



2015

Improvement Design Standards City of Dundee, OR



**ADOPTED BY
DUNDEE CITY COUNCIL
AUGUST 21ST, 2015**

Department of Public Works
City of Dundee, OR

Original Prepared by Wallis Engineering

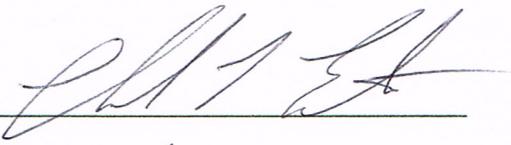


CERTIFICATION BY ENGINEER

**DUNDEE, OREGON
DUNDEE IMPROVEMENT DESIGN STANDARDS**

I hereby certify that the Dundee Improvement Design Standards were prepared by or under my direct supervision and that I am a duly registered Engineer under the laws of the State of Oregon.

Professional Engineer's
License No. OR 14,946

Signed: 

Date 8/21/15



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DIVISION 1: GENERAL

1.1 GENERAL REQUIREMENTS FOR PUBLIC IMPROVEMENTS

A. APPLICABILITY

1. These Design Standards are applicable to all improvements within existing and proposed public right-of-way and public utility easements, all improvements which are or will be maintained by the City, and all improvements that require approval by the City according to the Dundee Development Code.

B. GENERAL

1. All work which these Design Standards do not discuss but for which they apply shall conform to the latest revision of the Oregon Standard Specifications for Construction (OSSC).
2. These Dundee Design Standards will be cited routinely in the text as the "Design Standards."
3. These Design Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. The Design Standards are also not intended to limit unreasonably any innovative or creative effort which could result in increased quality, cost savings, or both.
4. The City Engineer has the authority to supersede any standards within this document.
5. Wherever specific supplementary standards (i.e. AWWA C-150, ASTM C-857) and manuals are indicated, it shall be understood to mean the latest revision thereof.
6. The provisions of these Design Standards are binding on owners, contractors and developers in the performance of any work covered under these Design Standards. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.
7. All other utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as these Design Standards.
8. Traffic control devices shall meet the standards of the current Manual on Uniform Traffic Control Devices (MUTCD), including Oregon amendments.
9. These Design Standards are not to be intended to replace building codes, development or zoning ordinances and other regulations for which procedures and standards have been established. Planning, zoning and related matters shall be satisfied prior to submitting an application for a public works construction permit.
10. All construction resulting from these Design Standards shall conform to the most recent addition of the OSSC.

C. ENGINEERING POLICY

1. The engineering policy of the City of Dundee requires compliance with Oregon Revised Statute 672 for professional engineers. The following requirements shall be applicable to the design of streets, parking lots, grading plans, sanitary sewers, storm drain systems, detention ponds, water quality facilities or enhancements and water distribution and storage facilities.
2. All engineering drawings, reports, or documents designated herein shall be prepared by a professional Civil Engineer registered in the state of Oregon, or by a subordinate employee under his direction, and shall be signed by him and stamped with his seal to indicate responsibility for them.
3. It shall be the Design Engineer's responsibility to review any proposed extension, modification or improvement of a public utility system with the City prior to final engineering and design work to determine any special requirements or whether the proposal is permissible. A preliminary review and/or approval of the drawings for construction for any project does not in any way relieve the Design Engineer of his responsibility to meet all requirements of the City or the obligation to protect life, health and property of the public. The drawings for any project shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met.

D. CONTRACTING POLICY

1. The policy of the City for construction of public improvements covered under these Design Standards requires that the contractor be registered with the Oregon Construction Contractors Board.

E. ABBREVIATIONS, DEFINITIONS AND TERMS

1. Refer to Section 00110 of the current Standard Specifications for Construction, for abbreviations, definitions and terms not listed below:

100 Year Flood	The flood event having a 1% chance of being equaled or exceeded in any given year.
ADA	Americans with Disabilities Act Of 1990.
ADT	Average Daily Traffic.
Air Gap Separation:	A physical vertical separation between the free-flowing discharge end of a potable water supply and the rim of any open, non-pressurized receiving vessel.
Alley	A public right-of-way not more than 20 feet and not less than ten (10) feet in width, which intersects with a public street.
Alta	American land title association.
Approved Backflow Prevention Assembly:	An assembly that has been investigated and approved by the Oregon Health Authority - Public Health Division for preventing backflow.
Appurtenance	Any fixed object located adjacent to the roadway and deemed to be a possible safety hazard.

Arterial Street	A street of considerable continuity which is used for moving large volumes of traffic to and from the highway and for interconnection between major areas of the City.
As-Built Drawings	Drawings prepared by the Design Engineer, signed and dated by the City representative indicating the drawings have been reviewed and revised, if necessary, to accurately show all as-built conditions and construction details.
Backflow	The flow of water or other fluids in a direction opposite to the normal flow.
BES	City Of Portland Bureau of Environmental Services
Bicycle Facilities	A general term denoting improvements and provisions which accommodate or encourage bicycling, including parking facilities, maps, signs, pathways, bike lanes, widened sidewalks, bikeways, and shared roadways designated for bicycle use.
Bicycle Path (Off-Street Pathway)	A paved pathway physically separated from motorized vehicular traffic by an open space or barrier within an independent right-of-way.
Bicycle Route (Bike Route)	A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number, or as designated on a bicycle map, brochure, or guidebook.
Building Sewer:	That part of the horizontal piping of the drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sanitary sewer system, private sanitary sewer system, individual sewage disposal system, or other approved point of disposal.
Building Supply:	The pipe carrying potable water from the water meter or other source of water supply to a building or other point of use or distribution on the lot. Building supply shall also mean customer line.
CARV	Combination Air and Vacuum Release Valve.
Catch Basin, CB	An approved receptacle designed to receive surface drainage and direct it to a stormwater collection system.
CBE	Crushed base equivalent (cbe) is the number that directly relates the traffic coefficient to the required number of inches of rock for street structural sections.
CBR	California Bearing Ratio.
CI	Cast Iron
City	City of Dundee, Oregon
City Engineer	City Engineer for the City of Dundee.
Clear Vision Area	A triangular area on a lot at the intersection of two streets or a street and a railroad, the sides of which are lines measured from the corner intersection of the right-of-way lines. The third side of the triangle is a line across the corner of the lot joining the ends of the other two sides. Where the lines at the intersections have rounded corners, the right-of-way lines will be extended in a straight line to the point of intersection.
CMP	Corrugated Metal Pipe (aluminum)

Collection Sewer:	Lateral and mainline sanitary sewers.
Collection System:	Facilities maintained by the City for the collecting, conveying, pumping and controlling of wastewater.
Collector Street	A centrally located street for moving traffic from arterials to local streets.
Contractor	Any individual, firm, co-partnership, corporation or any combination thereof who has or have been named on a public works construction permit as the person responsible for the construction of the subject work, or who have entered into a contract with the City for a particular project.
Construction Drawings	Drawings prepared by a registered professional engineer, including site plans, plan and profile views of utilities, cross sections, detailed drawings, etc. Or reproductions thereof, approved by the City Engineer, which show the location, character, dimensions and details for the work to be done.
Contact Cooling Water:	Water used as a medium for carrying away excess heat which, in the course of cooling process, comes in direct contact with the product, is mixed or co-mingled with any other substance or used as a means of carrying off any other substance, in suspension or in solution.
Cul-de-sac	A dead-end street with only one inlet/outlet
Cut Sheets	Construction submittals as required by section 1.3 of these Design Standards.
Creek	Any and all surface water generally consisting of a channel having a bed, banks, and/or sides in which surface waters flow to drain higher land to lower land, both perennial and intermittent, excluding flows which do not persist for more than 24-hours after the cessation of ½-inch of rainfall in a 24-hour period from October through March.
Cross Connection	Any connection or arrangement, physical or otherwise, Between a potable water supply system and any plumbing fixture or any tank, receptacle, equipment or devise, through which it may be possible for non-potable, used, unclean, polluted and contaminated water, or other substances, to enter into any part of such potable water system under any condition.
Customer Water Supply System	The water supply system of a building, premises or private system consists of the all supply pipe and appurtenances from the customer side of the water meter.
Design Engineer	The engineer licensed by the State of Oregon as a civil engineer under whose direction plans, profiles and details for work are prepared and submitted to the City for review and approval.
Detention	The holding of runoff for a short period of time while releasing it to the downstream drainage system at a controlled rate.
Developer	The owner and/or their agents or contractors responsible for a given project.
DI	Ductile Iron

Distribution Mains	All mains which are not designated as transmission mains, and which are used for supply to individual consumers. As a general rule these are the smaller mains in the water supply system.
Distribution System	Distribution main pipelines, pumping stations, valves and ancillary equipment used to transmit water from the supply source to the service line.
Domestic Sewage	The liquid and water borne waste derived from the ordinary living processes, free from industrial wastes, and of such character to permit satisfactory disposal, without special treatment into the public sanitary sewer or by means of private sanitary sewage disposal systems.
Double Check Valve Assembly	An assembly composed of two single, independently acting check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test ports.
Double Detector Check Valve Assembly	A line-sized approved double check valve assembly with a parallel meter and meter-sized approved double check valve assembly.
Downstream Intersection	The nearest intersection from a driveway located in the direction of traffic flow of the nearest lane of the abutting street.
Drainage Basin	The area of contributing runoff from the discharge to the most remote point of the entire city system.
Drainage Facilities/System	Pipes, ditches, detention basins, creeks, culverts, etc. Used singularly or in combination with each other for the purpose of conveying or storing stormwater runoff.
Drainage Waste	Stormwater, groundwater, surface drainage, subsurface drainage, spring water, well overflow, roof drainage, or other like drainage other than sewage or industrial waste.
Dwelling Unit	A facility designed for permanent or semi-permanent occupancy and provided with minimum kitchen, sleeping and sanitary facilities for one family.
Easement	Areas along the line of public utilities which are outside of dedicated right-of-way. Easements shall be prepared on City forms granting rights along the public utility line to the City.
Expansion Joint	A joint to control cracking in the pavement structure and filled with preformed expansion joint filler.
FEMA	Federal Emergency Management Agency.
Fire Department Connection	A connection through which the fire department can pump supplemental water into the sprinkler system, standpipe, or other system, furnishing water for fire extinguishment to supplement existing water supplies.
Fire Protection Service	A connection to the public water main intended only for the extinguishment of fires.
Fixture Unit Equivalents	The unit equivalent of plumbing fixtures as tabulated in chapter 4 of the uniform plumbing code.
GPS	Global Positioning System.
Grade	The degree of inclination of a road or slope.

HDPE	High Density Polyethylene
Health Division	Oregon Health Authority, Public Health Division. (OHA PHD)
Hydrant Lead	The line connecting the fire hydrant to the City main or private fire line.
IE	Invert Elevation.
Impervious Areas/Surfaces	Those hard surface areas located which either prevent percolation of water or reduce the percolation rate which existed under natural conditions prior to development
Industrial Waste	Waterborne waste and wastewater from an industrial user.
Inspector	The authorized representative of the City whose instructions and decisions shall be limited to the particular duties and responsibilities entrusted to him/her in making detailed inspections of any or all portions of the work or materials.
Intersection	The meeting point of two streets having at least three legs.
IPC	International Plumbing Code With Oregon Amendments.
Irrigation Service	A metered connection intended for seasonal use and delivering water which is not discharged to the sanitary sewer.
Lateral Sewer	Any public sanitary sewer which has no other common sanitary sewers discharging into it.
Local Or Residential Street	A facility not designed as an arterial or collector. It serves primarily to provide direct access to abutting land and offers the lowest level of traffic mobility. Through traffic movement is deliberately discouraged.
Longitudinal Joint	A joint which follows a course approximately parallel to the centerline of the roadway.
Mainline Hydrant Valve	The isolation valve between the City water main or private fire line and the fire hydrant.
Mainline Sewer	Any public sanitary sewer which receives flow from one or more lateral sewers.
Multiple Family Dwelling	A building or portion designed thereof for occupancy by two or more families, living independently of each other.
Multi-Use Trail	A pathway designated for pedestrian or bicycle use.
Natural Grade:	The grade with the land in an undisturbed state.
Noncontact Cooling Water:	Water other than sewage or industrial waste which is used as a medium for carrying away excess heat from apparatus, appliance, mechanism or device.
OHA PHD	Oregon Health Authority – Public Health Division
One-Way Driveway:	A driveway of either ingress or egress, but not both.
On-Site Detention:	The storage of excess runoff on the development site and gradual release of the stored runoff into a public storm drain system after the peak of the runoff has passed.
OSSC	The most current version of the Oregon Standard Specifications for Construction published jointly by the Oregon Chapter of APWA and the Oregon Department of Transportation (ODOT).

Owner	Any Individual, Partnership, Firm Or Corporation By Whom The Design Engineer Has Been Retained Or Who, As A Property Owner, Is Making Arrangements With The City.
Parking Lot	Paved surfaces on private property intended for the movement and storage of six (6) or more vehicles.
Parking Space:	A designated space in a parking area for the parking of one motor vehicle.
PCC	Portland Cement Concrete
Peak Discharge:	The maximum water runoff rate determined for the design storm.
Person	Individual, Firm, Corporation, Association, Agency Or Other Entity.
PGE	Portland General Electric
Plans	See Construction Drawings.
Plumbing System	All plumbing fixtures and traps, or soil, waste, special waste and vent pipes within a building and to a point five feet outside the building foundation thereof.
Potable Water	Water which is satisfactory for drinking, culinary and domestic purposes.
Private Collection System/Private Sewer	A privately owned and maintained sanitary sewer system.
Private Distribution System	A privately owned and maintained water distribution system.
Private Storm Drain	A storm drain located on private property serving more than one structure, and not operated or maintained by the City.
PROWAG	Public Right-of-way Accessibility Guidelines.
PRV	Pressure Reducing Valve.
Public Sewer:	Any sanitary sewer in the public right-of-way or easement operated and maintained by the City.
Public Storm Drain:	Any storm drain in a public right-of-way or easement operated and maintained by the City.
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
Receiving Body Of Water	Creeks, streams, lakes, and other bodies of water into which runoff is naturally or artificially directed.
Release Rate	The controlled rate of release of drainage and runoff water from property, storage ponds, detention basins, or other facility during and following a storm event.
Residential User	The owner, lessee, or occupant of a single dwelling unit in one structure.
Retention Facility	Facilities which hold water for a considerable length of time and then consume it by evaporation, plant transpiration, or infiltration into the soil.
Roadway	All of that portion of the right-of-way used, for vehicle movement, which exists between the curbs or proposed curbs or proposed curb lines.

Right-Of-Way (ROW)	All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public free of all encumbrances, within which the City shall have the exclusive right to install and maintain streets and public utilities.
Sedimentation	Deposition of debris or soil sediment displaced by erosion.
Service Lateral	That portion of the building sewer from the right-of-way line to a public sanitary sewer, private sanitary sewer, individual sanitary sewage disposal system, or other point of disposal.
Service Line	The waterline or pipe extending from the distribution main to the water meter, backflow prevention device, or private fire system double check valve
Sewage	The wastewater derived from human habitation and use of buildings for residential, institutional or commercial purposes, excluding storm waters and industrial waste.
Sidewalk	The portion of a street designed for preferential use by pedestrians.
Single Family Dwelling	Any residential building designed to house one family.
Standard Details	The drawings of structures or devices commonly used on work within the City of Dundee and referred to on the construction drawings. Also called standard drawings.
Standards	City of Dundee Design Standards.
Standard Specifications	The most current version of the Oregon Standard Specifications for Construction published jointly by the Oregon Chapter of APWA and the Oregon Department of Transportation (ODOT)
Street	A public or private way which affords the principal means of access to abutting property.
Street or Road	Any public highway, road, street, avenue, alley, way, easement or right-of-way to be used for vehicle movement.
Superelevation	The vertical distance between the heights of the inner and outer edges of pavement on horizontal curves.
Survey Cut Sheets	Sheets of tabulated survey data, indicating stationing, structures, fittings, angel points, beginning of curve, points on curve, end of curves, staking offset, various elevations and offset utility cuts.
Terrace	A relatively level step constructed in the face of a slope for drainage, erosion control and maintenance purposes.
Three-Quarter (3/4) Street:	A ± 75 percent portion of the ultimate width of a Street, but not less than 28 feet from face of curb to edge of pavement, usually along the edge of a development, where the remaining portion or tile street shall be provided when adjacent property is developed.
Traffic Coefficient	A number used in determining the structural section of a street.
Trail (Bike Or Pedestrian)	In the context of the general plan - "trail" is synonymous with bicycle path (off-street pathway).
Transition	The taper between portions of a street with different pavement widths.

Transmission Mains (Supply Lines):	Mains which are used for transporting water from the source of supply and storage reservoirs to the centralized point of distribution and distribution reservoirs.
Transverse Joint:	A joint which follows a course approximately perpendicular to the centerline of the roadway.
Trunk Drainage System:	That portion of the drainage system which receives waters from upstream land areas requiring in excess of 18" diameter pipe. The drainage system may consist of watercourses or manmade facilities such as pipes, ditches, and culverts.
Trunk Sewer:	A public sanitary sewer ten inches or larger which has been or is being constructed to receive the flow of more than one mainline sewer.
Turnaround Area:	A paved area of sufficient size and configuration that emergency vehicles may maneuver around to head in the opposite direction without having to move in reverse more than once.
Turnpike Street:	Any public street, road or right-of-way which has been paved for vehicular movement and does not have curbs, sidewalks or piped storm drainage facilities.
Two Way Driveway:	A driveway functioning as both an exit and entrance.
UGB	Urban Growth Boundary
Upstream Intersection	The nearest intersection from a driveway located in the direction opposite the traffic flow of the nearest lane of the abutting street.
Water Main	A water-supply pipe for public or community use.
Water Master Plan	The water system evaluation and master plan for the City of Dundee, Oregon, most recent revisions.
Work	All material, labor, tools, equipment, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the contract, and such additional items 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.

F. LOCATION OF UTILITIES WITHIN RIGHT-OF-WAY

1. The Standard Details indicate the general required location for each utility within the public right-of-way.
2. Installation of private utilities in a common trench with water, sanitary sewer or storm drain mainlines is prohibited.

G. PROVIDING FOR FUTURE DEVELOPMENT

1. Water, storm drain and sanitary sewers systems shall be sized to accommodate the entire drainage basin or immediate service area which they will ultimately serve.
2. Utilities and street improvements shall be extended to the boundaries of the development to provide for future extensions to the adjoining areas and prevent adjoining properties from becoming landlocked. In the case of utilities, this shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future
3. The City has the authority to require over-sizing of utility lines to accommodate future growth of the City.
4. Where existing City utility lines and/or roadways do not adjoin the proposed development or the capacity of existing lines is inadequate, the developer will be required to extend new improvements to the development as necessary, and extend them to provide for service to adjacent properties.
5. As a condition of water service, all developments will be required to provide public water mains of sufficient size for fire protection to adjacent parcel. This shall include the extension of water mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way. This shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future. This shall include waterlines that are oversized to provide capacity for required fire flows.

H. PERMITS

1. Permits, approvals, or agreements are required by the City, and sometimes other jurisdictions or agencies prior to initiating any construction or demolition work elements described within these Design Standards.
2. No developer, person or organization (other than the City of Dundee) shall begin to construct, reconstruct, cut, excavate, repair, modify, alter, or grade any sidewalks, curb, curb-cut, driveway, parking area, street, or begin to lay and install any sanitary sewer, water mainline, storm sewer, including appurtenances or service laterals, or other private or franchise utility within any public right-of-way, public utility easement or private property within the jurisdiction of the City without first obtaining approvals from the Public Works Supervisor and the City Engineer as required by these Design Standards, paying any required plan review and construction permit fees, depositing any required performance security, and obtaining a street/utility construction permit therefore as provided herein.
3. The majority of work covered under these Design Standards will require multiple permit authority review and approvals. Several types of permits and approvals require prior approval from the authority before a building or other substantial permit can be issued. Any questions regarding information about permits, approvals, and agreements should be directed to the City Engineer.

