to workers for violation of minimum wage rate requirements.
3. Concerning payment of claims by public officers, termination of Agreement because of a national emergency, conditions concerning the forfeiture of the Agreement.
4. Concerning payment of not less than prevailing wage rates, the Contractor shall pay not less than the prevailing rate of wages in conformance with ORS 279C.800 through 279C.870. Certification of wage payments by the Contractor shall be submitted to the City of Prineville in conformance with ORS 279C.845. Wage certification forms shall be provided by the Contractor.
5. The schedule of minimum hourly wage rates, as determined by the Commissioner of the Bureau of Labor of the State of Oregon is included within these Contract Documents. Any revisions will be delivered to all bidders in the form of Addendum to the Agreement.
6. The City of Prineville does not guarantee that labor can be procured for the minimum wages in the wage scale. The rates of wages listed are only minimums, below which the Contractor cannot pay. The Contractor shall ascertain the wages above the minimum set forth that the Contractor may have to pay.
7. It is understood and agreed that all parties to this Agreement shall determine the contents of these applicable statutes and comply with their provisions throughout the performance of the Agreement

#### **170.02 PERMITS, LICENSES AND TAXES**

The Contractor shall keep fully informed of all local ordinances, State and Federal laws, ordinances and regulations, in any manner affecting the work herein specified. Contractor shall at all times comply with said ordinances, laws, and regulations, and protect and indemnify the City of Prineville and officers and agents against any claim or liability arising from or based on the violation of such laws, ordinances or

regulations. Permits and licenses of a temporary or construction nature including government charges and inspection fees necessary for the prosecution of the work shall be secured and paid for by the Contractor. Easements and rights-of-way shall be secured and paid for by the City of Prineville, unless otherwise specified in the Supplementary Conditions.

#### **170.03 FURNISHING RIGHT-OF-WAY AND PERMITS**

City of Prineville shall furnish, as indicated in the Contract Documents and not later than the date when needed by Contractor, the lands upon which the work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the City of Prineville, unless otherwise specified in the Contract Documents. If Contractor believes that any delay in City of Prineville furnishing these lands or easements entitles Contractor to an extension of the Contract Time, she/he may make claim therefore. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

#### **170.04 PATENTS, COPYRIGHTS AND TRADEMARKS**

The Contractor shall pay all royalty and license fees. Contractor shall defend all suits or claims for infringement of any patent rights and shall save the City of Prineville harmless from loss on account thereof, except that the City of Prineville shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified; but if the Contractor has information that the process or article specified is an infringement of a patent, contractor shall be responsible for such loss unless contractor promptly gives such information to the City Engineer or City of Prineville.

#### **170.10 REQUIRED PAYMENTS BY CONTRACTORS**

Indebtedness incurred for any cause in connection with this work must be paid by the Contractor, and the City of Prineville is hereby relieved at all times from any indebtedness or claim other than payments under terms of the Agreement.

The Contractor agrees to withhold and pay any and all withholding taxes, whether State or Federal, sales tax, and to pay all Social Security charges and also all State Unemployment Compensation charges, and to pay or cause to be withheld, as the case may be, any and all taxes, charges or fees or sums whatsoever which are now or may hereafter be required to be paid or withheld under any laws.

### **PROVISIONS AND REQUIREMENTS**

#### **170.60 SAFETY, HEALTH AND SANITATION PROVISIONS**

The Contractor will be solely and completely responsible for conditions of the work site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

Safety provisions shall conform to all applicable State, County, and local laws, ordinances and codes, and to the current safety regulations as set forth in the Oregon Safety Codes adopted and published by the Workmen's Compensation Board, Salem, Oregon.

If required by law, the necessary sanitary conveniences, properly secluded from public observation, shall be erected and maintained by the Contractor at all times while persons are employed on the work; and the use of such sanitary conveniences shall be strictly enforced. The location of such conveniences shall be approved by the City Engineer.

The Contractor shall maintain at office or other well known place at the work site, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of all persons (including employees) who may be injured on the work site.

The Contractor shall also comply with "U.S. Department of Labor Occupational Safety and Health Act," the "Construction Safety Act" administered by the U.S. Department of Labor, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, and the "Manual on Uniform Traffic Control Devices", except where these are in conflict with state laws, in which case the more stringent requirements shall be followed.

If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the City Engineer and the City of Prineville. In addition, the Contractor must promptly report in writing to the City Engineer all accidents whatsoever arising out of or in connection with, the performance of the work whether on or adjacent to, the site, giving full details and statements of witnesses.

The duty of the City Engineer to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on or near the construction site. The City Engineer has not been retained or compensated to provide design and construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform work.

If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the City Engineer, giving full details of the claim.

## 170.70 INSURANCE COVERAGES

Work shall not commence until all insurance requirements have been met and certificates thereof have been filed with the City.

The contractor shall provide and maintain public liability and property damage insurance that protects the contractor and the City and its officers, agents and employees from any and all claims, demands, actions and suits for damage to property or personal injury, including death, arising from the contractor's work under this contract. Such claims may arise out of or result from the Contractor's operations under the Agreement, whether such operations be by Contractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts for them. The insurance shall provide coverage for not less than:

1. Claims under Workers' or Workmen's Compensation, disability benefit and other similar employee benefit acts;
2. Claims for damages because of bodily injury, occupational sickness or disease or death of Contractors' employees;
3. Claims for damages because of bodily injury, sickness or disease or death of any person other than Contractors' employees;
4. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor or (2) by any other person;
5. Claims for damages because of injury to or destruction of tangible property, including consequential damages; and
6. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
7. Minimum limits of insurance coverage shall be as follows:

(Insurance below (a) (b) (c) shall include Owner, City of Prineville and Design Engineer as additional insured.)

- a. **General Liability Insurance** with combined single limits of not less than \$1,000,000 for each occurrence and \$2,000,000 annual aggregate for Bodily Injury and Property Damage. It shall include contractual liability coverage for the indemnity provided under this contract, and shall provide that City of Prineville, and its agents, officers, and employees are Additional Insured but only with respect to the Contractor's services to be provide under this Contract.
- b. **Automobile Liability insurance** with a combined single limit of not less than \$1,000,000 for each occurrence and \$2,000,000 annual aggregate for Bodily Injury and Property Damage, including coverage for owned, hired or non-owned vehicles, as applicable.
- c. **Workers' Compensation Insurance** Prior to the performance of any work under a contract awarded by the City, the contractor shall comply with the

workers' compensation law, ORS Chapter 656, as it may be amended, and if workers' compensation insurance is required by ORS Chapter 656, the contractor shall maintain coverage for all subject workers as defined by ORS Chapter 656 and shall maintain a current, valid certificate of workers' compensation insurance on file with the City for the entire period during which work is performed under the contract.

Additional Insured may require inclusion of Oregon Department of Transportation and/or private property owners in addition to the City of Prineville.

Certificates of Insurance acceptable to the City of Prineville shall be filed with the City of Prineville prior to commencement of the work. The certificate(s) will specify all of the parties who are additional insured's (or loss payees). Contractor shall be financially responsible for all deductibles, self-insured retentions and/or self insurance included hereunder.

These certificates shall contain a provision that coverage afforded under the policies will not be cancelled until at least thirty days prior written notice has been given to the City of Prineville.

The Contractor's liability and property insurance with a completed Operations Endorsement shall be maintained after the completion of the project for the full warranty period. Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from operations under this Agreement.

When the construction is to be accomplished within a public or private right-of-way requiring special insurance coverage, the Contractor shall conform to the particular requirements and provide the required insurance. The Contractor shall include in liability policy all endorsements that the said authority may require for the protection of the authority, its officers, agents, and employees.

In case of the breach of any provision of this article, the City of Prineville, at its option, may take out and maintain at the expense of the Contractor such insurance as the City of Prineville may deem proper and may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Agreement.

The Contractor shall not commence work under this Agreement until Contractor has obtained all the insurance required hereunder and such insurance has been reviewed by the City of Prineville, nor shall the Contractor allow any subcontractor to commence work on subcontract until all similar insurance required for that portion of the work has been so obtained. Review of the insurance by the City of Prineville shall not relieve or decrease the liability of the contractor hereunder.

#### **170.71 INDEPENDENT CONTRACTOR STATUS**

The Contractor shall perform all work under this Agreement as an Independent Agent and shall not be considered as an agent of the City of Prineville, nor shall the Contractor's subcontractors or employees be sub-agents of the City of Prineville.

#### **170.72 INDEMNITY; HOLD HARMLESS**

In carrying out any of the provisions hereof in or exercising any authority granted by the Agreement, there will be no personal liability upon any public official.

The Contractor shall hold harmless, indemnify and defend the City of Prineville, the City Engineer and its consultants, and such of their officers and employees and agents, from any and all liability claims, losses or damages arising or alleged to arise from or during the performance of the work described herein, by reason of any negligent act or omission of the Contractor, any subcontractor or suppliers or any agent, employee or representative of any of them.

The obligation of Contractor shall not extend to the liability of City Engineer, their agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

#### **170.80 RESPONSIBILITY FOR DAMAGE TO WORK**

The Contractor shall protect work and materials from damage due to the nature of the work, the elements, carelessness of other contractors or from any cause whatever until the completion and acceptance of the work. All loss or damage arising out of a nature of the work to be done under these Contract Documents or from any unseen obstruction or defects which may be encountered in the prosecution of the work or from the action of the elements shall be sustained by the Contractor.

#### **170.85 RESPONSIBILITY FOR DEFECTIVE WORK**

All work shall be guaranteed for a period of one (1) year against defects in materials and workmanship.

The Contractor hereby agrees to make, at own expense, all repairs or replacements necessitated by defects in materials or workmanship supplied by Contractor or subcontractors that become evident within one (1) year after the date of written notice from the City Engineer recommending final acceptance of the entire project or entire schedule, by the City of Prineville. The Contractor also agrees to hold the City of Prineville harmless from claims of any kind arising from damage due to said defects. The Contractor shall make all repairs and replacements promptly upon receipt of written orders for same from the City of Prineville. If the Contractor fails to make the repairs and replacements promptly, the City of Prineville may do the work, and the Contractor and Contractors' surety shall be liable for the cost thereof.

#### **170.85(b) WARRANTIES**

Upon acceptance of the construction by the City of Prineville Engineering Division, a minimum one (1) year warranty agreement on materials and workmanship shall be initiated between the City of Prineville and the Developer.

The warranty shall be comprised of a bond or other approved security in a minimum value of 12% of the original improvement construction costs.

#### **170.89 PROTECTION OF UTILITY, FIRE-CONTROL AND RAILROAD PROPERTY AND SERVICES; REPAIR; ROADWAY RESTORATION**

The Contractor shall adopt every practical means and comply with all laws, ordinances, and regulations in order to minimize interferences to traffic and inconveniences, discomfort, and damage to the public, including the provision of adequate dust control measures. All obstructions to traffic shall be guarded in accordance with the *Manual on Uniform Traffic Control Devices*.

The Contractor shall protect against injury any pipes, conduits, utilities, lawns, gardens, shrubbery, trees, fences or other structures or property, public and/or private, encountered in this work except as stipulated elsewhere herein. The Contractor shall be responsible and liable for any damage to such pipe, structures, and property.

In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor, without special instruction or authorization from the City Engineer, is hereby obligated to act, at their discretion, to prevent such threatened loss or injury; and he shall so act, without appeal, if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work shall be determined by agreement or as covered under the section 'Change Orders'.

#### **170.93 TRESPASS**

The Contractor shall not trespass upon private property and shall be responsible for all injury or damage to persons or property, directly or indirectly, resulting from Contractors operations in completing this work.

The Contractor shall comply with the laws and regulations of the City of Prineville, county, and state, relating to the safety of persons and property, and will be held responsible and required to make good any injury or damage to persons or property caused by carelessness or neglect on the part of the Contractor or subcontractor(s) or any agent or employee of either during the progress of the work and until its final acceptance.

### **180 PROSECUTION AND PROGRESS**

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#### **ODOT PROVISIONS AND REQUIREMENTS**

#### **180.05 ASSIGNMENT/DELEGATION OF CONTRACT**

Neither party to the Agreement shall assign the Agreement or sublet it as a whole without the written consent of the other; nor shall the Contractor assign any monies due or to become due to Contractor hereunder without the previous written consent of the City of Prineville.



### **180.15 AGENCY'S RIGHT TO DO WORK AT THE CONTRACTOR'S EXPENSE**

If the Contractor should, in the opinion of the City Engineer, neglect to prosecute the work properly or should neglect or refuse at Contractors' own cost to take up and replace work as shall have been rejected by the City Engineer, then the City of Prineville shall notify the Surety of the condition and after ten (10) days written notice to the Contractor and the Surety or without notice if an emergency or danger to the work or public exists, and without prejudice to any other right which the City of Prineville may have under the Agreement, take over that portion of the work which has been improperly executed and make good the deficiencies and deduct the cost thereof from the payments then or thereafter due the Contractor.

### **180.21 SUBCONTRACTING**

The Contractor shall include, in the space provided in the Letter for Employment of Subcontractors, the legal corporate names of all proposed subcontractors and the portion of the work that these proposed subcontractors or other persons or organizations shall perform.

The Contractor agrees that she/he is as fully responsible to the City of Prineville for the acts and omissions of their subcontractors and of persons either directly or indirectly employed by them as he/she is for the acts and omissions of persons directly employed by Contractor.

Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the City of Prineville. Subcontractors shall be in accordance with, and the Contractor shall be bound by, the following provisions:

1. All subcontractors shall be subject to the approval of the City Engineer.
2. All subcontracts shall be in writing and shall provide that all work to be performed thereunder shall be performed in accordance with the terms of these Contract Documents.
3. If requested, true copies of any and all subcontracts shall be furnished to the City Engineer; however, prices may be omitted.
4. Subcontractors shall conform to the regulations governing employment of labor.
5. The subcontracting of any part of the work will in no way relieve the Contractor of their responsibility or liability or obligation under these Contract Documents.

### **180.30 MATERIALS, EQUIPMENT AND WORK FORCE**

The Contractor shall employ only competent skillful workers to do the work. The Contractor shall at all times enforce strict discipline and good order among employees. The Contractor shall comply with all applicable labor rules, wage scales, and regulations, including nondiscriminatory laws, of the Government of the United States, State, County, and City or Town in which the work is to be done.

#### **180.43 COMMENCEMENT AND PERFORMANCE OF WORK**

Before work shall be started and materials ordered, the Contractor shall meet and consult with the City Engineer relative to materials, equipment, and all arrangements for prosecuting the work. The Contractor shall provide and comply with work schedule, as agreed upon in the preconstruction conference. The Contractor shall commence the work contemplated under these Contract Documents within three (3) days after the City of Prineville's written notice to proceed unless otherwise notified by the City Engineer, and shall complete the work within the time specified in the Agreement, it being expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the work are of the essence of this Agreement.

The work shall be prosecuted at such time, and in or on such part or parts of the project as may be required, to complete the project as contemplated in the Contract Documents. Time is essence of this contract. Upon starting construction, the Contractor shall diligently and continuously pursue completion of the work with adequate crew and equipment. Should the Contractor, without the express approval of the City Engineer, reduce this effort, it shall be considered a failure of the Contractor to complete the work in the time agreed upon. As such it shall fall under the provisions of Section 180.85 **Failure to Complete on Time; Liquidated Damages**. Liquidated damages may be assessed for each day of reduced operations. It is expressly understood and mutually agreed between all parties to the Agreement that the City Engineer shall not determine or be responsible for construction methods.

The Contractor shall perform the work and take such precautions as contractor may deem necessary to complete the project so all work will be in conformance with the Contract Documents within the Contract time.

#### **180.50 CONTRACT TIME TO COMPLETE WORK**

The City Engineer may, at their sole discretion, issue a written notice of substantial completion for the purpose of establishing the starting date for specific guarantees, and to establish the date that the City of Prineville will assume the responsibility for the cost of operating such portions of the project. Said notice shall not be considered as final acceptance of any portion of the work or relieve the Contractor from completing the remaining work within the specified time and in full compliance with the Contract Documents. All equipment contained in the work, plus all other components necessary to enable the City of Prineville to operate the facility in the manner that was intended, shall be complete including acceptable testing as specified in these Contract Documents on the substantial completion date.

The City of Prineville shall have the right to exclude Contractor from the project after the date of substantial completion, but City of Prineville shall allow Contractor reasonable access to complete or correct remaining items of work.

### **180.60 NOTICE OF DELAY**

If the Contractor shall be delayed at any time in the progress of the work by any act or neglect of the City of Prineville or the City Engineer or of any employee of either; or by any separate contractor employed by the City of Prineville; or by changes ordered in the work; or by strikes, lockouts, fire, unavoidable casualties or any cause beyond the Contractor's control which justified the delay or by delay authorized in writing by the City Engineer, then the date for completion of the work shall be extended. Within 14 days after the Contractor submits to the City Engineer a written request for an extension of time, the City Engineer will determine the length of extension due the Contractor. The City of Prineville will make the final decision on all requests for extension of time.

No such extension shall be made for delays occurring more than seven (7) days before claim therefore is made in writing to the City Engineer. In case of a continuing cause of delay, only one claim is necessary.

If no schedule or agreement stating the date upon which supplemental drawings shall be furnished by the City Engineer is made, then no claim for delay shall be allowed the Contractor on account of failure to furnish drawings until two (2) weeks after demand for such drawings, and not then unless such claim be reasonable.

### **180.70 SUSPENSION OF WORK**

If the work should be stopped under an order of any court or other public authority for a period of three (3) months, through no act or fault of the Contractor or of anyone employed by Contractor; or if the City Engineer should fail to issue any estimate for payment within thirty (30) days after it is due; or if the City of Prineville should fail to pay the Contractor within thirty (30) days after the time specified in the paragraph "Partial Payment" of the section "Payment" any sum certified by the City Engineer, then the Contractor may, upon fifteen (15) days written notice to the City of Prineville and the City Engineer, stop work or terminate this agreement.

Agreement and recover from the City of Prineville payment for all work executed and any loss sustained upon any plant or material and reasonable profit and damages, unless said default has been remedied within said time.

### **180.80 ADJUSTMENT OF CONTRACT TIME**

The Contract Time may only be changed by a Change Order.

No extension of time will be granted to the Contractor for delays occurring to parts of the work that have no measurable impact on the completion of the total work under this Agreement.

No extension of time will be considered for weather conditions normal to the area in which the work is being performed. Unusual weather conditions, if determined by the City Engineer to be of a severity that would stop all progress of the work, may be considered as cause for an extension of Agreement completion time.

Delays in delivery of equipment or material purchased by the Contractor or subcontractors (including City of Prineville-selected equipment) shall not be considered as a just cause for delay. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all equipment and materials.

#### **180.85 FAILURE TO COMPLETE ON TIME; LIQUIDATED DAMAGES**

Should the Contractor fail to complete the work or any part thereof, in the time agreed upon in these Contract Documents or within such extra time as may have been allowed for delays by extensions granted as provided in these Contract Documents, the Contractor shall reimburse the City of Prineville for the additional expense and damage for every day specified that the Agreement remains uncompleted after the date of specified completion. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the work shall be as given in the following schedule for each workday the work exceeds the number of workdays specified.

The said amounts are hereby agreed upon as liquidated damages for the loss to the City of Prineville on account of expense due to the employment of engineers, inspectors, and other employees after the expiration of the time of completion, and on account of the value of the operation of the work dependent thereon. It is expressly understood and agreed that this amount is not to be considered in the nature of a penalty, but as liquidated damages which have accrued against the Contractor; and the City of Prineville is authorized to deduct the amount of such damages from any monies due the Contractor for work performed or material furnished under this Agreement; and the Contractor and Contractors' Sureties shall be liable for any excess.

#### **180.90 TERMINATION OF CONTRACT AND SUBSTITUTED PERFORMANCE**

If the Contractor should be adjudged as bankrupt; or if the Contractor should make a general assignment for the benefit of their creditors; or if a receiver should be appointed to account of their insolvency; or if the Contractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials; or if the Contractor should fail to make prompt payment to subcontractors for material or labor; or persistently disregards laws ordinances or the instructions of the City Engineer; or otherwise be guilty of substantial violation of any provision of the Agreement or any laws or ordinance; then the City of Prineville, upon the certification of the City Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, and after giving the Contractor and Surety seven (7) days written notice, transfer the employment for said work from the Contractor to the Surety. Upon receipt of such notice, such Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the work included under this Agreement and employ, by Contractor or otherwise, any qualified person or persons to finish the work and provide the materials therefore, in accordance with the Contract Documents, without termination of the

continuing full force and effect of this Agreement. In case of such transfer of employment to such surety, the Surety shall be paid in its own name on estimates according to the terms hereof without any right of the Contractor to make any claim for the same or any part thereof. In lieu of the foregoing, if the City of Prineville so elects, the City may terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method the City may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of completing the Agreement, including compensation for the additional managerial and administrative services, shall exceed such unpaid balance, the Contractor shall pay the difference to the City of Prineville. The expense incurred by the City of Prineville, as herein provided and the damage incurred through the Contractor's default shall be certified by the City Engineer.

Where Contractor's services have been so terminated by City of Prineville, said terminations shall not affect any rights of City of Prineville against Contractor then existing or which may thereafter accrue. Any retention or payment of monies by City of Prineville due Contractor will not release Contractor from liability.

Upon seven (7) days written notice to Contractor and City Engineer, City of Prineville, may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Agreement. In such case, Contractor shall be paid for all work executed and any expense sustained as determined by the City of Prineville.

## **195 PAYMENT**

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### **DESCRIPTION**

#### **195.00 SCOPE AND LIMIT**

In consideration of the faithful performance of all the covenants, stipulations, and conditions in these Contract Documents, the City of Prineville agrees to pay the Contractor the amount bid as adjusted when so stipulated in the Contractor's Proposal on the basis of the unit prices named in the contractor's Proposal for the work actually performed as determined by the final estimate of the City Engineer, together with any amounts due for extra work not classified under the items listed in the Contractor's Proposal as provided in Section 195.20 of these GENERAL CONDITIONS; less any deduction for failure to complete the work within the time specified; and less any deductions for claims and damages paid by the City of Prineville due to acts or omissions of the Contractor and for which the Contractor is liable under this Agreement.

#### **Payroll and Certified Statement**

(1) The form required by ORS 279C.845 is the Payroll and Certified Statement form, **WH-38**. This form must accurately and completely set out the contractor's or subcontractor's payroll for each week during which the contractor or subcontractor employs a worker upon a public works project.

(2) The contractor or subcontractor may submit the weekly payroll on the **WH-38** form or may use a similar form providing such form contains all the elements of the **WH-38** form. When submitting the weekly payroll on a form other than **WH-38**, the contractor or subcontractor must attach the certified statement contained on the **WH-38** form to the payroll forms submitted.

(3) Each Payroll and Certified Statement form must be submitted by the contractor or subcontractor to the public agency by the fifth business day of each month following a month in which workers were employed upon a public works project.

(4) The Payroll and Certified Statement forms received by the public agency are public records subject to the provisions of ORS 192.410 to 192.505. As such, they must be made available upon request. Pursuant to ORS 279C.845(2), information submitted on certified statements may be used only to ensure compliance with the provisions of ORS 279C.800 through 279C.870.

(5) If the contractor fails to submit its payroll and certified statement forms to the public agency as required by subsection (3) of this rule, the public agency must retain 25 percent of any amount earned by the contractor until the contractor has submitted the required payroll and certified statements to the public agency.

(a) The amount to be retained shall be calculated at 25 percent of the unpaid amount earned by the contractor at the time each payroll and certified statement are due. For example, if the contractor fails to submit its payroll and certified statement by the fifth of the month and the contractor earned \$100,000 in the period since its last payroll and certified statement were submitted to the public agency, the public agency must retain 25 percent of \$100,000 (\$25,000), until such time as the required payroll and certified statement are submitted.

(b) When calculating the amount to be retained, amounts previously retained shall not be included as amounts earned by the contractor.

(c) Once the required payroll and certified statement have been submitted to the public agency, the public agency must pay the amount retained to the contractor within 14 days.

(6) If a first-tier subcontractor fails to submit a payroll and certified statement form to the public agency as required by subsection (3) of this rule, the contractor must retain 25 percent of any amount earned by the first-tier subcontractor until the first-tier subcontractor has submitted the required payroll and certified statements to the public agency.

(a) The amount to be retained shall be calculated at 25 percent of the unpaid amount earned by the first-tier subcontractor at the time each payroll and certified statement are due. For example, if the first-tier subcontractor fails to submit the payroll and certified statement by the fifth of the month and the first-tier subcontractor earned \$100,000 in the period since the last payroll and certified statement were submitted to the public agency, the contractor must retain 25 percent of \$100,000 (\$25,000), until such time as the required payroll and certified statement are submitted.

(b) When calculating the amount to be retained, amounts previously retained shall not be included as amounts earned by the first-tier subcontractor.

(c) The contractor must verify that the first-tier subcontractor has filed the required payroll and certified statement(s) with the public agency before the contractor may pay the first-tier subcontractor any amount retained under this section.

(d) Once the first-tier subcontractor has filed the required payroll and certified statement with the public agency, the contractor must pay the amount retained to the first-tier subcontractor within 14 days.

(7) Notwithstanding ORS 279C.555 or 279C.570(7), amounts retained pursuant to the provisions of this rule shall be in addition to any other amounts retained.

(8)(a) If a project is a public works of the type described in ORS 279C.800(6)(a)(B), and no public agency awards a contract to a contractor for the project, the contractors and any subcontractors employing workers upon the public works project shall submit weekly payrolls as required by ORS 279C.845 and this rule to the public agency or agencies providing funds for the project.

(b) When more than one public agency provides funds for a project, the public agencies may designate one agency to receive the contractor's and any subcontractors' payrolls.

(9)(a) If a project is a public works of the type described in ORS 279C.800(6)(a)(C), and no public agency awards a contract to a contractor for the project, the contractors and any subcontractors employing workers upon the public works project shall submit weekly payrolls as required by ORS 279C.845 and this rule to the public agency or agencies that will occupy or use the completed project.

(b) When more than one public agency will occupy or use the completed project, the public agencies may designate one agency to receive the contractor's and any subcontractors' payrolls.

[ED. NOTE: Forms and Publications referenced are available from the agency.]

The City of Prineville reserves the right to increase or decrease quantities without limit or to omit portions of the work without invalidating said proposal or re-negotiating the unit bid price.

### **195.10 INVOICES**

Invoices must describe the work performed; deliverables completed and amounts due as follows: ALL INVOICES MUST INCLUDE THE FOLLOWING INFORMATION IF APPLICABLE

1. Submit on letterhead. Otherwise show company name, address, phone and fax numbers
2. Invoices must be submitted monthly. Invoices billing for work over 3 months old may not be paid.
3. Show City's Contract Number or P.O. Number
4. Invoice date must be current date.
5. Specify Invoice Number or Billing Number
6. Invoices to be addressed to the Contract Manager's attention.
7. Itemize all tasks, deliverables and/or services performed; hours expended and percent complete, where applicable, and dates of activities invoiced.
8. Show all payments to date outstanding items and balance to completion of contract.
9. Monthly progress reports must accompany invoices. A Contract Summary sheet will be prepared for all contracts that have Task Orders.

10. All billings for Change Orders and Amendments to the Basic Contract will be submitted as separate invoices.
11. Change Order and Amendment invoices will use the Basic Contract or P.O. number followed by a letter designation: (Ex. 100001 Basic Contract will use 100001A for the first Change Order or Amendment).
12. All reimbursable expenses must be submitted with receipts.

Any request for sub consultant or subcontractor payments must include a copy of their invoice signed as to approval by the Prime contractor.

## **PROVISIONS AND REQUIREMENTS**

### **195.20 CHANGES TO PLANS OR CHARACTER OF WORK**

Payment or credit for any alterations covered by a Change Order shall be determined by one or a combination of methods set forth in Unit Prices, Lump Sum or Payment for Force Account Work (Section 197) below:

#### Unit Prices

If applicable, those unit prices stipulated in the Proposal or unit prices negotiated and mutually acceptable to the Contractor and City of Prineville.

#### Lump Sum

A total sum for the work negotiated and mutually acceptable to the Contractor and City of Prineville.

In Unit Prices and Lump Sum above, Contractor's quotations for Change Orders shall be in writing and firm for a period of forty-five (45) days.

Any compensation agreed upon, and subsequently paid by the City of Prineville for work defined in a Change Order shall be deemed to include all costs and expenses related to such work, including the costs and expenses of a direct, indirect, and consequential nature or otherwise, and it is specifically understood and agreed that no additional compensation may be subsequently sought or charged by the Contractor for the work covered by the applicable Change Order.

The City of Prineville's request for quotations on alterations to the work shall not be considered authorization to proceed with the work prior to the issuance of a formal Change Order, nor shall such request justify any delay in existing work.

### **195.50 PROGRESS PAYMENTS AND RETAINED AMOUNTS**

At least ten (10) days before the 25th of each month, but not more often than once a month, Contractor shall submit to City Engineer for review an application for payment filled out and signed by Contractor covering the work completed as of the date of the application and accompanied by such data and schedules as City Engineer may reasonably require. If payment is requested on the basis of materials and equipment



not incorporated in the work but delivered and suitably stored at the site or at another location agreed to in writing, the application for payment shall also be accompanied by such data, satisfactory to City of Prineville, as will establish City of Prineville's title to the material and equipment and protect interest therein, including applicable insurance. Each subsequent application for payment may be required to include an affidavit of Contractor's obligations reflected in prior applications for payment.

Contractor warrants and guarantees that title to all work, materials and equipment covered by any application for payment, whether incorporated in the project or not, will pass to City of Prineville at the time of payment free and clear of all liens, claims, security interests and encumbrances.

City Engineer will, within ten (10) days after receipt of each application for payment, either indicate in writing, approval of payment and present the application to City of Prineville or return the application to Contractor indicating, in writing, reasons for refusing to approve payment. In the later case, Contractor may make the necessary corrections and resubmit the application.

The amount of said application for payment, after deducting five percent (5%) and all previous payments shall be due and payable to the Contractor not more than thirty (30) days after the last day of said month. The five percent (5%) deducted, as above set forth, shall be withheld by the City of Prineville to insure faithful completion of the work under the terms of the Contract Documents and to provide a fund for the payment of any claims which may accrue against the City of Prineville because of some act or omission on the part of the Contractor.

Nothing contained in this article shall be construed to affect the right, hereby reserved, to reject the whole or any part of the aforesaid work should such work be later found not to comply with any of the provisions of the Contract Documents. All estimated quantities of work for which progress payments have been made are subject to review and correction on the final estimate. Payment by the City of Prineville and acceptance by the Contractor of progress payments based on periodic estimates of quantities of work shall not, in any way, constitute acceptance of the estimated quantities used as the basis for computing the amounts of the progress payments.

Furthermore, on all Agreements for the construction, reconstruction, maintenance or repair of any public work in the State of Oregon, no payment will be made to the Contractor until the Contractor files with the City of Prineville the signed Wage Certification Form certifying that Contractor has paid not less than the prevailing rate of wages as required by Chapter 279, ORS, as set forth in General Conditions.

#### **195.80 ALLOWANCE FOR MATERIALS LEFT ON HAND**

Monthly progress payments will include compensation for materials received on the site during the pay period but not incorporated in the work providing they are properly stored and protected and the Contractor submits to the City Engineer, in writing, ten (10) days prior to the end of each pay period, a list, with costs supported by invoices

from suppliers for such materials on the job for which the Contractor feels credit is due.

Payments for material delivered to the site and not incorporated in the work during the pay period shall be understood to be advance payments for the Contractor's convenience. Final payment will be made only for materials actually incorporated in the work. Upon acceptance of the work, all materials stored on the site for which advance payments have been made, unless otherwise agreed upon in writing, shall revert to the Contractor and all remaining advance payments on materials shall be deducted from the final payment for the work.

Advance payments by the City of Prineville for materials on the site, but not incorporated in the work, shall not be considered as acceptance by the City of Prineville and shall not relieve the Contractor from their responsibilities.

### **195.90 FINAL PAYMENT**

#### **195.90(b) FINAL PAYMENT**

On public projects, neither the final payment nor any part of the retained percentage shall become due until the Contractor submits to the City of Prineville a signed affidavit, satisfactory to the City of Prineville, stating that so far as the Contractor has knowledge or information, all accounts for materials, labor, and incidentals in connection with the work have been paid in full. The form of affidavit shall be satisfactory to the City of Prineville.

If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the City of Prineville all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

To receive final payment, the Contractor must do the following:

1. Notify the City Engineer, in writing, that the Contractor has completed work in accordance with the Contract Documents and request final payment.
2. Submit to the City of Prineville appropriate waivers of lien and claims for itself and all subcontractors and a signed affidavit, satisfactory to the City of Prineville, stating that so far as the contractor has knowledge or information, all accounts for materials, labor, and incidentals in connection with the work have been paid in full.
3. On agreements for public works, furnish to the City of Prineville a completed wage certification as required by ORS 279, as amended.
4. Provide copies of all certified payrolls.
5. Provide required warranty letter and bond. (See Section 08 Development Provisions)

Within thirty (30) days of written notice from the Contractor that the work has been completed, the City Engineer shall conduct a final inspection of the work. If the work has been completed to the satisfaction of the City Engineer, he/she shall submit a certificate of acceptance of the completed work, together with a final

estimate of the amount due the Contractor under this Agreement, less any amount to be withheld by the City of Prineville to ensure guarantees, as may be provided in the Supplementary Conditions.

The City of Prineville shall, within thirty five (35) days, pay to the Contractor all monies due under the conditions of the Agreement upon the following:

1. The City of Prineville's acceptance of the City Engineer's final estimate.
2. The City of Prineville's approval of the affidavit of the release of lien and claim.
3. Inspection and approval by all or any concerned public works of the State, of any county, municipality or political subdivision created by law or Public Utility.

The acceptance by the Contractor of the final payment shall release the City of Prineville and the City Engineer as agent of the City of Prineville from all claims and all liability to the Contractor for all things done or furnished in connection with the work, and every act of the City of Prineville and others relating to or arising out of the work. No payment, however, final or otherwise, shall operate to release the Contractor from obligations under these Contract Documents.

**195.90(c) NO WAIVER OF RIGHT TO MAKE ADJUSTMENT**

Neither the inspection by the City of Prineville, through the City Engineer or any of City employees, nor any order by the City of Prineville for payment of money, nor any payment for or acceptance of, the whole or any part of the work by the City of Prineville or City Engineer, nor any extension of time, nor any possession taken by the City of Prineville or its employees, shall operate as a waiver of any provision of these Contract Documents or any power herein reserved to the City of Prineville or any right to damages herein, nor shall any waiver of any breach in this Agreement be held to be a waiver of any other or subsequent breach.

**197 PAYMENT FOR FORCE ACCOUNT WORK**

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**FORCE ACCOUNT WORK**

**197.01 GENERAL**

If the method of payment cannot be agreed upon prior to the beginning of the work, and the City of Prineville or the City Engineer directs that the work be done by written Change Order or on a force account basis, then the Contractor shall furnish labor equipment, and materials necessary to complete the work in a satisfactory manner and within a reasonable period of time. For the work performed, payment will be made for the documented actual cost of the following:

- A. Labor, including foremen, who are directly assigned to the force account work: (actual payroll cost, including wages, fringe benefits as established by negotiated labor agreements, labor insurance, and labor taxes as established by law). No other fixed labor burden will be considered unless approved in writing by the City of Prineville.
- B. Material delivered and used on the designated work, including sales tax, if paid for by Contractor or subcontractor.
- C. Rental or equivalent rental cost of equipment, including necessary transportation for items having a value in excess of one hundred dollars (\$100). The current Associated General Contractors of America published equipment rental rates will be the maximum allowable rate.
- D. Additional bond, as required and approved by the City of Prineville.
- E. Additional insurance (other than labor insurance) as required and approved by the City of Prineville.

To costs under Section 197 **Force Account Work**, there shall be added the following fixed fees for the Contractor or subcontractor actually performing the work:

- 1. A fixed fee of fifteen percent (15%) added to the cost of Items A, B and C; and
  - 2. A fixed fee of six percent (6%) added to the cost of items D and E above; and
  - 3. An additional fixed fee of ten percent (10%) shall be allowed the Contractor for the administrative handling of portions of the work that are performed by an approved subcontractor.
- No additional fixed fee will be allowed for the administrative handling of work performed by a subcontractor of a subcontractor unless by written permission from the City of Prineville.

The added fixed fees shall be considered to be full compensation, covering the cost of general supervision, overhead, profit, and any other general expense.

The City of Prineville reserves the right to furnish such materials and equipment, as it deems expedient, and the Contractor shall have no claim for profit or added fees on the cost of such materials and equipment.

For equipment under Item C above, rental or equivalent rental cost will be allowed for only those days or hours during which the equipment is in actual use. Rental and transportation allowances shall not exceed the current rental rates prevailing in the locality. The rentals allowed for equipment will, in all cases, be understood to cover all fuel, supplies, repairs, and renewals, and no further allowances will be made for those items, unless specific agreement to that effect is made.

The Contractor shall maintain records in such a manner as to provide a clear distinction between the direct costs of work paid for on a force account basis and the costs of other operations. The Contractor shall furnish the City Engineer report sheets in duplicate of each day's force account work no later than the working day following the materials used, and shall cover the direct cost of labor and the charges for

equipment rental, whether furnished by the Contractor, subcontractor or other forces. The daily report sheets shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type, and identification number of equipment and hours operated.

Material charges shall be substantiated by valid copies of vendors' invoices for materials used in the alterations covered by Change Orders. Such invoices shall be submitted with the daily report sheets or, if not available, they shall be submitted with subsequent daily report sheets. Said daily report sheets shall be signed by the Contractor or authorized agent.

To receive partial payments and the final payment for force account work, the Contractor shall submit in a manner approved by the City Engineer, detailed and complete documented verification of the Contractor's and any of subcontractor's actual current costs involved in the force account work pursuant to the issuance of an approved Change Order. Such costs shall be submitted within thirty (30) days after said work has been performed.

No payment will be made for work billed and submitted to the City Engineer after the thirty (30) day period has expired. No extra or additional work shall be performed by the Contractor, except in an emergency endangering life or property, unless in pursuance of a written Change Order.

## **199 DISAGREEMENT, PROTESTS AND CLAIMS**

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### **PROVISIONS AND REQUIREMENTS**

#### **199.30 CLAIMS PROCEDURE**

If the Contractor claims that any instructions involve extra cost under this Agreement, the Contractor shall give the City Engineer and City of Prineville written notice thereof within forty-eight (48) hours after the receipt of such instructions, and in any event before proceeding to execute the work. If such notification is not given or if the City Engineer is not afforded proper facilities by the Contractor for keeping strict account of actual cost, then the Contractor hereby agrees to waive the claim for such additional compensation. Such notice by the Contractor, and the fact that the City Engineer has kept account of the cost as aforesaid, shall not in any way be construed as proving the validity of the claim.

Claims for additional compensation shall be made in itemized detail and submitted, in writing, to the City of Prineville and City Engineer within ten (10) days following completion of that portion of the work for which the Contractor bases a claim is found to be just. It shall be allowed and paid for as provided in the section covering Change Orders.

## **199.40 CLAIM DECISION; REVIEW; EXHAUSTION OF ADMINISTRATIVE REMEDIES**

### **199.40(e) LITIGATION**

In the event suit or action is instituted to enforce any of the terms or conditions of this Agreement, the losing party shall pay to the prevailing party, in addition to the costs and disbursements allowed by statute, such sum as the court may adjudge reasonable as attorney's fees in such suit or action, in both trial and appellate courts.

## **220 ACCOMMODATIONS FOR PUBLIC TRAFFIC**

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### **DESCRIPTION**

#### **220.00 SCOPE**

The Contractor will be responsible to maintain two-way traffic at all times unless otherwise specified. The streets shall be open for two-way traffic at all times when the Contractor is not performing work unless otherwise specified. Approaches to all properties accessing to the project shall be maintained by the Contractor at all times except for short periods necessary to the progress of the construction.

#### **220.02 PUBLIC SAFETY AND CONVENIENCE**

The Contractor shall conduct the project with proper regard for the safety and convenience of the public. When the project involves use of public ways, Contractor shall provide flagmen when directed and install and maintain means of free access to all fire hydrants, service stations, warehouses, stores, houses, garages and other property.

Private residential driveways shall be closed only with approval of the Engineer or specific permission of the property owner. The Contractor shall not interfere with normal operation of public transit vehicles unless otherwise authorized. The Contractor shall not obstruct or interfere with travel over any public street or sidewalk without approval. Where detours are necessary, they shall be maintained with good surface and shall be clearly marked. The Contractor shall provide open trenches and excavations with adequate barricades of an approved type which can be seen from a reasonable distance. At night, the Contractor shall mark all open work and obstructions by lights. The Contractor shall install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges and facilities. The Contractor shall observe all safety instructions received from the Engineer or governmental authorities, but following of such instructions shall not relieve the Contractor from the responsibility or liability for accidents to workers or damage or injury to person or property.

Emergency traffic such as police, fire and disaster units shall be provided reasonable access to the work area at all times.

The Contractor shall be liable for any damages which may result from failure to provide such reasonable access or failure to notify the appropriate authority.

# Chapter IV

## CONSTRUCTION INSPECTION SERVICES

### 01 DEFINITIONS

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When used in the following specification the following terms will have the meanings defined below:

- Design Engineer:** The Engineer retained by the city to provide the design, including, interpretation of said design.
- Engineer:** The City Engineer or his representatives who are City of Prineville personnel.
- Inspector:** An individual responsible for construction inspection who is retained by the Design Engineer but responsible to the Engineer.
- City Inspector:** An individual who is responsible for construction inspection who is a city of Prineville employee.
- Contractor:** An individual, corporation and/or employee, who is awarded the contract for construction.

### 02 SCOPE

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Projects where a private firm has been retained by the City to provide construction inspection services.

An individual retained specifically for construction inspection shall be assigned as the Inspector to a project by the Engineer. This individual shall have a minimum of two years of similar construction inspection experience. The city of Prineville reserves the right to review the resume of the Inspector and reject the Inspector at the City's discretion. The Inspector shall sign a form certifying the veracity of the Inspector's resume.

The Inspector shall provide inspection as directed by the Engineer and is expected to daily inspect the project during the Contractor's operations to certify that the work is in accordance with all applicable standards and specifications. The Inspector shall be responsible to the City of Prineville and shall provide any and all documentation required by the City. The Inspector shall immediately alert the City of any significant items affecting the job that come to his attention.

The Inspector has not been retained or compensated to provide construction review services relating to the Contractor's safety precautions required to perform his work.



### 03 WEEKLY MEETING

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The Inspector shall conduct a weekly meeting on a mutually agreed upon day and time at the project site. The Contractor and the Engineer as well as any other interested parties shall be present at this meeting.

Among other purposes, this meeting will be an opportunity to facilitate communication between all parties, resolve any problems disclosed in the weekly report, check construction record drawings for completeness and direct the work for the next week.

### 04 REPORTS

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**Daily Construction Journal:** The Inspector shall keep with him at all times and make available for inspection by the engineer, a daily construction journal for the project. Upon completion for the project this journal shall contain at least the following information:

- Daily weather and job site conditions
- State and condition of any traffic control devices
- Changes in the contractor's equipment or personnel
- Hours of the contractor's operation
- Location and progress of the contractor's operations
- Times of the inspection
- Significant visitors to the site
- Significant communications
- Testing location and results
- Any other pertinent information

**Weekly Report:** The Inspector shall submit a written weekly report to the Engineer on Monday morning summarizing the work since the previous weekly report. This report shall contain at least the following information:

- Changes in the contractor's equipment or personnel
- Hours and days of the contractor's operation
- Location and progress of the contractor's operations
- Significant visitors to the site
- Significant communications by subject or title
- Testing locations and results
- Any other pertinent information

**Monthly Quantities Estimate (City Contracts):** Once per month, the contractor shall submit an invoice for payment to the City. The Inspector shall then independently make field measurements to verify the contractor's submittal. In the event that the Contractor takes exception to the Inspector's quantity estimate, the Inspector shall satisfy the city of Prineville that his estimate is correct. All measurements, quantities and pay requests shall be approved by the City.

**Final Quantities Estimate (City contracts):** Upon completion of the work, the Inspector along with a City Inspector shall measure the work and submit to Contractor a final quantities estimate to be used in the preparation of the final pay estimate.

This quantities estimate shall be signed by both inspectors attesting to its correctness. In the event that the contractor takes exception to the final quantity estimate, the inspectors shall satisfy the Contractor that the estimate is correct.

**Bid Item Verification (City Contracts):** Upon completion of the project the Inspector shall submit to the Engineer a verification for each bid item. This shall contain at least the following information:

- Date the work covered by the Bid item was begun and completed
- Final measure of the bid item with justification
- Basis of verification
- Reports and any description of observations made and used as a basis for approval
- Any manufacturer's certifications of materials

**Construction Record Drawings:** Upon completion of the project the inspector shall submit to the Engineer the original field drawings upon which have been noted the following:

- Any changes to the design
- Three swing ties to all water valves
- Service location ties
- Distances to fittings and other appurtenance
- Final measure
- Any other information as directed by the Engineer as pertinent

## **05 TESTING**

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All testing shall be in accordance with City of Prineville current Standard Specifications, special specification or as required by the City Engineer. Unless otherwise approved by the City Engineer, all testing shall be conducted in accordance with accepted principals and practices by a certified testing laboratory. It is anticipated that certain tests, such as concrete slump tests, sewer pressure tests, etc. may be adequately performed by the Inspector. Test reports shall be written and shall include a summary of the required and measured results.

## **06 AS BUILT DRAWINGS**

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The As Built drawings will be prepared by the City Engineer or their representative. The Inspector and Design Engineer or their representative, shall be available to assist in the preparation of these As Built drawings. It is anticipated that this assistance will be mainly the interpretation of notes, additional measurements, etc.

# Chapter V

## TRENCHES

### **405 TRENCH EXCAVATION, BEDDING AND BACKFILL**

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#### **DESCRIPTION**

##### **405.00 SCOPE**

Minimum general standards for facilities shall be set forth in the current edition *Oregon Standard Specifications for Construction*. This section covers trench foundation, pipe zone, trench backfill.

##### **405.02 DEFINITIONS**

###### **PIPE ZONE**

The pipe zone is defined as the full width of the trench from 4 inches below the bottom outside surface of the barrel of the pipe to a point 12 inches above the top outside of the barrel of the pipe.

#### **MATERIALS**

##### **405.13 PIPE ZONE MATERIAL**

Pipe zone material for pipes and structures shall be as Class B backfill or as directed by the Engineer. Samples of the proposed material shall be submitted to the Engineer for approval prior to construction.

##### **405.14 TRENCH BACKFILL**

###### **405.14 (a) CLASS A BACKFILL**

Class A backfill shall be native or common material which is acceptable to the Engineer. The intent of this specification is that material excavated on the site be used for backfill after being screened on a 3 inch screen. Class A backfill shall meet the following:

1. No rock has a dimension of greater than 3 inches.
2. Material larger than 1 1/2 inch minimum dimension shall not exceed 25 percent of the backfill by weight.
3. Material passing 100 sieves shall not exceed 30 percent of the backfill by weight.
4. Material passing the 1/4 inch sieve shall have a minimum of 25 percent by weight.

**405.14 (b) CLASS B BACKFILL**

Class B backfill shall be any non-plastic, granular material, pit run gravel or sand or non-plastic soil. Bedding material shall have more than 99 percent by weight passing a crushed 3/4 inch minus screen and shall contain no rock larger than 1 inch and be free of humus organic matter, vegetable matter, frozen material, clods, sticks and debris.

Class B backfill shall contain no more than 30 percent of material passing a 100 sieve. Material passing the 1/4 inch sieve shall have a minimum of 25 percent by weight. Pumice may be used if the construction contractor provides a “test trench” to demonstrate that adequate compaction is achievable.

**405.14 (c) CLASS C BACKFILL**

Class C backfill shall be clean sand with no particle size larger than 1/4 inch with no more than 10 percent of material passing a number 200 sieve.

**405.14 (d) CLASS D BACKFILL**

Class D backfill shall be native or common material which is acceptable to the Engineer. Class D backfill should be used only in trenches exceeding 9 feet in depth and only in areas where roadway construction is not scheduled to immediately follow the completion on the construction.

The intent of this specification is that material excavated on the site be used for backfill after being processed on a bar screen to remove larger rocks. The bar screen shall have not greater than 9 inch clear space between the bars. The Contractor shall make every reasonable effort to remove rock larger than 12 inch major dimension from the stock pile by means such as but not limited to scalping and wasting the base perimeter of the stockpile where such rock collects. The material shall predominate in the finer sizes such that no voids are evident in the stockpile or shall occur in the compacted backfill. The Engineer or their representative shall approve the stockpile prior to incorporation in the work.

The material shall be worked and compacted by mechanical means to a compaction equivalent to 95 percent of relative maximum density. The Contractor may be required to prove compaction by water jetting the backfill. Should subsidence be evident, the backfill shall be re-compacted.

Where Class D backfill is specified, it shall not be placed within 36 inches of the top of the pipe, within 24 inches of any other utility, nor within 36 inches of sub grade or finish grade. Class D backfill shall be placed only in a trench of sufficient width to permit heavy equipment to place and compact the backfill to the satisfaction of the City Engineer.

**OTHER CEMENT TREATED BASE (CTB)**

Cement Treated Base shall conform to the requirements of ODOT Class E. It shall contain 4.5%- 5.5% cement by weight (1 to 2 sacks of cement per ton).

### CONCRETE BACKFILL

Conform to ASTM C-94, Alternate 3. Proportion to obtain a 28 day compressive strength of 2,500 pounds per square inch. Use a minimum of five sacks of cement per cubic yard of concrete.

### CEMENT SLURRY

One (1) sack of cement to one (1) ton of sand. Place in one lift but do not agitate or use mechanical compaction. Cement Slurry shall be required for trenches less than 24 inches in width (section 405.41) or in high traffic areas as required by the City Engineer.

## CONSTRUCTION

### 405.40 GENERAL

The Contractor shall secure and comply with applicable State, County or City Street cutting permits. The Contractors shall comply with all City, County, State and Federal Highway Construction Safety and Health Standards. Prior to installing a pipe or utility trench in an unimproved street, the street shall be brought to sub grade to ensure that adequate bury, depth of cover and utility separation is acquired.

### 405.41 TRENCH EXCAVATION

#### 405.41 (c) TRENCH WIDTH

The trench depth and width at the bottom shall be below the profile showing finish elevations as indicated by the approved plans. The top of the ditch shall be a minimum 6 feet wider (see drawing 1-1 page V-6) and meet all safety standards unless otherwise agreed upon by the City Engineer or City representative.

Pipe Size I.D.	Min. Depth Water & Sewer	Max. Width Water & Sewer	Min. Width Water	Min. Width Sewer
Less than 6"	29"	30"	30"	30" *
6"	41"	36"	30"	30" *
8"	43"	36"	30"	30" *
10"	45"	42"	30"	30" *
12"	47"	42"	30"	30" *
14" - 16"	49" - 51"	48"	36"	36"
18" - 24"	53" - 59"	52"	40"	40"
Greater than 24"	60"	60"	48"	48"

\*For pipes with less than 60" of cover, minimum width of 30" will be allowed.

Trenches less than 30 inches in width under pavement, curb or sidewalk shall be backfilled with cement slurry or cement treated base (CTB).

#### **405.45 PIPE BEDDING**

The bottom of the trench shall be leveled by hand to the grade to which pipe is to be laid utilizing a 4 inch compacted depth of pipe bedding material as specified in Section 405.02. Before each section of pipe is laid the grade shall be checked with a straight-edge, level/rod or laser and irregularities found shall be corrected. The pipe bedding shall form a continuous and uniformly compacted bearing and support for the pipe to solid and undisturbed ground.

Prior to lowering pipe into the trench, a coupling hole shall be dug in the trench bottom having a length, width and depth to allow assembly and to maintain a minimum clearance of 4 inches between coupling and undisturbed trench bottom. The trench bottom between coupling holes shall be made flat and cut true and even to grade so as to provide continuous contact of the trench bottom with the pipe.

No blocking shall be used to achieve required bedding depth.

#### **405.46 BACKFILLING**

##### **405.46 (b) PIPE ZONE**

Pipe zone material shall be as specified in Section 405.13. The specified material above and around the pipe shall be carefully and thoroughly tamped in layers so that the fill is fully compacted to 95% of AASHTO T-99.

##### **405.46 (c) TRENCH BACKFILL**

Backfill shall be placed in accordance with Section 405.46 except the following: From 1 foot above pipe zone, to road base zone the material shall be Class A backfill as specified in 405.14A. It shall be carefully and thoroughly tamped in layers so that fill is fully compacted to 95% of AASHTO T-99 and modified in other sections of this specification. Methods of testing materials in the field may include nuclear densometer, sandcone, WA densometer or other methods approved by the Engineer.

### **MEASUREMENT**

#### **405.80 TRENCH EXCAVATION AND TRENCH BACKFILL**

The length of trench shall be measured horizontally from centerline to centerline of manholes or to the end of the pipe, whichever is applicable. Measurement of the various depth classes as stated in the Schedule of Bid Items will be from the pipe invert as constructed to the design subgrade elevation at the point of measurement.

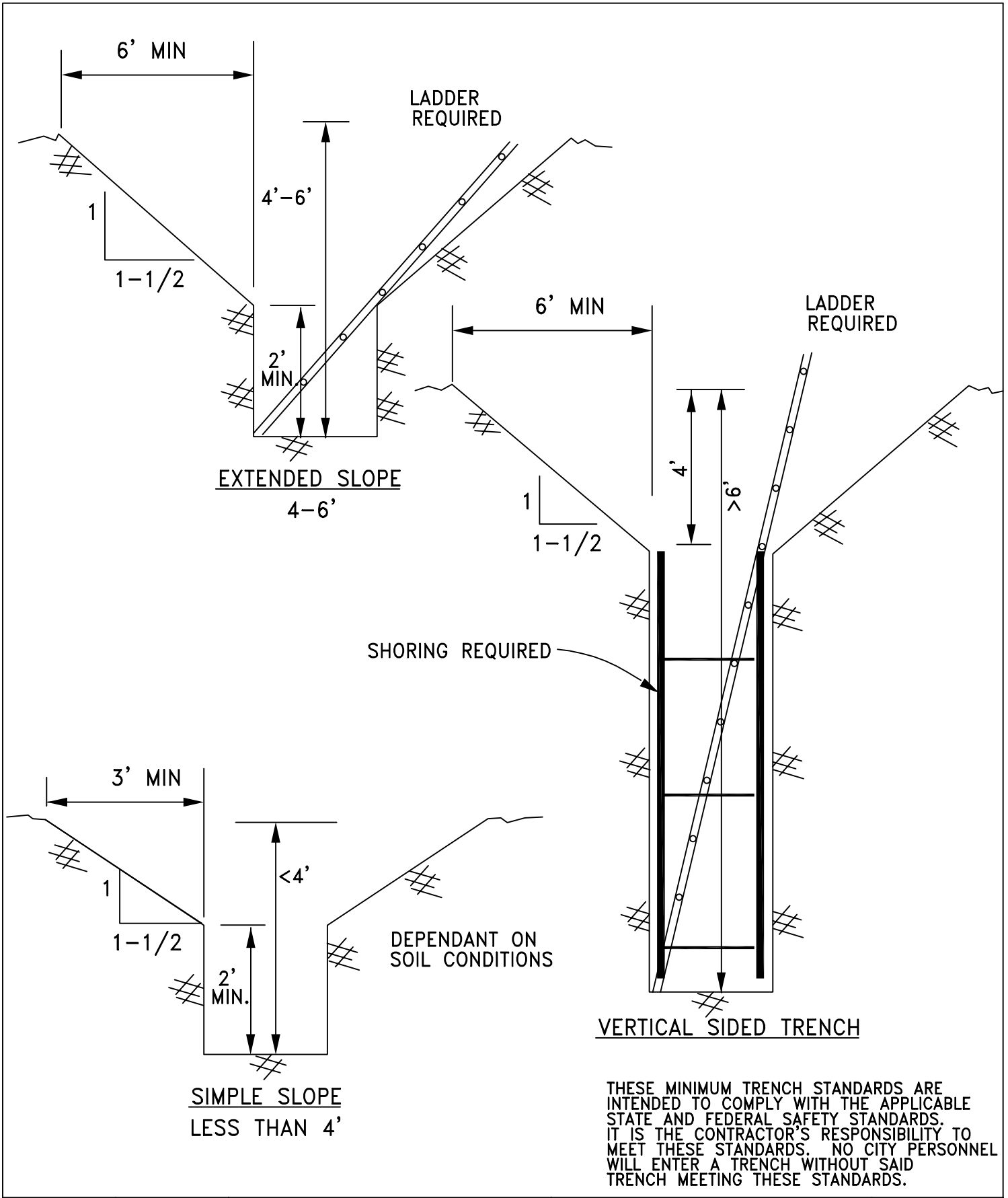
## **PAYMENT**

### **405.90 GENERAL**

Payment for TRENCH EXCAVATION will be at the unit price bid per linear foot at the specified diameter for the depth class as measured. Payment shall include all materials, tools, labor, equipment, bedding, backfill and incidentals required to excavate and backfill the trench as specified. All excavations shall be unclassified as specified in Section 330 unless specifically called for in the Schedule of Bid Items.

### **405.92 INCIDENTAL BASIS**

When not listed in the Schedule of Bid Items as a separate pay item, TRENCH EXCAVATION shall be considered incidental to the price bid for pipe.



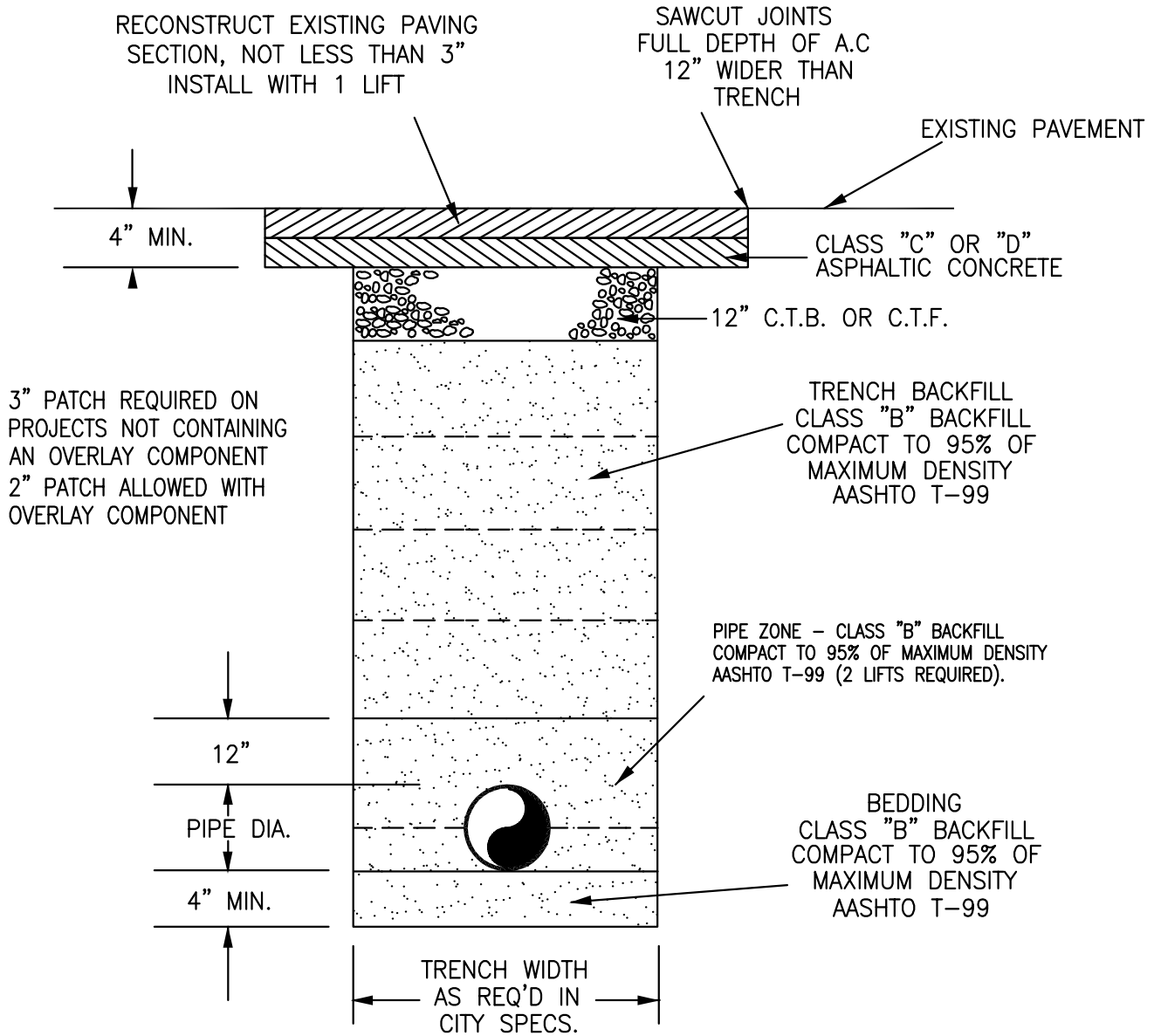
DATE :	SCALE :
06/07/10	NONE
DRAWING NO.	APPROVED BY :
1-1	EAK

TRENCH  
SAFETY  
STANDARDS

**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT



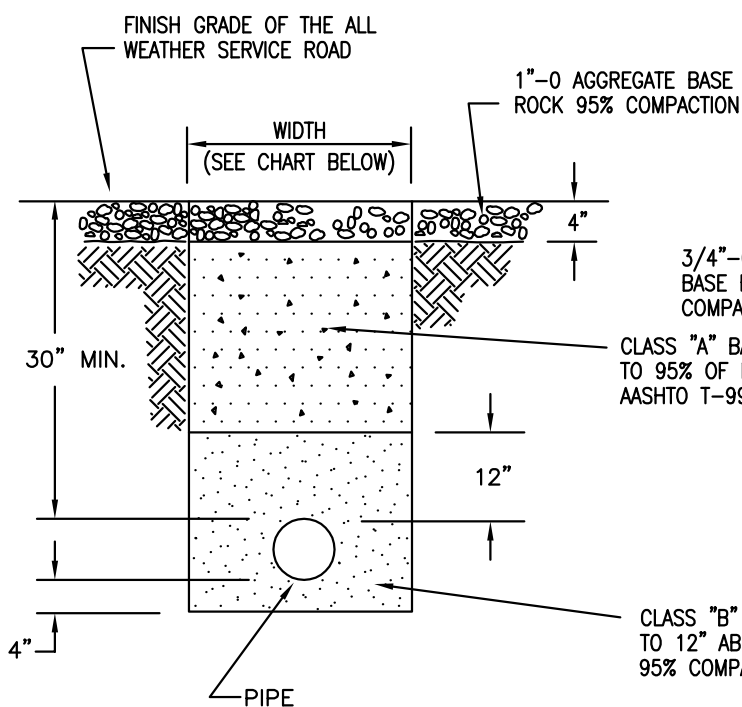




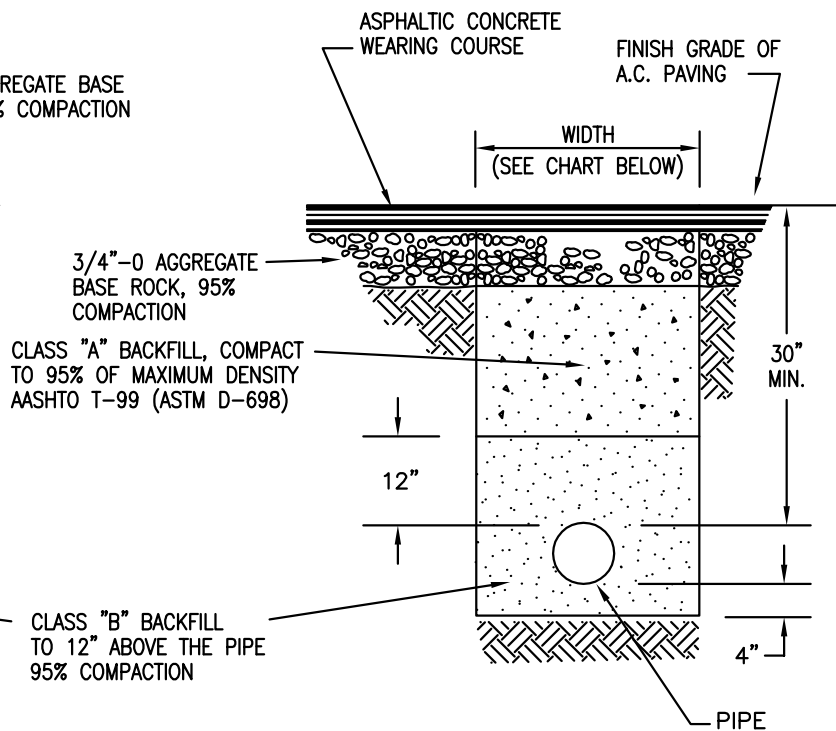
**NOTE:**

1. INSTALL 18 GAUGE COPPER LOCATE WIRE FOR WATER & PRESSURE SAN. SEWER MAIN ABOVE PIPE. LOOP WIRE UP AT EACH VALVE BOX TO WITHIN 6" OF VALVE COVER.
2. INSTALL DETECTION TAPE FOR WATER, GRAVITY SAN. SEWER, & PRESSURE SAN. SEWER MAIN. DETECTION TAPE TO BE LOCATED 12" TO 18" BELOW FINISH GRADE.
3. TRENCHES LESS THAN 24 INCHES IN WIDTH UNDER PAVEMENT, CURB AND/OR SIDEWALK AREAS SHALL BE BACKFILLED WITH CEMENT SLURRY OR CTB (CEMENT TREATED BASE). OTHER TRENCHES IN HIGH TRAFFIC AREAS MAY BE BACKFILLED WITH CEMENT SLURRY AND/OR CTB AS REQUIRED BY THE CITY ENGINEER.

DATE : 6/07/2010	SCALE : NONE	UTILITY TRENCH IN EXISTING PAVEMENT	<b>CITY OF PRINEVILLE</b>	
DRAWING NO. 1-2	APPROVED BY : EAK			



UTILITY TRENCH IN ALL WEATHER SERVICE ROAD



UTILITY TRENCH IN A.C. PAVED STREET

**NOTE:**

1. INSTALL 18 GAUGE COPPER LOCATE WIRE FOR WATER & PRESSURE SAN. SEWER MAIN ABOVE PIPE. LOOP WIRE UP AT EACH VALVE BOX TO WITHIN 6" OF VALVE COVER.
2. INSTALL DETECTION TAPE FOR WATER, GRAVITY SAN. SEWER, & PRESSURE SAN. SEWER MAIN. DETECTION TAPE TO BE LOCATED 12" TO 18" BELOW FINISH GRADE.
3. FOR PIPE SIZE LESS THAN 6 INCH DIAMETER, TRENCH WIDTH MAY BE REDUCED TO LESS THAN 24 INCHES IF CEMENT SLURRY OR CEMENT TREATED BASE (CTB) IS USED AS BACKFILL PER STANDARD DRAWING 1-2.

TRENCH WIDTH & DEPTH

PIPE SIZE I.D.	DEPTH MIN.	WIDTH MIN.
less than 6"	38"	30"
6"	40"	30"
8"	42"	30"
10"	44"	30"
12"	46"	30"
15"	49"	36"
18"	52"	40"

DATE :  
6/07/2010

SCALE :  
NONE

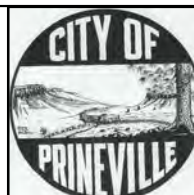
DRAWING NO.  
1-3

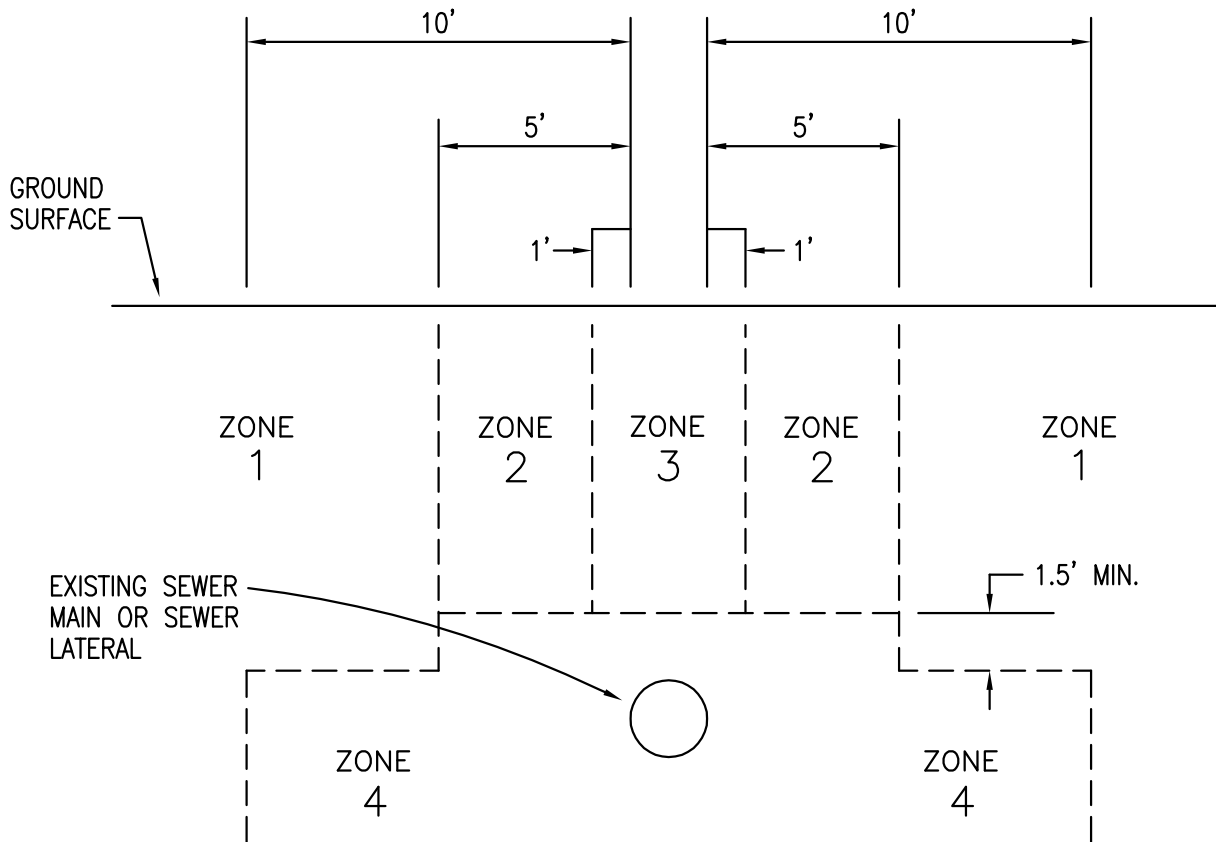
APPROVED BY :  
EAK

STANDARD UTILITY TRENCH DETAIL

CITY OF PRINEVILLE

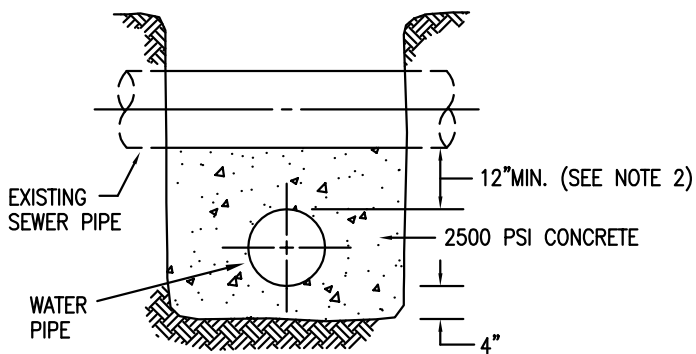
PUBLIC WORKS DEPARTMENT





### WATER & SEWER LINE IN PARALLEL CONDITIONS


ZONE	VERTICAL SEPARATION	HORIZONTAL SEPARATION	RESTRICTIONS
1	Water line higher than sewer	5'	Only crossing restrictions apply
1	Water line level or lower than sewer	10'	Only crossing restrictions apply
2	Water line 1.5' higher than sewer	Greater than 1' but less than 5'	Case-by-case determination
3	Water line 1.5' higher than sewer	Less than 1'	Parallel water line prohibited
4	Water line less than 1.5' above sewer	Less than 5'	Parallel water line prohibited
4	Water line level or lower than sewer	Less than 10'	Parallel water line prohibited



### CONCRETE ENCASEMENT UNDER EXISTING PIPES

#### NOTE:

1. WATER & SEWER LINE CROSSINGS SHALL COMPLY WITH DESIGN STANDARDS, B. SEWER OR O.A.R. 333-61-050 FOR SEPARATION AND PIPE MATERIAL REQUIREMENTS.
2. SEPARATION LESS THAN 12" FOR WATER & SEWER LINE CROSSINGS MUST BE APPROVED BY THE CITY ENGINEER.
3. CONCRETE ENCASEMENT TO BE USED IN CASES WHERE A WATER MAIN CROSSES UNDER AN EXISTING SEWER MAIN, WITH CITY APPROVAL. MINIMUM ENCASEMENT LENGTH SHALL BE 3 FEET EACH SIDE.
4. UNDERGROUND UTILITIES SHALL NOT BE LOCATED CLOSER THAN 10' HORIZONTALLY FROM ANY WATER AND SEWER MAIN. UNDER SPECIAL PERMISSION FROM THE CITY ENGINEER, SEPARATION MAY BE REDUCED FOR GRAVITY SEWER TO 5'.

DATE : 1/31/07	SCALE : NONE	WATER LINE & SEWER LINE SEPARATION	<b>CITY OF PRINVILLE</b>  <b>PUBLIC WORKS DEPARTMENT</b>	
DRAWING NO. 1-4	APPROVED BY : MDW			

# Chapter VI

## STREETS AND RELATED WORK

### 210 MOBILIZATION

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#### DESCRIPTION

##### 210.00 SCOPE

Except as modified or supplemented herein, the provisions of Section 210 of the current *Oregon Standard Specifications for Construction* shall apply.

This section covers the work necessary to move in personnel and equipment, set up all field offices and facilities and prepare for construction.

#### PAYMENT

##### 210.90 LUMP SUM BASIS

When listed in the proposal as a pay item, payment for mobilization will be made on a lump sum basis.

The amounts to be allowed for mobilization in the partial payments will be made as follows:

1. When 15% of the total original contract amount is earned from other bid items, 50% of the amount bid for mobilization or 15% of the total original contract amount, whichever is least, less normal retainage, will be paid.
2. When 50% of the total original contract amount is earned from other bid items, 100% of the amount bid for mobilization or 50% of the total original contract amount, whichever is least, less normal retainage, will be paid.
3. Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 50% of the total original contract amount will be paid.

The above schedule of partial payments for mobilization shall not be construed to limit or preclude partial payments otherwise provided by the contract.