4. A Street or utility construction permit is required for, but not limited to the following types of work. This list is not all inclusive. The intent is that any work covered under the Design Standards will require a utility/street construction permit prior to construction.
 - a. Streets: A permit shall be required for any work on a public street, dedicated fire lane, sidewalk, curb, curb-cut, driveways and driveway approaches within a public right-of-way, or within an existing or proposed public easement or fire lane, including signs, traffic markings and traffic control devices.
 - b. Storm sewer: A permit shall be required for any work to lay and install any storm sewer and storm sewer appurtenances, including detention ponds, water quality facilities and storm drainage service lateral(s), within any public right-of-way, existing or proposed public utility easement and on all private property (except single family residential).
 - c. Sanitary Sewer: A permit shall be required for any work to lay and install any sanitary sewer pipeline and appurtenances, including sanitary sewer service lateral(s), within any public right-of-way or within any existing or proposed public utility easement.
 - d. Water: A permit shall be required for any work to lay and install any water main and appurtenances, including water service lines and meter boxes, within any public right-of-way or within any existing or proposed public utility easement, or any improvements attached to the City water system.
 - e. Parking Lots, Private Streets, Common Use Driveways and Public Accessways: a permit shall be required for any work on a parking lot, private street, common use driveway or public accessway, both vehicular and pedestrian, that takes access from a Public City street, that discharges storm drainage to a public storm drain system, or that overlies a public sanitary sewer or water line. A City utility/street construction permit is not required for the portion of single family residential driveways (serving a single residence or duplex) that is outside the public right-of-way or public utility easements.
 - f. Site grading and filling. A permit shall be required for any site grading, filling or fill stockpiling operations as follows:
 - i. Projects that require site grading, filling or fill stockpiling operations associated with development of the property.
 - ii. Site grading, filling or fill stockpiling operations over existing public sanitary sewer, storm drain or water distribution lines, or such operations within existing or proposed public utility easements.
 - g. Street Closure: In the event any of the above activities or any activities related to the construction of a building, structure, or parking lot, which requires the temporary closure of a street, alley, lane of traffic, or sidewalk to vehicle or pedestrian flow, a permit shall be obtained from the City for said closure.
 - h. Franchise Utilities: A permit covering any work on underground franchise utilities within any public right-of-way or within any existing or proposed public utility easements. Permits will not be required for work on overhead or above grade franchise utilities which do not involve excavation within the areas specified herein

unless it includes the placement of improvements into the ground (i.e.: poles, guys, etc.).

I. APPROVAL OF CONSTRUCTION DRAWINGS REQUIRED

1. Construction drawings (plans) shall be submitted for review and approval prior to issuance of permits required by these Design Standards. Permits shall have the written approval of the Public Works Supervisor or his designated representative and the City Engineer prior to issuance of the permit. For subdivisions and other developments requiring improvements to public streets and/or multiple public utility systems, construction drawings for sewer, water, streets, and storm drains shall be submitted simultaneously to facilitate checking for conflicts.
2. Construction drawings submitted for approval shall be subject to the standards, specifications, policies and procedures, plan check, and permit fees of the Public Works Department in effect at the time of application or reapplication for plan check.
3. Except as provided below, such construction drawing approval shall be void upon expiration of six months from the date of written approval. Resubmittal of construction drawings will require that they be updated to reflect current City Design Standards.
4. Upon a written verification by the City Engineer that the facts upon which the plan approval was based have not changed to an extent sufficient to warrant a new review of construction drawings, the plan approval may be extended for a period not to exceed six additional months. No more than two such six month extensions shall be granted for any one development or project, resulting in a maximum time extension of one year. Reapplication for plan check must be upon expiration of said six month period, or extension periods provided herein, if the project is not completed within said approval or extension period.
5. All plans, reports, or documents for public utility improvements required by these Design Standards or the City Development Ordinances or other City ordinances shall be prepared by and certified by a registered professional civil engineer licensed by the State of Oregon.

J. SUBMITTAL REQUIREMENTS

1. GENERAL

- a. Submittal requirements consist of design plans, grading plans (where required), erosion control plans (where required), drainage calculations, geotechnical reports, and other information as required. Letters of transmittal referencing the project name shall accompany all submittals.
- b. The developer shall obtain a construction permit and begin construction within six (6) months from the time the construction drawings are approved by the City Engineer. If construction does not begin within this period, the approvals or the construction drawings shall be null and void. Renewal of the construction permit may result in additional conditions to meet new standards, changed conditions or new information discovered since the original approval.

2. PHASED DEVELOPMENT

- a. In the case of a development approved to be constructed in phases, the construction drawings for each phase shall be capable of standing alone.
- b. Approval by the City Engineer of construction drawings for each phase of a phased development shall be independent.

3. SUBMITTAL PLAN REVIEW PROCESS AND REVIEW FEES

- a. All plans must be legible and easy to read and understand.
- b. Pre-Design Conference: the developer is encouraged to meet with the City Engineer prior to final design of the proposed improvements. It shall be the developer's responsibility to provide the City Engineer with base maps showing existing utilities and proposed street improvement limits prior to the pre-design conference.

c. PLAN CHECK SUBMITTAL

- i. The submittal for plan check shall be filed by the responsible party (the Design Engineer for any improvements) with the City Engineer for any permits required by these Design Standards. Such submittal for plan check shall include the following as applicable, incomplete submittals may be returned without review:
 - 1) Name and address of the owner or owners of the property;
 - 2) Name and address of the developer of the property;
 - 3) Name, address, and phone number of the designer (Design Engineer for improvements);
 - 4) Description of the work area location, including addresses and tax lot numbers as applicable;
 - 5) Three sets of complete construction drawings, design reports and any supporting calculations.
 - 6) Estimated construction cost of the proposed project, or estimates based on the construction cost estimate schedule established by the Public Works Supervisor or the City Engineer.
 - 7) Plan review fees as prescribed by resolution of the City Council
 - 8) Required review fees are nonrefundable, and are required to support permit plan review. Additional fees may be charged to cover the actual plan review expenses.
 - 9) Evidence that all federal and state laws and regulations have been complied with, including a copy of any permits required by federal, state, or county agencies.
 - 10) Such other information as the City shall find reasonably necessary for the determination of whether plans should be approved for permit.

- d. Upon completion of the preliminary review, the City will return one (1) set of drawings outlining the required revisions. In order to be entitled to further review, the applicant's engineer must respond to each comment of the prior review. Resubmittals shall consist of a minimum of three (3) sets of drawings and/or calculations as necessary.
- e. Once the preliminary review has been completed and required revisions made, the developer shall circulate the drawings to all utility service companies within the City and other agencies as required.
- f. Prior to final approval of the construction drawings, all proposed drawings from utility service companies must be received and approved by the City. Approvals from other agencies with jurisdiction must also be received, including but not limited to the Oregon Health Authority – Public Health Division (OHA PHD), Department of Environmental Quality (DEQ), Department of Transportation (ODOT) and Yamhill County wherein each has jurisdiction.
- g. The applicant is responsible for the coordination with the various utilities and agencies during design and construction.
- h. Upon final approval of the drawings, submit a minimum of five (5) hard copies and one electronic copy of the revised drawings to the City to be stamped as approved for construction. Additional sets may be submitted at the developer's option.

4. SHEET SIZE AND SCALE

- a. All construction plans shall be on sheets measuring 22 x 34 inches (11x17, half-size reduction) or 11x17. The scale shall be 1"=10', 20', 40' or 50' horizontal and 1"=2', 4' or 5' vertical for all drawings except architectural, structural or mechanical drawings. The scale of corresponding plan views and profiles shall be the same. Scale shall be shown with north arrow and within a title block. Letter size shall not be smaller than 0.08 inch high

5. REQUIRED SHEETS

Construction plan submittals shall contain the following minimum sheets: title sheet (unless not required by the City Engineer), plan and profile sheet(s) for street, storm sewer, water, and wastewater sewer, overall utility plan (existing and proposed), proposed grading, temporary and permanent erosion control, and detail sheet(s) plus any other relevant construction details.

a. TITLE SHEET(S)

- i. All projects shall have a title sheet as the first page of the construction plans. This sheet shall contain the following minimum information:
 - 1) Site plan of entire project at a 1" = 100' scale. A 1" = 200' scale may be used if project size is too large. The site plan may also be a composite utility plan showing all properties served by proposed sewer, water, and storm facilities, in addition to the proposed facility.
 - 2) Vicinity map at a 1" = 1000' scale or greater.
 - 3) Index of sheets.

- 4) Complete legend of symbols used.
- 5) General and construction notes pertinent to project.
- 6) Temporary and/or permanent benchmarks used along with their descriptions, elevations of benchmark, and datum (when topographic survey is presented separately, show this information on that sheet.).
- 7) Engineer's name, address, phone number including emergency contact information, fax number, email, and seal.
- 8) Developer's/owner's name, address and phone number including emergency contact information.
- 9) Statement referencing City of Dundee Standard Specifications.
- 10) Contact phone number for all affected utility companies including the City.

b. EROSION CONTROL PLAN

- i. The erosion control plan shall address the measures as defined in Division 6 – Erosion Control.
- ii. The plan shall include existing contours at two (2) foot intervals, or as approved by the City, including location of erosion control facilities, outlet structures and existing public and private utilities.

c. PLAN SHEET(S)

- i. The plan view of each sheet shall be drawn at the appropriate scale showing the following minimum information:
 - 1) Street curbs, property lines, right-of-way lines, utility easements referenced to property lines, street centerlines, and intersections. Show property corner and curb elevations to determine water service level, serviceability of lot/property for wastewater sewer, points of disposal for building storm drains, and how new curbs will join to existing curbs.
 - 2) Location of all underground utilities within 100 feet of project (if they are affected by the project), existing power/telephone poles and guy anchors, valves, manholes, catch basins, fire hydrants, meter boxes and vaults, signs, etc. Location of nearest street light(s) and fire hydrant(s) even if distance is greater than 100 feet.
 - 3) Location of all water courses, railroad crossings, culverts, bridges, large water transmission pipes, sewers, and/or storm drainage facilities within 200 feet of proposed sewer and storm drain extensions. All water courses shall show the 100-year flood plain as indicated on FEMA maps and any current or proposed wetlands.

- 4) On sewer and storm drain plans, each manhole, catch basin, and cleanout shall be numbered and stationed. Stationing shall tie to existing street monuments, property corners, or manholes. Stationing for each line shall increase from left to right on the plan sheet. This typically results in north pointing to the top or to the right of the sheet.
- 5) On street plans, horizontal stationing shall show points of tangency and curvature for centerline; curve data shall show tangent, length, radius, distance, centerline curve length, and delta angle. Centerline intersection stationing, in both directions, shall be shown. Provide $\frac{1}{4}$ point elevations for curb returns.
- 6) Where streets are being widened, edge of pavement elevations shall be shown to determine pavement cross-slope to new curb or pavement edge.
- 7) On water plans, all fittings and valves shall be shown and identified by type (i.e., MJ x MJ, FLG x MJ, etc.); fire hydrants shown; intersection details for valves and fittings are required when scale of plans is smaller than 1" = 20' (i.e., 1" = 40').
- 8) Lot or parcel numbers, street names and other identifying labels (including tax lot and address numbers for all existing properties shown).

d. PROFILE SHEET(S)

- i. Profiles for construction plans shall be the same horizontal scale as the plan sheet. Profiles are typically drawn on the same sheet as the plan view and shall be immediately below the plan view. Stationing shall increase from left to right with lower stations to the left. The following minimum information shall be shown:
 - 1) For sewers and storm drains, show locations of manholes, catch basins, and cleanouts, with each numbered and stationed.
 - 2) Existing profile at centerline of proposed utility or street.
 - 3) Proposed profile grade, as appropriate, for all sewers, storm drains, and waterlines, giving pipe size, length between structures or fittings, slope, backfill and pipe material, sewer inverts, rim elevations, etc.
 - 4) Existing underground utility that crosses the alignment of the proposed facility.
 - 5) Beginning of all vertical curves, points of vertical intersection, end of vertical curve, low point of sag curve, and length of vertical curve. Profiles of existing centerline grade shall extend a minimum of 250 feet beyond the end of the improvement.
 - 6) Clearly show all potential conflicts with existing public and private utilities that impact proposed design.
- ii. SPECIAL NOTE: As-built records are only to be used as an aid to the engineer. The engineer shall field locate and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by the proposed facility.

e. **DETAIL SHEETS**

- i. Detailed drawings shall be included with all construction plans where City of Dundee Standard Specifications and Standard Drawings do not exist. If a standard drawing, such as sewer manholes, must be modified to fit existing or unique conditions, the modified drawing shall be shown on the plans. When City standard drawing appurtenances or construction installations are to be used, a reference to the specific standard drawing number shall be made on the relevant sheet.

6. **SUPPORTING INFORMATION**

- a. The engineer shall submit sufficient supporting information to justify the proposed design. Such information shall include, but not be limited to, the following:
 - i. Design calculations.
 - ii. Hydrology and hydraulic calculations with basin maps for storm drainage.
 - iii. Alternate materials specifications including manufacturer's design application recommendation.
 - iv. Grading plan support information to include as appropriate:
 - 1) Soils engineering report
 - 2) Hydrology report
 - 3) Engineering geology report
 - v. Stormwater facility calculations and description, including its intended functionality, and an explanation of how the outlet(s) function to meet requirements of peak velocity, flow control and water quality treatment.
 - vi. Water model calculations and fire flow calculations for waterline systems.
 - vii. Documentation of proper protection and/or replacement of Record Survey Monuments. If, in the course of construction of the proposed development, a record survey monument shall be removed, disturbed, or destroyed, a registered professional land surveyor shall replace the monument within 90 days in accordance with ORS 209.140 – ORS 209.156.

7. **PLAN SUBMITTAL**

Construction plans for all privately financed facility improvements shall be submitted to the City Engineer. The City Engineer will coordinate the plan review and approval of all construction plans which will include review for compliance with all Dundee standard specifications, the Dundee development code, and other City codes and ordinances.

8. **VARIANCES TO DESIGN/CONSTRUCTION STANDARDS**

Variances to specifications or standards may be requested as outlined below. It is to be noted that if the requested variance involves public safety, the City will rule in favor of safety.

- a. Variance process
 - i. Submittal
 - 1) Requests to modify City Standards shall be submitted in writing by the applicant's engineer to the City Engineer. This written request shall state the desired modification(s), the reason(s) for the request(s) and a comparison between the specification(s), standard(s), and the modification(s).
 - 2) Any request for modification or variance of City Standards should be documented with reference to nationally accepted specifications/standards.
 - ii. Review
 - 1) The request to modify shall be reviewed by the City Engineer, who shall consult the appropriate review authorities and make one of the following decisions:
 - Approve as is,
 - Approve with changes, or
 - Deny with an explanation.
 - 2) The modification, if approved, is for project specific use. Approval of a request shall not constitute a precedent.
 - iii. Appeal
 - 1) The applicant may appeal the City Engineer's decision to the City Council.
 - iv. Criteria for Modification of Specification Standards
 - 1) The City Engineer may grant a modification to the adopted specifications or standards when any one of the following conditions are met:
 - The specification or standard does not apply in the particular application.
 - Topography, right-of-way, or other geographic conditions impose an unusual or unique hardship on the applicant and an equivalent alternative which can accomplish the same design is available that does not compromise public safety or accessibility for the disabled.
 - A change to a specification or standard is required to address a specific design or construction problem which if not enacted will result in an undue hardship or would jeopardize public safety.

K. SPECIAL DESIGN PROBLEMS

1. Special applications not covered in these Design Standards require review and approval by the City Engineer. Submittal of full design calculations, supplemental drawings, and information will be required prior to any approval.

Such applications that may occur requiring special review and approval include, but not limited to, the following:

Sewer force mains	Water distribution pump stations
Relining of existing sewers	Relining of existing water mains
Internal sealing of existing sewers	Water pressure regulating devices
Wastewater regulatory devices	Energy dissipaters
Wastewater pump stations	Water reservoirs
Sewer siphons	Water treatment plants
Wastewater treatment plants	Water flow
Wastewater flow measurement/monitoring device	Measurement/monitoring/telemetry device

L. CONSTRUCTION PERMIT APPLICATION

1. Prior to issuance of construction permits, the developer shall provide the City with the following:
 - a. Copy of an approved (by City Attorney) Developer/City agreement for improvements signed and notarized by the developer and the developer's engineer.
 - b. Completed construction permit application including the following:
 - i. Name and address of the owner or owners of the property.
 - ii. Name and address of the developer of the property.
 - iii. Name and address of the designer (Design Engineer for public improvements).
 - iv. Name and address of the party doing the work, including subcontractors.
 - v. Location of the work area, including addresses as applicable.
 - c. Pay all construction permit fees
 - d. Recorded copies of all easements. Executed and notarized copies of easements for all public utilities which are constructed prior to the recording of a final plat or final acceptance.
 - e. A detailed unit price construction cost estimate for the proposed project.
 - f. Proposed construction schedule.
 - g. Proposed traffic control plan.
 - h. Certificates of insurance, minimum limits as outlined in the Standard Specifications. City of Dundee and City Engineer shall be named as additional insured.
 - i. Evidence of workman's compensation coverage from contractor performing the work.

- j. Any required Waiver of Remonstrance Agreements.
- k. Executed and recorded copies of any Construction Deferral and/or Waiver of Remonstrance Agreements required as a condition of the development, except for subdivisions or partitions where the agreements will be recorded in conjunction with the final plat.
- l. Such other information specific to the project as the Public Works Supervisor or the City Engineer shall find necessary for the determination of whether a permit should be issued.

M. CONSTRUCTION PERMIT FEES.

1. The construction permit fee shall be as prescribed by resolution of the City Council.
2. Permit fees are required to support permit issuance, testing, and inspection. Additional permit fees may be charged to cover actual expenses.
3. In computing the constructions permit fees, the estimated value of proposed construction shall be comparable with current bid prices for City contract projects, and shall be approved by the City prior to issuing the permit.
4. Work being done under contract with the City shall be exempt from permit fees.
5. Work being done by franchise utilities shall be exempt from permit fees to the extent provided by the franchise agreements with the City.
6. Where work for which a permit is required by these Design Standards has commenced prior to obtaining said permit, the construction permit fees shall be doubled, but the payment of such double fee shall not relieve any person from fully complying with the requirements of these Design Standards and other applicable City codes, standards and ordinances in the execution of the work nor from any other penalties prescribed herein.
7. Permits required by these Design Standards shall be non-transferable. Any change in applicant, such as a subdivision sale, will require re-application for permit. If six months has elapsed since plan approval, reapplication for plan review shall be made. If previous plan review deposit provided by the applicant is insufficient to cover the costs of the new review, the City may assess an additional review fee which will, in the opinion of the City Administrator, cover the estimated cost for the new review.

N. CONSTRUCTION AGREEMENT & PERFORMANCE GUARANTEE

1. Except as otherwise provided below, a performance guarantee shall be provided for all work for which a permit is required. Depending on the type of project, the performance guarantee may consist of a restriction on the issuance of a building permit(s), a restriction on the recording of a plat, or a financial security. Acceptable performance guarantees shall be as outlined below for the different classes of project listed.
2. Work being done by franchise utilities shall be exempt from performance guarantee requirements only to the extent provided by the franchise agreements with the City.