##### 210.91 INCIDENTAL BASIS

When neither specified nor listed in the proposal for separate payment, mobilization shall be considered incidental work for which no separate payment will be made.

## DESCRIPTION

### 225.00 SCOPE

This section covers all work necessary to conduct construction operations so as to offer the least possible obstruction and inconvenience to the public and to protect pedestrian and vehicular traffic. The current Standard Specifications of the City of Prineville and the *Manual of Uniform Traffic Control Devices* shall apply. The work shall include, but is not limited to the following, hereafter referred to as Traffic Control Devices:

- A. **Semi-permanent Traffic Control Devices** shall be defined as devices maintained at one location during the life of the contract or until replaced by other signs.
- B. **Temporary Traffic Control Devices** are such devices as certain warning signs and traffic cones which may be moved frequently.
- C. **Flaggers**, including pilot cars and associated warning signs.

### 225.05 CONTRACTOR'S TRAFFIC CONTROL PLAN

At the pre-construction conference the Contractor may be required to submit to the City Engineer for approval a Traffic Control Plan and Schedule for the type and placement of all Traffic Control Devices and other Temporary Traffic Control. The Contractor's plan shall include such items as the spacing and size of Traffic Control Devices, the legends of warning signs, the methods of supporting Traffic Control Devices, the number of flaggers required and periods of operation requiring flaggers.

During the performance of the work, the Contractor shall notify the Engineer and obtain approval from the Engineer, for any revision or modification of this plan.

All Traffic Control Devices shall remain the property of the Contractor.

## MATERIALS

### 225.10 GENERAL

Flaggers, procedures, barricades, signs and other Traffic Control Devices shall conform to the Manual on Uniform Traffic Control Devices, published by the U.S. Department of Transportation and the Oregon Supplement of the Manual of Uniform Traffic Control Devices, published by the Oregon Department of Transportation.

## CONSTRUCTION

### 225.40 GENERAL

Semi-permanent Traffic Control Signs shall be mounted on single or double posts. In high pedestrian traffic areas such must be mounted such that the bottom of the sign is

7 feet above the ground. All other signs may be mounted on acceptable portable and temporary bases.

All devices shall be maintained by the Contractor in proper position, clean and legible at all times. Lights, flashers and similar devices shall be kept clean, visible and operable. Devices damaged or destroyed by any means shall be immediately repaired, restored or replaced by the Contractor. On a daily basis and prior to beginning and ceasing operation, the Contractor shall patrol the traffic control area for the purpose of maintaining devices and removing or covering all non-applicable signs during periods not needed.

Unless otherwise specified in these documents, public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible. The Contractor shall provide access to private properties at all times except during brief, urgent stages of construction.

The Contractor shall give occupants of property fronting a street at least 24 hours notice before more than half the street is closed to vehicular traffic due to his operations. The Contractor shall not close a street without prior knowledge of the Engineer and permission of the City of Prineville. The Contractor is responsible for coordinating the closing of a street with all concerned and affected individuals and public agencies.

## **MAINTENANCE**

### **225.60 TEMPORARY TCD**

Failure to maintain Traffic Control Devices in accordance with the plans and specifications shall result in the immediate suspension of work. During suspension of the work for failure to maintain Traffic Control Devices, work days will continue to be charged to the Contract. The following representatives of the City of Prineville shall have the authority to suspend work for failure to maintain Traffic Control Devices:

City Engineer or representatives  
Superintendent of Streets

During suspension of work, for any reason, the Contractor shall continue to be responsible for and shall maintain temporary Traffic Control.

## **PAYMENT**

### **225.90 METHOD "A" – UNIT BASIS**

When listed in the proposal as a separate pay item, Semi-permanent Traffic Control Signs shall be measured by the square foot of sign area. Payment will be only for those signs approved by the Engineer and called for in the Traffic Control Plan and Schedule. Payment shall be full compensation for constructing, providing and maintaining the traffic control signs for the life of the contract. Where flashers, lights or the equivalent are specified, any cost for such items shall be incidental to the price

bid. Payment will be at the contract unit price bid for Semi-permanent Traffic Control Signs. When listed in the proposal as a separate pay item, semi-permanent Traffic Control Barriers shall be measured by the lineal foot of barrier face. Payment will be only for those barriers approved by the Engineer and called for in the Traffic Control Plan and Schedule. Payment shall be full compensation for constructing, providing and maintaining the Traffic Control Barriers for the life of the contract.

Where flashers, lights or the equivalent are specified, any cost for such items shall be incidental to the price bid. Payment will be at the contract unit price bid for Traffic Control Barriers.

When listed in the proposal as a separate pay item, Flaggers shall be measured by the actual hours each Flagger is required to work. Hours will be measured to the nearest whole hour. All associated safety equipment, signs, tools and materials shall be incidental to the price bid. Payment will be only for Flaggers approved by the Engineer and called for on the Traffic Control Plan and Schedule. Payment shall be at the contract unit price bid for Flaggers.

#### **225.90A METHOD “B” – LUMP SUM BASIS**

When listed in the proposal as a separate pay item, measurement and payment for Temporary Traffic Control will be made on Lump Sum basis. Payment will be prorated based on workdays charged over the contract time. Upon completion of the contract any remaining portion will be paid.

#### **225.90B METHOD “C” – INCIDENTAL BASIS**

When neither specified nor listed in the Proposal as a separate pay item, Temporary Traffic Control will be considered incidental work for which no separate payment will be made.

### **320 CLEARING AND GRUBBING**

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#### **DESCRIPTION**

##### **320.00 SCOPE**

Except as modified or supplemented herein the provisions of Section 320 of the current edition *Oregon Standard Specifications for Construction* shall apply.

##### **320.02 DEFINITIONS**

CLEARING AND GRUBBING shall include, but not be limited to, the removal of all concrete including curbs, sidewalks and walls; all vegetable growth such as trees, snags, down timber, vines, shrubs, brush, stumps; fences, guard rails, irrigation pipe and street structures, pavement, debris and rubbish of any nature; and other similar items not specifically covered by unit price. All debris shall be broken up and removed from the site.

## CONSTRUCTION

### 320.40 CLEARING OPERATIONS

Trees, shrubbery and flower beds designated by the Engineer shall be left in place and care shall be taken by the Contractor not to damage or injure such trees, shrubbery or flower beds by any of Contractor's operations.

Where ornamental trees exist in parking areas and are not to be removed, it shall be the Contractor's responsibility to trim low limbs which will interfere with the normal operation of Contractor's equipment. The trimming shall be performed in a professional manner by competent personnel prior to Contractor's machine operations and in such a manner as the Engineer may direct.

The Contractor shall be responsible for all damages to existing improvements resulting from operations.

### 320.42 OWNERSHIP AND DISPOSAL OF MATTER

The Contractor shall make arrangements for disposing of this material off site and informing the City of the disposal sites.

## MEASUREMENT

### 320.80 MEASUREMENT

CLEARING AND GRUBBING will not be measured.

## PAYMENT

### 320.90 PAYMENT

Payment will be at the contract lump sum price for CLEARING AND GRUBBING.

### 320.91 INCIDENTAL BASIS

Removal and disposal of all trees not specifically covered under TREE REMOVAL item shall be considered incidental to CLEARING AND GRUBBING.

## 330 EARTHWORK

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### DESCRIPTION

#### 330.00 SCOPE

Except as modified or supplemented herein, the provisions of Section 330 of the current edition *Oregon Standard Specifications for Construction* shall apply.

This section covers the work necessary for excavating and grading the roadway, side streets, sidewalk and planting areas, alleys, cuts, embankments, slopes, roadway



ditches, side streets, driveway and alley approaches and all other earth moving work required in the construction of the project including disposal of all surplus material.

Unclassified excavation is defined as all excavation regardless of the type, nature or condition of the materials encountered. The Contractor shall assume full responsibility to estimate the kind and extent of the various materials to be encountered in order to accomplish the work.

## **MATERIALS**

### **330.10 SELECTED MATERIALS**

It is the intent of this specification that all suitable excavated material be used on the project unless declared surplus by the Engineer.

It is the responsibility of the Contractor to separate suitable material from the excavated material. It is the Contractor's responsibility to make arrangements for off site disposal of surplus material and inform the City of the disposal site.

### **330.12 BORROW MATERIAL**

Fills shall be formed of material from the excavation or borrow material, subject to approval of the Engineer. Should additional material be needed, the Contractor shall supply borrow material acceptable to the Engineer.

## **CONSTRUCTION**

### **330.40 GENERAL**

#### **330.40(b) PRESERVATION OF EXISTING SURFACES**

AC pavement cuts shall be straight lines, having vertical faces and are required wherever existing pavement is to be matched or removed to a line designated on the plans and as directed by the Engineer. Where so specified, AC pavement cuts shall be saw cut.

### **330.41 EXCAVATIONS**

#### **330.41(b) EXCAVATION OF EXISTING SURFACES**

Removal of existing roadbeds and driveways area included in the general excavation quantities. The Contractor will be responsible for the excavation of areas to be asphalt patched.

The Contractor shall place base material in all areas designated for asphalt patching as shown on the drawings. Base material shall be provided by the Contractor where a separate contract for paving work exists. No separate payment will be made for this work, but shall be considered incidental to General Excavation.

When so required by the Engineer; base material shall be provided by the Contractor designated to provide base material, so that immediately upon approval by the Engineer, traffic ramps of base material shall be placed at such locations as

Driveway AC Patch, ends of existing cut pavement and other areas as directed by the Engineer. Placing of base material ramps shall not be measured or paid for separately, but shall be considered incidental to GENERAL EXCAVATION.

### **330.42 EMBANKMENT FILLS AND BACKFILLS**

#### **330.42(a) EMBANKMENT FOUNDATION PREPARATION**

The area to be filled shall first be cleared and grubbed. The Contractor shall break up and roughen the ground surface before embankment material is placed. Areas designated as Obliterate Roadway shall be broken up such as no fragment has a dimension greater than 6 inches. The loosened and broken fragments shall be mixed and blended such that no seams shall form in the compacted fill.

The Contractor shall compact the natural ground underlying embankments to the depth of the grubbing or a minimum of 12 inches, to the density specified for the embankment material to be placed.

#### **330.42(b) MOISTURE-DENSITY TESTABLE MATERIALS**

Fill shall be compacted to not less than 95 percent maximum density as determined by AASHTO T-191 or an equivalent method approved by the Engineer.

#### **330.42(c) EMBANKMENT CONSTRUCTION**

##### **330.42(c)(2) ROCK IN EMBANKMENT CONSTRUCTION**

Rock embankments shall be defined as those embankments constructed of material containing particles greater than 6 inches in greatest dimension.

No rock embankments shall be constructed of material larger than 3 feet in greatest dimension. The material shall be placed in lifts as directed by the Engineer but shall not exceed 3 feet in depth. Within 3 feet of subgrade or finished slope, the placement of fill shall be in lifts not to exceed 8 inches without any rock fragments having a dimension greater than 8 inches. The rock shall be distributed and manipulated in such a manner that the interstice between the larger pieces shall be filled with smaller pieces, forming a dense homogeneous and compact mass. All materials shall be maintained at the optimum moisture content during all phases of the embankment operation.

After each lift of material is placed and in such a manner to completely fill all interstices with material no greater than 1/4 inch in greatest dimensions, said lifts shall be compacted with sufficient compactive effort to achieve the required density. Said compactive effort shall at a minimum equal or exceed the following levels:

Each 6 inch depth of lift or fraction thereof shall be compacted with at least one full coverage with a vibratory roller having a minimum dynamic force of 40,000 pounds impact per vibration and a minimum frequency of 1,000 vibrations per minute, providing this produces the specified density of material.

If the nature of the material and the Contractor's operation insures that a lift thickness of 1.50 feet is not exceeded and complies with all applicable parts of these specifications, then each lift shall be compacted with 4 full coverage passes per 6 inch depth or portion thereof, of lift of an approved vibratory roller with a dynamic force of not less than 30,000 pounds impact per vibration and a minimum frequency of 1,000 vibrations per minute, providing this produces the specified density of material.

Rollers shall be so constructed that they will exert uniform pressure over the area covered. Vibratory rollers shall be operated at speeds not to exceed 1.5 miles per hour. In addition to the above rolling, each lift shall be further compacted by routing loaded and unloaded hauling equipment uniformly over the entire length and width of the embankment.

Unless otherwise specified, each lift shall be compacted to a uniform density of 95% of maximum as determined by AASHTO T-99 Method A.

### **330.43 EARTHWORK COMPACTION REQUIREMENTS**

#### **330.43(a) GENERAL**

Earth embankments shall be defined as those embankments constructed of materials less than 6 inches in greatest dimension. Each lift shall be compacted by approved tamping or sheepfoot rollers, pneumatic tire rollers or other mechanical means approved by the Engineer, to such extent that they shall produce the specified relative compaction. At locations where it would be impractical because of inaccessibility to use such compacting equipment, fill layers shall be compacted to the specified requirements by hand directed compaction equipment.

Unless otherwise specified, each lift shall be compacted to a relative density of 95% of maximum as determined by AASHTO T-99 Method A.

When soil types or a combination of soil types are encountered which tend to develop densely packed surfaces as a result of spreading or compaction operations, the surface of each lift shall be sufficiently roughened after compaction to insure bond to the next succeeding layer.

## **FINISHING AND CLEANING UP**

### **330.70 GENERAL**

Areas, where "grade only" is called for on the plans, shall be graded to meet the tolerances for the subgrade where base material is to be placed. The surface shall be constructed to a straight grade from the finished improvement elevations shown on the plans to the elevations of the existing ground at the extremities of the area to be graded. Driveways shall be constructed to a straight grade from the finished improvement elevations to the elevation of the existing driveway for the width of the driveway as shown on the plans. The area shown on the plans for "grade only driveway" does not include cut and fill slopes. Such slopes shall conform to the

specifications given with the typical section for the station of the driveway. Grade only shall not be paid for separately, but shall be considered incidental to GENERAL EXCAVATION.

## **MEASUREMENT**

### **330.81 GENERAL**

Unless otherwise indicated in the Contract Documents, all excavation shall be considered unclassified.

GENERAL EXCAVATION has been computed from cross sections and the excavation will not be re-measured unless there are plan changes. The estimated quantity on the Schedule of Bid Items will be the measured quantity for payment. In the event of plan changes, the estimated quantity will be adjusted to reflect the change. Changes in general excavation will be measured by the cubic yard and payment will be made at the contract unit price bid for GENERAL EXCAVATION.

The unit price bid per cubic yard shall include full compensation for all labor, equipment and materials required to excavate the roadway to the lines and grades shown on the plans.

AC pavement cuts will not be measured or paid for separately, unless specified on the plans and listed in the Schedule of Bid Items. If not listed separately, AC pavement cuts will be considered incidental work to GENERAL EXCAVATION.

### **330.82 EMBANKMENT BASIS MEASUREMENT**

The pay quantities of "Embankment in Place" will be limited to the neat lines of specified cross sections, lines, grades and slopes and above the ground or base elevations existing at the time embankment construction thereon begins. The pay quantities will not include additional quantities required due to subsidence and settlement of the ground or foundations to settlement of materials within the embankments or to shrinkage, settlement, washout, slippage or loss regardless of cause. If at any time during construction the Contractor feels that this is not an accurate representation of actual embankment constructed, they shall notify the City immediately of the possible discrepancy and it shall be the Contractor's responsibility to collect the data necessary to determine the actual amount of construction embankment. The cost of this data collection will be considered incidental and no separate payment shall be made. Cross-Sectional information generated by the computer and used in the design of the project will be made available by the City.

**DESCRIPTION**

**340.00 SCOPE**

Except as modified or supplemented herein, the provisions of Section 340 of the current edition *Oregon Standard Specifications for Construction*, shall apply. This section covers the work necessary to furnish and apply water. Water may be ordered for dust control, cleanup or compaction as determined by the Engineer. Excluded from this section is water used in Portland Cement concrete construction and water used for testing purposes.

**MATERIALS**

**340.10 WATER**

Water used in the work shall be free from silts or deleterious substances. The Contractor shall maintain an adequate supply of water at the job to conduct operations in a timely manner.

The City may provide water for a fee to the Contractor from a fire hydrant or similar source. The Contractor must make application to the City for such service.

**CONSTRUCTION**

**340.40 WATERING**

The Contractor shall apply water by means which ensures uniform and controlled application.

If the Contractor has not provided water as ordered by the Engineer, under Section 340 of the *Oregon Standard Specifications for Construction*, the Owner may provide water and charge any applicable costs to the Contractor.

**MEASUREMENT**

**340.80 WATERING**

When listed in the proposal as a separate pay item, measurement and payment for Watering will be made on unit price basis. The Contractor shall be responsible for maintaining an accurate record of the amount of water approved or ordered by the Engineer and applied to the project; and for submitting these records at end of each week for payment on a monthly basis. Water will be measured by the number of thousands of gallons actually used according to the records maintained by the Contractor on City authorized forms and as verified by the Engineer.

## PAYMENT

### 340.90 GENERAL

Payment for water will be at the contract unit price bid for each 1,000 gallons (Mgal) of water.

### 340.92 INCIDENTAL BASIS

When neither specified nor listed in the Proposal as a separate pay item, watering will be considered incidental work for which no separate payment will be made.

## 344 TREATED SUBGRADE

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### DESCRIPTION

#### 344.00 SCOPE

Except as modified or supplemented herein, the provisions of Section 344 of the current edition *Oregon Standard Specifications for Construction*, shall apply. This section covers the work necessary for the preparation of the subgrade.

#### 344.01 DEFINITIONS

Subgrade is defined as the area upon which additional materials are to be placed as part of the work covered by this contract or by future work.

### CONSTRUCTION

#### 344.40 PREPARATION

Prior to starting subgrade work all underground work contemplated in the area of the subgrade shall be completed.

The Contractor shall blade, shape and compact the subgrade to line and grade as specified, removing all irregularities and securing a uniform surface. The Contractor shall remove all unsuitable material as directed and replace with suitable material at no extra cost to the owner.

After the placement of curbs and drainage structures where specified, the Contractor shall fine blade the subgrade to achieve the specified tolerances.

#### 344.45 TOLERANCES

Subgrade shall not vary more than 0.05 foot from the specified grade and cross section, except that at the discretion of the Engineer, the specified grade and cross section at centerline may vary 0.1 foot, provided the location is 75 feet from a manhole or fixed feature, does not affect drainage and a uniform and regular cross section is maintained. Variations within the above specified tolerances shall be compensating so that the average grade and cross section shall meet the specification.

## PAYMENT

### 344.90 GENERAL

No measurement or payment will be made for work required for the preparation of subgrade. This work is incidental to the price bid for EXCAVATION.

## 480 DRAINAGE CURBS

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### DESCRIPTION

#### 480.00 SCOPE

Except as modified or supplemented herein, the provisions of Section 480 of the current edition *Oregon Standard Specifications for Construction* shall apply.

This section covers the work necessary for the construction of curbs, gutters, combination curb and gutter, combination curb, gutter and sidewalk, islands and traffic separators, hereinafter referred to collectively as structures.

An additional but incidental portion of this work shall be to stamp an "S" or "W" at all locations where a sewer or water service line crosses under the curb.

The work included in CURB BACKFILL provides for the placing of clean backfill material behind the curbs, between the curb and sidewalk, behind sidewalks and behind walls, sloping it as shown on the plan.

### MATERIALS

#### 480.10 GENERAL

##### **Portland Cement Concrete**

Portland Cement concrete shall conform to the applicable requirements of Section 2010 of the *Oregon Standard Specifications for Construction*.

Unless otherwise specified, Portland Cement concrete shall be ODOT Class 3300 (6.1 sack mix). Cement shall be type I or type II. Air entrainment shall be between 4% and 7% as determined by ASTM C231-97 at the time of placing. The chloride content of any admixtures shall not exceed 0.5% by weight for applications with imbedded steel and shall not exceed 2% by weight for applications without imbedded steel. Set accelerating admixtures shall meet the requirements of ASTM C494-92, type C or E.

The amount of deleterious substances shall not exceed the following limits:

Friable Particles	1% (by weight)
Lightweight Particles	1% (by weight)
Material Passing No.200 sieve	4% (by weight)

Concrete supplier shall provide batch tickets for each load to verify mix ingredients.

### **Aggregate Base**

Aggregate base shall conform to the requirements of Section 2630.

### **Curb Backfill**

Class A backfill material shall be placed behind the curbs, between the curb and sidewalk, behind sidewalks and behind walls, sloping it as shown on the standard drawings. The top 8 inches of the backfill shall be good quality topsoil. Topsoil shall be a fertile, loamy, natural surface soil, well-graded and free from substances toxic to plant growth, noxious weeds, roots, refuse, sticks and lumps. Topsoil material shall be spread smoothly over the specified areas to the thickness, grades and slopes indicated by the plans or as otherwise ordered by the Engineer. Compaction shall be performed by a mechanical tamper or other method approved by the Engineer until the material is firm and unyielding. The finished surface shall be raked by hand.

## **CONSTRUCTION**

### **480.40 PREPARATION OF BASE**

Curb subbase and base shall be constructed to the grades and slopes indicated by the plans or as otherwise ordered by the Engineer. Subbase shall be compacted to 95% of AASHTO T-99 prior to placing aggregate base material. Aggregate base shall be compacted to 95% of AASHTO T-99 prior to placing curbs.

### **480.42 COMMERCIAL GRADE CONCRETE CURBS**

#### **480.42(a) PLACING AND FINISHING**

Concrete shall be finished to a smooth and uniform texture by troweling and floating. The surface shall have a light broomed finish transverse to the direction of traffic, unless other specified.

The top and face of the finished curb shall be true and straight.

When a straightedge 10 feet long is placed on the top or face of the curb, the surface shall not vary more than 1/4 inch from the edge of the straightedge, except at changes in grade or curves.

#### **480.42(b) TRANSVERSE EXPANSION JOINTS**

Expansion joints shall be placed at no less than 100 foot spacing.

#### **480.42(c) TRANSVERSE CONTRACTION JOINTS**

Concrete shall be scored with contraction joints at 10 foot intervals.

#### **480.42(d) CURING**

Concrete shall be cured by application of a liquid membrane forming compound applied uniformly to the damp concrete by pressure spray methods or by keeping the concrete protected and moist for a minimum of 72 hours. Curing compounds shall conform to the requirements of AASHTO M 148. All compounds shall be class A. Solvent based compounds shall be Type 1-D.



**OTHER: WEATHER LIMITATIONS**

- 1) Concrete is to be placed when the air temperature is at least 25°F. and rising.
- 2) Concrete shall not be placed on frozen ground. Frost and ice shall be removed from all forms, reinforcing steel, imbedded items and subgrade.
- 3) Concrete from the chute shall have a temperature of not less than 55°F.
- 4) Concrete work shall be protected from freezing for at least seven days after placement. A curing sealant or impervious material shall be placed on the concrete.
- 5) The inspector can require the Contractor to provide a minimum recording thermometer, having not less than 2° divisions, to verify that the temperature at the surface of the work does not fall below 32°F. The reading shall be taken as close to the surface of the concrete as possible.
- 6) Any concrete indicated as being damaged from freezing shall be rejected and replaced.

**MEASUREMENT**

**480.80 GENERAL**

Curb backfill material will be measured by the linear foot of curb backfilled to the nearest foot.

Concrete curb shall be measured to the nearest foot on a linear foot basis along the face of the curb for the actual length constructed.

**PAYMENT**

**480.90 LENGTH BASIS**

When neither specified nor listed in the proposal for separate payment, Curb and Curb Backfill shall be considered incidental work for which no separate payment will be made.

Payment for concrete curb will be at the price bid for concrete curb.

Payment for curb backfill will be at the contract bid unit price per linear foot of backfill, which price shall constitute full compensation for supplying and placing curb backfill.

**641 AGGREGATE SUBBASE, BASE AND SHOULDERS**

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**DESCRIPTION**

**641.00 SCOPE**

This section covers the work necessary for supplying, spreading, compacting and fine grading aggregate base material. All work shall be in accordance with Section 641 of the current edition *Oregon Standard Specifications for Construction*, except as supplemented or modified hereafter.

## MATERIALS

### 641.10 GENERAL

Base aggregates shall consist of crushed gravel or crushed rock, including sand, free of frozen material, with less than the percentage listed below by weight of deleterious material, to include humus organic matter, vegetable matter, clods, sticks and debris.

Gravel shall have at least one fractured face on 50 percent of the material retained on each sieve size 1½ inch and above and 70 percent for the material passing the 1½ inch sieve and retained on each of the sieves down to ¼ inch.

Base aggregates for use on arterials, collectors and industrial streets shall have a dry unit weight of not less than 100 lbs. /C.F. as determined per ODOT TM 201-86 (AASHTO T19)

### 641.10(a) GRADING

Base aggregates shall conform to the following grading requirements.

#### GRADING REQUIREMENTS FOR BASE AGGREGATES

Separated Sizes:    2 1/2"-0            2"-0            1 1/2"-0            1"-0            3/4"-0

Sieve Size	% Passing (by weight)				
3"	100				
2 1/2"	95-100	100			
2"		95 - 100	100		
1 1/2"			95 - 100	100	
1 1/4"	55 -75				
1"		55 - 75		90 - 100	100
3/4"			55-75		90 - 100
1/2"				55 -75	
3/8"					55 - 75
1/4"	30 - 45	30 - 45	35 - 50	40 - 55	40 - 60
No. 10	12 -27	12 - 27	14 - 30	16 -33	16 - 36
No. 40	0 - 16	0 - 16	3 - 18	8 - 24	8 - 24
No. 200	0 - 9	0 - 9	0 - 8	0 - 8	0 - 10

The determination of sizes and grading shall be in conformance with ODOT TM 204.

**BASE AGGREGATE GRADATION FOR LOCAL STREETS**

<u>SIEVE SIZE</u>	<u>1"-0 BASE PASS</u>	<u>3/4"-0 BASE PASS</u>
1 1/2	100%	-
1	90-100%	100%
3/4 -0	-	90-100%
1/2 -0	50-80%	-
3/8 -0	-	50-80%
*1/4-0	35-50%	40-60%

Recommendation for base: 1"-0 or 3/4"-0.

\* Of amount passing 1/4" sieve, 35-65% shall pass a #10 sieve.

**641.10(c) SAND EQUIVALENT**

Base aggregates to be incorporated in the work shall have a sand equivalent of not less than 30 when tested in conformance with ODOT TM 101.

**641.11 STOCKPILING**

The materials to be furnished in stockpiles shall be of the kinds, sizes and quality specified. Each designated size of material shall be placed in a separate stockpile.

Stockpiles shall be at least 8 feet high with side slopes of 1 1/2 horizontal to 1 vertical. The method used in placing the material in the stockpile shall be such as to minimize segregation of the aggregate particles.

**641.15 QUALITY CONTROL**

The source material from which aggregate base materials are obtained, produced or manufactured, shall meet the following qualifying test requirements.

<u>Test</u>	<u>Test Method</u>	<u>Requirements</u>
Degradation:		
Passing No. 20 sieve	ODOT TM 208	30 percent max.
Sediment Height	ODOT TM 208	3 inch max.
Abrasion:	ODOT TM 211	35 percent max.

For local Streets - Test Method: ODOT TM 211; Requirements: 40 percent on average of three tests if first test fails. Sample to be taken by the testing lab at the site.

**Wood Waste**

Allowable limits of wood waste, as determined by weight by test method ODOT TM 225, follow:

- a. Major Arterial - 0.1 percent

- b. Minor Arterial - 0.1 percent
- c. Industrial - 0.1 percent
- d. Collector - 0.1 percent
- e. Local Residential & Cul-de-sac - 0.35 percent
- f. All Weather Surface Road - 0.35 percent
- g. Alley - 0.35 percent

Oversize pieces, which are retained on the top sieve size, are limited to 25 percent of the total amount of wood waste allowed.

### **Metal Waste**

Allowable limit of metal waste, as determined by weight, is 0.1 percent.

### **641.16 ACCEPTANCE OF AGGREGATES**

Aggregate base will be sampled for acceptance in the following priority order:

- a) Immediately after crushing as long as produced and placed within one year of placement.
- b) In the stockpile after all shaping work has been completed; or, one test per project or 1 test every 5,000 cubic yards.
  - \* Jobs 500 Cu Yd or less may use letter of certification or an approved testing lab as proof of acceptable aggregate base.
- c) In its final state on the roadbed after all processing and prior to the placement of subsequent surfacing materials; see Section 165 General Conditions, for testing procedures. Frequency: One test per job or one test per 1,000 cubic yards.
  - \* Jobs 500 Cu. Yd or less may use letter of certification or an approved testing lab as proof of acceptable aggregate base.

## **EQUIPMENT**

### **641.21 HAULING EQUIPMENT**

Vehicles for hauling aggregate or mixtures of aggregate and water shall be capable of depositing the material into or in front of spreading equipment with minimum of segregation.

### **641.22 SPREADING EQUIPMENT**

The equipment shall be capable of spreading and striking off material to the designated line, grade and transverse slope with a uniform surface texture free of excessive segregation or fracture of material.

### **641.24 COMPACTING EQUIPMENT**

Equipment used to compact aggregate bases shall be self-propelled steel wheel or pneumatic tire rollers. Rollers shall be capable of compacting materials to a firm, even surface.

## CONSTRUCTION

### 641.41 MIXING, HAULING AND PLACING

When, in the judgment of the Engineer, weather conditions will be detrimental to the work, the Contractor shall suspend operations until the weather is favorable. No aggregate base materials shall be placed in the snow or on a soft, muddy or frozen subgrade.

#### Mixing

The materials shall be mixed until well blended. The Contractor shall add water during mixing in an amount sufficient to provide optimum moisture content plus or minus 2 percent.

The subbase or base course materials shall be mixed by one of the following methods.

- a) Stationary Plant Method - Materials mixed by means of a pug mill or other type of mixer, transported to the project at proper moisture content and placed by an aggregate spreader;
- b) Travel Plant Method - Materials mixed and placed on the project in a continuous operation; or,
- c) Road Mix Method - Materials mixed on the project by motor graders or other approved equipment.

### 641.43 THICKNESS AND NUMBER OF LAYERS

If the required compacted depth of the sub-base or base course exceeds 6 inches, it shall be constructed in two or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

### 641.44 SHAPING AND COMPACTING

During compaction, materials shall be maintained within 2 percent of the optimum moisture content. The Contractor shall begin compaction of each layer immediately after the material is spread and continue until a density of not less than 95 percent of the maximum density has been achieved. Maximum density will be determined by ODOT TM 106. (100% Relative Maximum Density of Granular Base Materials)

If the specified compaction is not obtained, the Contractor shall notify the Engineer. The Contractor may be required to use a modified compaction procedure or apply additional compactive effort. If approved materials meeting the specifications cannot be compacted to the required density regardless of compactive effort or method, the Engineer may reduce the required density or direct that alternate materials be used. In no case shall aggregate placement proceed until the Contractor is able to compact the material to the satisfaction of the Engineer.

### 641.45 SURFACE TOLERANCE

The surface of the aggregate base shall be within -0.04 foot to +0.02 foot of plan elevation at any one point. The final surface shall not deviate at any point more than

0.04 foot from the bottom of a 12-foot straightedge laid in any direction on the surface on either side of the roadway crown.

When directed by the Engineer, the surface shall be tested with a 12 foot straightedge furnished and operated by the Contractor. The surface shall not vary from the testing edge by more than 0.04 foot at any point. The Engineer will observe this testing and may require additional testing. The average of the variation from the design grade shall not be greater than 40 percent of the allowable maximum variation.

#### **OTHER**

When shown on the plans, the Contractor shall supply base rock to be placed under the curb with minimum depth of 2 inches under curb. Base rock under curb is considered incidental and no separate payment will be made.

### **MEASUREMENT**

#### **641.81 MASS (WEIGHT) BASIS**

Aggregates will be measured and paid for on a ton basis, to the nearest 0.01 ton.

#### **641.82 VOLUME BASIS**

Aggregate base will be measured and paid for on a cubic yard basis, to the nearest 0.1 yard. The thickness will be measured by depth tests, cores or elevations.

A minimum of one measurement shall be made for each 300 square yards of material placed. The measurements shall be made to the nearest 0.01 foot.

On individual depth measurements, thicknesses more than 0.04 feet in excess of the specified thickness shall be considered to be specified thickness plus 0.04 feet in computing the yardage for payment.

#### **641.83 AREA BASIS**

Aggregate base will be measured on the surface to the nearest 0.1 foot. Payment will be on a square yard basis, to the nearest 0.1 yard between the hinge points or curb lines.

### **PAYMENT**

#### **640.90 GENERAL**

When not listed in the bid schedule, base aggregates will be considered incidental work.

## **745 HOT MIXED ASPHALT CONCRETE**

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### **DESCRIPTION**

#### **745.00 SCOPE**

Asphalt paving materials and construction shall be in accordance with Section 745 of the current edition *Oregon Standard Specifications for Construction*.

This item consists of furnishing and placing asphalt concrete pavement as designated on the plans. Asphalt concrete pavement shall be Class "C" mix as designated on the plans. No warm mix designs will be allowed.

Asphalt patching consists of paving areas as designated by the Engineer and as shown on the plans as Asphalt Patching. Asphalt patching areas shall include driveways, cuts in existing pavement areas to be preserved and other such areas that are behind the curb or involve a significant amount of hand labor to complete the work.

### **MATERIALS**

#### **745.10 AGGREGATE**

##### **745.10(a) GENERAL**

New aggregates shall be hard, sound, durable and free of deleterious substances.

Prior to producing aggregates, the Contractor shall advise the Engineer as to the type of bituminous mixing plant to be used and the size or sizes of coarse and fine aggregate to be produced.

The Contractor shall modify or adjust crushing and screening operations as necessary to produce materials meeting the specifications. During production of aggregates, samples of each size shall be provided as frequently as the Engineer considers necessary to determine conformance to the specifications.

The determination of sizes and gradings shall comply with ODOT TM 204. When treatment of aggregates with hydrated lime is required, all testing requirements will apply prior to treatment.

The aggregate shall be stockpiled and removed from stockpiles in a manner that will minimize segregation.

##### **745.10(a)(4) DURABILITY**

The material from which the aggregates are produced and the crushed aggregates, shall meet the following test requirements.

**Maximum Values**

<u>Test</u>	<u>Test Method</u>	<u>Coarse Aggregates</u>	<u>Fine Aggregates</u>
Soundness (5 cycles)	ODOT TM 206	12%	12%
Degradation			
Passing No. 20 Sieve	ODOT TM 208	30%	30%
Sediment Height	ODOT TM 208	3"	4"
Abrasion	ODOT TM 211	30%	-

**745.10(a)(5) FRACTURED FACES**

A minimum of 75 percent of crushed gravel retained on the 1/4-inch sieve shall have two fractured faces.

A minimum of 75 percent of the material passing the 1/4-inch sieve but retained on the #10 sieve shall have one fractured face. All aggregate shall conform to ODOT TM 213.

**745.10(a)(6) HARMFUL SUBSTANCES**

The amount of deleterious substances in each test fraction of the crushed aggregate material shall not exceed the following values.

<u>Test</u>	<u>ODOT Test Method</u>	<u>Maximum Percentages (by weight)</u>
Lightweight Pieces	TM 222	1.0
Wood Particles	TM 225	0.1
Friable Particles		
Coarse Aggregate	TM 221	1.0
Fine Aggregate	TM 221	2.05
Flat and Elongated Pieces		
Coarse Aggregate	TM 229	5.0

The aggregates shall be free from all other deleterious substances such as soft or disintegrated pieces, clay, loam or vegetative matter, either in a free state or adherent to the aggregate.

**745.10(c) FINE AGGREGATE**

**745.10(c)(5) BLEND SAND**

Sand Equivalent shall be not less than 30 when tested in accordance with ODOT TM 101.

**745.10(g) PREPRODUCED AGGREGATE**

Recycled material used in the asphalt concrete pavement shall have a maximum size of 1 inch prior to entering the cold feed. Any recycled material larger than 1



inch shall be separated by screening or broken down by mechanical means to pass a 1 inch sieve and reincorporated with the balance of the recycled material to form a mixture acceptable to the Engineer.

The recycled material shall be blended with new aggregate to provide a mix conforming to the job mix formula. If there is evidence that the recycled material is not breaking down during the heating and mixing of the asphalt concrete mixture, the Engineer may elect to modify the maximum size requirement. The fraction of recycled material in the new pavement shall not exceed 20 percent of the total aggregate by weight.

**745.11 ASPHALT CEMENT, ADDITIVES AND AGGREGATE TREATMENT**

**745.11(a) ASPHALT CEMENT**

New asphalt cement shall meet the requirements of one of the asphalt cements listed in the ODOT's current publication *Specifications for Asphalt Materials*. The specific grade to be used shall be as determined by the Engineer.

**745.11(b) ASPHALT CEMENT ADDITIVES**

Anti-stripping additives ordered and/or approved by the Engineer shall be added to the asphalt cement and shall meet the requirements of the *Oregon Standard Specifications for Construction*.

**745.11(c) AGGREGATE TREATMENT**

When specified or directed, new aggregates shall be treated with lime in the following proportions to undergo an aging process.

<u>Separated Sizes</u>	<u>Percent Hydrated Lime (by Weight of Aggregate)</u>	<u>Tolerance (Percent)</u>
3/4"-1/4", 3/4"-1/2", 1/2"-1/4"	0.35	+ 0.15
1/4"-0	1.5	+ 0.15
1/4"-#10	1.0	+ 0.15
#10-0	2.0	+ 0.15

Each size of aggregate shall be stockpiled separately. One of the following treatment procedures shall be used:

**1) Dry Hydrated Lime Added to Wet Aggregates**

At the time of mixing the aggregate and hydrated lime, the minimum moisture content of the coarse and fine aggregate shall be 2.5 percent and 5.0 percent, respectively. Hydrated lime, water and aggregate shall be thoroughly mixed in a pugmill or other approved mechanical mixer and shall then be stockpiled. If the aggregate contains free water (water not adhering to the aggregate surface), the excess moisture shall be removed before adding hydrated lime. The mixed material shall remain in the stockpile for a minimum of 24 hours before being used in the production of asphalt concrete mixture.

2) **Lime Slurry Added to Aggregates**

The lime shall be added to the aggregate in the form of a slurry. The lime slurry shall contain a minimum of 70 percent water by weight. The slurry and aggregate shall be thoroughly mixed in a pugmill or other approved mechanical mixer and shall then be stockpiled. The mixed material shall remain in the stockpile for a minimum of 24 hours before being used in the production of asphalt concrete mixture.

No additional payment will be made for lime treatment of aggregates.

**OTHER**

Portland cement filler shall meet the requirements of the *Oregon Standard Specifications for Construction*. Hydrated lime used as filler or used to treat aggregates shall meet the requirements of AASHTO M 216, Type 1, Grade A. The Contractor shall furnish manufacturer's certifications in conformance with Section 165.

Mineral filler shall meet the requirements of AASHTO M 17.

**745.12 MIX TYPE AND BROADBAND LIMITS**

The asphalt concrete mixture shall be a well-graded, uniform, durable mix of the class or classes as shown on the plans or approved by the Engineer. The components shall be within the broadband limits set forth in the following table unless modified by the job mix formula.

**BROADBAND LIMITS**  
**DENSE GRADED MIXTURE**

Sieve Size                      Percentages of Total Aggregate (by weight)

Passing	Class "B"	Class "C"	Class "D"
1"	99 - 100	-	-
3/4"	90 - 98	99 - 100	-
1/2"	75 - 91	90 - 100	99 - 100
1/4"	50 - 70	52 - 80	85 - 100
No. 10	21 - 41	21 - 46	37 - 57
No. 40	8 - 24	8 - 25	13 - 29
No. 200*	2 - 7	3 - 8	4 - 9
Asphalt Cement**	4 - 8	4 - 8	4 - 8

\*Include lime or cement filler. When treatment of aggregate with lime is required, the percentage passing the #200 sieve will be increased by 0.5%.

\*\*Percent of total mix by weight. The amount of new asphalt cement to be added to the recycled mixture will vary from 3 to 8 percent.

**745.13 JOB MIX FORMULA REQUIREMENTS**

The Contractor shall furnish a job mix formula for the approval of the Engineer or may propose the use of a current job mix formula on file with the owner or with ODOT. A job mix formula will be required for each aggregate source.

If a job mix formula is not approved by the Engineer, then a new job mix formula will be established at the Contractor's expense.

**745.13(a) CONTRACTOR PROVIDED JMF**

The Engineer reserves the right to modify specified mixes for use under various traffic conditions on various segments of the work and for feathering, spot patching and other special purposes. The Contractor shall provide mixes proportioned as directed by the Engineer for such purposes.

Modifications of the mix as directed may require changes in the Contractor's plan and sequence of operations. Such changes shall be allowed for by the Contractor.

Upon written request from the Contractor, the Engineer may approve field adjustments to the job mix formula of up to 2 percent of the aggregate passing the ¼ inch sieve, 1 percent for the aggregate passing the #10 sieve and 0.5 percent for the aggregate passing the #200 sieve. These field adjustments to the job mix formula may be made by the Engineer provided the change will produce material of equal or better quality. The above adjustments or any further adjustments ordered by the Engineer, will be considered the job mix formula. Adjustments beyond these limits will require development of a new job mix formula.

The adjusted job mix formula, plus or minus the allowed tolerances, shall be within the broadband limits.

**745.14 TOLERANCES AND LIMITS**

After the job mix formula is determined, the mixture shall conform to the formula within the following tolerances.

**Narrow Band Tolerance**

(from job mix formula)

<u>Constituents of Mixture</u>	<u>Base and Leveling Courses</u>	<u>Surface Course</u>
Aggregate passing 1", 3/4", and 1/2" sieves specified in subsection 745.12	Within the broadband ranges specified in subsection 745.12	
Aggregate passing 1/4" sieve	+/- 7.0%	+/- 6.0%
Aggregate passing #10 sieve	+/- 5.0%	+/- 4.0%
Aggregate passing #40 sieve	+/- 5.0%	+/- 4.0%
Aggregate passing #200 sieve	+/- 2.0%	+/- 2.0%
Asphalt cement	+/- 0.6%	+/- 0.5%
Moisture content at time of discharge		

from the mixing plant (upper limit)      0.6% max.      0.6% max.

Compaction Density (lower limit):

- a) Normal Lift Pavement- 92 percent of maximum density (ODOT TM 306).
- b) Control Strip Method- 98 percent of target density or 92 percent of maximum density (ODOT TM 306) whichever is the lower value.
- c) Thin lift pavement (less than 1 1/2 inches compacted thickness) - see subsection 745.49(c).
- d) Open Graded Mixes- compact as directed by the Engineer.

## **745.16 HMAC PRODUCTION QC/QA**

### **745.16(a) QUALITY CONTROL**

All the components of the asphalt concrete mixing plant shall be utilized and operated in a manner to ensure compliance with this section. The combined materials shall be mixed until the asphalt cement is distributed thoroughly in the mixture and the aggregate particles are completely and uniformly coated.

The moisture content of the mix shall not exceed 0.60 percent at time of discharge from the mixing plant.

The temperature of the mix at discharge from the plant shall not exceed 325°F.

### **745.16(a)(3) HMAC PRODUCTION SAMPLING AND TESTING**

The Contractor is responsible for process control and shall conduct sampling, testing, measurement and inspection as necessary to insure the finished pavement meets specifications.

The Engineer will determine the suitability of the final product through final acceptance testing. Results of these tests will be used to determine payment deductions, if any, to be assessed against the contract.

The Engineer shall be permitted to cut samples or to take cores from the compacted mixture for testing purposes. Where samples have been taken, the Contractor shall furnish new material and fill the holes as directed with no compensation beyond the unit price for asphalt concrete in place.

Aggregate Gradation and Asphalt Content: The Contractor shall take samples from the grade on a random basis in the presence of the inspector for testing by the Engineer. A minimum of three samples shall be taken for each 500 tons of asphalt concrete or portion thereof.

## **EQUIPMENT**

### **745.21 HMAC MIXING PLANT**

#### **745.21(a) DEQ PERMITS**

Prior to producing and furnishing asphalt concrete from a new or revised stationary plant location or a portable plant, the Contractor shall furnish the following items to the Engineer.

- 1) A current air contaminant discharge permit number for the plant being used;
- 2) The expiration date of the permit; and,
- 3) A written statement that the DEQ has been advised of the location of the plant and when operation is to commence.

The name and address of the air pollution authority having jurisdiction over the area may be obtained from the Engineer.

#### **745.21(b) SCALES**

Scales shall be accurate to 0.5 percent throughout the range of use and shall be tested and adjusted as often as directed by the Engineer to verify continued accuracy.

### **745.22 HAULING EQUIPMENT**

Vehicles used for hauling asphalt concrete mixtures shall have tight, clean and smooth beds which have been thinly coated with paraffin oil, lime solution, soapy water or other approved material to prevent the mixture from adhering to the beds. Diesel oil may be used when requested by the Contractor and approved by the Engineer. During each application of approved coating material and prior to loading, the vehicle bed shall be drained of all excess coating material.

Hauling vehicles shall be equipped with covers to protect against moisture intrusion and heat loss and shall have a 3/8 inch diameter hole near the middle of the left side wall of the bed to allow access for a thermometer.

Vehicles which cause excess segregation, leak badly or delay normal operations shall not be used.

### **745.23 HMAC PAVERS**

Pavers shall be self-contained, power-propelled units with an activated screed or strike-off assembly, heated if necessary and capable of spreading and finishing layers of asphalt concrete material to the widths, thicknesses, lines, grades and cross sections required.

The paver shall be equipped with a receiving and distribution system of sufficient capacity for a uniform spreading operation and capable of placing the mixture uniformly in front of the screed without segregation of materials. Extensions added to

the paver when used on travel lanes shall have the same augering and screeding equipment as the rest of the paver.

The paver shall be designed so minor irregularities in the surface of the base will not be reflected in the surface of the layer being placed. The weight of the paver shall be supported on tracks or wheels none of which shall contact the mixture being placed. The contact area of the screed or strike-off assembly shall be uniform over the entire width of the mixture being placed.

The screed or strike-off assembly shall produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture. The paver shall be equipped with a manual or electronic line and grade control. When applicable, a windrow pick up machine shall be used in lieu of end dump machine.

#### **745.24 COMPACTORS**

Rollers shall be steel wheel, pneumatic tire, vibratory or a combination of these types. They shall be in good condition and capable of reversing without backlash.

##### **745.24(a) STEEL WHEEL ROLLERS**

Steel wheeled rollers shall have a minimum gross static weight of 8 tons and a minimum static weight on the drive wheel of 250 pounds per inch of width. For finish rolling a 6 ton minimum gross static weight is acceptable and the 250 pounds per inch of width will not be required.

##### **745.24(b) VIBRATORY ROLLERS**

Vibratory rollers shall be equipped with amplitude and frequency controls and shall be specifically designed for compaction of asphalt concrete mixture. The rollers shall be capable of frequencies of not less than 2,000 vibrations per minute.

##### **745.24(c) PNEUMATIC ROLLERS**

The pneumatic-tired rollers shall be self-propelled, tandem or multiple axle, multiple wheeled with smooth-tread pneumatic tires. The tires shall be of equal size and staggered on the axles at spacings and overlaps that will provide uniform compacting pressure for the full compacting width of the roller. Ground pressures shall be at least 80 pounds per square inch of tire contact area. Pneumatic-tired rollers shall be fully skirted to insulate the tires from significant heat loss during compaction.

## **CONSTRUCTION**

#### **745.40 SEASON AND TEMPERATURE LIMITATIONS**

Asphalt concrete shall be placed on a dry prepared surface when the surface temperature is not less than specified below.

Nominal Specified

<u>Compacted Thickness of Individual Courses</u>	<u>Wearing Course</u>	<u>All Other Courses</u>
Less than 1 1/2"	55°F	55°F
1 1/2" to 2 1/2"	45°F	35°F
2 1/2" and over	35°F	35°F

Asphalt concrete shall not be placed during rain or other adverse weather conditions, except that mix in transit at the time these adverse conditions occur may be laid if the mix has been covered during transit and is at the specified temperature, if the foundation is free from pools or flow of water and if all other requirements of these specifications are met. Asphalt concrete mixtures shall not be placed when the foundation is frozen or when, in the opinion of the Engineer, existing or expected weather conditions will prevent the proper handling, finishing or compaction of the mixtures.

#### **745.41 PRE-PAVING CONFERENCE**

The Contractor and subcontractors who are to be involved in the paving work shall meet with the Engineer for a pre-paving conference at a time mutually agreed upon. At this conference, the Contractor shall discuss the proposed methods of accomplishing all phases of the paving work.

#### **745.42 PREPARATION OF UNDERLYING SURFACES**

All bases and foundations on which the pavement is to be constructed shall meet the applicable specifications and be approved prior to the start of paving. Existing bases and foundations shall be reconditioned as specified or directed.

Broken or ragged edges of existing paved surfaces underlying or abutting the new pavement shall be trimmed back to firm material. Surfaces against which asphalt concrete is to be placed shall be treated with an asphalt tack coat as specified in Section 730 of *Oregon Standard Specifications for Construction*.

Depressed areas in existing pavement shall be tacked and leveled with an approved asphalt concrete mixture and compacted with a pneumatic tired roller. This leveling work shall be a separate operation and performed as specified. Leveling material shall be spread by means of a paving machine except in small or irregular areas where the Engineer may permit the use of other equipment. At the direction of the Engineer, leveled areas shall be re-tacked prior to placement of subsequent material.

When reconditioning old roadbeds, an asphalt tack coat shall be applied to all overlay area and the surface of the curbs to the highest elevation of the pavement. An asphalt tack coat shall be applied to all overlay areas, portions of concrete structures such as catch basins, manholes and curbs that will abut asphalt pavement and any other areas designated by the Engineer. Asphalt tack coat shall be applied by pressure spray equipment. Care shall be taken to shield areas not to directly abut asphalt concrete from being coated by asphalt tack.

#### **745.43 DRYING AND HEATING AGGREGATES FOR HMAC**

Aggregates shall be dried to the extent that any retained moisture will not result in visible defects in the mixture such as slumping loads, boils or slicks.

In plants which have screens, the aggregates shall be separated, immediately after drying and heating, by screening into the sizes required for separate handling, storing and proportioning at the mixing plant.

#### **745.43(b) HEATING TEMPERATURES**

Asphalt heating equipment shall be capable of uniformly heating the asphalt cement to the temperature specified.

The temperature of the asphalt cement when introduced in the mixture shall be not less than 250°F and shall not exceed 350° F.

#### **745.45 HMAC STORAGE**

During production, hauling and storage, aggregates shall be handled in a manner that will prevent segregation of materials or intermingling of separate gradings or kinds of aggregates. Covers shall be used to protect the mixture when adverse weather or cold air temperature is encountered during hauling.

Storing or holding of hot asphalt concrete mixture in open stockpiles will not be permitted.

Temporary storing or holding of hot asphalt concrete mixture in storage silos up to 24 hours will be permitted. Trucks shall be loaded from the storage silos in a manner that prevents segregation.

#### **745.45(e) DISCHARGING AC AND LOADING TRUCKS**

Each pay load of asphalt concrete mixture shall be weighed on vehicle scales meeting the requirements of Section 190.20 of the *Oregon Standard Specifications for Construction* except as follows.

When vehicle scales are not available for check weighing, the Contractor, upon written approval of the Engineer, will be permitted to use an approved weigh hopper that is accurate within 0.5 percent throughout the range of use. Use of the hopper to determine pay weights will be discontinued when random check weighing indicates that the quantities are not accurate within 0.5 percent.

Each load of mixture shall have a weigh memo provided by the Contractor.

#### **745.46 CONTROL OF LINE AND GRADE**

When specified in the contract, the Engineer will establish references at reasonable intervals for line and grade control of the placing operations. The Contractor shall furnish, place and maintain supports, wires, devices and materials as necessary to



provide continuous line and grade reference control to the automatic paver control system on either or both sides of the paving machine.

With approval of the Engineer, the line and grade reference control may be a floating beam device or multi-footed ski of a length and sensitivity that will control of the paver to the grade specified. After the paving of the first lane, a joint matcher or manual control of line and grade will be permitted with approval of the Engineer.

#### **745.48 HAULING, DEPOSITING AND PLACING**

##### **745.48(c) PLACING**

No paving shall be placed when the air temperature is less than 35°F or when the base material is frozen.

Asphalt shall not be matched to a transverse or longitudinal asphalt edge an end slope of less than 2:1. This requirement shall not apply where the Engineer specifies a feathered edge.

Asphalt pavers conforming to subsection 745.23 shall be used to distribute the mixture. Placing of the mixture shall be continuous and uniform.

In areas where patching, irregularities or unavoidable obstacles make the use of specified equipment impracticable, the mixture may be spread with other equipment approved by the Engineer.

#### **745.49 COMPACTION, QC**

Immediately after the asphalt concrete mixture has been spread, struck off and surface irregularities and other defects remedied, it shall be thoroughly and uniformly rolled until the mixture is compacted.

##### **745.49(a) GENERAL**

The type, number and weight of rollers shall be sufficient to compact the mixture while it is still within the specified temperature range. Between October 1 and April 1, pneumatic-tired rollers shall be used for breakdown compaction except on the wearing course where a single coverage with a vibratory or steel-wheel roller shall precede pneumatic-tired rolling. The use of equipment which crushes the aggregate will not be permitted. Rollers shall not be operated in vibratory mode when the temperature of the mixture has dropped below 180°F.

Steel roller wheels shall be moistened with water or other approved material to the least extent necessary to prevent pickup of mixture and not cause spotting or defacement of the surface of the mixture.

Rollers shall be operated at speeds recommended by the roller manufacturer and slow enough to avoid displacement of the mixture. The maximum speeds shall be 3 miles per hour for vibratory rollers, 4 miles per hour for steel-wheeled rollers and 5 miles per hour for pneumatic-tired rollers.

Care shall be exercised not to displace the line and grade of edges. Displacement of any course occurring as a result of the reversing of the direction of a roller or from other causes, shall be corrected at once by the use of approved rakes and addition of fresh mixture when required.

Any mixture that becomes loose and broken, contaminated, segregated or is in any way defective, shall be removed and replaced with new mixture at no expense to the owner.

Finish rolling shall continue until all roller marks are eliminated.

Along curbs and walls, on walks, irregular areas and other areas not practicably accessible to specified rollers, the mixture shall be compacted with approved self-propelled rollers, mechanical tampers, hot hand tampers or heavy hand rollers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

### **SAMPLING AND TESTING**

For final acceptance of the pavement, the density of each section of pavement will be determined by random acceptance tests using a nuclear gauge or laboratory analysis of pavement core samples. Density tests will be taken at five randomly selected sites for each section of pavement. The average of the five density tests will constitute the density of the pavement.

A section of pavement will be the area constructed from 500 consecutive tons of mixture or portion thereof.

Acceptance tests will not be made within one foot of the edges of the panel or from areas where the specified compacted thickness is less than 1 1/2 inches.

When using a nuclear gauge, two readings will be obtained at each site, the second at right angles to the first. The two readings will be averaged to obtain the test density. For any section of pavement, if the Contractor requests in writing within two work days after nuclear gauge test results are furnished to the Contractor, pavement cores will be obtained at the same randomly selected sites used for the nuclear gauge tests. The density of the core samples will be determined by an independent testing laboratory. The average density of these five core samples will constitute the in-place density of the section of pavement and will prevail over nuclear results. If the density as determined by the core samples does not meet density requirements, the Contractor shall bear the cost of coring and testing.

The Engineer shall have the right to test any areas that appear defective in compaction. If the areas are found deficient, the Engineer may require the Contractor to bring the areas into conformance with the specifications.

**745.49(a)(1) TEMPERATURE**

The temperature of the mixture at the time it is placed in final position shall be within 10 degrees of 280° F. The Engineer may adjust the lay-down temperature in 10-degree increments to attain maximum workability and compaction. In no case shall the lay-down temperature of mixture be less than 240°F.

**745.49(b) NORMAL PAVEMENT**

The mixture shall be placed in the number of lifts and to the compacted thickness of each lift as shown on the plans. If the compacted thickness of each lift is not shown on the plans, the maximum compacted thickness for any lift shall be 3 inches.

For a specified lift thickness of less than 1 1/2 inches, the mixture shall be compacted with at least four coverage's by rollers, excluding finish rolling.

For a specified lift thickness of 1 1/2 inches or greater, the mixture shall be compacted to at least 92 percent of the theoretical maximum density as determined by ODOT TM 306.

The Engineer may allow the Contractor to establish a target density by use of a 200 foot control strip conforming to the Control Strip Method specified in the ODOT Standard Specifications. The city shall furnish and operate the nuclear gauge or shall retain an independent testing firm to perform the compaction testing. Contractor shall attain 98% of target density for duration of the job.

All additional costs associated with the use of the control strip method shall be borne by the Contractor.

**SAMPLING AND TESTING**

The Engineer will select locations for non-destructive measurement of core samples to determine pavement thickness.

If non-destructive measurement indicates a pavement section is less than the thickness shown on the plans or is otherwise out of specification, the Contractor may take cores at the same locations to verify the Engineer's measurements. If the pavement section is found to comply with specifications, the coring and restoration will be paid for as extra work. Pavement found to be out of specification shall be subject to replacement or to payment at adjusted prices.

In determining deficient or excessive thickness in asphalt concrete overlays, the Engineer shall adjust the cross section measurement sequence, average series of measurements or take other appropriate steps to allow for the desirable leveling of low or high areas on the existing pavement.

Where a deficiency is found and the Engineer determines the deficiency serious enough to impair the traffic service expected from the pavement, the area of such

deficiency shall be removed by the Contractor and shall be replaced with pavement meeting the specifications. The cost of the deficient pavement and of the removal shall be borne by the Contractor.

## **TEMPORARY**

### **745.50 TEMPORARY SURFACING COURSE**

Asphalt concrete mixture for temporary surfacing, which is not to become a part of the final pavement, shall be a well-graded, uniform, durable mix using all new materials or a combination of new materials and RAP. The allowable percentage of RAP in the temporary surfacing shall be determined through an approved mix design.

The components of the mixture shall be within the broadband limits specified in Section 745.12. Aggregates treated with lime in accordance with Section 745.11(c) are acceptable.

The mixture will be accepted on the basis of test results for each 200 tons of mixture or by other testing the Engineer deems necessary to ensure the mixture is appropriate for the intended use.

### **OTHER: TEMPORARY PAVEMENT MARKINGS**

During paving operations, lane markings shall be maintained throughout the project by applying temporary lane stripes to the roadway each day. Temporary striping shall consist of strips of pavement marking tape a minimum of 1 foot in length on the lane separation line to delineate the path of travel for vehicles. Intervals between marking strips shall be a maximum of 25 feet.

The pavement marking tape shall be 4 inches wide, pressure sensitive, reflective tape of a form suitable for marking asphalt or concrete pavement surfaces. Biodegradable tape with paper backing will not be allowed. Surface preparation and application shall be in conformance with the manufacturer's specifications.

The pavement marking shall be maintained in serviceable condition by the Contractor during the interval of time it is in use. All preliminary layout and marking in preparation for application and the application of the temporary striping shall be the Contractor's responsibility. If specified, the Contractor shall remove the temporary striping prior to placement of subsequent paving materials or permanent lane markings.

## **MAINTENANCE**

### **745.60 CORRECTION OF DEFECTS**

Segregation of materials, non-uniform texture, fouled surfaces preventing full bonding between lifts of mixture and other defects determined by the Engineer as detrimental, shall be corrected by the Contractor at no expense to the owner.

## **745.61 LONGITUDINAL JOINTS**

### **745.61(a) LOCATION**

The width of pavement strips shall be adjusted to minimize the number of longitudinal joints required. Longitudinal joints in the wearing course shall be at a lane line or the edge line of a traffic lane. On median lanes and on shoulder areas, joints shall occur only at points designated by the Engineer. The longitudinal joints in one layer shall offset those in the layer immediately below by a minimum of 6 inches. Underlying longitudinal joints shall be within 12 inches of the edge of a lane or within 12 inches of the center of a lane, except in irregular areas.

### **745.61(b) DROPOFFS**

When placing asphalt concrete pavement under traffic in courses in excess of a 2-inch thickness, work shall be scheduled so at the end of each working shift the full width of the area being paved, including shoulders, shall be complete to the same elevation with no longitudinal drop-offs.

When placing asphalt concrete pavement under traffic in courses between 1 and 2 inches in thickness, work shall be scheduled so that at the end of each working shift a strip of new pavement shall not extend beyond the adjoining strip of new pavement more than the distance normally covered by each shift. Prior to any suspension of operations for a period of one day or more, the full width of the area to be paved, including shoulders, shall be completed to the same elevation with no longitudinal drop-offs.

The transverse drop-off at the end of each strip shall be feathered out in accordance with Section 745.62.

Where abrupt or sloped drop-offs occur within or at the edge of the paved surface, the Contractor shall provide suitable warning signs.

## **745.62 TRANSVERSE JOINTS**

On wearing courses, pavement depth, line and grade shall be maintained at least 4 feet beyond the selected transverse joint location. On all courses, a sloped end section shall be constructed. If subject to traffic, the end section shall be sloped at not less than 50:1. If not subject to traffic, the end section shall be sloped at a minimum of 10:1.

When paving is not expected to continue from the transverse joint until the following day or later, paper or other suitable material shall be placed under the material ahead of the transverse joint location.

Prior to continuing the permanent paving lift, the Contractor shall remove the material beyond the joint to a vertical face against which paving will resume. The base shall be cleaned of all debris. A tack coat shall then be applied to the vertical edge and surface of the exposed area before paving is continued.

After placement and finishing of the new asphalt concrete, both sides of the joint shall be compacted to the specified density. The joint surface shall conform to the requirements of Section 745.70.

## **FINISHING AND CLEANING UP**

### **745.70 PAVEMENT SMOOTHNESS**

The top surface of the asphalt concrete pavement shall not vary by more than 0.02 foot when tested with a 12 foot straightedge either parallel with or perpendicular to the centerline. The straightedge shall be furnished and operated by the Contractor. The Engineer will observe this testing and may require additional testing.

The joint between the pavement and the top surface of utility structures, such as manhole covers and valve boxes located in the traveled way, shall meet the pavement surface tolerances.

The surface of the finished pavement shall be within 0.02 foot of the specified line, grade and cross section.

The Contractor shall correct any surface tolerance deficiency by a method that has been approved by the Engineer. All corrective work shall be completed within 10 work days following notification from the Engineer. All corrective work, including furnishing of materials, shall be performed at the Contractor's expense and no adjustment in contract time will be made.

### **OTHER: SPECIAL PROTECTION UNDER TRAFFIC**

No traffic or equipment shall come in contact with the compacted mixture until it has cooled and set sufficiently to prevent marking. Edges shall be protected from being broken down and edge drop-offs 1 inch or more in height shall be marked with warning devices visible by day and night to the traveling public and placed at spacing's as specified or as directed by the Engineer.

## **MEASUREMENT**

### **745.80 GENERAL**

#### **Ton basis**

Asphalt concrete will be measured and paid for on a ton basis, to the nearest 0.01 ton. There will be no separate measurement or payment for asphalt cement contained in the mixture.

#### **Square Yard Basis**

Asphalt concrete will be measured on the surface to the nearest 0.1 foot. Payment will be on a square yard basis, to the nearest 0.1 yard.

**Separate tonnage of mixture and asphalt cement**

When the bid schedule so indicates, the quantities of asphalt concrete mixture and asphalt cement contained in the mixture will be measured and paid for separately as follows.

- a) Asphalt concrete mixture will be measured and paid for on a ton basis, to the nearest 0.01 ton. No deduction will be made for the weight of the asphalt cement or any additive used in the mixture as required by the specifications or ordered by the Engineer.
- b) Asphalt cement will be measured and paid for on a ton basis, to the nearest 0.01 ton. If invoice and tank stickings are not available, the quantities shall be based on extraction tests.

Patching and leveling work will be measured and paid for in conformance with Section 745.80 Ton basis.

**PAYMENT**

**745.95 PAYMENT DEDUCTIONS AND REJECTION OF PAVEMENT**

**Aggregate Gradation and Asphalt Content**

A deduction of 1.0 percent of the in-place price for asphalt concrete and cement will be made for each 1.0 percent cumulative weighted deviation beyond the allowable tolerance of each component of the job mix formula specified in Section 745.14.

The following factors shall be used to calculate deductions due to deviations from the job mix formula.

**Deviation Weighting**

Asphalt Cement	12 x Deviation
200 minus	3 x Deviation
#10	1.5 x Deviation
#40	1.5 x Deviation
All Other Sizes	1 x Deviation

The cumulative weighted deviation is the sum of all weighted deviations as determined from the table above.

A minimum of three samples as a lot shall be averaged to determine any reduction in payment. Where the cumulative weighted deviation equals or exceeds 15.0 percent, the materials shall be removed and replaced at no cost to the owner.

When asphalt paving materials with a cumulative deviation of less than 15.0 percent are furnished, the Engineer may require the Contractor to remove and replace defective materials at no cost to the owner or shall deduct from payments to the Contractor an amount equal to the cumulative weighted percentage deviations from the job mix formula.

**Compaction**

Asphalt concrete pavement which does not comply with compaction requirements shall be removed and replaced or, at the discretion of the Engineer, be subject to a price reduction determined from the following table:

PRICE REDUCTION SCHEDULE

<u>% MAXIMUM DENSITY (Normal Method)</u>	<u>% PAY *</u>	<u>% TARGET DENSITY (Control Strip Method)</u>
92.0 and above	100	98.0 and above
91.5 - 91.9	95	97.5 - 97.9
91.0 - 91.4	90	97.0 - 97.4
90.5 - 90.9	85	96.5 - 96.9
90.0 - 90.4	80	96.0 - 96.4
89.5 - 89.9	70	95.5 - 95.9
89.0 - 89.4	60	95.0 - 95.4
Below 89.0	0 - 50	Below 95.0

\*Applies to price for in-place asphalt concrete, including asphalt cement where measured and paid for separately on City of Prineville Public Works contracts.

**Pavement Thickness**

In determining payment reductions for deficient or excessive pavement thickness, a section of pavement will normally be one full roadway station (100 lineal feet).

For non-roadway paving and in other situations where the Engineer determines the above section is inappropriate, the Engineer may establish a different unit of work on which to calculate average thicknesses and price reductions.

When pavement thickness, as determined by the Engineer's measurements or test cores, is found deficient by more than the thickness of the specified surface course of asphalt concrete, the Engineer may allow the Contractor to place an additional lift of asphalt concrete to bring the total thickness of the pavement into conformance with the specifications.

When the pavement in any section of pavement is found deficient in thickness by less than the specified thickness of the surface course and the Engineer allows the pavement to remain in place, payment for that pavement will be made at an adjusted price determined from the following table.

<u>% Reduction in Pay *</u> <u>(Payment on Weight Basis)</u>	<u>% Deficiency</u> <u>in Thickness</u>	<u>% Reduction in Pay *</u> <u>(Payment on Area Basis)</u>
No deduction	0.0 to 5.0	No deduction
" "	5.1 to 10.0	1.0 x Deficiency
0.5 x Deficiency	10.1 to 20.0	1.5 x Deficiency



1.0 x Deficiency

20.1 to 30.0

2.0 x Deficiency

\*Applies to price for in-place asphalt concrete, including asphalt cement where measured and paid for separately.

No payment will be made for any area of pavement found deficient in thickness by more than 30.0 percent even though the work is permitted by the Engineer to remain in place.

Unless otherwise specified, the work required for reconditioning an old roadbed will not be measured or paid for separately as extra work. This work shall be considered incidental to the work required for placing asphalt concrete.

## **ASPHALT PATCHING**

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Asphalt patching will be required under two general situations: (1) In new construction asphalt patching shall include driveways, trenching in existing pavement areas and other such areas that are behind the curb and/or involve a significant amount of hand labor to complete the work and (2) In existing pavements where the scope of the work is primarily paving underground utility trenches.

### **Pavement Patching**

#### **1. Backfill**

- a. Class A. Backfill  
See Chapter V- Trenches.
- b. Class B Backfill  
See Chapter V- Trenches.
- c. Cement Treated Base  
See Chapter V- Trenches.
- d. Pipe Bedding and Pipe Zone  
See Chapter V- Trenches.

#### **2. Asphalt Patch**

##### **a) Preparation**

The existing pavement shall be cut back to undisturbed areas and the edges shall be straight and vertical. Pavement shall be saw cut or wheel cut such that the finished edge is neat and uniform. All existing pavement or concrete surfaces shall be uniformly tacked with asphalt by brushing or spray equipment. A mist or fog application of tack is not sufficient and surfaces must be fully coated.

Patches constructed of cold mix AC will be acceptable during times when Hot Mix plants are not operating or will not be operating within a reasonable period. Cold

mix asphalt patches that are deemed substandard by the City inspector shall be dug out and replaced with hot mix patches when Hot Mix AC becomes available.

**b. Placement**

The pavement patch shall be a minimum of 12 inches of CTB/CTF and 3 inches of Asphalt Concrete.

Asphalt concrete shall be placed and raked such that, when compacted, the surface will be uniform and smooth and shall match abutting pavement edges. When checked with a 4 foot straightedge, a variation of more than 1/4 inch from true line and grade shall be cause for rejection of the patch.

The Contractor shall maintain sufficient Asphalt tack and mason sand on site to choke the finished surface of the patch, if, in the opinion of the City Inspector, the margin of surface is too coarse or open graded.

**c) Base Material**

This work shall include furnishing, fine grading and compacting crushed rock base material at the depth specified under all patching areas. In new construction where two contracts have been awarded, base rock will be placed by the Excavation/Concrete Contractor. However, the Paving Contractor is expected to re-grade and make up material as required to construct the asphalt patch as specified. Base material that has been contaminated by dirt shall be removed.

Base material shall be in conformance with the applicable specifications for the area in which it is placed. Costs associated with supplying this base material is incidental to ASPHALT CONCRETE PATCHING.

**d) Paving**

The existing pavement shall be cut back to undisturbed areas and the edge shall be made straight lines and vertical. Pavement may be saw cut or wheel cut such that the finished edge is neat and uniform. All existing pavement or concrete surface shall be uniformly asphalt tacked with brush or spray equipment. A mist or fog application of tack is not sufficient and surfaces must be fully coated.

In existing pavement, the asphalt patch shall be a minimum of 12 inches of CTB/CTF and 3 inches of Asphalt Concrete.

Asphalt concrete shall be placed and raked such that, when compacted, the surface will be uniform and smooth and shall match abutting pavement edges. When checked with a 4 foot straightedge, a variation of more than 1/4 inch from true line and grade shall be cause for rejection of the patch.

Compacting shall be performed with a steel wheeled roller having a minimum weight of 4 tons and shall continue until roller wheel marks are no longer discernable.

In confined asphalt patch areas where a larger roller is not practicable, the largest steel wheel roller capable of operating in the asphalt patch area shall be used for breakdown compacting. A vibratory plate compaction device may be used for finishing. A vibratory plate compaction device may be used in small asphalt patch areas for both breakdown and finishing with the approval of the Engineer. Where no mechanical means can be used for compaction and finishing a hand tamper shall be used.

The Contractor shall maintain sufficient Asphalt tack and mason sand on site to choke the finished surface of the patch if, in the opinion of the City inspector, the margin or surface is too coarse or open graded.

**e) Temporary Pavement Restoration**

Permanent pavement patching in existing streets shall be completed as explained in Section ASPHALT PAVING above.

To comply with the requirement of pavement restoration within 48 hours of removal or disturbance, the Contractor may provide temporary patching. The temporary patching shall be a hard surface consisting of asphalt concrete, asphalt concrete cold mix or steel plates. CTB (Concrete Treated Base) may be used, but the top portion will require grinding to provide appropriate AC replacement for permanent restoration.

Between construction and the end of the 48 hour period, the street surface may be maintained with backfill or crushed rock provided that no subsidence occurs.

**MEASUREMENT AND PAYMENT**

**INCIDENTAL BASIS**

When neither specified nor listed in the proposal for separate payment, ASPHALT CONCRETE shall be considered incidental work for which no separate payment will be made.

**ASPHALT CONCRETE**

ASPHALT CONCRETE will be measured by the ton to the nearest 0.01 ton. The Contractor shall provide weigh tickets from certified scales to prove the ASPHALT CONCRETE tonnage. Payment for ASPHALT CONCRETE will be at the contract unit price bid per ton of the class of asphalt specified, complete in place.

**ASPHALT CONCRETE PATCHING**

ASPHALT CONCRETE PATCHING will be measured by the square yard to the nearest full square yard. Payment for ASPHALT CONCRETE PATCHING will be at the contract unit price bid for ASPHALT CONCRETE PATCHING. This payment shall include full compensation for all labor, equipment and materials required to perform the work.

**ASPHALT CONCRETE PATCH-TRENCH**

ASPHALT CONCRETE PATCH-TRENCH will be measured by the linear foot of trench over the installed utility measured on a horizontal plane. Payment for ASPHALT CONCRETE PATCH-TRENCH will be at the contract unit price bid for ASPHALT CONCRETE PATCH-TRENCH. This payment shall include full compensation for all labor, equipment and materials required to perform the work.

**ASPHALT TACK COAT**

No separate measurement or payment will be made for furnishing and applying asphalt tack coat. Full compensation for tack coat is included in the contract unit price bid for asphalt concrete or asphalt patching as the case may be.

**BASE ROCK**

Where no separate pay item exists for Base Rock, base rock will be considered an incidental item to the work required and full compensation for base rock is included in the price bid for that item of work.

**759 MISCELLANEOUS PORTLAND CEMENT CONCRETE STRUCTURES**

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**DESCRIPTION**

**759.00 SCOPE**

Except as modified or supplemented herein, the provisions of Section 759 of the current edition *Oregon Standard Specifications for Construction* shall apply.

This section covers the work necessary for the construction of Portland Cement concrete driveways and entrances, sidewalks and pathways, in accordance with Standard Drawings 2-9, 2-10 and 2-11. Asphalt concrete driveways shall be covered under ASPHALT PATCHING. This section also covers colored Portland Cement concrete and interlocking paver downtown sidewalks in accordance with Standard Drawings 2-12, 2-13 and 2-14. The Construction of Asphalt Concrete pathways and sidewalks is covered under Section 745.

Driveways are considered to be that portion of paved vehicular access that lies behind the sidewalk or driveway entrance. Entrances shall also be referred to as aprons and are generally a transition section 5 feet in width between the grade of the gutter and the grade of the top of the curb.

There are two classifications of driveway aprons; Portland Cement concrete conforming to Standard Drawings 2-7 and 2-8 and interlocking pavers conforming to Standard Drawing 2-13. Pavers may be required in the downtown area.

## **Requirements**

Driveways for arterials shall conform to the Driveway access policy. Direct access to an arterial should be avoided whenever practical.

Concrete Driveway Aprons are required on all new construction, except asphalt aprons approved by ODOT (Permit required).

Driveways should be spaced a minimum of 4 feet apart measured from the top of transition. The maximum practical spacing should be sought.

The distance between an intersection and the first driveway shall be a minimum of 20 feet, unless variance is approved by City Engineer. The distance shall be measured from the point of tangency of the intersection curb to the nearest edge of the first driveway. The City Engineer may determine the minimum distance for commercial and industrial to be greater, dependent upon frontage and type of expected traffic.

Residential driveway maximum width shall be 27 feet and commercial driveway maximum width shall be 35 feet, unless an exception is granted.

Structures, such as fire hydrants and central delivery mailboxes, shall not be located in the sidewalk except as approved by the City Engineer.

The back edge of the sidewalk shall smoothly meander back from the central delivery mailbox station to provide a 5 foot wide unobstructed pathway. No portion of the mailbox shall be within 6 inches of the curb.

Sidewalks constructed abutting the curb are most desirable. Sidewalks shall be poured monolithic with the curb. When a sidewalk meanders from the curb the alignment may require special approval; and the following conditions shall be met:

The sidewalk shall generally follow a smooth and gradual alignment free of sharp angles or bends. Horizontal curves shall not be less than 20 foot radius. The centerline of the side walk shall not meander more than 35 feet from the street curb line. All sidewalks shall be within the right-of-way or, in particular situations where topographical or vegetation limitations require sidewalks out of the right-of-way, 15 foot easements shall be provided. The location of meandering sidewalks shall be shown on the plans and profile as a condition for approval by the City Engineer.

Sidewalk grades shall not exceed 5% greater than the existing street grade and in no case greater than a 15% grade. The total vertical separation between the top of curb and the top of the sidewalk shall not be greater than 10 feet. In no case shall the cross slope of the parking strip between the curb and the sidewalk be steeper than 2:1. The grade of meandering sidewalks shall be shown on the profile as a condition for approval by the City of Prineville.

Safety is a primary design consideration. All portions of the sidewalk shall be visible from the street. Trees and brush shall be thinned or removed to provide the required visibility.

Meandering sidewalks shall cross intersections no further back than the center of the curb radius. Handicap ramps shall be provided.

The parking strip so created shall not be less than 36 inches wide, except where the sidewalk meander returns to be adjacent to the curb. In order to prevent sharp re-entrant angles in the parking strip, an edge not less than 8 inches long and squared to the curb shall be constructed at the juncture of the sidewalk to the curb. Provision shall be made for landscaping the parking strip. Particular attention must be paid to the irrigation of the parking strip.

## **MATERIALS**

### **759.10 GENERAL**

Portland Cement concrete shall conform to the requirements of Section 2010.

### **759.11 AGGREGATE BASE**

Portland Cement concrete base aggregates for PCC driveways and approaches shall consist of gravel, rock, sand, cinders or soil; free of frozen material; with less than 0.35 percent by weight of deleterious material, to include humus organic matter, clods, sticks and debris. Maximum size shall be 1 inch (passing a 1 inch screen) and minimum unit weight shall be 95 pcf. Materials may be blended to achieve the minimum unit weight. Minimum sand equivalent shall be 30. The construction Contractor or designated representative shall submit written verification of the proposed material from an independent certified testing laboratory prior to incorporation into the work. Proctor information shall also be submitted.

Another option is to use Class C Backfill, Section 405.14C as the base material. When using pea gravel or sand, the base area shall be permanently confined for the entire perimeter.

### **OTHER: Interlocking Pavers-Downtown Sidewalks**

Pavers shall be Uni-Decor design as manufactured by Concrete Paving Stone Company, Inc., 80 mm thick, cobble unit with edge units in the classic color. Herringbone pattern shall be used.

Cementitious materials shall conform to the following applicable ASTM specifications: Portland Cements-C150, blend cements-C595, Hydrated lime-Type S-C207 and Pozzolans-C618.

Physical Requirements: Air-entraining agents, coloring pigments, integral water repellants, finely ground silica, etc., shall be previously established as suitable for use in concrete and either will conform to ASTM standards where applicable or will be shown by test or experience not to be detrimental to the concrete.

At the time of delivery to the site, the average compressive strength shall not be less than 8000 psi

The average absorption shall not be greater than 5% with no individual unit greater than 7%.

The Manufacturer shall verify durability by providing written documentation on the following:

Freeze-thaw testing: when tested in accordance with Section 8 of ASTM C 67-73, specimens shall have no breakage and not greater than 1.0% loss in dry weight of any individual unit when subjected to 50 cycles of freezing and thawing. This test shall be conducted not more than 12 months prior to delivery of units.

Abrasion resistance: when tested in accordance with ASTM C 418-76, “Abrasion Resistance of Concrete by Sandblasting”, specimens will no have greater volume loss than 15 cubic centimeters per 50 square centimeters.

The average thickness loss will not exceed 3 millimeters.

Permissible Variations in Dimensions: Length or width of units will not differ by more than 1.5 mm from approved samples. Heights of units will not differ by more than 3 mm from the specified standard dimension.

Visual Inspection: All units will be sound and free of defects that would interfere with the proper placing of unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual methods of manufacture or minor chipping resulting from the customary methods of handling in shipment and delivery, will not be deemed grounds for rejection.

Sampling and Testing:

1. The purchaser or authorized representative will be accorded proper facilities to inspect and sample the units at the place of manufacture from the lots ready for delivery.

2. Sample and test units in accordance with ASTM methods C140, Sampling and Testing Concrete Masonry Units.

Rejection: In case the shipment fails to conform to the specified requirements, the manufacturer may sort it and new specimens will be selected by the purchaser from the retained lot and tested at the expense of the manufacturer. If the second set of specimens fails to conform to the test requirements, the entire lot will be rejected.

Expense of Test: Except as specified and unless otherwise agreed, the expense of inspection and testing will be borne by the purchaser.

Sand Laying Course: The sand laying course will consist of clean, sharp sand with the following gradation limits:

<u>Sieve Size</u>	<u>% Passing</u>
4	90-100
8	80-95
16	55-85
50	10-35
200	0-5

Edge Restraint: All edges of the paving stone installation will be restrained. The type of edge restraint will be concrete curb or sidewalks.

**OTHER: Colored Portland cement concrete and interlocking pavers (Aggregate base)**

Base aggregates for downtown sidewalks including colored Portland Cement concrete and interlocking pavers shall be 1”-0. A ½ inch leveling course of clean sand shall be placed between pavers and aggregate base.

**CONSTRUCTION**

**759.42 FOUNDATION**

Driveway aprons shall be 6 inches thick or as shown on the plans. Any transition from 6 inches to 4 inches thickness shall not occur in the apron.

**759.43 FOUNDATION PREPARATION**

Preparation of subbase shall conform to the requirements of Section 480.40 and the following. If the in-situ material does not meet the material specification for base, then the base shall be excavated 8 inches from finish grade, raked smooth of large rocks and other organic material and 4 inches of base placed and compacted per standard drawing. If the in-situ material meets the specification for base, as proven by the Contractor and verified by the City Engineer, then the base shall be excavated 4 inches from finish grade, raked smooth of large rocks and other organic material and compacted.

A minimum of one test every 300 feet or as directed by the City Engineer, is required. The costs of passing tests are the responsibility of the City, while the costs of failing tests are the responsibility of the Contractor.

**759.48 EXPANSION JOINTS**

**759.48(b) DRIVEWAYS, WALKS, MONOLITHIC CURBS AND  
SIDEWALKS AND SURFACING**

Expansion joints are required at ends of driveway in accordance with the standard drawings.



In sidewalks, expansion joints shall be constructed at each point of tangency, at connections to existing curbs, driveways, sidewalks and pathways, around objects which protrude through, into or about the sidewalk and at spacings not to exceed 45 feet.

#### **759.49 CONTRACTION JOINTS**

Contraction joints are required at the center of the driveway in accordance with the standard drawings.

In sidewalks, contraction joints are required at 5 foot intervals.

#### **759.51 CURING**

This work shall conform to the requirements of Section 480.42d

#### **OTHER: CURB RAMPS**

The Contractor shall construct handicap ramps at the locations shown on the plans and in accordance with the details shown on the plans and meeting all ADA requirements.

#### **OTHER: INTERLOCKING PAVERS-DOWNTOWN AREA**

##### Construction of the Base Course

1. The finished sub grade will be approved before placement of any base course.
2. The base course will be compacted with suitable compaction equipment that will ensure a minimum 90% of ASTM designation D1557.
3. The base course will be shaped to grade and cross section with an allowable local tolerance of .01 feet.
4. Construction of the base course will be the responsibility of the General Contractor.

##### Construction of The Sand Laying Course

1. The finished base course will be approved before the placement of the sand laying course.
2. The sand laying course will be spread evenly over the area to be paved and screeded to a level that will produce the 1½ inch thickness when the paving stones have been placed and vibrated.
3. Once screeded and leveled this sand laying course will not be disturbed in any way.

##### Laying of Concrete Paving Stones

1. The paving stones will be laid in the approved pattern.
2. The paving stones will be laid in such a manner that the desired pattern is maintained and the joints between the stones do not exceed 1/8 inch.
3. The gaps at the edge of the paved surface will be filled with standard edge pieces or with stones cut to fit. The stones will be cut to a straight even surface without cracks or chips.
4. The paving stones will be vibrated to their final level by two or three passes of a vibrating plate compactor.

5. After vibration, white silica sand will be brushed over the surface and vibrated into the joints with additional passes of the plate vibrator so as to completely fill the joints.
6. Surplus material will be then swept from the surface and the entire site left clean.
7. After final vibration, the surface will be true to grade and will not vary by more than 1/2 inch when tested with a 3 foot straight edge at any location on the surface.

**OTHER: WEATHER LIMITATIONS**

- 1) Concrete is to be placed when the air temperature is at least 25°F. and rising.
- 2) Concrete shall not be placed on frozen ground. Frost and ice shall be removed from all forms, reinforcing steel, imbedded items and subgrade.
- 3) Concrete from the chute shall have a temperature of not less than 55°F.
- 4) Concrete work shall be protected from freezing for at least seven days after placement. A curing sealant or impervious material shall be placed on the concrete.
- 5) The inspector can require the Contractor to provide a minimum recording thermometer, having not less than 2° divisions, to verify that the temperature at the surface of the work does not fall below 32°F. The reading shall be taken as close to the surface of the concrete as possible.
- 6) Any concrete indicated as being damaged from freezing shall be rejected and replaced.

**MEASUREMENT**

**759.80 GENERAL**

Driveways, pathways and sidewalks shall be measured on a square foot basis to the nearest whole square foot.

Aprons shall be measured on a square foot basis to the nearest whole square foot. Transition sections from apron to sidewalks shall not be measured.

**PAYMENT**

**759.90 GENERAL**

When neither specified nor listed in the proposal for separate payment, driveways, aprons, pathways and sidewalks shall be considered incidental work for which no separate payment will be made.

Payment for driveways, aprons, pathways and sidewalks shall be at the unit price bid at the thickness and measurement unit specified.

## **1040 PLANTING**

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### **DESCRIPTION**

#### **1040.00 SCOPE**

Except as modified or supplemented herein, the provisions of Section 1040 of the current edition *Oregon Standard Specifications for Construction* shall apply. This section covers the work necessary to install landscaping in public right-of-way, including downtown sidewalks.

#### **1040.03 GENERAL**

Scope of Work: Furnish labor, materials, equipment and supervision necessary to complete all work shown on the Drawings and in the Specifications. Trees will be 2 inches caliber to be measured 6 inches from graft and an approved tree type. The City will approve tree type and location before ordering.

Protect active utilities encountered; notify persons owning same. Contractor to verify with General Contractor location of all underground site utilities.

### **MATERIALS**

#### **1040.10 GENERAL**

Materials shall be as shown on the Drawings and specified herein.

#### **1040.13 TOPSOIL**

Topsoil shall be Clean, friable, natural sandy loam material, free of debris, roots, stones, weeds and grass. 4.6 cubic yards are required for each new tree location.

#### **1040.16 SOIL AMENDMENTS**

Textural soil amendments shall be Garden Care Compost, as provided by North American Soils, Inc., Portland, Oregon 97203. 5 cubic yards are required to be distributed between 9 new tree locations.

#### **1040.19 PLANTS**

Trees will be 2 inches caliber to be measured 6 inches from graft and an approved tree type. The City will approve tree type and location before ordering.

### **CONSTRUCTION**

#### **1040.43 TOPSOIL**

Thoroughly mix together 4.6 cubic yard topsoil and 6 inches textural soil amendment at each proposed tree location.

**1040.49 GENERAL PLANTING**

Remove from all planting openings, stones, mortar, concrete, asphalt, rubbish, debris and any other materials harmful to plant life.

**1040.55 MISCELLANEOUS ITEMS**

**1040.55(b) TREE GRATES**

Tree grates to be installed after the irrigation and topsoil placement has been completed. Verify tree grate installation with General Contractor. Tree grates shall be 4' x 4' Neenalt Foundary Company or equivalent.

**PAYMENT**

**1040.98 MISCELLANEOUS**

Pay quantities will be paid for at the contract price per unit of measurement for each of the items that appear in the proposal that are specified in this section.

Payment shall be understood to comprise full and complete compensation for all material, labor, equipment, tools and incidentals necessary to complete the work as specified in this section.

**1120 IRRIGATION**

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**DESCRIPTION**

**1120.00 SCOPE**

Furnish all labor, materials, equipment and supervision necessary to complete all work shown on the Drawings and in the specifications.

The Contractor shall provide and install sleeving, automatic irrigation system and jumbo valve boxes. Remove existing soil from around existing trees to allow for irrigation heads and new tree grates as detailed.

Coordinate sleeving under all hard surfaces with General Contractor.

Related Work By Others: Points of Connections (P.O.C.) for the irrigation system and jumbo valve boxes will be provided by the City of Prineville.

Irrigation Foreman: Landscape Contractor to employ competent individuals knowledgeable with irrigation products and equipment specified. Individual to be on site at all times during installation of irrigation system.

Design and Plan: The layout of the irrigation system is schematic. Follow as closely as is practicable. Notify Engineer of changes that have taken place in the field.

Verification of Dimensions: Before proceeding with the installation of any section of the irrigation system, Contractor will check and verify the correlation between ground measurements and the drawings.

Protection Of Unfinished Work: Provide protection at all times to keep rock, dirt, gravel, debris and all other foreign materials from entering piping, valves and other irrigation equipment.

## **MATERIALS**

### **1120.10 GENERAL**

Material and equipment will be new and of brands and types shown on Drawings and specified herein.

Irrigation emitters shall be Cicolac, construction except as otherwise specified by model number reference. Manufacturer's catalog numbers indicated on Drawings. RB-Rain Bug EM-M20 Emitter.

### **1120.11 PIPE, TUBING AND FITTINGS**

#### **1. PVC Pipe (Polyvinylchloride)**

PVC 1120, Type 1, normal impact, I.P.S., NSF approved; plain and/or bell end; conforming to ASTM D1784-69 and D2241-73, color white. (2 inch sleeving)

#### **2. PVC Pipe Fittings**

PVC 1120, Schedule 40, Type 1, normal impact, I.P.S., NSF approved, meeting requirements of ASTM tentative specifications D-2466 and D-1784.

#### **3. PVC Riser**

PVC 1120, Type 1, normal impact, I.P.S., NSF approved schedule 80 PVC, conform to PS 21-70. Cut to required lengths threaded both ends, color: dark grey.

#### **4. Irrigation Tubing**

Rain Tube - low density polyethylene, manufactured under the strictest ASTM - RB - 1049.

#### **5. Emitter distributing Tubing**

RB-150 - Low density polyethylene.

#### **6. PVC Solvents:**

##### **1. PVC Solvent Cement**

NSF approved solvent for PVC through 4 inches, meeting requirements of ASTM D-2564, #705.

##### **2. PVC Primer and Cleaner**

Weld-On P-70

Do not store PVC pipe and fittings in direct sunlight.

**1120.13 QUICK-COUPLING EQUIPMENT**

Quick-Coupling Valve Coupler shall be Rain Bird No. 55 K-1.

**1120.14 HOSE BIBS**

Hose swivel shall be Rain Bird No. SH-2.

**1120.15 CROSS-CONNECTION DEVICES**

Refer to Drawings. Local codes will determine final choice of Backflow device.

**1120.17 VALVES**

**1. Automatic Control Valve**

1" - 24 volt Irri: -Trol DC latching solenoid valves.

**2. Manual Drain Valve**

Rain Bird No. MVA - 3/4 or approved.

**3. Quick-Coupling Valve**

One piece, double slot 1 inch I.P.S. with vinyl cover and lock top. Rain Bird No. 5 LVC.

**1120.18 VALVE BOXES AND PROTECTIVE SLEEVES**

Jumbo concrete boxes supplied by the Contractor.

**1120.19 ELECTRICAL WIRE AND SPLICES**

Control Wire shall be Type UF bearing U/L approval for direct underground burial in National Electric Code Class II circuits. AWG sizes, minimum size #16.

**OTHER**

Gravel shall be 3/4 inch x 1/2 inch clean, washed, round gravel.

Controller shall be Battery Operated Controller and Battery Box Two Station IBOC Irri-Tol Controller and BP-1 Battery Box.

**CONSTRUCTION**

**1120.40 GENERAL**

Installation of all materials and equipment will be in strict accordance with manufacturer's written specifications and recommendations and Local and State of Oregon requirements.

**1120.40(a) PLUMBING**

**1120.40(a)(1) DOUBLE CHECK VALVE ASSEMBLY (DCVA)**

Have State Health Department approved double-check valve tested by local State Certified Tester before start up. Have double-check valve tested again at

the end of guarantee period. Submit copy of Test Report to Engineer after each test is completed.

#### **1120.42 EXCAVATION**

1. Trenches: Pipe trenches straight or 'snaked' slightly allowing for expansion and contraction of PVC pipe.
2. Grades: Bottoms of uniform slopes 1% minimum grade, except 1/2% minimum where greater slope is not practicable.
3. Trench Depth: 12 inches minimum pipe cover where possible.
4. Trench Width: Provide trench of sufficient width to allow for proper tamping around pipe.
5. Preliminary Backfill: Backfill any excess excavation with suitable material free of rock or other material that may damage pipe and thoroughly compact to give full support to the pipe.
6. Bell Holes: Provide bell holes to ensure support of pipe over its entire length.
7. Bottom of Trench: Bottom of trenches will be smooth and free of sharp rock and other objects that may damage pipe.

#### **1120.43 PIPING**

1. Lay pipe in accordance with best practice, substantially supported at all points and "snaked" slightly allowing for expansion and contraction.
2. PVC pipe joints, solvent welded except as indicated. Cut pipe square, deburr, wipe from the surface all saw chips, dust, dirt, moisture and all foreign matter which may contaminate the cemented joint. Apply primer and solvent cement; make joints in accordance with manufacturer's recommendations.
3. Provide a leak-resistance joint with freedom of movement at all swing and/or swivel joints.
4. In freezing weather, solvent welding of PVC pipe is not allowed. In rainy weather, solvent welding of PVC pipe to be done only under cover.

#### **1120.45 INSTALLATION**

##### **1120.45(a) MAINLINE FLUSHING**

Flush mainline before installing emitters. Install emitters at locations shown on Drawings.

##### **1120.45(d) CONTROLLERS**

Install control valves and quick-coupling valves as indicated on Drawings. Verify exact locations in the field with Engineer prior to installation.

**1120.45(e) VALVE BOXES AND QUICK COUPLERS**

Install perpendicular/square with building wall, curb or sidewalk for neat uniform appearance.

**1120.45(f) VALVES**

Install manual drain valves at all P.O.C. as shown on Drawings. Note MDV locations on 'Record Drawings.

**1120.45(g) CENTRAL CONTROL EQUIPMENT**

Install automatic controllers as indicated on Drawings.

**1120.46 LOW VOLTAGE ELECTRICAL INSTALLATION**

Control Wiring

1. Lay in trench under mainline for maximum protection.
2. Place in conduit and pipe sleeves where indicated.
3. Single wires (red) to each solenoid from control and a common neutral wire (white) to all solenoids from the controller.
4. For wire sizes, use wire sizing chart published by manufacturers of battery control valves installed.
5. No wire splices permitted.

**1120.47 FLUSHING AND TESTING**

**1120.47(a) GENERAL**

Immediately correct any and all leaks or defects found and re-test. Submit backflow device test report to Public Works Department.

**1120.47(d) MAINLINE FLUSHING**

Flush mainline before installing emitters.

**1120.47(e) MAINLINE TESTING**

Test mainline piping, valves, joints and fittings for not less than two (2) hours before inspection prior to backfilling. Minimum test pressure will be pre-set by pressure regulator for two hours, with no greater pressure loss than 5 PSI.

**1120.48 ADJUSTING SYSTEM**

Adjust and balance irrigation system to provide uniform coverage.

**1120.49 BACKFILL**

Backfill to sub grade, place backfill carefully around and over piping, removing rocks or other material that may damage pipe; wet and tamp earth in layers not over 6 inches thick until thoroughly compacted and settled.

**OTHER**

Keep premises reasonably free from accumulation of debris. On completion of each division of work, remove all debris, equipment and surplus materials and leave the premises clean.



## MAINTENANCE

### 1120.69 SYSTEM OPERATION

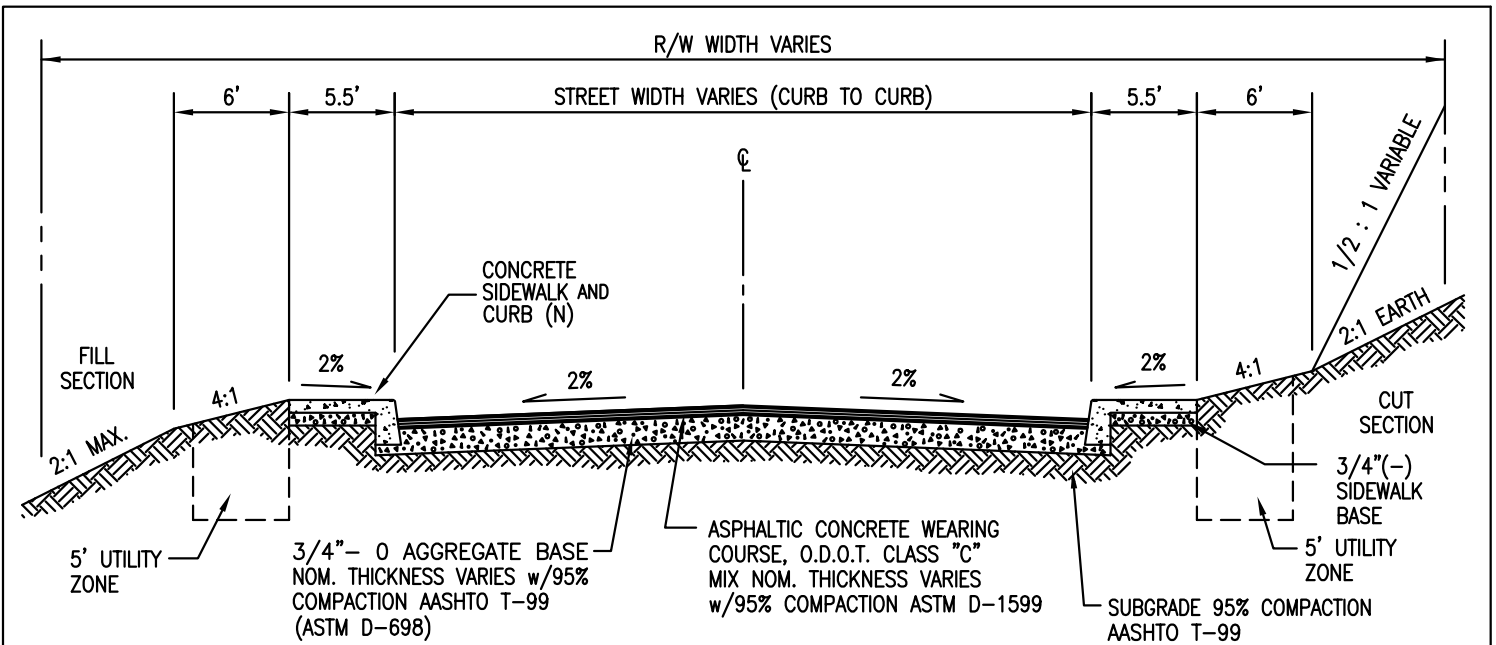
During the first-year guarantee period, shut down and winterize system no later than November 1<sup>st</sup>, activate system in spring no later than April 15<sup>th</sup>, and balance for coverage. (Shut-down and turn-on is based on weather condition-use best judgment. Notify Engineer of changes due to weather conditions.) Provide the City of Prineville before final payment with "Record Drawings" of irrigation system showing drain valve locations and other revisions, including product information on all materials used. Three copies of product information are required.

Guarantee And Replacement: Guarantee the irrigation system or any part thereof against defective material and workmanship for one year from the date of acceptance. Correct same without expense to the City of Prineville. Repair any settling of backfilled trenches occurring during a one-year period after final acceptance without expense to the City of Prineville. Include complete restoration of all damaged planting, paving or other improvements of any kind.

## PAYMENT

### 1120.90 GENERAL

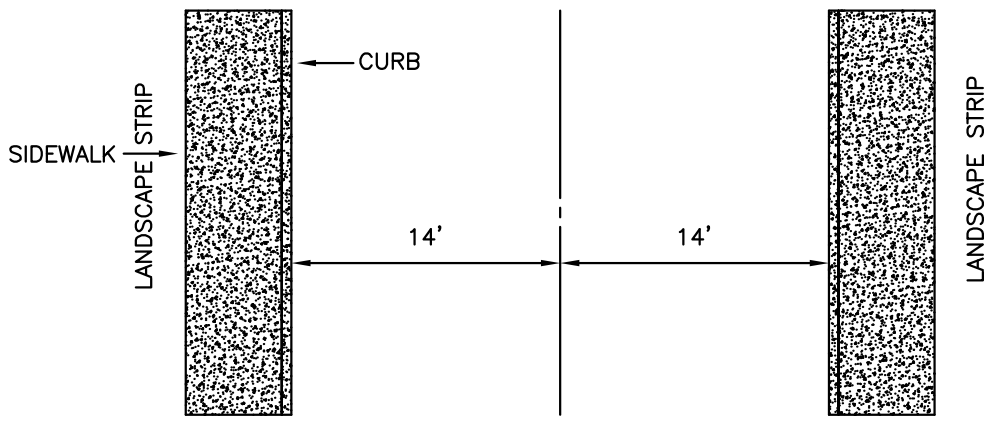
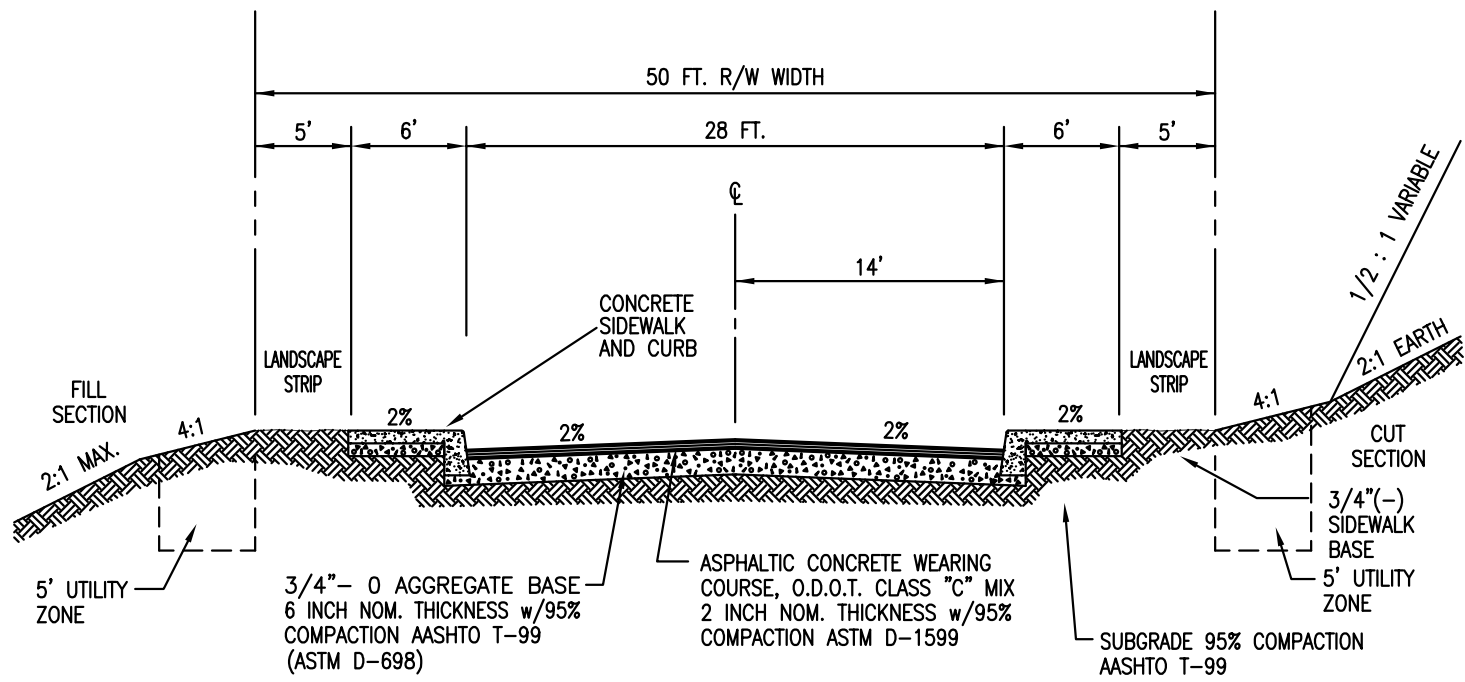
Irrigation shall be paid for as called for in the proposal, lump sum or unit price. The price shall constitute full payment for the pipe in place, leakage testing, all fitting required and all other work specified, including excavation, bedding and backfill.



TYPE OF STREET	R/W WIDTH (FT.)	PAVING WIDTH CURB TO CURB (FT.)	TRAVEL LANE WIDTH (FT.)	TURN LANE WIDTH (FT.)	BIKE LANE WIDTH (FT.)	PARKING LANE WIDTH (FT.)	(C.) SIDE-WALK WIDTH (FT.)	AC DEPTH (IN.)	(E.) AGGR. BASE DEPTH (IN.)	MIN. CURB RETURN RADIUS (FT.)	DESIGN SPEED (MPH)	(B) MAX. GRADE (%)	MIN. CL CURVE RADIUS (FT.)
MAJOR ARTERIAL (STATE HIGHWAY)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)	(L)
MINOR ARTERIAL	100	50	12	14	6	N/A	7(M.)	4	10	(L)	40	8	(H.)
MAJOR COLLECTOR	80	36	12	N/A	6	N/A	5	4	10	(L)	35	8	(H.)
MINOR COLLECTOR	80	40	12	N/A	N/A	8	5	3	10	(L)	35	8	(H.)
INDUSTRIAL COLLECTOR	80	40	14	N/A	6	N/A	5	4	10	(L)	35	8	(H.)
INDUSTRIAL	80	44	14	N/A	N/A	8	5	4	10	(L)	35	8	(H.)
LOCAL RESIDENTIAL - GRID	60	36	10	N/A	N/A	8	5	3	8	(L)	25	10	(H.)
LOCAL RESIDENTIAL CUL-DE-SAC	60(D.)	36(A.)	10	N/A	N/A	8	5	2	8	(L)	25	10	(H.)
ALL WEATHER SERVICE ROAD	30(J.)	24(G.)	12	N/A	N/A	N/A	N/A	2(G.)	6	15	15	10	(H.)
ALL WEATHER UTILITY ACCESS	20(F.)	14(G.)	14(K.)	N/A	N/A	N/A	N/A	2(G.)	6	15	15	10	(H.)
ALLEY	20	16	8	N/A	N/A	N/A	N/A	2	6	15	15	10	(H.)


- (A.) THE PAVING RADIUS IN THE TURNAROUND OF A CUL-DE-SAC SHALL BE 48 FEET WITH A RIGHT-OF-WAY RADIUS OF 50 FEET AND A 5 FOOT UTILITY EASEMENT.
- (B.) MINIMUM GRADE OF 0.5%. IF UNAVOIDABLE CONDITIONS EXIST, A GRADE OF 2.0 % STEEPER THAN SHOWN IS ALLOWED.
- (C.) SIDEWALKS SHALL BE PROVIDED ON BOTH SIDES OF THE STREET UNLESS CONDITIONED OTHERWISE IN THE LAND USE APPROVAL PROCESS. CONSIDERATION MUST BE GIVEN TO ACCOMMODATE AND MATCH EXISTING DRIVEWAYS.
- (D.) MAXIMUM LENGTH OF A CUL-DE-SAC SHALL BE 600 FEET (CL TO CL) AND MINIMUM LENGTH SHALL BE 130 FEET (CL TO CL). RIGHT-OF-WAY WIDTH MAY BE REDUCED TO 50 FEET FOR CUL-DE-SAC STREETS LESS THAN 200 FEET (CL TO CL) IN LENGTH. IN SUCH CASES, A 5 FOOT UTILITY EASEMENT SHALL BE PROVIDED ON BOTH SIDES OF THE RIGHT-OF-WAY.
- (E.) AGGREGATE BASE MAY BE INCREASED OR DECREASED WHEN A "CBR" OR "R" VALUE IS REQUIRED.
- (F.) MAY BE LOCATED IN AN EASEMENT GRANTED TO THE CITY OF PRINEVILLE.
- (G.) CURBS ARE NOT REQUIRED. AC PAVING MAY BE REQUIRED FOR ALL WEATHER SERVICE & UTILITY ACCESS ROADS UNDER SPECIAL CIRCUMSTANCES.
- (H.) DESIGN CRITERIA SHALL BE APPROVED BY THE CITY OF PRINEVILLE AT NO LESS THAN CURRENT AASHTO STANDARDS. SEE CHAPTER II- DESIGN STANDARDS, SECTION 2 DESIGN PARAMETERS, STREET, HORIZONTAL CURVES.
- (I.) ADDITIONAL RIGHT-OF-WAY MAY BE REQUIRED TO ACCOMMODATE THE LARGE RETURN RADIUS AND WHEELCHAIR RAMP.
- (J.) MINIMUM WIDTH REQUIRED FOR PUBLIC ACCESS.
- (K.) ONE TRAVEL LANE ONLY.
- (L.) DESIGN CRITERIA SHALL MEET CURRENT O.D.O.T. STANDARDS.
- (M.) SIDEWALK SHALL BE 7.0 FEET WIDE IF LOCATED TIGHT TO CURB, 5 FEET WIDE IF SEPARATED FROM CURB.
- (N.) SEE SECTION 759.00 OF CHAPTER VI-STREETS, SEE STANDARD DRAWINGS 2-13 FOR DOWNTOWN COLORED SIDEWALK REQUIREMENTS.

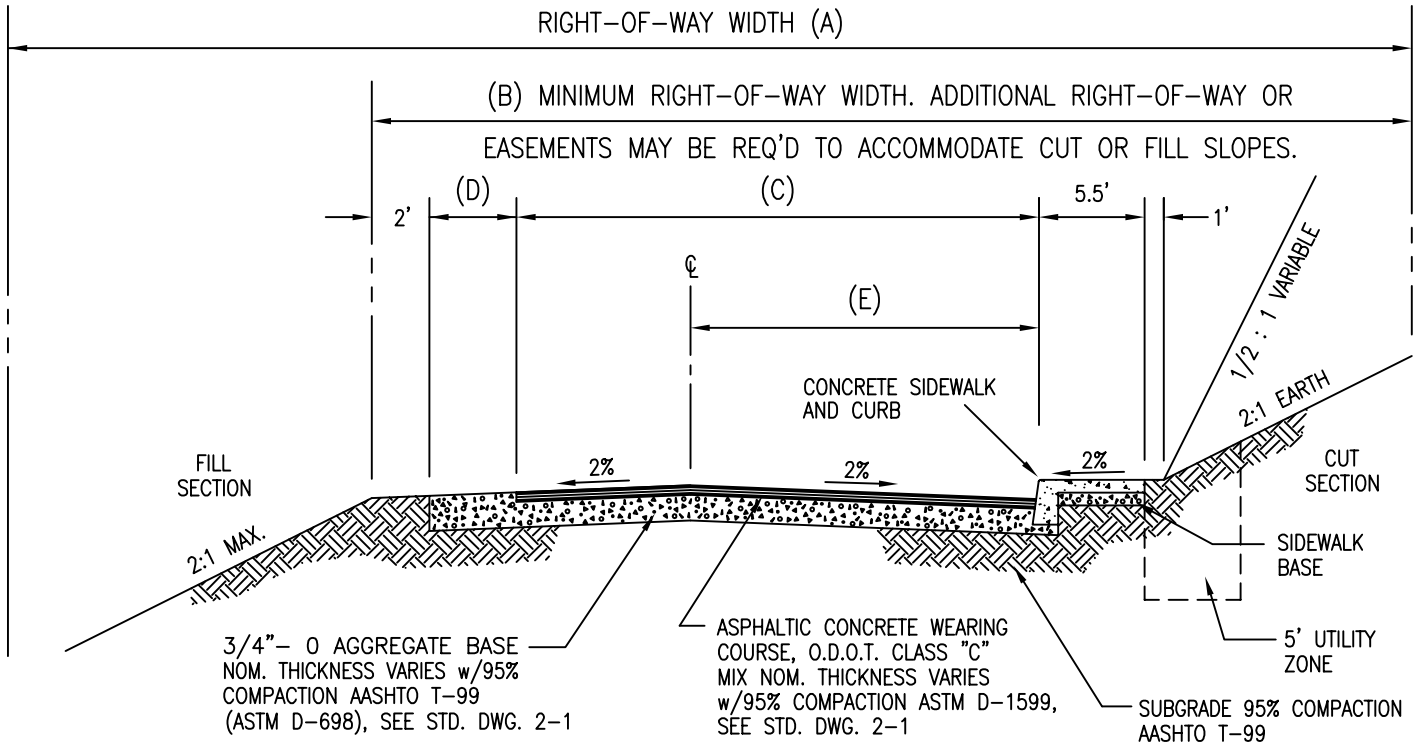
DATE :	SCALE :	TYPICAL MINIMUM STREET CROSS SECTION DIMENSIONS	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
3/12/12	NONE			
DRAWING NO.	APPROVED BY :			
2-1	EAK			



TYPE OF STREET	R/W WIDTH	PAVING WIDTH CURB TO CURB	AC DEPTH (INCHES)	BASE DEPTH (INCHES)	CURB RETURN RADIUS	DESIGN SPEED MPH	MAX. % OF GRADE (D.)	MIN. $\phi$ RADIUS OF CURVATURE
LOCAL RESIDENTIAL NON-GRID STREET	60'	36'	3	8	20'	25	10%	(E.)
RESIDENTIAL ALLEY	20'	16'	2	6	15'	15'	10%	(E.)

- (A.) The location and approval of Reduced Width Non-Grid streets is determined only through the land use process. 20 ft. wide public utility and access easements located at the rear lot line in conjunction with Reduced Width Streets are optional. Optional public utility and access easements shall be improved to AC paved alley standards or gravel all weather service road standards including paved aprons at all street intersections and are required to have an agreement for maintenance provisions filed with the Community Development Dept.
- (B.) Sidewalks shall be provided on both sides of the street. Consideration must be given to accommodate and match existing driveways. Sidewalks shall be monolithic to the curb.
- (C.) No parking allowed within 40 feet of the end of all curb returns in order to accommodate large emergency vehicles.
- (D.) Minimum grade of 0.5%. If unavoidable conditions exist, a grade of 2.0% steeper than shown is allowed.
- (E.) See Chapter II-Design Standards, Section 2 Design Parameters, Street, Horizontal Curves.
- (F.) Maximum distance between Reduced Width Street intersections shall be 660 feet. Cul De Sacs are not permitted.

DATE : 3/12/12	SCALE : SCALE	REDUCED WIDTH STREET TYPICAL NON-GRID STREET CROSS SECTION & DIMENSIONS	<b>CITY OF PRINEVILLE</b>	
DRAWING NO. 2-2	APPROVED BY : EAK		<b>PUBLIC WORKS DEPARTMENT</b>	



TYPE OF STREET	(A) FULL R/W WIDTH (FT.)	(B) MIN. 3/4 R/W WIDTH (FT.)	(C) PAVING WIDTH (FT.)	(D) SHOULDER WIDTH (FT.)	(E) DIST. TO CENTERLINE (FT.)
MINOR ARTERIAL	100	75	44	4	25
MAJOR COLLECTOR	80	60	32	4	18
MINOR COLLECTOR	80	60	34	4	20
INDUSTRIAL COLLECTOR	80	60	34	4	20
INDUSTRIAL	80	60	36	4	22
LOCAL RESIDENTIAL/GRID	60	45	29	2	18

### PARTIAL STREET IMPROVEMENT STANDARD

STREETS SHALL BE DEVELOPED TO FULL CITY STANDARDS AND SPECIFICATIONS FOR NEW DEVELOPMENTS AS SHOWN IN STANDARD DRAWING 2-1 INCLUDING ASPHALTIC CONCRETE PAVING, CURBS & SIDEWALKS BOTH SIDES AND STRIPING UNLESS CONDITIONED OTHERWISE IN THE LAND USE APPROVAL PROCESS FOR THE FOLLOWING REASONS:

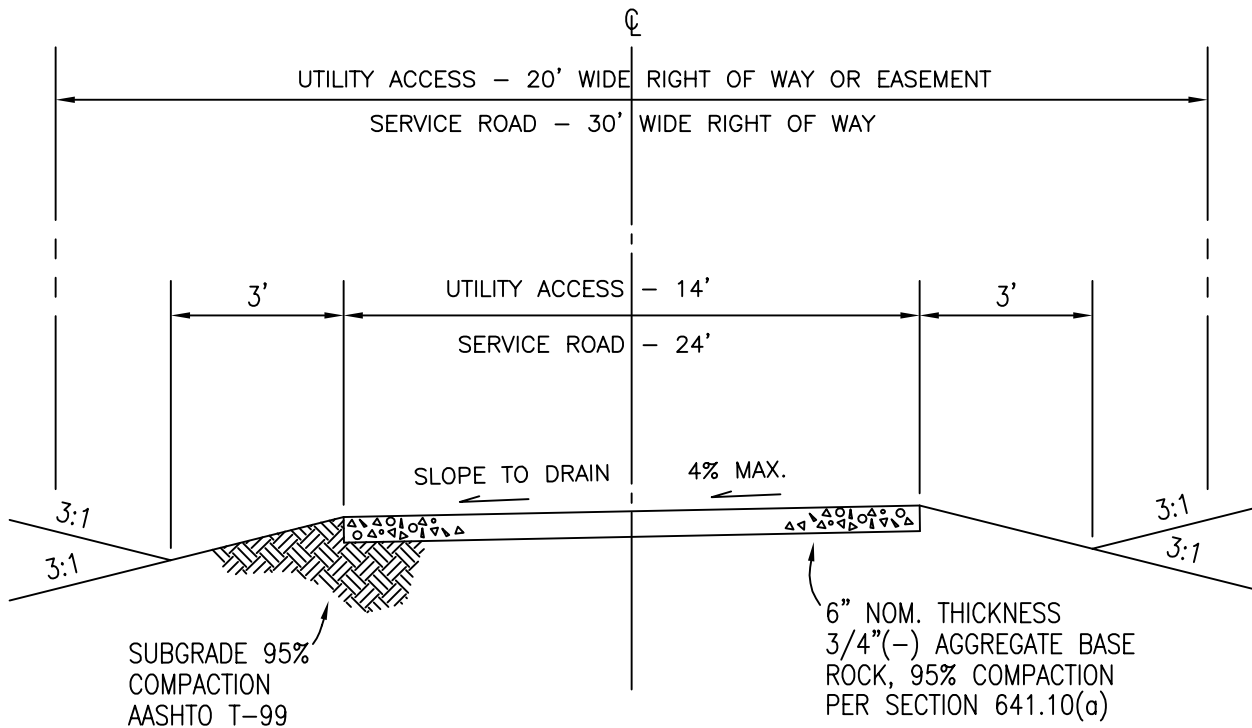
1. In the case of a boundary or offsite street, the Public Works Dept. may grant approval to reduce pavement width to a minimum of 3/4 street with curb & sidewalk on that side of the street adjacent to the proposed development.
2. If there are extreme topographic circumstances such as steep slopes or unstable soils that would prevent the development of a City Standard street, curb to curb pavement width can be reduced to no less than 24 feet including curbs & sidewalks on both sides and posted "No Parking".
3. When finishing an existing 3/4 street to a full width street, the existing street shall be saw cut and removed to centerline.

DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
2-3	MDW

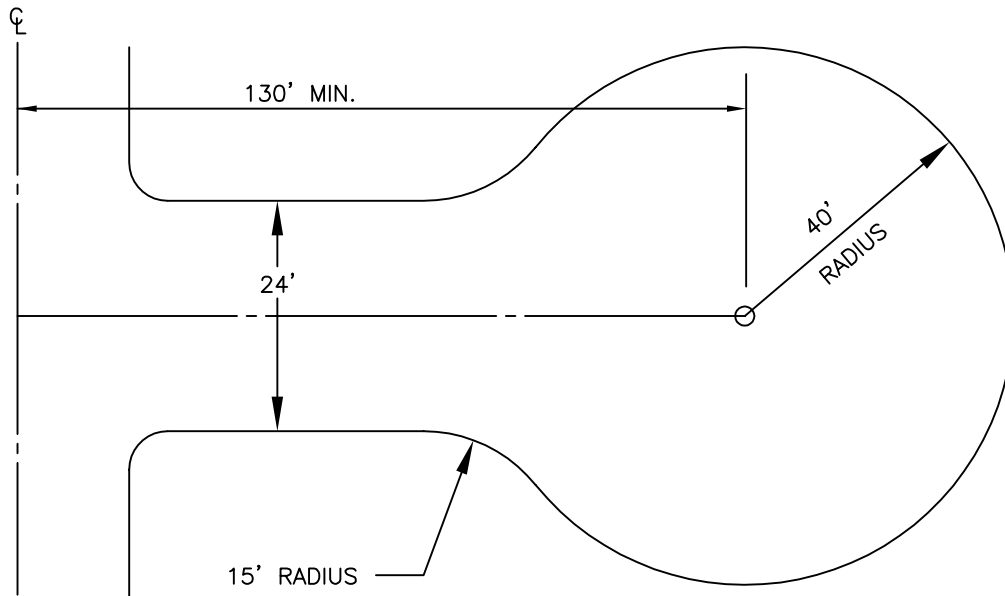
TYPICAL MINIMUM PARTIAL STREET IMPROVEMENT STANDARD

**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT






ALL WEATHER SERVICE & UTILITY ACCESS ROAD

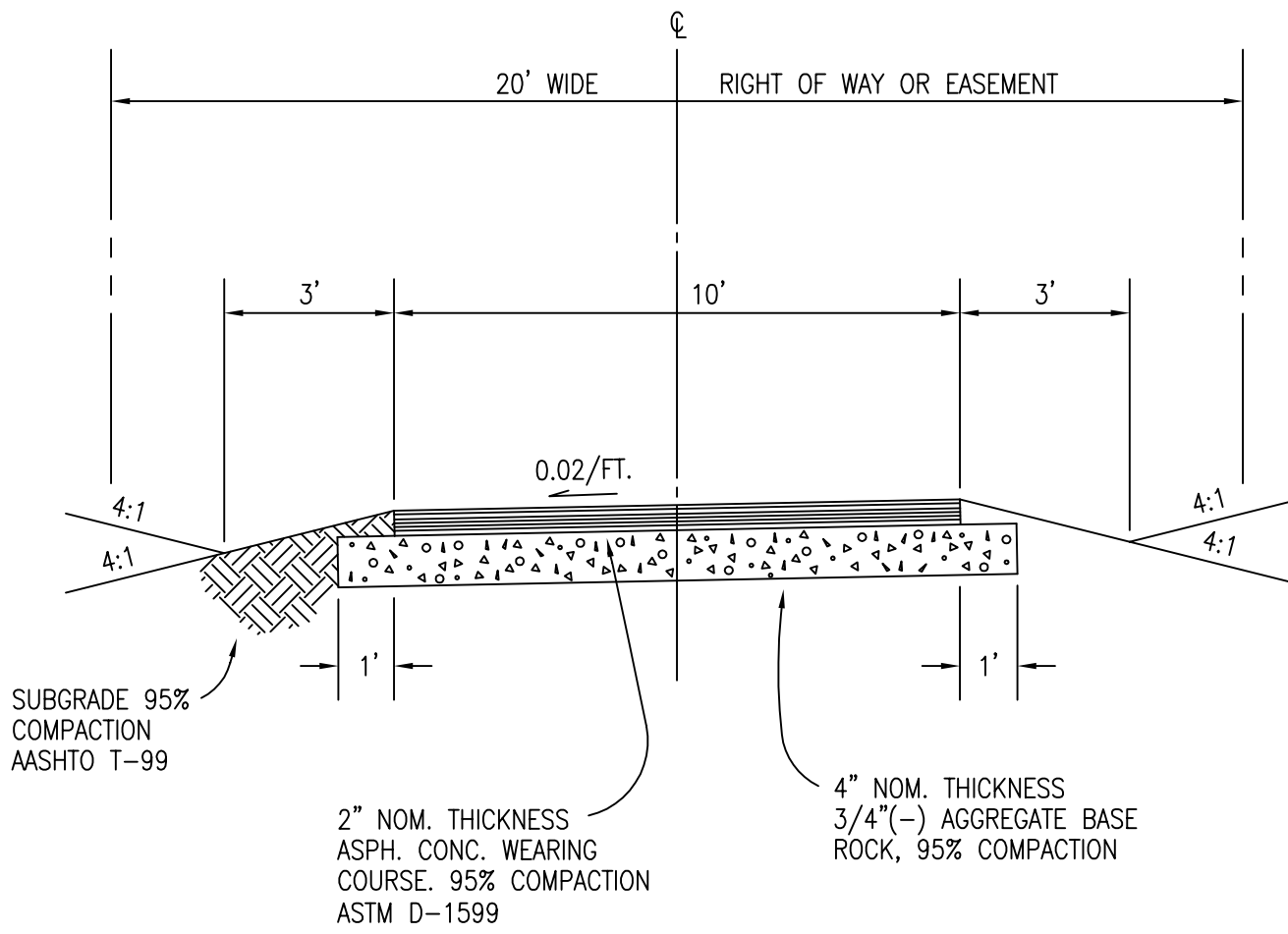


ALL WEATHER TURN-AROUND CUL DE SAC


NOTE:

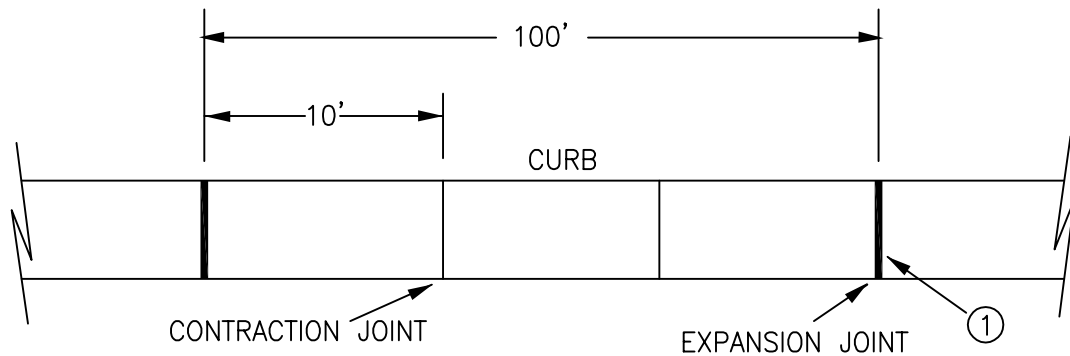
1. CURBS ARE NOT REQUIRED
2. ALL WEATHER SERVICE ROADS SHALL BE 24 FT. IN WIDTH, UTILITY ACCESS ROADS SHALL BE 14 FT. IN WIDTH.
3. AC PAVING MAY BE REQUIRED UNDER SPECIAL CIRCUMSTANCES.
4. DESIGN SHALL MEET CROOK COUNTY FIRE AND RESCUE APPROVAL.

DATE : 3/12/12	SCALE : NONE	ALL WEATHER SERVICE, TURN-AROUND & UTILITY ACCESS ROAD STANDARD	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-4	APPROVED BY : EAK			

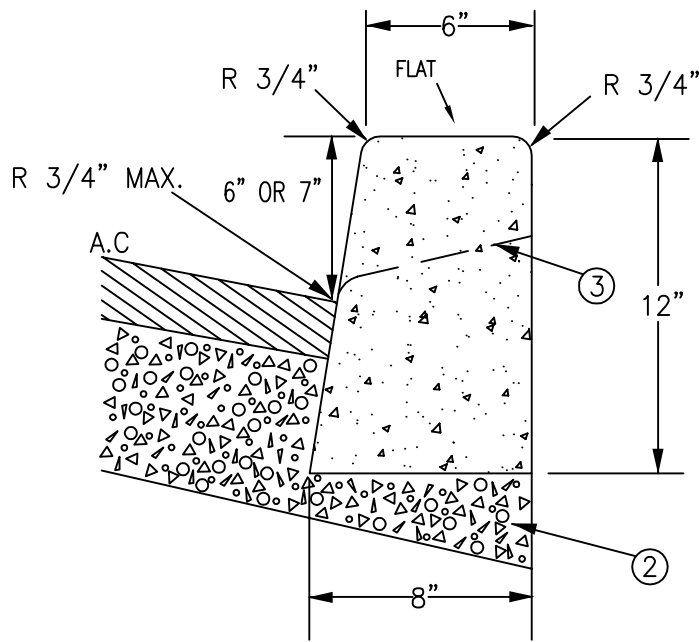


NOTE:  
 PLACE 6" OF SELECT BACKFILL  
 ON ALL SLOPES TO CATCH POINT  
 PRIOR TO PAVING

DATE : 3/12/12	SCALE : NONE	TYPICAL MULTI-USE PATH SECTION	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-5	APPROVED BY : EAK			



EXPANSION & CONTRACTION JOINTS



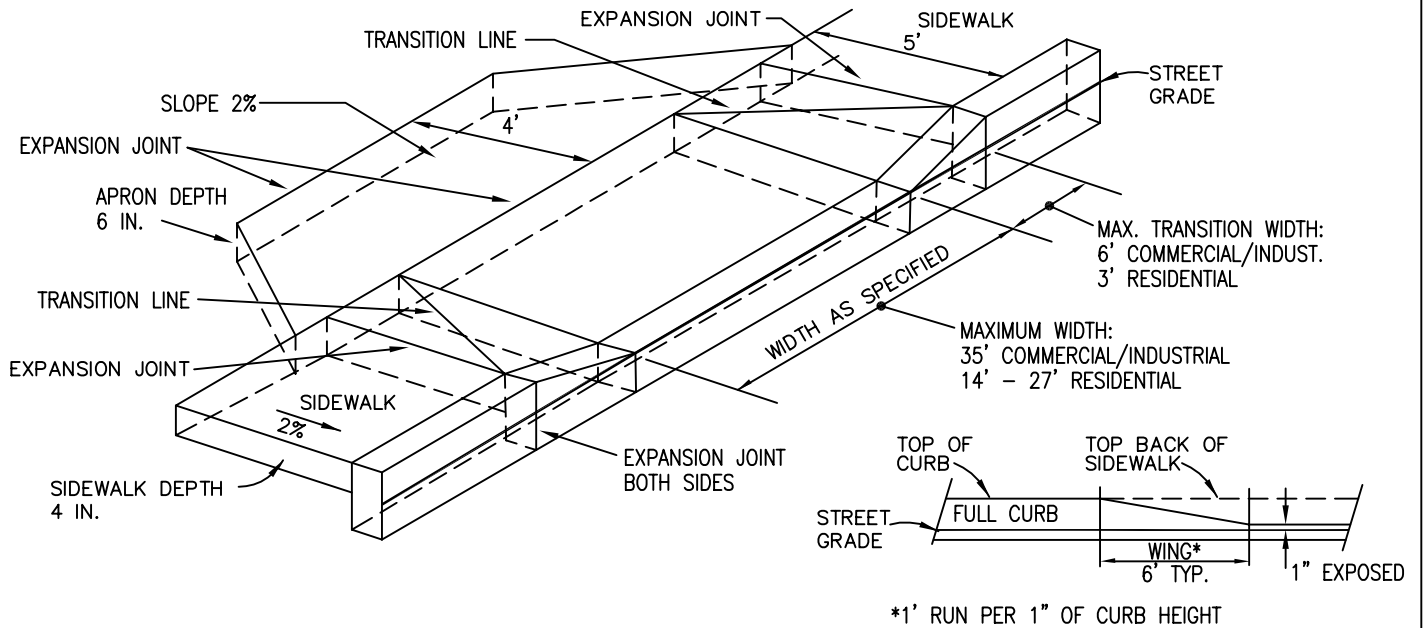
12" CITY STANDARD CURB

NOTES:

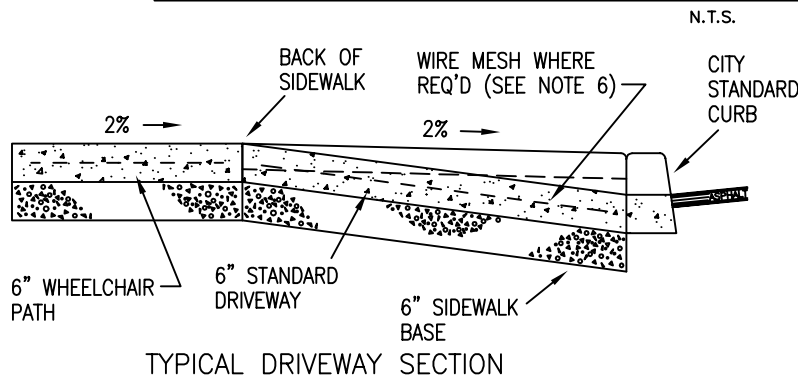
CONCRETE SHALL BE CLASS 3000 (SIX SACK MIX) AND CONTAIN NO ADDITIVES TO CAUSE RAPID SETTING, 4% - 7% AIR ENTRAINMENT REQUIRED.

1. EXPANSION JOINTS REQUIRED AT:
  - A. END OF CURB RADIUS
  - B. DRIVEWAY APRONS
  - C. POINTS OF CURVATURE
  - D. MAXIMUM SPACING OF 100'
2. BASE ROCK UNDER CURB AS REQUIRED TO MATCH STREET SECTION. 2" MINIMUM THICKNESS.
3. SLOPE DRIVEWAY TOWARD STREET. 3/4" MAXIMUM LIP AT GUTTER.
4. LIGHT BROOM FINISH REQUIRED.
5. ALL WATER & SEWER SERVICE LOCATIONS MUST BE MARKED ON THE FACE OF CURB USING A STAMPED IMPRESSION OF "W" OR "S".

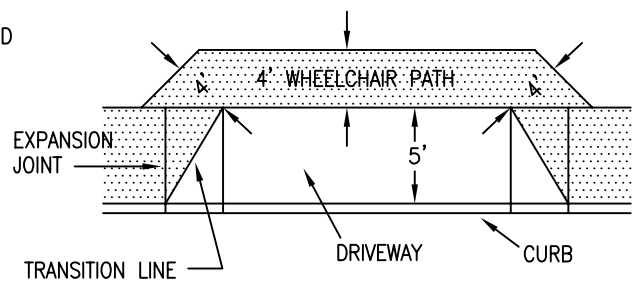
DATE : 6/07/2010	SCALE : NONE	CONCRETE CURBS	<b>CITY OF PRINEVILLE</b> <hr/> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-6	APPROVED BY : EAK			



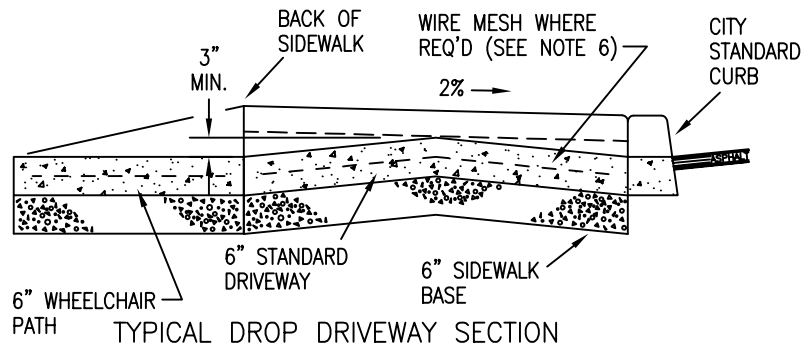
TYPICAL DRIVEWAY / DROP CURB FOR STANDARD SIDEWALK – OPTION "A"



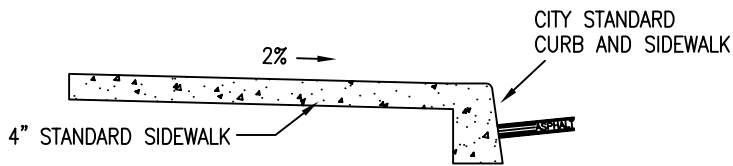
TYPICAL DRIVEWAY SECTION



PLAN VIEW



TYPICAL DROP DRIVEWAY SECTION



TYPICAL SIDEWALK SECTION (SEE DWG 2-11)

NOTES:

1. COMPACT BACKFILL UNDER SIDEWALK & DRIVEWAY TO 90% OF RELATIVE MAXIMUM DENSITY (AASHTO T-99) TO 6" THICK MIN.
2. CONCRETE SHALL BE 6.0 SACK, CLASS 3000 AND CONTAIN NO ADDITIVES TO CAUSE RAPID SETTING. 4% - 7% ENTRAINED AIR REQUIRED. PROTECT FROM ADVERSE WEATHER FOR 7 DAYS MIN.
3. LIGHT TRANSVERSE BROOM FINISH REQUIRED ON SIDEWALKS AND DRIVEWAYS.
4. FULL EXPANSION JOINTS AT ENDS OF DRIVEWAY. CONTRACTION JOINTS AT CENTER OF DRIVEWAY AND 5' CENTERS ALONG SIDEWALK.
5. MAINTAIN CONSTANT GRADE AT BACK EDGE THROUGH DRIVEWAYS WHENEVER POSSIBLE.
6. NO. 4 REBAR (2 LONGITUDINAL BARS, TRANSVERSE BARS 4'-0" O.C.) REQUIRED IN COMMERCIAL AND INDUSTRIAL DRIVEWAYS. 6"x 6", 10 GA., WIRE MESH MAY BE USED IN LIEU OF REBAR.
7. DRIVEWAY APRONS ARE REQUIRED ON ALL NEW CONSTRUCTION.

DATE :	SCALE :
2/29/12	NONE
DRAWING NO.	APPROVED BY :
2-7	EAK

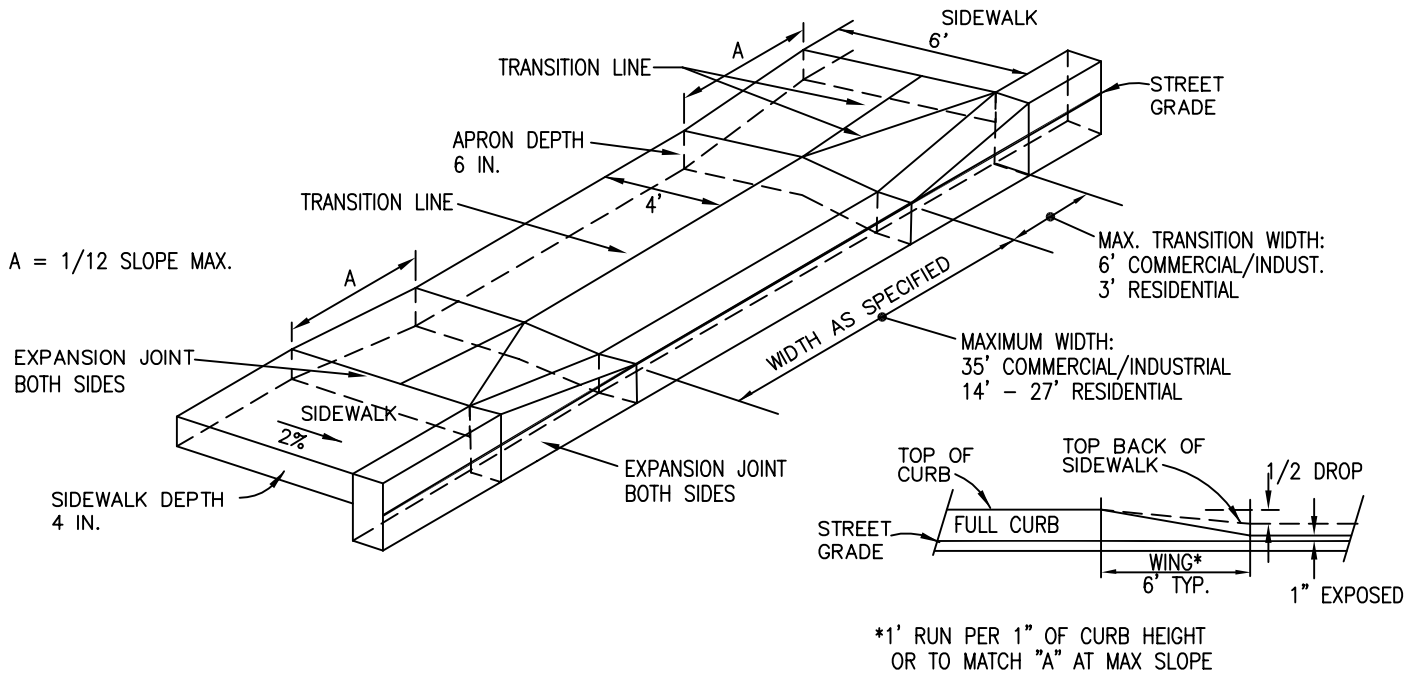
CONCRETE DRIVEWAY  
APRONS & CURB CUT  
OPTION "A"

CITY OF PRINEVILLE

PUBLIC WORKS DEPARTMENT

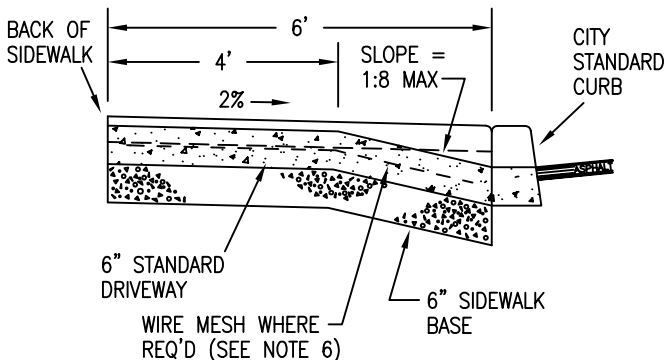




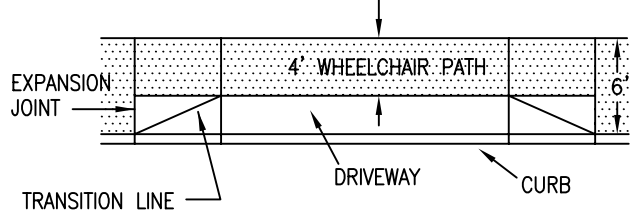


TYPICAL DRIVEWAY / DROP CURB FOR STANDARD SIDEWALK – OPTION "B"

N.T.S.



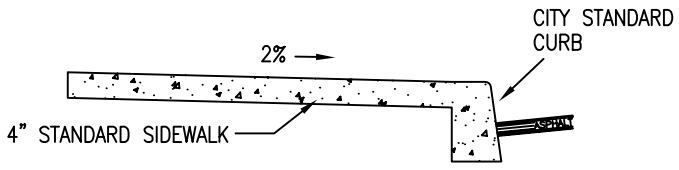
TYPICAL DRIVEWAY SECTION




PLAN VIEW  
N.T.S.

NOTES:

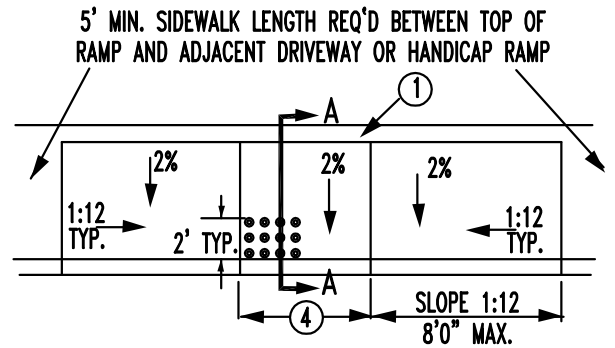
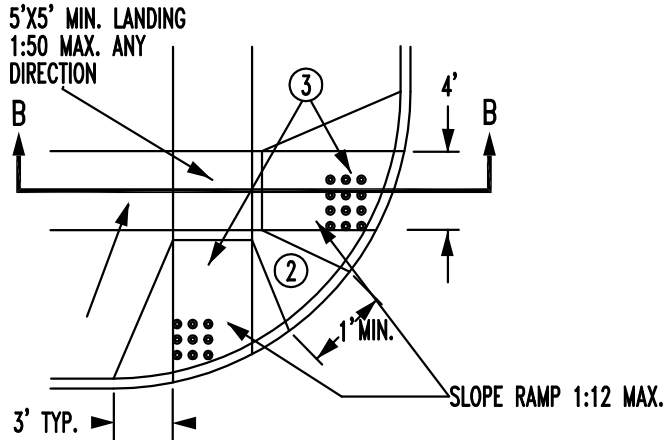
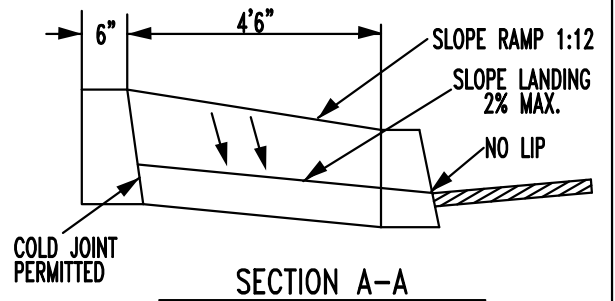
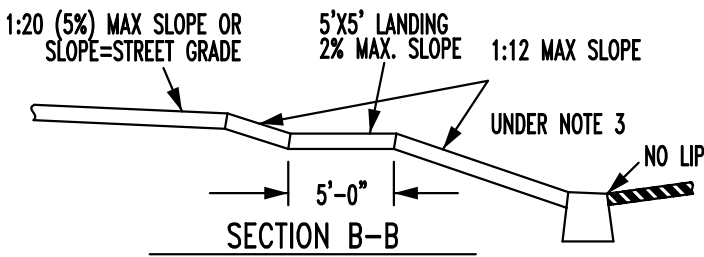
1. COMPACT BACKFILL UNDER SIDEWALK & DRIVEWAY TO 90% OF RELATIVE MAXIMUM DENSITY (AASHTO T-99) TO 6" THICK MIN.
2. CONCRETE SHALL BE 6.0 SACK, CLASS 3000 AND CONTAIN NO ADDITIVES TO CAUSE RAPID SETTING. 4% - 7% ENTRAINED AIR REQUIRED. PROTECT FROM ADVERSE WEATHER FOR 7 DAYS MIN.
3. LIGHT TRANSVERSE BROOM FINISH REQUIRED ON SIDEWALKS AND DRIVEWAYS.
4. FULL EXPANSION JOINTS AT ENDS OF DRIVEWAY. CONTRACTION JOINTS AT CENTER OF DRIVEWAY AND 5' CENTERS ALONG SIDEWALK.
5. MAINTAIN CONSTANT GRADE AT BACK EDGE THROUGH DRIVEWAYS WHENEVER POSSIBLE.
6. NO. 4 REBAR (2 LONGITUDINAL BARS, TRANSVERSE BARS 4'-0" O.C.) REQUIRED IN COMMERCIAL AND INDUSTRIAL DRIVEWAYS. 6"x 6", 10 GA., WIRE MESH MAY BE USED IN LIEU OF REBAR.
7. DRIVEWAY APRONS ARE REQUIRED ON ALL NEW CONSTRUCTION.



TYPICAL SIDEWALK SECTION (SEE DWG 2-11)

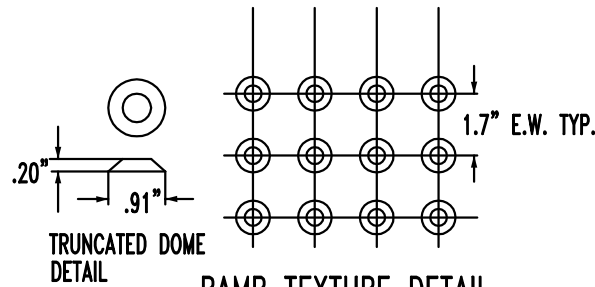
DATE : 3/12/2012	SCALE : NONE	<p>CONCRETE DRIVEWAY APRONS &amp; CURB CUT OPTION "B"</p>	<p><b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT</p> 
DRAWING NO. 2-8	APPROVED BY : EAK		

THESE REQUIREMENTS BASED ON OREGON STATE HIGHWAY DIVISION DWG. RD755-759, 2008



**PERPENDICULAR RAMP  
STANDARD FOR NEW CONSTRUCTION  
(SHOWN ON 15' RADIUS)**


**PARALLEL RAMP  
(SHOWN ON TANGENT)**



1. PLACE TRUNCATED DOMES AS O.D.O.T. DETAIL DWG. NO. RD 759
2. TEXTURE TO BE APPLIED TO LOWER 2' OF RAMP

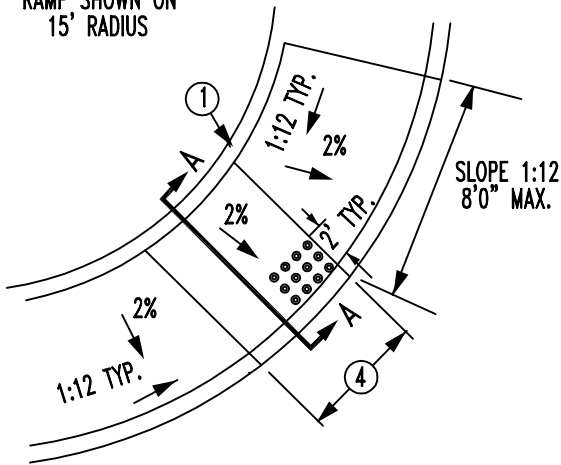
**NOTE:**

1. BACK EDGE OF RAMP IMPROVEMENT TO BE THE SAME PROFILE AND GRADE AS THE CONTINUATION OF THE BACK EDGE OF SIDEWALK THROUGH THE RAMP AREA.
2. THIS AREA IS NOT A SIDEWALK AND IS CONCRETE SURFACED ONLY FOR MAINTENANCE PURPOSES. WHERE THIS AREA EXCEEDS 100 SF, OR IS DESIGNED FOR LANDSCAPING IN AN APPROVED SITE PLAN, IT MAY BE LEFT OPEN.
3. IN ALTERATIONS CURB RAMP SLOPE(S) MAY BE 10% FOR A MAX. RISE OF 6" OR 12.5% FOR A MAX. RISE OF 3". CURB RAMPS, IN ALTERATIONS NEED NOT EXCEED 6' IN LENGTH. [O.D.O.T. DWG. NO. RD755]
4. 5'-0" MIN. NEW CONSTRUCTION; 4'-0" MIN. ALTERATIONS; SIDE FLARES: SEE NOTE 6, [ODOT DWG. NO. RD755-7] - NO GRATING IS TO BE SPECIFIED AT THE BOTTOM OF RAMP - RAMPS FOR BIKEWAYS TO BE A SEPARATE DESIGN CONFORMING TO BIKEWAY STANDARDS.