3. The performance guarantee may consist of one of the following, and shall be in a form as required by the City.
 - a. If a building permit is requested before all improvements within the public right-of-way or utility easements are completed and approved by the City, the developer shall provide a financial security acceptable to the City to guarantee the completion of all work covered under the permit. The financial security shall be 110% of the estimated construction cost, or \$500, whichever is greater, and may consist of cash, or it may be a bond or irrevocable letter of credit as outlined in Subsection D below. Occupancy of structures and permanent connection to City water and sewer service will not be allowed until all permitted improvements have been completed and approved by the City.
 - b. If the applicant fails to complete all improvements for which a performance surety bond or letter of credit were provided, the City shall estimate the cost of completing any required improvement, call on the bond or letter of credit for the funds necessary to complete the improvement, and complete the improvement to the extent of the funds obtained upon call of the bond or letter of credit. If the amount obtained is insufficient to complete the improvement, the City may either hold the collected funds until additional funds are authorized for the improvement or expend the collected funds on a revised improvement or on a portion of the improvement as determined reasonable by the City.

O. CONDUCT AND PROGRESS OF THE WORK

1. All work under said permits shall be completed in conformity with the provisions of these Design Standards, the terms of the applications and construction permits, and under the supervision and subject to the approval of the person designated by the City. Immediately upon completion of work, all surplus earth, debris, rubbish or other materials shall be removed immediately and the street and utilities restored to a condition as good as or better than existed prior to the work.
2. Timeframe for Restoration of Existing Street Surfaces.
 - a. Unless authorized in writing by the City Administrator prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days.
 - b. Unless authorized in writing by the City Engineer prior to the start of the work, trenching within existing paved streets shall be backfilled and repaved within 14 days of the start of excavation unless the trenches are repaired with cold patch. In addition, trenching within existing streets shall be plated or repaired with cold patch at the end of each work day, unless otherwise approved by the City Engineer. Trenching within existing major streets (collector or commercial-industrial streets) shall always be plated or repaired with cold patch at the end of each work day. Trenching within existing gravel streets will be restored or plated at the end of each work day. Failure to maintain any temporary cold mix trench patching in a smooth condition will result in the City requiring the cold mix to be removed and replaced with hot mix AC for

temporary patching. Such replacement shall occur within 4 days of written notice by the City.

- c. Unless authorized in writing by the City Administrator prior to the start of the work, the timeframes specified herein shall apply independently and separately to each block or intersection where trenching work occurs. In all cases, trenches within each block or intersection shall be permanently repaved within 21 days of the start of excavation, except where the street will be reconstructed as part of the project.
3. The contractor is responsible for the coordination with the various utilities and agencies during construction.
4. The Design Engineer shall note the requirements above on the construction plans as necessary.

P. ADHERENCE TO AND EXHIBITION OF PERMITS

1. No work shall be undertaken other than that specified in the application and permit for the particular cut or excavation. Upon demand of the City Engineer, Public Works Supervisor or his designate or any City Police Officer, the permits shall be produced at the place where the work is in progress, or such work will be stopped until the permit is produced.

Q. EXPIRATION OR SUSPENSION OF PERMIT, STOP WORK ORDER, APPEAL

1. EXPIRATION OF PERMIT

- a. Street/utility construction permits shall lapse if construction for which the permit was issued has not commenced within six (6) months of the date of issuance.
- b. To reinstate the permit, the applicant shall submit a written request for reinstatement to the City giving the reasons for failure to begin construction, pay a reinstatement fee and provide a date when construction will be commenced.
- c. In reinstating the permit, the City may impose additional requirements or conditions deemed necessary for the project to conform to current City Standards.

2. SUSPENSION OF PERMIT

- a. At any time after the issuance of a construction permit required by these Design Standards, the City may suspend the same upon a finding that any of the following grounds exist:
 - i. False, misleading, or erroneous data or information submitted by the applicant in connection with securing the permit.
 - ii. Materials or workmanship do not meet specification for the construction or installation of any non-permitted improvement; or construction or installation varies from the approved plan or design of the improvements.
 - iii. Violation of any of the provisions of the City development ordinances governing the work being done under the permit.

- b. Upon suspension of a construction permit as provided in Subsection (a) of this Section, the City shall cause to be issued a written "Stop Work Order", one copy of which shall be sent by regular mail to the permittee at the address shown on the permit application, one copy of which shall be sent by regular mail to the permittee's engineer overseeing the work, if known, and one copy of which shall be personally delivered to the person in charge of any work in progress.
- c. It shall be unlawful for any person to cause, suffer, or permit any work to be done for which a permit is required by these Design Standards when a "Stop Work Order" has been issued as provided in Subsection (b) of this section.
- d. An applicant whose permit has been suspended as provided in Subsection (a) of this section may appeal such action to the City Administrator through the City's established appeal process. Notwithstanding the provisions for appeal to the City Administrator, the filing of an appeal shall not stay the effect of a "Stop Work Order" issued under Subsection (b) of this section.

R. NOTICE OF COMPLETION OF WORK, FINAL INSPECTIONS

- 1. Within 72 hours of completion of the work for which a permit was required under these Design Standards, all in accordance with the approved construction drawings and City Standards, the person or organization to whom the permit to do such work was issued shall submit written notice to the City Engineer stating that the work has been completed and give such other information as may be required by the City, and request a preliminary final inspection of the work.
- 2. As a minimum, the following must be submitted to the Public Works Supervisor or the City Engineer as applicable prior to the preliminary final inspection.
 - a. All exterior property pins and street monumentation set (partitions & subdivisions).
 - b. All set property pins exposed and all property corners marked with appropriate markers (partitions & subdivisions).
 - c. All easement limits (except PUES parallel with R/W) marked with labeled lath.
 - d. Paper copy of as-built drawings submitted to City Engineer a minimum of 48 hours prior to final inspection, including distance ties to all utility stub ends.
 - e. Written copies of all required utility test reports (compaction, mandrel, pressure, vacuum, etc.), as well as video tapes of any required pipeline TV inspections.
 - f. Completion report from Design Engineer including written copies of all utility test reports (compaction, mandrel, pressure, vacuum, etc.), as well as inspection reports of any required TV inspections. Submitted compaction tests shall include certification of engineered fills, base rock and AC pavement tests for streets and trench patching, as well as soil compaction results for all lots with fills.
 - g. Certification that the areas within the building envelopes of all lots conform to compaction requirements of the Oregon International Building Code (IBC).

3. Any corrective work items identified during the preliminary final inspection (i.e. punch list items) shall be completed prior to the City's conditional acceptance of any of the public streets or utilities. Failure by the City to include items on the preliminary punch list shall not, in any way, relieve the contractor from any obligation to perform the work in strict compliance with the approved plans and City Standards. Additional items discovered during subsequent inspections must be corrected prior to provisional acceptance of the improvements by the City.
4. Upon completion of all corrective work to the satisfaction of the Public Works Supervisor and the City Engineer, including a final inspection by the City, the developer shall provide the following prior to provisional acceptance of the public improvements by the City.
 - a. Paper and PDF copy of as-built drawings (based from an as-built survey) for permitted improvements.
 - b. Acceptable maintenance bond valued at a minimum of 40 percent of the estimated construction costs for permitted improvements. The period of the bond shall be for the full period of the warranty period, as outlined in section 1.1(S) below, but not to be less than one (1) year, and require release by the City. The warranty period shall not commence prior to provisional acceptance of the public improvements by the City.
 - c. Photocopies of any recorded easements required in conjunction with the improvements, except for on-site easements that will be recorded after the plat is recorded.
 - d. Other items required as conditions of the land use planning approval, where applicable.
5. In no case shall the City issue written provisional acceptance of the work until as-built drawings (for public improvements) and maintenance bonds (if required) are submitted to and accepted by the City. Final acceptance by the City shall not occur until the end of the warranty period.
6. **AS-BUILT PLAN REQUIREMENTS**
 - a. For all public works facility improvements the engineer shall submit certified as-built drawings for all plans that were approved for construction. As-built drawings shall meet the requirements of these Design Standards and shall be of archival quality. Submittal shall include full size paper and electronic copies, including the original CADD files.
 - b. The engineer shall submit, along with the as-built drawings, a statement certifying that all work for which plans were approved has been completed in accordance with the Dundee Design Standards and Standard Specifications. No disclaimer to the accuracy of the as-built records is allowed.
 - c. The words "as-built drawing" shall appear as the last entry in the revision block along with the month, day, and year the as-built drawing was prepared.
 - d. Actual location and depth from finish grade of any other utilities encountered during construction shall be shown and noted on both plan and profile of the as-built plans.
 - e. Street

- i. The following minimum information shall be noted on street as-built drawings:
 - 1) Change in horizontal alignment, curve data, and stationing of primary control points (e.g., PC, PI, PT, PRC, and PCC).
 - 2) Vertical curve or grade changes; change in location of low point in sag vertical curve.
 - 3) Change to approved thickness for street structural section components. Show station limits where changes in structural section have occurred.
 - 4) Change to driveway locations or widths, or construction materials.
 - 5) Other change(s) altering the approved plans.

f. Storm Drains

- i. The following minimum information shall be noted on storm drain as-built drawings:
 - 1) Station of wye or tee connection into main line; tie end of branch line to nearest property corner at right-of-way line and distance back from the face of curb.
 - 2) Show alignment changes, grade changes, and changes in construction materials. If changed alignment results in station changes, a station equation shall be shown as appropriate at a manhole.
 - 3) Other change(s) altering the approved plans.

g. Wastewater

- i. The following minimum information shall be noted on wastewater as-built drawings:
 - 1) Station of wye or tee into main line. Tie end of service lateral to nearest property corner at right-of-way line and distance back from the face of curb.
 - 2) Depth at the end of service lateral measured from existing ground to invert of pipe. When required by the City Engineer, invert elevations shall be noted.
 - 3) Length of service lateral measured from centerline of sewer main to end of pipe.
 - 4) Show alignment changes, grade changes, and changes in construction materials. If changed alignment results in station changes, a station equation shall be shown as appropriate at a manhole.
 - 5) Other change(s) altering the approved plans.
 - 6) Type of pipe, backfill material and location.

- h. Water main
- i. The following minimum information shall be noted on water main as-built drawings:
 - 1) Station and/or property line/corner to valves (not at standard location), all fittings, blow-offs, and dead-ended lines.
 - 2) All changes from standard 36-inch depth cover. Limits shall be shown on plan with annotated reason for change. Actual pipe elevation (top of pipe) will be taken at every fitting.
 - 3) Show alignment changes, grade changes, and changes in construction materials. If changed alignment results in station changes, a station equation shall be shown as appropriate at a valve.
 - 4) Provide manufacturer of all valves and hydrants; identify types of fittings (i.e., MJ x MJ, FLG x MJ, etc.).
 - 5) Other change altering the approved plans.
 - 6) Provide design calculations and complete pressure/leak test results to the city engineer.

S. CITY POLICY FOR ACCEPTING NEW OR RECONSTRUCTED STREETS AND PUBLIC UTILITIES

- 1. The City will accept developer-built public street, sanitary sewer, storm sewer and water distribution improvements constructed in conformance with these Design Standards subject to the following procedures:
 - a. After construction of the total project has been completed, all final inspections have been completed, and any required bonds and as-builts have been submitted and accepted by the City, the Public Works Supervisor or the City Engineer will provide a memo to the City Administrator recommending that the City provisionally accept the public street, sanitary sewer, storm drainage and/or water system improvements, with final acceptance to occur at the end of the warranty period.
 - b. The standard warranty period for public sanitary sewer, storm drainage and/or water system improvements that are not listed as "special items" for design by the PWDS shall be a minimum of two (2) years from the date of provisional acceptance of the improvements by the City.
 - c. The standard warranty period for public street improvements shall be 3 years from the date of provisional acceptance of the improvements by the City, or until construction is completed on 90% of the lots within the development, whichever is shorter, except that the warranty period shall not be less than two (2) years. Any damage to the street pavement, curbing, sidewalks, street lights, etc. During the warranty period shall be corrected prior to final acceptance by the City and release of the warranty.
 - d. The standard warranty period for sanitary sewer, storm drainage and/or water system improvements that are listed as "special items" for design by the PWDS shall be a minimum of two (2) years from the date of provisional acceptance of the improvements by the City.

- e. The warranty period may be extended at the discretion of the City Administrator if the Public Works Supervisor or the City Engineer identifies construction materials or methods that differ from City Standards, but which the City does not require to be removed and replaced. This authority granted to the City Administrator shall in no way obligate the City to accept any work that is not constructed in full conformance with the approved plans and these Design Standards, nor shall it be construed as establishing a precedent.
- f. Prior to the end of the warranty period, Public Works Supervisor and/or the City Engineer will make warranty inspection(s) and investigations as deemed necessary by the City to identify any defective work that must be corrected prior to final acceptance of the improvements by the City. The developer will be notified in writing of any required corrective work. All required corrective work shall be completed by no later than 21 days from the date of such written notification. Any delay in correcting the identified deficiencies will result in a delay in final acceptance by the City.

T. PENALTY, CONTINUING VIOLATIONS

- 1. Failure to comply with any provision of these Design Standards, or with any restrictions or conditions imposed hereunder, or failure to comply with the conditions of a construction permit issued by the City, shall subject the person, firm or corporation who violates, disobeys, omits, neglects, or refuses to comply with any of the provisions of these Design Standards to civil penalties as prescribed by the City.

1.2 GENERAL MATERIAL REQUIREMENTS

- A. Materials for construction of public works infrastructure are included in each applicable section. Reference OSSC for any materials not covered within these Design Standards.
- B. The approval of any alternate material not approved in the applicable division will be considered for approval based on the requirements of that division's design criteria section. Alternate materials shall meet or exceed the minimum requirements of these Design Standards.
- C. The project engineer must apply in writing to the City Engineer for approval of any alternate material.
- D. The written application for use of alternate materials shall include, but not be limited to, the manufacturer's specifications and testing results, design drawings, calculations, and other pertinent information.
- E. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer.

- F. It is not the intent of these Design Standards to exclude other equipment or materials of equal value, quality, or merit. Whenever a product is designated, or manufacturer's name, brand, or item designation is given or described, it shall be understood that the words "or approved equal" follows such name, designation, or description, whether in fact they do so or not. Determination of quality in reference to the project design requirement will be made by the City Engineer. A contractor shall not use an "equal" product without prior written approval of the City Engineer.
- G. Construction submittals for materials & equipment incorporated into the work shall generally conform to the requirements outlined in Section 1.3.

1.3 CONSTRUCTION SUBMITTALS

A. GENERAL

1. SCOPE

- a. This section includes requirements for construction submittals for public works projects which will be turned over to the City for operation and maintenance, including but not limited to streets, public utility pipelines, pump stations, treatment facilities (water, sewer or storm), storage reservoirs, bridges, etc.
- b. Coordination of Submittals
 - i. All submittals to the City, with the exception of the laboratory test certificates, shall be made only by the Design Engineer. Direct submittals from contractors, subcontractors or suppliers will not be accepted unless otherwise noted herein or approved in writing by the City Engineer.
 - ii. All submittals shall reference the specification item that it covers. The Design Engineer and contractor's name, the project title and location, and the date of submission. Submittal shall also indicate whether the information is for the City's review and approval, for record purposes or for the fulfillment of the operation and maintenance requirements.
 - iii. Prior to submitting information to the City Engineer:
 - 1) The Design Engineer and contractor shall carefully review the correctness and thoroughness of the material, verify all field measurements, and coordinate all aspects of each item being submitted.
 - 2) The Design Engineer and contractor shall carefully review and ensure that all submittals are tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information, and that all options and equipment furnished are indicated.
 - 3) The Design Engineer shall verify his review by affixing his stamp of approval and signature to the front page of each submittal.

B. PRODUCTS

1. GENERAL

- a. All submittals shall be accompanied by a completed copy of the submittal report included under subsection 4 of this section.
- i. All submittal reports shall be numbered sequentially. Resubmittals shall be designated with the same number as the original submittal followed by a designation letter (i.e. submittal "5a" for the first resubmittal of submittals, submittal "5b" for second, etc.).
- ii. A separate submittal report shall be prepared for each submittal. Generally, items under a single specification section can be included on the same submittal report. Each submittal report shall clearly designate the specification section(s) that apply to the material or equipment being submitted on.
- iii. Except in the case of operations and maintenance manuals or as otherwise approved by the engineer, a single submittal report shall not be used for items under different specification sections or material categories.
- b. Three Categories of Information are Normally Required:
 - i. Information for record.
 - ii. Information for the City's review and approval.
 - iii. Operation and maintenance information.
- c. All submittals shall be tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information. All options and equipment furnished shall be so indicated.
- d. Manufacturers submitting proposals for equipment, which will require changes to the design shown on the drawings, or specified herein, shall also include detailed information on structural, electrical, mechanical and other miscellaneous changes or modifications required to adapt their equipment to the design shown.

2. INFORMATION FOR RECORD

- a. **Laboratory Certificates:** Certificates shall include the results of tests by an independent laboratory for comparison to specification requirements, mix design data and approval, plan inspection reports and certification, and other required information from the laboratory. All information submitted shall be signed by an authorized agent of the laboratory.
- b. **Licenses and Permits:** The contractor shall obtain all licenses and permits required by local, state and federal laws and submit copies of them to the City.
- c. **Installation and Calibration Certificates:** Certificates shall be submitted for equipment as indicated in the individual sections. These certificates shall indicate manufacturer's satisfaction with the installation, the accuracy of calibration and alignment, and the operation of the equipment. An authorized agent of the manufacturer must sign such certificates.

3. INFORMATION FOR THE CITY'S REVIEW AND APPROVAL

- a. Construction Schedules: The contractor shall submit construction schedules directly to the City and the City Engineer.
- b. Material and Equipment Submittals:
 - i. The Design Engineer shall indicate on the submittals all variances from the requirements in the specifications or on the drawings. Failure to note variances from the specification requirements may result in the submittal being returned without review.
 - ii. All submittals shall be tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information. All options furnished shall be indicated. Failure to follow these instructions will result in the submittal being returned without review.
 - iii. If the proposed equipment includes modifications from standard features or options typically provided by the manufacturer for similar applications, these shall be clearly noted on the submittal.
 - iv. Submittals for all materials and equipment used by the contractor in the performance of the work shall include the following as applicable.
 - 1) Manufacturer's Literature: Literature indicating the compliance of the product with the specifications shall be included with all submittals. This shall include catalog sheets and other descriptive bulletins. Manufacturer's literature shall also include, but not be limited to the following:
 - Manufacturer's catalog data
 - Materials of construction
 - Manufacturer's name and model number
 - Installation instructions and drawings
 - 2) Manufacturers' or Suppliers' Certificates: Certificates shall state that the products have been sampled and tested in accordance with the proper industrial and governmental standards and meet the requirements of the approved construction drawings and these Design Standards. An authorized agent of the manufacturer shall sign certificates.
 - 3) Design Data: Design data shall include the calculations, supporting theories, safety factors and assumptions used in designing the product.
 - 4) Samples: Samples shall be provided as required in the individual sections. Samples shall be of the precise material proposed to be furnished. The number of samples and sample size shall be of the industry standard unless otherwise stated in the individual sections.