DATE : 2/29/12	SCALE : NONE	SIDEWALK & CURB RAMPS	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-9	APPROVED BY : EAK			

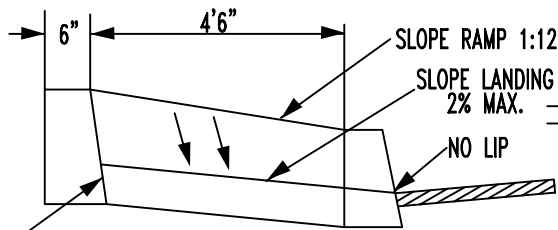
THESE REQUIREMENTS BASED ON OREGON STATE HIGHWAY DIVISION DWG. NO. RD755-759, 2008

RAMP SHOWN ON  
15' RADIUS



PARALLEL RAMP ON CURB RADIUS CENTER

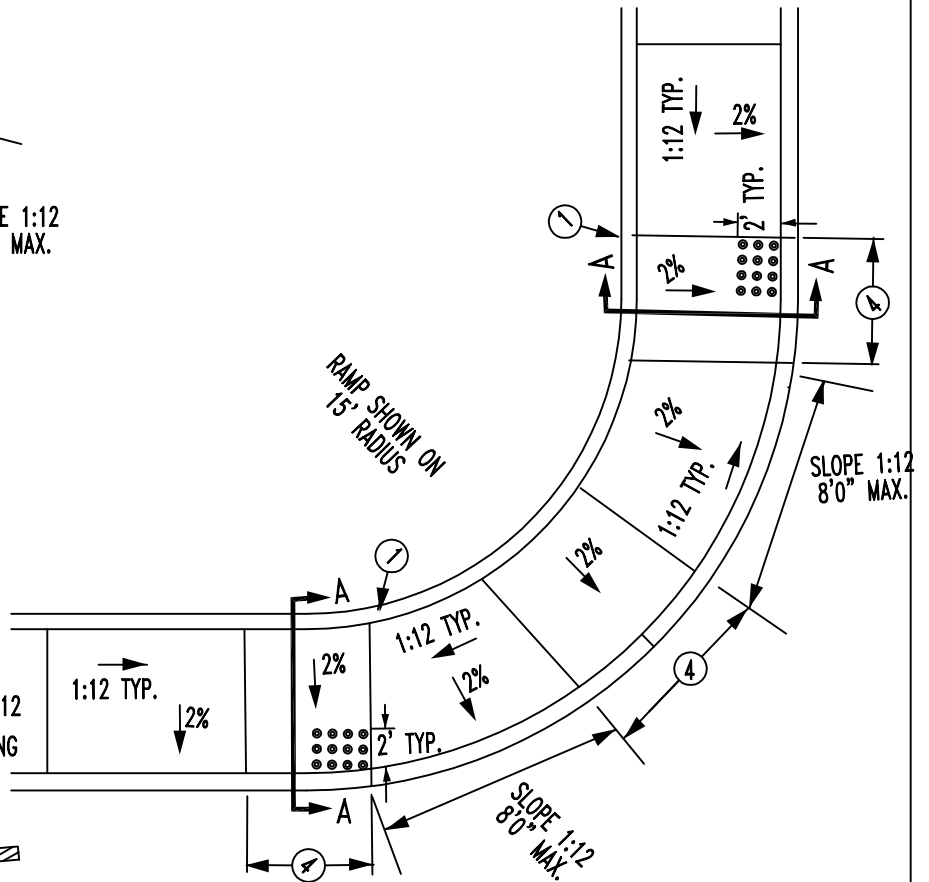
A RAMP-ON-RADIUS WILL BE PERMITTED ONLY AT CITY ENGINEERS DISCRETION



COLD JOINT  
PERMITTED

SECTION A-A

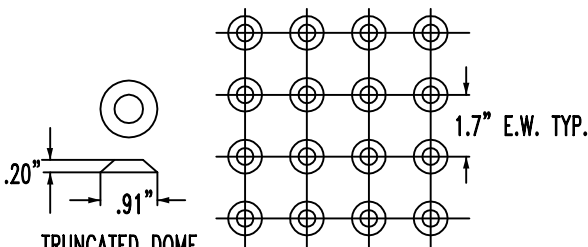
RAMP SHOWN ON  
15' RADIUS



PERPENDICULAR RAMP STANDARD  
FOR NEW CURB TIGHT CONSTRUCTION

NOTES

1. BACK EDGE OF RAMP IMPROVEMENT TO BE AT THE SAME PROFILE AND GRADE AS THE CONTINUATION OF THE BACK EDGE OF THE SIDEWALK THROUGH THE RAMP AREA.
2. IN ALTERATIONS CURB RAMP SLOPE(S) MAY BE 10% FOR A MAX. RISE OF 6" OR 12.5% FOR A MAX. RISE OF 3". CURB RAMPS, IN ALTERATIONS NEED NOT EXCEED 6' IN LENGTH. [ODOT DWG. NO. RD755]
3. 5'-0" MIN. NEW CONSTR.; 4'-0" MIN. ALTERATIONS  
-SIDE FLARES: SEE NOTE 6, [ODOT DWG. NO. RD755]  
-NO GRATING IS TO BE SPECIFIED AT THE BOTTOM OF RAMP  
-RAMPS FOR BIKEWAYS TO BE A SEPARATE DESIGN CONFORMING TO BIKEWAY STANDARDS.



RAMP TEXTURE DETAIL

1. PLACE TRUNCATED DOMES AS PER O.D.O.T. DETAIL DWG. NO. RD725.
2. TEXTURE TO BE APPLIED TO LOWER 2' OF RAMP.

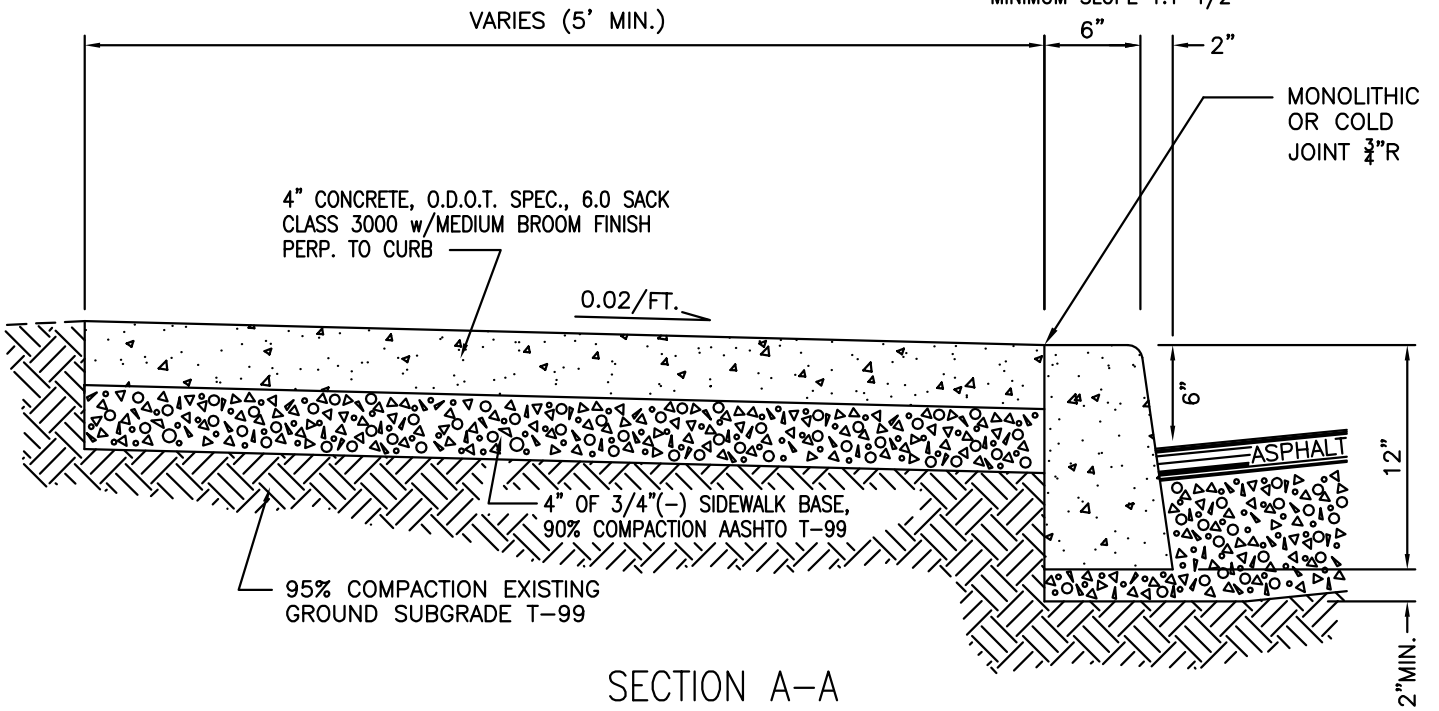
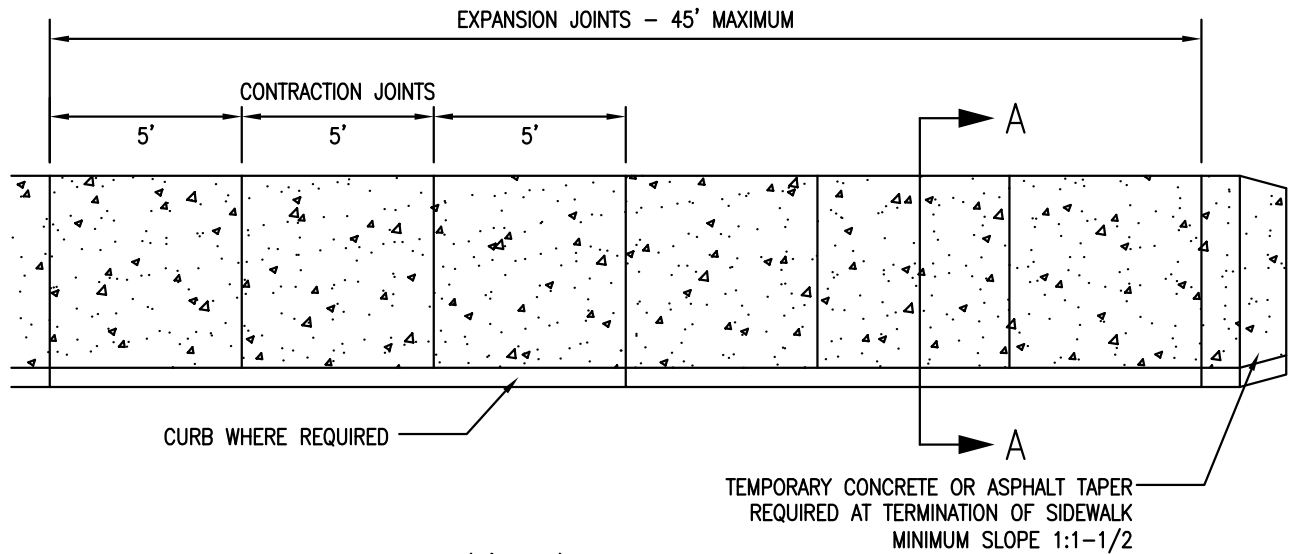
DATE :	SCALE :
3/12/12	NONE
DRAWING NO.	APPROVED BY :
2-10	MDW

SIDEWALK  
& CURB  
RAMPS

*CITY OF PRINEVILLE*


PUBLIC WORKS DEPARTMENT

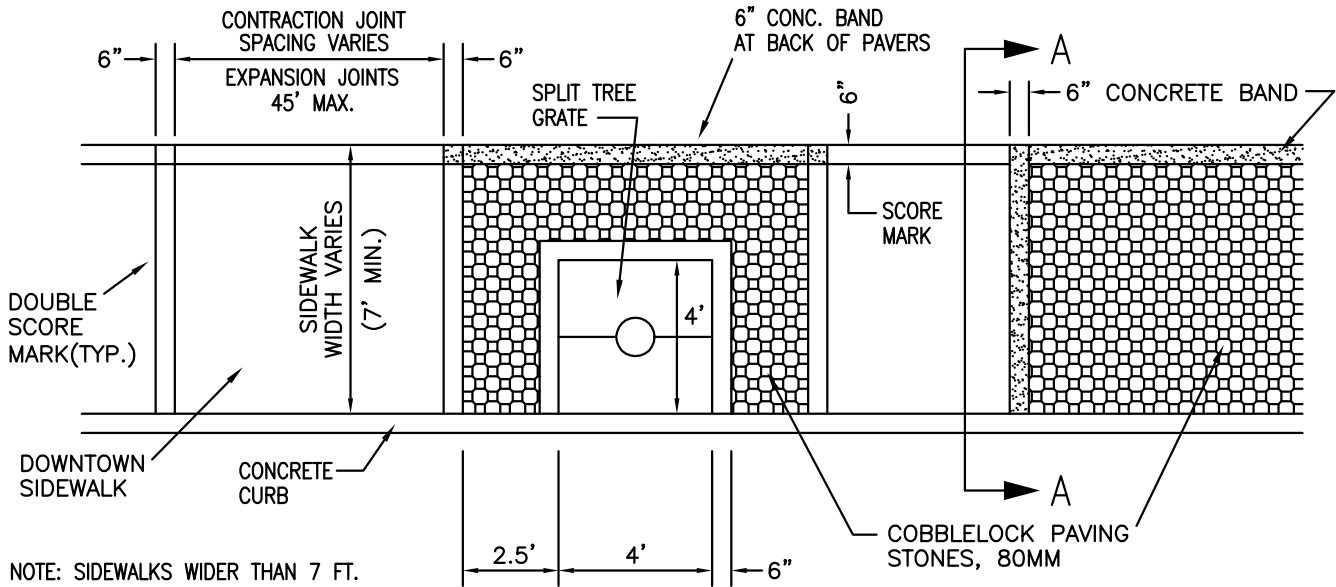




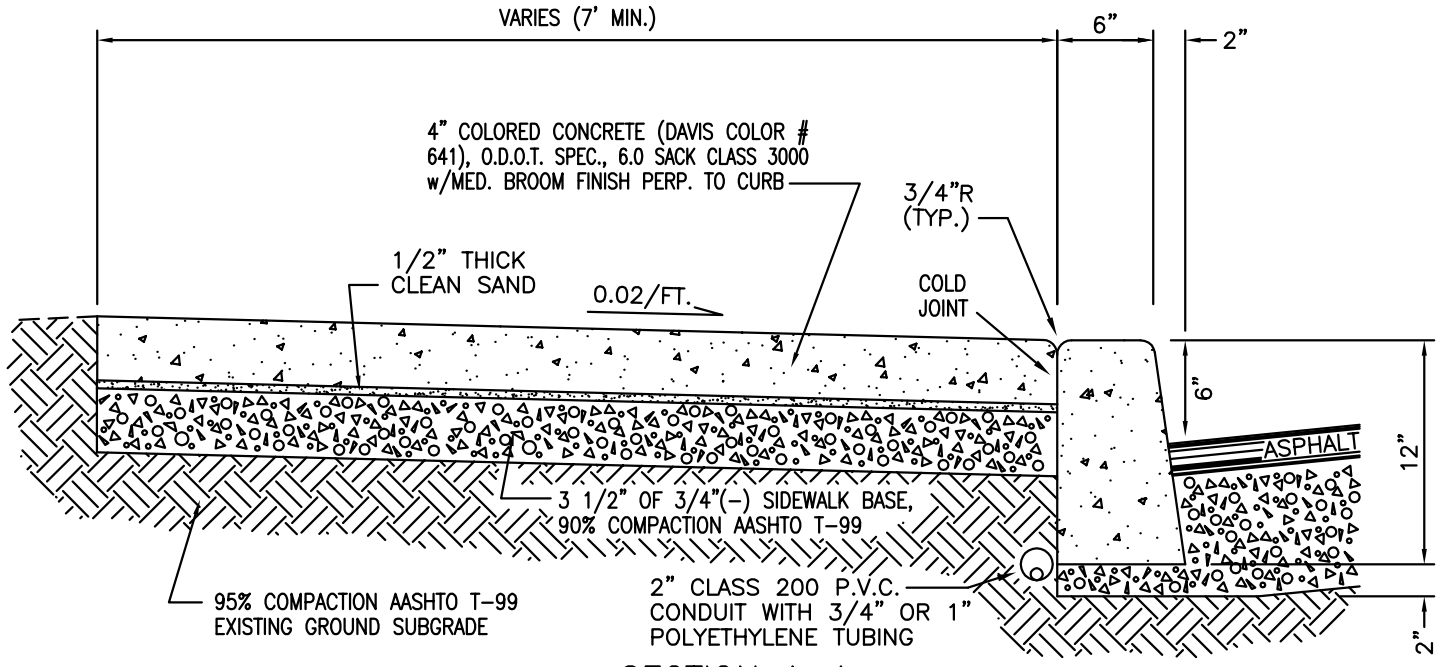
STANDARD CONCRETE CURB & SIDEWALK

NOT TO SCALE

DATE :	SCALE :	TYPICAL CONCRETE CURB & SIDEWALK DETAIL	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
3/12/12	NONE			
DRAWING NO.	APPROVED BY :			
2-11	EAK			




NOTE: SIDEWALKS WIDER THAN 7 FT. SHALL HAVE A LONGITUDE CONTRACTION JOINT AT THE WIDTH MIDPOINT.

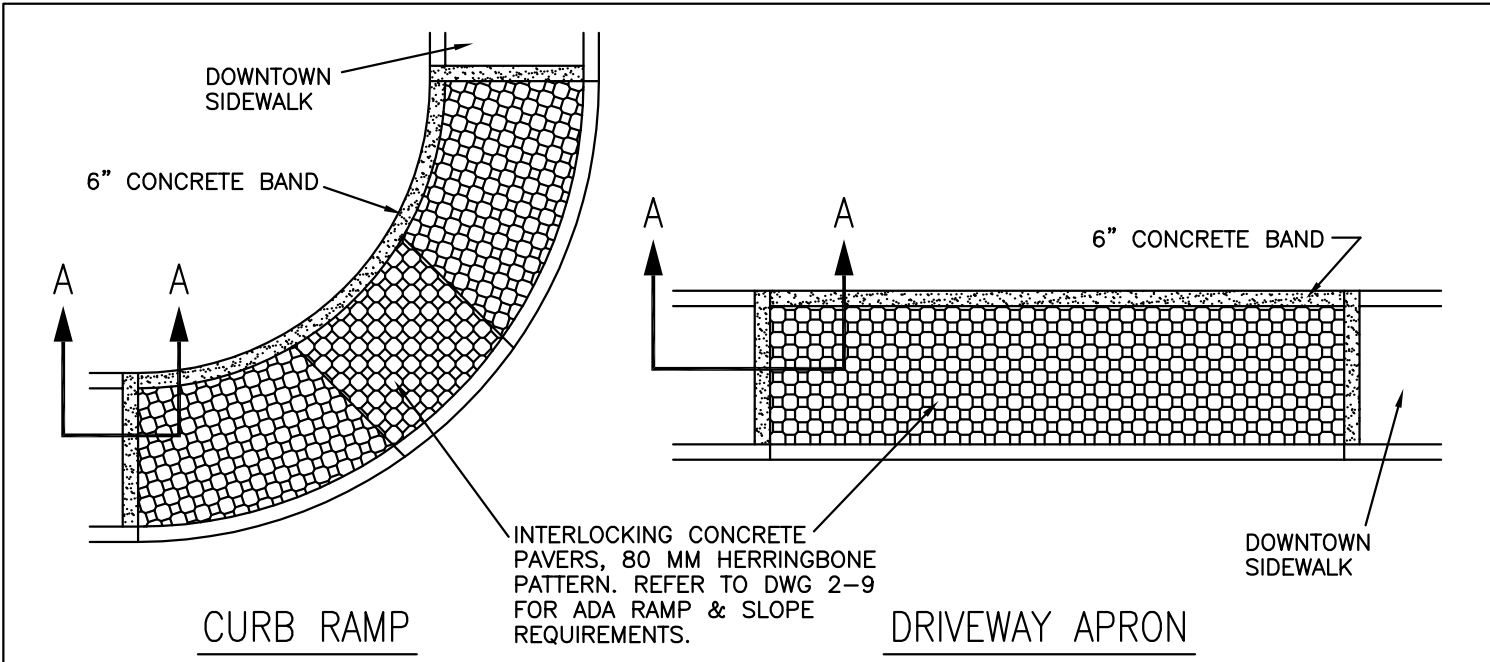


SECTION A-A

DOWNTOWN COLORED CONCRETE SIDEWALK

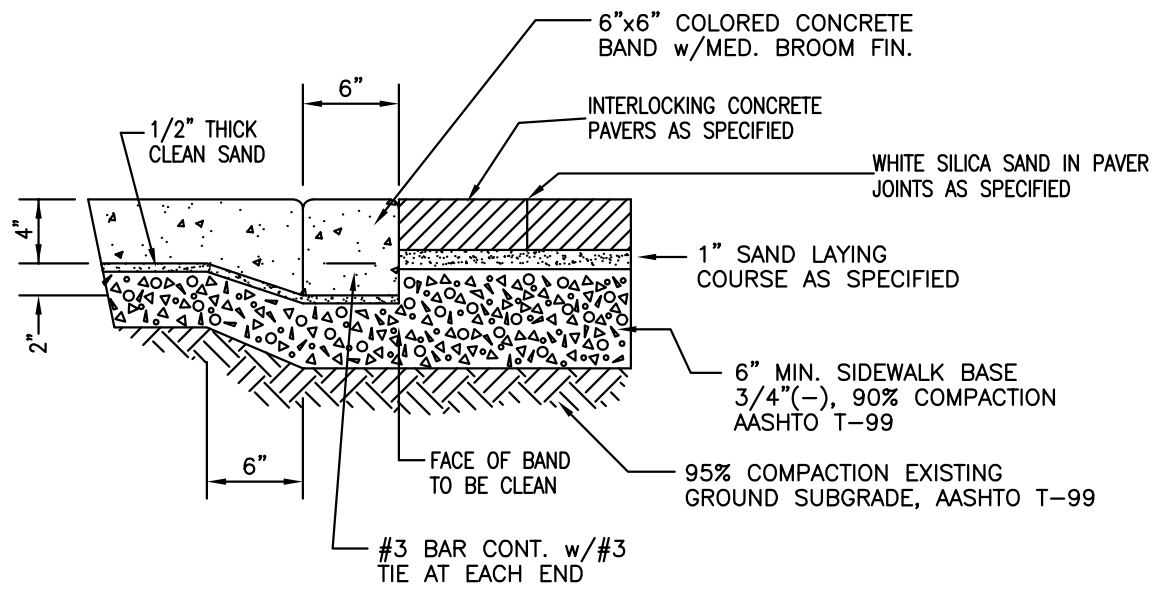
NOT TO SCALE

DATE :	SCALE :	TYPICAL DOWNTOWN CONCRETE SIDEWALK	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
3/12/12	NONE			
DRAWING NO.	APPROVED BY :			
2-12	EAK			




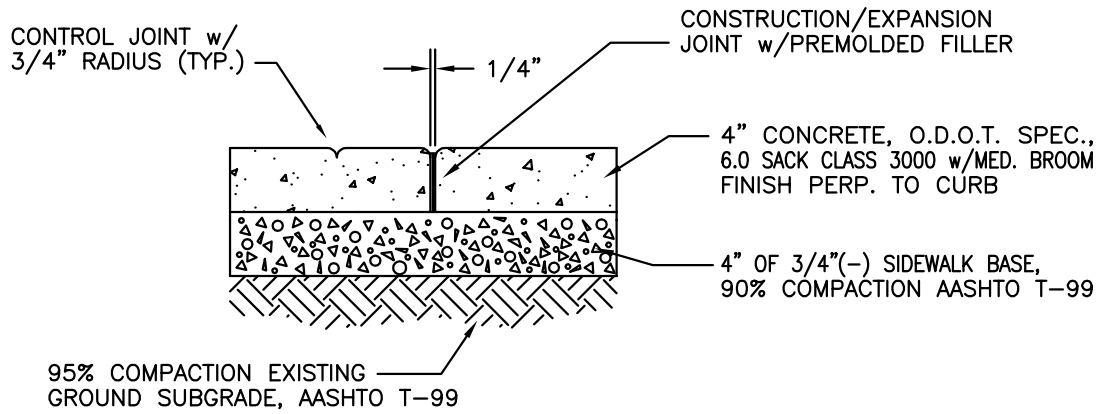
CONCRETE BAND & INTERLOCKING CONCRETE PAVERS

NOT TO SCALE




SECTION A-A

DATE : 3/12/12	SCALE : NONE	TYPICAL COLORED CONC. BAND & INTERLOCKING CONCRETE PAVERS	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-13	APPROVED BY : EAK			

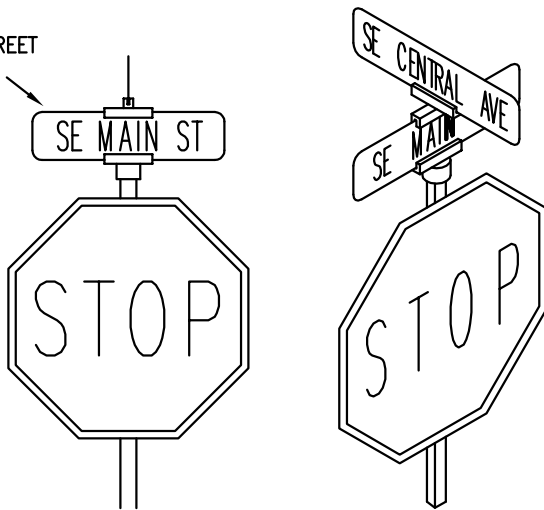


## CONCRETE JOINT

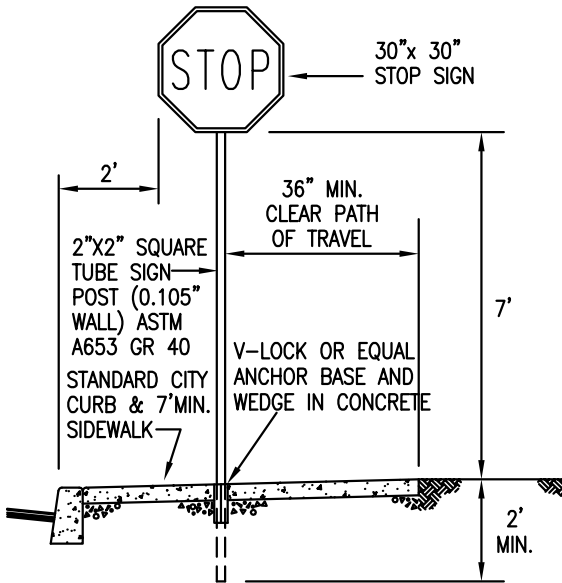
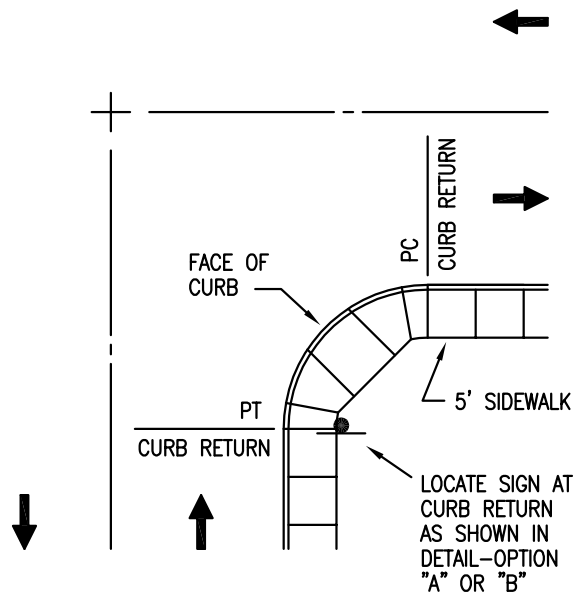
NOT TO SCALE

DATE :	SCALE :	TYPICAL CONCRETE JOINT SECTIONS	<b>CITY OF PRINEVILLE</b>	
DRAWING NO.	APPROVED BY :		<b>PUBLIC WORKS DEPARTMENT</b>	
3/12/12	NONE			
2-14	EAK			

24"x6" STREET NAME SIGN

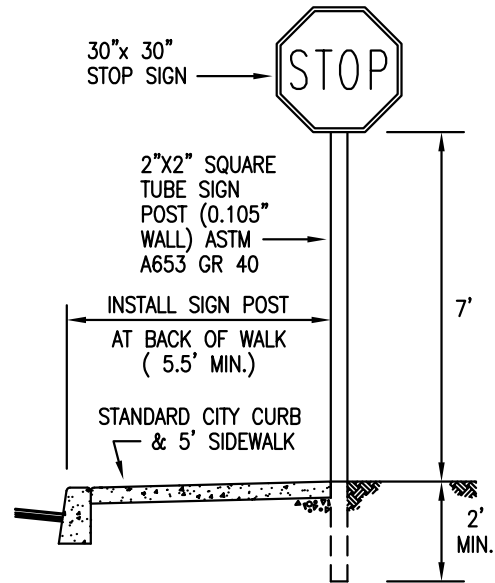


COMBINATION STOP & STREET NAME SIGN



7' MIN. WIDE SIDEWALKS

OPTION "A"



STANDARD 5' WIDE SIDEWALKS

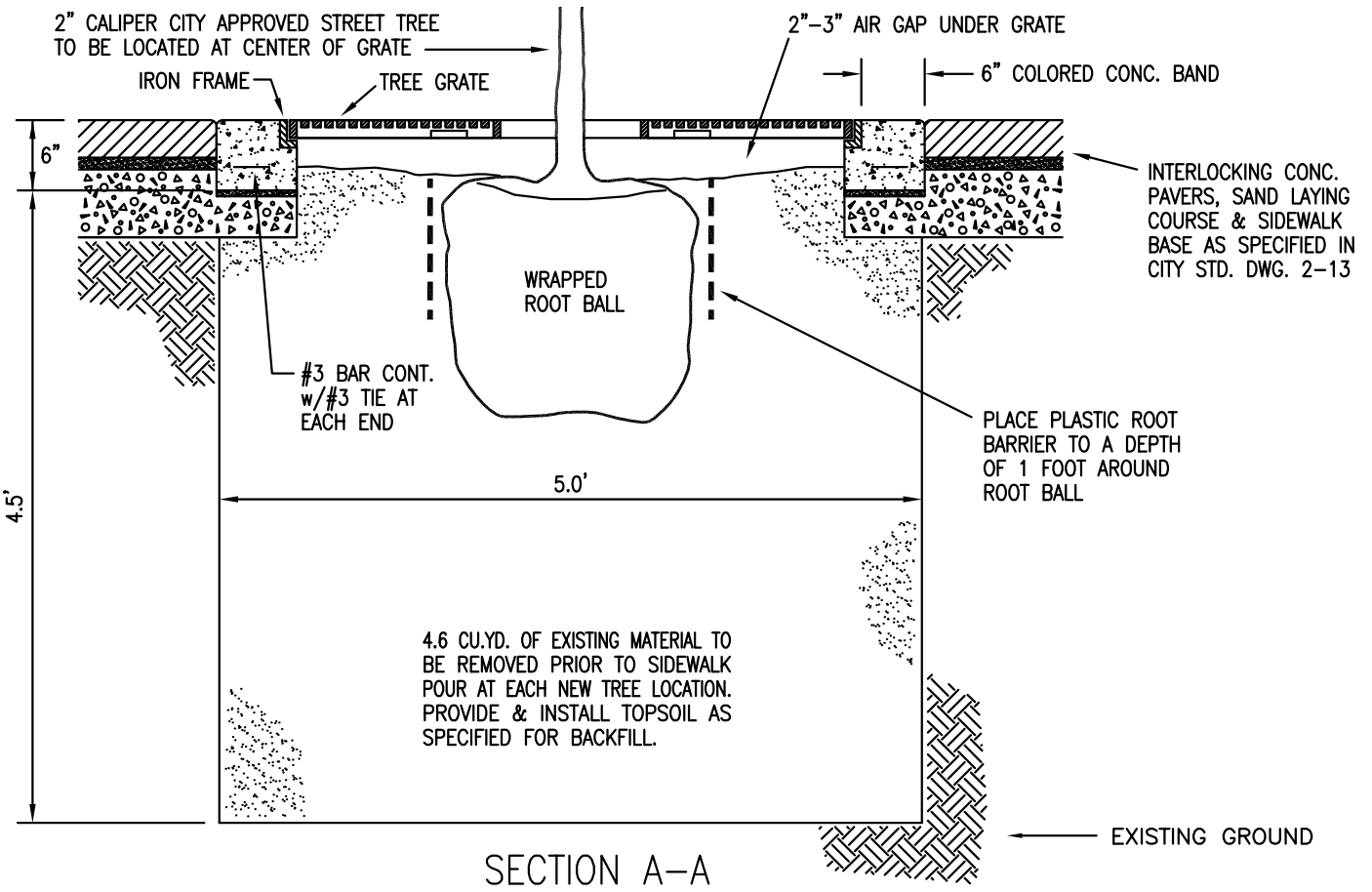
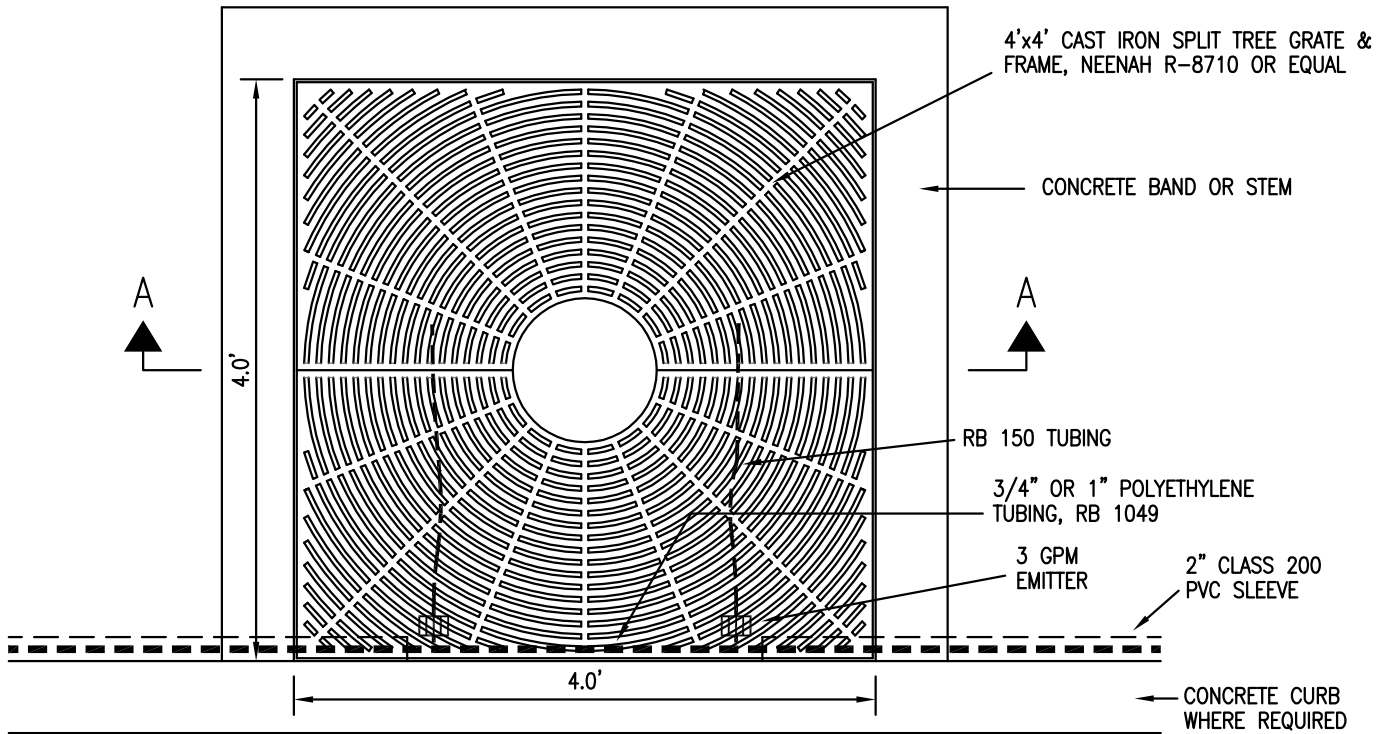
OPTION "B"

STOP SIGN INSTALLATION


1. SIGNS TO MEET ALL FEDERAL AND STATE HIGHWAY DEPT. SPECS.
2. FACES ARE MADE OF ENGINEER GRADE REFLECTIVE 3M BRAND SCOTCHLITE.
3. ALUMINUM BACKING IS MADE OF 5052-H38 ALLOY AND IS OF 0.080 GAUGE THICKNESS.
4. STREET NAME SIGNS TO HAVE 4" WHITE LETTERS WITH GREEN BACKGROUND.

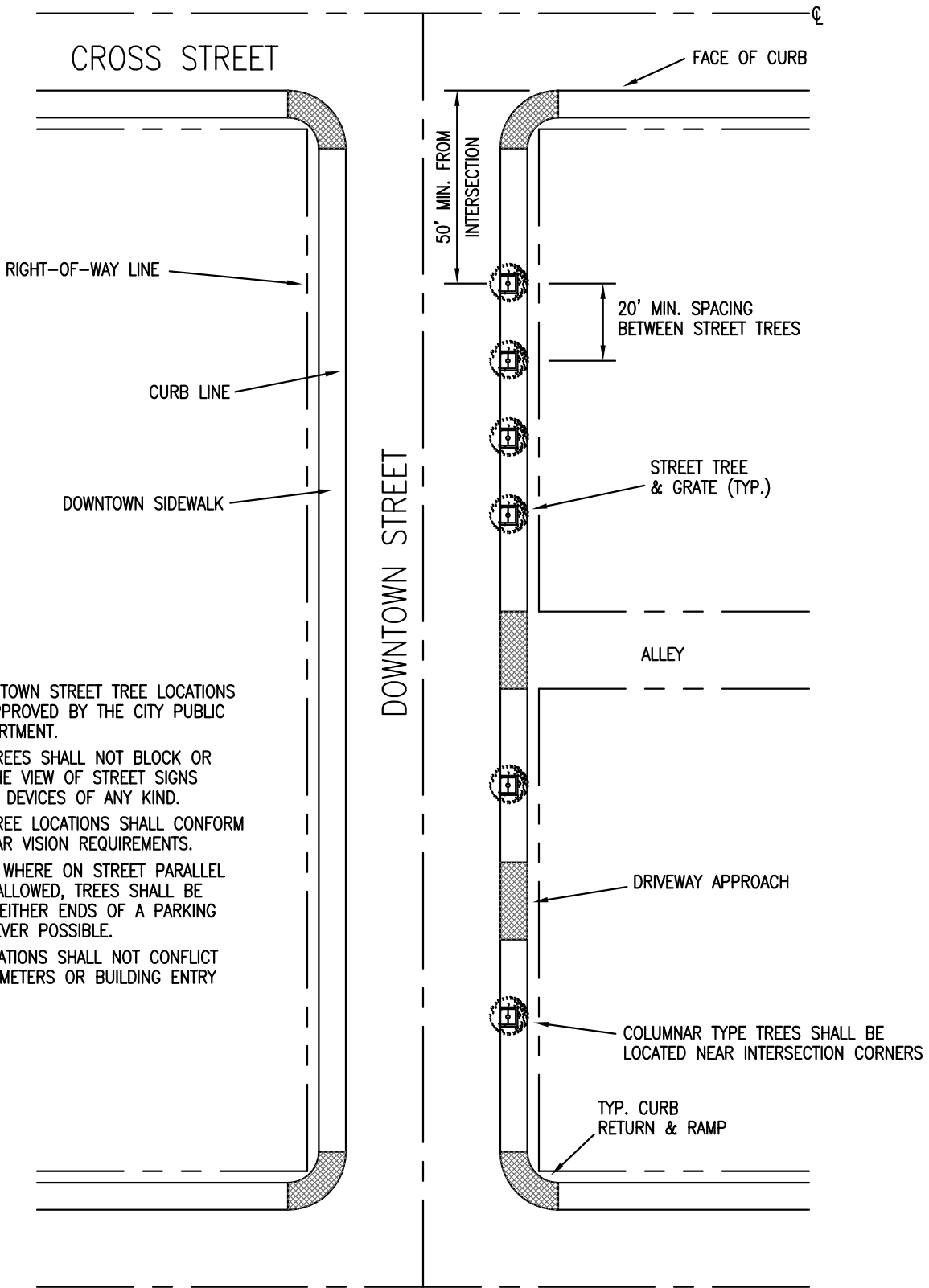
DATE : 1/31/07	SCALE : NONE	TYPICAL STOP & STREET NAME SIGN COMBINATION	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-15	APPROVED BY : MDW			






SECTION A-A

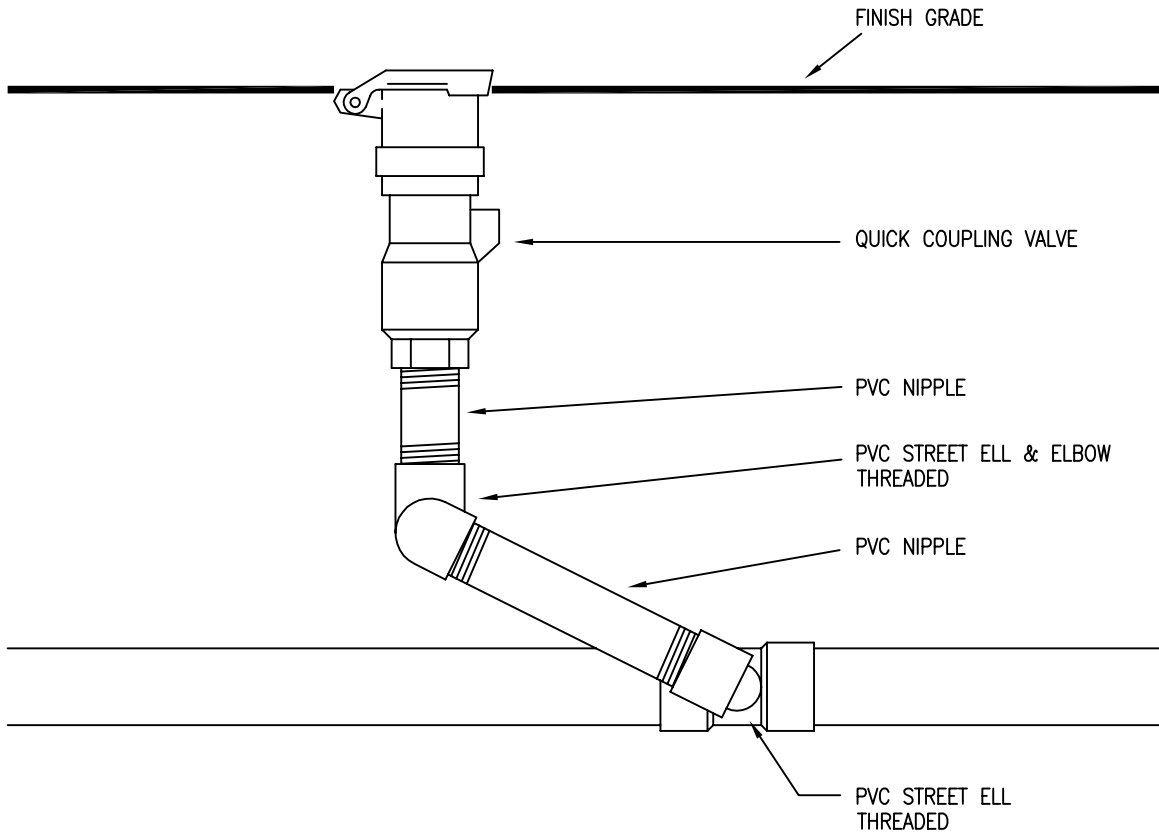
DATE : 1/31/07	SCALE : NONE	TYPICAL DOWNTOWN STREET TREE & TREE GRATE INSTALLATION	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-16	APPROVED BY : MDW			



**NOTES:**

1. ALL DOWNTOWN STREET TREE LOCATIONS SHALL BE APPROVED BY THE CITY PUBLIC WORKS DEPARTMENT.
2. STREET TREES SHALL NOT BLOCK OR OBSTRUCT THE VIEW OF STREET SIGNS OR CONTROL DEVICES OF ANY KIND.
3. STREET TREE LOCATIONS SHALL CONFORM TO CITY CLEAR VISION REQUIREMENTS.
4. IN AREAS WHERE ON STREET PARALLEL PARKING IS ALLOWED, TREES SHALL BE LOCATED AT EITHER ENDS OF A PARKING STALL WHENEVER POSSIBLE.
5. TREE LOCATIONS SHALL NOT CONFLICT WITH WATER METERS OR BUILDING ENTRY WAYS.

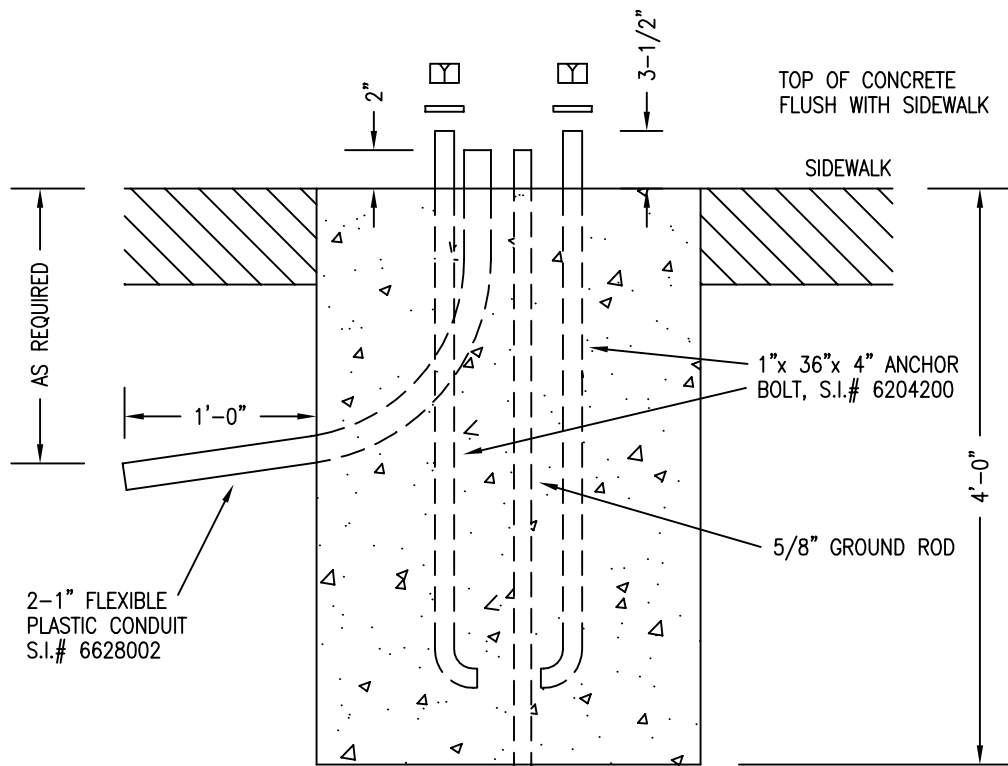
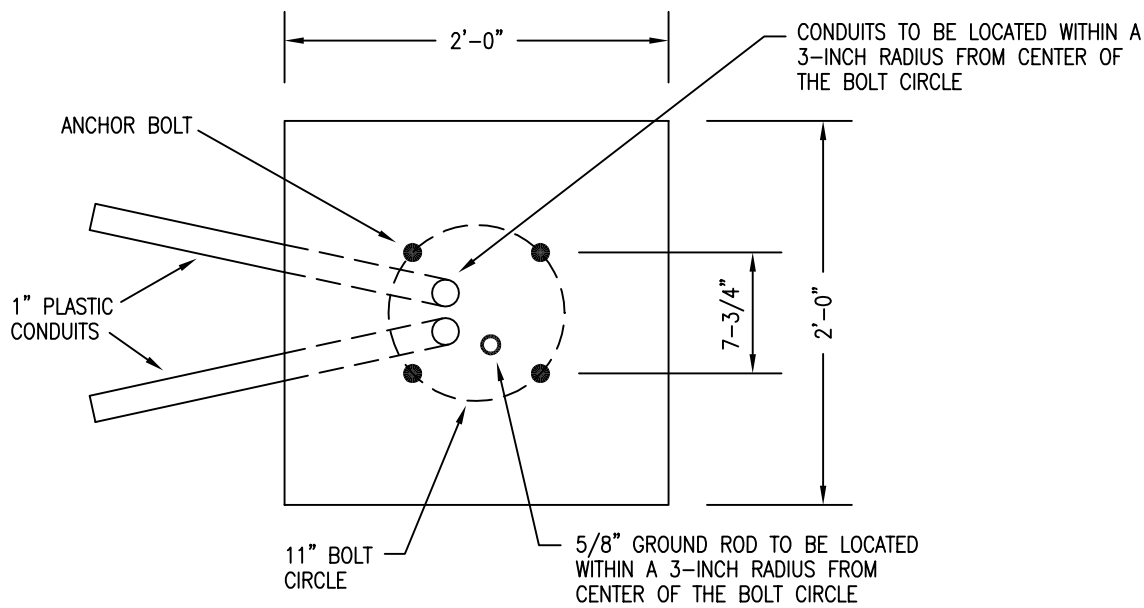
DATE :	SCALE :	TYPICAL DOWNTOWN STREET TREE LOCATION STANDARD	<b>CITY OF PRINEVILLE</b> <hr/> <b>PUBLIC WORKS DEPARTMENT</b>	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
2-17	MDW			



QUICK COUPLING VALVE FOR DOWNTOWN  
SIDEWALK & TREE IRRIGATION SYSTEM

N.T.S.

DATE : 1/31/06	SCALE : NONE	TYPICAL QUICK COUPLING IRRIGATION VALVE DETAIL	<b>CITY OF PRINEVILLE</b> <hr/> <b>PUBLIC WORKS DEPARTMENT</b>	
DRAWING NO. 2-18	APPROVED BY : MDW			

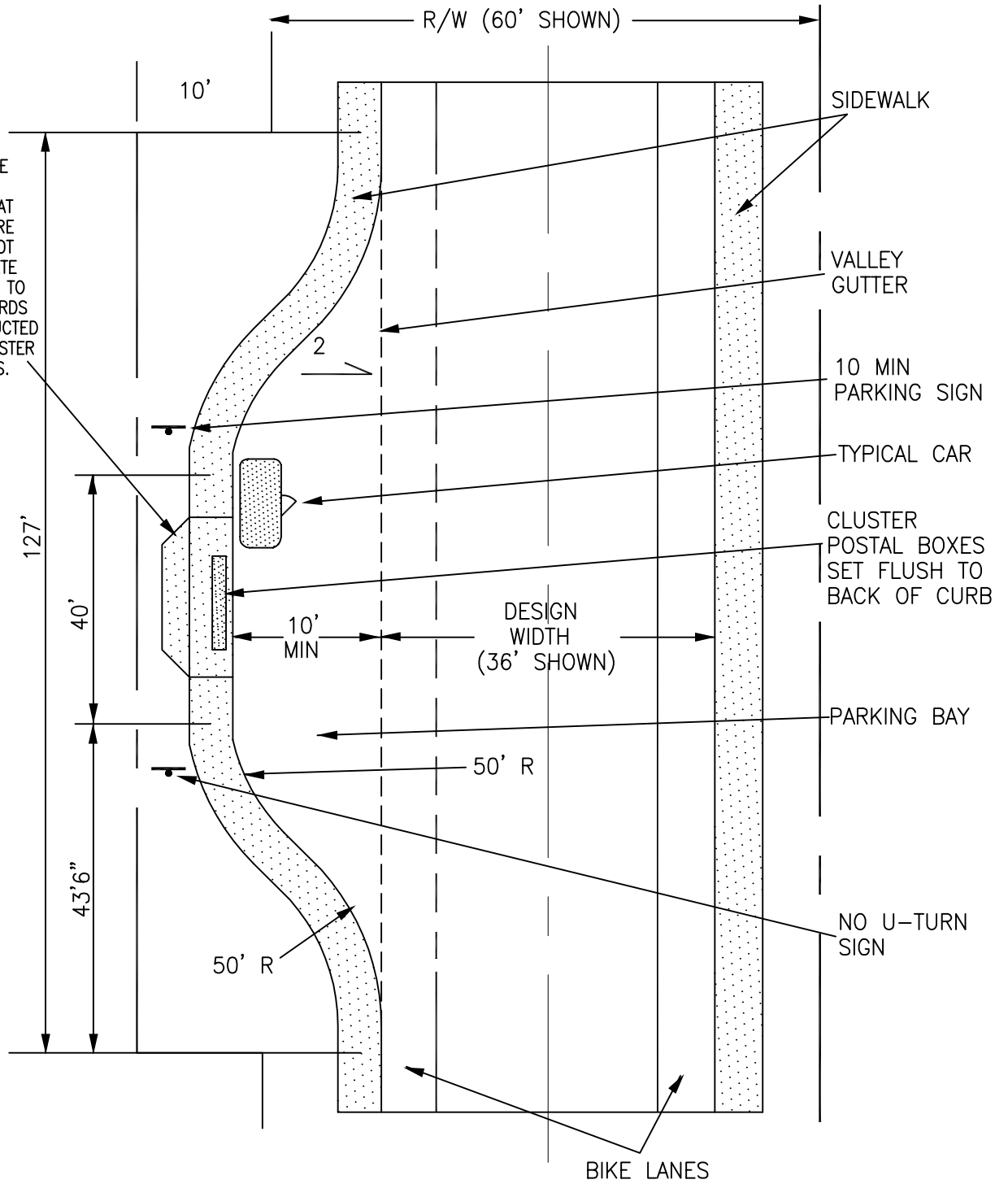


**NOTES:**

1. FOOTINGS TO BE LOCATED WITH THE VERTICAL CENTER LINE APPROX. 24" BACK FROM THE CURB FACE.
2. NUMBER AND ORIENTATION OF PLASTIC CONDUITS TO BE DETERMINED BY LOCAL POWER COMPANY
3. ANCHOR BOLTS TO BE HOT DIP GALVANIZED AND HAVE 6" MINIMUM THREAD LENGTH.
4. FOOTING AS SPECIFIED IN THIS STANDARD TO BE USED WITH STANDARD 11 GAUGE (OR 10 GA.) METAL STREET LIGHT POLES FOR MOUNTING HEIGHTS UP TO 32 FEET. NOT TO BE USED FOR POLES OF A HIGHER STRENGTH (DEAD-END POLES, COMBINATION STREET LIGHT/TRAFFIC SIGNAL POLES, ETC.).

DATE : 1/31/07	SCALE : NONE	TYPICAL STREET LIGHT POLE BASE & CONCRETE FOOT DETAIL	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 2-19	APPROVED BY : MDW			

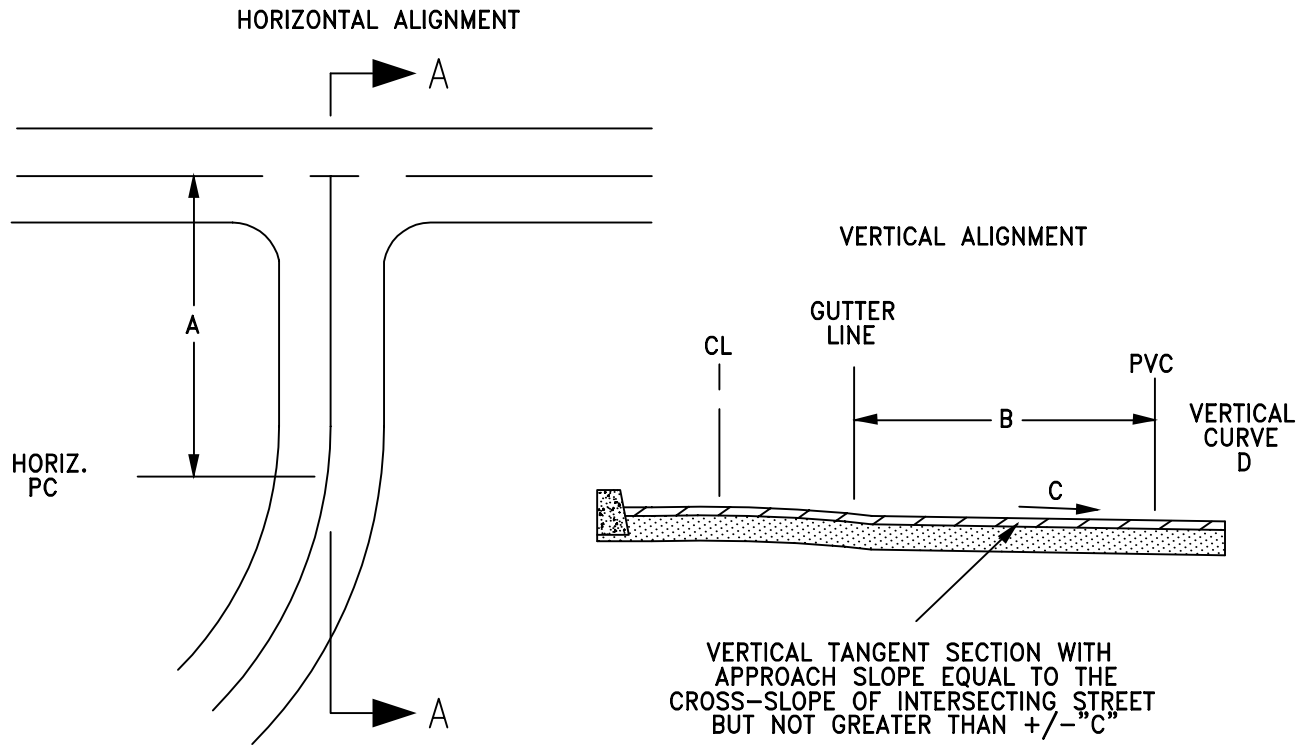
SIDEWALK TO HAVE 5' OF CLEARANCE TO POST BOXES AT ALL POINTS. WHERE A SIDEWALK IS NOT REQ'D, A CONCRETE PAD CONFORMING TO SIDEWALK STANDARDS WILL BE CONSTRUCTED AROUND THE CLUSTER OF POSTAL BOXES.



**NOTE:**

PARKING BAY IS REQUIRED ON DESIGNATED COLLECTOR STREETS (AS SHOWN). IT IS ALSO RECOMMENDED FOR LARGE INSTALLATIONS ON LOCAL STREETS.

DATE :	SCALE :	CLUSTER POSTAL DELIVERY BOX PARKING BAY	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
2-20	MDW			



SECTION A-A

THRU STREET	STEM STREET	A MIN.	B MIN.	C MAX. SLOPE	D MINIMUM V.C.
LOCAL/INDUSTRIAL	LOCAL/INDUSTRIAL	0'	0'	6%	50'
COLLECTOR	LOCAL/INDUSTRIAL	50'	50'	4%	50'
COLLECTOR	COLLECTOR	100'	100'	3%	100'
ARTERIAL	LOCAL	50'	50'	4%	100'
ARTERIAL	COLLECTOR	100'	100'	2%	125'
ARTERIAL	ARTERIAL	200'	200'	2%	150'

DATE : 1/31/07	SCALE : NONE	<p>"T" INTERSECTION ALIGNMENT STANDARD</p>	<p><b>CITY OF PRINEVILLE</b></p> <hr/> <p><b>PUBLIC WORKS DEPARTMENT</b></p>	
DRAWING NO. 2-21	APPROVED BY : MDW			

# Chapter VII

## SEWER FACILITIES

### 445 SANITARY, STORM, CULVERT, SIPHON AND IRRIGATION PIPE

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#### DESCRIPTION

##### 445.00 SCOPE

This section covers all the work necessary for the installation and construction of storm sewers and installation of sewer pipe and fittings, except as amended or modified hereafter; the provisions of Section 445 shall apply.

#### MATERIALS

##### 445.10 GENERAL

Sanitary sewer pipe shall be designated as either gravity or pressure for purposes of this specification. Unless otherwise specified, all gravity sewer and pressure pipe in the project shall be poly vinyl chloride (PVC). Where more than one type of material is indicated as appropriate, the type required will be designated on the plans.

At the sole discretion of the city, the contractor and/or material supplier shall provide certified manufacture date of any PVC pipe with visible cracking, discoloration and/or fading due to ultraviolet light exposure. Pipe which is one year or older may be rejected. City also reserves the right to reject pipe material for cause regardless of age of pipe.

Unless otherwise specified, all storm sewer pipe in the project shall be poly vinyl chloride (PVC) C-900 water pipe meeting the requirements of AWWA C-900 specifications, *Poly Vinyl Chloride (PVC) Pressure Pipe*.

##### 445.11 MATERIALS

##### **POLYVINYL CHLORIDE (PVC) PIPE (See 2410.70)**

##### **Gravity Sewer Pipe**

1. Rigid PVC pipe compounds used in gravity sewer pipe shall conform to ASTM D-1784, Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (PVC) Compounds.
2. PVC pipe shall conform to ASTM D-3034, standard dimensions ratio not to exceed 35 or to ASTM F789, minimum pipe stiffness of 46 psi. Provide manufacturer's certification, including test results, for all materials supplied under this Specification.

3. All piping system components of a pipe class shall be the products of one manufacturer.
4. Where minimum cover cannot be maintained or where directed by the Engineer, Pipe shall be C-900 water pipe meeting the requirements of AWWA C-900 specifications, ***Poly Vinyl Chloride (PVC) Pressure Pipe.***

#### **Pressure Sewer Pipe**

1. Pipe shall be Class 160 (160 psi) rigid PVC Class 12454-B, conforming to ASTM D-1784 and ASTM D-2241 or ASTM D-1785 and ASTM D-2241; or
2. Pipe shall be Class 150-C900 and have a minimum DR of 18 unless specified otherwise.
3. All piping system components of a class shall be the products of one manufacturer.
4. Where minimum cover cannot be maintained or where directed by the Engineer, Pipe shall be C-900 water pipe meeting the requirements of AWWA C-900 specifications, ***Poly Vinyl Chloride (PVC) Pressure Pipe.***
5. Purple non-metallic tape shall be laid 12 inches above the pipe when using white or blue plastic pipe in pressure sewer installation.

#### **JOINTING MATERIALS: Poly Vinyl Chloride Pipe**

##### **1. GRAVITY SEWER PIPE**

Joints shall be rubber gasketed conforming to ASTM D-3212 for gravity sewers. Gaskets shall conform to ASTM F-477. Lubricant jointing shall be as approved by the pipe manufacturer. A

##### **2. PRESSURE SEWER PIPE**

Joints shall be rubber gasketed or glued.

Rubber gasketed or glued joints shall conform to the manufacturer's recommendations for the pressure class specified. Gaskets shall conform to ASTM F-477. Lubricant jointing shall be as approved by the pipe manufacturer.

#### **FITTINGS: Poly Vinyl Chloride Pipe**

##### **1. GRAVITY SERVICE FITTINGS**

- a. PVC pipe fittings shall conform to ASTM D-3034, standard dimensions ratio not to exceed 35 or to ASTM F789, minimum pipe stiffness of 46 psi. Provide manufacturer's certification, including test results, for all materials supplied under this Specification.
- b. All fittings shall be the same as the joints used on the sewer pipe. Caps or plugs shall be furnished with each tee outlet or stub with the same type gasket and joint as furnished with the service connection pipe specified for future service connections. The plug or cap shall be banded or otherwise secured to withstand all test pressures involved without leakage.
- c. Each tee for future service connection shall be marked with detection tape and a metal fence post (type 101 or 133) extending from the end of service pipe to within 6 inches of ground surface.



## **2. PRESSURE SEWER FITTINGS**

### **a. Gate Valves (Isolation Valves)**

Gate valves shall be iron-body resilient-seated gate valve conforming to AWWA C509, equivalent to "Ken-seal" valves as manufactured by Kennedy Valve Co. Gate valves shall be polymer coated inside and out, have flanged or threaded ends and a non-rising stem.

Unless otherwise specified, gate valves shall be supplied with a 2 inch operating nut and O-ring joints. In vault or above ground gate valves shall be supplied with hand wheels.

### **b. Check Valves**

Check valves on pressure sewers, except for service lines, shall be spring loaded, external lever actuated, iron-body, flanged end, resilient seat check valves equivalent to Kennedy model 106 ALS. APCO model 104P3 with backflow device may be used in lieu of the Kennedy check valve in certain applications. Commercially available PVC check valves may be used for individual 3" diameter service lines where the total head at the check valve does not exceed 25 feet.

### **c. Valve Enclosures**

Valve enclosures for check valves and gate valves shall be concrete in travel areas and may be plastic elsewhere. Covers shall have the word "SEWER" in raised letters. Top section and base section shall have minimum overlap of 4 inches.

### **d. Pressure Pipe Cleanouts**

Cleanouts shall be constructed as indicated on the Drawings. Box shall be a standard valve box.

### **e. Pressure Pipe Air-release Valves**

Air-release valves shall be constructed as indicated on the Drawings, complete with 2" shut-off valve, 1" blow-off valve, quick disconnect coupling and back flushing apparatus, APCO Model 400 or equal. Valve shall provide for an operating pressure range of 0-50 psi.

### **f. Saddles**

Saddles shall be nylon coated ductile iron body saddles with double stainless steel straps equivalent to type 357 service saddles as manufactured by Smith-Blair or Inserta Tee as manufactured by Inserta Tee Pipe Fittings on systems of 12 PSIG or less.

### **g. Valve Boxes**

Valve boxes subject to traffic loading shall be a two piece grade adjustable box. The valve box shall have 5" I.D. with a slip top section without a dirt flange on the bottom as shown in the Standard Drawing. Valve boxes shall be Brooks 910. The extension piece shall be of the proper length for depth of cover. The word "SEWER" shall be cast into the top of the lid and lid shall be filled with concrete.

### **445.11(e) TRACER WIRE**

Detection tape and wire shall be installed on all non-metallic gravity sewer mains. Detection tape shall be manufactured by Allen Systems or an approved equal. One course detection tape is required at the top of the pipe zone. Detection wire shall be installed on all pressure sewer mains, all gravity sewer mains and all service

connections. The wire shall be a green-clad 18 gauge UF bury solid copper wire. The wire shall be attached to the top of the pipe.

Where there is a splice, it shall be repaired with a King KWC 100 tan watertight connector or equivalent as approved by the Engineer.

For service connections, detection wire shall be brought to the ground surface within the cleanout access box, allowing for adequate length (approximately 6 inches) for locator connection.

### **INSULATION**

Pipe insulation shall be a minimum of 2-inch thickness, CPR Upjohn-Trymer bun material, Manville Micro-Lok or equivalent, covered with an aluminum roll jacketing, 0.016-inch minimum thickness, PABCO Surefit Aluminum Jacketing, Manville Micro-Lok or equivalent. Insulation shall have a maximum conductivity ("K") of 0.40. Insulation at pipe supports shall be calcium silicate or other approved rigid insulation adequate to support the pipe. Jacketing joints shall be sealed within silicone caulk. Pipe supports and hangers shall be plated or hot dipped galvanized after fabrication.

### **COMMERCIAL GRADE CONCRETE IN BLOCKS refer to section 440**

Concrete for thrust blocking and support structures shall conform to ASTM C 94, Alternate 2 and shall be proportioned to obtain a 28-day compressive strength of 2500 pounds per square inch or approved equal.

### **BRIDGE CROSSING PIPE**

Pipe for bridge crossing shall be ductile iron as specified herein except that restrained joint pipe may be used and deflected within the limits of the manufacturer's recommendations to facilitate wingwall penetration and overall alignment. Flanged fittings may be used for the wing wall penetrations. Bridge crossing pipe shall be insulated with a urethane or fiberglass pipe wrap system specifically designed for pipe insulation purposes.

## **CONSTRUCTION**

### **445.40 GENERAL**

#### **445.40(a) TRENCH WORK**

Trench excavation, bedding and backfill shall be in accordance with Chapter V-Trenches unless otherwise specified.

#### **445.40(b) LINE AND GRADE**

Project shall be staked according to General Specifications and City standards for street construction.

#### **445.40(c) PIPE DISTRIBUTION AND HANDLING**

Material shall be stored on the job from cars, trucks or storage yard no faster than can be used to good advantage. Pipe and fittings shall be stored in such a manner as to prevent damage or contamination.

At all times, the Contractor shall protect pipe and fittings from contamination or damage. Proper implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work.

All pipe, fittings, valves and hydrants shall be carefully lowered into the trench in such a manner as to prevent damage to the pipeline materials and protective coatings and linings. Under no circumstances shall pipeline materials be dropped or dumped into the trench. No more pipe shall be laid out along open ditch, prior to installation, than can be laid in one work shift. Pipeline materials shall be removed daily from a storage area and placed in trench.

All foreign material shall be removed from the bell-and-spigot ends of each pipe. When deemed necessary by the City Inspector, the outside of the spigot and the inside of the bell shall be wiped clean dry and free from oil, grease or ice before the pipe is laid. The ends of the solvent weld pipe and fittings and of rubber gasket joint pipe and fittings shall be wiped clean of all dirt, grease and foreign matter.

**445.40(d) LAYING PIPE ON CURVES**

The Contractor shall lay pipe on horizontal or vertical curves in accordance with the manufacturer's recommendations. Pipelines intended to be straight shall be so laid and in no case shall the deviation from the straight line at any joint exceed 1".

**445.40(f) INSTALLATION OF SANITARY SEWER SERVICE TEES AND WYES**

When the City does the main line tapping for service pipe, but not the trench excavation the Contractor will provide a finished trench. The main line's full circumference shall be exposed and free of foreign material prior to the service tap being performed. When crossing streets or when required, traffic shall be maintained. Damage to pipe already in the ground is the responsibility of the excavator.

Service connections shall be designed and approved on an individual basis. Materials required will be specified and designated on approved plans. Pipe shall be no larger than 3" diameter and shall be connected to the City system by City crews with a gate valve and check valve assembly.

**OTHER: SETTING OF FITTINGS AND COUPLING**

Fittings, plugs and caps shall be set and jointed in pipe in the manner described within these specifications or by the approval of the City Engineer or City representative. For dissimilar pipes, standard "Calder" type adapter couplings shall be used. Special conditions encountered for which suitable adapter couplings are not available (rare) shall be referred to the City Engineer for consideration of an approved method.

## **445.43 PLACING AND JOINING PIPE**

### **445.43(a) GENERAL**

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed into the trench. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into it, the Inspector may require that, before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. Between each shift, pipe end shall be plugged to prevent any objects or animals from entering.

No pipe shall be laid in water or when, in the opinion of the Inspector, trench conditions are unsuitable.

At times when pipe laying is not in progress, the open ends of pipe in trench shall be closed by a watertight plug or other means approved by the Inspector and no trench water shall be permitted to enter the pipe. These provisions shall apply during the noon hour as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

Pipe shall be laid with bells facing upgrade/upstream unless otherwise directed by engineer.

### **445.43(c) PVC PIPE**

The pipe shall, when necessary, be cut in a neat and professional manner without damaging the pipe. The pipe shall be cut so as to leave a smooth end at right angles to the axis of the pipe. The pipe cut end shall be dressed in conformance with the pipe manufacturer's recommendation.

### **445.43(e) PIPE JOINTS**

After a length of Solvent Weld pipe is placed in the trench, both the spigot end and the receiving bell shall receive a thorough application of primer and glue as per the manufacturer's specifications. The pipe shall be centered, seated and rotated at least 90 degrees. The pipe shall be brought to correct line and grade and secured in place with approved backfill material. Pipe and fittings which do not allow a sufficient and uniform space for jointing shall be removed and replaced with pipe and fittings of proper dimensions to ensure such uniform space. Precaution shall be taken to prevent dirt from entering the joint space.

Solvent Weld and Rubber gasket joint pipe shall be connected as hereinafter specified as soon as they are placed in the trench.

After a length of rubber gasket joint is placed in the trench, the plain end shall be centered in the bell and the pipe shaft properly seated and brought to correct line and grade.

Pipe and fittings which do not allow a sufficient and uniform space for jointing shall be removed and replaced with pipe and fittings of proper dimensions to ensure such uniform space. Precaution shall be taken to prevent dirt from entering the joint space.

PVC fittings with rubber gasket type joint shall be laid and jointed in strict accordance with the manufacturer's recommendations as approved by the Inspector and in accordance with the requirements of the Special Specifications (if applicable). The Contractor shall provide all special tools and devices such as special reamers, rasps and similar items required for the installation. Lubricant for the pipe gaskets shall be of the type recommended by the pipe manufacturer and no substitute will be permitted under any circumstances.

In reference to joints for dissimilar pipe, use an approved flexible mechanical compression joint coupling with No. 305 stainless steel bands manufactured by Dresser, Romac or approved equal.

Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, a manhole shall be required. Where long-radius curves are permitted by engineer, the amount of deflection allowed shall be uniform and not exceed that indicated in the manufacturer's specifications.

#### **445.45 BACKFILLING**

Trench backfill shall be placed in accordance with the requirements of Chapter V-Trenches except that the finished backfill shall be water jetted under the direction of the Engineer to demonstrate that all rock crevices that may have been opened up during installation are sealed.

### **FINISHING, CLEANING UP AND TESTING**

#### **445.70 GENERAL**

##### **445.70(a) SANITARY SEWER**

All sanitary sewers (gravity and pressure) shall be flushed and TV'd prior to testing.

##### **445.70(b) STORM SEWER AND CULVERT INSTALLATIONS**

All storm sewer not located under paved roadway shall be provided with two layers of detection tape as required in the standard drawings. All storm sewers and culverts under roadway sections shall be flushed and TV'd prior to testing.

#### **445.71 REQUIREMENTS PRIOR TO TESTS**

##### **445.71(a) GENERAL**

All gravity systems and appurtenances shall successfully pass an air test prior to acceptance and shall be free of visible leakage, using either method of testing. Information regarding air testing may be obtained from the Engineer.

On pipe 36" in diameter and larger, individual joints may be tested by an approved joint testing device. All details of testing procedure shall be subject to approval of the Engineer.

The Contractor shall test the system during the normal work day, scheduling the plugging, capping and other preparatory work so as to conduct the test during daylight hours.

#### **445.71(b) PLUGGING TEES, WYES, STUBS AND SERVICE CONNECTIONS (SANITARY ONLY)**

The Contractor shall plug all wyes, tees, stubs and service connections with gasketed caps or plugs securely fastened or blocked to withstand the internal test pressure. Such plugs or caps shall be removable and their removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.

#### **445.71(c) TESTING EQUIPMENT**

The Contractor will provide 2 test gauges equipped with 1/2 inch male adapter with standard pipe threads. The gauges will be calibrated by the Contractor.

For hydrostatic testing for pressure pipe, furnish the following equipment and materials:

- (2) Approved Graduated Containers
- (2) Pressure Gauges
- (1) Hydraulic Force Pump Approved by the Engineer
- Suitable Hose and Suction Pipe as Required

#### **445.72 PIPE TESTING**

##### **445.72(b) HYDROSTATIC TESTING**

Pressure sewer lines shall be tested by hydrostatic methods. The Contractor shall furnish all necessary equipment and material and make all taps in the pipe as required for test purposes. The City Engineer or City representative will monitor the tests. The test pressure shall be two times the calculated operating pressure, but not less than 50 psi for the low end of the pipe. For high pressure lines, the test pressure shall not exceed the manufacturer's recommendation.

##### **Backfilling and Thrust Blocks**

Conduct the tests after the trench has been completely backfilled. The Contractor may, if field conditions permit as determined by the Engineer, partially backfill the trench and leave the joints open for inspection and conduct an initial test. The acceptance test shall not, however, be conducted until all backfilling has been completed. Where any section of pipe is provided with concrete thrust blocking, the pressure test shall not be conducted for five days after the concrete blocking is installed. If high-early cement is used for the concrete thrust blocking, the curing time may be reduced to two days.

## Procedure

After backfilling, fill pipe with water. Expel all air from pipe prior to test. Make up any water lost by absorption and then apply test pressure with suitable pump. Valve off line when test pressure is reached and conduct pressure test for two hours. At the end of the test period, raise to test pressure with the pump. Measure the quantity of water required to restore test pressure. The pipe shall be deemed to have passed if this makeup water is less than that calculated for allowable leakage.

Allowable leakage shall be determined by the formula:

$$L = \frac{ND\sqrt{P}}{7400}$$

Where:

- L = Allowable leakage (gal./hr.)
- N = Number of joints in the section tested (pipe and fittings) In 1000' there are 50 pipe joints. Each fitting has 2 joints.
- D = Nominal diameter of pipe (in.)
- P = Average test pressure. Equal to gage pressure less 1/2 static head where gage is located at the low point of the line. Where gage is located at the high point, add 1/2 static head.

The accompanying table has approximate allowable leakage. Fittings have been neglected in this table.

**PRESSURE SEWER EXFILTRATION**

Allowable Leakage for Mechanical Joint or Push-On Joint

Pipe in 20 Ft. Nominal Lengths

ALLOWABLE LEAKAGE PER 1000 FT. - GALLONS PER HOUR

AVG. TEST PSI	PIPE SIZE - INCHES					
	2.5	3	4	6	8	10
400	0.34	0.41	0.54	0.81	1.08	1.35
375	0.33	0.39	0.52	0.79	1.05	1.31
350	0.32	0.38	0.51	0.76	1.01	1.26
325	0.30	0.37	0.49	0.73	0.97	1.22
300	0.29	0.35	0.47	0.70	0.94	1.17
275	0.28	0.34	0.45	0.67	0.90	1.12
250	0.27	0.32	0.43	0.64	0.85	1.07
225	0.25	0.30	0.41	0.61	0.81	1.01
200	0.24	0.29	0.38	0.57	0.76	0.96
175	0.22	0.27	0.36	0.54	0.72	0.89
150	0.21	0.25	0.33	0.50	0.66	0.83
140	0.20	0.24	0.32	0.48	0.64	0.80
130	0.19	0.23	0.31	0.46	0.62	0.77
120	0.19	0.22	0.30	0.44	0.59	0.74
110	0.18	0.21	0.28	0.43	0.57	0.71
100	0.17	0.20	0.27	0.41	0.54	0.68
90	0.16	0.19	0.26	0.38	0.51	0.64
80	0.15	0.18	0.24	0.36	0.48	0.60
70	0.14	0.17	0.23	0.34	0.45	0.57
60	0.13	0.16	0.21	0.31	0.42	0.52
50	0.12	0.14	0.19	0.29	0.38	0.48

\*The allowable leakage, G, is determined from the above table by the formula:

$$G = [ T \times L1 \times (D1/1000) ] + [ T \times L2 \times (D2/1000) ] + \text{etc.}$$

- Where :
- G = allowable loss in gallons for the system
  - T = time of test in hours
  - L1,L2 = loss from above table for the diameter of pipe at the average test pressure
  - D1,D2 = length of corresponding diameter pipe



This is an approximate test. It is slightly conservative compared to an absolute determination by the Manufacturer recommended formula. In the event of a barely failing test or a short line with many "fittings, the allowable leakage should be re-calculated based on the total of all fittings in the system."

#### **445.72(c) AIR TESTING**

The Contractor has the option after completion of the system, including service connections and backfilling and compaction, of conducting a low pressure air test in lieu of the hydrostatic test required herein.

The Owner may require testing of manhole to manhole sections as they are completed in order to expedite the acceptance of the system and allow connections before the entire system is complete.

The test shall be conducted at no expense to the City. The Contractor shall provide all equipment and personnel for the test. The method, equipment and personnel shall be subject to the approval of the Engineer. The Engineer may, at any time, require a calibration check of the instrumentation used. The pressure gauge used shall have minimum divisions of 0.10 psi and have an accuracy of 0.0625 psi (one ounce per square inch). All air used shall pass through a single control panel.

The Air Test indicated in this section shall be used for plastic pipe. The Air Test indicated in the APWA specifications shall be used for all other materials. Where a question exists as to the appropriateness of the method to be used, the method resulting in the longest test time shall be used.

#### **Safety Precautions**

All plugs used to close the sewer for the air test must be capable of resisting the internal pressures and must be securely braced, if necessary.

All air testing equipment must be placed above ground and no one shall be permitted to enter a manhole or trench where a plugged line is under pressure. All pressure must be released before the plugs are removed. The testing equipment used must include a pressure relief device designed to relieve pressure in the line under test at 10 psi or less and must allow continuous monitoring of the test pressures in order to avoid excessive pressure. The Contractor shall use care to avoid the flooding of the air inlet by infiltrated ground water. The Contractor shall inject the air at the upper plug if possible. Only qualified personnel shall be permitted to conduct the test.

#### **Ground Water**

The presence of ground water will affect the results of the test. The average height of ground water over the lines must be determined immediately before starting the test. The method of checking the ground water height shall be as approved.

## **Procedure**

All air testing shall be by the Time Pressure Drop Method. The test procedures are described as follows:

1. Clean the lines to be tested and remove all debris where noted.
2. The Contractor has the option of wetting the lines prior to testing.
3. Plug all open ends with suitable test plugs. Brace each plug securely.
4. Check the average height of the ground water over the line. The test pressures required below shall be increased 0.433 psi for each foot of average water depth over the line.
5. Add air slowly to the section of system being tested until the internal air pressure is raised to 4.0 psig greater than the average back pressure of any ground water that may submerge the pipe.
6. After the internal test pressure is reached, allow at least 2 minutes for the air temperature to stabilize adding only the amount of air required to maintain pressure.
7. After the temperature stabilization period disconnect the air supply.
8. At any convenient observed pressure reading between 3.5 and 4.0 psig greater than the average external pressure of any groundwater above the pipe, begin timing the pressure loss. If the time shown in the table below for the designated pipe size and length elapses before the air pressure drops 0.5 psig, the section is considered to have passed the test. The test may be discontinued once the prescribed time has elapsed, even though the 0.5 psig loss has not occurred.
9. Technical data
  - a. Allowable air loss rate (Q) - the value for Q is 0.0015 cubic feet per minute per square foot of internal surface.
  - b. Testing main sewers with services - If lateral sewers such as services are included in the test because of the difficulty in isolating such lateral sewer, their lengths may be ignored for computing test times. Ignoring the laterals results in a slightly more severe test.
  - c. Rounding off pipe lengths - Rounding off pipe lengths shall always be to the next higher length value shown, i.e., the test time for 201' shall be the times shown for 250'. At the discretion of the inspector, test times for a unique pipe length may be linearly interpolated from the next higher and lower times indicated.

Pipe Dia. (in.)	Minimum Time (min:sec)	Length for minimum time (ft.)	Time for Longer Length (sec)	Specific Time for Length (L) Shown (min:sec)						
				100 ft	150 ft	200 ft	250 ft	300 ft	350ft	400 ft
6	2:50	398	0.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51
8	3:47	298	0.760 L	3:47	3:47	3:47	3:47	3:47	4:26	5:04
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54
24	11:20	996	837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35

**445.73 DEFLECTION TESTING FOR FLEXIBLE PIPE**

PVC sanitary sewer mains shall be tested using the 95% Mandrel deflection test per Section 445.73 and DEQ requirements.

**445.74 TELEVISION INSPECTION OF SANITARY AND STORM SEWERS**

The Contractor shall televise all lines before the placement of base material and paving.

Prior to TV inspection the following conditions need to be met:

1. All manholes to be in place and uncovered.
2. All curbs in place.
3. Streets clear of materials and debris to allow inspection equipment access to point(s) of inspection.
4. If manhole is more than one foot above grade, ramping is required.
5. All lines should be flushed just prior to TV Inspection.
6. TV inspection should be performed prior to base rock placement.

Findings will be recorded and reported to the City. The Contractor will be required to correct all deficiencies at no expense to the City.

Upon correction of deficiencies revealed by televiewing, the Contractor shall notify the Engineer and the same steps listed above shall be repeated until all work is acceptable.

At any time during the one year warranty period the examination of the sewer line discloses a deficiency from construction, that deficiency shall be corrected by the contractor at no expense to the City.

#### **445.75 REPAIRS**

The Contractor shall repair or replace, in a manner approved by the Engineer, any portion of the system not passing the air or hydrostatic test.

Infiltration of ground water in an amount greater than specified, following a successful hydrostatic or air test, shall be considered as evidence that the original test was in error or that failure of the system has occurred.

The Contractor shall correct such failures occurring within the warranty period in a manner approved by the Engineer and at no expense to the owner.

### **MEASUREMENT**

#### **445.81 PIPES AND APPURTENANCES**

##### **445.81(a) PIPES**

Measurement and payment for pipe will be made on a linear foot basis for the various classes, types and size of pipe listed and installed. The pipe will be measured horizontally from center-to-center of manholes or to the end of the pipe, whichever is applicable.

Measurement and payment for storm drains will be made on a linear foot basis. Measurement will be made horizontally along the pipe centerline from the finished end to end of the pipe.

##### **445.81(b) TEE AND WYE FITTINGS**

Measurement and payment for tee and wye fittings will be made at the unit price for each size and type as listed and installed.

Measurement and payment for concrete tee and wye encasement will be made at the unit price each for the various sizes of pipe as listed and installed.

### **PAYMENT**

#### **445.91 PIPES AND APPURTENANCES**

No final payment for pipe in place will be made until the pipe has successfully passed the air or hydrostatic test.

Payment for tee and wye fittings will be in addition to payment for pipe from manhole to manhole.

#### **445.99 INCIDENTAL BASIS**

When neither specified nor listed in the proposal for separate payment, Pipe and Fittings (Sanitary Sewer) shall be considered incidental work for which no separate payment will be made.

Trench excavation and backfill shall be paid for under the provisions of Section 405.80. When neither specified nor listed in the proposal for separate payment, storm

drains shall be considered incidental work for which no separate payment will be made.

Where no separate storm drain trench excavation and backfill item exists in the Schedule of Bid Items, such work shall be considered incidental to the work required to provide storm drains.

## **470 MANHOLES, CATCH BASINS AND INLETS**

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### **DESCRIPTION**

#### **470.00 SCOPE**

This section covers the work necessary for the construction of manholes. Manholes shall be located as shown on the Plans or as directed by the City Engineer or City representative. Except as modified or supplemented herein, the provisions of Section 470 of the current edition *Oregon Standard Specifications for Construction* shall apply.

This section covers the work necessary to construct catch basins and storm water disposal facilities at the locations shown on the plans and Standard Drawings.

The City standard double and single catch basins are as shown on the Standard Drawings. City standard catch basin grate caps are shown on the standard drawings.

### **MATERIALS**

#### **470.10 GENERAL**

All materials shall conform to *Oregon Standard Specifications for Construction* Section 2450 Manhole and Inlet Materials.

All excavation and backfill shall conform to the requirements of Section 405.

All Manholes shall be wrapped with NPC External Joint Wrap or approved equal.

#### **Concrete**

Concrete shall conform to the requirements of ASTM C478 Alternate 2. Compressive strength for manhole bases and miscellaneous concrete structures shall be not less than 4000 psi at 28 days. Maximum size of aggregate shall be 1 1/2 ". Slump shall be between 2" and 4".

#### **Mortar**

Mortar shall conform to the requirements of ASTM C387 or be proportioned 1 part Portland cement to 2 parts clean, well graded sand which will pass a 1/8 in screen. Admixtures may be used not exceeding the following percentages of weight of

cement: hydrated lime, 10 percent; diatomaceous earth or other inert materials, 5 percent. Consistency of the mortar shall be such that it will readily adhere to the precast concrete.

### **Welded Frames and Grates**

The grates will be furnished by the contractor and conform to Standard Drawings. The Owner has the option to supply the grates.

### **470.11 PRECAST CONCRETE MANHOLES AND BASES**

Materials shall conform to the requirements of ASTM C478. All manholes shall be constructed in a plant certified by either the National Precast Concrete Association or Prestressed Concrete Institute. Minimum wall thickness shall be 4 inches. Cones shall have the same wall thickness and reinforcement as riser sections. Joints shall be of a rubber gasketed type. Cone shall be eccentric unless otherwise specified. Flat top manholes shall be used where depth is less than 6 feet. Joint gasket shall meet ASTM C990-09 specification.

Minimum manhole diameter shall be as 48 inches unless otherwise approved by the Engineer.

Manholes over 6 feet deep shall be 60 inches in diameter. 15 inch diameter lines or larger require manholes to be 60 inches in diameter. Polypropylene steps shall be incorporated into all manholes.

Materials shall conform to the requirements of ASTM C478. Minimum wall thickness shall be 4 inches. Cones shall have the same wall thickness and reinforcement as riser sections. Joints shall be of a gasketed type. Cone shall be eccentric unless otherwise specified. Flat top manholes shall be used where depth is less than 6 feet.

Cast in place bases shall be formed prior to setting wall sections, i.e. blocking up walls and casting base beneath will not be acceptable. Options include using block outs in first wall section (over pipe) to use as form or casting base with form ring.

### **470.14 PIPE AND FITTINGS**

Pipe and fittings shall conform to the applicable portions of Section 445. Tees, ells and other fittings for drop manholes shall be of the same material as the pipe in the adjacent mains unless specified otherwise.

### **470.15 PIPE STUBOUTS FOR FUTURE SANITARY SEWER CONNECTIONS**

Pipe stub outs shall be the same type as approved for use in the lateral, main or trunk sewer construction. Strength classifications shall be the same class as in adjacent trenches. Where there are two different classes of pipe at a manhole, the higher strength pipe shall govern strength classification.

Rubber-gasketed water tight plugs shall be furnished with each stub out adequately braced against hydrostatic or air test pressure.

## CONSTRUCTION

### 470.40 GENERAL

#### 470.40(a) EXCAVATION, BACKFILL AND FOUNDATION STABILIZATION

If in the opinion of the Engineer, unstable material exists that will not support the manhole or other structure, the Contractor shall excavate below grade and backfill with compacted foundation stabilization material as approved by engineer.

After the backfill operation, including mechanical compaction, is complete, the backfill around catch basins shall be water jetted if directed by the Engineer. Water jetting shall continue until all evidence of subsidence disappears. When dry, the subsided area shall be re-backfilled with appropriate material. The Engineer may then require re-jetting of the entire backfill. Other techniques include mechanical compaction.

#### 470.40(b) PIPE CONNECTIONS

All pipes entering or leaving the manhole shall be provided with flexible joints (Kor-N-Seal or approved equal) at the manhole structure and shall be placed on firmly compacted bedding. Special care shall be taken to see that the openings through which the pipes enter the structure are completely watertight.

### 470.41 PRECAST CONCRETE MANHOLES

#### 470.41(a) BASES

If bases are cast in place, the concrete shall be consolidated by mechanical vibration.

The concrete shall be screeded off in a manner such that the first manhole section to be placed has a level uniform bearing for the full circumference.

If the bases are precast, the base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported in true alignment and making sure that all entering pipes can be inserted on the proper grade.

The minimum open channel length thru the manhole shall not be less than the diameter of the manhole less 12", i.e., 48" manhole equates to 36" minimum channel length. All pipes entering or leaving shall be provided with flexible joint at the exterior wall of the manhole structure. This Pipe-to-Manhole connector shall be a Kor-N-Seal connector or approved equal.

#### 470.41(c) GRATES, FRAMES, COVERS AND FITTINGS

The final elevation for each manhole shall match within 1/4" of the finished street. It is permissible to adjust the manhole frame to final grade after street paving provided the structure is low enough so as not to interfere with the street paving operation. Patching material shall be asphalt concrete or Portland Cement Concrete with a maximum patch diameter of 6 feet.

Manhole cover shall have two holes. A cut out at the rim should be provided for raising the lid.

The grate frame shall be formed into the concrete. The dimensions of the various grate frames are shown on the standard drawings. All grates shall be manufactured in the U.S.A.

Catch basin grates shall be placed after street paving has been completed. In the interim, 2" wood planking shall be substituted in order to protect the structure during street construction.

## **MAINTENANCE, CLEAN UP AND TESTING**

### **470.71 SANITARY MANHOLE ACCEPTANCE TESTING**

Manholes shall be tested using vacuum methods specified in Section 470.71(b).

#### **470.71(b) VACUUM TESTING**

Perform vacuum testing according to ASTM C 1244/C 1244M. Plug and brace all pipes entering the manhole. Place the test head in or on top of the manhole ring. Draw a vacuum of 254 mm (10 inches) of mercury on the manhole, close the valve on the vacuum line of the test head and shut off the vacuum pump. Measure the time for the vacuum to drop to 228 mm (9 inches) of mercury. The manhole is acceptable if the time for the vacuum reading to drop from 254 mm (10 inches) of mercury to 228 mm (9 inches) of mercury meets or exceeds the values indicated in the table below:



Minimum Test Times For Various Manhole Diameters

Depth*(m)	METRIC DIAMETER (MM)								
	750 or 825	900	1050	1200	1350	1500	1650	1800	
									Time**(s)
2.4 or less	11	12	14	17	20	23	26	29	33
3	14	15	18	21	25	29	33	36	41
3.7	17	18	21	25	30	35	39	43	49
4.2	20	21	25	30	35	41	46	51	57
4.9	22	24	29	34	40	46	52	58	67
5.5	25	27	32	38	45	52	59	65	73
6.1	28	30	35	42	50	53	65	72	81
6.7	31	33	39	46	55	64	72	79	89
7.3	33	36	42	51	59	64	78	87	97
7.9	35	39	46	55	64	75	85	94	105
8.5	39	42	49	59	69	81	91	101	113
9.1	42	45	53	63	74	87	98	108	121

\*Depth is measured from the top of the manhole to the lowest invert.

\*\*Test times for manhole depths between those shown in this table may be calculated by interpolation.

Depth* (feet)	ENGLISH DIAMETER (Inches)								
	30or Less	33	36	42	48	54	60	66	72
									Time**(s)
8 or less	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	35	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

\*Depth is measured from the top of the manhole to the lowest invert.

\*\*Test times for manhole depths between those shown in this table may be calculated by interpolation.

## MEASUREMENT

### 470.80 GENERAL

Measurement and payment for manholes and catch basins will be made on a per each basis for each type and size shown.

## PAYMENT

### 470.90 GENERAL

Payment shall include all materials and work necessary to construct manholes complete and in place as shown.

Payment shall constitute full compensation for all tools, materials, work and incidentals required to complete the work.

When neither specified nor listed in the proposal for separate payment, manholes, catch basins and inlets shall be considered incidental work for which no separate payment will be made.

Where not listed as a separate item, excavation for any drainage structure will be considered incidental to the price bid to construct the structure. Where listed as a separate item, excavation will be measured by the cubic yard to the nearest 1 cubic yard.

The dimensions for measuring excavation will be the exterior dimensions of the drainage structure as designed and specified by the Engineer. Payment for excavation will be at the contract unit price bid for excavation.

## **490 WORK ON EXISTING SEWERS AND STRUCTURES**

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### DESCRIPTION

#### 490.00 SCOPE

This section covers the work necessary for the installation of sewer service lines, service taps and connections. In general, service lines will extend from the sewer main to the street or alley right of way line.

At the sole discretion of the city, the contractor and/or material supplier shall provide certified manufacture date of any PVC pipe with visible cracking, discoloration and/or fading due to ultraviolet light exposure. Pipe which is one year or older may be rejected. City also reserves the right to reject pipe material for cause regardless of age of pipe.

## MATERIALS

### 490.10 GENERAL

#### Pipe and Fittings for Service Lines

Sewer service connection lines shall conform to the same specifications as sanitary sewer lines unless otherwise modified by these specifications.

#### Sewer Service Connections

Direct service connections shall be Inserta Tee as manufactured by Inserta Tee Pipe Fittings or equivalent.

#### Service Saddles

Service saddles shall be Romac "CB" type saddles or equivalent. The type shall conform to style 101S with painted saddle and stainless steel strap. No other type shall be permitted.

#### Swing Check Valves

Swing valves shall be APCO series 100 or equivalent. The check valve shall be capable of passing a 3" diameter solid.

#### Gate Valves

Iron body resilient seated gate valves will be "Kennedy Ken-Seal" type 1561x or equivalent. Gate valves will meet AWWA standards (C-500), have non-rising stems, be rated at 200 lbs. working pressure and 350 lbs. hydrostatic pressure, open left - 2" square operating nuts, with brass fittings, "O" ring stem pressure seals, non-directional, mechanical joints; as manufactured by Kennedy, Mueller, Waterous or American Darling.

## CONSTRUCTION

### 490.42 SERVICE LINE CONNECTIONS TO EXISTING SANITARY SEWERS

Sewer service lines shall not have less than 3.0 feet of cover under roadway area and shall not have less than 2.0 feet of cover to natural ground in the right-of-way. Services shall be extended at minimum grade or as required to provide gravity services to each building.

Each property shall be connected to the sewer main or lateral by a sewer service. Sewer services may share the same trench.

Where a sewer service is to be connected to an existing sewer main and no connection fitting is available, the connection may be made by the City of Prineville. Inspection by the City Engineering Division is required for work in the public right-of-way.

Sewer services in new construction areas shall extend to the property line and be marked by an extension a minimum of 6" above the natural ground surface. This extension shall be painted green. The distance from natural ground surface to the top

of the service connection in feet and inches shall be neatly written in permanent ink on the sewer service marker.

**Sewer Taps**

All taps on existing sewer mains may be performed by City of Prineville Sewer Division personnel with 72 hour advance notice.

**MEASUREMENT**

**490.80 UNIT BASIS**

Measurement and payment for service line pipe will be made on a linear foot basis for the size and type of pipe shown. Measurement will be made along the centerline of the service pipe from the main line fitting to the cap or termination of the service line.

Measurement and payment for sewer taps will be made on a per each basis for the type, kind and size specified and shall constitute full compensation for constructing the sewer tap complete and in place.

**490.81 INCIDENTAL BASIS**

Where no separate sewer service trench excavation and backfill item exists in the Schedule of Bid Items, such work shall be considered incidental to the work required to provide sewer services.

**PAYMENT**

**490.90 UNIT BASIS**

Trench excavation and backfill shall be paid for under the provisions of Section 405.80.

No final payment for service line pipe will be made until the section of sewer into which the services are connected has successfully passed the applicable internal pressure test as described in Section 445.81.

When neither specified nor listed in the proposal for separate payment, service line sewers shall be considered incidental work for which no separate payment will be made.

**SEWAGE LIFT STATIONS**

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**DESCRIPTION**

Lift stations, both City collection system and privately owned individual service, shall be designed and approved on an individual basis. These specifications describe a station as manufactured for the City of Prineville, Oregon, Comply with the

requirements of the Department Environmental Quality, Oregon Standards for design and construction of waste water pump stations, May 2001. This is done to indicate the type, function, standard design, efficiency and quality required and shall not be construed as eliminating from competition other manufacturers with comparable and equal equipment. The station manufacturer shall be required to affix an UNDERWRITER'S LABORATORIES (UL) LABEL attesting to the compliance of that assembled equipment under the PACKAGED PUMP SYSTEMS (QCZJ) UL Listing Category. This label shall be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures. Equipment manufactured without this third party certification label or equipment manufactured by an outside source or brokered equipment defined as systems not assembled on the premises of the named manufacturer by that company's employees **WILL NOT** be considered as equal.

## **MATERIALS AND CONSTRUCTION**

### **STRUCTURES (Simplex/Residential)**

#### **FIBERGLASS WET WELL/VALVE VAULT**

The wet well and valve vault shall be fiberglass of sufficient size in accordance with the approved design and shall be constructed of materials as specified herein. Unless otherwise indicated, the plastic terminology used in this specification shall be in accordance with the definitions given in American Society for Testing and Materials (ASTM). This specification is for the hand lay-up, chopped spray technique for manufacturing of vertical underground fiberglass basins. Other methods of manufacturing shall not be acceptable.

The resin used shall be of a commercial grade and shall be evaluated as a laminate by test or determined by previous service to be acceptable for the environment. The resins used may contain the minimum amount of fillers or additives required to improve handling properties. Up to 5% by weight of thixotropic agent that will not interfere with visual inspection may be added to the resin for viscosity control.

Resins may contain pigments and dyes by agreement between fabricator and engineer, recognizing that such additions may interfere with visual inspection of laminate quality.

The reinforcing material shall be a commercial grade of glass fiber having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

The laminate shall consist of a Gel-Kote interior coating, an inner layer of chopped strand, a main layer consisting of chopped fibers and woven roving and an exterior coating of Gel-Kote.

The inner surface shall be free of cracks and crazing with a smooth finish and with an average of not over two pits per square foot, providing the pits are less than 1/8" in diameter with not over 1/32" deep and are covered with sufficient resin to avoid exposure of inner surface fabric. Some waviness shall be permissible as long as the

surface is smooth and free of pits. Between 0.02" - 0.025" of Gel-Kote inner surface shall be provided.

A minimum of 0.100" of laminate next to the inner surface shall be reinforced with 30% by weight of chopped-strand fiber having fiber lengths from 0.5" to 3.0".

Subsequent tank wall reinforcement shall be continuous-strand roving fiberglass. The thickness of the woven roving portion of the tank shell shall vary with the tank height to provide the aggregate strength necessary to meet the tensile and flexural requirements.

If additional longitudinal strength is required, the use of other reinforcement such as woven fabric, Balsa Kore reinforcing bands, chopped-strand mat or chopped strands shall be interspersed in the lamination to provide additional strength. Glass content of this main structural layer shall be 50 to 60% by weight. The exterior surface shall be relatively smooth with no exposed fibers or sharp projections. Handwork finish shall be present to prevent fiber exposure.

The tank/valve box wall must be designed to withstand wall collapse based on the assumption of hydrostatic type loading by backfill with a density of 120 lb./ft.<sup>3</sup>. The tank wall laminate must be constructed to withstand or exceed two times the assumed loading for any depth of basin.

The tank bottom shall be of .25" A36 steel plate to prevent deflection due to equipment weight or uplift forces and to provide a means of mounting to a concrete pad. Steel base shall be completely encapsulated in fiberglass resin to prevent corrosion.

The width of the first layer of joint overlay shall be 12" minimum. Successive layers shall uniformly increase in width to form a smooth contour laminate that is centered on the joint + 1/2". A highly filled resin paste may be placed in the crevices between joined pieces leaving a smooth surface for lay-up. The cured resin surface of the parts to be joined shall be roughened to expose glass fiber. This roughened area shall extend beyond the lay-up areas so that no reinforcement is applied to an unprepared surface. Surfaces shall be clean and dry before lay-up. The entire roughened area shall be coated with resin after joint overlay is made.

The finished laminate shall be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, air bubbles, pinhole, pimples and delamination. The surfaces shall be relatively smooth; hand finish is acceptable, with no exposed fibers or sharp projections.

The top flange and cover O.D. shall assure a tight fit and afford ease of access not possible with recessed covers. Nut-serts shall be inserted in all bolt holes of the top flange and shall be positively locked with threads and resin to prevent stripping. A 10-hole pattern shall accommodate the mounting of a one-piece or split steel cover.

## **COVER**

Cover shall be of .375" galvanized steel construction with an outside diameter equal to the outside diameter of the top flange of the basin/valve box. The cover shall be secured to the basin with stainless steel bolts and stainless steel bolts will hold access hatches securely to the basin cover. Access hatch will be made of .25" galvanized steel and sized to provide easy access to pumps/valves for maintenance and removal.

## **CORROSION PROTECTION**

After fabrication, the basin/valve box cover shall be slagged to remove weld splatter and flux. The steel shall then be cleaned with a hot alkaline cleaner to remove oil and grease. The complete unit will then be placed in a hot acid bath "pickling" solution to remove surface rust, mill scale and similar deposits for a pure metallic surface.

After "pickling," the steel cover shall be immersed into the molten zinc at approximately 8500 Fahrenheit to a minimum thickness coating of 2.0 ounces of zinc per square foot of surface area. Hot-dipped galvanizing will be done in accordance with American Hot-Dip Galvanizers Association (AHDGA) and A.S.T.M.-A-123 standards.

Painted steel covers requiring periodical painting and ongoing maintenance costs to the owner shall not be considered as "equal" to hot-dipped galvanizing.

## **PUMPS AND GUIDE RAILS**

### **OPERATING CONDITIONS**

Each pump shall be capable of handling a 3" spherical solid. The pump shall be non-overloading throughout the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.20. The performance curve submitted for approval shall state in addition to head and capacity performance, the pump efficiency, solid handling capacity and reflect motor service factor.

### **CONSTRUCTION**

The pump shall be a centrifugal, non-clog, solids handling and submersible, wastewater type as manufactured by Hydromatic Pump. The pump volute, motor and seal housing shall be of high quality gray cast iron ASTM A-48, Class 30. The pump discharge shall be fitted with a standard ASA 125 lb. flange, faced and drilled. All external-mating parts shall be flameproof joints with special labyrinth joint to prevent a flame or spark to travel to the media being pumped. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

### **POWER CORD**

The electrical power cord shall be STW-A water resistant 600V, 600 C., UL and CSA approved and applied dependent on amp draw for size. The pump shall be triple protected with a compression fitting and two epoxy potted areas at the power cord entry to the pump. A separation between the junction box area of the pump and the motor be it a stator lead, sealing gland or terminal board shall not be acceptable.

The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire at staggered intervals and each strand shall be individually separated.

This area of the cord cap shall then be filled with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction. The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire-to-wire connection, rather than a terminal board that allows for possible leaks.

The connection box wiring shall be separated from the motor housing wiring by stripping each lead down to bare wire, at staggered intervals and separating each strand. This area shall be filled with an epoxy compound potting. Fiberglass terminal boards which are subject to heat fatigue and cracking and which may lead to possible leaks shall not be acceptable. The cord cap assembly where bolted to the connection box assembly and the connection box assembly where bolted to the motor housing shall each be sealed with a Buna N Rubber O-ring on a beveled edge to assure proper sealing.

## **MOTOR**

The stator, rotor and bearings shall be mounted in sealed submersible type housing. The stator windings shall have Class F insulation (1550 C or 3110 F) and dielectric oil filled motor, NEMA B design. Winding thermal sensors shall provide further protection.

The pump and motor shall be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped. The pump shall not require cooling water jackets. Dependence upon or use of, water jackets for supplemental cooling shall not be acceptable.

Stators shall be securely held in place with a removable end ring and threaded fasteners so they may be easily removed in the field without the use of heat or a press. Stators held by a heat shrink fit shall not be acceptable. Stators must be capable of being repaired or rewound by local motor service station. Units that require service only by the factory shall not be acceptable. No special tools shall be required for pump and motor disassembly.

The pump shall be equipped with heat sensors. The heat sensor shall be a low resistance, by metal disc that is temperature sensitive. It shall be mounted directly on the stator windings and sized to open at 1200 C and automatically reset at 300 - 350 C differential. The sensors shall be connected in series with motor starter coil so that the starter shall be equipped with 3 leg overload heaters so all normal overloads are protected by the starter.

## **BEARINGS AND SHAFT**

An upper radial bearing and a lower thrust bearing shall be required. These shall be heavy-duty, single row ball bearings that are permanently lubricated by the dielectric



oil that fills the motor housing. Double row, sealed grease packed bearings shall not be acceptable. Bearings that require lubrication according to a prescribed schedule shall not be acceptable.

The shaft shall be machined from a solid 303 stainless steel forging and be a design which is of large diameter with minimum overhang to reduce shaft deflection and prolong bearing life.

### **SEALS**

The pump shall have two mechanical seals mounted in tandem with an oil chamber between the seals. John Crane type 21, BF1C1, seals shall be used with the rotating seal faces being carbon and the stationary seal faces to be ceramic. The lower seal shall be replaceable without disassembly of the seal chamber and without the use of special tools.

Pump-out vanes shall be present on the backside of the impeller to keep contaminants out of the seal area.

Units that require the use of tungsten-carbide seals or foreign manufactured seals shall not be acceptable. Seals shall be locally available.

The pump shall be equipped with a seal leak detection probe and warning system. This shall be designed to alert maintenance personnel of lower seal failure without having to take the unit out of service for inspection or requiring access for checking seal chamber oil level and consistency.

There shall be an electric probe or seal failure sensor installed in the seal chamber between the two tandem mechanical seals. If the lower seal fails, contaminants which enter the seal chamber shall be detected by the sensor and send a signal to operate the specified warning device. Units equipped with opposed mechanical seals shall not be acceptable.

### **IMPELLER**

The impeller shall be of the multi-vane or recessed non-clogging design and have pump-out vanes on the front and backside of the impeller to prevent grit and other materials from collecting in the seal area. Single vane design impellers which cannot be easily trimmed and which do not maintain balance with wear causing shaft deflections and reducing seal and bearing life are not acceptable.

Impellers shall be dynamically balanced. The tolerance values shall be listed below according to the

International Standard Organization Grade 6.3 for rotors in rigid frames. The tolerance is to be split equally between the two balance planes that are the two impeller shrouds.

<b>RPM</b>	<b>TOLERANCE</b>
3500	.01 in. - oz./lb. of impeller weight
1750	.02 in. - oz./lb. of impeller weight
1150	.026 in. - oz./lb. of impeller weight
870	.03 in. - oz./lb. of impeller weight

The impeller shall be slip fit to a tapered shaft and key driven. A 300 series stainless steel washer and impeller bolt shall be used to fasten the impeller to the shaft. Straight end shafts and/or threaded shafts for attachment of the impeller shall not be acceptable.

### **DISCHARGE BASE ELBOW**

A discharge base elbow designed to mount directly on the sump floor shall be supplied for each pump. It shall have a standard 125 lb. flange faced and drilled on the outlet side with a machined mating inlet connection. The design shall be such that the pump to discharge connection is made without the need for any nuts, bolts or gaskets. The base elbow shall also anchor and align the two guide rails.

### **SEALING FLANGE WITH RAIL GUIDE**

A sealing flange/rail guide bracket shall be mounted on each pump discharge. It shall have a machined mating flange that matches the base elbow discharge connection. Sealing of this discharge connection shall be accomplished by a simple linear downward motion of the pump culminating with the entire weight of the pumping unit supported entirely by the base elbow.

### **UPPER GUIDE BRACKET**

The upper guide bracket shall align and support the two guide rails at the top of the sump. It shall bolt directly to the hatch frame and incorporate an expandable rubber grommet for secure rail installation.

### **GUIDE RAILS**

The dual rail guide design keeps the pump in proper alignment with the stationary discharge piping. These rails shall be galvanized steel pipe which bolt directly to the base elbow and to the access frame at the top of the wet well by an upper guide rail bracket.

### **LIFTING CHAIN**

The submersible pump station shall be provided with a Chain Grabber Lifting System. Each pump shall be equipped with a 2 ft. section of 5/16" 300 series stainless steel and a 3/8" nylon guide rope. A Chain Grabber link shall be included for use with the pump hoisting system. The Chain Grabber link shall be made of alloy steel and sized to fit the lifting chain. The lifting chain and the Chain Grabber shall be rated for a minimum working load limit of 500 lbs.

## **ELECTRICAL** **CONTROL PANEL**

The electrical controls shall be mounted in a NEMA 4 steel enclosure. Enclosure door will be hinged and equipped with closure latching hardware. The enclosure will bear a U.L. Label of an enclosure manufacturer. The control enclosure shall be provided with a removable back panel for mounting the control components.

For the safety and convenience of the operator, "screw-cover" removable panel doors will not be acceptable as an equal to a hinged cover. All components shall be securely mounted in the enclosure, components labeled and wires numbered to indicate functions and provide a means of tracing.

All components will bear a U.L. Label. All wiring, workmanship and schematics will comply with standards set forth by the National Electric Code (NEC) and Underwriter's Laboratory (U.L.).

The controls shall bear an Underwriter's Laboratory (U.L.) Label for "ENCLOSED INDUSTRIAL CONTROL PANEL" before being shipped from the manufacturer or other approved recognized testing laboratory to insure a standard of quality for the protection of the operator.

## **WIRING/CONDUIT**

All control or accessory wiring entering, exiting or to the door controls shall terminate on a terminal block mounted on the back panel, except for main service breakers or approved disconnect and motor power wires which shall be wired continuously between the motor and the starter overload block. All current carrying wire and conduit shall be properly sized in accordance with N.E.C.

## **MOTOR PROTECTION**

Each pump motor shall be protected by a properly sized combination circuit breaker and motor starter.

The circuit breakers will be molded case, air break type, sized in accordance with N.E.C. for the proper amperage and sealed by the manufacturer after calibration to prevent tampering. All circuit breakers shall bear U.L. Listing.

The magnetic motor starter is to be of open across-the-line type bearing the U.L. Label for motor control devices and properly sized by motor horsepower. All auxiliary contacts shall be accessible from the front. Starter contacts shall be accessible from the front. Starter contacts shall be provided with an arc chute to extend the life of the contacts.

All motor starters shall be equipped with under-voltage release and ambient compensated overload protection. The overload relays will be provided with manual reset and overload trip "test" features. Final trip setting shall be made on start-up to actual field operating conditions using a field adjustable auto-calibration dial.

Melting alloy heaters that cannot be calibrated to field conditions are not acceptable. An overload reset button will be mounted through the door to permit resetting of the starter overload without opening the panel door.

### **LEVEL CONTROL SYSTEM** **SUBMERSIBLE TRANSDUCER**

The level sensor for controlling the sewage level in the wet well shall consist of a submersible bonded strain gauge inconel pressure-sensing element encased in a watertight case with a 316 stainless steel FM approved explosion resistant body. It shall be supplied with 40 feet of shielded and vented cable, able to withstand 200 pounds of tensile strength, allowing the transducer to be suspended directly by its own cable. The cable shall be connected directly to the signal input terminals on the main control panel with no intervening junction box or calibration device required. The device shall require a 10-30 VDC low voltage power supply. The output shall be a standard 4-20 MA DC control signal, factory set proportional to the selected fixed range of the transducer and shall have an accuracy of <0.5% across the temperature band with a one year stability of <0.2% FSO.

The transducer shall be provided with a sealed bag for compensating for atmospheric changes and to insure that no external moisture reaches the internal electronics. The nose of the transducer shall be threaded onto a protective device consisting of the top half of a 316 stainless steel chemical seal with a welded 316 stainless steel diaphragm. The fill fluid shall be glycerin. Eight stainless steel spacers and bolts and nuts hold a stand-off ring in position so as to fully protect the diaphragm from the debris commonly encountered in a lift station. This device shall be the **Birdcage** level sensor as assembled and fabricated by Blue Ribbon Industrial Components Corp or approved equal.

### **CONTROLLER**

The set point controller shall be in a 1/4 DIN enclosure (92mm x 92mm) containing the electronics designed to run two pumps, controlling separately both the “on” level and the “off” level of each and in addition, containing two alarms which can be programmed to be Hi-Hi, Lo-Lo or Hi-Lo. The controller shall be able to select whether to alternate or not alternate the pumps as well as to select whether the pumps shall pump “in” or pump “out”. Memory shall be non-volatile requiring no batteries to retain settings on power loss. The controller shall contain 2 each SPDT relays rated at 10A @ 240VAC and 20A @ 120VAC resistive plus 2 each SPST alarms rate at 3A @ 240VAC resistive or 1.5AJJ @ 240VAC inductive. Loop power supply shall be isolated 24VDC @ 50mA regulated. Accuracy shall be +/- .25% span +/- least significant digit. Front panel shall be rated PI66 (Type Nema 4X). The controller shall be approved by UL E83723 and CE. Operating range shall be -10 to 44 degrees C (-14 to 175 degrees F). Optional 4-20 mA retransmission shall be available. The controller shall be the **Bulldog Set Point Controller** as manufactured by Blue Ribbon Industrial Components or approved equal.

## **MERCURY FLOATS**

A high level and low level backup mercury float backup will also be supplied with the lift station. Each mercury level sensor is field adjustable from above.

Each level sensor shall be connected to an intrinsically safe relay module located in the motor control panel. The module shall have a single channel with a 10A form C contact and shall be approved for Class 1, Division 1, Group D, locations.

## **SEQUENCING**

On a rising wet well level, the controls will start selected LEAD pump and a continuing rise shall in turn start the SECOND pump. The pumps shall operate individually or in parallel as required, pumping down to the selected stop levels in the reverse order of the starting sequence. An elapsed time meter will be provided for each pump to allow the operator to balance pump use and wear.

## **ALARMS**

Each pumps discharge will be equipped with a proximity switch mounted on the check valve. The proximity switch will be tied to a time delay in the control panel for monitoring pump flow. If the check valve does not open after a predetermined amount of time the pump will be shut down and removed from the control sequence. This is done to prevent the pump from running dry and damaging the pump or pump mechanical seal with excessive heat build up. The alarm will need to be reset before the pump can return to service.

In addition, each pump will indicate a seal failure or thermal overload condition.

A separate mercury level sensor will be provided to indicate high water conditions in the wet well. This float will also have intrinsically safe protection provided by the previously described module.

Each of the above listed alarm conditions will be provided with an individual indicating light mounted on the face of the control panel, a 120 vac common alarm output with "push to silence feature" and "dry" telemetry contacts for interfacing with the autodialer.

## **PIPING**

### **DUCTILE IRON PIPE**

All pipe and fittings shall be ductile iron pipe. Each pump discharge pipe shall end in a flanged connection. A common flanged discharge line shall leave the valve box.

### **PLUG VALVE**

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with ANSI B16.1 including facing, drilling and flange thickness.

Valve bodies shall be ASTM A-126 Class B cast iron. Valves 3" and larger shall be furnished with a welded-in overlay seat of not less than 90% nickel in accordance with AWWA C507-73. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of ASTM A-536 Grade 65-45-12 in compliance with AWWA C-504 Section 2.2. The plugs shall be of one-piece construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

### **CHECK VALVES**

Check valves shall be all iron body, bronze mounted, full opening swing type. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a "full flow" through the valve equal to the nominal pipe diameter. They shall comply with AWWA standard C-508 latest revision. Check valves shall be rated at 175-PSI water working pressure, 350-PSI hydrostatic test for structural soundness (2" through 12"). Seat tightness at rated working pressure shall be in accordance with values shown in AWWA standard C-500 for gate valves and fully conform to AWWA C-508. Check valves shall be furnished with 125# ANSI flanged ends.

All cast iron shall conform to ASTM-A-126 Class B. Castings shall be clean and sound without defects that will impair their service. No plugging or welding of such defects will be allowed. Check valve clappers shall be all bronze in sizes 2" through 4" and cast iron in 6" through 30". Seat facing for all sizes shall be neoprene rubber. The neoprene rubber ring shall be securely held in position by a bronze clamp ring mechanically attached to clapper assembly. Hinge pins shall be 18-8 Stainless Steel rotating in bronze plugs.

Check valves shall be constructed to permit top entry for complete removal of internal components without removing the valve from the line. Glands shall be O-rings in valves sizes 2" through 12". When specified for application conditions of rapid flow reversal, vertical installation or back flushing the check valves shall be equipped with adjustable outside manual operation lever and spring to accomplish faster closing and to minimize slamming effect. Bosses shall be provided on check valves that may be tapped for draining or used for by-pass.

### **ACCESSORIES**

#### **TRANSFER SWITCH**

Station shall be equipped with a NEMA 3R transfer switch with high visibility handle and nameplate with on/off/on indication, clear line terminal shields, generous wiring room that meets or exceeds NEC wire bending space requirements, side hinges and rated for 60/700 C wire connection through 200 amps.

#### **GENERATOR RECEPTACLE**

Stations equipped with a transfer switch will also come equipped with a user specified heavy duty circuit breaking receptacle. Receptacle shall be mounted on the outside of

the pump station and will be equipped with a weatherproof spring door. Receptacle shall be Crouse Hinds Arktite model AR1041.

### **SPARE PARTS**

One complete replacement pump shaft seal and case O-ring gaskets shall be supplied with each station.

### **AUTOMATIC DIALER**

The Automatic dialing alarm system shall be microprocessor based and have the capability to monitor from 4 to 48 dry contact or digital inputs, 8 to 48 analog inputs or energize from 4 to 24 relays in any combination. Each of these inputs shall monitor a set of dry contacts (normally closed or normally open). In addition, the dialer shall monitor the AC power and battery voltage continuously. Upon detecting an alarm on any of its inputs, a low battery condition or detecting loss of its AC power, the dialer shall begin dialing the first of up to 16 user-programmed telephone numbers. The dialer shall speak user recorded messages to the called party describing its location and the alarm conditions that are present. The dialer shall then verbally request that an acknowledgement be given. If the acknowledgment is not given during the call, it shall hang up, wait from 1 to 3600 seconds and then dial the next number on the list. If a successful acknowledgment occurs, the dialer will give a sign-off message, hang up and then wait a user-programmed period of time for the alarm conditions to be corrected. If the period of time elapses and the alarm condition(s) still exist, the dialer shall begin the alarm notification cycle again. The dialer shall have relay outputs that shall remain energized as long as long as the dialer has any unacknowledged alarms. This output shall be available to allow for wiring to an external horn, buzzer, light or other local alarm device. Alternatively, the user shall be able to program the dialer to allow remote activation of this relay from a telephone keypad. The Auto dialer will be a **Dialog Elite** as manufactured by Antx.

### **EQUIPMENT MANUFACTURER**

In these specifications and accompanying drawings specific equipment and materials are deemed most suitable for the service anticipated.

## **FINISHING AND TESTING**

### **TESTING**

The completed pump station shall be given an operational test of all equipment at the factory to check for excessive vibration, leaks in all piping and seals, correct operation of the automatic control system and all auxiliary equipment. The automatic control will be adjusted to start and stop the pumps at approximately the levels required by the job conditions. All irregularities will be corrected at the factory.

After delivery and installation the completed system shall be given thorough performance testing by certified manufacturer representatives to ensure that all components and systems meet design and performance criteria. City shall have sole discretion as to adequacy of performance testing and acceptance by City.

## **WARRANTY**

The manufacturer of the lift station shall warrant it to be of quality construction, free from defects in material and factory workmanship.

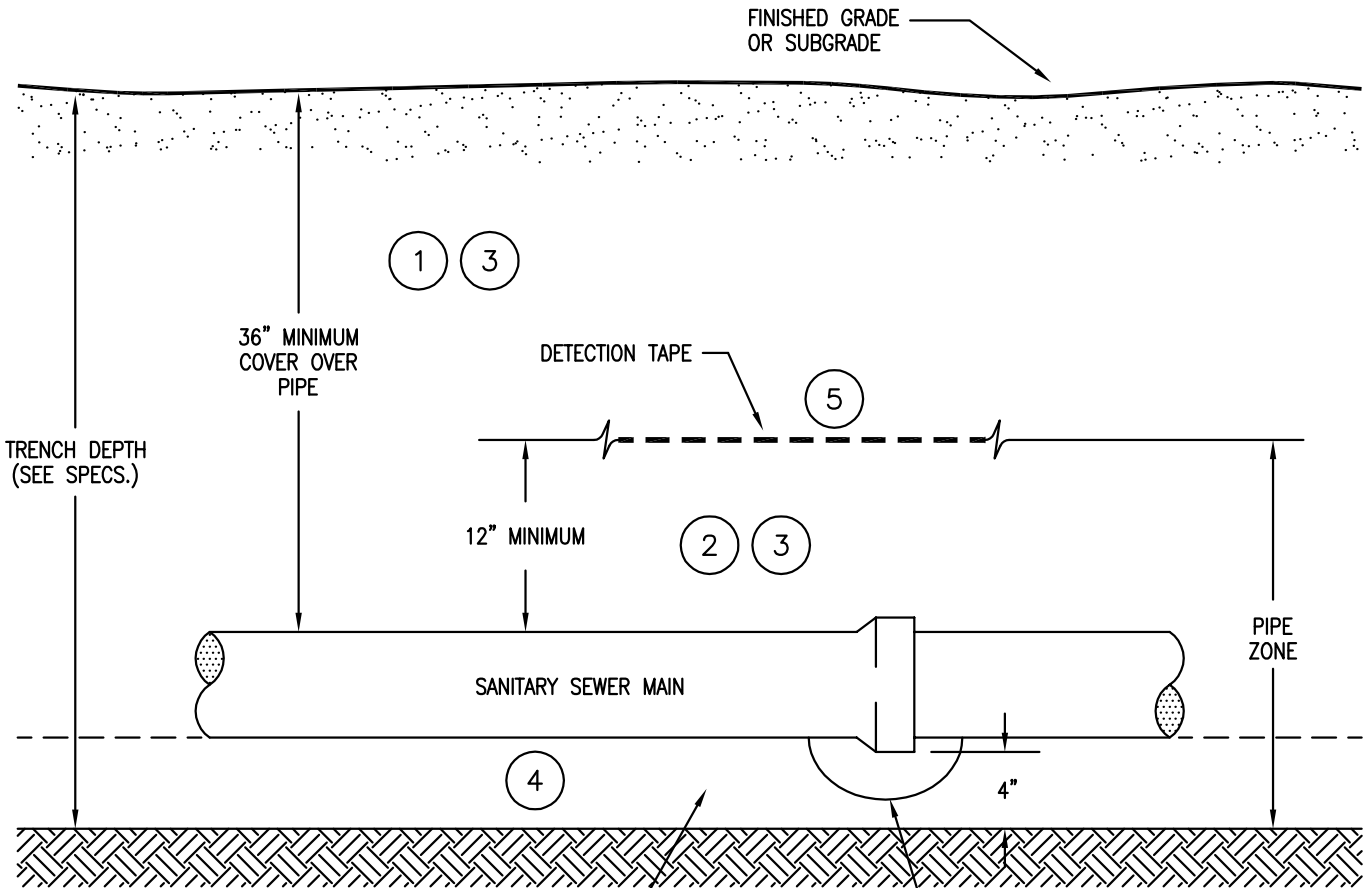
The pump station chamber and cover shall be warranted for a period of five (5) years to be free from defects and resistant to rust, corrosion or physical failures occurring in normal service, when installed in accordance with the manufacturer's recommendations.

The interior equipment; pumps, motors and apparatus shall be warranted for a period of one (1) year excepting only those items normally consumed in service such as light bulbs, oil, grease, packing, gaskets and O-rings. The pump station manufacturer shall be solely responsible for the pump station and all related components. Warranties and guarantees by the suppliers of various components used to manufacture the pump station will not be valid.

Major components that fail to perform as specified by the engineers (or as represented by the manufacturer) or prove defective in service during the warranty period shall be replaced, repaired or satisfactorily modified by the manufacturer without cost of parts or labor to the owner. After start-up service has been performed, labor to replace accessory items such as blowers, heaters or other accessible and easily serviced parts shall be the responsibility of the owner. Such components, parts or repairs determined by the manufacturer to have failed because of defects in workmanship or materials will be replaced or repaired F.O.B. factory or other designated location.

This does not imply that the manufacturer assumes liability for consequential damages or contingent liabilities arising from the failure of any product (or parts thereof) to operate properly be it caused by, resulting from or arising out of defect, replacement, delay in delivery or otherwise.

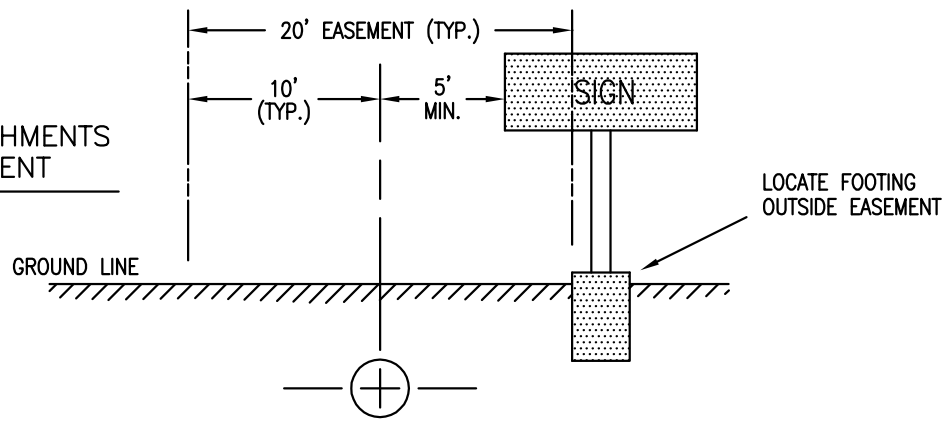





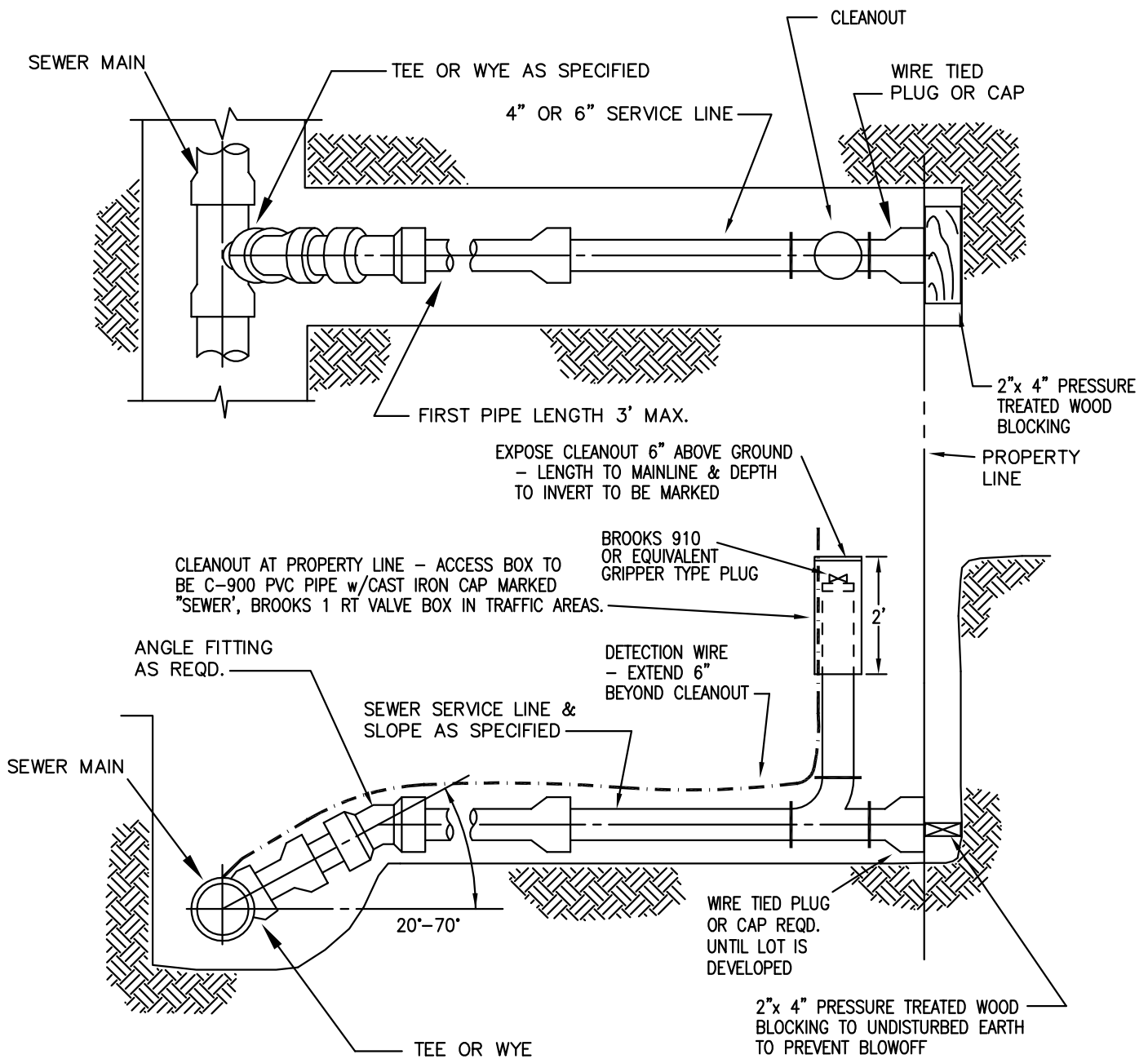
**NOTES:**

1. CLASS "A" BACKFILL COMPACTED TO 95% OF AASHTO T-99.
2. SPECIFIED PIPE ZONE MATERIAL ABOVE, AROUND, AND BELOW PIPE SHALL BE COMPACTED TO 95% OF AASHTO T-99.
3. THE ENGINEER MAY REQUIRE THIS ZONE TO BE WATER SETTLED TO PROVE THE INTEGRITY OF THE BACKFILL.
4. PIPE BEDDING SHALL MEET THE REQUIREMENTS OF CHAPTER V- TRENCHES, SECTION 405.45. PIPE BEDDING SHALL BE MECHANICALLY COMPACTED TO 95% OF MAXIMUM AS DETERMINED BY AASHTO T-99.
5. DETECTION TAPE TO BE LOCATED AT TOP OF PIPE ZONE, 12" ABOVE THE PIPE.

**ALLOWABLE ENCROACHMENTS  
IN UTILITY EASEMENT**



DATE : 1/31/07	SCALE : NONE	PROFILE OF TYPICAL SANITARY SEWER MAIN INSTALLATION	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 3-1	APPROVED BY : MDW			



**NOTE:**

MINIMUM SLOPE TO BE 1/4" PER FOOT OR AS APPROVED BY THE CITY ENGINEER.


PROVIDE RUBBER RING ADAPTOR FOR CONNECTION TO A CONCRETE, CLAY, ASBESTOS CEMENT, OR P.V.C. MAIN LINE.

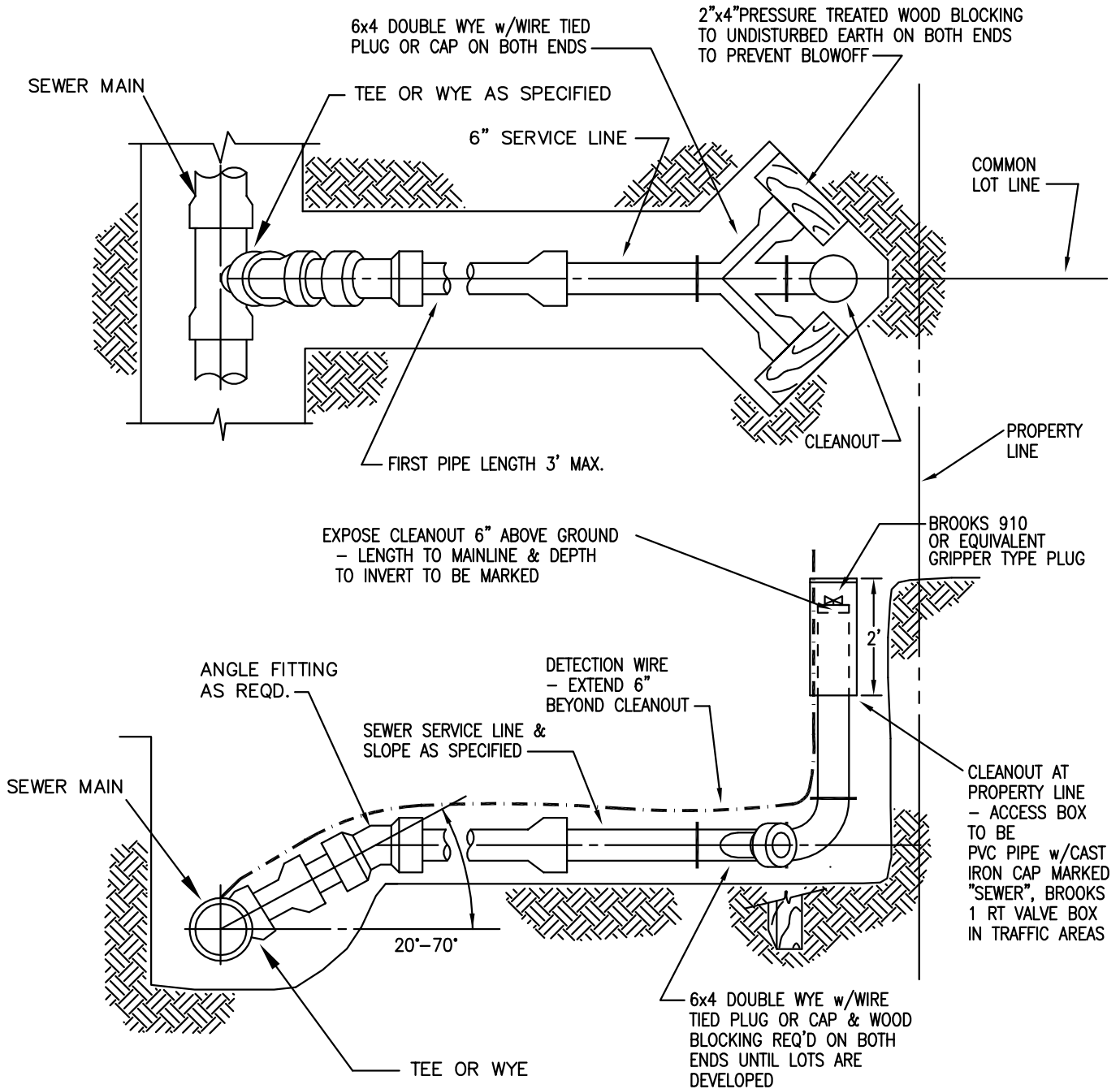
WHERE NO TEE IS PROVIDED, A SERVICE SADDLE OF PROPER SIZE SHALL BE INSTALLED UNDER THE SUPERVISION OF THE CITY.

ALL TRENCH BACKFILL TO CONFORM TO CITY OF PRINEVILLE STANDARDS AND SPECIFICATIONS FOR SEWER MAIN. MINIMUM SERVICE TRENCH WIDTH IS 24".

ALL SERVICE LINES SHALL END WITH A CLEANOUT AT THE PROPERTY LINE.

SEWER SERVICE LINES SHALL NOT HAVE LESS THAN 3.0' OF COVER UNDER ROADWAY AND 2.0' OF COVER TO NATURAL GROUND IN THE RIGHT OF WAY.

DATE :	SCALE :	TYPICAL SEWER SERVICE & CLEANOUT	<b>CITY OF PRINEVILLE</b> <hr/> <b>PUBLIC WORKS DEPARTMENT</b>	
4/01/08	NONE			
DRAWING NO.	APPROVED BY :			
3-2	MDW			



**NOTE:**

MINIMUM SLOPE TO BE 1/4" PER FOOT OR AS APPROVED BY THE CITY ENGINEER.


PROVIDE RUBBER RING ADAPTOR FOR CONNECTION TO A CONCRETE, CLAY, ASBESTOS CEMENT, OR P.V.C. MAIN LINE.

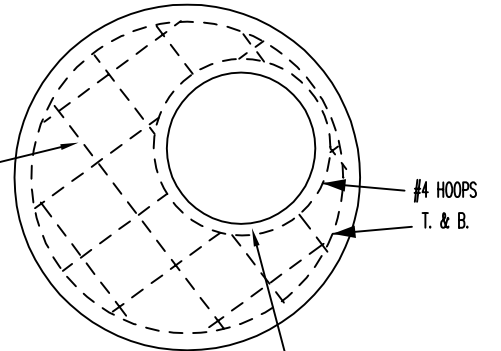
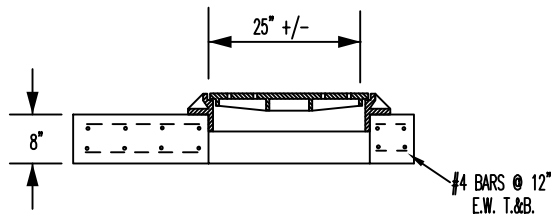
WHERE NO TEE IS PROVIDED, A SERVICE SADDLE OF PROPER SIZE SHALL BE INSTALLED UNDER THE SUPERVISION OF THE CITY.

ALL TRENCH BACKFILL TO CONFORM TO CITY OF PRINEVILLE STANDARDS AND SPECIFICATIONS FOR SEWER MAIN. MINIMUM SERVICE TRENCH WIDTH IS 24".

ALL SERVICE LINES SHALL END WITH A CLEANOUT AT THE PROPERTY LINE.

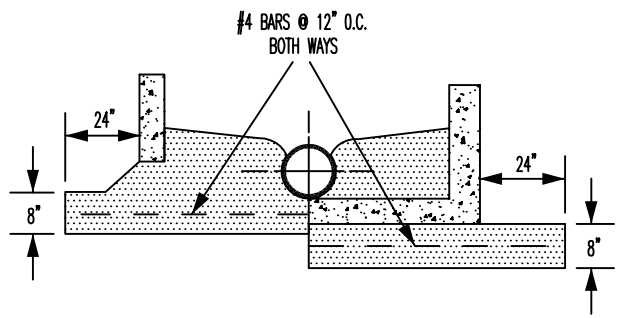
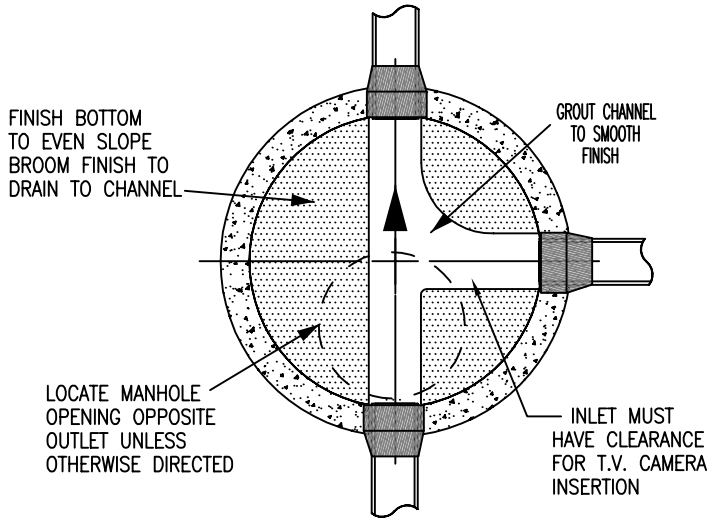
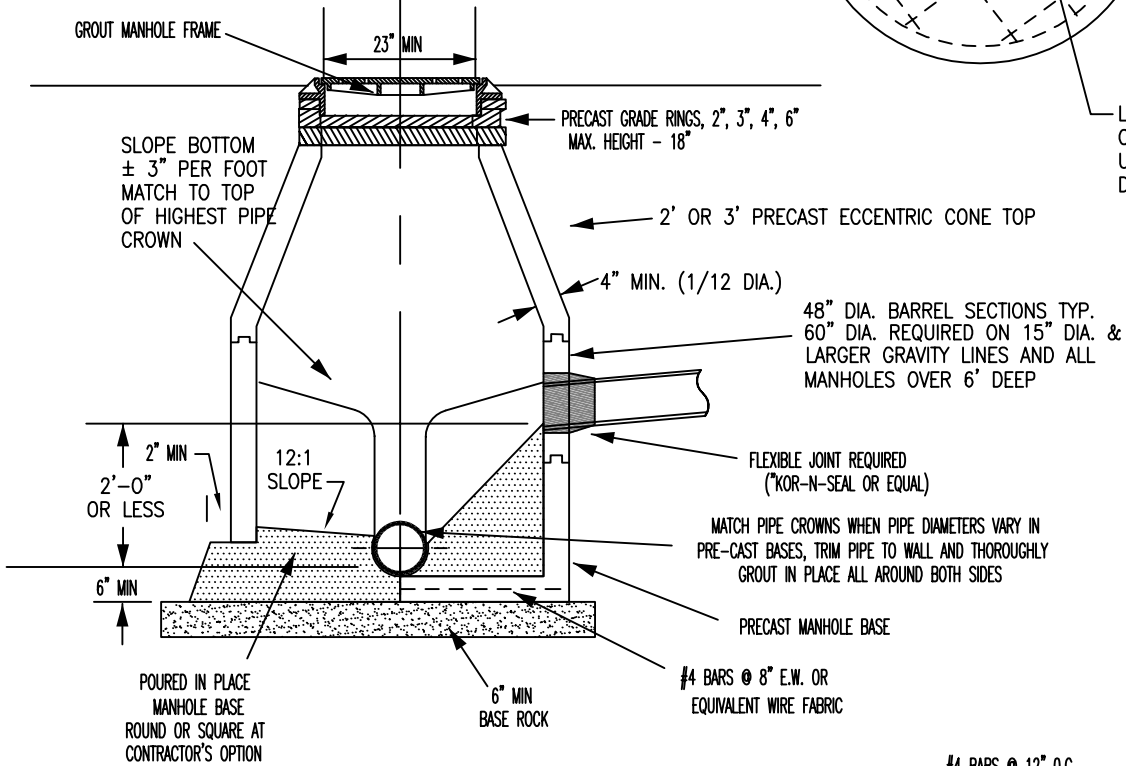
SEWER SERVICE LINES SHALL NOT HAVE LESS THAN 3.0' OF COVER UNDER ROADWAY AND 2.0' OF COVER TO NATURAL GROUND IN THE RIGHT OF WAY.