5) Shop Drawings: Shop drawings shall include the following as applicable to the equipment or system along with any special requirements listed in the individual specification sections:

- Scaled details
- Scaled dimensional drawings
- Sectional assembly drawings
- Fabrication information
- Wiring schematics with termination point identification
- Motor information
- Piping schematics

v. Substitutions:

- 1) Submittals for substitute materials or equipment shall include but not be limited to manufacturer's literature, design criteria, dimensions and installation instruction.
- 2) The submittal shall include any certifications or test results required to demonstrate that the proposed materials or equipment meets the requirements of the specifications and is equivalent or better than the specified materials or equipment.
- 3) If the substitution requires a change in the design, the submittal shall include all pertinent design information and details for the required design change, with supporting documentation

4. OPERATION AND MAINTENANCE INFORMATION

- a. The Design Engineer shall furnish five (5) copies of O&M manuals with information on all equipment requiring maintenance. The work shall not be considered to be substantially complete until all associated O&M information is submitted and accepted by the City.
- b. Review copies of the O&M manuals shall be complete volumes organized and indexed for all associated items of equipment to be included in that volume, with colored pages inserted for items to be inserted. The O&M information for individual equipment items is not to be submitted piecemeal. Where O&M manuals have multiple volumes, the different volumes (mechanical, electrical, scada, etc.) can be submitted separately for review, but the volumes must be numbered and accompanied by a draft overall index covering all volumes.
- c. The final O&M manuals will be accepted only if complete, properly identified with contract section numbers and only after revised, where necessary, to conform to the City's notes on previous submittals that have been marked "furnish as corrected." the contractor shall be responsible for submitting the O&M manuals far enough prior to the end of the contract period to allow the City adequate time to review the manuals.

- d. A table of contents and index tabs shall be furnished for all manuals containing data for three or more items of equipment. Index tabs shall separate and each system or major equipment item. Where an index tab section for a system includes three or more separate items of equipment, an index table of contents shall be provided at the front of the index tab section.
- e. All manuals shall be tailored to the project by high lighting appropriate information and/or deleting or crossing out non-applicable information. All options furnished shall be indicated.
- f. Manuals shall be printed on heavy, first quality paper, 8-1/2" x 11" size with standard three hole punching
- g. A complete manual shall be provided for each site in 3-ring binder(s) with index tabs between all sections, as well as between each system and major equipment item. Binders shall be locking o-ring, view style binders, with exterior view pockets on the front, back and spine of the binder. Multiple volumes are acceptable if required, although single volumes are preferred for each site if possible. If multiple volumes are provided, they need to be labeled as volume 1, 2, etc. With labels that indicate generally what is included in the manual. The manuals should be labeled on the front cover, the spine, as well as a title page inside the front cover. For multiple volumes, copies of a table of contents showing the general content of all manuals shall be included at the front of each binder.
- h. Drawings shall be reduced to 11" x 17". Where reduction is not possible, larger drawings shall be folded separately and placed in envelopes, which are bound into the manual.
- i. Field modifications to equipment during installation shall be included in the manual so that the manual reflects as-built conditions. Revisions to the manual may be submitted for incorporation into the manual where appropriate. However, the City reserves the right to return all manuals to the Design Engineer for revision to reflect as-built conditions.
- j. O&M manuals shall include but not be limited to the following:
 - i. Certificate of completion (in letter form) from the contractor certifying that all materials, equipment and workmanship incorporated into the project are in accordance with the drawings and specifications, and that all work is free of defects and in proper operating condition at the time of project completion. Any exceptions (if any) must be listed and the justification for the exceptions given. The certificate of completion shall also include a written warranty against defect for the full of the warranty period from the date of substantial completion covering all workmanship and materials used in the project.
 - ii. Summary sheet listing each supplier's name, address and telephone number along with manufacturer's job number and/or purchase order number for all equipment supplied. This summary shall be included at the front of the manual. The supplier information shall also be included at the front of each individual section of the manual.
 - iii. Photocopies of building, plumbing, mechanical and/or electrical permits, as well as photocopies of the final inspection certificates for each. Photocopies of laboratory and field test reports.

- iv. Copies of all required or provided warranties shall be included at the front of each applicable section. Provide photocopies of warranty registration cards filled out with the appropriate information.
- v. Copies of any service contracts provided.
- vi. Copies of factory, startup and field test reports required by the individual specification sections.
- vii. Overview of topics covered during training provided as required by the individual specification sections.
- viii. Copies of all submittals for the project on equipment that may require maintenance or replacement, including a copy of the City's submittal review letter or comments. At the front of each section, provide a complete list of equipment and appurtenances included, complete with manufacturer and model number (i.e. bill of materials). If there are any differences between the bill of materials included in the submittal information and that provided, provide a corrected bill of materials. Include written confirmation specifically indicating the manner in which each correction noted on shop drawings or submittals approved subject to conditions was addressed.
- ix. Descriptive literature, bulletins or other data covering the equipment or system shall include, but not be limited to the following, either in the included submittal data or in the O&M information.
 - 1) General arrangement drawing.
 - 2) Sectional assembly.
 - 3) Dimension print.
 - 4) Materials of construction.
 - 5) Parts list with assembly drawings.
 - 6) Recommended spare parts list with part and catalog number.
 - 7) Utility requirements.
 - 8) Lubrication recommendations and instructions.
 - 9) Drive dimensions and data.
 - 10) Pump seal data.
- x. Performance guarantee, including certified performance curve(s) where applicable.
- xi. Description of equipment controls and associated instrumentation.
- xii. Assembly, installation, alignment, adjustment and checking instructions.
- xiii. Operating instructions.
- xiv. Maintenance instructions including trouble-shooting guidelines, lubrication and preventive maintenance instructions with task schedule.
- xv. Special tools and equipment required for operation and maintenance.
- xvi. Schematic wiring diagrams.
- xvii. Schematic piping diagrams, where applicable.

- xviii. Programming instructions for any controllers or other programmable equipment. Copies of the any required software, including registration cards, shall be provided with the O&M manuals. Printout and electronic copy of any programming for controllers or other programmable equipment.

5. OTHER SUBMITTALS

- a. Other submittals are required under various sections of the specifications.

C. EXECUTION

1. GENERAL

- a. Delivery prior to approval of any material or equipment for which submittals are required will be at the contractor's risk. Material or equipment for which submittals are required shall not be incorporated into the work until after the submittals have been reviewed and approved.
- b. Any material or equipment on-site which is rejected by the City after review of submittals shall be removed from the job site by the contractor within two working days of notification of rejection.

2. DISTRIBUTION

- a. Distribution of submittals shall be as follows unless otherwise directed in the individual sections:
 - i. Information for Record - The contractor or the laboratory shall submit one copy of all test certificates, licenses, permits and installation and calibration certificates directly to the City.
 - ii. Information for City's review and approval
 - 1) The Design Engineer shall submit to the City four copies of all documents requiring the City's review.
 - 2) The City will review the submittals with reasonable promptness for their compliance with the design concept, the approved construction drawings and these Design Standards.
 - 3) If the submittals are found insufficient three copies will be returned to the Design Engineer for correction. The Design Engineer shall than resubmit four copies of the corrected information.
 - 4) Upon acceptance, the City Engineer will retain one copy and distribute marked copies as follows:
 - One copy-City
 - Two copies - Design Engineer and contractor

1.4 GENERAL CONSTRUCTION REQUIREMENTS

A. PRECONSTRUCTION CONFERENCE

1. A preconstruction conference shall be scheduled before issuance of the public utility construction permits. The meeting is to include the developer's representative, developer's engineer and prime contractor, and all affected utility companies. The purpose of the conference is to discuss the construction schedule and times of the work which require special coordination.
2. The developer/contractor shall be responsible for notifying the private utility companies of the time and location of the preconstruction conference, and requesting that a representative of each utility be present. The developer may be required to submit proof of notification to the City prior to the preconstruction conference. Copies of notification letters sent to the utility companies by the developer are acceptable.
3. Specific requirements for the construction of public works infrastructure are included in each applicable section.
4. Any alternate construction method not explicitly approved in each applicable section will be considered for approval based on the applicable design criteria section. Any alternate construction method must result in a product that meets or exceeds the minimum requirements of these Design Standards.

B. SAFETY REQUIREMENTS

1. The contractor is responsible for observing the safety of the work and all persons and property coming into contact with the work. The contractor shall conduct his/her work in such a manner as to comply with all the requirements prescribed by OSHA.
2. The City Project Inspector's role is not one of supervision or safety management, but is one of observation only. Nothing contained in this section or elsewhere in the book shall be interpreted to obligate the City to act in any situation, nor shift the owner's responsibility for safety compliance to the City. No responsibility for the safety of the work or for construction means, methods, techniques, sequences, or procedures shall attach to the City by virtue of its action or inaction.

C. PROTECTION OF PROPERTY

1. The contractor shall exercise all due care in protecting property along the route of the improvement. This protection shall include, but not be limited to, trees, yards, fences, drainage lines, mailboxes, driveways, shrubs, and lawns. If any of the above has been disturbed, they shall be restored to as near their original condition as possible or replaced to the owners approval.

D. INSPECTION

1. GENERAL REQUIREMENTS

- a. Work performed within the public right-of-way, or as described in these Design Standards, whether by or for private applicant, by City forces, or by a City contractor, shall be done to the satisfaction of the City and in accordance with the OSSC, any approved plans, and these Design Standards. Unless otherwise approved, any revision to construction plans must be approved by the City before being implemented.
- b. The City shall have authority to enforce the standards as well as other referenced or pertinent specifications. The City will appoint project engineers, assistants, and inspectors as necessary to inspect the work and they will exercise such authority as the City Engineer may delegate.
- c. It is the responsibility of the applicant, contractor, or their agents to have an approved set of plans, and/or permits on the job site wherever work is being accomplished.
- d. It is the responsibility of the applicant, contractor, or their agents to notify the City in advance of the commencement of any authorized work. A preconstruction conference and/or field review shall be required before the commencement of any work per the requirements of these Design Standards.
- e. Failure to comply with the provisions of these Design Standards may result in stop work orders, removal of work accomplished, or other penalties as established by ordinance.

2. CITY INSPECTOR'S ACTIVITIES

- a. Inspecting services provided by the City shall include:
 - i. Monitoring both work progress and performance testing results.
 - ii. Performance of administrative and coordination activities as required supporting the processing and completion of the project.
 - iii. Issuance of a corrective notice to the contractor/engineer to make corrections to the work. The City's Project Inspector, at the discretion of the City Engineer or Public Works Supervisor, may post a stop work order.
 - iv. Maintaining a completion file containing the following:
 - 1) The original of the project completion certification; and
 - 2) A complete copy of the report file initialed by the City's Project Inspector; and
 - 3) The results of material tests, compaction tests, and soil analysis as detailed in the construction file.

- v. Informing the City Engineer of all proposed plan changes, material changes, corrective notices, stop work orders, or errors or omissions in the approved plans or specifications as soon as practical. Any revision to the approved plans must be at the direction of the engineer. It shall be at the discretion of the City's Project Inspector as to whether the revision is significant enough to warrant review by the City Engineer. If so, the developer's engineer shall submit five (5) copies of the revised plans to the City for approval. No work affected by the revision shall be done until approved by the City Engineer.

3. CONTRACTOR'S RESPONSIBILITY FOR SCHEDULING

a. Sequence of Operations

- i. The contractor shall plan construction work and execute operations with a minimum of interference with the operation of the existing public facilities, including but not limited to, water, sewer, and roads. It may be necessary to perform certain parts of the construction work outside normal working hours in order to avoid undesirable conditions, and it shall be the obligation of the contractor to perform this work at such times. This scheduling, however, is subject to the City's approval and does not relieve the contractor from making work available for inspection.
- ii. The contractor shall notify the City at least 48 hours (two full working days) prior to any City inspection. Connections between existing work and new work shall not be made until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the plans and specifications.

b. Inspections Steps

- i. The following items of work shall be inspected by the City:
 - 1) Street or sidewalk work and subgrade (also tested by the contractor) prior to placement of crushed surfacing.
 - 2) Crushed surfacing (also tested by the contractor) prior to placement of paving, curb, or sidewalks.
 - 3) Notify the City prior to the placement of any paving, curb, or sidewalks.
- ii. Other items of inspection notification are included under the various items of work outlined in these Design Standards.

c. Progress of Construction

- i. Construction shall proceed in a systematic manner that will result in a minimum of inconvenience to the public.
- ii. In the case of a pipe-laying job for sanitary sewer, storm drainage, and water improvements the trenching equipment at no time shall be greater than 100 feet ahead of the pipe-laying crew, without written permission from the City Engineer.

- iii. The trench shall be backfilled so that no section of the trench or pipe is left open longer than 24 hours. Trenches located in a right-of-way or Public Street shall be completely backfilled or plated before the contractor leaves the site each day. All piping is to be plugged with a serviceable expansion plug at the end of each workday.

4. CONTRACTOR'S REQUIREMENT FOR TESTING

a. General

- i. Testing shall be performed in accordance with OSSC by a certified independent testing lab hired by the developer or developer's contractor with the results being supplied to the City Engineer. The developer shall pay the cost of all required testing.
- ii. Refer to the OSSC Field-Tested Materials Acceptance Guide and the OSSC Non field-Tested Materials Acceptance Guide for material testing procedures and requirements.
- iii. The testing is not intended to relieve the contractor from any liability for the work. It is intended to show the inspector and the City that the improvements meet these specifications.

b. Asphalt Testing

- i. Compaction of all lifts of asphalt as specified in the OSSC Standard Specifications with the following modifications:
 - a. Thin Pavements:
 - 1) Thin lift pavements shall be considered to be less than 1.5”.
 - b. Other Areas:
 - 1) For surface restoration of utility trenches less than 8 feet wide provide one (1) test per every 200 feet of trench.
- c. Subgrade and Crushed Surfacing Testing
 - i. Compaction testing as specified in the OSSC Standard Specifications. Number of tests required:
 - 1) For streets, provide one test of the subgrade and one test of the crushed surfacing for every 5,000 square feet of surface area of pavement, curb, and sidewalk.
- d. Bedding and Backfill for Utility Trenches
 - i. Compaction testing as specified in the OSSC Standard Specifications. Number of tests required:
 - 1) For utility trenches provide one test at top of bedding for every 500 feet of trench.
 - 2) For utility trenches provide one test for each lift of backfill and for every 500 feet of trench.

e. Earthwork Compaction Testing

- i. Number of tests required: for each location where the fill is deeper than two (2) feet or greater than 300 cubic yards, provide one test per every two (2) vertical feet and every 500 cubic yards.

DIVISION 2: WATER

2.1 DESIGN CRITERIA

A. APPLICABILITY

1. These Design Standards shall govern construction and upgrade of all public water distribution facilities in the City of Dundee and applicable work within its service areas.
2. This section supplements the OSSC Standard Specifications.
3. Permanent water distribution facilities shall be provided to all properties within the City of Dundee in accordance with these Design Standards. This shall generally be interpreted to mean that permanent water distribution facilities shall be provided for existing legal lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
4. SPECIAL ITEMS
 - a. The design of the following are considered special items and are not covered in detail in these Design Standards:
 - i. Water Distribution Pump Stations
 - ii. Reservoirs
 - iii. Wells
 - iv. Treatment Plants
 - v. Pressure Regulating Devices
 - vi. Flow Measurement Devices
 - vii. Relining Of Existing Water Mains
 - viii. Chemical Addition or Ph Adjustment
 - ix. Bridge Crossings
 - x. Creek Or Stream Crossings
 - b. Review and approval of the above special items by the City Engineer shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval. Special items may also require review and approval by the Oregon Health Authority - Public Health Division.

B. GENERAL REQUIREMENTS

1. Water distribution systems will be designed to the following general requirements:
 - a. Meet all expected domestic, commercial and industrial demands including fire flows within the design life;
 - b. Have sufficient structural strength to withstand all external loads which may be imposed;
 - c. Be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
 - d. Meet all design requirements of the Oregon Health Authority - Public Health Division (OHD). Alternate materials and methods will be considered for approval on the basis of these objectives.

C. WATER SYSTEM CAPACITY

1. CALCULATION REQUIREMENTS

a. Design capacities shall be determined by consideration of the following factors and assumptions:

- 1) Area to be serviced, both immediate and adjacent.
- 2) Current and projected population within the areas to be served.
- 3) Current and projected land use within the areas to be served.
- 4) Commercial, industrial, or institutional users to be served.
- 5) Changes in any of the above factors which are likely to occur within a foreseeable time period.

2. DEMAND ASSUMPTIONS

a. In the absence of consumption data or other reliable information, the following factors may be assumed:

i. Peak hour demands as follows:

- 1) 5 gpm per single family residential
- 2) 2.5 gpm per dwelling unit for multiple family residential
- 3) 5,000 gallon/day for commercial development
- 4) 10,000 gallon/day for industrial development

ii. Demand for unique commercial installations, industrial users, PUD's, multiple and institutional developments shall be calculated on an individual basis.

D. FIRE FLOW REQUIREMENTS

1. Unless otherwise approved or required by the local fire marshal, minimum fire flows shall be as follows:

Table 2.1 – Fire Flow Requirements**			
Land Use		Fire Flows (Gpm)	Duration (Hr.)
Industrial		4,000	4
Commercial		3,000	3
Multiple Family		3,000	2
Residential	R-1	1,000	2
	R-2	1,000	2
	R-3	1,000	2
All Others		1,000	2
**these values do not supersede or take the place of ifc or ibc fire flow requirements. Higher values may be necessary based on fire code, fire marshal or iso requirements. Reductions may be allowed by the fire marshal for buildings with fire sprinkler systems.			

2. In all cases, all new fire hydrants shall be capable of delivering a minimum of 1,000 gpm at 20 psi residual system pressure. This requirement will apply independently to each phase of multi-phase projects.

E. HEAD LOSS CALCULATION REQUIREMENTS

1. Head loss shall be determined by the hazen-williams equation based on the following coefficients:

Table 2.2 – Hazen Williams Coefficients	
Pipe Diameter	C Value
8 Inches And Less	100
10 To 12 Inches	110
Greater Than 12 Inches	120

F. VELOCITY AND PRESSURE REQUIREMENTS IN MAINS

1. Velocities in mains shall normally range from three (3) to six (6) feet per second for average demand to a maximum velocity of ten (10) feet per second for maximum day demand plus fire flow.
2. Private systems shall limit velocities as required by the Oregon State Plumbing Specialty Code, Installation Standards.
3. Normal working pressure in the distribution system should be approximately 70 psi with a range of 40 psi to 80 psi.
4. The minimum working pressure for all mechanical joint fittings of a diameter ranging from 4 to 24 inches shall be 350 psi.
5. The water system shall have sufficient capacity to maintain 40 psi at the building entrance for one and two family dwellings. For other development, the system shall have sufficient capacity to provide minimum pressure of 35 psi at the building side of the meter during periods of maximum use, and to provide sufficient volumes of water at adequate pressures to satisfy the maximum expected daily consumption plus fire flows.
6. A 20 psi residual pressure under fire flow conditions shall be maintained at all points in the distribution system. Generally, a maximum velocity of 10 feet per second will govern for sizing mains at all other locations of the service level where this criteria does not govern.

G. LOOPING

1. The distribution system mains shall be looped at all possible locations.
2. All water lines shall be looped and valved such that the removal of any single line segment from service will not result in more than one fire hydrant being taken out of service.
3. The installation of permanent dead-end mains upon which fire protection depends and areas of large demands on single mains will not be permitted.

H. BLOWOFFS

1. All dead-end mains shall terminate with a blow-off assembly or a fire hydrant.
2. Permanent dead-ends shall have a permanent blow-off assembly and a permanent thrust restraint system. Permanent blow-offs in cul-de-sacs shall be located in front of the curb within 5 feet from the curb face.
3. Mains which can conceivably be extended at some later date shall have a mainline valve in front of the blow-off assembly, and a thrust restraint system which allows the mainline valve to be connected to without taking the line out of service.
4. Blow-offs shall be sized to ensure that the water mains can be flushed at a minimum velocity of 2½ feet per second in accordance with AWWA c-650. The following table may be used as a minimum guideline assuming 40 psi minimum residual system pressure under flushing conditions.

Table 2.3 – Mainline Blow-off Sizes

Water Main Diameter	Minimum Blow-off Diameter
6 And 8-Inch	2-Inch
10 And 12-Inch	4-Inch
12-Inch And Larger	As Required

5. The Design Engineer shall submit calculations showing that these flushing velocities can be satisfied.
6. Temporary blow-offs larger than 2-inches in diameter shall have a valve conforming to the requirements contained herein for mainline valves.
7. Temporary blow-offs, where required for cleaning new water mains, shall be located at the lower end of the line to be flushed whenever possible.

I. MINIMUM DEPTH

1. The standard minimum cover over buried water mains within the street right-of-way or easements shall be 36 inches from the finished grade, except that a minimum of 40 inches cover shall be required for waterlines in fill slopes.
2. Finish grade shall normally be determined as follows:

Table 2.4 – Finish Grade

Mainline Location	Finish Grade
Waterline Under Sidewalk In Right Of Way	Top Of Curb
Waterline In Front Of Curb	Gutter
Waterline In Cut Slope Behind Sidewalk	Top Of Curb
Fill Slopes	Perpendicular From Pipe To Surface
Easement	Finish Grade At Pipe Centerline

3. Where the waterline is located in the cut side slope, in an undeveloped right-of-way, or along a roadway developed at less than ultimate width (including sidewalks), the waterline shall be placed at a depth sufficient to ensure that 36-inches of cover is maintained at the time of final construction of the roadway.

J. WATER MAIN REQUIREMENTS

1. MINIMUM MAINLINE SIZE

Minimum sizes for water mains shall be as follows:

Table 2.5 - Mainline Size Requirement	
Minimum Diameter	Type of mainline
6-Inch	Private fire line supplying either a single fire hydrant or a building fire suppression system.
8-Inch	Minimum size water main for the public water system. Looping back into the distribution grid shall be at intervals as required by the City, but shall generally not exceed 600 feet.
8-Inch	Public water distribution mains and permanently dead-end mains supplying fire hydrants with a required fire flow of 1,500 gpm or less.
10-Inch And Larger	As required for transmission mains, distribution mains in industrial subdivisions, and fire lines supplying more than 1,500 gpm.

2. ALIGNMENT AND LOCATION

a. General Requirements

- i. Water lines shall generally be parallel to the right-of-way or easement lines
- ii. Unless otherwise required by the City Engineer, water lines shall generally be located on the south and west sides of the right-of-way.

b. Location with Regard to Other Utilities

- i. Water mainlines shall be separated from all other utilities by a minimum of 5 feet.
- ii. Water mainlines shall generally be separated from sewer mainlines by a minimum of 10 feet. In no case shall the separation be less than 5 feet or as required by OAR Chapter 333, Division 61.
- iii. Sanitary sewer main crossings
 - 1) Where water mainline crosses below or within 18 inches vertical separation above a sanitary sewer main or lateral, one full length of ductile iron pipe shall be centered at point of crossing.

3. LOCATION IN EASEMENTS

- a. Unless otherwise specified or authorized by the City, minimum easement widths for water mainlines shall be 15 feet for normal depth lines.
- b. Mainlines in easements will be allowed only in cases where it is required in order to loop a mainline to avoid a permanent dead end condition, and only after all reasonable attempts to loop the mainlines in a right-of-way have been exhausted.

- c. When water mainlines in easements are approved by the City, the easement shall be centered on the mainline, and the mainline shall be offset a minimum of 6 feet from any property line.
- d. The conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for water mainline purposes. Under no circumstances shall a building or structure, trees, ornamental landscaping or fence be placed over a water mainline or easement. Prohibited structures shall include footings, decks and overhanging portions of structures located outside the easement.
- e. Easement locations for public water mainlines serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit unobstructed vehicle access for maintenance.
- f. Water mainlines with inside diameters larger than 12-inches will require wider easements.
- g. Common placement in the easement of water and sewer or storm drain line may be allowed under certain conditions subject to approval by the City Engineer. Easements wider than the minimum will be required.
- h. Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet OHA PHD requirements.
- i. All easements must be furnished to the City for review and approval prior to recording.

K. VALVES

1. SIZES

- a. In general, valves shall be the same size as the mains in which they are installed.
- b. Unless otherwise approved or required by the City Engineer, valves shall conform to the following table.

Table 2.6 - Required Valves By Size And Operating Conditions		
Valve Size	Static Pressure	Valve Style
10- Inch and Smaller	<120 Psi	Gate Valve
8-Inch & 10-Inch	120 Psi	Butterfly Valve
12-Inch & Larger	All Pressures	Butterfly Valve

- c. Valve types and materials shall conform to the requirements of these Design Standards and the OSSC Standard Specifications.

2. LOCATION

- a. Distribution system valves shall be located at the tee or cross fitting as nearly as possible.
- b. There shall be a sufficient number of valves so located that not more than four (4) and preferable three (3) valves must be operated to effect any one particular shutdown. The spacing of valves shall not exceed 400 feet generally.

- c. A tee-intersection shall be valved on two (2) branches and a cross-intersection shall be valved on three branches.
- d. Hazardous crossings (i.e. creek, railroad, freeway crossings, etc.) shall be valved on each side of the crossing.
- e. Distribution branches on transmission mains shall be spaced not more than 800 feet apart where practical and shall be valved and plugged.
- f. Transmission water mains shall have valves at spacings as required by the City Engineer.
- g. Reducers for reconnection into existing water mains less than eight (8) inches in diameter shall be placed between the new valve and the existing line.

3. TAPPING TEES

- a. Tapping tees to make connection to existing, in-service lines are only allowed in cases where the City determines that water service cannot be interrupted to cut in a tee or cross, or where the additional in-line valve is not needed for system isolation as outlined above.

4. AIR RELEASE VALVES

- a. General Requirements
 - i. Provisions for air relief shall be provided at all high points of waterlines. Where possible, location of service taps at high points in the line is preferable to the installation of an air relief valve. Fire hydrants may be used for air relief on lines ten (10) inches in diameter or less.
 - ii. An automatic air release valve shall be installed in a structure off of the street where flooding will not occur.

L. FIRE HYDRANTS

1. COVERAGE

- a. Preferred coverage shall result in maximum hydrant spacing of 500 feet in residential areas, 300 feet in high-value districts including industrial subdivisions and no further than 250 feet from the furthest point of any dwelling, business, garage or building. Hydrant stubs with mainline valves will be required as a minimum in undeveloped areas.

2. LOCATION

- a. No fire hydrant shall be installed on a main of less than 8-inch diameter unless it is in a looped system of 6-inch diameter mains. The hydrant lead shall be a minimum of 6 inches in diameter.
- b. Hydrants shall be placed in locations approved by the local fire marshal.
- c. In general, hydrants shall be located at the corner of street. Hydrants located at points other than intersections shall be located at the extension of property lines.
- d. Unless otherwise approved by the City, hydrants shall be placed between the sidewalk and the property line.

- e. No hydrant shall be installed within 5 feet of an existing utility pole or guy wire nor shall a utility or guy wire be placed within 5 feet of an existing hydrant.

3. HYDRANT VALVES

- a. Each fire hydrant shall have a hydrant valve and valve box at the mainline hydrant tee which will permit removal and repair of the hydrant without shutting down the water main supplying the hydrant.

M. SERVICE LINES

1. GENERAL REQUIREMENTS

- a. The use of pumps on a service line to provide adequate pressure to a subdivision lot or property located above the pressure level of the supply main shall be prohibited.
- b. Each legal lot of record shall be connected by a separate water service line connected to the public or approved private water main. Combined water service lines will be permitted only when the property cannot legally be further divided. An example of this is a residential lot with a house and unattached garage or shop with plumbing fixtures.

2. SIZES

- a. Standard service line sizes are 1-inch, 1 1/2-inch, 2-inch, 3-inch, 4-inch, 6-inch and 8-inch diameter. Service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

Table 2.7 – Minimum Service Size

Type Of Service	Minimum Service Size
Single Residential Service	1-Inch
Double Residential Service	1-Inch
Triple Residential Service (Triplexes Only)	1½-Inch
Commercial Service	1-Inch Minimum
Note: The Next Larger Service Size May Be Required For Residential Lots Large Enough To Be Partitioned Into Additional Lots Without A Water Main Extension.	

- b. The water service line on the private side of the meter may not be larger than one nominal pipe size larger than the service line size.
- c. Commercial services shall not be smaller than 1-inch. For new streets or streets being cut for service installation, far side commercial services shall be installed in a 3-inch minimum size PVC sleeve.
- d. Service piping shall be equal to the meter size, but not less than 1-Inch.
- e. For 3-inch and larger services, design drawings must be submitted showing the vault and fitting requirements, including a lockable bypass line, with the expected flow requirements and proposed usage.

3. PRESSURE REDUCING VALVES

- a. All new service lines shall be equipped with an approved pressure reducing valve installed on the private side of the meter.

4. TAPPING REQUIREMENTS

- a. Tapping requirements for water service lines shall be as outlined below:

Table 2.8 - Water Service Tapping Requirements		
Service Size	Mainline Type	Tapping Requirements
1 Inch	• Existing Mainlines	Service Saddle
	• PVC Mainlines	
	• 6 Inch And Smaller Mainlines	
	• 12 Inch And Larger Mainlines	
	• New 8 Inch And Larger Class 52 Di	Direct Tap Or Service Saddle Allowed
1½ Inch	All Pipe Types	Service Saddle
2 Inch And Larger	All Pipe Types	Mainline Tee With Flanged Valve

5. LOCATION

a. Domestic

- i. The service lines shall normally extend from the main to a point 6 inches behind the right-of-way. A curb stop and meter box shall be located at the termination of the service line.
- ii. In general, individual service connections shall terminate in front of the property to be served. Double services shall be located on each side of a common side property line.
- iii. Domestic service lines shall not be connected to fire protection services, including hydrant leads.

6. FIRE SERVICE

- a. A backflow prevention assembly shall be placed on fire service lines as required by the City.
- b. Plans for fire service lines shall meet the requirements outlined in Division 1 and shall be stamped by a licensed civil engineer.
- c. Drawings for fire services shall include vicinity map, adjoining street name, width, curb and property line, location of existing water line referenced to the property line, existing hydrant locations and the distance to property pins where the service crosses the property line.

N. WATER METERS

1. GENERAL REQUIREMENTS

- a. All water meters within the service area of the City of Dundee will be furnished and installed by the City at the request and expense of the customer. The service line, meter box and all piping within the meter box must be installed by the developer.

2. LOCATION

a. General

- i. Meters shall be located at the termination of the City service line.
- ii. A public utility and access easement shall be provided to and around any meter boxes set on private property. The easement shall be sized to provide a minimum of five (5) foot clear around the meter box or vault on all sides.

b. 1 inch through 2 inch meters

- i. Meters shall be located in the right-of-way in a location that allows for easy reading and maintenance, preferably 3-inches behind the back of sidewalk.

c. 3-inch and larger meter

- i. Meters shall be located on private property adjacent to the public right-of-way to allow reading and maintenance. Meters must be accessible with a crane truck to within 10 feet of the installation with a 10 foot vertical clearance.
- ii. The meter, vault and piping are to be protected from freezing, vandals and vehicles. The area around the vault must be sloped in such a manner to prevent storm water from ponding over or running into the vault.
- iii. A minimum 3 foot clear space must be provided around the vault to provide ample working space for maintenance.
- iv. All 3-inch and larger meters shall be provided with a remote readout head located such that it can be read without entering the meter vault.

3. METER BOXES

- a. Meter boxes shall be provided by the developer for each water service and meter location. Double set meters (2 meters in 1 box) are not allowed.
- b. Meter boxes shall be set level to finish grade. The developer or builder shall be responsible for setting meter boxes and services to finish grade prior to installation of water meters by the City.

O. PRIVATE WATER SYSTEMS

1. General design considerations for private water systems shall conform to requirements set forth by the Oregon Health Authority - Public Health Division, by the Oregon Plumbing Specialty Code, and these Design Standards.
2. Each connection of the private water system to the City system shall be through an approved backflow prevention assembly and meter.
3. Requirements for capacity, materials, looping, valves, fire protection, service lines and meters shall also be applicable to design within PUD areas.

4. The resale of water without written approval of the City shall be prohibited. Written authorization from the City shall be required for each service connection and for any sale of water.

P. BACKFLOW PREVENTION

1. CROSS-CONNECTIONS.

No cross-connections shall be created, installed, used or maintained when served by the city's water system, unless said cross-connections comply with the applicable requirements of this chapter.

2. BACKFLOW PREVENTION ASSEMBLY REQUIREMENTS.

Unless determined by the cross-connection specialist not to present a backflow threat to the city's water supply, all of the following are subject to backflow prevention:

- a. Whenever the nature and extent of activity or the materials used in connection with said activity or materials stored at a premises could contaminate or pollute the city's water supply;
- b. When premises has cross-connections;
- c. When intricate plumbing arrangements are present that make it impractical to ascertain whether cross-connections exist;
- d. Where a used water return system or auxiliary water supply could be connected to the city's water system;
- e. Where there is unduly restricted entry so that inspections for cross-connection cannot be made with sufficient frequency or with sufficient notice to assure that cross-connections do not exist;
- f. Where there is a repeated history of cross-connection being established or reestablished;
- g. Where materials of a toxic or hazardous nature are being used such that, if backflow should occur, a health hazard could result;
- h. Lawn irrigation systems;
- i. All water services larger than one inch;
- j. Any other water system which receives water from the city and which does not have a cross-connection control program approved by the city;
- k. Where the installation of any approved backflow prevention assembly is deemed to be necessary to accomplish the purpose of these regulations in the judgement of the cross-connection specialist.

3. THERMAL EXPANSION

- a. It is the responsibility of the owner to address the possibility of thermal expansion if a closed system has been created by the installation of a backflow prevention assembly.

4. MOBILE UNITS

- a. Any mobile unit or apparatus using city water or water from a premises attached to the City's system shall first meet all cross-connection requirements imposed by the City and obtain a permit prior to using City water if there is a possibility that the attachment may contaminate the City's water system.

5. INSTALLATION REQUIREMENTS

- a. All backflow prevention assembly installations shall comply with the requirements of OAR 333-061-0070(8) and 333-061-0071, the Oregon Plumbing Specialty Code, and meet all standards of the Oregon State Health Division. All backflow prevention assemblies required under this section shall be of a type and model approved by the Oregon State Health Division.

6. FIRE SYSTEMS

- a. An approved double detector check assembly shall be the minimum protection on fire sprinkler systems using piping material that is not approved for potable water use and/or does not provide for periodic flow-through during each 24-hour period. A reduced pressure principle detector assembly (“RPDA”) must be installed if any solution other than potable water can be introduced into the sprinkler system.

7. ACCESS TO PREMISES

- a. Authorized personnel of the city, with proper identification and sufficient notice, shall have access during reasonable hours to all parts of a premises to which the city supplies water in order to ascertain compliance with the requirements of this chapter.

8. ANNUAL TESTING AND REPAIRS

- a. All backflow prevention assemblies provided water by the city shall be tested consistent with Oregon Health Division Rules at the time of installation, repair or relocation, and at least annually thereafter, by a state-certified backflow prevention assembly tester. Testing shall be more frequently than annually for approved backflow prevention assemblies that repeatedly fail, or are protecting health hazard cross-connections, as determined by the cross-connection specialist. All assemblies found not functioning shall be promptly repaired or replaced.

9. TERMINATION OF SERVICE

- a. Consistent with the terms of OAR 333-061-0070(9)(a), the city may cause the discontinuance of water service to the premises for:
 - i. Failure to remove or eliminate an existing unprotected or potential cross-connection;
 - ii. Failure to install a required approved backflow prevention assembly;
 - iii. Failure to maintain an approved backflow prevention assembly;
 - iv. Failure to conduct the required testing of an approved backflow prevention assembly.

10. LOCATION

- a. The approved backflow prevention assembly shall be installed on the property being served in a location accessible for City inspection and testing as follows:
 - i. Before any branch, immediately downstream of the meter; or
 - ii. If not meter, at the property line; or
 - iii. If in the building, before the first branch or hazard being controlled or as determined by the City Engineer; or
 - iv. If installed outside the building being served, it shall be placed at the property line or easement line in a vault or structure in accordance with the manufacturer's recommendations and as approved by the City Engineer. Vaults must have a sump and be watertight.
 - v. The distance from a fire hydrant to the fire department connection shall not exceed 40 feet unless otherwise approved in writing by the fire chief, but in no case shall a distance of greater than 60 feet be allowed.

Q. UNDERGROUND WARNING TAPE

1. Detectable or non-detectable acid and alkali-resistant safety warning tape shall be provided along all mainlines not located under sidewalks or paved portions of public streets.
2. Underground warning tape shall be placed a minimum of 12 inches and a maximum of 15 inches below the finish ground surface, and shall be continuous the entire length of the mainline as specified.

R. MAINLINE BORED CROSSINGS

1. Bore casing size shall be adequate to permit proper construction of the carrier pipe to the required lines and grades. Carrier pipe used in bore casings shall be as specified herein.
2. All bore crossings shall be provided with casing spacers and end seals. Casing spacer configuration shall conform to the manufacturer's recommendations, but in no case shall less than three (3) spacers per length of pipe be used.
3. In order to prevent over-belling of flexible pipe while installing it through the casing, provide a method for restricting movement between the assembled bell and spigot conforming to the manufacturer's recommendations.
4. The design of the bore crossing shall include the following as a minimum:
 - a. Casing and carrier pipe materials and dimensions, including outside bell diameters of the carrier pipe.
 - b. Details for any part of the system which must be changed as a result of the boring operation (manhole, headwall, etc.).
 - c. Bore and receiving pit backfill material and compaction requirements.

2.2 MATERIALS

A. GENERAL

1. Unless otherwise approved by the City Engineer, materials used for the construction of public water lines shall conform to the most current version of the Oregon Standard Specifications for Construction, the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the any of the city required standards.
2. In the case of conflicts between the provisions of these Design Standards and the PWS, the more stringent as determined by the City Engineer shall apply. Acceptable materials shall be as outlined in these Design Standards.
3. It is not intended that materials listed herein are to be considered acceptable for all applications. The Design Engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.
4. All materials or products which will come in contact with or which will be used on material or products which will come in contact with potable water shall conform to the requirements of OAR 333-61-087, product acceptability criteria or the National Sanitation Foundation (NSF) Standard 61, Drinking Water System Components - health effects as approved by the Oregon Health Authority - Public Health Division.

B. PIPE

1. Water distribution pipe shall be Class 52 ductile iron pipe conforming to AWWA C151, and cement-mortar lined and seal coated in accordance with AWWA C104.
2. All ductile iron pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of one (1) mil thick unless otherwise specified.

C. FITTINGS

1. MECHANICAL JOINT FITTINGS

- a. All mechanical joint (MJ) tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C153.
- b. The minimum working pressure for all mechanical joint (MJ) fittings 4-inches through 24-inch in diameter shall be 350 psi.

2. FLANGED FITTINGS

- a. All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48 inches in diameter shall be cast iron or ductile iron fittings in conformance with AWWA c110.
- b. The minimum working pressure for all flanged cast iron or ductile iron fittings shall be 250 psi.