DATE :	SCALE :	TYPICAL SEWER SERVICE & CLEANOUT FOR DUPLEX OR COMMON LOT LINE	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
4/01/08	NONE			
DRAWING NO.	APPROVED BY :			
3-3	MDW			



NOTE: A 3-POINT MECHANICAL ADJUSTMENT SYSTEM SUCH AS RADS OR APPROVED EQUAL SHALL BE USED TO ADJUST MANHOLE FRAME AND COVER TO FINISH GRADE


FLAT TOP

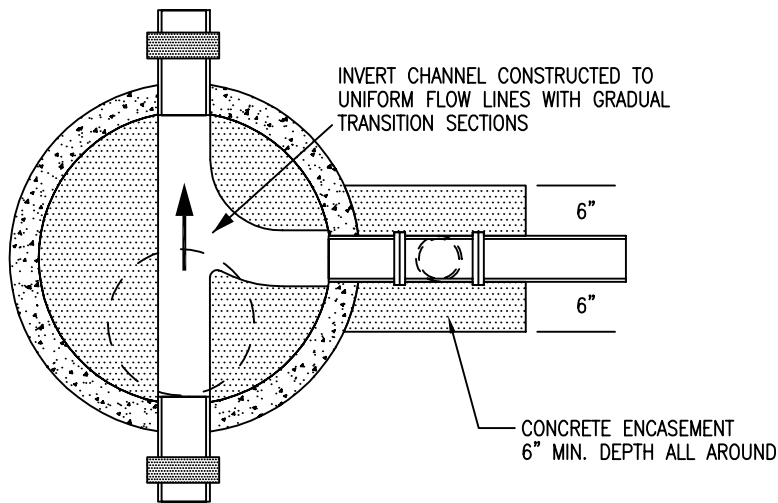
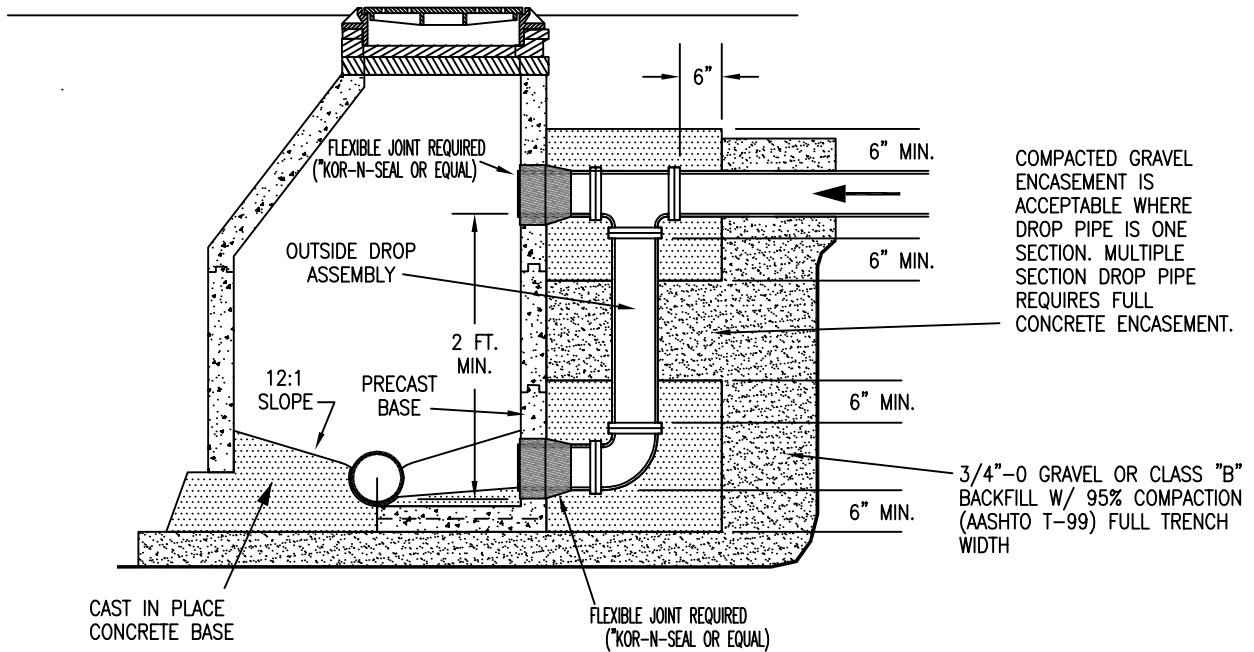


SPREAD FOOTING (FOR FILL AREAS)  
 \*BOYANCY CALCULATIONS REQUIRED FOR APPLICATIONS WHERE GROUNDWATER IS ENCOUNTERED OR EXPECTED

NOTE:  
 ALL MANHOLES SHALL BE WRAPPED TO ENABLE VACUUM TESTING  
 POLYPROPYLENE STEPS SHALL BE INCORPORATED INTO ALL MANHOLES


STANDARD MANHOLE SHOWING INSIDE DROP

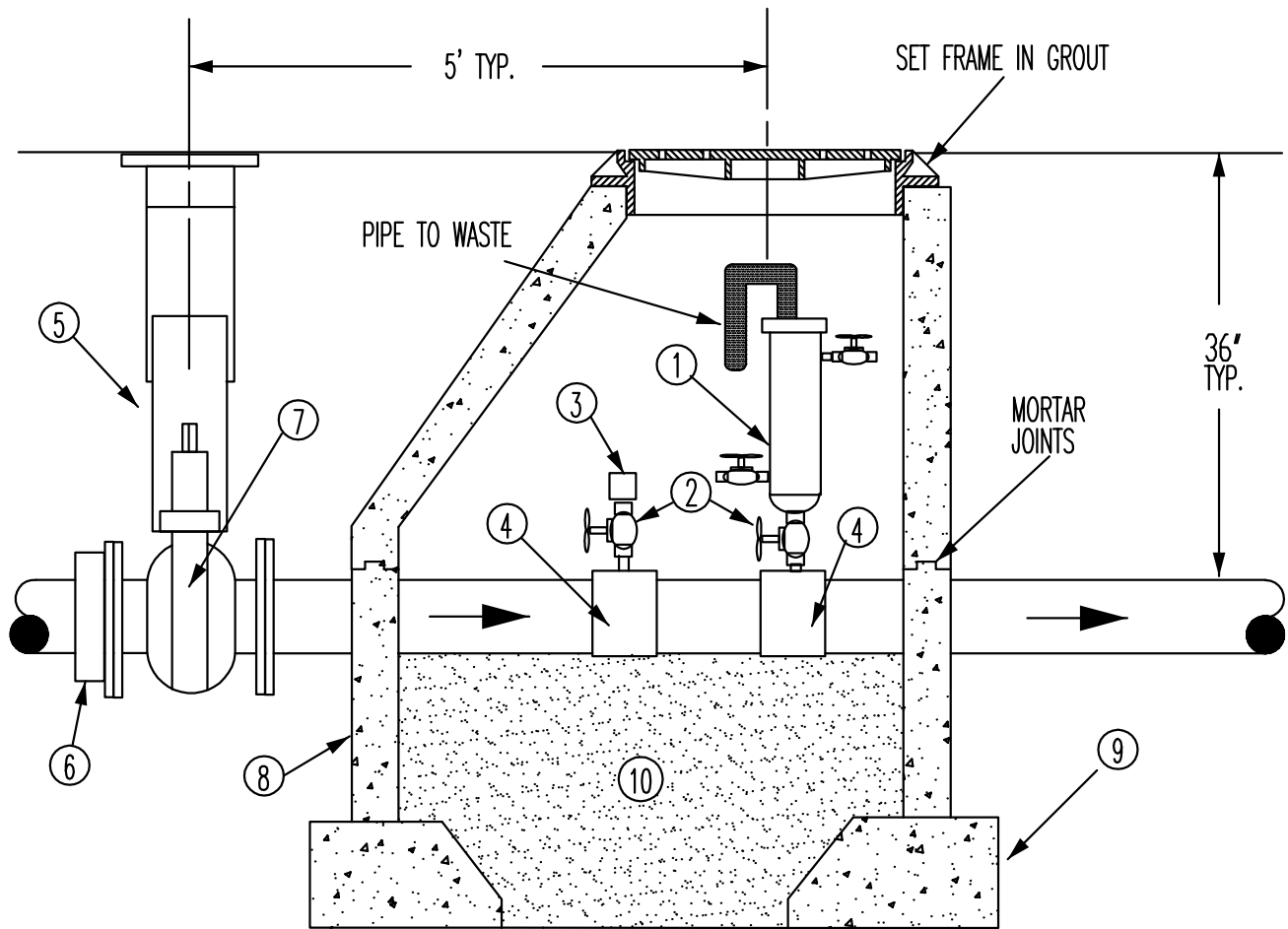
DATE : 3/25/13	SCALE : NONE	STANDARD SEWER MANHOLE	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 3-4	APPROVED BY : EAK			



**NOTE:**


ALL MANHOLES SHALL BE WRAPPED TO ENABLE VACUUM TESTING  
 POLYPROPYLENE STEPS SHALL BE INCORPORATED INTO ALL  
 MANHOLES

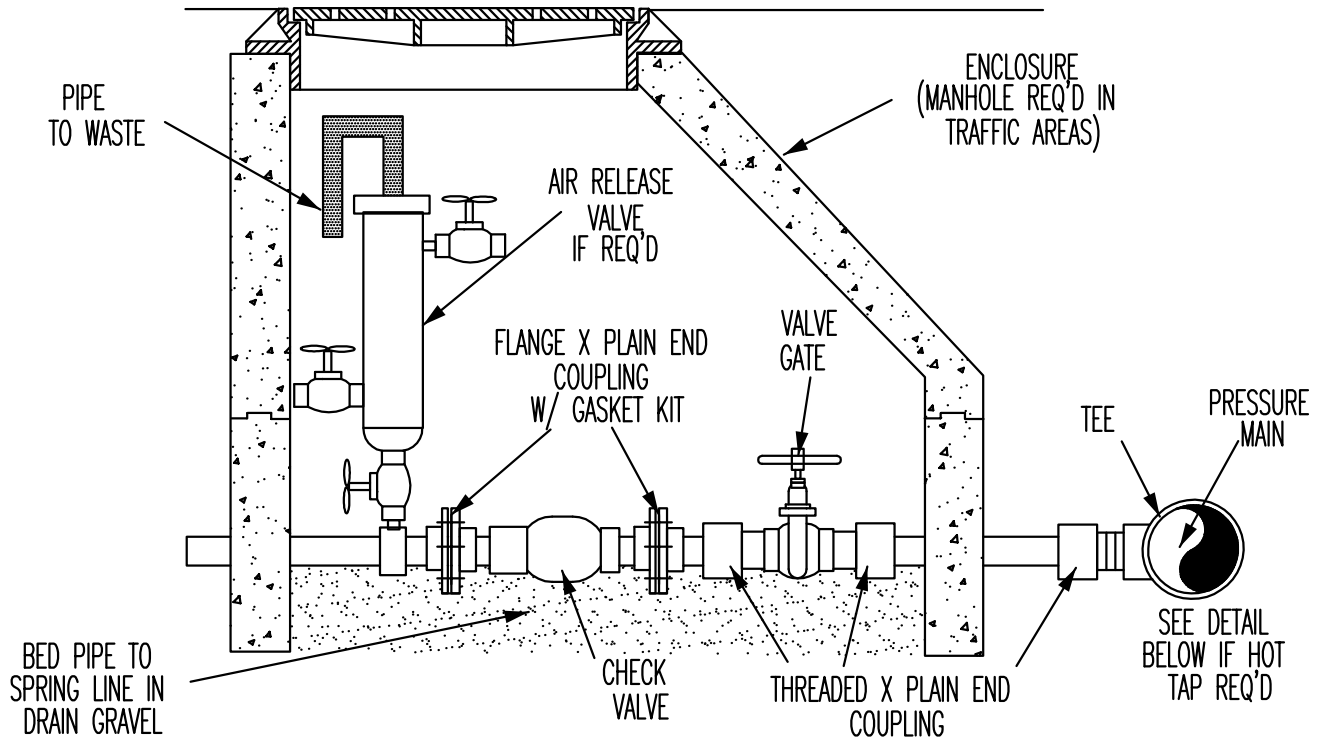
DATE : 3/25/13	SCALE : NONE	STANDARD OUTSIDE DROP SEWER MANHOLE	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 3-5	APPROVED BY : EAK			



NOTES

1. APCO SHORT BODY AIR AND VACUUM VALVE (SERIES 400 SAVV) OR APPROVED EQUAL
2. 2" GATE VALVE WITH HAND WHEEL TO MEET REQUIREMENTS OF SECTION 1150
3. THREADED CAP
4. 2" TEE OR 2" SADDLE TEE AS APPROVED FOR PRESSURE APPLICATIONS
5. ADJUSTABLE VALVE BOX WITH COVER. TOP MARKED "SEWER"
6. FLANGE BY SLIP FITTING TO MEET REQUIREMENTS OF SECTION 1150
7. RESILIENT SEAT GATE VALVE TO MEET REQUIREMENTS OF SECTION 1150
8. 48" DIA. (MINIMUM) MANHOLE. PRECAST SECTIONS TO CONFORM TO THE REQUIREMENTS OF ASTM C-478
9. ANGULAR SHAPED CONCRETE BASE. CAST IN PLACE.
10. 3/4"-1/2" WASHED GRAVEL FOR DRAINAGE

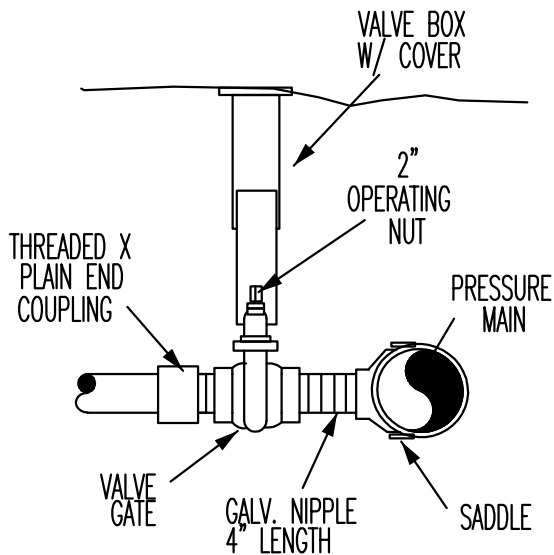
DATE :	SCALE :	PRESSURE SANITARY SEWER MANHOLE	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
3-6	MDW			




**TYPICAL INSTALLATION IN TRAFFIC AREA**  
 SHOWN WITH WHEEL VALVE IN ENCLOSURE  
 HOT TAP WILL REQUIRE VALVE TO BE OUTSIDE IN VALVE BOX

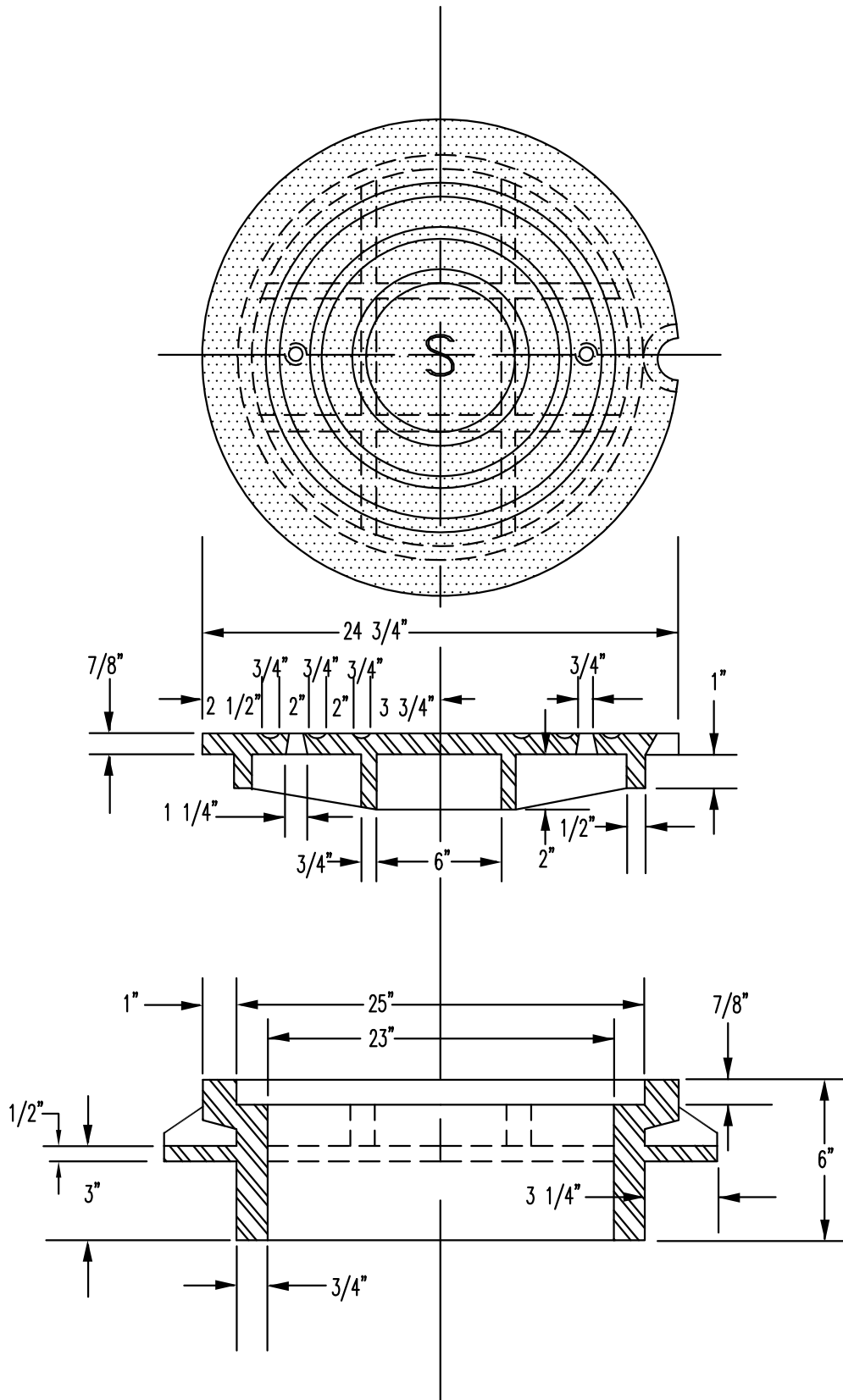
**NOTE**

- 1) SEE SECTION 445 PIPE AND FITTINGS OF THE CITY OF PRINEVILLE STANDARD SPECIFICATIONS FOR MATERIAL SPECIFICATIONS.
- 2) PVC CHECK VALVE ALLOWED ONLY ON INSTALLATIONS WITH TDH (TOTAL DYNAMIC HEAD) BELOW 25'.
- 3) MANHOLE ENCLOSURE TO BE USED IN TRAFFIC ACCESSIBLE AREAS. METER ENCLOSURE WITH METAL LID MAY BE USED OUTSIDE TRAFFIC AREAS.
- 4) GATE VALVE LOCATED OUTSIDE MANHOLE REQUIRES A VALVE BOX AND COVER TO BE INSTALLED.
- 5) TAPPING BITS USED FOR SEWER TAPS SHALL NOT BE USED FOR WATER TAPS.



**HOT TAP DETAIL**

DATE : 1/31/07	SCALE : NONE	PRESSURE SEWER SERVICE CONNECTIONS	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 3-7	APPROVED BY : MDW			



DATE :  
1/31/07

DRAWING NO.  
3-8

SCALE :  
NONE

APPROVED BY :  
MDW

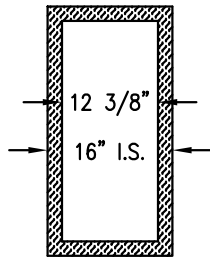
STANDARD SEWER  
MANHOLE RING & COVER

CITY OF PRINEVILLE

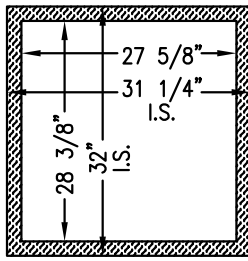
PUBLIC WORKS DEPARTMENT



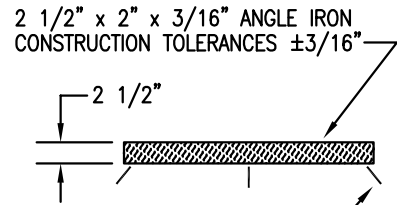




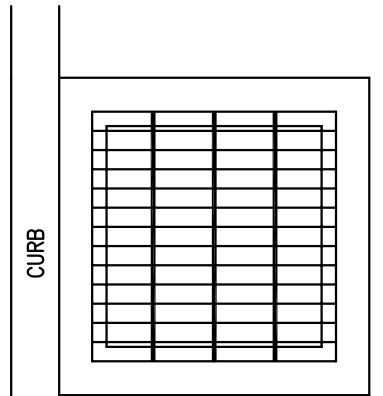
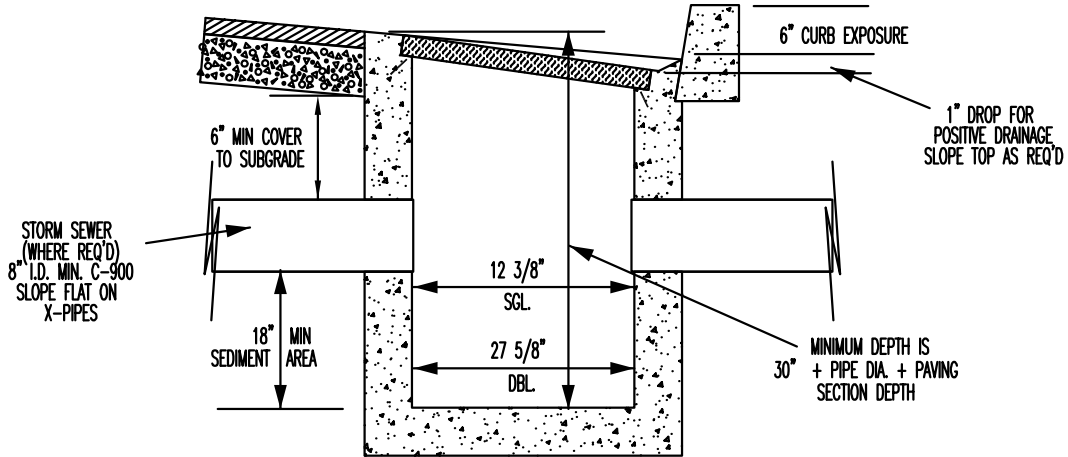
SINGLE FRAME



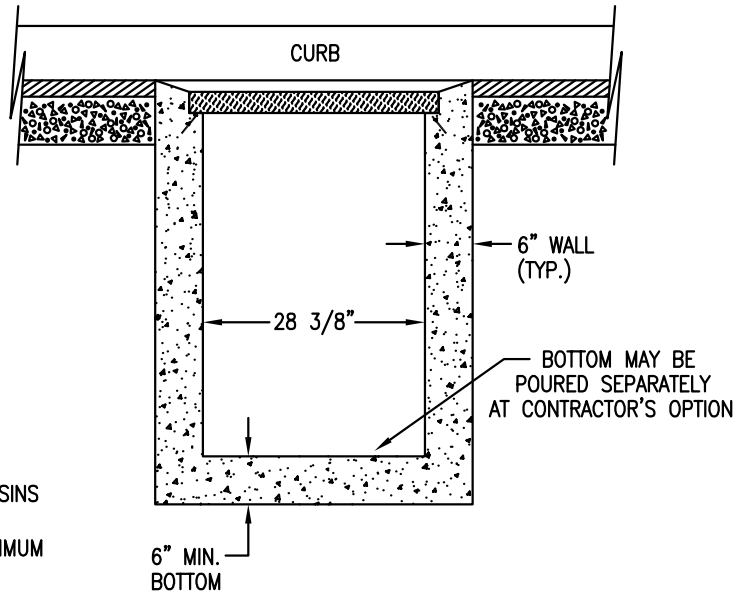
DOUBLE FRAME



1/2" DIA. ANCHOR BOLTS OR EQUIVALENT WELDED TO FRAME. 8 REQ'D - SINGLE, 16 REQ'D - DOUBLE.



DETAIL SHOWING GRATE ORIENTATION TO CURB LINE



NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL CATCH BASINS TO BE DOUBLE CATCH BASINS.
2. BACKFILL TO BE COMPACTED TO 95% OF OPTIMUM AASHTO T-99.
3. DURING CONSTRUCTION, 2" PLANKING SHALL BE USED TO COVER CATCH BASIN UNTIL GRATES ARE INSTALLED.

DATE :  
1/31/07

SCALE :  
NONE

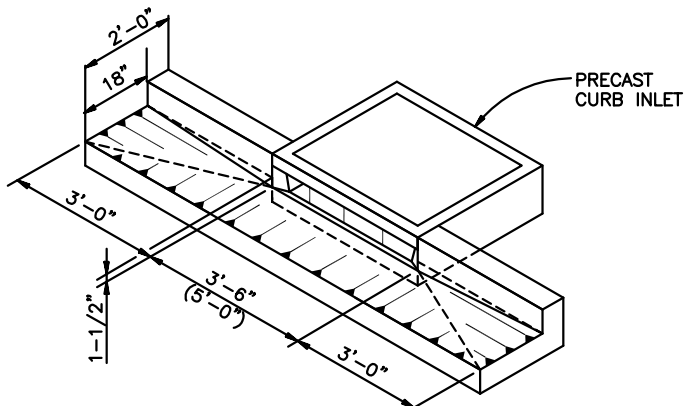
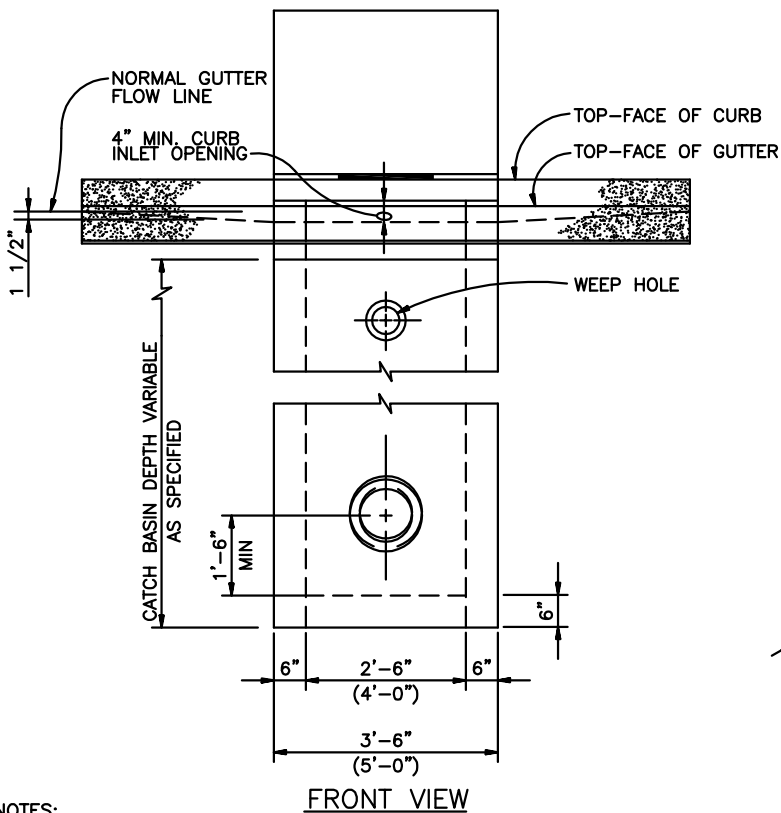
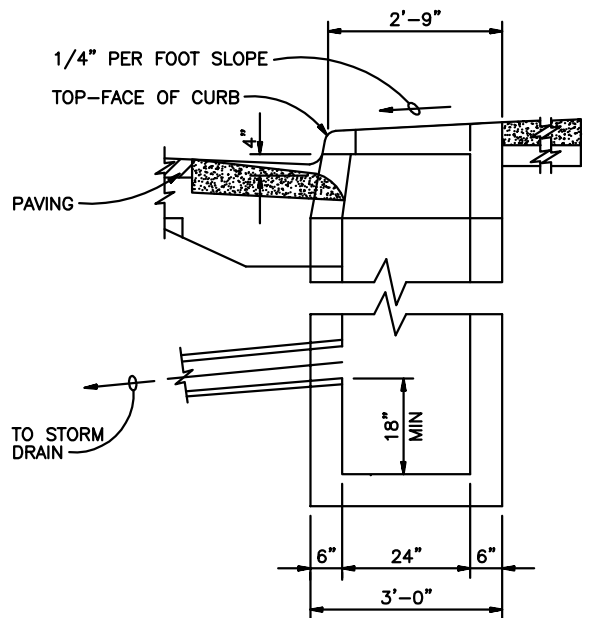
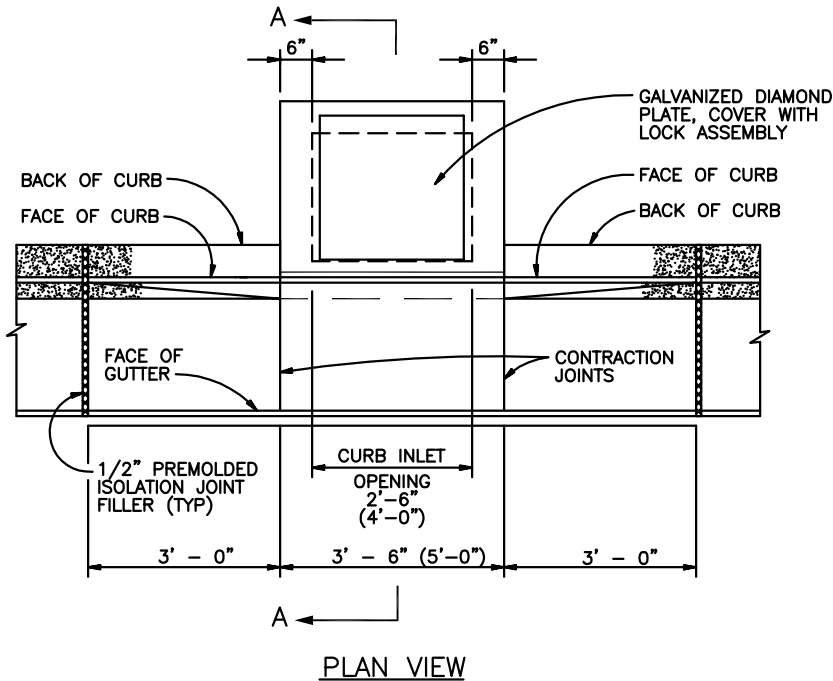
DRAWING NO.  
3-9

APPROVED BY :  
MDW

STANDARD CATCH BASIN  
DOUBLE & SINGLE

CITY OF PRINEVILLE  
PUBLIC WORKS DEPARTMENT





**NOTES:**

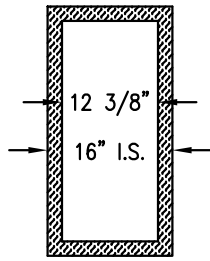
1. ALL FABRICATED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
2. CONCRETE SHALL BE CLASS 3000.
3. FOR  $\geq 4\%$  GRADES AND IN SAG CURVES, USE STD. PRECAST INLET WITH 4'-0" OPENING OR TWO 2'-6" OPENING INLETS.
4. CURB INLET BASE MAY BE PRECAST OR CAST-IN-PLACE.

DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
3-10	MDW

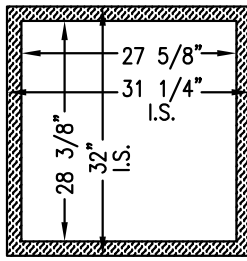
SIDEWALK CATCH BASIN  
&  
CURB INLET

**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT



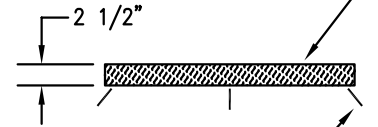


SINGLE FRAME

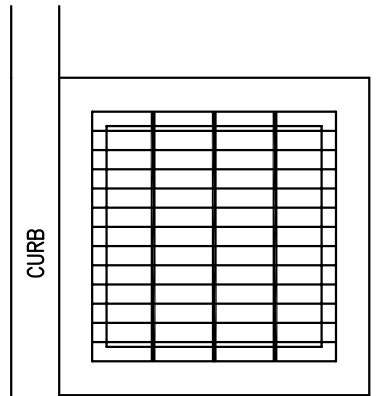
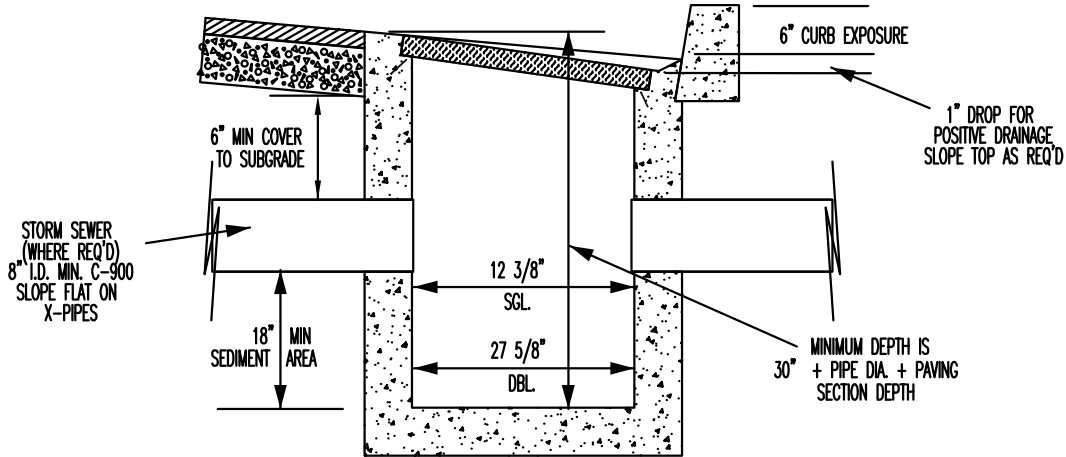


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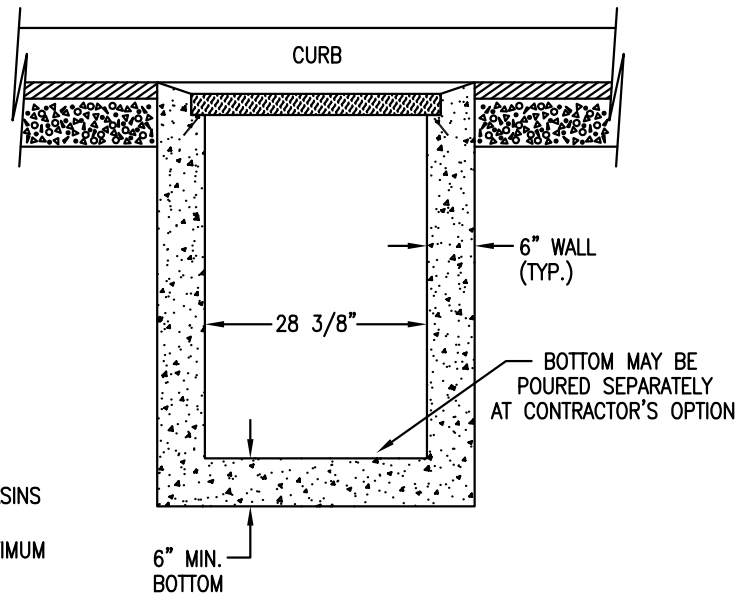
2 1/2" x 2" x 3/16" ANGLE IRON  
CONSTRUCTION TOLERANCES ±3/16"



1/2" DIA. ANCHOR BOLTS  
OR EQUIVALENT WELDED TO  
FRAME. 8 REQ'D - SINGLE,  
16 REQ'D - DOUBLE.



DETAIL SHOWING GRATE  
ORIENTATION TO CURB LINE



**NOTES:**

1. UNLESS OTHERWISE SPECIFIED, ALL CATCH BASINS TO BE DOUBLE CATCH BASINS.
2. BACKFILL TO BE COMPACTED TO 95% OF OPTIMUM AASHTO T-99.
3. DURING CONSTRUCTION, 2" PLANKING SHALL BE USED TO COVER CATCH BASIN UNTIL GRATES ARE INSTALLED.

DATE :  
1/31/07

SCALE :  
NONE

DRAWING NO.  
3-11

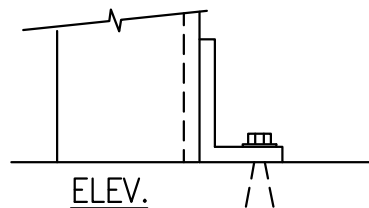
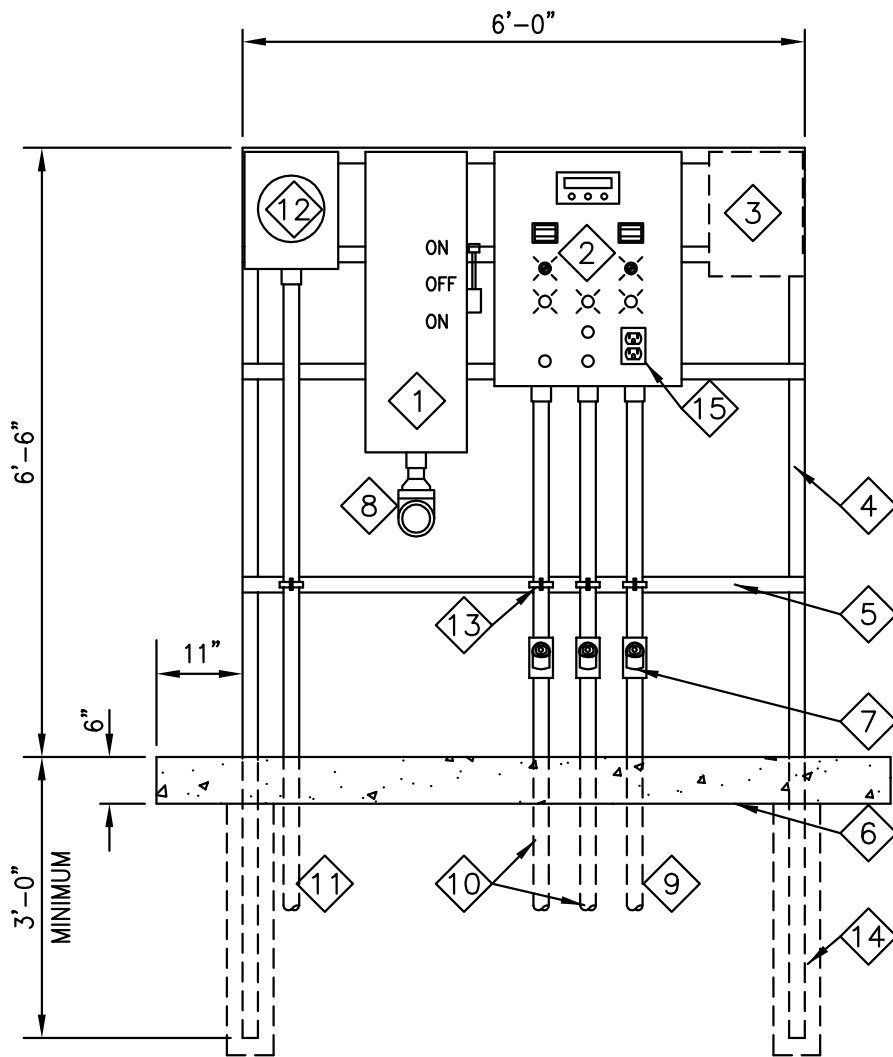
APPROVED BY :  
MDW

STANDARD CATCH BASIN  
DOUBLE & SINGLE

CITY OF PRINEVILLE

PUBLIC WORKS DEPARTMENT





ELEV.

PLAN

A DETAIL

1

N.T.S.

ELEV.

PLAN

B DETAIL

1

N.T.S.

- 1 NEMA 3R SERVICE RATED FUSED TRANSFER SWITCH, SIZED & FUSED TO LIFT STATION LOAD & N.E.C. STANDARDS. SWITCH MUST HAVE PAD LOCK PROVISIONS.
- 2 NEMA 3R MOTOR CONTROL CENTER WITH DEAD FRONT CONTROLS MOUNTED ON INNER SWING OUT DOOR. OUT DOOR. CABINET MUST HAVE PAD LOCK PROVISIONS.
- 3 SPACE FURNISHED FOR POSSIBLE TELEMETRY EQUIPMENT
- 4 VERTICAL POST SHALL BE GALVANIZED UNI-STRUT P5501, 2" GALVANIZED STEEL PIPE, 3" GALVANIZED ANGLE IRON OR APPROVED EQUAL.
- 5 HORIZONTAL SUPPORTS SHALL BE GALVANIZED UNI-STRUT P3000 OR APPROVED EQUAL.
- 6 CONTROL PEDESTAL SHALL BE SUPPORTED BY CONCRETE BASE DIMENSIONS AS NOTED. THE CONTROL PEDESTAL MAY ALSO BE MOUNTED TO A CONCRETE OR STEEL WET WELL COVER WITH MINOR PEDESTAL FABRICATION MODIFICATIONS. (SEE DETAILS A\1 & B\1)
- 7 GAS TIGHT SEAL OFF FITTINGS POTTED AFTER WIRE INSTALLATION.
- 8 GENERATOR RECEPTICAL SHALL BE 100 AMP. CROUSE HINES ARKITE AR1041 OR APPROVED EQUAL.
- 9 P.V.C. CONDUIT TO WET WELL FOR LEVEL SENSOR SYSTEM TO BE SIZED PER WIRE SIZE & N.E.C. STANDARDS.
- 10 P.V.C. CONDUIT TO WET WELL FOR PUMP MOTOR & SENSOR CORDS SIZED PER WIRE SIZE & N.E.C. STANDARDS.
- 11 INCOMING UNDERGROUND POWER SERVICE IN P.V.C. CONDUIT SIZED PER LOAD & N.E.C. STANDARDS.
- 12 METER BASE SUPPLY SHALL BE BASED ON VOLTAGE, PHASE, AMPERAGE & LOCAL POWER SUPPLIER STANDARDS.
- 13 SECURE CONDUITS TO HORIZONTAL SUPPORTS WITH APPROVED STRUT PIPE CLAMPS.
- 14 USE 6" CYLINDRICAL FORM TUBE
- 15 120v GFI CONVENIENCE OUTLET

DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
3-12	MDW

STANDARD SEWER  
LIFT STATION CONTROL  
PEDESTAL DETAIL

CITY OF PRINEVILLE

PUBLIC WORKS DEPARTMENT



# Chapter VIII

## WATER FACILITIES

### **TRENCHES**

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Refer to City of Prineville Standard Specifications Chapter V- Trenches.

### **1140 POTABLE WATER PIPE AND FITTINGS**

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#### **DESCRIPTION**

##### **1140.00 SCOPE**

This section covers the work necessary for furnishing and installing water pipe and fittings normally used for water distribution systems.

A true and accurate record of the location of the lines, valves, services, connections and appurtenances shall be kept by the Contractor and verified by the City. Such record shall be furnished to the City upon completion of the work.

#### **MATERIALS**

##### **1140.10 GENERAL**

The Contractor shall furnish material certifications. At the sole discretion of the city, the contractor and/or material supplier shall provide certified manufacture date of any PVC pipe with visible cracking, discoloration and/or fading due to ultraviolet light exposure. Pipe which is one year or older may be rejected. City also reserves the right to reject pipe material for cause regardless of age of pipe.

Where more than one type of material is specified, the type required will be designated on the plans. Material used on pump station, meter vault or control valve applications shall be approved by the City Engineer on a case by case basis. All appurtenances shall be of same manufacture. All material shall be manufactured or produced in the United States of America.

##### **C-900 PVC WATER PIPE**

PVC water pipe shall meet the requirements of AWWA C-900 (6-inch through 16-inch diameter) for PVC pressure pipe. Joints (couplings) shall be fitted with elastomeric gaskets conforming to the requirements of ASTM F477. Assembled pipe (bell end joints or couplings) shall meet the performance requirements of ASTM D3139. Pipe shall have a minimum pressure class of 150 psi (DR 18). See Design Standards for size requirements. Water pipe larger than 16-inch shall be ductile iron.

## **DUCTILE IRON PIPE**

Ductile iron pipe shall be centrifugally cast in metal molds and cement lined in accordance with AWWA specifications C151-76.

Tyton joint pipe shall be used except where conditions require mechanical type joints as shown and approved on plans. Care shall be taken in handling the pipe. No material shall be shipped inside coated pipe. Pipe shall meet the following specifications:

1. 6" through 12" I.D., Class 52 Ductile, AWWA Specification C151-76 ductile iron pipe.
2. 14" I.D. and larger, Class 50 Ductile, AWWA Specification C151-76 ductile iron pipe.

## **PIPE FITTINGS**

### **Buried**

Buried ductile or cast iron, long bodied fittings with mechanical joints or flanged, shall meet ASA specification 21.10, 250 psi working pressure, with glands, bolts and gaskets in accordance with ASA 21.11. Mechanical joints shall be so designed to completely accommodate star brace bolts, if required. A non-toxic vegetable soap lubricant shall be supplied in sufficient quantities for installing the pipe furnished. Lube must be approved by the City Engineer or representative, prior to use.

### **Above Ground**

Above ground ductile or cast iron fittings with threaded flanged joints shall meet appropriate ASA specifications, 250 psi working pressure, bolts and gaskets in accordance with appropriate ASA specification.

### **Couplings**

Couplings 6" to 12" diameter must be 12" long; 14" diameter or larger must be the long style. All couplings must be standard Pacific States (Union Foundry) or U.S. Pipe M.J. cast or ductile sleeve. Appurtenances shall be of same manufacture.

### **Plugs- Caps**

Plugs shall be of tyton joint type with internal set screws. Caps shall be of M.J. type.

## **SPECIAL COATINGS AND LININGS**

For special conditions, other types of coating and linings may be available. Such special coatings and linings shall be approved by the City Engineer or representative, prior to the time of purchase.

## **PIPE INSULATION**

Bridge crossing shall be ductile iron and shall be insulated with a urethane or fiberglass pipe wrap system specifically designed for pipe insulation purposes, minimum 2-inch thickness, CPR Upjohn-Trymer bun material, Mansville Micro-Lok or equivalent, covered with an aluminum roll jacketing, 0.016-inch minimum thickness, Pabco Surefit Aluminum Jacketing, Mansville Micro-Lok or equivalent.

Insulation shall have a maximum conductivity ("K") of 0.40. Insulation at pipe supports shall be calcium silicate or other approved rigid insulation adequate to support the pipe. Jacketing joints shall be sealed within silicone caulk. Pipe supports and hangars shall be plated or hot dipped galvanized after fabrication.

### **TAPPING SLEEVE**

The tapping sleeves shall be constructed of heavy welded steel. The outlet flange shall be AWWA 207, Class D, ANSI 150 lb. drilling, recessed for tapping sleeve. The body finish shall be a fusion-applied epoxy coating. Gasket shall have a resistance to water, oil and hydrocarbon fluids. Bolts shall be corrosion resistant, stainless steel 18-8 type 304. A ¾" test plug shall be installed for testing prior to drilling pipe and air tested to 75 psi. A minimum service rating of 150 psi shall be required. Tapping sleeves shall be a JCM 412 or a Ford FTSC tapping sleeve.

### **DETECTION WIRE**

Detection wire shall be blue clad 18 gauge UF bury solid copper wire.

### **DETECTION TAPE**

Detection tape shall be a blue metallic tape manufactured by Allen System or an approved equal.

### **CONCRETE FOR THRUST BLOCKING**

Concrete for thrust blocking and hydrant support shall conform to ASTM C 94, Alternate 2 and shall be proportioned to obtain a 28-day compressive strength of 2500 pounds per square inch or approved equal. "Sacrete" type products are not allowed.

### **1140.11 HANDLING PIPE AND FITTINGS**

The method of corrosion protection shall be as specified when required.

All material shall be handled with care to avoid damage. Whether moved by hand, skid-ways or hoists, material shall not be dropped, bumped or allowed to impact.

The Contractor shall provide safe storage for material until it has been incorporated into the completed project. Storage shall be on skids off of the ground. It shall not be strung on job more than one shift. The interior of all pipe, couplings, rings, fittings and other accessories shall be kept free from dirt and other foreign matter at all times. Valves and hydrants shall be drained and stored in such a manner that will protect them from damage by freezing. Material that is supplied by the Contractor and rejected at the point of delivery because of defects or damage shall be replaced by the Contractor. Material damaged subsequent to acceptance by the Engineer shall be replaced by the Contractor.

### **1140.12 CUTTING PIPE**

#### **Rubber Gasket Joint Pipe**

When rubber gasket joint pipe is cut in the field, it shall be cut as recommended by the pipe manufacturer or when approved by the Inspector, the pipe may be cut cold in

field by the use of rolling pipe cutters or Carborundum cutting wheel. The cut end shall be reconditioned so that it may be used for the next joint. On rubber gasket joint pipe, the outside of the cut shall be ground back or dressed as recommended by the pipe manufacturer and approved by the Inspector.

### **Flame Cutting**

The flame cutting of pipe by means of an oxyacetylene torch or electric arc will not be allowed.

### **PVC Pipe Cutting**

All cuts of pipe shall be made by proper pipe cutting tools designed specifically for that purpose. Cuts shall be made in accordance with the manufacturer's recommendations.

## **CONSTRUCTION**

### **1140.40 TRENCH WORK**

#### **1140.40(a) DEWATERING TRENCHES**

Care should be taken to clean joints and to keep them free of water during construction. Whenever water is excluded from the interior of the pipe, adequate backfill shall be deposited on the pipe to prevent floating. In the event of any flotation occurring, the pipe so affected shall be removed from the trench, replaced and relayed at the Contractor's expense.

Groundwater in the area may not be above the invert of the pipe. No pipe or fitting shall be lowered into a trench containing water. Water shall be pumped from wet trenches. The trenches shall be kept dry until the joints have been completed and the open ends of the main have been closed with watertight plugs or bulkheads. The plug or bulkhead shall not be removed unless the trench is dry. Every effort shall be made to keep the trench dry at all times.

### **1140.41 LAYING PIPE**

Each section of the pipe and each fitting shall be thoroughly cleaned before it is lowered into the trench. Cleaning of each pipe or fitting shall be accomplished by swabbing out, brushing out, blowing out with compressed air and washing to remove all foreign matter.

All pipe shall be laid to and maintained at the lines and grades required by the Engineer. Fittings, valves, air vents and hydrants shall be installed at the required locations with joints centered, spigots home and valve and hydrant stems plumb. No deviation shall be made from the required line and grade without approval from the Engineer or representative.

Pipe shall be laid for firm support by pipe bedding and pipe zone material. Bedding shall be excavated for bells to provide continuous support along length of pipe.



Pipe shall be plugged or capped to maintain a water-tight seal on the end of lines during construction. This will take place at the end of the day or whenever the trench is to be left open for an extended period of time. This is to minimize the possibility of contamination from surface runoff from rainfall or construction watering.

Each section of pipe shall be lowered into the trench by means of slings or a type approved by the Engineer and the pipe main assembled piece by piece with the pipe barrel bearing evenly along its length on the bottom of the trench. Where necessary to properly locate valves and fittings, the pipe shall be neatly and squarely cut to length.

Fittings shall be set in place to accurate line and grade and centered. In pipes lines not encased in concrete, all cast iron fittings consisting of elbows 11-¼ degree or more shall have thrust blocks. Collars and rods or thrust blocks shall be used on all cast iron plugs and at the other locations as indicated on the drawings.

Minimum cover above pipe shall be 30". There may be sections of the line where it is desirable to lay to a uniform slope to avoid high points in the line. Where the profile drawings indicate this condition, the line shall be laid to uniform slope.

Pipe shall be laid accurately in conformity with the prescribed lines and grades. Gradual curvature, both horizontal and vertical, may be obtained by deflecting the pipe, but in no case shall such deflection exceed the manufacturer's stated allowable deflection angle. Pipe fittings shall be used for deflections in excess of that stated above. Bends shall have thrust blocks. The following is an example of recommended maximum deflection radius for PW Pipe C900 "Twinseal" class 150 pipe, 20 foot lengths:

<u>Pipe Diameter</u>	<u>Average O.D.</u>	<u>Manufacturers' Recommendation</u>
6"	6.90"	350'
8"	9.05"	450'
10"	11.10"	550'
12"	13.20"	650'

After each length of pipe has been laid to line and grade, there shall be no movement of the pipe to disturb its alignment.

#### **1140.42 JOINTING PIPE**

##### **Setting Valves and Fittings**

Valves, fittings, plugs and caps shall be set and jointed in pipe in the manner described within these specifications or by the approval of the City Engineer or City representative.

##### **Coupling Pipe**

Pipe with rubber gasket type joints shall be laid and jointed in strict accordance with the manufacturer's recommendations and shall be in accordance with the requirements

of these Specifications. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer. Rubber gaskets cannot be reused.

**MAXIMUM DEFLECTION OF RUBBER GASKET JOINT DUCTILE IRON PIPE**

Based on 18-Foot Pipe Length

SIZE OF PIPE	BEND IN ONE JOINT ANGLE A	DEFLECTION IN INCHES D	APPROX. RADIUS IN FEET OF CURVE PRODUCED BY SUCCESSION OF JOINTS
6" fire hydrant	2° 00'	8"	450'
6" through 12"	2° 00'	8"	450'
14" through 24"	1° 30'	6"	650'

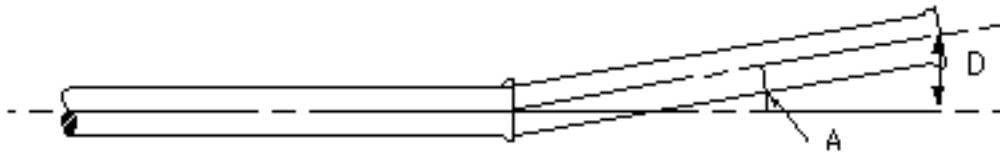


Fig. 1- Pipe Deflection

C-900 PVC Water Pipe shall meet the requirements of AWWA C-900 specification or C-905 specification "Polyvinyl Chloride (PVC) Pressure Pipe." Joints shall be elastomeric gasketed or, with special approval of the City Engineer, solvent cement welded and shall conform to the requirements of ASTM D3139. Gaskets shall conform to the requirements of ASTM F477 and ASTM D1869. Unless otherwise specified, pipe shall be Class 150 and have a minimum DR of 18. Minimum size for mainline shall be 8". Hydrant lines may be reduced to 6" for runs under 100' in length unless located in industrial subdivisions where all hydrant lines shall be 8".

The threads of the screwed joints shall be thoroughly cleaned by wire-brushing, swabbing or other approved method. Approved joint compound shall be applied to the threads prior to making the joint. Joints shall be water tight at test pressures before acceptance.

**Installation of Mechanical and Flexible Couplings**

Mechanical and flexible couplings shall be provided where indicated on the plans and shall be installed in accordance with the manufacturer's recommendations as approved by the Inspector. Before couplings are installed, the end of the pipes shall be thoroughly cleaned of oil, scale, rust and dirt for a distance of at least 8 inches back from the end to provide a seat for the coupling gaskets.

Care shall be taken that the gaskets are wiped clean before they are installed. If necessary, they may be lubricated with pipe lubricant for installation on the pipe ends.

Coupling bolts shall be tightened progressively, drawings up bolts on opposite sides a little at a time until all bolts have a uniform tightness.

Worker tightening bolts shall be equipped with torque-limiting wrenches or other approved wrench type. Mechanical and flexible couplings shall be tested when the tests on the adjacent pipe are made. In the event the couplings do not pass the requirements of the leakage tests, the couplings shall be removed and reassembled on the pipe and the leakage test shall be repeated.

**MAXIMUM DEFLECTION OF MECHANICAL JOINT PIPE**  
**Safe Deflection for 150 PSI<sup>1</sup>**  
**Based on 18-Foot Pipe Length**

(see fig. 1)

SIZE OF PIPE	BEND IN ONE JOINT ANGLE A	DEFLECTION IN INCHES D	APPROX. RADIUS IN FEET OF CURVE PRODUCED BY SUCCESSION OF JOINTS
8-12"	2° 00'	8"	450'
14-16"	1° 45'	7"	590'
18-20"	1° 30'	5"	685'
24"	1°	4"	1000'

(1) For pressures above 150 PSI, reduce the tabulated deflection for 10% for each additional 150 PSI.

**Jointing Mechanical Joint Valves, Fittings and Appurtenances**

Mechanical joint valves, fittings and appurtenances vary slightly with different manufacturers and the particular fittings furnished shall be installed in accordance with the manufacturer's recommendations as approved by the Inspector. All appurtenances to fittings and/or valves shall be of the same manufacture and material.

In general, the procedure shall be as herein after specified. The ends of the valves and fittings shall be cleaned of all dirt, mud and foreign matter by washing with water and scrubbing vigorously with a wire brush. The gland and gasket shall be slipped on the plain end. If necessary, the gasket may be lubricated with soapy water to facilitate sliding in place. The end of the pipe shall then be guided carefully into the bell of the fitting. The spigot shall be centrally located in the bell, the gasket placed in position and the bolt inserted in the holes. All appurtenances to fittings and/or valves shall be of the same manufacture and material.

Torque ranges to be applied to cast iron bolts, shall be as follows:

Diameter of Bolt - In.	Torque Range Ft. - Lbs.
-	40 - 60
¾	60 - 90

1	70 - 100
1¼	90 - 120

When tightening bolts, the gland should be brought up toward the flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This shall be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side and last, the remaining bolts. This cycle should be repeated until all bolts are within the required range of torques. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning.

**Flanged Ductile Iron Pipe and Fittings**

Flanged ductile iron pipe and cast iron fittings shall be furnished and installed as shown on the plans. The flanges shall be thoroughly cleaned by washing or other approved method. The pipe shall be carefully aligned and faces brought together so that the bolt holes are lined up. The gaskets shall be inserted and bolts slipped in place. Bolts shall be drawn up gradually so that the tension is equal and the faces of the flanges are in close contact over the entire area.

Flanges, where required, shall be steel ring flanged, conforming to A.W.W.A. C207, Class D. Flanges shall be faced and drilled 125 pound or 250 pound U.S.A.S. as directed. Steel blind flanges for use on welded steel pipe shall be as shown.

*Flanged Jointing Materials:* All nuts, bolts and gaskets required for jointing the flanged pipe, fittings and appurtenances shall meet the requirements of A.W.W.A. C207. Gaskets shall be full-cut with holes to pass the bolts, of rubber or neoprene composition, e inch thick.

Prior to joining flanged valves the flange faces shall be thoroughly cleaned. After cleaning, insert the gasket and tighten the nuts progressively and uniformly. If flanges leak under pressure, loosen the nuts, reset or replace the gasket, retighten the nuts and retest the joint. Joints must be watertight at test pressures before acceptance.

**Jointing Rubber Gasket Joint Pipe**

Pipe with rubber gasket type joint shall be laid and jointed in strict accordance with the manufacturer's recommendations as approved by the Inspector and in accordance with the requirements of the Special Specifications (if applicable). The Contractor shall provide all special tools and devices such as special jacks, chokers and similar items required for the installation.

Lubricant for the pipe gaskets shall be of the type recommended by the pipe manufacturer and no substitute will be permitted under any circumstances.

**Tie Rodding/Mega Lugs**

Tie rods/mega lugs and/or thrust blocks are required on all mechanical joint branch valves and fittings. If used, rods shall be of such a diameter and strength of material to

ensure that no separation of valves or fittings from the mainline shall occur under test pressures. Rods shall be of a sufficient length to ensure that all threads on any tightened nut are in contact and seated with rod threads.

Additional mainline tie rods/mega lugs may be required in certain instances at the discretion of the City Engineer or City representative.

Note: Tie rods may be used in lieu of thrust blocks as an alternative means only with Engineer's approval (See 1140.44). Tie rods may be used to compliment the thrust blocking and proper installation. Mega Lugs shall be installed as per manufacturer recommendations and engineer's approval.

**1140.44 CONCRETE THRUST BLOCKS**  
**THRUST BLOCKING**

**Anchorage: Limiting Pipe Diameter and Degree of Bend**

On all pipe lines 6 inches in diameter or larger, all tees, plugs, caps, 11¼° or greater bends and other locations where unbalanced force exist, shall be securely anchored by suitable thrust blocking as shown on the Plans or hereinafter specified.

**Anchorage: Thrust Blocking**

Reaction or thrust blocking shall be placed as shown on the Plans and shall consist of concrete. Blocking shall be placed between the undisturbed ground and the fitting to be anchored. The quantity of concrete and the area of bearing on the pipe shall be as shown on the Plans or directed by the Inspector. The blocking shall be placed so it will not obstruct repairs to the joint, unless specifically shown otherwise on the Plans. The pipe and fitting joints shall be wrapped with plastic sheeting before pouring. Where any section of pipe is provided with concrete thrust blocking the pressure test shall not be made until at least 5 days have elapsed after the concrete reaction blocking is installed. If high-early cement is used for the concrete thrust blocking, the time may be cut to 2 days instead of the 5 previously specified.

**Metal Harness**

Metal harness of tie rods or clamps of adequate strength to prevent movement may be used instead of concrete blocking as alternative means only with Engineer's approval. Steel rods or clamps shall be galvanized or otherwise rustproof treated as shown on the Plans or directed by the Inspector.

**Existing Thrust Blocks**

No existing thrust blocks shall be removed by Contractor unless a City of Prineville representative is on-site for inspection and coordination.

**DEADMAN TABLE**

Deadman requirement:

- 1) Able to withstand twice test pressure - 300 psi

<u>THRUST (lbs)</u>					
<u>Pipe</u>	<u>Plug</u>	<u>90°</u>	<u>45°</u>	<u>22-1/2°</u>	<u>11-1/4°</u>

6	13,460	19,037	10,303	5,252	2,638
8	23,159	32,749	17,723	9,036	4,540
10	34,837	49,266	26,662	13,594	6,829
12	49,266	69,671	37,706	19,224	9,659
14	66,186	93,604	50,659	25,826	12,974
16	85,604 1	21,061	65,516	33,401	16,780

**CONCRETE (yds)**

<u>Pipe</u>	<u>Plug</u>	<u>90°</u>	<u>45°</u>	<u>22-½°</u>	<u>11-¼°</u>
6	3.3	4.7	2.5	1.3	0.7
8	5.7	8.1	4.4	2.2	1.1
10	8.6	12.2	6.6	3.4	1.7
12	12.2	17.2	9.3	4.7	2.4
14	16.3	23.1	12.5	6.4	3.2
16	21.1	29.9	16.2	8.2	4.1

**1140.45 DETECTABLE MARKING TAPE OR WIRE**

Detection wire and tape shall be installed on all non-metallic mainline and service lines larger than two-inch. Detection wire shall be installed on all non-metallic service lines two-inch and smaller. Detection tape shall be as manufactured by Allen Systems or an approved equal.

One course of detection tape shall be installed twelve-inches above the pipe. Detection wire shall be a blue-clad 18 gauge UF bury solid copper wire attached to the top of the pipe. The wire shall be continuous in continuity and a lead shall be brought through to above the top of each valve stack. Where there is a splice, it shall be repaired with a King KWC 100 tan watertight connector or equivalent as approved by the Engineer.

**1140.47 CONNECTIONS TO EXISTING MAINS**

When appropriate and/or shown on the plans, branches and large services may be tied to existing City of Prineville facilities by utilizing a tapping sleeve and tapping valve. The performance of this procedure shall be performed only by a City approved contractor and said approval shall be obtained from the City Engineer or City authorized representative, 48 hours in advance of performing the hot tap. No pipe shall be exposed without a City representative on-site.

**TAPPING SLEEVE REQUIREMENTS**

Sleeve Types as Manufactured by JCM, Mueller or Rockwell

1. Epoxy coated Fabricated Steel Sleeve; JCM 412 or equal.
2. Epoxy coated Fabricated Steel Sleeve; JCM 422 or equal.

**FOR TAPS OTHER THAN SIZE -ON-SIZE**

TYPE OF MAIN UP BEING TAPPED 12"	MAIN 8" & UNDERTAP	MAIN 10" OR 12" 8" & UNDER	12" MAIN 10" TAP	MAIN 14" & UP TAP 8" & UNDER	MAIN 14" & TAP 10" &
C-900 Plastic	1	1	1	N/A	N/A
Steel Size Plastic	2	2	N/A	N/A	N/A
Ductile Iron	1	1	1	1	1

Cast Iron (spun)	1	1	1	1	1
Cast Iron (pit cast)	1	1	1	1	1
Steel	1	1	1	1	1

**FOR SIZE-ON-SIZE TAPS**

TYPE OF MAIN BEING TAPPED	MAIN 8" & UNDER	MAIN 10"	MAIN 12"	MAIN 14" & UP
C-900 Plastic	1	1	1	N/A
Ductile Iron	1	1	1	1
Cast Iron (spun)	1	1	1	1
Cast Iron (pit cast)	1	1	1	1
Steel	1	1	1	1

N/A = Not Applicable

N/R = Not Recommended

**SERVICES**

1. Fittings for copper tubing shall be compression type Mueller or approved equal or pack joint.
2. All services will have 30 inches of cover.
3. All services shall have a saddle or tee.
4. Bedding shall be at least 4" below and shall be at least 12" above all pipe of approved bedding material, hand tamped or water jetted.
5. Approved plastic traffic rated meter boxes with lids shall be installed on each meter and adjusted to existing ground level or proposed finished grade. They shall be two piece adjustable to grade and aligned vertically.
6. The main corporation, meter re-setter or PVC jumpers shall be of approved makes/models.
7. All services shall be blown free of all foreign objects before attempting to hook to customer's pipe.
8. All services to be flushed and checked for flow.
9. Meter boxes shall be set directly behind the sidewalk or directly behind the curb where there is no sidewalk.
10. Meter boxes in the line of traffic; e.g. streets, alleys, driveways, sidewalks and parking lots shall be approved, plastic traffic-rated meter boxes fitted with reinforced metal lids.
11. Services larger *than 1"* shall have an approved double check valve assembly installed on the service side of the meter.
12. Any service rising 30" above the top of the main shall have an approved double check valve assembly installed on the service side of the meter.
13. 1" Service runs shall not exceed 60'.
14. Service runs shall not contain unions unless approved by the City Engineer.
15. Service taps on C-900 shall be with approved make/model tapping saddle.
16. Electrical continuity shall be provided as shown in the standard drawings on services 1" and larger.
17. All new duplexes will have separate meters and shut off installed in individual conventional meter boxes. These may be served either by individual 1" copper service lines or a single 1" copper service line split at or near the property line.
18. Service taps shall have 18" minimum separation.

19. Triplexes, four-plexes and other multi-family buildings will be master metered. Service size is to be determined by Design Engineer and/or Building Official.
20. Pressure reducing valves may be required in areas of excess pressure (80 psi), PRV's shall be placed on customer side of meter. PRV's will be maintained by property owner.
21. Minimum separation from power and water shall be 10 feet.

## FIELD TESTING

### 1140.51 HYDROSTATIC TESTING

#### Leakage

Leakage shall be defined as the quantity of water necessary to restore the specified test pressure at the end of the test period. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formulas below.

Should any test of pipe laid disclose leakage greater than that allowed by the formulas, the Contractor shall, at Contractors' own expense, locate and repair the defective joints or pipe until the leakage is within the specified allowance. No piping or jointing having visual leakage will be accepted.

**C 900 PVC:** Allowable leakage shall be determined by the formula:

$$L = ND \sqrt{P} / 7400$$

Where: L = Allowable leakage (gal./hr.)  
 N = Number of joints in the section tested (pipe and fittings). In 1000' of 18' lengths, there are 55.5 pipe joints. Each fitting has 2 joints.  
 D = Nominal diameter of pipe (in.)  
 P = Average test pressure (psi). Equal to two times the system pressure, but not less than 150 psi.

**Ductile Iron:** Allowable leakage shall be determined by the formula:

$$L = SD \sqrt{P} / 133,200$$

Where : L=Allowable leakage (gal/hr)  
 S=Length of pipe tested (feet)  
 D=Nominal diameter of pipe (inches)  
 P=Average test pressure (psi). Equal to two times the system pressure, but not less than 150 psi.

#### Hydrostatic Tests

The test shall be conducted on buried pipe after the trench has been backfilled. If partial backfill (spot load) is desired, Contractor will be responsible for securing pipe



during test. Where any section of pipe is provided with concrete thrust blocking the pressure test shall not be made until at least 5 days have elapsed after the concrete reaction blocking is installed. If high-early cement is used for the concrete thrust blocking, the time may be cut to 2 days instead of the 5 previously specified.

Duration of the test shall be 2 hours with an allowable leakage not greater than the figure calculated from the above formulas. All visible leaks shall be repaired before the pipe trench is completely backfilled.

Any and all testing necessary for final acceptance may be performed by a certified individual under the supervision of the City of Prineville. This work shall conform to procedures set by the City of Prineville (see Leakage/Hydrostatic Testing & Disinfection Procedures).

#### **1140.52 DISINFECTING**

Sterilization of new lines shall be completed prior to normal operations in conjunction with existing systems. Approval by City Engineer or City representative must be acquired prior to this work and said work may be performed by a certified individual under the supervision of the City of Prineville. This work shall conform to procedures set by the City of Prineville.

### **LEAKAGE/HYDROSTATIC TESTING & DISINFECTION PROCEDURES**

#### **SCOPE**

The testing of water lines for conformance with the requirements for the City of Prineville and the Health Division of Oregon DHS shall be the responsibility of the Contractor. This testing includes chlorination, flushing, bacteriological testing and pressure testing. A City of Prineville approved laboratory will run all tests according to approved procedures. The City Representative will monitor and observe all testing procedures.

For bacteriological testing, an independent certified laboratory retained by the Contractor for that purpose shall be used.

#### **CERTIFICATION**

The Contractor or Contractor's employee shall be not less than a State of Oregon certified Water Distribution Systems Operator I. This person shall be present at and shall supervise all phases of these procedures.

The Contractor or Contractor's representative shall prove knowledge of the steps required for chlorinating/flushing/testing; and a field demonstration of technique.

#### **MATERIALS**

Equipment used for testing will be kept clean and disinfected at all times. Tanks, hoses, pumps or any equipment directly in contact with any potable water or City of

Prineville water facilities shall be dedicated to potable water use only. Equipment is subject to inspection and/or testing by the City at any time to prove compliance.

The Contractor will supply all water and chemicals used for test procedures. The chlorine used will be approved by the City of Prineville prior to use. In some cases the City may be able to provide water. The method of chlorination will be by injection. Slug chlorination will not be allowed. The Contractor will also be responsible for the safe disposal of chlorinated water at the completion of the test.

### **PROCEDURES**

Testing procedures shall be conducted during normal City working hours, 7:00 AM to 4 PM, Monday through Friday. Pressure testing will be scheduled so completion will be within these normal working hours. Chlorine and pressure tests will not be performed when the temperature is expected to be less than 33° between the hours of 8 AM and 4 PM. Chlorine tests require a minimum of 24 hours.

The Contractor shall not operate any valve connected to City water lines except with a City representative present and only at that representative's express direction.

### **FLUSHING**

The Contractor will be responsible for all flushing activity, including but not limited to flushing air from service and main lines at time of chlorination, flushing chlorinated water after all chlorination and re-chlorination and as directed by the City's representative prior to chlorination due to dirty conditions.

The Contractor shall thoroughly flush all lines. Flushing velocity shall not be less than 2 fps. Any flushing is considered completed when the system chlorine residual matches the background chlorine residual level of the City system at that point.

### **CHLORINATION**

The Contractor will be responsible for chlorine taps. Taps will be required on all dead ends and may be required on high points to vent trapped air. Taps will be coordinated and observed by the City of Prineville.

Before chlorination, the City Representative will witness all valves being opened in the system being chlorinated.

The City Representative will sample chlorine residuals as follows:

- After chlorination (beginning of test initial value).
- Prior to the chlorination solution being flushed at the end of the 24 hour test period (finish value).
- The system water after the system has been thoroughly flushed.

A maximum of 60.00 PPM and a minimum of 25.00 PPM of free residual chlorine are the acceptable limits for the initial test. Optimum chlorine residual for the initial test is 50.00 PPM. Any residual above or below acceptable initial limits shall be grounds for

restarting the chlorination test. If the finish residual value varies by 60% or more than the starting value, the test shall be deemed to have failed and re-chlorination shall be required after thoroughly flushing the line.

If after three chlorination's no passing level is obtained, the line will be deemed contaminated, be removed and replaced.

### **BACTERIOLOGICAL**

When the chlorination test has been deemed to have passed, the system will be ready for a bacteriological sample to be run. The system shall be thoroughly flushed. Twenty-four (24) hours after the completion of the flushing a representative of the City of Prineville shall draw bacteriological samples from the closed system.

There will be a minimum 48 hour period between collecting the chlorination sample and the scheduling of the beginning of the pressure testing to permit an acceptable bacteriological test to be conducted. If the bacteriological test result is negative, pressure testing of the main can proceed. However, if the bacteriological test result is positive, re-chlorination of main is required. When re-chlorination due to a failed sample is required, a companion sample set will be taken with the second primary sample set.

### **PRESSURE TESTING**

Prior to pressure testing, any and all air will be flushed from system. The City Representative will witness all valves being checked to be open and all service stops and hydrants securely closed.

Pressure testing should be done from the high end of the main unless otherwise directed by the City of Prineville. No pressure testing shall be completed through a fire hydrant. The test pressure shall be two times the system pressure, but not less than 150 PSI or greater than 240 PSI, for a period of not less than one hour.

The Contractor's pressure testing equipment (hoses from pump to metering device and from metering device to main) will be made to connect to a 3/4" meter.

The length of pressure test will be two hours. The allowable pressure loss shall be determined from the formula in the City of Prineville Water Specifications.

### **OTHER TESTS**

The City Representative may require other tests, such as Volatile Organic Chemicals, Inorganic Chemicals, Synthetic Organic Chemicals, if he has reason to believe the line has been contaminated by such compounds. The costs of these tests are substantial and shall be borne by the Contractor/Developer. Failure to pass such other tests will be grounds to reject the work and cause it to be replaced.

## **CLEANUP**

Upon completion of the testing and acceptance of the tests by the City of Prineville, the Contractor shall clean the area and set valves to closed or open as directed by the City.

## **MEASUREMENT**

### **1140.82 PIPE**

Measurement and payment for pipe will be made on a linear foot basis for the type and size of pipe installed. No reduction in length will be made for valves and fittings unless specified.

### **1140.83 FITTINGS AND COUPLINGS**

Measurement and payment for fittings will be made on a per each basis for the type, kind and size specified and installed. No separate or additional payment will be made for couplings, joint lubricant, nuts bolts, washers and other fitting related hardware or supplies.

### **THRUST BLOCKS**

Measurement and payment for thrust blocks will be made on a per each basis for each thrust block installed.

## **PAYMENT**

### **1140.95 INCIDENTAL BASIS**

When neither specified nor listed in the proposal for separate payment, Pipe, Fittings and Thrust Blocks shall be considered incidental work for which no separate payment will be made

## **1150 POTABLE WATER VALVES**

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### **DESCRIPTION**

#### **1150.00 SCOPE**

This section covers the work necessary for furnishing and installing valves and meters.

### **MATERIALS**

#### **1150.10 GENERAL**

Buried iron body gate valves will meet AWWA standards (C-509), have non-rising stems, be rated at 200 lbs. working pressure and 350 lbs. hydrostatic pressure, open left - 2" square operating nuts, resilient seat, with brass fittings, "O" ring stem pressure seals, non-directional, mechanical joints; as approved by the City Engineer or representative. Special attention should be made of AWWA specification, Section 10-4-3.

Above ground or in-vault gate valves shall be equipped with hand wheels.

Valve operating nuts that are deeper than 3' from finish grade shall have a valve operating nut extension installed prior to setting the valve box. The valve operating nut extension shall be HD Fowler or approved equal with a set-screw to attach the extension to the valve operating nut.

**BUTTERFLY VALVES** (refer to Section 2480.22)

Butterfly valves shall meet the strength and performance characteristics of AWWA C 504-70, Class 150-B, except worm gear operators are not permitted. Valve makes/models to be approved by City Engineer. Butterfly valves shall be used on all water lines of 10" size and larger or where 10" of cover over the operating nut cannot be obtained on smaller mains. Variance may be obtained for special valve installation from the City Engineer or representative.

Above ground or in-vault butterfly valves shall be equipped with hand wheels.

Valve operating nuts that are deeper than 3' from finish grade shall have a valve operating nut extension installed prior to setting the valve box. The valve operating nut extension shall be HD Fowler or approved equal with a set-screw to attach the extension to the valve operating nut.

**VALVE BOXES** (refer to Section 2480.25)

All valve boxes shall be a two piece grade adjustable box. The valve box shall have 5" I.D. with a slip top section without a dirt flange on the bottom. Valve boxes shall be Brooks 910 with 3034 PUL Riser Extension or equal. The extension piece shall be of the proper length for depth of cover. The word "WATER" shall be cast into the top of the lid. Where valve boxes are located outside of pavement they shall be provided with a 6" thick concrete collar not less than 30" square.

Valve clusters may be set in a single collar provided there is not less than 12" from the edge of the valve to the edge of concrete.

**CHECK VALVES** (refer to Section 2480.40)

**Swing Check Type**

Swing check valves shall be bronze mounted with cast or ductile iron body with outside lever and spring unless otherwise specified.

**Spring Loaded plug or Disc Type**

Spring loaded plug or disc type check valves shall be bronze mounted with bronze, cast or ductile iron body, bronze plug or disc, stainless steel spring and resilient seal suitable for clear cold water service. The plug or disc of the check valves shall be easily removable and replaceable.

**Hydraulic Cushion Type**

Hydraulic cushion type check valves shall be of bronze, cast or ductile iron with bronze disc and disc faces, seat rings and pivot pins. The valve shall provide

drop-tight sealing. The valve shall be provided with an adjustable speed, integrally mounted, oil dashpot mechanical snubber system.

### **METERS**

Meters shall be of Neptune model #T-10 with touch reads or approved other by the City Engineer.

### **Corporation Stop**

Corporation stops are those which occur next to the main and shall be Mueller, McDonald, Ford Compression type (1"), AWWA approved, ball valve type or equal approved by the City Engineer or representative, in writing.

### **METER BOXES**

Meter boxes shall be as shown on the standard drawings. Meter boxes for single ¾", 1" service meter boxes shall be Mid-State Raven 1527 with meter reader lid and 6" extension (traffic). Single ¾", 5/8" and 1" service meter boxes shall consist of two mid-state model #1527 boxes with ductile iron reader lid (traffic). Double 5/8" service meter boxes shall consist of two mid-state model #1730 boxes with ductile iron reader lid (traffic). 1½" and 2" service meter boxes shall consist of two mid-state 1730 boxes with ductile iron lid (traffic). All water meters located in "downtown" sidewalks shall be installed in two mid-state model #1730 boxes with ductile iron reader lid. Special care shall be taken to ensure the meter is set to proper depth and the box is set flush with the finish grade of the sidewalk. Downtown boxes shall be 6" from back of curb +/- 2".

All meter boxes in traffic areas, including sidewalks and pathways shall be traffic rated with traffic rated meter reader lids.

## **CONSTRUCTION**

### **1150.40 GENERAL**

Before installation, valves shall be carefully cleaned of all foreign material and inspected in open-closed position. Valves shall be installed in accordance with the applicable portions of these Specifications. Unless otherwise indicated, gate valves shall be mounted with the stem vertical. Butterfly valves shall be mounted with the stem vertical and on the 'curb' side of the main. Horizontal valves shall be mounted in such a manner that adequate clearance is provided for operation. Installation practices shall conform to the manufacturer's recommendations.

A metal valve box shall be provided for every valve which has no gearing or operating mechanism or in which the gearing or operating mechanism is not fully protected with a cast iron grease case. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be flush with the surface of the finished pavement or such level as may be directed by the Inspector.

Meter Installations shall be installed by the City of Prineville.