D. COUPLINGS

1. Couplings shall be limited in their application to connection of new pipe work to existing waterlines, temporary installations, and where specifically approved by the City Engineer.
2. Couplings shall be mechanical joint solid sleeve or mechanical joint split sleeve type couplings consisting of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts.
3. Mechanical joint couplings shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.
4. Solid sleeve couplings shall be Clow F-1208 or approved equivalent. Split sleeve couplings shall be Mueller H-785 or approved equivalent.
5. Dresser-type couplings are not an approved option unless specifically approved by the City Engineer. Applications shall be limited to transitions between pipe types for which mechanical joint couplings are not available.

E. MAIN LINE VALVES

1. GENERAL

- a. All mainline valves and appurtenances shall have the name, monogram, or initials of the manufacturer cast thereon. They shall be built and equipped for the type of operation as specified herein or as shown on the drawings.
- b. Valve Operators
 - i. All valve operators shall be totally enclosed traveling nut type manual operators, sealed and lubricated for underground service.
 - ii. All buried valves shall be supplied with a 2-inch square operating nut. Nuts shall have a flanged base on which shall be cast an arrow at least 2-inch long with the word "open" cast on the nut to clearly indicate the direction of opening.
 - iii. Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Extension stem shall extend to within 12-inches (maximum) of the finished ground surface and shall be provided with spacers to center the stem in the valve box.
- c. Valve Boxes
 - i. All buried valves shall be provided with valve boxes as shown on the Standard Details.
- d. Gate Valves
 - i. All gate valves shall be resilient wedge gate valves conforming to the requirements of AWWA C-509, except as herein modified.

- ii. Gate valves shall be epoxy coated iron-body, resilient wedge non-rising stem gate valves. The wedge shall be cast iron completely encapsulated in an elastomer covering with polymer guide bearing caps on each side. The valves shall have a full diameter waterway with no grooves or recesses at the valve seat location. Flanges, where required, shall be 125 pound, full faced, drilled per ANSI B16.1.
- iii. Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and a minimum test pressure 300 psi.
- iv. Gate valves shall be Mueller A-2360, Waterous Series 500 or approved equivalent.
- e. Butterfly Valves
 - i. All butterfly valves shall conform to AWWA C504, except as herein modified.
 - ii. Butterfly valves shall be epoxy coated short body type AWWA Type-B valves. Flanges, where required, shall be 125 pound, full-faced, drilled per ANSI B16.1.
 - iii. Valve operators shall be enclosed traveling nut type manual operators, sealed and lubricated for underground service, and shall be rated for submerged operation up to ten (10) psi (± 23 feet).
 - iv. Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 150 psi and a minimum test pressure 300 psi.
 - v. Butterfly valves shall be Pratt Groundhog Series, or approved equivalent.
- f. Shop Painting
 - i. All valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C550.

F. SERVICE PIPE AND FITTINGS

1. All services that are saddle tapped shall use ductile iron service saddles with stainless steel bolts and clamps. All ductile iron service saddles shall be furnished with a fusion bonded epoxy coating conforming to the requirements of AWWA C-550.
2. Unless otherwise shown on the drawings, single and double residential service pipe shall be one (1) inch in diameter.
3. One (1) inch services
 - a. Unless otherwise specified herein, water service lines shall be seamless Type K copper pipe, conforming to AWWA C500, 160 psi rated.
 - b. All corporation stops shall be brass ball valve corporation stops rated to 300 psi with iron pipe thread inlet and compression outlet to adapt copper pipe. Corporation stops shall be Ford FB-1100 or approved equivalent.
 - c. Each individual water service line shall be equipped with a locking ball valve meter stop assembly at the inlet to the meter. All meter stop assemblies shall be brass with copper pipe connector as appropriate and outlet for meter coupling.
 - d. Meter stops for 1-inch meters shall be locking angle ball valves with CTS pack joint inlet. 1-inch meter stops shall be Ford BA43-242W and Ford BA43-444W, respectively, or approved equivalent. A 1-inch x 3/4 inch adapter shall be provided on the meter stop for each new 1-inch service.

- e. Service line couplings shall be CTS pack joint style couplings. Couplings shall be Ford C44 coupling or approved equivalent.
- f. Double meter stop assemblies for a 1-inch service line to two (2) ¾-inch services shall consist of a 14-inch u-branch assembly with CTS pack joint inlet x MIP thread outlets, and locking angle ball valve meter stops. Double meter stop assemblies shall be Ford U48-43-14 U-branch with Ford BA 13-232w meter stops, or approved equivalent.

4. 1½ Inch and Larger Services

- a. 1½ inch and 2 inch water service lines shall be seamless type k copper pipe, conforming to AWWA C800, 160 psi rated.
- b. 1½ inch and 2 inch water services shall be provided with high bypass copper setters for flanged meters, Ford 70 Series or approved equivalent conforming to Standard Details.
 - i. The coppersetter shall be provided with ball valves on the inlet and outlet, with inlet valve provided with a lock wing and the outlet valve provided with a handle.
 - ii. The bypass line shall be 1-inch diameter minimum, and shall be provided with a lockwing ball valve.
- c. 2-inch and larger services shall have a mainline tee with flanged side outlet and flanged resilient wedge gate valve conforming the requirements specified herein.
- d. 3-inch and larger water service lines shall be reviewed on a case-by-case basis. Pipe and fittings shall be as required by the City Engineer.

G. WATER METER BOXES

- 1. Unless otherwise approved by the City Engineer, all meter boxes must be as shown below:

Table 2.9 - Water Meter Boxes			
Meter Size	Non-Traffic Area	Traffic Area	Inside Dimensions
1 Inch	1armorcast A6001946pcx12	1armorcast A6001946pcx12	13" X 24"
	Lid A6001866r	Lid A6001866	
1 ½ Inch	1armorcast A6001640pcx12	1armorcast A6001946pcx12	17" X 30"
	Lid A6001643r	Lid A6001643	
2 Inch	1armorcast A6001640pcx12	1armorcast A6001946pcx12	17" X 30"
	Lid A6001643r	Lid A6001643	
3 Inch And Larger	Vault Built To Public Works Requirements		
1 –Or Approved Equivalent			

- 2. Meter boxes outside of traffic areas shall be polymer concrete boxes with nonskid polymer concrete covers and hinged reading lids.
- 3. Meter boxes within traffic areas shall be polymer concrete boxes with one piece traffic rated covers.

4. All meter boxes shall be provided with knockouts for touch-read sensors.

H. FIRE HYDRANTS

1. Unless otherwise required by the Dundee Department of Public Safety, all fire hydrants shall conform to the following:
 - a. All fire hydrants shall be improved, dry barrel, 5¼-inch compression type valve, traffic model.
 - b. Fire hydrants shall be equipped with two 2 ½-inch hose ports (NST), one 4 ½-inch pumper port (NST), 1 ½-inch pentagon nut, and barrel drains.
 - c. Fire hydrants shall be oriented so as to optimize access to ports, or as directed by the engineer.
 - d. Fire hydrants shall be Mueller Super Centurion 250, Model A-423, and shall be factory painted red.

I. MAINLINE TAPPING TEES

1. Tapping tees used for making connections to existing, in-service lines shall be all stainless steel construction, including stainless steel flange, with full perimeter gasket, and shall have Class 125 outlet flanges. In all cases, the tapping tee shall be designed for use with the existing pipe materials and O.D. equivalent.
2. All tapping valves shall be resilient wedge gate valves furnished with a fusion bonded epoxy coating inside & outside conforming to the requirements of AWWA C550.
3. Any company performing mainline taps shall be prequalified with the City prior to performing any work on a project.

J. UNDERGROUND WARNING TAPE

1. Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
2. The tape shall be safety blue and shall be provided with the legend "caution buried water line below" or approved equivalent printed continuously down the length of the tape.

K. BORE CASINGS AND ACCESSORIES

1. Casing shall be welded smooth steel pipe conforming to the requirements of ASTM A-53 or approved equal, with a minimum yield strength of 35,000 psi.

DIVISION 3: SEWER

3.1 DESIGN CRITERIA

A. APPLICABILITY

1. These Design Standards shall govern all construction and upgrading of public sanitary sewer facilities in the City of Dundee and applicable work within its service areas.
2. This section supplements the OSSC Standard Specifications
3. Permanent sanitary sewer facilities shall be provided to all properties within the City of Dundee in accordance with these Design Standards. This shall generally be interpreted to mean that permanent sanitary sewer distribution facilities shall be provided for existing legal lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
4. These design requirements may be used for private systems when plumbing code requirements cannot be met, provided the system is designed and appropriately certified by a professional engineer licensed in the State of Oregon.
5. Review and approval by the City Engineer of any items not covered within these Design Standards shall be required.

B. GENERAL REQUIREMENTS

1. Sanitary sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow.
2. Sewers shall be designed to convey the peak instantaneous wet weather flows anticipated over the design period without surcharging.
3. All sanitary sewers shall be designed to flow by gravity to an existing or new sewer without lift stations where possible.
4. All developments will be required to provide public sewers to serve adjacent upstream parcels in order to provide for the orderly development of the drainage area.
5. Storm water, including street, roof or footing drainage, shall not be discharged into the sanitary sewer system.
6. Unpolluted (noncontact) cooling waters shall not be discharged into sanitary sewers.

C. DESIGN BASIS & CAPACITY

1. DESIGN BASIS
 - a. All sewers shall be designed to carry the peak domestic, commercial and industrial contributions, plus infiltration/inflow (I/I) from the individual gravity service laterals, sewer mains and manholes.

- b. New sewer systems within the City may be designed on the basis of the following flows, flows from types of establishments not listed shall be as approved by the City Engineer:
 - i. Residential domestic flows: 100 gal/capita/day (gpcd)
 - ii. Schools, non-residential students & staff: 25 gpcd
 - iii. Commercial, non-residential customers:
 - 1) Restaurant/cafe: 40 gal/day/seat
 - 2) Tavern/bar: 50 gal/day/seat
 - iv. Laundries, self-service: 500 gal/day/machine
 - v. Infiltration/inflow:
 - 1) New facilities: 1,600 gal/acre/day
 - 2) Existing facilities: as measured.

2. CAPACITY

- a. Public lateral or mainline sewers shall not be less than eight (8) inches in diameter unless approved in writing by DEQ and the City Engineer.
- b. Sewers shall be designed to carry, without surcharging, not less than four (4) times the design sanitary flow, plus I/I allowance, plus existing or planned flows from upstream properties.
- c. A minimum "n" value of 0.013 shall be used in Manning's formula for the design of all sewer facilities regardless of pipe material. The use of higher "n" values for existing pipe may be required by the City Engineer.

D. PIPE SERVICE AREA CAPACITY REQUIREMENT

- 1. Mainline and lateral sewers shall be designed for the ultimate development of the tributary area. Consideration shall be given to the maximum anticipated capacity of institutions, industrial parks, commercial establishments, etc.
- 2. Selection of the design period for trunk sewers shall be based on evaluation of functional and other considerations. Some of the factors that should be addressed in the design of trunk sewers are:
 - a. Solids deposition, odor, and pipe corrosion at initial flows.
 - b. Effect of sewer sizing on land use and development.
 - c. Population and economic growth projections and the anticipated accuracy of these projections, coupled with the comparative costs of staged construction and the anticipated manner in which the future improvements will be funded.

E. SEWER HORIZONTAL ALIGNMENT

- 1. Sewer lines shall be laid on a straight alignment and uniform slope between consecutive manholes.
- 2. Horizontal and vertical curves in sanitary sewers are not permitted.

3. Sewer mainlines and lateral mainlines shall be separated from all other utilities by a minimum of five feet clear. Separation of utilities must meet Oregon state Department of Environmental Quality (DEQ) and Oregon Health Authority - Public Health Division (OHA PHD) requirements.
4. Sewer mainlines and lateral mainlines shall generally be separated from water mainlines by a minimum of ten (10) feet.

5. WATER MAIN CROSSINGS

- a. Where sanitary sewer lines cross above or within 18 inches of vertical separation below a waterline, sewer mains and/or laterals shall be replaced with AWWA C900 PVC pipe (DR 18) in accordance with OAR 333.
- b. One full (20 foot) length of AWWA C900 PVC pipe (DR 18) shall be centered at point of crossing. C900 PVC pipe to be connected to existing sewer lines with approved rubber couplings with stainless steel bands.
- c. Sewers crossing streams or drainage channels shall be designed to cross the stream as nearly perpendicular to the stream channel as possible with no less than three (3) feet of cover and shall be free from grade changes at the crossing.

6. EASEMENTS

- a. Public sewers within easements will be permitted only upon showing that services cannot be provided from a line within a right-of-way.
- b. All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the developer.
- c. Sewer easements shall not be used for any purpose which would interfere with the unrestricted use for sewer main purposes.
- d. Minimum Easement Widths
 - i. Unless otherwise specified or authorized by the City, minimum easements widths for sanitary sewers shall be as follows, additional width may be required at the discretion of the City Engineer:

Table 3.1 - Minimum Sanitary Sewer Easement Width		
Sewer Pipe Diameter	Depth To Invert	
	Less Than Or Equal To 6 Feet	Greater Than 6 Feet
8 To 10 Inches	15 Feet	15 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert
12 To 15 Inches	20 Feet	20 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert
15 To 24 Inches	25 Feet	35 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert

F. SEWER VERTICAL ALIGNMENT

1. MINIMUM PIPE SLOPE

- a. All sanitary sewers shall be designed to flow by gravity to an existing or new sewer without sewage lift stations, where possible.
- b. All sanitary sewers shall be laid on a slope which will produce a mean velocity when flowing full of at least two (2) feet per second based on manning's formula.
- c. Sewers shall be laid with uniform slope and alignment between manholes.

2. MAXIMUM PIPE SLOPE

- a. The difference between the inlet pipe slope and outlet pipe slope at any manhole shall not exceed twenty-five percent (25%).
- b. Sewers on slopes of twenty percent (20%) or greater shall be anchored with concrete anchor walls or other restraining methods approved or specified by the City.
- c. Where velocities greater than 15 feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes against erosion or displacement.

3. MINIMUM DEPTH

- a. All sanitary sewers shall be laid at a depth sufficient to drain building sewers, to protect against damage by frost or traffic and to drain basement sewers where practical.
- b. Sanitary sewers in residential areas shall be placed in the street with the following minimum cover:
 - i. Lateral and mainline sewers – six (6) feet
 - ii. Trunk sewers:
 - 1) In the roadway – seven (7) feet
 - 2) In easements – eight (8) feet
- c. Where the topography is relatively flat and existing sewers are five (5) feet or less and cannot be practically lowered, the minimum cover may be reduced to three (3) feet. Cover depths less than three (3) feet will require the approval of the City Engineer, and will require the installation of Class 52 Ductile Iron Pipe (corrosion resistant mortar lined) or Class 150 C900 PVC.

G. SERVICE LATERALS

1. GENERAL REQUIREMENTS

- a. Construction of the sewer service lateral shall be of the same quality and meet the same requirements as the public sewer. These sewers shall also conform to state and local plumbing codes and restrictions.
- b. Sewer service laterals shall not tie into manholes.
- c. Each legal lot of record shall be connected by a separate sewer service lateral connected to the public or approved private sewer main. Combined sewer

service laterals will be permitted only when the property cannot legally be further divided.

- d. Additional sanitary sewer laterals must be stubbed into the property sufficient to serve all future residential parcels where such service or future partition would require that new streets be cut to install such services.
- e. A backwater check valve shall be installed when the lowest floor level of a house to be connected to the public sewer is less than 12-inches above the top of the nearest upstream manhole or cleanout structure. A gate valve in addition to the required backwater check valve is optional but should be considered for installation for additional protection should the backwater valve fail or become clogged with debris.
- f. Sewer service laterals shall have at least 4 feet of cover from finish grade at the right-of-way or easement line.
- g. Connections of service laterals to existing sewers shall be made watertight.
- h. The entire portion of the sanitary sewer lateral or building sewer outside the public right-of-way (or outside the public sewer easement for sewer mainlines not constructed in public right-of-way) shall be the sole responsibility of the property owner. Where a property line cleanout exists, the private lateral maintenance responsibility extends to the property line cleanout wye.

2. CLEANOUTS

- a. A cleanout shall be installed at the right-of-way or easement line for all new and existing sanitary sewer service laterals. The sanitary sewer service lateral shall extend beyond the cleanout to the back of any easements fronting the right-of-way or easement.

3. MINIMUM DIAMETER AND SLOPE

- a. The minimum inside diameter of a sewer service lateral shall be 4-inches and shall be equal to or greater than the building plumbing stub (building drain) diameter.

H. MANHOLES

1. MANHOLE LOCATION

- a. Where practical, manholes shall be located at street intersections.
- b. Manholes shall be placed at the following locations:
 - i. At minimum intervals of 450 feet or less.
 - ii. The upper end of all lateral sewers
 - iii. Every change in grade or alignment
 - iv. Every change in size of sewer
 - v. Each intersection or junction of sewers, excluding service laterals 6 inches or less in diameter
 - vi. In front of the last property or lot being served, a minimum of 10 feet past the common lot line of the adjoining parcel served.
 - vii. Adjacent to the center point of a cul-de-sac
- c. Manholes shall not be located in the curb or in the gutter.

- d. Two (2) manholes shall be installed when the horizontal deflection angle between two (2) sewers is an acute angle less than or equal to 80° . Spacing of such manholes shall be a minimum of 10 feet outside to outside.
- e. Manholes constructed over existing sanitary sewers shall conform to the requirements of OSSC.

2. MANHOLE SIZING

- a. For sewer pipe 21 inches in diameter and smaller, the minimum manhole diameter shall be 48 inches.
- b. For sewer pipe larger than 21 inches in diameter, the minimum manhole diameter shall be 60 inches.
- c. Larger manholes may be required for multiple pipe connections.
- d. Manhole sizes for drop structures or metering manholes will be reviewed on a case-by-case basis.

3. VERTICAL DROP ACROSS MANHOLE

- a. Generally, the minimum vertical drop across a 4-foot diameter manhole is required as shown below:
 - i. Straight through runs: 0.1 foot minimum drop
 - ii. Bends greater than 45° : 0.2 foot minimum drop
- b. Maximum vertical drop across a 4-foot diameter manhole shall not exceed 18 inches.
- c. In cases where two pipes discharge into a manhole from opposite directions and one pipe has a slope more than four percent (4%) steeper than the pipe opposite, the invert of the pipe with the lower slope shall be set a minimum of 0.35 feet or half of the pipe diameter, whichever is greater, above the invert of the steeper pipe.
- d. Manhole Flow Channels
 - i. Flow channels in manholes shall be constructed to provide smooth transition between inlet and outlet sewers and to minimize turbulence.
 - ii. Flow channel height shall be to the crowns of the sewers. Benches beside flow channels shall be sloped from the manhole wall toward the channel to prevent accumulation of solids.
 - iii. Flow channels shall be shaped to allow the insertion of a 6-inch diameter by 3-foot long TV camera into the downstream sewer.

4. DROP MANHOLE

- a. All drop manhole installations must be approved in writing by the City Engineer on a case-by-case basis. Drop manholes will not be allowed for pipe greater than 12 inches in diameter.
- b. Inside drop manholes shall be a minimum of 60 inches in diameter. All inside drops shall be constructed with pipe with stainless steel support structures. No partitions will be allowed.

5. MANHOLE RIM ELEVATION

- a. The rims of all manholes located within paved or other hard-surfaced areas shall be set to finished grade.
- b. The rims of all manholes located outside of paved or other hard surfaced areas shall be set 6 inches above finish grade. Finish grade shall be defined as the final ground surface after grading and landscaping.
- c. Concrete riser rings shall be used to bring casting to grade. The height from the top of the cone or flattop section to the rim shall not exceed 18 inches.
- d. All manholes within easements shall have lock down lids.

6. MANHOLE TAPS

- a. When an existing manhole is tapped into a new sewer which will drain into the manhole, the crown of the new sewer shall generally match the crown of the existing pipes.
- b. Connection of new pipe lines to existing manholes shall be core drilled for connection using a core and seal boot with non-shrink grout and link seal.
- c. When the size of the new pipe being tapped into the existing manhole is the same size as the existing pipe exiting the manhole, the invert of the new pipe should be a minimum of 0.35 feet above the invert of the existing pipe, or higher as required to be above the normal sewage flow level.

I. CLEANOUTS

1. Mainline cleanouts will not be approved as substitutes for manholes. Cleanouts shall only be allowed at the upper end of lateral or main sewers less than 150 feet long that will be extended on the same grade and alignment during the next construction phase, and which do not have any laterals.
2. Mainline cleanouts will be considered on a case-by-case basis by the City Engineer. In all cases, plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole shall be submitted prior to approval of cleanouts.

J. UNDERGROUND WARNING TAPE

1. Detectable or non-detectable acid and alkali-resistant safety warning tape shall be provided along the full length of all service laterals and all mainlines not located under sidewalks or paved portions of public streets.
2. Underground warning tape shall be placed a minimum of 12 inches and a maximum of 15 inches below the finish ground surface, and shall be continuous over the entire length of the main line and over the service laterals installed from the mainline to the back of the PUE. The warning tape shall be continuous between manholes or cleanouts.

3.2 MATERIALS

A. GENERAL

1. Unless otherwise approved by the City Engineer, materials shall conform to the most current version of the Oregon Standard Specifications for Construction, the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the any of the city required standards.
2. In the case of conflicts between the provisions of these Design Standards and the PWS, the more stringent as determined by the City Engineer shall apply. Acceptable materials shall be as outlined in these Design Standards.
3. It is not intended that materials listed herein are to be considered acceptable for all applications. The Design Engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.

B. NON-PRESSURE PVC PIPE

1. Pipe and fittings 15 inches in diameter or less shall conform to ASTM D-3034, SDR 35.
2. Pipe and fittings 18 through 27 inches in diameter shall conform to ASTM F-679.
3. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.

C. JOINTS

1. Joints shall conform to ASTM D-3212, joints for drain and sewer plastic pipes using flexible elastomeric seals.
2. Joints for pipe shall be push-on joints using factory installed elastomeric ring gaskets. The gaskets shall be securely fixed into place by the manufacturer so that they cannot be dislodged during joint assembly.
3. The gaskets shall be of a composition and texture which is resistant to common ingredients of sewage and industrial wastes, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.

D. PIPE ACCESSORIES

1. Fittings shall be of the same material as the pipe, molded or formed to suit pipe size and end design.
2. FLEXIBLE, MECHANICAL COUPLINGS AND ADAPTERS (GRAVITY APPLICATIONS)
 - a. Flexible, mechanical couplers and adapters shall be used for connecting plain ends of non-compatible types or sizes of pipe and for the installation of cut-in tee connections and other fittings into existing lines.
 - b. Couplers and adapters shall be supplied with stainless steel bands.
 - c. Flexible mechanical couplers and adapters shall be as manufactured by fernco or approved equivalent.

E. MANHOLES

1. Manholes shall conform to ASTM C478.
2. Unless otherwise approved, all joints between manhole sections shall be keylock or o-ring type conforming to ASTM C443.
3. Precast base sections shall be of monolithic construction and shall be manufactured such that the base riser section is integral with the base slab.
4. The bottom of the precast base section shall be a minimum of 6 inches thick, and contain a minimum of 0.32 sq. Inches of reinforcing steel each way in the top of the base slab.
5. Sanitary sewer manhole bases shall be provided with core-drilled openings and flexible manhole-to-pipe connectors for the connection of stub outs.

F. MANHOLE STEPS

1. All manholes shall be equipped with permanent factory-installed steps to provide a continuous ladder of 12 inch center-to-center rung spacing.
2. Manhole steps shall be of polypropylene plastic reinforced with a ½ inch, grade 60 reinforcing rod.
3. There shall be no more than 30 inches from the manhole rim and the rung of the top step.

G. MANHOLE GRADE RINGS

1. Concrete grade rings shall have precast keyway grooves, and the height from the top of the cone or the bottom of the flattop section shall not exceed 18 inches in height.

H. MANHOLE FRAME AND COVER ASSEMBLIES

1. Castings shall be cast iron conforming to the requirements of ASTM A48, Class 30, and shall match the dimensional requirements of the Standard Details.
2. Standard frames and covers shall be used for all paved areas.
3. Where pressure tight manhole covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer. Threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for the manhole casting.

I. MAINLINE CLEANOUTS

1. Mainline cleanouts shall consist of a lid and frame of heavy duty cast iron construction with closed lid design. A 3,300 psi concrete collar is required for cleanouts located in paved areas.

DIVISION 4: STREET

4.1 DESIGN CRITERIA

A. APPLICABILITY

1. These Design Standards shall govern the construction and upgrade of all public and private streets in the City of Dundee and applicable work within its service areas.
2. This section supplements OSSC Standard Specifications
3. Conditions not covered by this standard are to be specifically reviewed and approved by the City.
4. These Design Standards shall be the minimum allowable standards for any street within the City limits. Streets under the jurisdiction of ODOT or Yamhill County may have additional requirements and require the governing agency's approval prior to construction.

B. GENERAL REQUIREMENTS

1. All materials and streets shall be designed with a minimum practical design life of not less than 20 years.
2. All lots must be provided with legal access to a public or private street, conforming to the requirements of these Design Standards, prior to or concurrently with the development of the property. This shall generally be interpreted to mean that permanent streets and associated improvements, including but not limited to paving, curbs, non-deferred sidewalks, street lights, storm drains to drain the street improvements, etc., shall be provided for existing lots of record at the time development occurs and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
3. All public improvements shall be designed and constructed in such a manner as to be readily accessible to and usable by individuals with disabilities as per the requirements of the Americans with Disabilities Act (ADA).

C. STREET CLASSIFICATIONS AND TYPICAL SECTIONS

1. The classification of arterials, collectors and residential roadways are established by the Dundee Transportation System Plan (TSP). Industrial and commercial streets are established by the surrounding land use designation. Refer to the Dundee tsp for streets designation and cross-sectional requirements.
2. Additional pavement and right-of-way width may be required to accommodate turning lanes, parking and bike lanes.
3. The number of travel/turn lanes for collector streets shall be determined by the volume of traffic. The City may require additional turning lanes where required by public works or require a traffic engineer's report evaluating the need for additional turning lanes.

D. SURFACING REQUIREMENTS

1. The minimum pavement section for public streets shall conform to the following requirements. These sections are based upon subgrade compacted to 95% of AASHTO t-180 (modified proctor).

Street Classification	AC pavement Thickness (Inch)	Base Rock Thickness (Inch)
Arterial	4	15
Collector	4	12
Commercial/Industrial	4	15
Local Residential	3	10
Cul-De-Sac (Residential)	3	9

2. The City reserves the right to require an engineer-designed pavement section in lieu of the standard section. This will typically be required for streets for which the City Engineer has reason to suspect unsuitable soil conditions, high percentage of truck traffic, overlays proposed, or any other conditions that may significantly affect the pavement structure design.
3. Unless otherwise approved by the City Engineer, pavement designs shall be based on AC pavement conforming to OSSC Section 00744 (asphalt concrete pavement), Level 2 unless otherwise required by the City Engineer.

E. OVERLAYS

1. Overlays shall be designed by a professional engineer registered in the State of Oregon experienced in pavement design and shall be designed with a minimum practical design life of not less than 20 years.
2. Unless otherwise approved by the City Engineer, testing of the existing pavement shall include the following as a minimum:
 - a. Coring of the street at maximum 50 foot intervals to establish the thickness and condition of existing pavement and aggregate base
 - b. Non-destructive falling weight deflectometer tests on the existing pavement proposed for overlay.
3. AC pavement overlays that include non-woven fabric shall be specifically designed for use with AC pavement. Overlay fabric shall be in accordance with the most current OSSC specifications, or approved equivalent. Hot oil tack coat (PBA-5 or approved equivalent) shall be used prior to placement of the overlay fabric. Use of emulsion tack coats shall be prohibited.
4. The standard minimum overlay thickness shall be 2-inches. In no case shall the overlay thickness be less than 1½ inches. This minimum thickness shall be increased as necessary to provide the required cross slopes, with smooth transitions between all variations in cross slope.

5. Sections which exhibit deflection or alligator cracking or which have otherwise failed shall be excavated and replaced prior to the overlay. Base rock and AC pavement repair thicknesses shall match standard section thicknesses or existing section, whichever is greater. Cracks greater than 1/8-inch wide shall be cleaned out and filled with an asphalt emulsion slurry and sand, or other method approved by the City Engineer. All crack sealing, skin patching and plugging of dig out areas must be approved by the City Engineer prior to the placement of the final fabric and overlay.
6. Unless otherwise approved by the City Engineer, all existing manholes, valve boxes and other structures shall be raised to grade before, or during, the overlay. Structures raised to grade following placement of the overlay shall have the pavement saw cut around the structure as required by the City Engineer and a PCC concrete patch placed around the structure.

F. HORIZONTAL ALIGNMENT

1. Street centerline alignments shall be parallel with the centerline of the right-of-way.
2. Unless required to match curvature of existing rights-of-way, horizontal curve radii shall be to an even 5 feet, and shall meet the following minimum requirements:

Table 4.2: Minimum Horizontal Curve Radii	
Street Classification	Minimum Horizontal Curve Centerline Radius
Arterial	300 Feet
Collector	200 Feet
Commercial/Industrial	250 Feet
Local Residential	200 Feet
Cul-De-Sac (Residential)	160 Feet
Note: Horizontal Curve Lengths Shall Conform To The Minimums Outlined Herein, Or The Length Required By AASHTO For The Posted Speed, Whichever Is Greater.	

G. SURVEY MONUMENTATION

1. The centerline of all street right-of-way shall be monumented in accordance with ORS 92.060 Section (2) and/or ORS 209.155 Section 2 before the City shall accept a street improvement. Monuments shall be set under the direction of a registered professional land surveyor. A record of survey must then be filed in compliance with ORS 209.250 and any additional requirements set forth by the City.
2. Survey monuments within the paved street improvement areas shall be set flush with the finish pavement surface with 2-inch aluminum caps.
3. The following centerline monuments shall be set as a minimum:
 - a. All centerline - centerline intersections
 - b. The centers of all cul-de-sacs.
 - c. Curve points in accordance with ORS 92.06 and 209.15.
4. All public utilities within the right-of-way shall be placed in positions that does not interfere with centerline monumentation.

H. VERTICAL ALIGNMENT & STREET GRADE

1. Street grades shall be designed to allow drainage to the curb areas within the public right-of-way.
2. Streets intersecting with a greater functional classification street or streets intended to be posted with a stop sign shall provide a 20 foot landing, measured from the curb line of the intersecting street, averaging five percent (5%) or less.
3. Street grades shall not exceed the following unless approved in writing by the City Engineer:
 - a. Arterials – 6%
 - b. Collectors – 10%
 - c. All others – 12%
 - d. Longitudinal street gradients shall be 0.4% minimum along the crown and gutter flow line.
 - e. At street intersections, the crown of the major (higher classification) street shall continue through the intersection. The roadway section of the minor street will flatten to match the longitudinal grade of the major street at the projected curb line.
 - f. Grade changes of more than one percent (1%) shall be accomplished with vertical curves. Vertical curve K-values shall conform to the values listed below. The vertical curve K-value shall be defined as the length of the vertical curve divided by the algebraic difference between tangent street grades ($k=l/a$). This table assumes that street lighting exists. The City Engineer may require a higher K-value for sag vertical curves if the roadway will not be lighted.

Table 4.3: Design Control For Vertical Curves

Design Speed Mph	Crest Vertical Curve, Minimum K-Value	Sag Vertical Curve, Minimum K-Value
20	7	9
25	12	13
30	19	19
35	29	26
40	44	34
45	61	44

Source: American Association of State Highway and Transportation Officials, A Policy of Geometric Design of Highways and Streets 2001, Fourth Edition.

I. CROSS SECTIONS AND CROSS SLOPES

1. GENERAL
 - a. Street cross-slopes shall be between two percent (2%) and five percent (5%).
 - b. Symmetrical street cross sections are preferred.
 - c. Off-set crown cross sections are acceptable only where required due to unusual topographic conditions and/or to match existing facilities. Off-set crowns shall not exceed 12 inches between the high and low curb.

- d. Shed cross-sections are not permissible for any public street without specific approval from the City Engineer.
- e. See Dundee Standard Details 401-403 for typical cross sections.

2. SUPERELEVATION

- a. Superelevations shall be prohibited unless approved by the City Engineer.
- b. If approved by the City Engineer, superelevations shall be designed per ODOT's Highway Design Manual.

J. TRANSITIONS

1. Street width transitions from a narrower width to a wider width shall be designed with a 10:1 taper. Delineators, as approved by the City, shall be installed to mark the edges of the transition.
2. Street width transitions from one width to a narrower width, or lane alignment transitions shall be designed with the length of transition taper as follows:

$$L = S \times W$$

Where L = minimum length of taper (feet)

S = designated speed (mph)

W = ep to ep offset width (feet)

3. Delineators, as approved by the City, may be installed to define the configuration. Maximum spacing of delineators shall be the numerical value of the design speed, in feet (i.e. 35 foot spacing for 35 mph).
4. In situations where a tapered transition cannot be provided, a barricade shall be installed at the end of the wider section of the street and a taper shall be appointed and delineated as approved by the City. The barricade shall conform to MUTCD standards.

K. CURB & GUTTER

1. Cement concrete curb or curb and gutter will be used for all street edges for each street classification unless otherwise approved by the City Engineer. All curb or curb and gutter will be constructed of commercial concrete.
2. The standard curb for City streets shall be 24-Inch curb and gutter for all road classifications, per Oregon Standard Drawing RD700.
3. A minimum of two curb weep holes, 3-inches in diameter, shall be provided for each lot.
4. All new curbing shall be stamped to mark where each water, sanitary sewer or storm drain services lateral crosses the curb line. The curbs shall be marked on the top of the curbs with an imprinting stamp a minimum of 2-inches high. The impression for a water service shall be the letter "W", sanitary sewer service shall be the letter "S" and storm drain service shall be the letter "D".
5. Street curbs shall be imprinted with street names at intersections.

L. SIDEWALKS

1. Sidewalks shall be provided on both sides of all streets for all road classifications unless otherwise specified within an approved plan or by the City Engineer.
2. Sidewalks will be provided setback from the roadway curb whenever possible. Curbside sidewalks will only be allowed on a case by case basis.
3. Sidewalks shall be constructed of concrete, and shall be a minimum of 5 feet wide when setback from the roadway and 6 feet wide when adjacent to the roadway, unless otherwise required by the Dundee TSP, capital improvement plan or area specific master plan.
4. Sidewalks shall be a minimum of 4-inches thick except at driveway crossings, which shall be a minimum of 6 inches thick.
5. Drain pipe shall be provided under all sidewalks to connect to all curb weep holes.
6. Handicap access ramps shall be located so as to avoid conflict with storm drain catch basins.
7. Handicap access ramps shall conform to current PROWAG Standards and shall be provided at all corners of intersections where crossing is permitted and at the ends of all sidewalks unless otherwise approved by the City Engineer.
8. Sidewalks shall be designed with adequate clear space conforming to current PROWAG Standards at all street furnishing and appurtenance locations. Additional right-of-way (or easement) may be required to either relocate the obstruction or widen the sidewalk.
9. The City may, at their discretion, require the installation of special sidewalk surfacing for new public sidewalks. The City will provide stamps for contractor use.
10. Crosswalks shall only be placed at intersections and are required at the following locations:
 - a. Those locations adjacent to and along established pedestrian routes to and from a school.
 - b. Locations adjacent to public parks, community centers, libraries, and other high use public facilities.
 - c. Locations where accident records, sight obstructions and/or pedestrian volume warrants the installation.
 - d. Locations where significant numbers of handicapped or senior citizens cross a street.
11. Crosswalks shall be marked (striped) only at crossings that are protected by a traffic signal, or stop sign, or at other locations recommended by the City Engineer or required by the City Council.
12. Pedestrian crosswalks shall not be located on arterial roads or roads with a speed limit greater than 35 mph unless in conjunction with signalization or as approved by the City Engineer.

M. BIKEWAYS

1. Bikeway locations shall be determined by the City. Bikeway facilities shall meet the requirements of this document and the AASHTO publication, Guide for Development of New Bicycle Facilities, as amended and adopted by the Oregon Department of Transportation.
2. Structural sections of bikeway facilities on streets shall conform to that of the street or be integral with the curb. Bikeways not within a street shall be constructed upon compacted subgrade that has been sterilized if an asphaltic concrete bikeway, to one of the following pavement section designs:
 - a. 4-inches of asphalt concrete over 2-inches of compacted base rock, or
 - b. 2-1/2 inches of asphalt concrete over 4-inches of compacted base rock, or
 - c. 4-inches of Portland Cement concrete over 2-inches of compacted base rock.
3. Design shall conform to AASHTO guidelines. When bikeways are integrated with a curb, all inlet grates shall be designed to protect the bicyclist from the grate or opening.

N. INTERSECTIONS

1. Traffic control shall be maintained per the current edition of the Manual on Uniform Traffic Control Devices (MUTCD). Traffic control may be subject to modification by the City Engineer in accordance with recent traffic engineering study findings.
2. The interior angle at intersecting streets shall not be less than seventy-five degrees (75°).
3. Design vehicle for intersections will be determined by the City Engineer on a case by case basis.
4. A tangent section shall be carried a minimum of 50 feet each side of the intersecting right-of-way lines, except along arterial or collector streets. Arterial and collector streets shall maintain a tangent section carried a minimum 100 feet measured from the curb line of the intersected street.
 - a. Staggered or Tee intersections at collectors and arterials shall be avoided within 300 feet of an opposing intersection. Intersections of local streets shall not be offset staggered less than 150 feet from an opposing intersection.
 - b. Curb radii at intersections shall be as shown below for the various functional classifications. The right-of-way radius at intersections shall be sufficient to maintain the same right-of-way to curb spacing as the lower classified street and must provide for sufficient right-of-way to allow construction of required ADA facilities.

Table 4.4: Minimum Curb Intersection Radii

Street Classification	Arterial	Collector	Commercial / Industrial	Local
Arterial	40 Feet	-	-	-
Collector	25 Feet	20 Feet	-	-
Commercial/Industrial	40 Feet	40 Feet	40 Feet	-
Local Residential	12 Feet	12 Feet	12 Feet	10 Feet

- c. Safe intersection sight distance shall be evaluated for all intersections using the principles and methods outlined by AASHTO.
- d. Traffic signal modification, relocation or installation is required when roadway or driveway geometry interfere with existing signal facilities, would result in an un-signalized approach or meets signal warrants.
- e. Visual Obstructions - As defined by AASHTO guidelines, the sight distance triangle will be free from obstructions to a motor vehicle operator's view between a height of 2.5 feet and 10 feet above the existing surface of the street. Please note that the clear vision area requirements do not apply to:
 - i. Public utility poles.
 - ii. Trimmed trees with an 8 foot clearance to the tip of the first branch furthest from the trunk measured from the top of curb.
 - iii. Warning signs or signals.
 - iv. Locations where natural ground contours prohibit cross visibility at the intersection.