## **PAYMENT**

### **1150.90 GENERAL**

Measurement and payment for Back flow Prevention Devices will be made on a per each basis for the type, kind and size specified.

Measurement and payment for Meters will be made on a per each basis for the type, kind and size specified.

When neither specified nor listed in the proposal for separate payment, Valves and Meters shall be considered incidental work for which no separate payment will be made.

### **1150.91 VALVES**

Measurement and payment for valves will be made on a per each basis for the type, kind and size specified.

## **1160 HYDRANTS AND APPURTENANCES**

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### **DESCRIPTION**

#### **1160.00 SCOPE**

This section covers the work necessary for furnishing and installing fire hydrants.

### **MATERIALS**

#### **1160.10 GENERAL**

The Contractor shall furnish material certifications.

Traffic model fire hydrants will meet AWWA specifications C-502-64 with dry top. They shall have a center stem compression, 5¼" valve opening, 2 - 2½" hose and 1 - 4½" steamer nozzles with National Standard Threads, 6" mechanical joint inlet connection, open left 1 - 1½" pentagon operating nut and gaskets in nozzles. The hydrants shall be painted the City approved white. Hydrant makes/models shall be approved by the City Engineer. The barrel length will fit 4½, 5 or 5½ foot trench as required. A brass seating ring is required. Hydrants must be of proper color before acceptance of system.

Hydrant extensions shall be of same manufacture as hydrants.

Gravel for drainage under fire hydrants shall be graded river gravel free of organic matter, sand, loam, clay and other small particles that will tend to restrict water flow through the gravel.

## CONSTRUCTION

### 1160.40 SETTING HYDRANTS

Hydrants shall be located as shown on the Plans or as directed by the City Engineer. The center of the operating nut on the hydrant barrel shall be set a minimum of 6' and not more than 7' from face of curb as shown in the standard drawings. Hydrants located in parking lots shall be protected by a 6' X 6' concrete pad and bollards as shown in the standard drawings.

No hydrant should be set within 70' of a dry well unless specifically permitted by the City Engineer.

No hydrant shall have more than a 6 foot bury.

All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the curb with the pumper nozzle facing the curb. Hydrants shall be set to the established grade with the bottom edge of break off flange no less than 3 inches nor more than 6 inches above the top of the concrete slab as shown on the plans or as directed by the Inspector.

Unless otherwise specified in the Plans or special specifications, hydrant drainage shall be provided at the base of the hydrant by placing graded river gravel from the bottom of the trench to at least 6 inches above the waste opening in the hydrant and to a distance of 1 foot around the bowl. No drainage system shall be connected to a sewer. A concrete base, at least 12 inches square by 4 inches deep, shall be provided for all hydrants.

The bowl of each hydrant shall be well braced against undisturbed earth at the end of the trench with concrete or it shall be tied to the pipe with suitable metal tie rods and clamps or both if required, as shown on the plans or directed by the Inspector.

All hydrants shall be re-painted with 1 coat of rust preventive paint, at least 6 mils thick. Paint shall be applied by brush or spray painting. Color shall be City approved white. For a typical hydrant drawing see standard drawings. Steel bollards shall be painted 'safety red.'

## MEASUREMENT

### 1160.80 GENERAL

Measurement and payment will be made on a per each basis for the type of hydrant specified and installed.



## PAYMENT

### 1160.90 GENERAL

When neither specified nor listed in the proposal for separate payment, Fire Hydrants shall be considered incidental work for which no separate payment will be made.

### 1170 POTABLE WATER SERVICE CONNECTIONS, 50 mm (2 inch) AND SMALLER

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## MATERIALS

### 1170.10 GENERAL

#### SERVICE PIPE

Service lines from the main to the meter and 4 feet beyond meter box shall be as follows:

Type	Size I.D.
(non-rigid) 1"	K soft annealed copper
Above 1"	Brass and copper with pack joints only. Brass or bronze threads as needed. Certified less than 5% lead by manufacturer.

2" water services may also be constructed with sch 80 pvc as described below:

- From the saddle there will be a 2" brass nipple to the required gate valve.
- 2" gate valve.
- 2" threaded coupler.
- 2" thread to slip sch 80 adapter.
- Sch 80 pvc to new meter box.

#### SERVICE CONNECTION

##### **General**

All brass fittings shall be manufactured in accordance with AWWA C-800 latest edition and meet the requirements of Standard Drawing 4-5.

##### **B 1"- 2" Service Saddles**

Service clamps (saddles) for 1½" and 2" services shall be Mueller double strap AWWA approved or equal. 1½" and 2" services: Brass or bronze nipple between saddle and valve is to be installed at 22 ½ degrees (See drawing 4-5); bolts torque to manufacturer's specifications.

##### **1" Service Saddles**

Service saddles shall be required for all service line hook-ups. Saddles shall be Romac 101-5 series or equivalent as approved by the Engineer.

**Corporation Stops**

Corporation stops shall be Mueller H-15008 or H-15028; Ford F-1100 or F-1000; or AY McDonald 4701T or 4704T shall be ball valve type of the size and for the type of main line pipe material shown on the plans. Stops shall have AWWA taper thread on the inlet and copper pack joint connections on the outlet.

**Angled Meter Stops**

Angled meter stops shall be as follows: 1", Mueller H-14258, AY McDonald 4602-T or Ford KV 43. 1 ½" and 2", Mueller H-14277, AY McDonald 4602 BT, Ford FV 43 shall be ball valve type.

**Couplings and Unions**

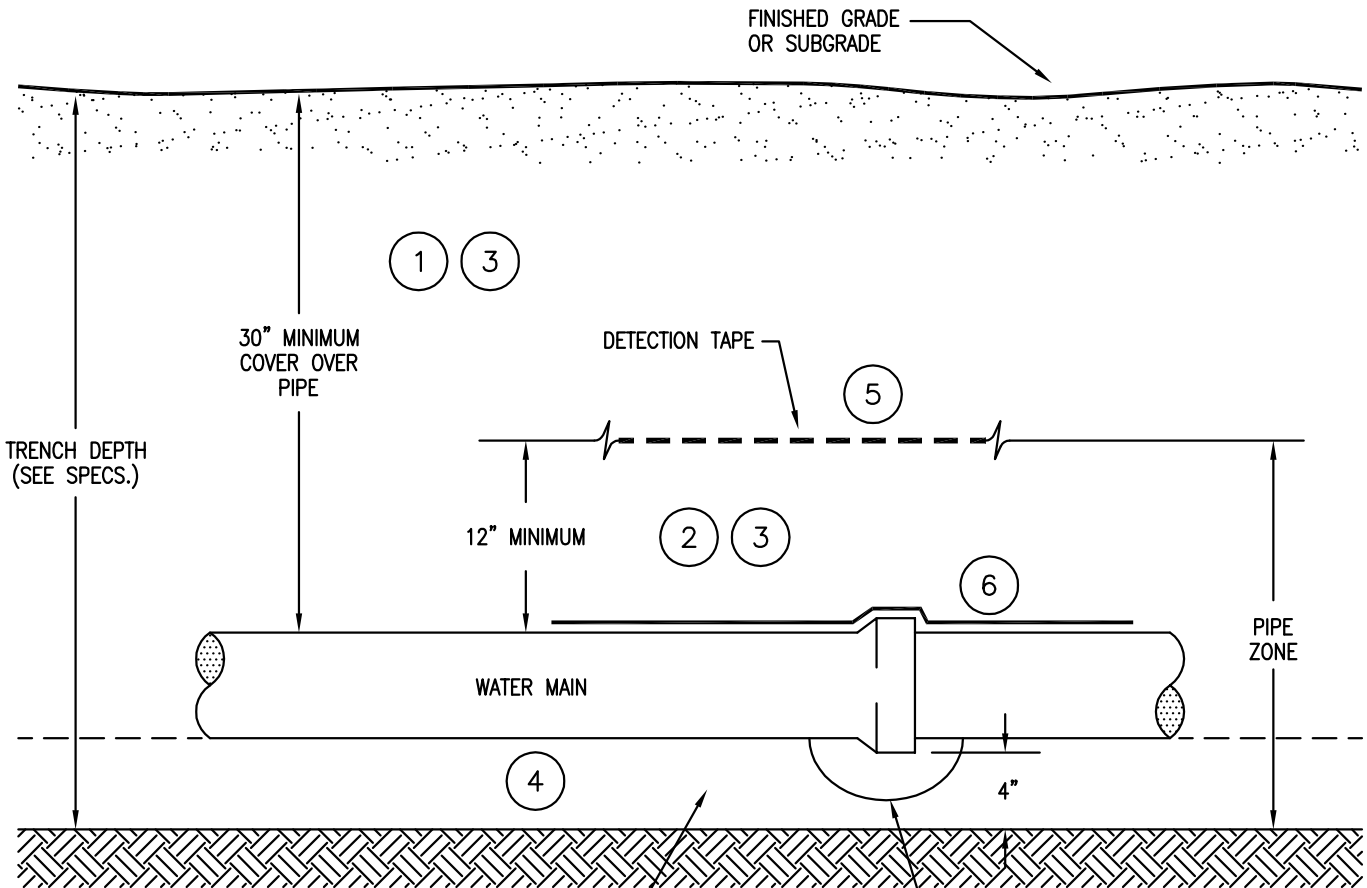
Couplings and unions shall be furnished as detailed on the standard drawings of the City. Copper couplings and unions shall be all pack Mueller H-15403, AY McDonald 4758T for runs longer than a standard 60-foot roll of soft copper or one stick of rigid copper.

**Service Gate Valves**

Gate valves 1½" in diameter and smaller shall not be used. 2" service gate valves shall be AWWA approved resilient seated with 2" square operating nut.

**Duplex Services**

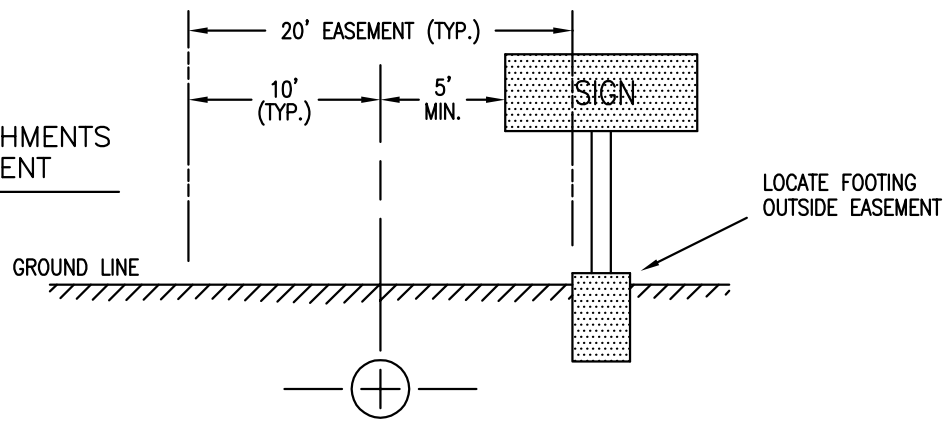
Services for Duplex units may be Ford Key Branch Assembly, catalog number UV 43-42W-65 or AY McDonald 09UZCW 6 ½" branch, for 1 inch service line and two 1 inch meters or equivalent as approved by the Engineer.




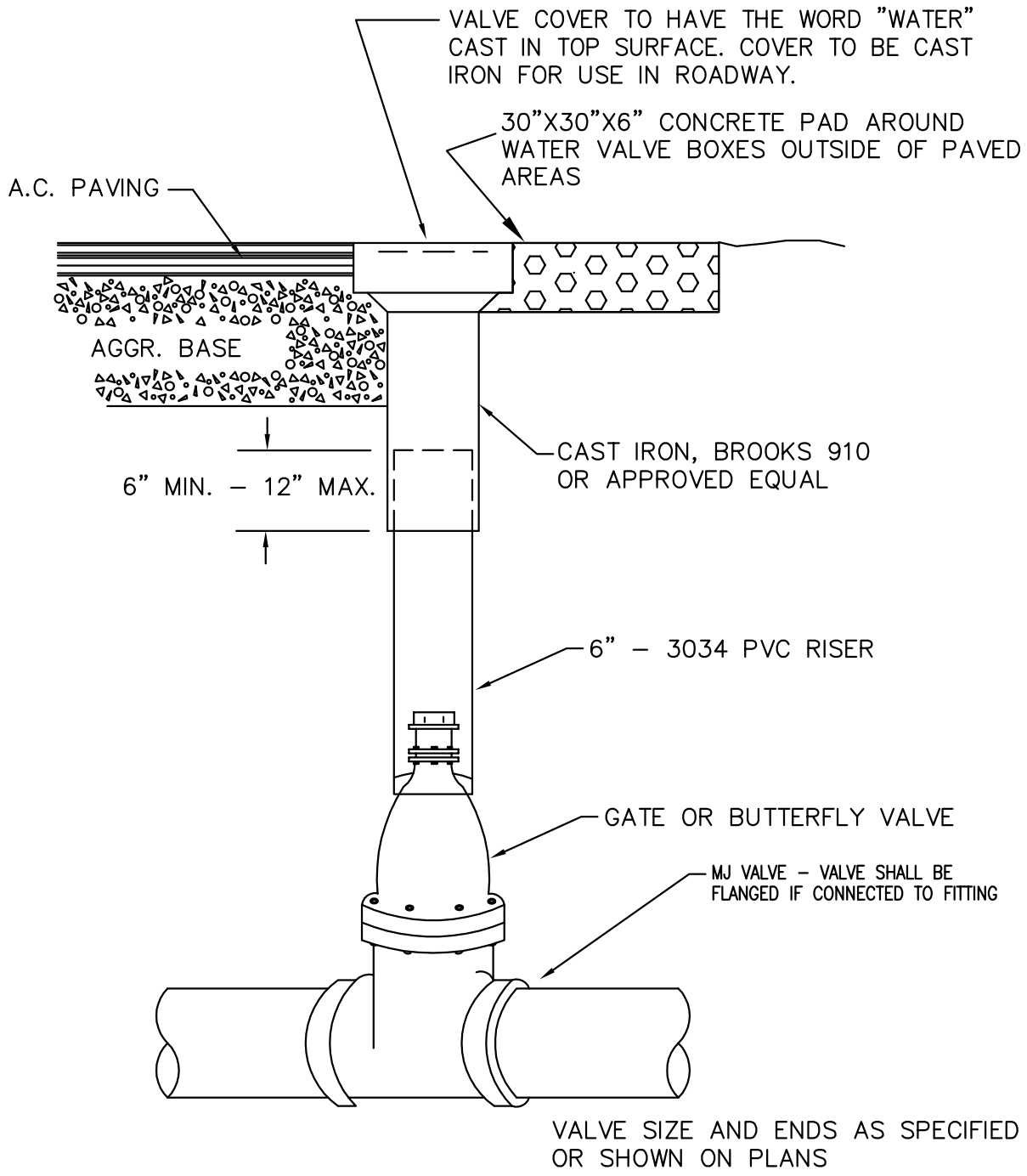
**NOTES:**

1. CLASS "A" BACKFILL MECHANICALLY COMPACTED TO 95% OF AASHTO T-99.
2. SPECIFIED PIPE ZONE MATERIAL ABOVE, AROUND, AND BELOW PIPE SHALL BE COMPACTED TO 95% OF AASHTO T-99.
3. THE ENGINEER MAY REQUIRE THIS ZONE TO BE WATER SETTLED TO PROVE THE INTEGRITY OF THE BACKFILL.
4. PIPE BEDDING SHALL MEET THE REQUIREMENTS OF DIVISION I. PIPE BEDDING SHALL BE MECHANICALLY COMPACTED TO 95% OF AASHTO T-99.
5. DETECTION TAPE TO BE LOCATED AT TOP OF PIPE ZONE, 12" ABOVE THE PIPE.
6. DETECTION WIRE TO BE LOCATED DIRECTLY ABOVE OR TAPED TO TOP OF PIPE. MAINTAIN ELECTRICAL CONTINUITY THROUGHOUT SYSTEM. EXTEND WIRE TO ALL FIRE HYDRANTS AND SIMILAR SERVICES. EXTEND WIRE TO SURFACE AT ALL VALVES. DETECTION WIRE NOT NEEDED FOR DUCTILE IRON PIPE.

**ALLOWABLE ENCROACHMENTS  
IN UTILITY EASEMENT**



DATE : 1/31/07	SCALE : NONE	PROFILE OF TYPICAL WATER MAIN INSTALLATION	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-1	APPROVED BY : MDW			



DATE :  
1/31/07

SCALE :  
NONE

TYPICAL VALVE &  
BOX INSTALLATION  
DETAIL

**CITY OF PRINEVILLE**  
**PUBLIC WORKS DEPARTMENT**



DRAWING NO.  
4-2

APPROVED BY :  
MDW

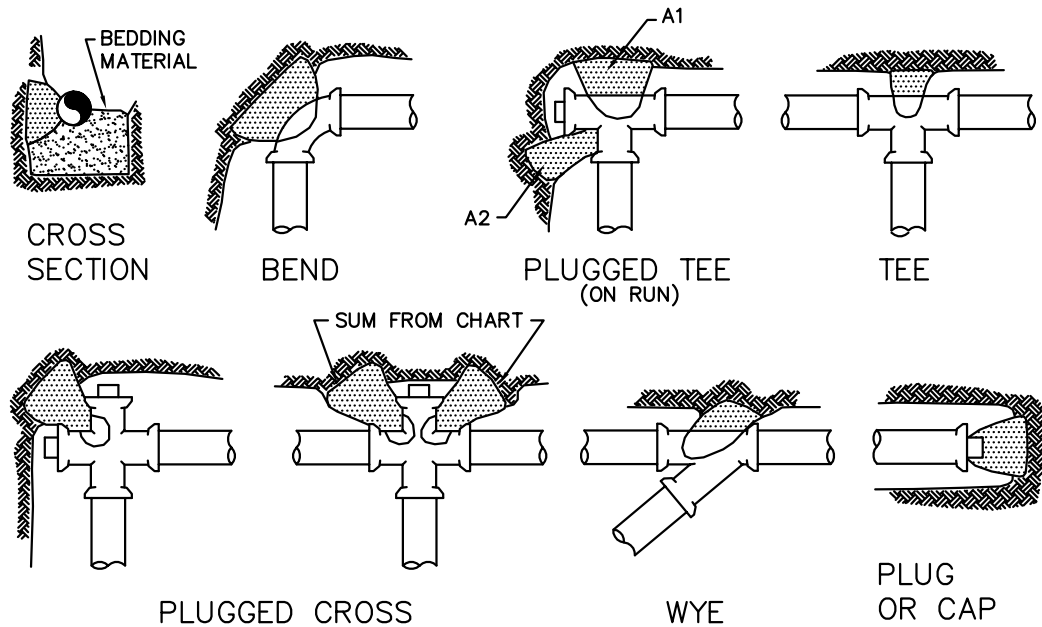


CHART A

SIZE OF FITTING (PIPE DIA.)	THRUST BLOCKING BEARING AREA (SQ.FT.)						
	TEE, WYE, PLUG, CAP	90° BEND, PLUGGED 'X'	PLUGGED TEE (ON RUN) A1    A2		45° BEND	22 1/2° BEND	11 1/4° BEND
4"	1.0	1.4	1.9	1.4	1.0	—	—
6"	2.1	3.0	4.3	3.0	1.6	1.0	—
8"	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10"	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12"	8.5	12.0	17.0	12.0	6.6	3.4	1.7
14"	11.5	16.3	23.0	16.3	8.9	4.6	2.3
16"	15.0	21.3	30.0	21.3	11.6	6.0	3.0
18"	19.1	27.0	38.0	27.0	14.6	7.6	3.8

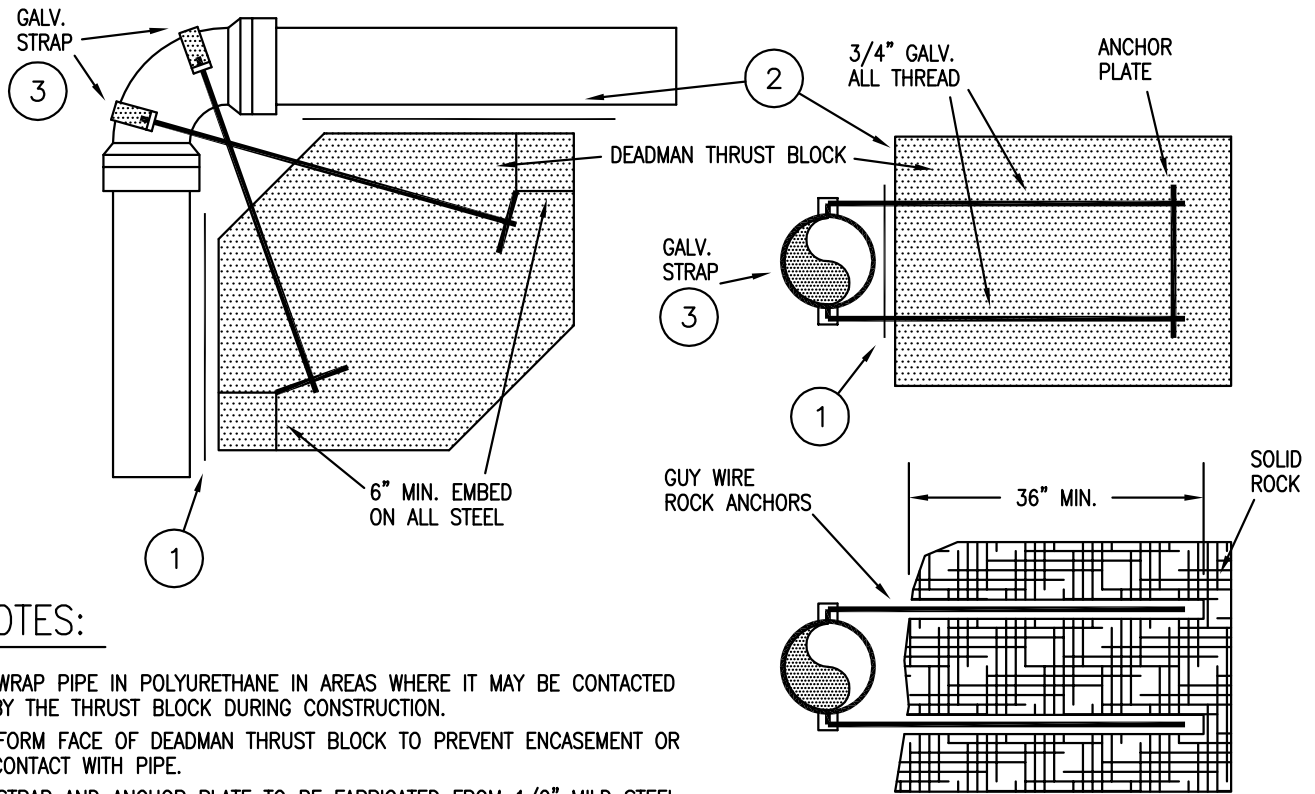
NOTES:

1. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. THE BEARING AREA SHALL BE EQUALLY DIVIDED ABOVE & BELOW THE CENTERLINE OF THE PIPE.
3. CONCRETE SHALL BE KEPT CLEAR OF JOINTS AND ACCESSORIES.
4. REQUIRED BEARING AREAS SHALL BE AS INDICATED ON CHART A, ADJUSTED WHEN NECESSARY TO CONFORM TO TEST PRESSURE(S) & ALLOWABLE SOIL BEARING STRESS(ES). SEE CHART B, SOIL BEARING.
5. CHART A IS BASED ON A TEST PRESSURE OF 150 PSI & AN ALLOWABLE SOIL BEARING STRESS OF 2,000 LBS. PER SQ. FT.
6. SAFE BEARING LOADS GIVEN IN CHART B ARE FOR HORIZONTAL THRUSTS WHEN THE PIPE COVER EXCEEDS TWO FEET.
7. IN MUCK OR PEAT, ALL THRUSTS MUST BE RESISTED BY PILES OR TIE RODS TO SOLID FOUNDATIONS, OR BY REMOVAL OF THE MUCK OR PEAT & REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THE THRUSTS INVOLVED.

CHART B

BEARING LOADS FOR SOILS	
TYPE OF SOIL	SAFE BEARING LOAD (LBS. PER SQ. FT.)
HARD SHALE	10,000
SAND & GRAVEL (CEMENTED WITH CLAY)	4,000
SAND & GRAVEL	3,000
SOFT CLAY	2,000
MUCK OR PEAT, ETC.	0

DATE : 1/31/07	SCALE : NONE	THRUST BLOCK DETAILS	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-3	APPROVED BY : MDW			



**NOTES:**

1. WRAP PIPE IN POLYURETHANE IN AREAS WHERE IT MAY BE CONTACTED BY THE THRUST BLOCK DURING CONSTRUCTION.
2. FORM FACE OF DEADMAN THRUST BLOCK TO PREVENT ENCASEMENT OR CONTACT WITH PIPE.
3. STRAP AND ANCHOR PLATE TO BE FABRICATED FROM 1/2" MILD STEEL FLAT STOCK, COATED TO PREVENT CORROSION. STRAP TO BE SHAPED TO CONFORM TO O.D. OF PIPE.
4. REQUIREMENTS OF TABLE MAY VARY DUE TO PRESSURE IN AREA.

**ROCK ANCHOR ALTERNATE**

**DEAD END**

PIPE DIAMETER	6"	8"	10"	12"	14"	16"	18"
VOLUME OF CONCRETE IN DEADMAN	3.3 CY	5.7 CY	8.6 CY	12.2 CY	16.3 CY	21.1 CY	26.5 CY
NO. OF RODS REQ'D	2	2	2	4	4	4	6
WIDTH OF STRAP AND ANCHOR PLATE	2 1/2	2 1/2	2 1/2	4 1/2	4 1/2	4 1/2	6 1/2

**90° FITTING**

PIPE DIAMETER	6"	8"	10"	12"	14"	16"	18"
VOLUME OF CONCRETE IN DEADMAN	4.7 CY	8.1 CY	12.2 CY	17.2 CY	23.1 CY	29.9 CY	37.5 CY
NO. OF RODS REQ'D	4	4	4	8	8	12	12
WIDTH OF STRAP AND ANCHOR PLATE	2 1/2	2 1/2	2 1/2	4 1/2	4 1/2	6 1/2	6 1/2

**45° FITTING**


PIPE DIAMETER	6"	8"	10"	12"	14"	16"	18"
VOLUME OF CONCRETE IN DEADMAN	2.5 CY	4.4 CY	6.6 CY	9.3 CY	12.5 CY	16.2 CY	20.3 CY
NO. OF RODS REQ'D	2	2	2	4	4	4	6
WIDTH OF STRAP AND ANCHOR PLATE	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

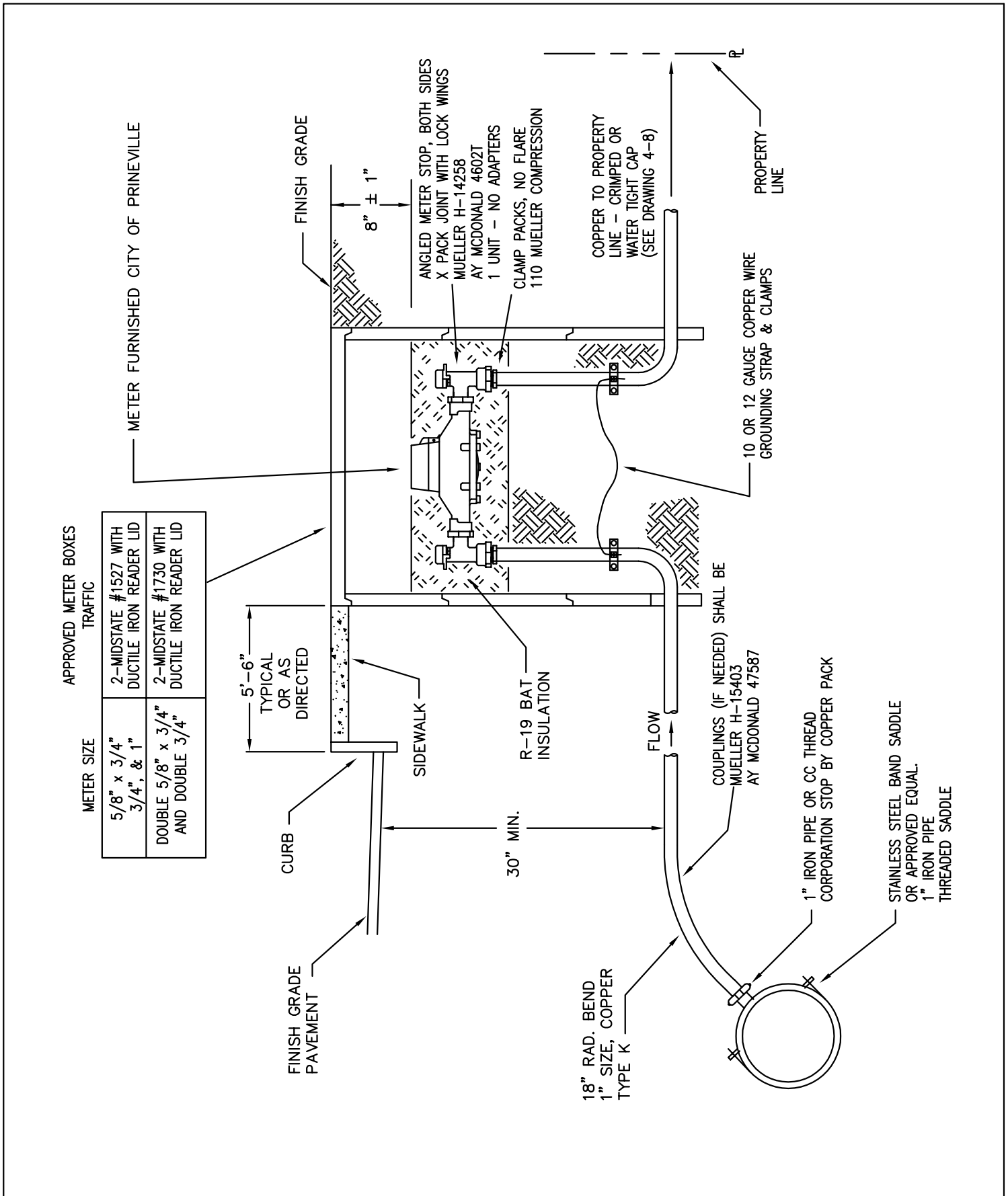
**22 1/2° FITTING**

PIPE DIAMETER	6"	8"	10"	12"	14"	16"	18"
VOLUME OF CONCRETE IN DEADMAN	1.3 CY	2.2 CY	3.4 CY	4.7 CY	6.4 CY	8.2 CY	10.4 CY
NO. OF RODS REQ'D	2	2	2	4	4	4	6
WIDTH OF STRAP AND ANCHOR PLATE	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

**11 1/4° FITTING**

PIPE DIAMETER	6"	8"	10"	12"	14"	16"	18"
VOLUME OF CONCRETE IN DEADMAN	0.7 CY	1.1 CY	1.7 CY	2.4 CY	3.2 CY	4.1 CY	5.2 CY
NO. OF RODS REQ'D	2	2	2	2	2	2	2
WIDTH OF STRAP AND ANCHOR PLATE	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2

DATE : 1/31/07	SCALE : NONE	<b>DEADMAN THRUST BLOCK</b>	<b>CITY OF PRINEVILLE</b> <hr/> <b>PUBLIC WORKS DEPARTMENT</b>	
DRAWING NO. 4-4	APPROVED BY : MDW			

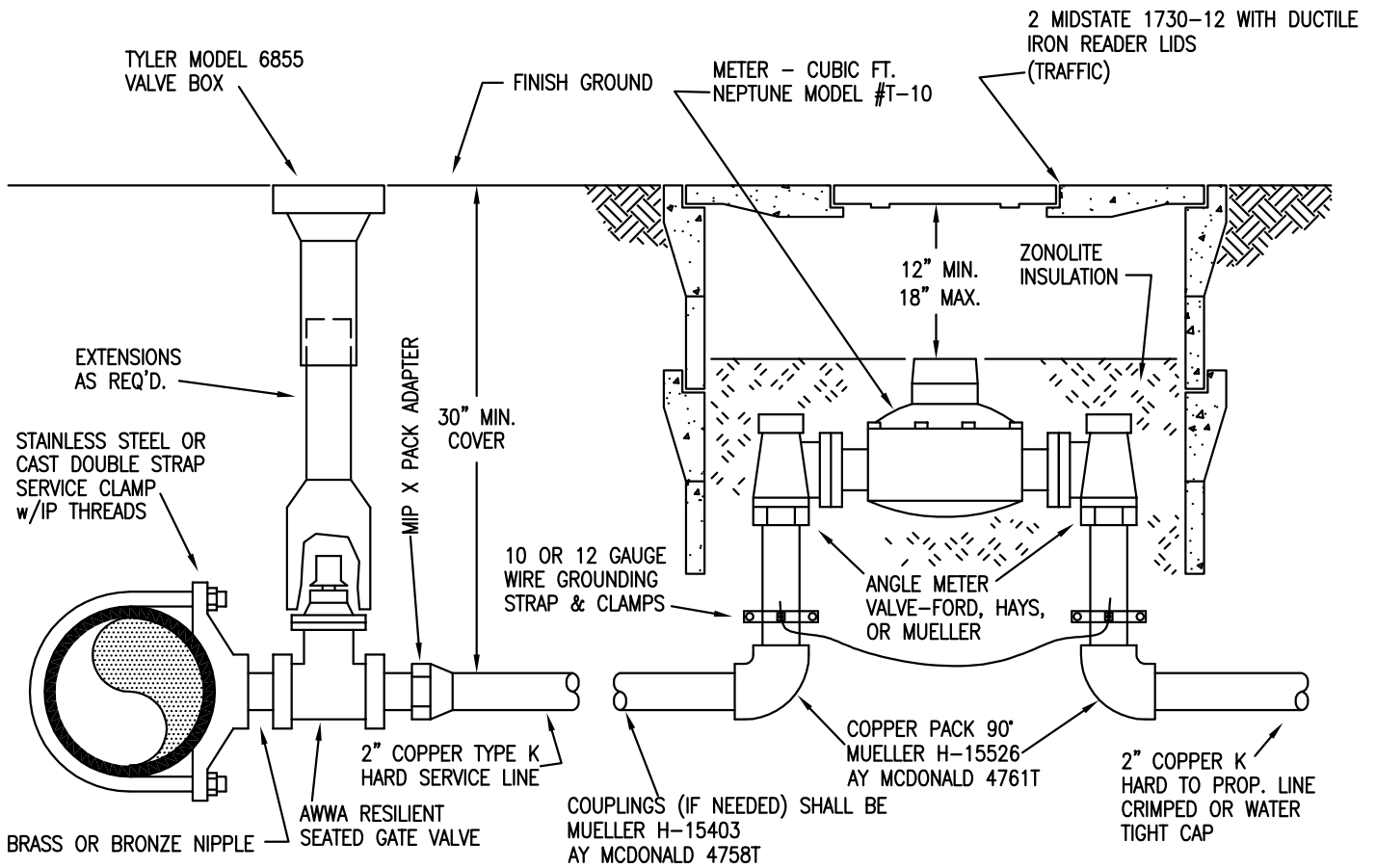


DATE :	SCALE :
4/01/08	NONE
DRAWING NO.	APPROVED BY :
4-5	MDW

3/4" & 1" WATER SERVICE CONNECTION  
DETAIL

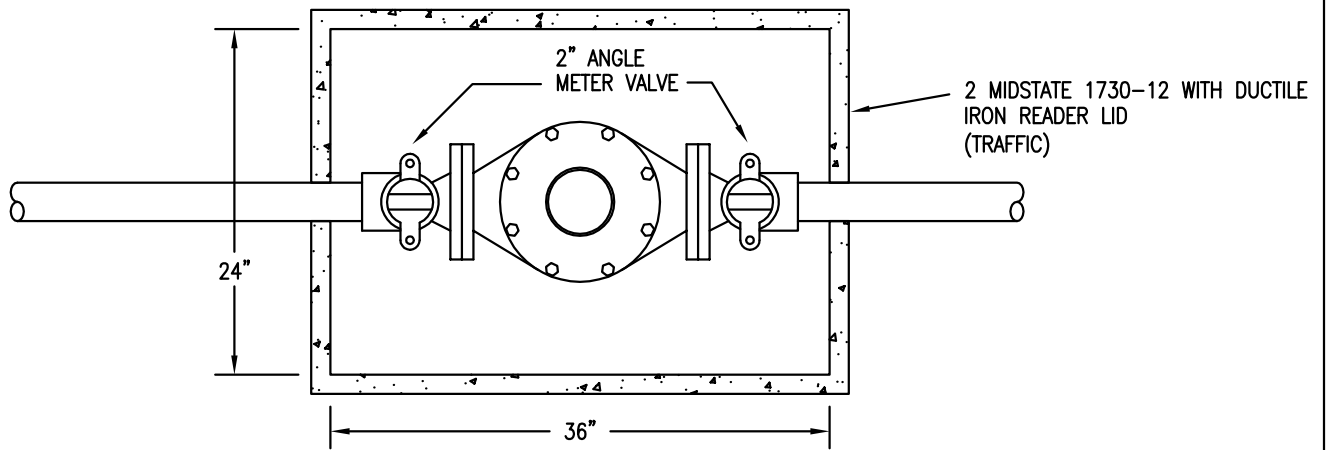
**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT





CONNECTION AT MAIN LINE

METER BOX SECTION



METER BOX PLAN

NOTE:

ALL BRASS AND VALVES TO BE FORD, HAYS OR MUELLER  
 SERVICE LINE MAY ALSO BE CONSTRUCTED OF SCH 80 PVC AS SHOWN ON PG VIII-21

DATE :	SCALE :
6/08/2010	NONE
DRAWING NO.	APPROVED BY :
4-6	EAK

TYPICAL 1-1/2" & 2"  
 WATER SERVICE AND  
 METER INSTALLATION

**CITY OF PRINEVILLE**  
 PUBLIC WORKS DEPARTMENT





VAULT, FITTINGS AND PIPING SIZING REQUIREMENTS

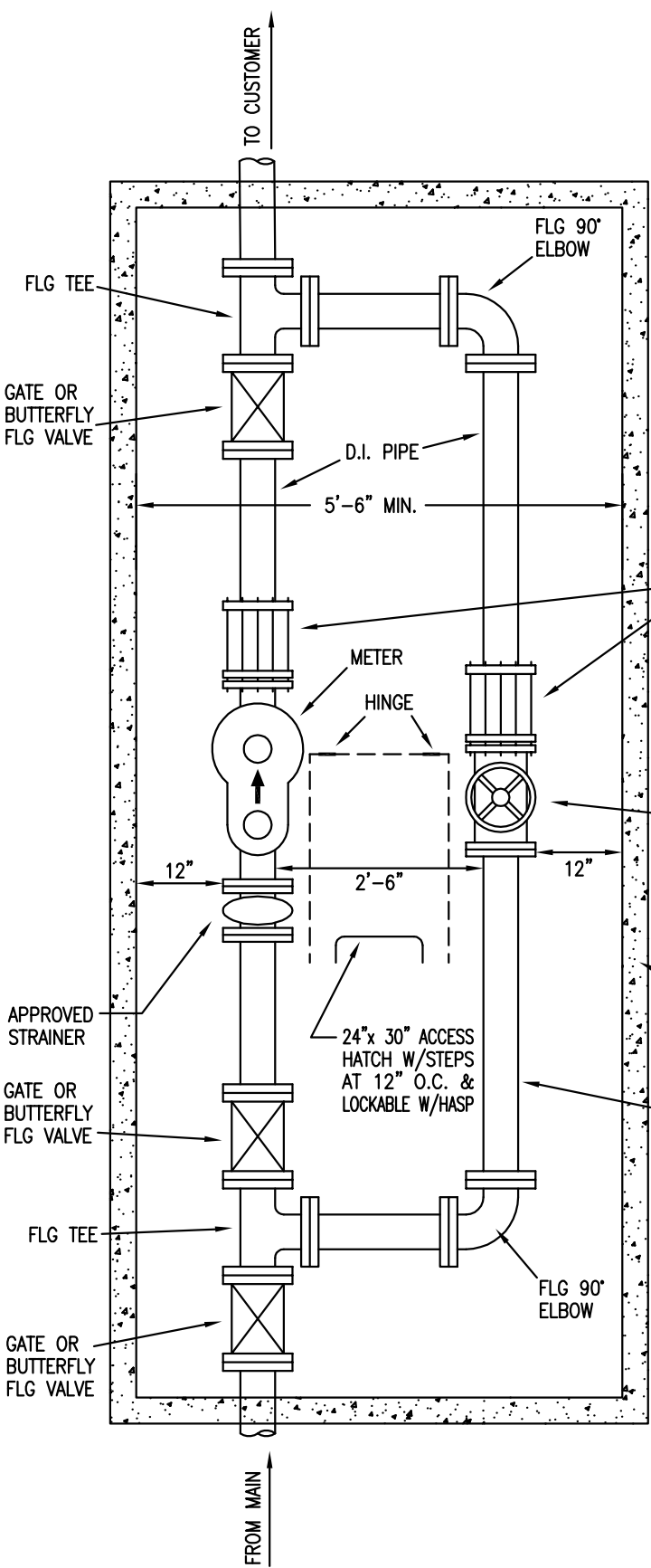
METER SIZE	BYPASS VALVES AND PIPING	BYPASS TEE (FL x FL)	MIN. INSIDE VAULT LEN.	MIN. INSIDE VAULT WIDTH	MIN. INSIDE VAULT HT
3"	3"	3' x 3'	8 FT	6 FT	6 FT
4"	4"	4' x 4'	10 FT	6 FT	6 FT
6"	4"	6' x 4'	12 FT	6 FT	6 FT

NOTE:

APPROVED METER - NEPTUNE DIRECT C.F. READING DOUBLE REGISTER, MAGNETIC (S.R.M.) COMPOUND METER OR APPROVED EQUAL.

GROUNDWATER ISSUES MAY DICTATE SEALED BOTTOM AS REQUESTED BY CITY ENGINEER.

FLANGE x FLEX COUPLING WITH 3/4" SET BACK FROM COMPANION FLANGE



APPROVED GATE OR BUTTERFLY VALVE

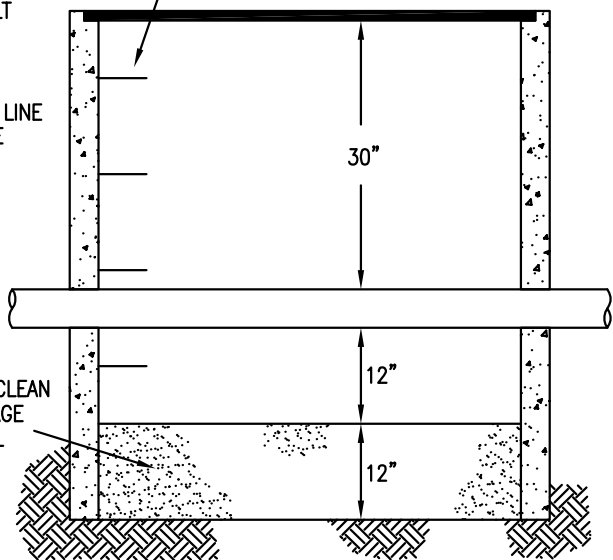
APPROVED LADDER OR STEPS

METAL LID w/LOCKABLE ACCESS HATCH

CONCRETE VAULT

BYPASS LINE D.I. PIPE

3/4" CLEAN DRAINAGE GRAVEL



SECTION VIEW

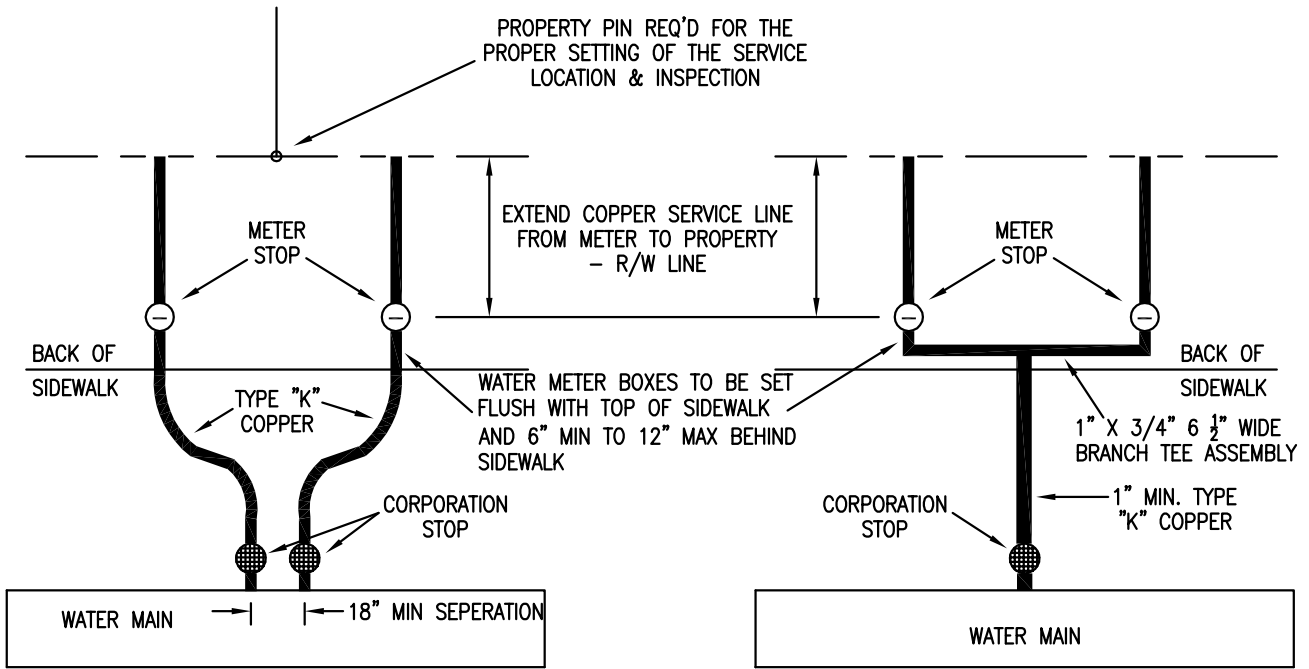
DATE :	SCALE :
6/08/2010	NONE
DRAWING NO.	APPROVED BY :
4-7	EAK

TYPICAL WATER METER VAULT 3" AND LARGER

**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT



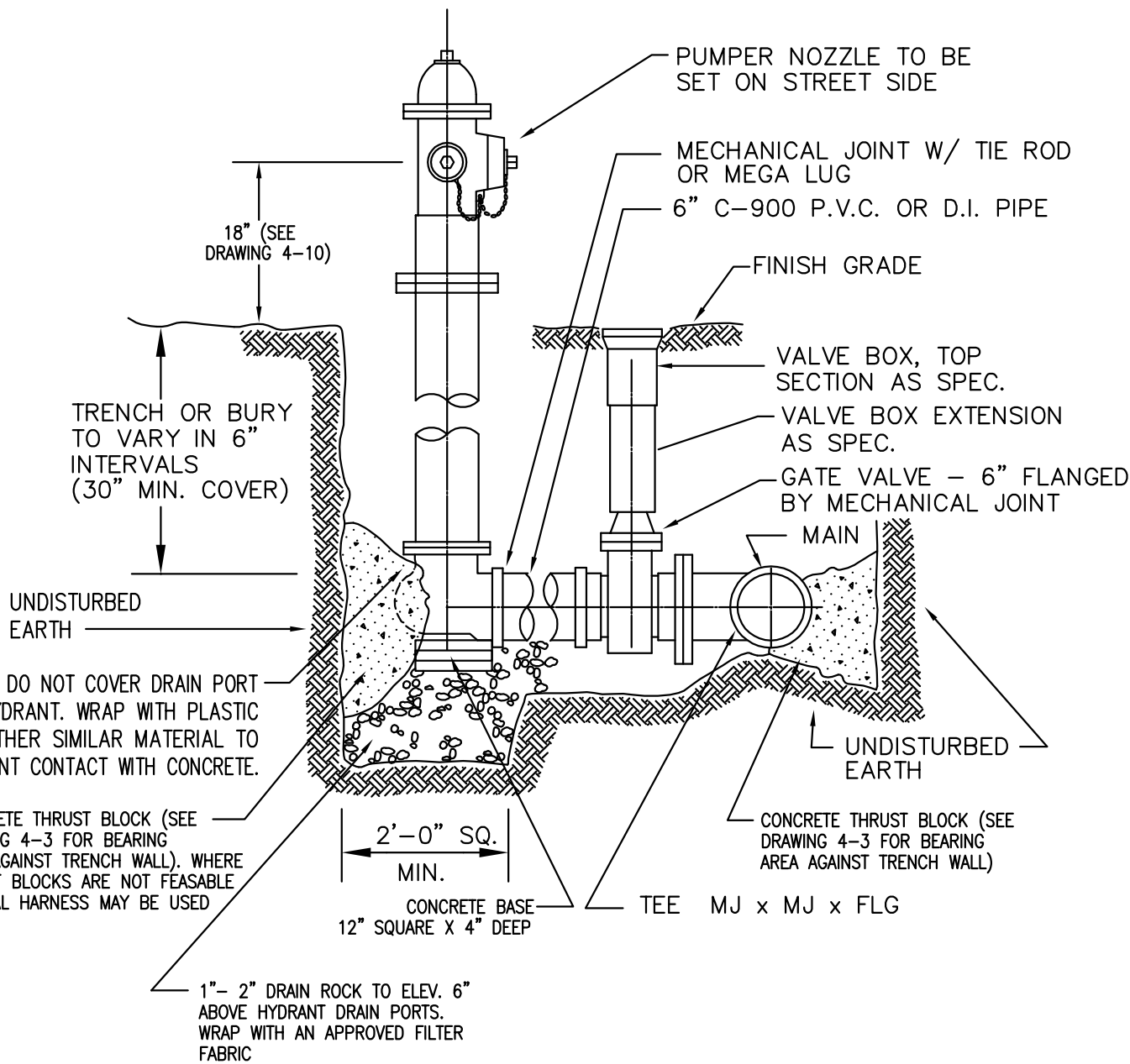
NOTE: SEWER SERVICES SHALL BE SET NO CLOSER THAN 10' TO WATER SERVICES



TWO SERVICES SHARING ONE DITCH AT PROPERTY CORNER

DUPLEX SERVICE

DATE : 4/01/08	SCALE : NONE	WATER SERVICE INSTALLATION DETAIL	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-8	APPROVED BY : MDW			



NOTE: HYDRANTS LOCATED IN INDUSTRIAL DEVELOPMENTS SHALL UTILIZE A 8" SERVICE LINE REDUCED TO 6" AT THE BELL OF THE HYDRANT.

DATE :  
6/08/2010

SCALE :  
NONE

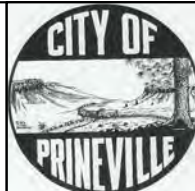
DRAWING NO.  
4-9

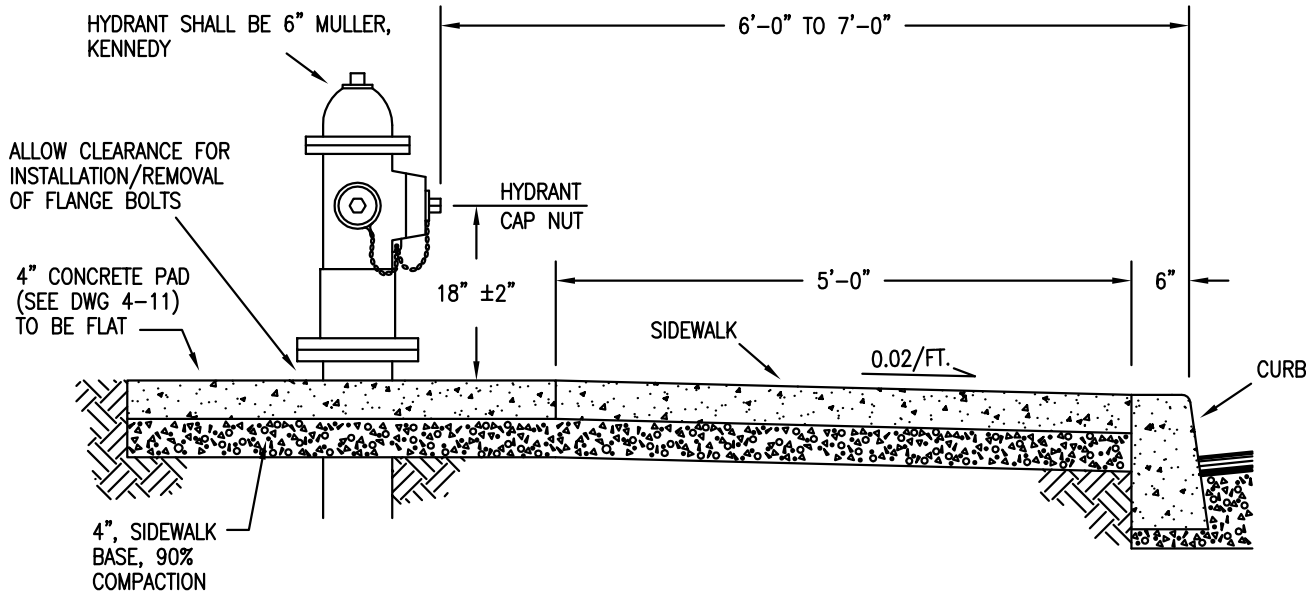
APPROVED BY :  
EAK

FIRE HYDRANT & GATE  
VALVE CONTROL  
INSTALLATION

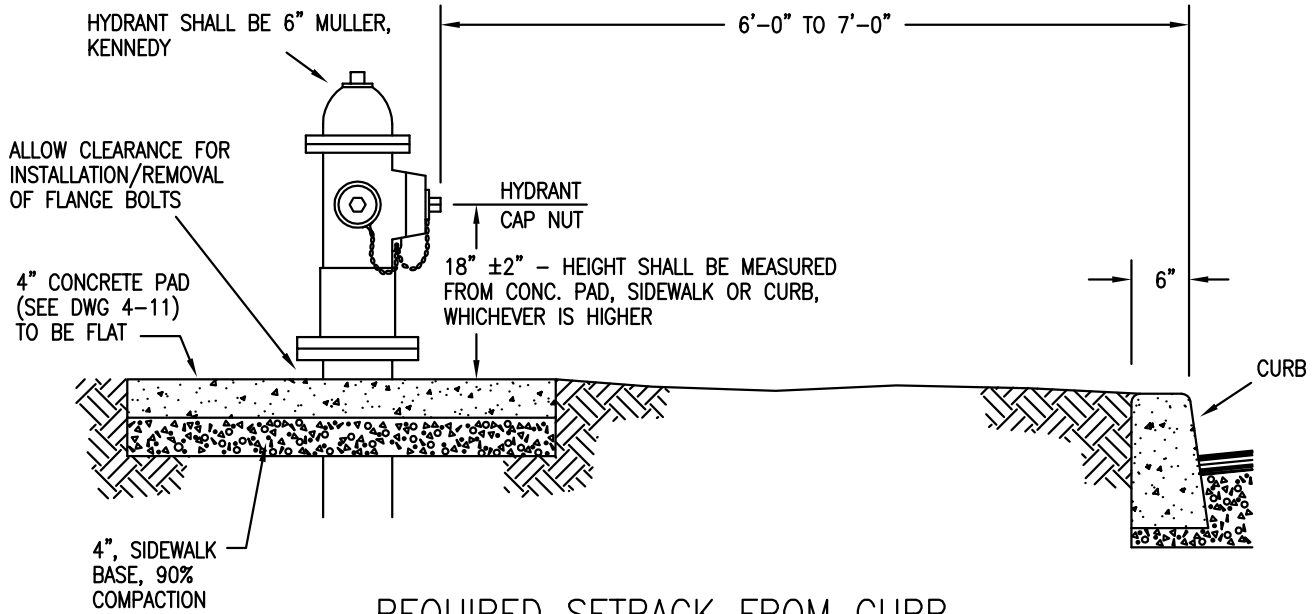
**CITY OF PRINEVILLE**

**PUBLIC WORKS DEPARTMENT**






REQUIRED HYDRANT SETBACK FROM CURB & SIDEWALK

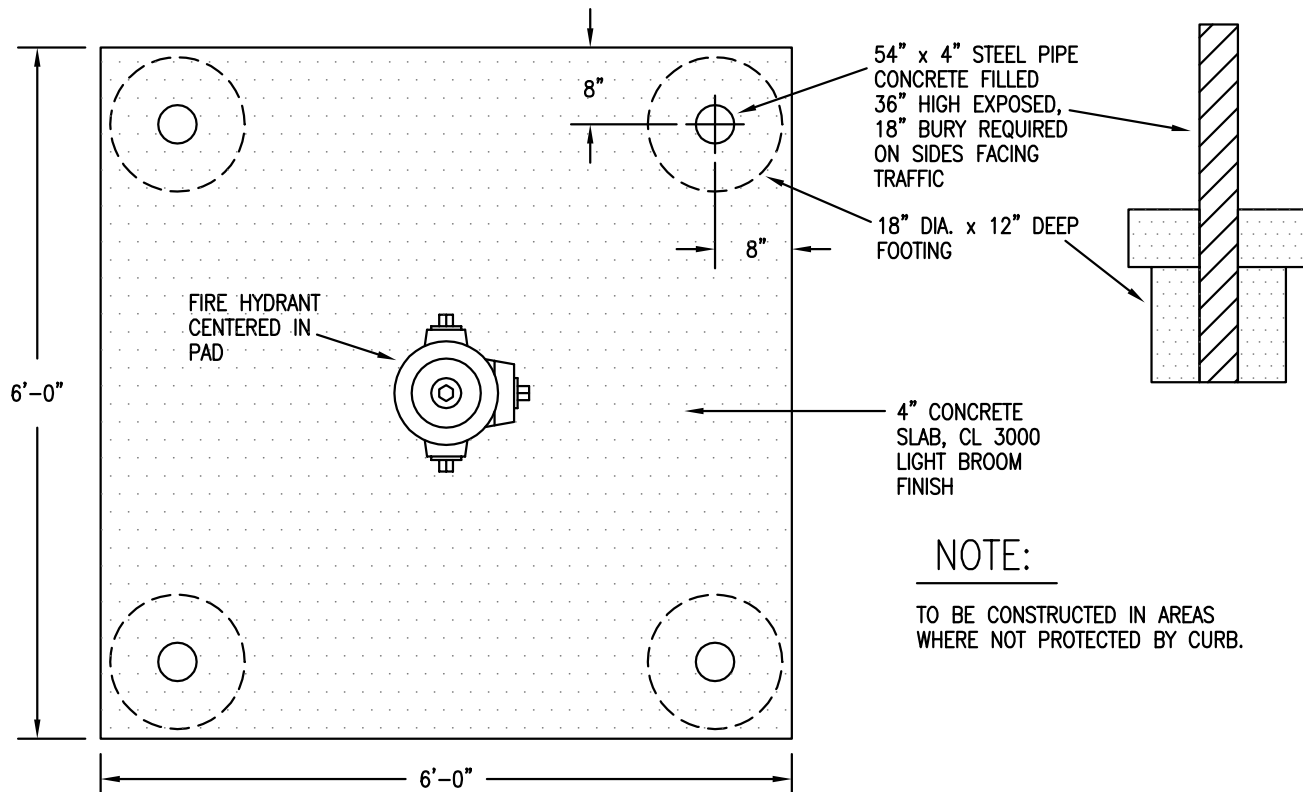


REQUIRED SETBACK FROM CURB

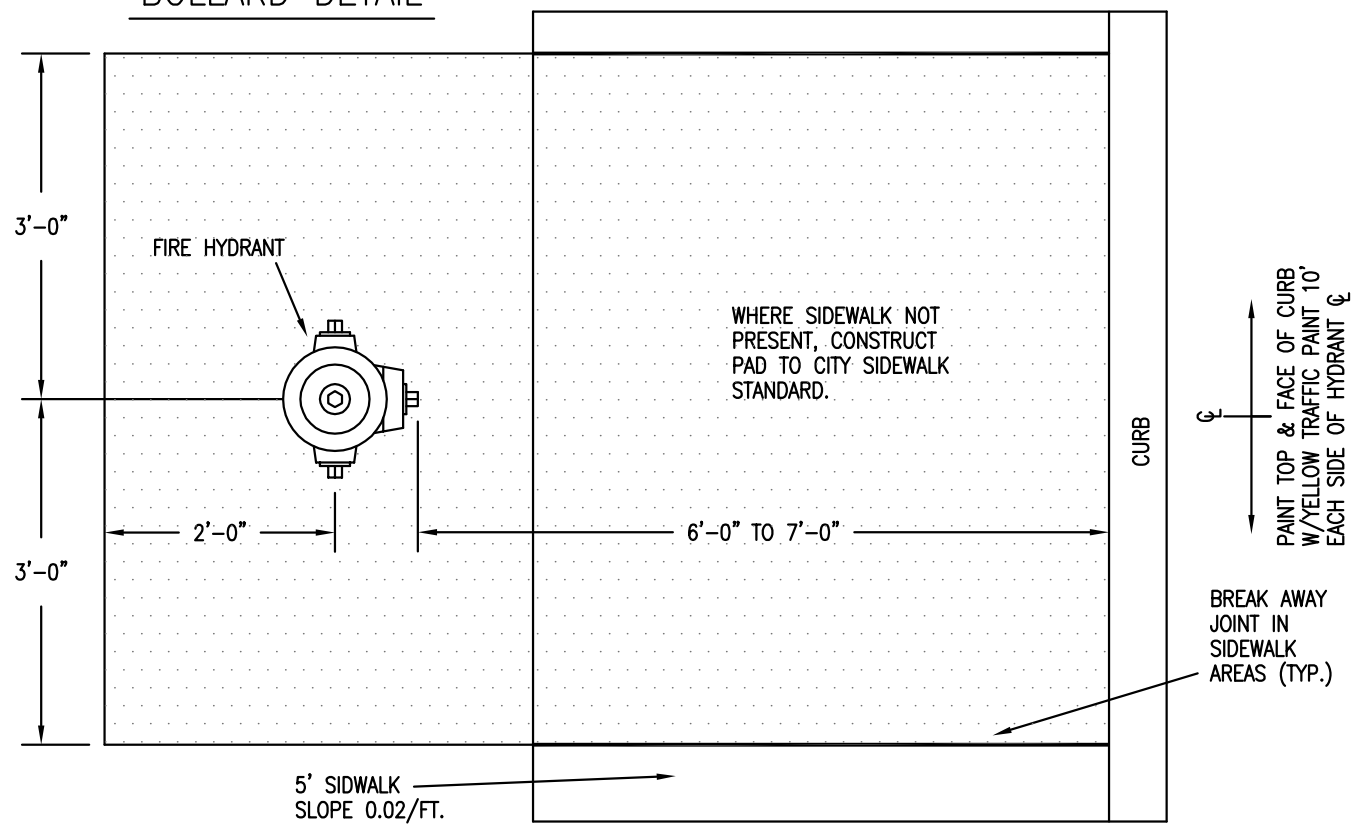
NOTES:

1. CITY OF PRINEVILLE FIRE DEPARTMENT REQUIRES MIN 3' CLEARANCE FROM HYDRANT IN ALL DIRECTIONS.
2. ALL HYDRANTS REQUIRE A MAINLINE ISOLATION VALVE AND A HYDRANT VALVE.


DATE :	SCALE :	STANDARD FIRE HYDRANT SET BACKS	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
4-10	MDW			

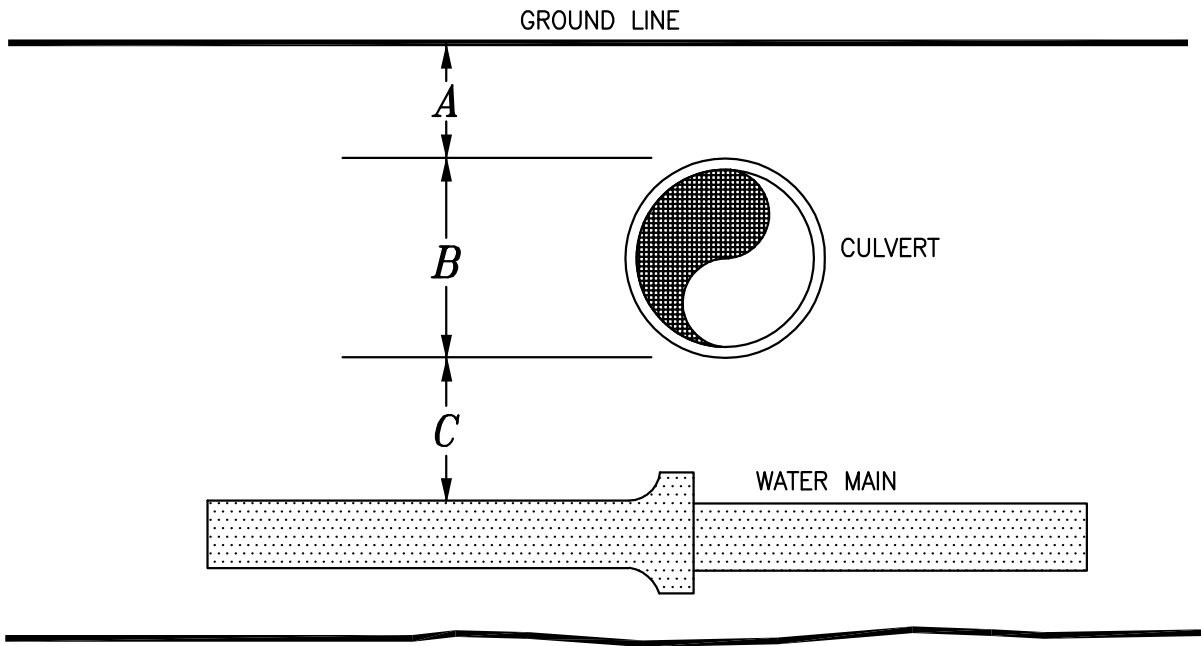


BOLLARD DETAIL




TYPICAL ROADSIDE HYDRANT DETAIL

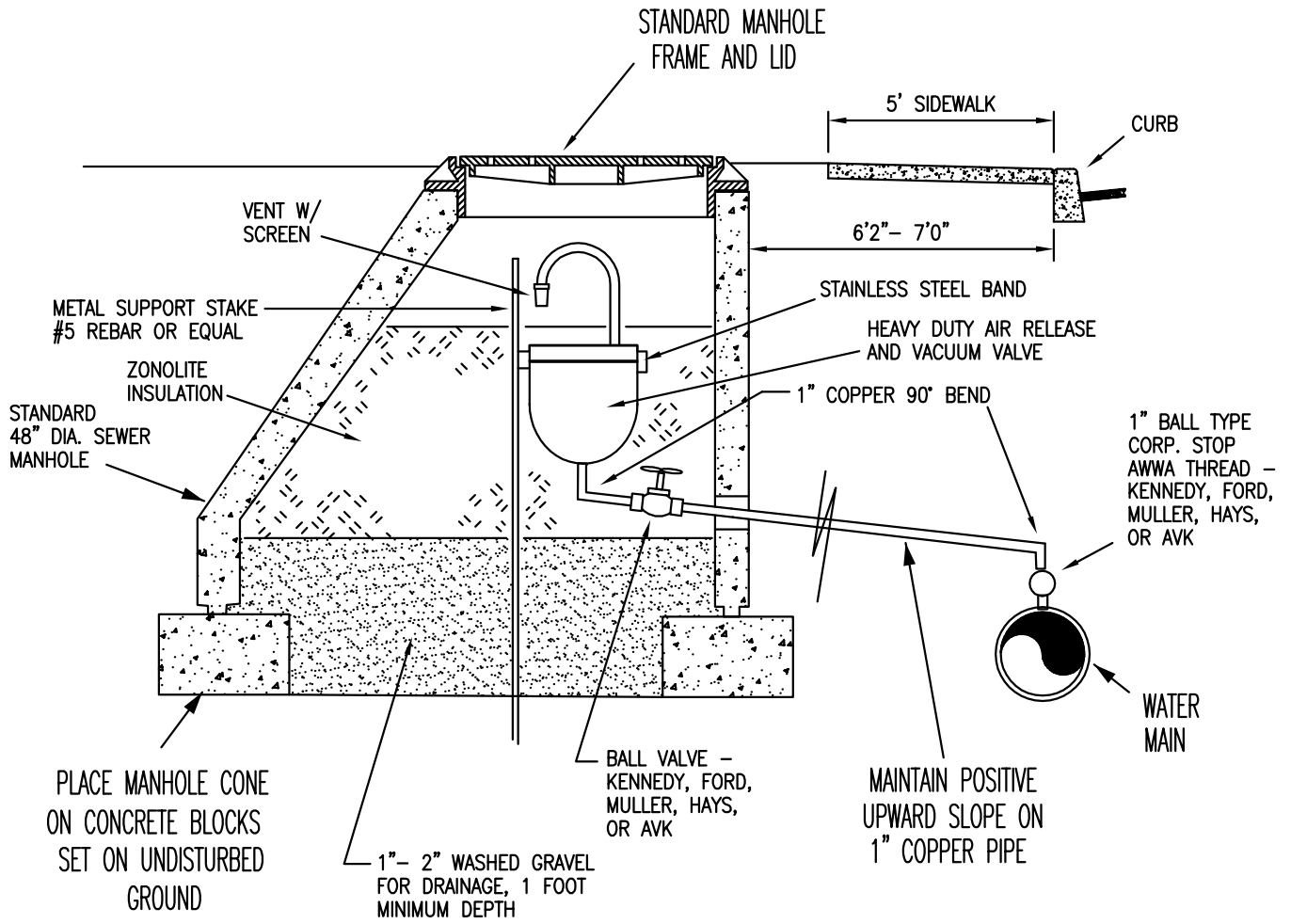
DATE : 4/01/08	SCALE : NONE	FIRE HYDRANT LOCATION DETAILS	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-11	APPROVED BY : MDW			



<i>A</i>	<i>B</i>	<i>C</i>
COVER FROM CULVERT TO FINISH GRADE	CULVERT SIZE	SEPARATION CULVERT TO MAIN
12" OR LESS 12" OR MORE	6" THRU 12" 6" THRU 12"	NOT LESS THAN 18" NOT LESS THAN 12"
12" OR LESS 12" OR MORE	14" THRU 24" 14" THRU 24"	NOT LESS THAN 30" NOT LESS THAN 24"
	GREATER THAN 24"	NOT LESS THAN 36"

CLEARANCE OF WATER MAIN TO INSIDE WALL OF A  
CATCH BASIN SHALL BE NOT LESS THAN 30".

DATE :	SCALE :	SEPARATION OF WATER LINE TO IRRIGATION CULVERTS	<b>CITY OF PRINEVILLE</b> <hr/> <b>PUBLIC WORKS DEPARTMENT</b>	
1/31/06	NONE			
DRAWING NO.	APPROVED BY :			
4-12	MDW			



**NOTES:**

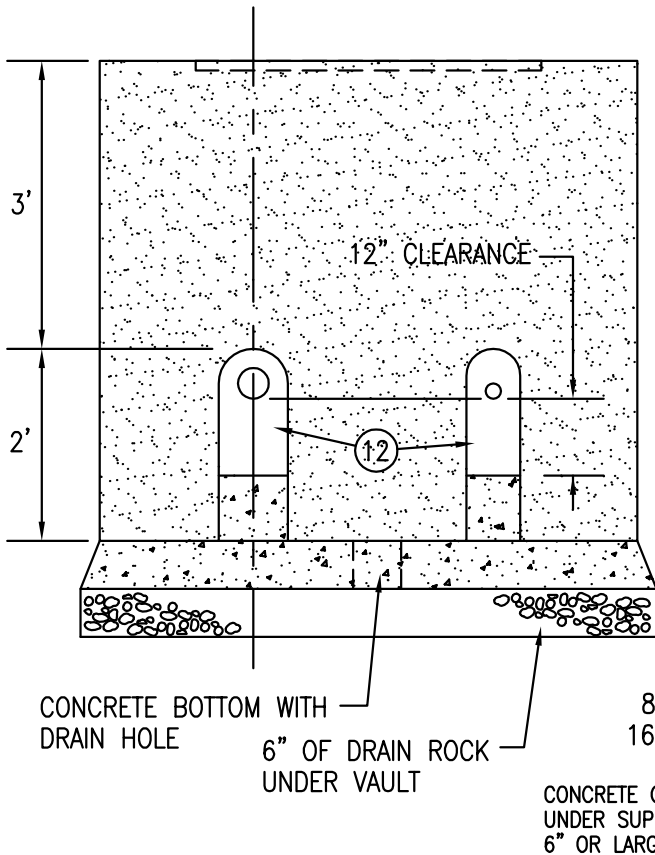
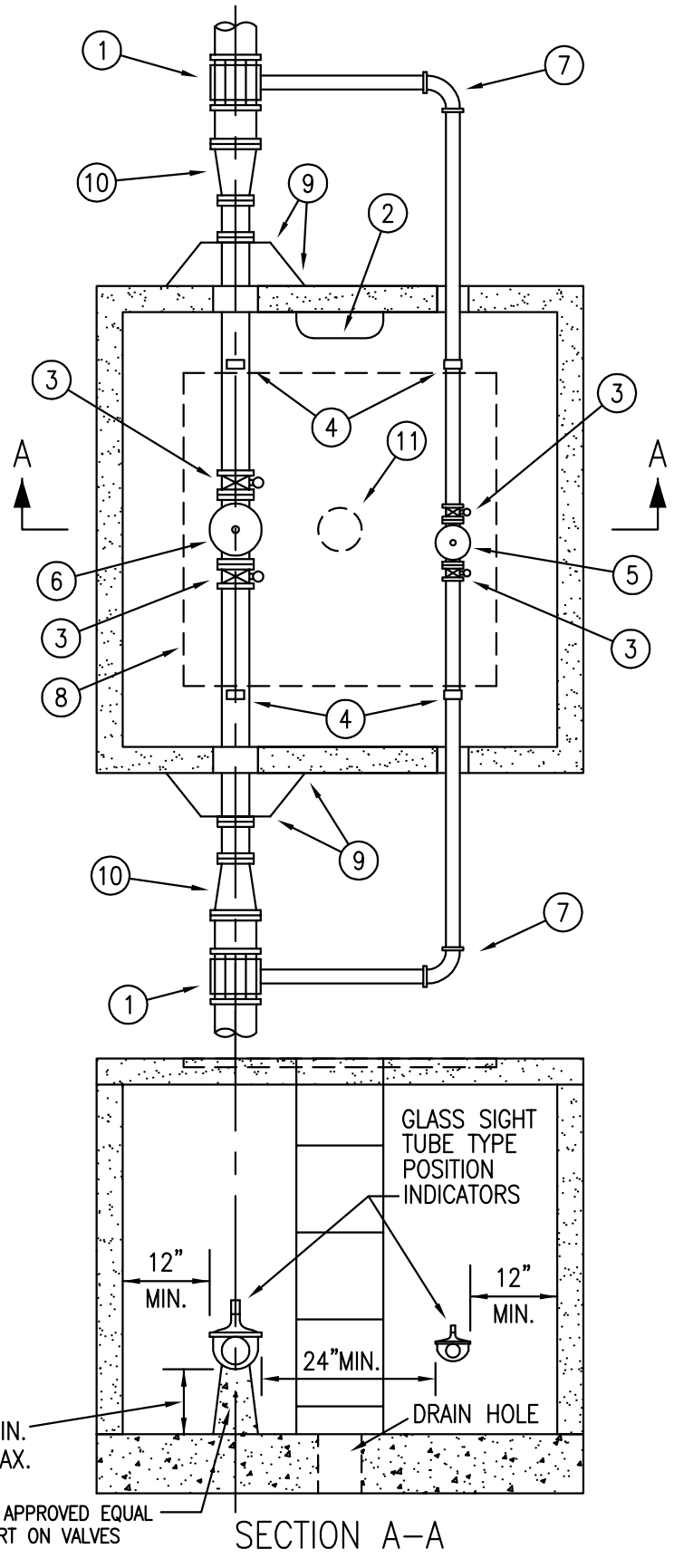
1. 1" ASSEMBLIES TO BE APCO 1430. 2" ASSEMBLIES TO BE APCO 1450 OR EQUAL
2. 1" SERVICE LINE TO BE COPPER.
3. 2" SERVICE LINE, 2" COPPER SIZE AND 2" BALL VALVE FOR 2" ASSEMBLIES, OR SCH. 40 PVC.
4. ASSEMBLIES INSTALLED AT EASEMENTS TO ROADS & STREETS WITHOUT CURBS SHALL BE PROTECTED WITH GUARD POSTS.
5. VALVE STACK REQUIRED AT MAIN CONNECTION ON 2" OR LARGER SERVICE, TYLER MODEL 6855.

DATE : 1/31/07	SCALE : NONE	STANDARD AIR RELEASE & VACUUM VALVE ASSEMBLY	<b>CITY OF PRINEVILLE</b> PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-13	APPROVED BY : MDW			

**NOTES**

1. SADDLE TAP
2. GALVANIZED STEEL LADDER w/RUNGS @ 12" O.C.
3. BUTTERFLY VALVE, AS REQ'D
4. PRESSURE GAUGE WITH SHUT OFF
5. BYPASS PRESSURE REDUCING VALVE, AS SPEC.
6. PRIMARY PRESSURE REDUCING VALVE, AS SPEC.
7. 90° BEND
8. DOUBLE OPENING GALVANIZED STEEL LIDS
9. COATED STEEL PLATE (PAINT, MASTIC, BITUMUL)
10. REDUCER
11. DRAIN HOLE
12. KNOCK-OUTS TO BE FILLED WITH APPROVED MOISTURE PROOF INSULATION

5' x 5' - MIN. VAULT SIZE FOR 6" & 8" MAINS . ALL OTHER VAULT SIZES AS SPECIFIED .



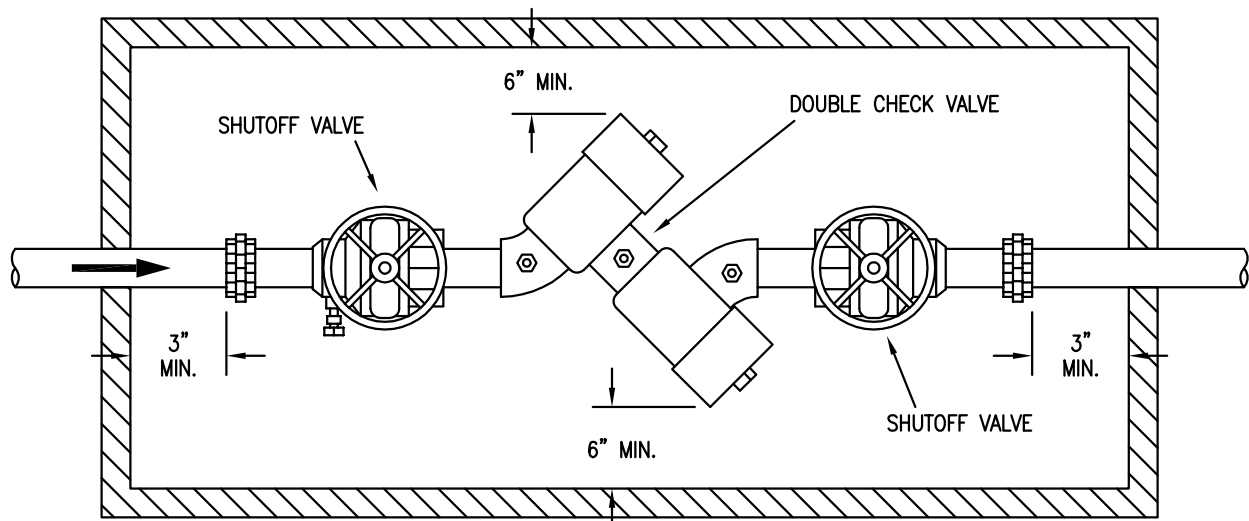
DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
4-14	MDW

**PRESSURE REDUCING  
VALVE VAULT**

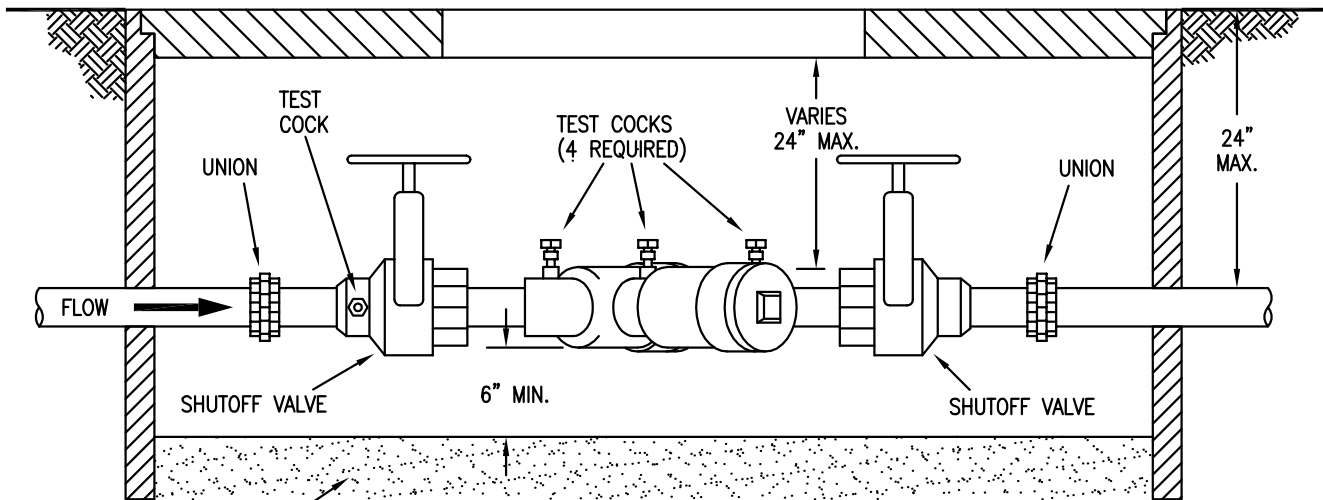
**CITY OF PRINEVILLE**  
**PUBLIC WORKS DEPARTMENT**







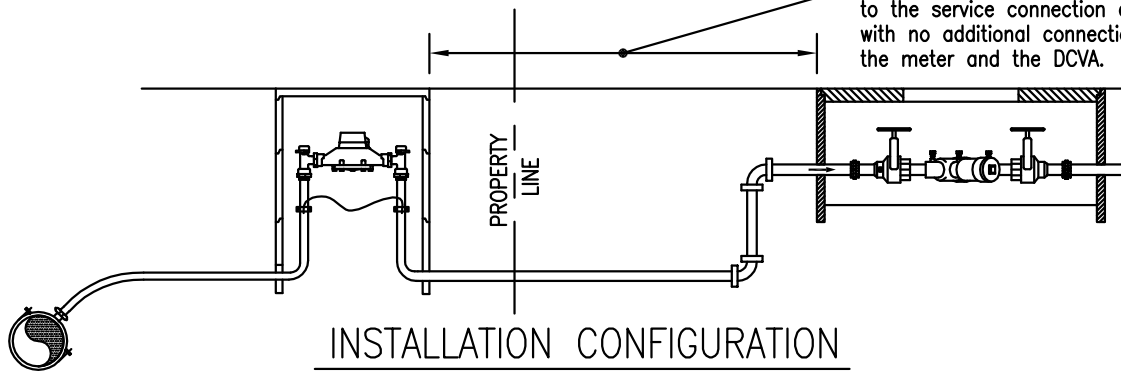
TOP VIEW  
DOUBLE CHECK VALVE ASSEMBLY




SIDE VIEW

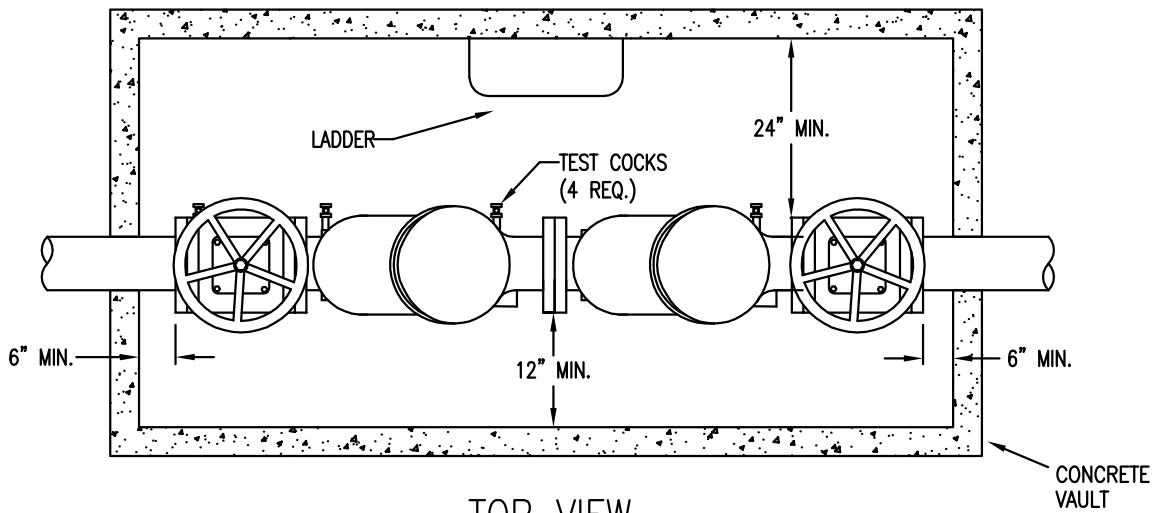
12" OF 3/4" CLEAN DRAINAGE GRAVEL

Assembly shall be located as close to the service connection as possible with no additional connections between the meter and the DCVA.

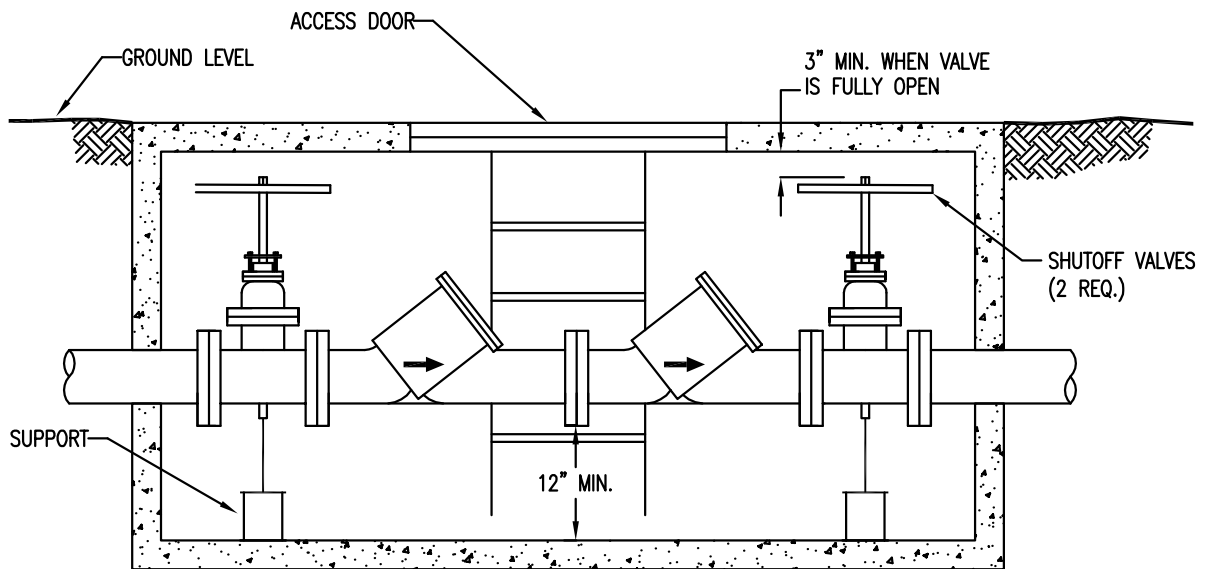


INSTALLATION CONFIGURATION

DATE : 1/31/07	SCALE : NONE	TYPICAL BACKFLOW DEVICE 3/4" TO 2" DCVA INSTALLATIONS	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
DRAWING NO. 4-15	APPROVED BY : MDW			

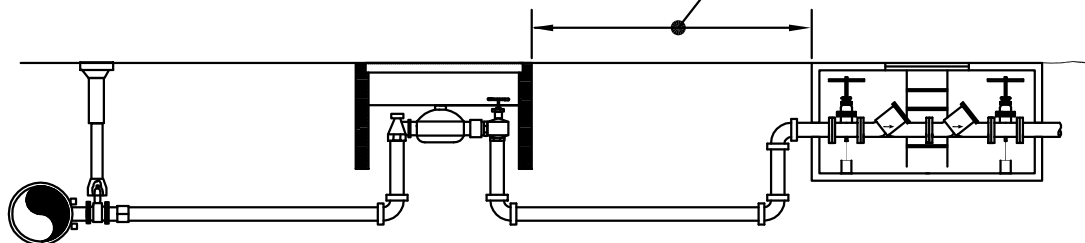


TOP VIEW  
DOUBLE CHECK VALVE ASSEMBLY & VAULT



SIDE VIEW

Assembly shall be located as close to the service connection as possible with no additional connections between the meter and the DCVA.



INSTALLATION CONFIGURATION

DATE :  
1/31/07

SCALE :  
NONE

DRAWING NO.  
4-16

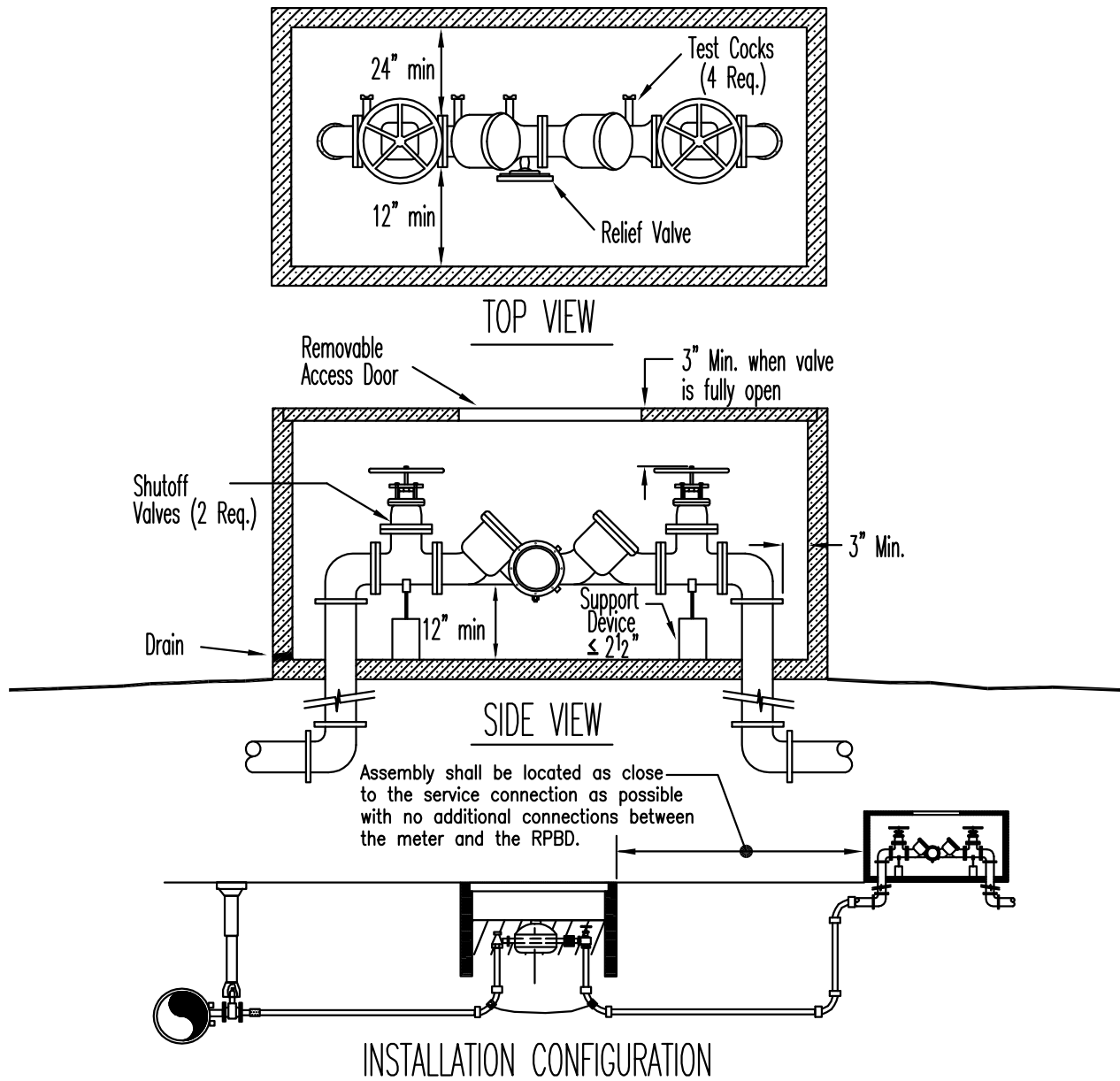
APPROVED BY :  
MDW

TYPICAL BACKFLOW DEVICE  
LARGER THAN 2" DCVA  
INSTALLATIONS

**CITY OF PRINEVILLE**


**PUBLIC WORKS DEPARTMENT**

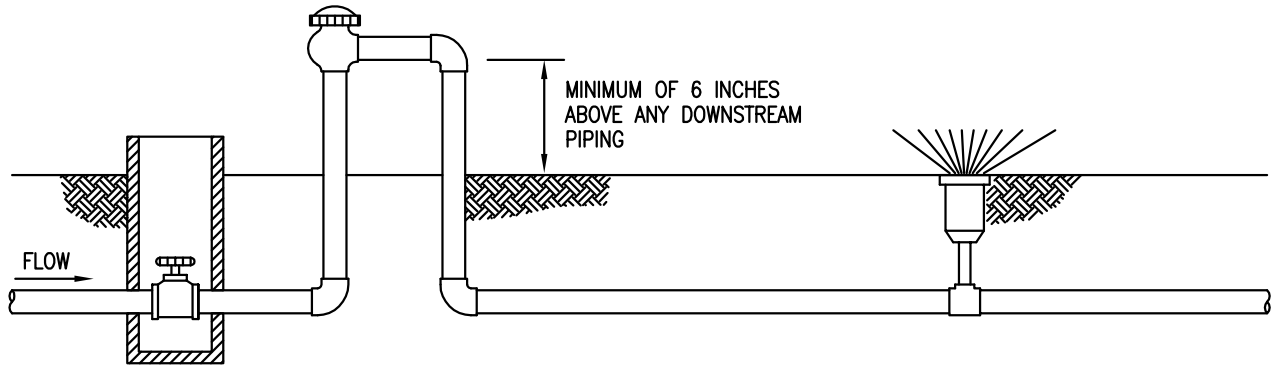




**NOTES:**

1. Bottom and side clearances apply when devices are installed inside building. Access doors may be provided on side of above-ground vault.
2. RPBDs shall always be installed horizontally, never vertically.
3. RPBDs shall always be installed above the 100 year (1 %) flood level unless approved by the local authority.
4. Relief valves shall never be extended or plugged.
5. Provide heat or insulation for protection from freezing.
6. A provision for an air gapped drain shall be provided.
7. RPBDs shall not be installed in a closed vault or box unless a bore-sighted drain to daylight is provided.
8. Minimum clearances for device assemblies 2 inches or smaller may be reduced provided that they are accessible for testing and repairing and approved by the water division.

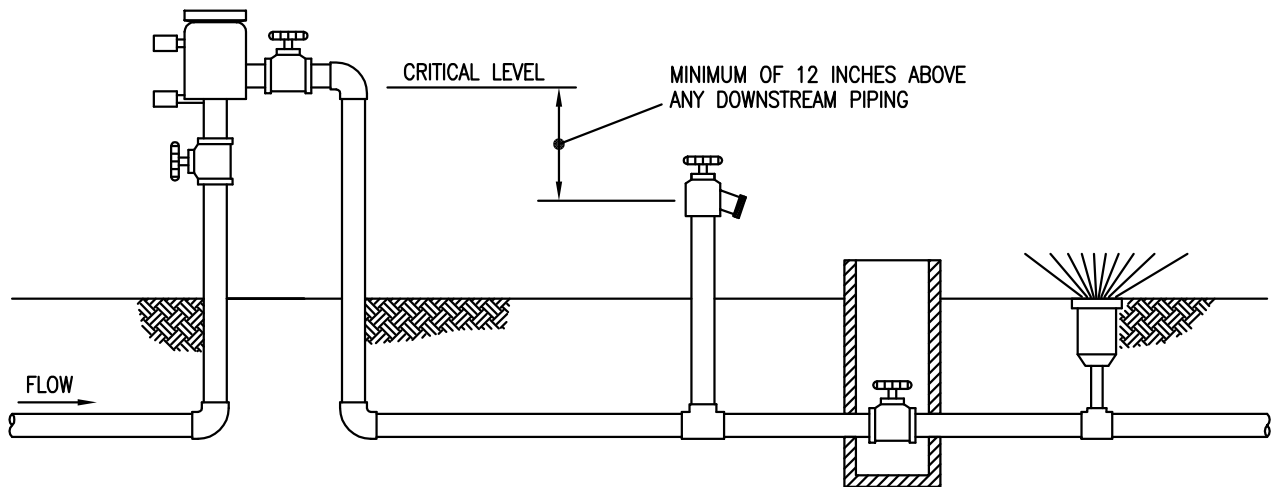
DATE :	SCALE :	<b>REDUCED PRESSURE BACKFLOW DEVICE – DCVA INSTALLATION</b>	<b>CITY OF PRINEVILLE</b>  <b>PUBLIC WORKS DEPARTMENT</b>	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
4-17	MDW			



**NOTE:**

1. ABSOLUTELY NO MEANS OF SHUT-OFF ON THE DOWNSTREAM OR DISCHARGE SIDE OF THE VACUUM BREAKER.
2. FOR INTERMITTENT USE ONLY. MUST NOT BE PRESSURIZED FOR MORE THAN 12 HOURS IN ANY 24 HOUR PERIOD.
3. SHALL NOT BE SUBJECT TO ANY BACKPRESSURE.
4. SHALL NOT BE INSTALLED IN DUSTY OR CORROSIVE ATMOSPHERES.
5. SHALL NOT BE INSTALLED WHERE SUBJECT TO FLOODING.


### ATMOSPHERIC VACUUM BREAKER (AVB) INSTALLATION

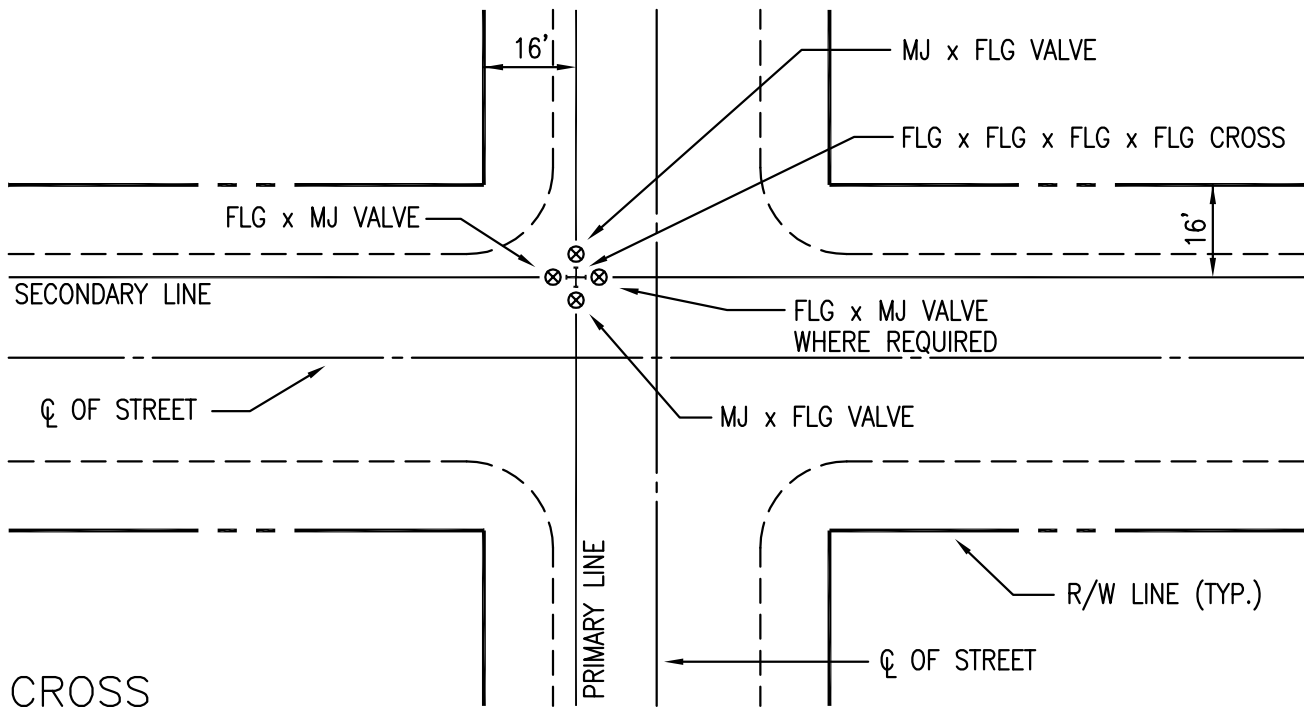


**NOTE:**

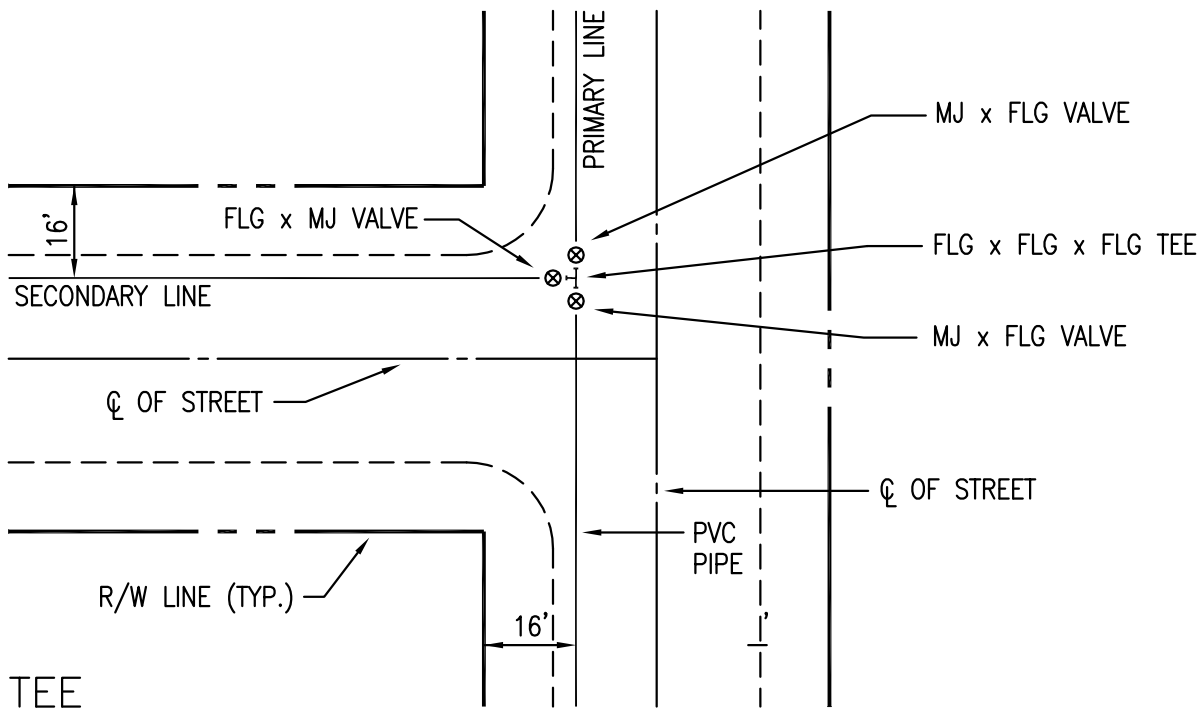
1. DOWNSTREAM SIDE OF VACUUM BREAKER MAY BE MAINTAINED UNDER PRESSURE BY A VALVE. BUT, THERE SHALL BE ABSOLUTELY NO MEANS OF IMPOSING PRESSURE BY PUMP OR OTHER MEANS.
2. PVB'S ARE DESIGNED TO PROTECT AGAINST BACK SIPHONAGE ONLY, NOT BACKPRESSURE.
3. IT SHALL BE INSTALLED WHERE OCCASIONAL WATER DISCHARGE FROM THE DEVICE CAUSED BY PRESSURE FLUCTUATIONS WILL NOT BE OBJECTIONABLE.
4. ADEQUATE SPACING SHALL BE AVAILABLE FOR MAINTENANCE AND TESTING.
5. SHALL NOT BE INSTALLED WHERE SUBJECT TO FLOODING.

### PRESSURE VACUUM BREAKER (PVB) INSTALLATION


DATE :	SCALE :	BACKFLOW DEVICE STANDARD FOR VACUUM BREAKER INSTALLATION	<b>CITY OF PRINEVILLE</b> <hr/> PUBLIC WORKS DEPARTMENT	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
4-18	MDW			

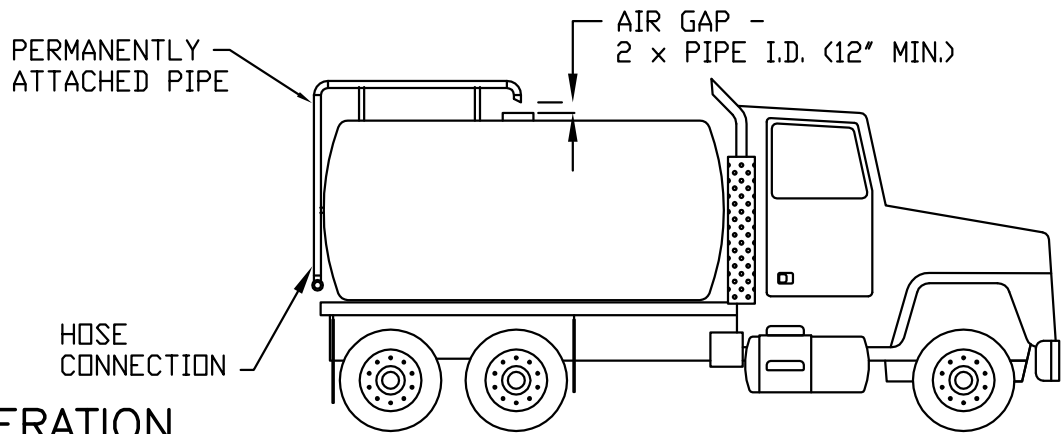


CROSS



TEE

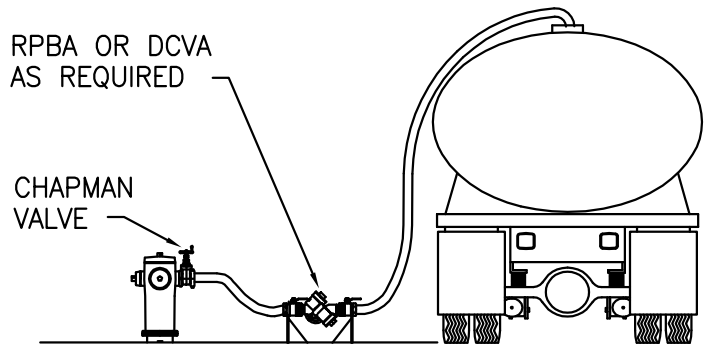
DATE :	SCALE :	TYPICAL WATER LINE INTERSECTION CONNECTIONS	CITY OF PRINEVILLE PUBLIC WORKS DEPARTMENT	
1/31/07	NONE			
DRAWING NO.	APPROVED BY :			
4-19	MDW			



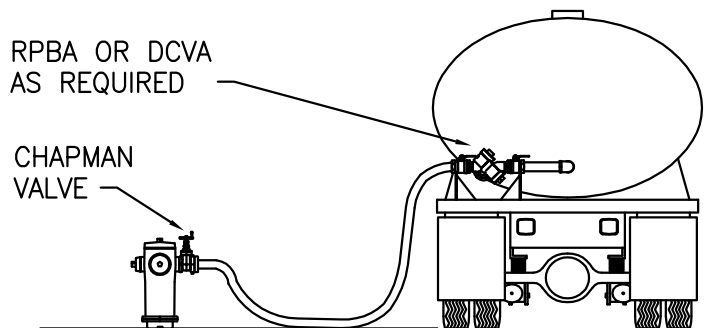
## HYDRANT OPERATION

1. TOOLS— USE ONLY APPROVED HYDRANT WRENCH ON TOP OPERATING NUT AND PORTS.
2. WATER HAMMER— OPERATION OF ALL VALVES SHALL CONDUCTED AT A RATE SLOW ENOUGH TO PREVENT SUDDEN MOVEMENT IN THE SYSTEM. CEASE VALVE OPERATION UPON ENCOUNTERING AIR OR "SHUTTERING" VIBRATION IN THE SYSTEM UNTIL ALL AIR HAS BEEN EXPELLED AND CONTINUE OPENING. DO NOT CLOSE VALVE UNTIL ALL AIR HAS CLEARED.
3. VALVES— USE ONLY "MULTI-TURN GATE VALVES" ON HOSE NOZZLES. LEVER OPERATED QUARTER TURN VALVES ARE PROHIBITED.
4. PARTIALLY DISASSEMBLED/DAMAGED HYDRANTS— DO NOT ATTEMPT TO OPERATE ANY HYDRANT UNDER ANY STATE OF REPAIR. IMMEDIATELY REPORT ANY MALFUNCTIONING HYDRANTS TO THE PUBLIC WORKS DEPT.
5. CLOSING TORQUE— CENTER STEM COMPRESSION HYDRANTS ARE "NORMALLY CLOSED" AND REQUIRE ONLY MINIMAL EFFORT TO CLOSE. SHOULD EXCESSIVE RESISTANCE BE ENCOUNTERED, OR FLOW DOES NOT ABATE, SLOWLY RE-OPEN TO CLEAR ANY OBSTRUCTION AND RE-CLOSE. AFTER FULL SHUT-OFF, APPLY  $\frac{1}{8}$  TURN OPEN TO RELIEVE INTERNAL STEM STRESS.
5. FULL OPEN OPERATION— HYDRANT MUST BE OPERATED IN THE FULLY OPENED POSITION ONLY. A MULTI-TURN GATE VALVE SHALL BE INSTALLED ON THE HYDRANT NOZZLE TO REGULATE SLOWER THAN FULL FLOWS ("CHAPMAN VALVE" OR EQUAL— $2\frac{1}{2}$ " N.F.S. TO MALE ADAPTER WITH 2" GATE VALVE).

## AIR GAP



## PORTABLE ASSEMBLY



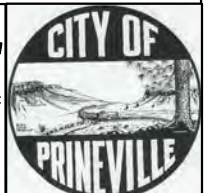
## TRUCK MOUNTED ASSEMBLY

DATE :	SCALE :
2/20/12	NONE
DRAWING NO.	APPROVED BY :
4-20	EAK

WATER TRUCK FILL  
CONNECTIONS  
HYDRANT OPERATION

**CITY OF PRINEVILLE**

**PUBLIC WORKS DEPARTMENT**



# Chapter IX

## STRUCTURES

### 1050 FENCES

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#### DESCRIPTION

##### 1050.00 SCOPE

This section covers the work necessary to furnish and install fences, gates and gateways of barbed wire, woven wire fabric, chain link fabric or combinations thereof, in reasonably close conformity to the lines and grades designated by the Design Engineer or City Engineer. All dimensions shown on the plans are horizontal and vertical measurements.

Except as modified or supplemented herein, the provisions of Section 1050 of the current edition *Oregon Standard Specifications for Construction* shall apply.

#### MATERIALS

##### 1050.10 GENERAL

The Contractor shall furnish all required material certifications.

#### CONSTRUCTION

##### 1050.40 GENERAL

Materials removed under these provisions, including excess excavation, shall be disposed of by the Contractor in a manner satisfactory to the Engineer.

##### 1050.41 LINES, GRADES AND PREP WORK

The fence lines designated by the Design Engineer or City Engineer shall be cleared, grubbed and otherwise prepared by the Contractor such that the grade shall not vary more than 6 inches in any 15 foot run. All shrubs, brush, logs, down timber, snags, rock and other such obstacles, including trees up to 6 inches in diameter, which interfere with the fence, shall be removed to 36 inches from the construction. Trees having diameters in excess of 6 inches on fence lines will normally be preserved. The bottom of fence fabric shall generally follow the contour of the ground, with no less than one inch nor more than six inches clearance from the ground surface. As much as possible, the fence shall be erected on natural ground. Irregularities which would interfere with maintaining the specified fence ground clearance shall be removed by cutting or by filling with earth or fine rock. Grading shall provide a neat appearance.

At locations where breaks in a run of fencing are required or at intersections with existing fences, appropriate adjustment in post spacing shall be made to conform to the requirements for the type of closure indicated.

## **1050.43 INSTALLING POSTS AND BRACES**

### **1050.43(a) GENERAL**

All posts shall be set firmly in the ground or in concrete footings as applicable. Reasonable variation in depths will be permitted and posts may be appropriately shortened or left slightly high, as approved by the Engineer, to avoid unnecessary penetration or excavation in rock or other unusually firm material or to obtain desired grades along the fence. The height of post above ground shall not exceed the design height by more than three inches.

### **1050.43(a)(2) DUG HOLES**

When drilling into solid rock is required to set a post, the Contractor may shorten the post such that a minimum of 12 inches of the post is grouted into the rock.

### **1050.43(a)(3) CONCRETE FOOTINGS**

Excavations for concrete footings shall be to reasonably neat lines, to not less than the specified dimensions in soil and shall be made with care to prevent disturbance of original ground at the sides and bottom of the excavation. Footings shall have dimensions not less than the dimensions shown on the standard plan and shall fill the excavated areas and contact firm soil at the sides and bottom. Typically a fence shall have as a minimum 3 feet of set in excavated materials. The concrete shall be poured in place and tamped around the posts and brace ends after the post and braces have been brought to and firmly held in proper position. The surface of the concrete shall be struck off and sloped to a reasonably smooth surface at the ground level and the concrete shall be allowed to cure for at least 5 days before the posts and braces are subjected to strain.

### **1050.43(f) LINE POSTS**

Line posts shall be set along the line of fence, between end, corner and gate posts and normally at the spacing's called for by the plans. In individual cases the line posts may be set at greater spacing's (not exceeding 25% greater) than specified or at closer spacing's if approved by the Engineer. It is the intent of this provision that the actual number of line posts required will average out to the number required for normal spacing.

### **1050.43(g) BRACES**

Metal post braces shall be firmly attached to metal end posts, intermediate end posts, corner posts and gate posts and shall be set in concrete footings, when indicated on the plans. Corner posts and intermediate end posts shall be provided with two braces, one each way from the post in the main lines of the fence. End posts and gate posts shall be provided with one brace in the line of the fence as called for on the plans.



#### **1050.44 BARBED AND WOVEN WIRE FENCE**

##### **1050.44(b) SPLICING FABRIC AND WIRE**

Fabric splices shall be with spiral pickets of specified chain link fabric material. Splices of tension wire and barbed wire shall be of the wrap or telephone type with each end wrapped around the other wire for not less than six complete turns.

In final position, the fabric and barbed wire shall be free from warp and sag and appearance shall reflect first-class workmanship in every detail.

##### **1050.44(c) STRETCHING FABRIC**

In stretching fence fabric, care shall be exercised that the pull shall be evenly distributed over the longitudinal wires.

##### **1050.44(d) FASTENING FABRIC AND WIRE**

Fabric shall be fastened to end, gate and corner posts and to gate frames as detailed on the plans. Fabric shall be attached to line posts with wire ties at top and bottom and at intermediate spacing's not exceeding 18 inches. Fabric shall be fastened to top and bottom rails and to longitudinal tension wire with metal bands or tie wires spaced as detailed on the plans but in no case greater than 24 inches apart.

#### **1050.45 CHAIN LINK FENCE**

##### **1050.45(b) CHAIN LINK FENCE RAILS AND TENSION WIRES**

###### **1050.45(b)(2) TENSION WIRE**

Tension wire shall be attached to end, gate and corner posts by bands and clamps. Top tension wire shall be either threaded through line post loop caps or held in open slots therein in such a manner as to limit vertical movement. Bottom tension wire shall be tied or attached to the bottom of line posts by ties or clamps in such a manner as to prevent vertical movement.

Expansion sleeves or couplings in longitudinal top and bottom rails shall be provided at spacing's not exceeding 200 feet. Tension wires shall be provided with one turnbuckle or one ratchet take-up in each run of fence.

##### **1050.45(c) CHAIN LINK FENCE FABRIC AND WIRE**

###### **1050.45(c)(1) SPLICING FABRIC**

Fabric splices shall be with spiral pickets of specified chain link fabric material. Splices of tension wire and barbed wire shall be of the wrap or telephone type with each end wrapped around the other wire for not less than six complete turns.

In final position, the fabric and barbed wire shall be free from warp and sag and appearance shall reflect first-class workmanship in every detail.

###### **1050.45(c)(2) FASTENING FABRIC**

Fabric shall be fastened to end, gate and corner posts and to gate frames as detailed on the plans. Fabric shall be attached to line posts with wire ties at top

and bottom and at intermediate spacing's not exceeding 18 inches. Fabric shall be fastened to top and bottom rails and to longitudinal tension wire with metal bands or tie wires spaced as detailed on the plans but in no case greater than 24 inches apart.

#### **1050.49 GATE INSTALLATION**

Gates shall be constructed so as to reflect high quality workmanship. Wire splices shall develop the full strength of the wire and the finished work shall provide a taut and well-aligned closure of the opening, capable of being readily opened and closed by hand. Gate openings shall be cleared and graded to permit the gate to swing in a horizontal plane to the extent hereinafter specified.

Swing gates shall be hinged in a manner which will prevent removal of the gate without proper tools. The fittings shall be firmly attached to the posts and gates in a workmanlike manner. Each single gate shall be hinged in a manner which will prevent removal of the gate without proper tools. The gate shall be set to swing freely inward and outward in an approximately horizontal plane and shall fasten securely in its latch holder or in the case of double gates, in its latch holder and gate stops. Double gates shall be set on their respective hinge pintles to provide, in so far as is practicable, a common horizontal plane in which each single gate shall swing. Gates shall swing open for a minimum of 90 degrees in each direction.

Roll gates shall be constructed in accordance with the plans and manufacturers recommendations.

### **PAYMENT**

#### **1050.90 GENERAL**

Payment shall include full compensation for furnishing all labor, material, tools, equipment and incidentals necessary to construct the work as specified.

Measurement and payment for gates will be on a per each basis for the type and length of gate specified and constructed. Barbed wire on Gates shall be paid for under the Barbed Wire item.

There will be no separate payment for clearing and grubbing. This work is considered incidental to the fence construction.

#### **1050.91 BARBED AND WOVEN WIRE FENCE**

Measurement and payment for barbed wire will be on a linear foot basis for the type of fencing specified and constructed.

#### **1050.92 CHAIN LINK FENCE**

Measurement and payment for fencing will be on a linear foot basis, less gate openings, for the type of fencing specified and constructed.

## **3010 FENCING MATERIALS**

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### **MATERIALS**

#### **3010.10 BARBED WIRE**

The barbed wire shall be 2-strand and either 12-1/2 gage or 15-1/2 gage with 4-point barbs spaced at 5-inch intervals conforming to the requirements of ASTM A 12-1/2. Galvanizing shall be Class 3.

All barbed wire installed on the project shall be the same gauge unless otherwise approved by the Engineer.

#### **3010.20 WOVEN WIRE FABRIC**

In addition to the above requirements for fabric, the screening shall be "View Gard" or an approved equal. The fabric shall be 3 1/2 inches by 5 1/2 inches mesh, woven from 9 gauge galvanized wire. The top and bottom selvage shall be furnished with a knuckle finish. The screening shall be vinyl slats in an approved color, approximately 5/16 inches by 2 3/8 inches. The slats shall be inserted vertically and shall be securely fastened to the wire fabric with stainless steel staples.

#### **3010.30 CHAIN LINK FABRIC, TIES AND TENSION WIRE**

Unless otherwise specified, chain link fabric shall be 9 gauge galvanized steel, 0.148 inches in diameter, having not less than .04 ounce galvanizing per SF. Chain link fabric shall conform to the requirements of AASHTO M 181 supplemented and modified as follows:

Fabric may be zinc coated steel with Class B coating, aluminum coated steel or aluminum alloy as the Contractor may elect provided that only one type is used on any one project.

Wire fabric ties, wire ties and hog rings may be zinc coated steel wire, aluminum coated steel wire or aluminum alloy wire as the Contractor may elect regardless of the type of wire fabric used.

The wire used for zinc coated steel wire fabric ties, wire ties and hog rings shall be ductile steel coated with zinc meeting the requirements of AASHTO M 120, applied at a rate of 0.7 ounce per square foot minimum to 1.4 ounce per square foot maximum of uncoated wire surface. Wire used for aluminum coated steel wire fabric ties, wire ties and hog rings shall be coated with a minimum of 0.3 ounce aluminum per square foot of uncoated surface.

Unless otherwise specified, the bottom tensioning wire shall be 7 gauge spring wire.

#### **3010.40 VINYL CLAD FABRIC**

The thickness of the coating shall not be included in the gauge rating of the fabric.

**3010.50 METAL FENCE POSTS, BRACES AND APPURTENANCES**

**RAILING**

Unless otherwise specified, all posts railings and similar structural elements shall be standard weight galvanized steel having not less than 1.6 ounce galvanizing per SF. Posts and railings shall conform to the following diameter schedule:

Railings and gates	1 5/8 inches
Line posts	2 3/8 inches
Corner and end posts	2 7/8 inches
Gate posts per swing-	
Gate swing	2.5 feet to 6 feet swing - 3 inches Greater than 6 feet swing - 4 inches

**Steel**

Steel shall be galvanized in accordance with the requirements of ASTM A153 unless otherwise specified. Shapes, plates and bars shall conform to the requirements of ASTM A36 unless otherwise specified.

Tubing shall conform to the requirements of ASTM A500, Grade B, ASTM 501 or ASTM A53, Grade B, unless otherwise specified.

Posts shall conform to the requirements of ASTM A27, Grade 65-35, unless otherwise specified.

Nuts, bolts and washers shall conform to the requirements of ASTM A307, Grade A, unless otherwise specified.

**Aluminum**

Tubing shall conform to the requirements of ASTM B221, alloy 6061-TG or 6351-T5. Posts shall conform to the requirements of AASHTO M193. Nuts, bolts, washers and set screws shall conform to the requirements of ASTM B211, alloy 2024-TG or 6061-TG. Finished nuts and bolts shall be given clear anodic coating at least 0.0002 inch in thickness and chromate sealed.

**3010.60 GATES**

Chain link gate frames shall be galvanized steel pipe conforming to the requirements of ASTM A53 or ASTM A120.

# **GRAVITY IRRIGATION SYSTEM INSTALLATION CANAL CROSSING, HEADWALL AND WINGWALL**

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## **DESCRIPTION**

### **SCOPE**

This work shall consist of the construction of Portland Cement concrete structures.

The structures shall be constructed in accordance with this specification at the respective locations shown on the drawings or designated by the Engineer and in reasonably close conformity to the lines, grades, dimensions and designs shown on the drawings or established by the Engineer.

### **MATERIALS**

#### **Portland Cement Concrete**

Portland Cement concrete shall be 3,000 psi in 28 days in accordance with ASTM C-31 and 39 and shall contain no additives to cause rapid heating or setting. Entrained air shall be a required additive in the amount of 5 percent, plus or minus one percent. Slump shall not exceed 4 inches at time of placement into forms in accordance with ASTM C-143. Concrete shall be placed within 90 minutes of water being added to batch mix. Contractor shall submit a mix design for Engineer's review a minimum of one week prior to concrete placement.

#### **Reinforcing Steel**

Steel bars shall be ASTM A 615, Grade 60 deformed bars, except where otherwise indicated. Tie wire shall be minimum 16 gauge.

### **CONSTRUCTION**

#### **Preparation of Base**

Areas on which concrete structures are to be constructed shall be brought to proper lines and grade and compacted to not less than ninety-five percent (95%) of the maximum density, at optimum moisture, as determined by the ASTM D-698 compaction control test unless otherwise indicated on the drawings. The base shall be moist and firm at the time the concrete is placed.

#### **Weather precautions-**

##### **Cold Weather Precautions**

Place no concrete on frozen subgrade. Remove ice and snow from reinforcing, forms and embedded items. Raise temperature of all surfaces in contact with concrete above 40° F prior to concrete placement. Minimum concrete temperature for 72 hours after placement: 55° F. Minimum air temperature during first 24 hours after protection removal: 50° F. Use of salts or chemical admixtures to prevent concrete freezing prohibited. Do not permit temporary heaters to locally over-heat or over-dry concrete.

Assume responsibility, including costs, for testing suspected frozen concrete. Remove and replace freeze-damaged concrete at Contractor's expense.

### **Warm Weather Precautions**

When air temperature exceeds 90° F and when wind exceeds 20 miles per hour, place concrete in accordance with the following requirements: Maximum concrete temperature at time of placement: 75°F. Mix concrete minimum possible time and place as soon as possible thereafter. Sprinkle forms, reinforcing, embedded items and subgrade with cool water immediately prior to concrete placement. Protect unstripped formwork and exposed concrete surfaces against excessive drying with water spray or other approved method. Assume responsibility, including costs, for testing suspected damaged concrete. Remove and replace damaged concrete at Contractor's expense.

### **Concrete Forms**

Concrete structures shall be constructed between suitable forms of sufficient strengths to resist springing during depositing and consolidating concrete. In preparation for the placing of concrete all sawdust, chips and other construction debris and extraneous matter shall be removed from the interior of forms. Temporary struts, stays and braces used to hold forms shall be entirely removed from the forms prior to placing concrete and not buried in the concrete.

Forms shall comply with requirements of the International Building Code. Responsibility for the adequacy of the forms shall rest with the Contractor.

Forms for all concrete shall be 5/8 inch minimum thickness DFPA "Plyform". Thinner plywood or metal may be used as a lining for more substantial forms. Foundation forms shall be of 2-inch stock. Curved walls may be formed in straight segments, each segment not to exceed 2 feet in width. Coat contact surfaces of forms with new, stainless form oil. Temporary openings at the base of wall forms shall be provided to facilitate cleaning and inspection just before depositing concrete.

Form ties shall be "Snap-Ty", "Snap-Ins" or other of approved design, adjustable length. Use no twisted wire ties or wood spacers. Coat ties with grease; arrange so that, when forms are removed, metal will be one inch from concrete surface.

Forms shall not be removed without approval of the Engineer, nor in such manner as to cause injury to concrete. In no case may forms be removed before the expiration of three days.

External corners shall have 3/4-inch chamfer unless otherwise noted.

### **Reinforcing Steel Placement**

Cleaning, bending and placement of reinforcing bars shall be in accordance with requirements of the American concrete Institute Building Code (ACI 318). Furnish tie and support bars, as required, detailed to length, whether specifically shown on drawings or not.

The Contractor shall submit four copies of shop drawings and placing plans of reinforcement to the Engineer before fabrication, detailed in strict accordance with ACI Manual of Standard practice for Detailing Reinforced concrete Structures. Cut and bend no reinforcement before shop drawings have been reviewed by the Engineer.

Reinforcement, when placed, shall be clean and free of paint, loose rust, scale or other coatings which will reduce bond.

Spacers, chairs, ties or other devices necessary for properly placing, spacing, supporting and fastening reinforcement in place shall be included such that reinforcement is adequately supported in the proper place prior to placing concrete.

### **Embedded Items**

The Contractor shall provide and install all embedded items and anchorages for equipment. Where pipes pass through the structure they shall be cast in the concrete, unless shown otherwise. Place no chases or openings whatever in concrete which are not shown on the drawings unless approved by the Engineer.

### **Preparation of Place of Deposit**

All concrete placed on earth shall be placed on undisturbed or compacted inorganic earth, properly leveled or sloped. Shortly before placing concrete, wet, but do not flood, earth.

### **Mixing and Transportation**

All concrete shall be supplied by an established transit-mix firm, mixed and delivered in conformity with ASTM C-94. Concrete shall be proportioned and batched to meet these specifications at the plant. Under no circumstances will the addition of water to the truck after leaving the plant be permitted unless directed by the Engineer or his authorized representative.

### **Concrete Placing**

Construction joints shall be placed as shown on the plans unless other locations are specifically approved by the Engineer. All pours between construction joints shall be continuous. The sequence of placing concrete shall be subject to the Engineer's approval. A placing schedule shall be submitted prior to the beginning of concrete work.

Concrete in walls shall be placed generally in horizontal layers approximately 12 inches thick. Concrete shall not be dropped more than six feet without the use of flexible drop chutes.

Concrete shall be thoroughly compacted by the proper use of immersion type vibrators, 7,000 rpm minimum when immersed, inserted vertically into the previously placed layer as deep as it goes by its own weight, approximately 18 inches apart.

Place concrete as nearly as practicable in its final position; do not utilize vibration as a means of moving concrete in the forms. Two (2) vibrators will be at the site prior to placing any concrete.

Special attention shall always be given the necessity of securing exposed surfaces which are smooth, dense and free of rock pockets, which will not require patching after form removal. The Contractor shall employ experienced placers, vibrator operators and one (1) spare vibrator to ensure uniform contact between concrete and forms.

### **Construction Joints**

Locate construction joints not shown on the drawings so as to least impair the strength of the structure. Location of all construction joints shall be shown on the approval of the Engineer and shall be shown on the placement drawings. Locate horizontal joints in walls at the tops of footings or grade slabs.

Provide longitudinal keys as indicated in all construction joints in walls and between walls and slabs or footings.

Prepare construction joint surface for bonding by thoroughly cleaning, brushing the surface and removing all laitance.

### **Wall Finish**

After removal of forms, repair or patch honeycombs, tie holes and other defective concrete.

Repair surface defects and defective areas in accordance with ACI 301.

After correction of surface defects, remove all fins and corrections and rub all patched surfaces to obtain the same color as surrounding concrete.

### **Surface Finish**

Surfaces shall be finished to smooth and uniform texture by troweling and floating and, if so directed by the Engineer, by cross-booming or burlap-finishing. The surface shall be ground smooth and sacked with tie holes filled. Edges shall be chamfered to 3/4 inch.

The finished surface of concrete shall not vary more than 0.02 of a foot from the testing edge of a 10 foot straight edge, except at grade changes. Irregularities exceeding the above shall be satisfactorily corrected. The completed surface shall be uniform in color and free of surface blemishes and tool marks.

All surfaces which will be exposed to the weather and are normally level shall be sloped for drainage. Unless the use of other slopes or level surfaces is indicated on the drawings, slopes shall conform to the following:



- a. Narrow surfaces, such as tops of walls: 3/8 inch per foot.
- b. Broader surfaces, such as platforms, decks and slabs: 1/8 inch per foot.
- c. Thickness of slabs shall be not less than the indicated thickness at any point regardless of slope requirement.

### **Curing**

After concrete has been placed and finished as specified, it shall be cured (1) by application of a white pigmented liquid membrane-forming compound applied uniformly to damp concrete by pressure spray methods or, (2) by keeping the concrete protected and constantly moist for at least 72 hours.

### **Protection**

The completed concrete surface shall be protected from damage until the project is accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Surfaces that are damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Removed portions shall be disposed of off the project site by the Contractor at no additional cost to the Owner.

### **Defective Work**

Any concrete not formed as shown on the drawings, out of alignment or level or having a defective surface shall be removed by the Contractor, unless permission to patch the defective area is granted by the Engineer.

When permission is granted to patch, the following operations should be performed as soon as possible after form removal, before concrete surface is allowed to dry. Chip out defective areas to one inch minimum with perpendicular edges. Wet surface and compact in place same mix as concrete used, omitting coarse aggregate. Screed slightly higher than surrounding surface, then finish to match.

Fill holes left by withdrawal of rods or ties solidly with mortar or approved silicone type sealer, wiping smooth to form a watertight seal.

## **MEASUREMENT AND PAYMENT**

Payment for work described in this section shall be included in the lump sum amount stated in the Proposal.

# **GRAVITY IRRIGATION SYSTEM INSTALLATION CANAL CROSSING**

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## **DESCRIPTION**

### **SCOPE - CMP CULVERTS, UTILITY DUCTS AND FENCE**

This section covers the work necessary for the construction of the culverts, utility ducts and fence complete.

## **MATERIALS**

### **Excavation and Backfill**

Conform to City of Prineville current Standard Specifications chapter Trenches. Trench backfill shall be class "B."

### **Culvert Pipe**

Culvert pipe shall be galvanized corrugated metal pipe conforming to AASHTO M-36. The outside of the pipe shall be suitably marked at the correct place on both ends to clearly designate the center line of the top of the pipe. Culvert pipe shall meet H2O live load requirements and be Asphalt Coated.

Corrugated steel pipe shall be manufactured of not lighter than 16-gauge sheet steel and furnished in single lengths when practicable. Provide manufacturer's standard watertight coupling bands with similar protective coating and galvanized steel bolts.

Culvert pipe to meet requirements of plans for size and type.

### **Culvert Pipe, Alternate Material**

Culvert pipe shall be helical corrugated aluminum pipe conforming to AASHTO M-196. Corrugated aluminum pipe shall be manufactured of not lighter than 14-gauge sheet aluminum, conforming to ASTM B-209. Provide manufacturer's standard coupling bands.

### **Utility Ducts**

Ducts shall be 4 inch diameter, Schedule 40, PVC pipe conforming to ASTM D1785 with solvent weld joints.

### **Fence**

Conform to City of Prineville current Standard Specifications chapter Structures; Section 3010.30 Chain Link Fence materials.

## CONSTRUCTION

### **Laying Culvert Pipe**

Install culvert pipe to proper line and grade by a method approved by the Engineer. Inspect pipe before laying and remove any damaged or defective pipe from the job and replace at no additional cost to the Owner.

Begin laying at the lowest end of culvert. Thoroughly clean ends of the pipes. Lay corrugated metal pipe culverts and connect sections in conformance with the manufacturer's printed instructions. Repair all damaged areas of the protective coating with material similar to the original and permit to dry or solidify before backfilling. Provide, as may be necessary, for temporary diversion of stream flow in order to permit the installation of the pipe under dry conditions.

### **Laying Utility Duct Pipe**

Install at locations indicated by the Engineer with minimum depth of cover of 2.5 feet. Lay with uniform slope to provide drainage.

### **Fence Installation**

Fence shall be installed plumb and along the alignment indicated in the Drawings. Conform to City of Prineville current Standard Specifications chapter Structures; Section 1050.

## MEASUREMENT AND PAYMENT

Payment for work described in this section shall be included in the lump sum amount stated in the Proposal.

### **Utility Duct/Conduit Bank Crossing**

Payment for Utility Ducts/Conduit Bank Crossing will be based on the unit price per linear foot of the Conduit Bank (4 lines) stated in the Proposal.

### **Fence**

Payment for fence work will be in accordance with Section 1050.90.

## **CANAL UTILITY CROSSING**

---

### **DESCRIPTION**

#### **SCOPE**

This section covers the work necessary to install a pipeline crossing of an irrigation canal.

### **MATERIALS**

#### **Riprap**

Riprap materials shall be Class 50 conforming to Section 390.11 of the Oregon Standard Specifications for Construction.

#### **Concrete**

Concrete for the cut-off wall shall meet the requirements of (same as headwall & wingwalls) of the City of Prineville current Standard Specifications.

#### **Waterstop**

Material for the waterstop shall consist of "Concrete for Trench Backfill" as specified in City of Prineville current Standard Specifications chapter Trenches.

### **CONSTRUCTION**

#### **General**

The canal crossing workmanship shall conform to the latest standards and revisions of the applicable Irrigation District/Authority. Details and dimensions of construction shall conform to the standard detail provided with the plans and described in these specifications.

Workmanship shall also comply with applicable sections of the chapter Trenches; (1) shoring, sheeting and bracing, (2) compaction equipment, (3) concrete backfill, (4) blasting, (5) repair of damage and, (6) settlement.

Work shall be completed and ready for use in a schedule to allow uninterrupted function of the canal.

#### **Formation of Embankment**

Embankments with riprap shall be formed to match the existing canal banks as determined by Ochoco Irrigation District and/or People's Ditch.

Compaction of all subgrade materials supporting structures and all backfill and embankment materials shall be compacted to ninety-five percent (95%) maximum density at optimum moisture as determined by ASTM D698.

### **Unclassified Excavation**

- (1) The Contractor shall complete all excavations for structures and structures footings to the lines and grades or elevation shown on the plans or as staked by the Design Engineer or City Engineer. The excavation shall be of sufficient size to permit the placing of the full width and length of the bottoms of footings, as shown on the plans.
- (2) Boulders, logs or any other objectionable materials encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level or stepped as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than that of rock, special care shall be taken not to disturb the bottom of the excavation and excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.
- (3) The Contractor shall do all bracing, sheeting or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws.
- (4) Unless otherwise provided, bracing, sheeting or shoring involved in the construction of this item shall be removed by the Contractor after completion of the structure.
- (5) After each excavation is completed, the Contractor shall notify the Engineer to that effect; and concrete or reinforcing steel shall be placed after the Engineer has approved the depth of the excavation and the character of the foundation materials.

### **Concrete Structures**

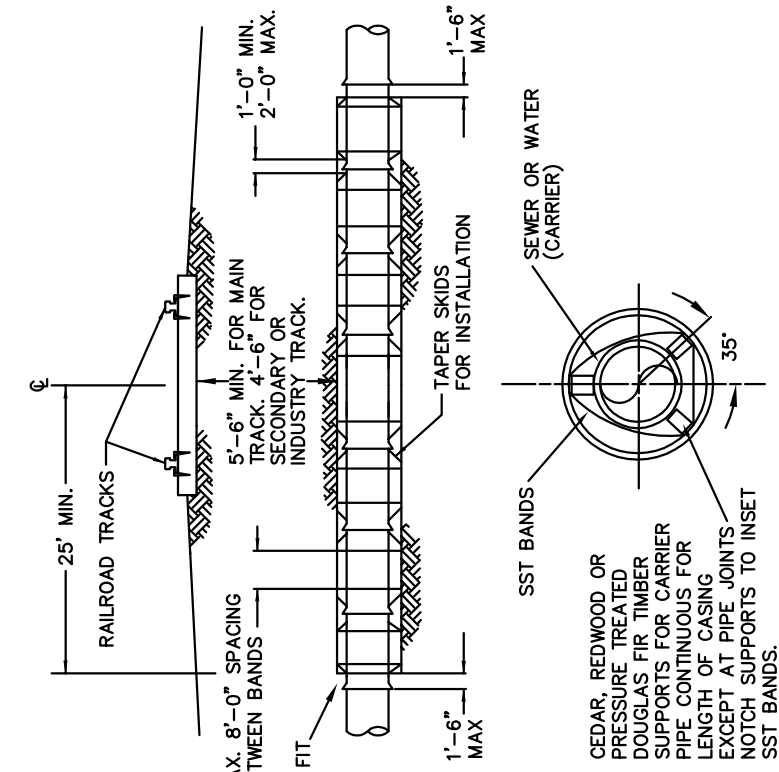
Concrete structures shall be built on prepared foundations, conforming to the dimensions indicated on the plans. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the Engineer before the concrete is poured.

### **MEASUREMENT**

The canal crossing shall be measured on a lump sum basis to the limits shown on the standard detail. See Drawing 1-6.

### **PAYMENT**

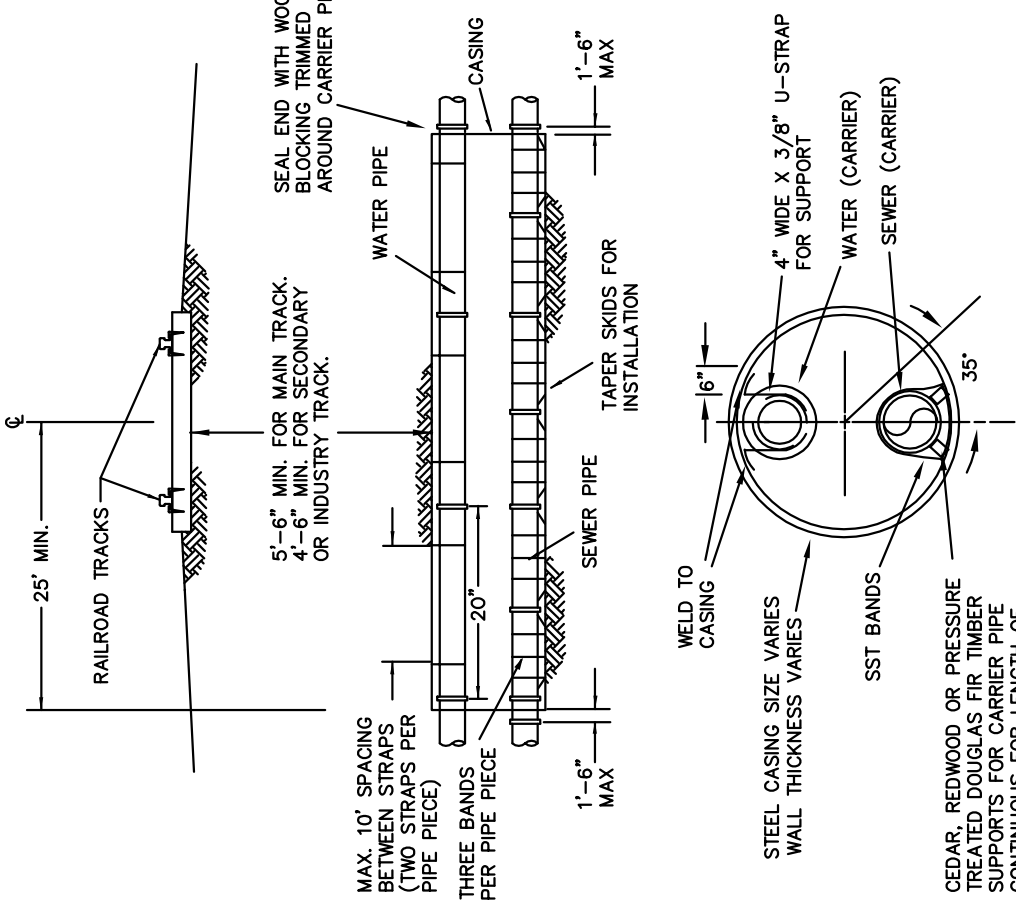
The accepted pay quantity shall be a lump sum for the canal crossing and include all materials, including the pipeline with appurtenances, labor, equipment, tools and incidentals necessary to complete the work.



### SINGLE USE CASING

CASING PIPE UNDER RAILROADS MIN. STEEL YIELD STRENGTH 35,000 PSI	
PIPE DIAMETER (INCHES)	MINIMUM WALL THICKNESS (INCH)
UNDER 14	0.188
14-16	0.219
18	0.250
20	0.281
22	0.312
24	0.344
26	0.375
28-30	0.406
32	0.438
34-36	0.469
38-42	0.500

\* PER AMERICAN RAILWAY ENGINEERING ASSOCIATION, E-72 LOADING



### JOINT USE CASING

### RAILROAD CROSSING DETAIL

NOTES:

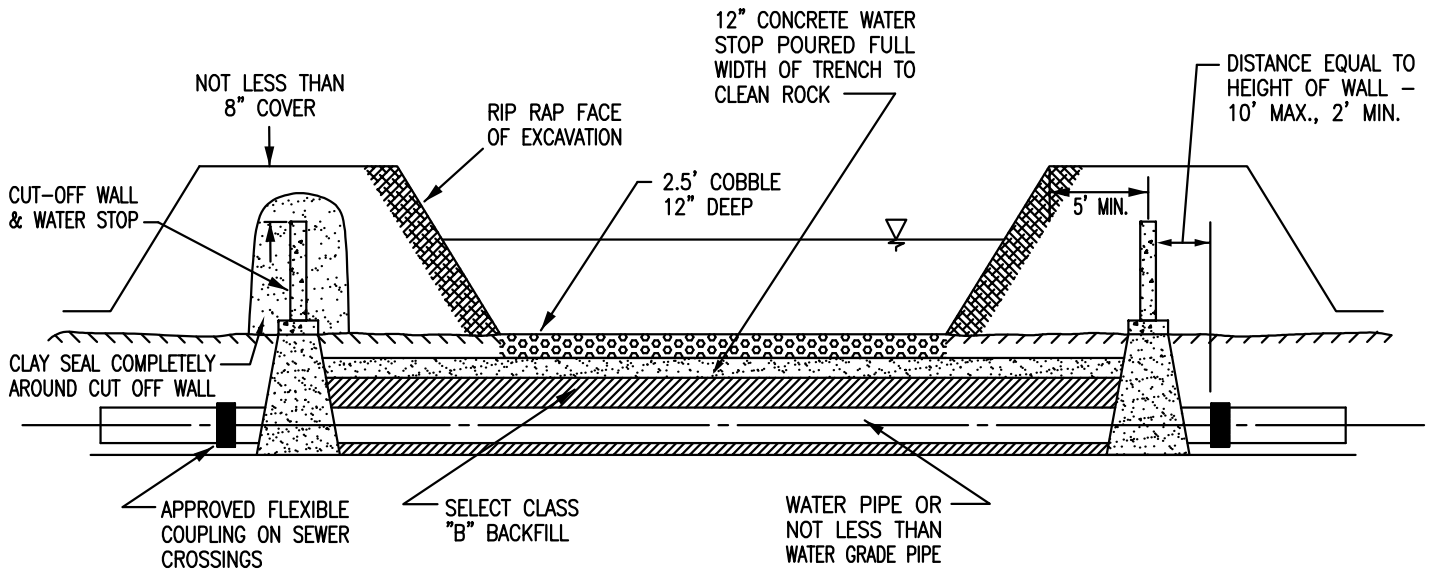
1. MINIMUM CASING WALL THICKNESS VARIES WITH CASING SIZE. SEE TABLE
2. CASING SHALL CONFORM TO SEWER SLOPE WHEN APPLICABLE.
3. CROSSING DETAIL MAY BE USED FOR HIGHWAYS, STREETS, AND ROADS WITH MIN. WALL THICKNESS OF 0.25 INCH.

DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
5-1	MDW

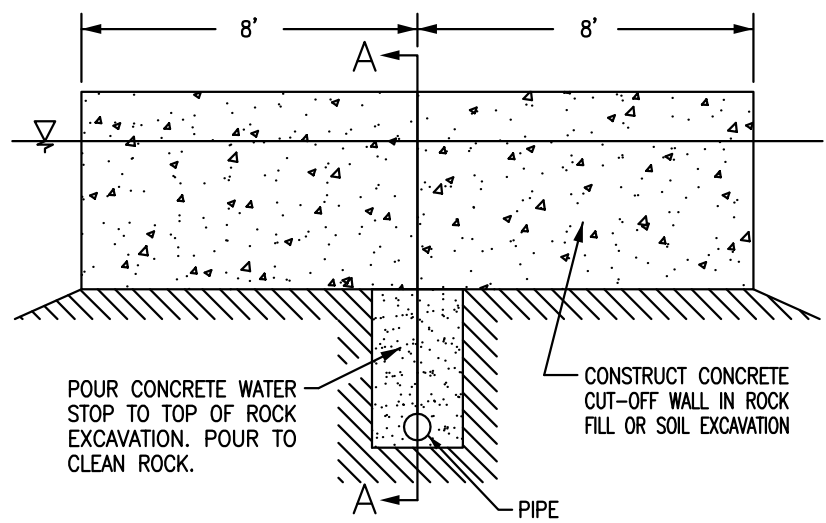
RR X-ING SINGLE/JOINT  
USE CASING FOR  
WATER & SEWER LINES

**CITY OF PRINEVILLE**  
PUBLIC WORKS DEPARTMENT

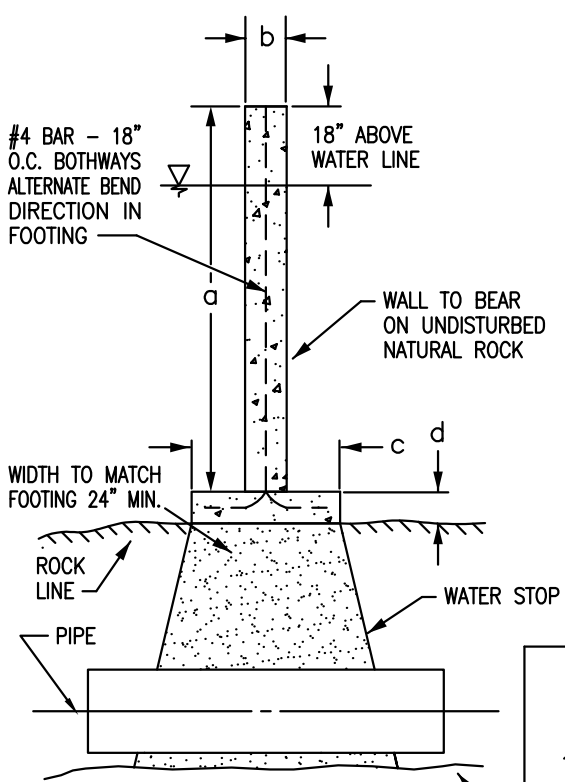




TRENCH PROFILE THRU CANAL



CUT-OFF WALL



SECTION A-A

a	b	c	d(min.)
0-6'	8"	24"	8"
6'-10'	12"	36"	8"
10'-14'	12"	48"	12"

DATE :	SCALE :
1/31/07	NONE
DRAWING NO.	APPROVED BY :
5-2	MDW

TYPICAL IRRIGATION CANAL UTILITY CROSSING DETAIL

CITY OF PRINEVILLE  
PUBLIC WORKS DEPARTMENT