O. DRIVEWAYS (ACCESS)

1. The City Engineer shall have the authority to limit access and designate access locations on public streets under jurisdiction of the City. When a parcel has multiple roadway frontages, access shall be granted from the lesser classification roadway. Access to streets and highways under Yamhill County or ODOT jurisdiction must be formally approved by those entities at the applicant's initiative and expense.

2. DRIVEWAY SPACING

- a. No more than one driveway per property shall be permitted in residential zones.
- b. Joint-use driveways serving two adjacent parcels may be built on their common boundary upon formal written agreement by both property owners and approval of the City. The agreement will be a recorded easement for both parcels of land specifying joint usage.
- c. Driveways shall not be located within 25 feet of a local road intersection or 150 feet of a collector, arterial or industrial road intersection.
- d. Residential driveways of adjoining properties shall have a minimum 15 foot separation between driveway edges.
- e. Location of all driveways serving commercial, industrial or multifamily facilities shall be approved on a case-by-case basis by the City Engineer.
- f. No commercial driveway will be approved where backing onto the curb or sidewalk occurs.
- g. One driveway access to arterial streets shall be allowed for adjacent properties with a common owner. Driveway access may be denied or closed if another access exists.
- h. Commercial or industrial driveways shall have a minimum edge to edge spacing of 75 feet.
- i. Driveways serving a single parcel shall be a minimum six feet (6') from top of wing to property line.

3. DRIVEWAYS AND DRIVEWAY APPROACHES

- a. Standard residential, commercial or industrial driveways are required for all developments.
- b. Driveways shall conform to the City of Dundee Standard Details.
- c. Driveway approaches shall be constructed to meet current ADA Standards at all locations where sidewalks cross or will cross the driveway.
- d. Driveway approaches on curbed streets shall be constructed of concrete, and shall be a minimum of 6 inches thick.
- e. All driveways shall have a minimum 10 foot paved approach from the back of sidewalk location.
- f. Common driveways serving multiple lots and flag lot driveways over 150 feet in length shall be provided with an emergency turn around meeting the requirements of the Department of Public Safety.
- g. Driveway slopes shall not exceed 15 percent (15%).
- h. Two-way multifamily residential driveways shall have a minimum width of 18 feet and a maximum width of 22 feet. One-way multifamily residential driveways shall have a minimum width of 10 feet and a maximum width of 12 feet.
- i. Two-way commercial or industrial driveways shall have a minimum width of 24 feet and a maximum of 35 feet. One-way commercial or industrial driveways shall be designed for the largest vehicle with a minimum driveway width of 12 feet. A turning diagram must be submitted for all commercial or industrial driveway submittals showing adequate width for the largest vehicle. Wider driveway widths may be permitted on a case-by-case basis.
- j. Single family residential driveways shall be a minimum width of 10 feet and a maximum width of 24 feet.
- k. All driveways shall be angled 90 degrees to the street, unless designated as a right-turn only with approval from the City Engineer.
- l. No object (fire hydrants, light poles, power poles, street trees etc.) Shall be placed within 6 feet of the driveway edge, where feasible.

P. CUTTING EXISTING STREETS

1. No street shall be cut within five years of construction or reconstruction unless approved by the City Engineer and authorized in writing by the City Council.
2. In the event that the City allows a street to be cut within the time limits described above, the City Engineer may prescribe paving replacement greater than shown within these Design Standards.
3. If construction work is performed by a private party, a maintenance bond for the cost of the original construction and repair shall be posted with the City stating that the party shall be responsible for the condition of pavement patches for a period of two years, and during that time shall repair to the City's satisfaction any of the patches which become settled, cracked, broken or otherwise faulty.
4. Street cuts in Portland Cement concrete streets shall be restored as required by the City Engineer.

Q. PRIVATE STREETS

1. Private streets serving four or more residences shall be constructed to public street standards.
2. Pavement sections and widths for private streets, common driveways or flag lot drives shall conform to the following:

Table 4.5 Minimum Pavement Width And Sections			
Classification	Minimum ¹	Pavement	Base rock
	Paved Width ²	Thickness	Thickness
Common Drives Serving Two Or Three Residences	20 Feet	2 ½ Inches (Ac)	8 Inches
		6 Inches (PCC)	2-inches
Flag Lot Driveway	12 Feet	2 ½ Inches (AC)	6 Inches
		6 Inches (PCC)	2-inches
1 - wider pavement widths may be required by the local fire chief			
2 - paved width shall be measured from the face of curb where curbs exist.			

3. As a minimum, all grading for flag lot drives shall be completed by the developer at the time of street and utility construction.
4. Private roads shall be constructed within easements with an easement width equal to the width of the surfacing (pavement and sidewalk) plus 10 feet, to provide 5 feet on each side.
5. Acceptance as public streets. Acceptance of private streets as public streets will be considered only if the streets meet all applicable public street standards, including right-of-way widths.
6. New street names are subject to the approval of the City.

R. STREET ENDS

1. All streets shall be designed as part of an interconnected grid system unless approved by the City Engineer. Where an interconnected grid system is not possible, the following recommendations shall be met:
 - a. Stub Streets
 - i. Stub streets greater than 300 feet in length are required to provide a paved cul-de-sac turnaround or hammerhead.
 - ii. Stub streets that are to allow for future extensions shall be barricaded and signed as per the standard drawings.
 - b. Cul-de-sacs, Eyebrow Corners & Turnarounds
 - i. Cul-de-sacs, eyebrow corners, and turnaround areas shall be allowed only on local streets and commercial or industrial streets.
 - ii. Hammerheads may be used on private streets in lieu of a cul-de-sac. A driveway shall not be used as part of the hammerhead.
 - iii. All street ends shall be paved and signed “no parking” except when located on local streets.

- iv. Cul-de-sacs shall be as short as possible with a maximum permissible length of 200 feet.
- v. The minimum curb radius for transitions into cul-de-sacs shall be twenty-five (25) feet and the right-of-way radius shall be sufficient to maintain the same right-of-way curb spacing as the adjacent portion of the road.
- vi. Eyebrow corners may be utilized on local streets where expected ADT will not exceed five-hundred (500) vehicles per day or as approved by the City Engineer. Minimum curb radius for eyebrow corners is forty-one (41) feet with a minimum right-of-way radius of forty-five (45) feet. Eyebrows shall be evaluated to allow turning requirements for fire department vehicles.

S. ILLUMINATION

- 1. Spacing and location of street lighting shall be approved by City based on a photometric design. The design and installation of street lights shall be paid for by the developer.
- 2. Street lights shall be placed at all street intersections. Unless otherwise approved by the City, street light spacing shall not exceed 200 feet or 3 lot widths, whichever is less. Lesser spacing must be used whenever required by the photometric design.
- 3. Street lights to be located per City Standard Details unless specifically approved by the City Engineer.

T. LANDSCAPING/STREET FURNITURE IN THE RIGHT-OF-WAY, EASEMENTS, AND ACCESS TRACTS

- 1. Plantings established in the right-of-way shall be maintained by the abutting property owner.
- 2. Any existing planting areas within the right-of-way that are disturbed by construction activity shall be restored to their original condition.
- 3. Any plantings or other improvements placed within the right-of-way (by abutting property owners) are subject to removal when the right-of-way is needed for public use. The property owner is responsible for removing any landscaping or other improvements upon official notice. The property owners shall be responsible for survival of the relocated plantings.
- 4. Plantings within the right-of-way shall comply with the following provisions:
 - a. All landscaping shall comply with the sight distance provisions of these Design Standards, unless otherwise approved by the City Engineer. No trees shall be planted within 30 feet of an intersection measured from the closest curb.
 - b. Where existing landscaping maintained by the City exists, every effort shall be taken to protect and preserve the existing vegetation during construction. Plants shall be relocated or removed only upon approval of the Public Works Departments. Damaged landscape areas shall be restored prior to issuing a final occupancy permit.
 - c. In areas where an existing landscaping concept or pattern has been established or approved, all new landscaping shall conform to the intent of the concept.

Plantings shall be of a similar variety, size, and spacing to those already established and/or approved for the area.

- d. All trees planted in areas with adjacent pedestrian usage shall maintain 7 feet of clearance to the lowest branches.
 - e. No low growing vegetation is to extend beyond the curb. Trees must have no limbs or other vegetation extending beyond the curb line or edge of asphalt for a distance of 7-1/2 feet above the road surface.
 - f. Approval from the Public Works Department must be received before trees are planted in or adjacent to sidewalk sections. All tree planting is subject to the regulations of the Dundee Municipal Code Chapter 12.12.
 - g. Street trees are required along the frontages of all developments as specified in the Dundee development ordinance. Street trees shall be species listed on the street tree list of the Dundee development ordinance, section 2.207.
5. Street furniture may be required at the discretion of the City Engineer and will be required to meet all ADA clear space requirements.

U. TRAFFIC CONTROL

1. SIGNAGE

- a. Street signs shall be installed on all new public and private streets. Street names for all new streets shall be approved by the City.
- b. Sign material shall conform to City Standards. Location and type of signs shall conform to the MUTCD, or the Oregon supplement to the MUTCD and City Standards.
- c. Signs along county or state right-of-ways shall be approved by the county or ODOT as appropriate.

V. TRAFFIC CALMING

1. In existing neighborhoods, traffic calming devices will be installed only through the City TSP. In new developments, traffic calming devices may be required by the City if problems are anticipated or as the result of an engineering study. All traffic calming devices will be reviewed and approved by Public Works Supervisor / City Engineer.
2. The following are approved for installation as traffic calming devices:
 - a. Traffic circle;
 - b. 14 foot local speed bump;
 - c. 22 foot collector speed bump;
 - d. Chokers, curb extensions;
 - e. Chicanes; and
 - f. Semi and full diverters.

W. TEMPORARY TRAFFIC CONTROL:

1. It is the responsibility of the developer to provide adequate temporary traffic control to ensure traffic safety during construction activities.

2. Plans meeting the requirements of Section 1-10 of the Standard Specifications shall be reviewed and approved by the City Engineer prior to any temporary traffic control being installed.
3. All traffic control devices shall conform to the Manual on Uniform Traffic Control Devices and the Oregon supplement to the MUTCD

X. BARRICADES AND GUARDRAILS

1. Guardrails shall be designed and constructed per OSSC standards.
2. Barricade installation shall be based on MUTCD. Red and white reflectorized Type III barricades shall be used at the end of a street. White and black reflectorized Type III barricades shall be used at the end of a street widening which does not taper back to the existing pavement width. White and black reflectorized Type II barricades shall be used at the end of the sidewalk or pedestrian/bike path.

Y. FRANCHISE UTILITIES

1. Non-City owned franchise utilities are required to relocate existing facilities at their own expense when a conflict results between their facilities and public street improvements. The improvement work must be required by the non-City owned utility in order for the relocation work to be the financial responsibility of the utility; otherwise all costs shall be the responsibility of the developer. Any relocation of a utility shall be underground.
2. All non-City owned franchise utility distribution or collection systems including but not limited to power, telephone, natural gas, and T.V. cable in new plats or short plats shall be installed underground prior to paving.
3. For all new single-family plats and short plats, a minimum 5-foot wide common or individual non-exclusive utility easement shall be provided connecting any lots without public street frontage to a public street. Easements for existing or future utility lines that do not lie along rear or side lot lines, shall be of a width specified by the serving utility.

Z. MEDIANS

1. A median shall be in addition to, not part of, the specified road width. Where raised medians are allowed, the following criteria must be met:
 - a. Landscaping and irrigation shall be required. Plans shall be prepared by a qualified landscape architect.
 - b. Shall be designed so as not to limit turning radius or sight distance at intersections.
 - c. The raised median shall be set back at least 2 feet from the median lane on both sides.
 - d. Street lighting shall be sufficient to provide illumination of the raised median.
 - e. Objects, such as trees, shrubs, signs and light poles shall not physically or visually interfere with vehicle or pedestrian traffic in the travel way.
 - f. The style and design of the raised median shall be site specific. The raised median shall be safe for the design speed, and shall be subject to approval of the City Engineer.
2. Shall be maintained by the homeowners association unless otherwise approved.

4.2 MATERIALS

A. GENERAL

1. Unless otherwise approved by the City Engineer, materials used for the construction of public streets shall conform to the most current version of the Oregon Standard Specifications for Construction (OSSC), the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the any of the city required standards.
2. In the case of conflicts between the provisions of these Design Standards and the Standard Specifications, the more stringent as determined by the City Engineer shall apply.
3. It is not intended that materials listed herein are to be considered acceptable for all applications. The Design Engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.

B. AC PAVEMENT

1. AC pavement shall conform to OSSC Section 00745 - hot mix asphalt concrete (HMAC), and shall meet job mix formula requirements for Level 1, 2, 3 or 4 as defined in OSSC Section 00745.13(b) as specified.

C. GRANULAR BASEROCK

1. Granular base rock shall conform to OSSC section 02630.10 - Base Aggregate. Gradation shall be as follows:
 - a. Base Rock: 1½ inch - 0
 - b. Leveling Rock: ¾ inch - 0
 - c. Alternate Single Size Aggregate: 1-inch - 0 as approved by the engineer.

D. CONCRETE (CAST-IN-PLACE)

1. All concrete shall conform to the requirements of OSSC Section 00440, Commercial Grade Concrete, 3300 psi.

E. STREET LIGHTS

1. Unless otherwise approved by the City Engineer, street light poles and arms shall be fiberglass poles that are grey or brown in color, have a natural finish, and be of the direct burial type. Poles used on residential streets excluding intersections shall not exceed a nominal 25 feet in height. Poles used on collector streets or intersections may not exceed a nominal 30 feet in height.
2. Street lights along residential streets, excluding intersections, shall be limited to 100 watt HPS fixtures. Street lights along nonresidential streets or at intersections shall be limited to 150 watt HPS fixtures, except that lights at major intersections on state highways shall be limited to 250 watt HPS fixtures.
3. All street lighting shall meet the requirements of DMC 17.303 Exterior Lighting and Dark Sky/Outdoor Lighting Requirements.

4. All street lighting materials, including wire and installation procedures shall meet current requirements for maintenance by the City and the local electric utility company.

F. SIGNAGE

1. All sign posts shall be 2-3/8 inch diameter steel pipe factory powder coated color “black”.

DIVISION 5: STORMWATER MANAGEMENT

5.1 DESIGN CRITERIA

A. APPLICABILITY

1. These Design Standards are intended for use by project engineers as a general design guideline for all storm drainage facilities within Dundee City limits.
2. This section supplements OSSC Standard Specifications
3. These Design Standards shall govern all construction and upgrading of all public and private drainage facilities in the City of Dundee and applicable work within its service areas. This standard shall apply to all drainage facilities which impact any public storm drain system, public right-of-way or easement dedicated to or located within the City of Dundee, any water course or natural drainage way located within the City of Dundee and within all off-street parking and loading areas.
4. Conditions not covered by these Design Standards are to be specifically reviewed and approved by the City.

B. GENERAL REQUIREMENTS

1. All stormwater runoff shall be conveyed to a public storm drain or natural drainage channel having adequate capacity to carry the flow without overflowing or otherwise causing damage to public and private property. In the case of private development, the developer shall pay all costs associated with designing and constructing the facilities necessary to meet this requirement.
2. Site stormwater discharge shall not be permitted to increase from conditions existing prior to any development except where the applicant can demonstrate that there is no adverse impact to downstream properties, according to the criteria contained in these Design Standards and the judgment of the City Engineer.
3. A project is exempt from performing an offsite analysis if all of the following conditions apply unless otherwise required by the City Engineer:
 - a. The project:
 - i. Adds less than 2,000 square feet of new impervious surface; and
 - ii. Adds less than 35,000 square feet of new pervious surface; and
 - iii. Does not construct or modify a drainage pipe/ditch that is 12 inches or more in size/depth or that receives runoff from a drainage pipe/ditch that is 12 inches or more in size/depth; and
 - iv. Does not contain or lie adjacent to a landslide, steep slope, or erosion hazard area; and
 - v. Does not change the rate, volume, duration, or location of discharges to and from the project site (e.g., where existing impervious surface is replaced with other impervious surface having similar runoff-generating characteristics or where pipe/ditch modifications do not change existing discharge characteristics).

4. The offsite analysis shall extend downstream for the entire flow path, from the development site to the receiving water or up to one (1) mile, whichever is less.
5. The existing conditions and potential impacts to be evaluated in the offsite analysis shall include, at a minimum, but not be limited to:
 - a. Excessive sedimentation.
 - b. Upland erosion impacts, including landslide hazards.
 - c. Stream channel erosion at the outfall location.
 - d. Stream bank erosion.
 - e. Conveyance system capacity.
 - f. Localized flooding.
 - g. Violations of surface water quality standards as identified in a basin plan or a total maximum daily load (TMDL); or violations of groundwater standards in a wellhead protection area.
 - h. Spills and discharges of priority pollutants, as defined by the federal clean water act.
 - i. Existing offsite impacts that are not affected by the project site do not require mitigation. However, in cases where the project site was the cause of the existing impact, it is the responsibility of the applicant to mitigate for those impacts.
6. The design of a storm drainage system shall include provisions to convey all stormwater runoff to an approved point of disposal, as defined by these Design Standards.
7. All drainage systems are to be designed to provide a minimum practical design life of not less than 50 years.
8. Surface drainage entering a development shall be received at the naturally occurring locations and surface water exiting the development shall be discharged at the naturally occurring locations with adequate energy dissipaters to minimize erosion and other damage.
9. All public and private storm drainage systems shall discharge by gravity into the downstream drainage system without the use of pumps or other mechanical means.
10. The point of disposal for all stormwater may be a piped system, curb, or open channel as approved. Direct outfalls to infiltration systems, detention ponds, or waterways shall be approved on a case-by-case basis. Acceptance of suggested disposal points will depend upon the site conditions, capacity of existing downstream facilities, potential for erosion, and feasibility of alternate designs.
11. When an approved point of disposal is located on adjacent private property, the property owner shall be responsible to acquire an approved drainage easement and record it with Yamhill County at the owner's expense.
12. Design calculations shall be submitted for all drainage facilities. These drainage calculations shall be included on the site plan drawings and shall be stamped by a professional engineer licensed in the State of Oregon.
13. Surface or subsurface drainage, caused or affected by development, shall not flow over adjacent public or private property in a volume or location materially different from that

which existed before development occurred, but shall be collected and conveyed to a point of disposal as approved.

14. Permanent stormwater management facilities shall be provided for all developments within the City of Dundee in accordance with these Design Standards.

C. STORMWATER QUALITY

1. GENERAL

- a. Owners of new development and other activities which create new impervious surfaces, alters existing impervious surfaces or increase the amount of stormwater runoff or pollution leaving the site are required to construct or fund permanent water quality facilities to reduce contaminants entering the storm and surface water system.

2. CRITERIA FOR REQUIRING CONSTRUCTION OF A WATER QUALITY FACILITY

- a. A water quality facility shall be constructed on-site unless, in the judgment of the City Engineer, any of the following conditions exist:
 - i. The site topography or soils makes it impractical, or ineffective to construct an on-site facility;
 - ii. There is a more efficient and effective regional site within the sub-basin that was designed to incorporate the development or is in the near vicinity with the capacity to treat the site.
 - iii. The development is for the construction of one or two family (duplex) dwellings on an existing lot of record.

3. WATER QUALITY FACILITIES

- a. As Design Standards for stormwater quality, the City Engineer will accept stormwater quality facilities designed pursuant to the policies and procedures of the City of Portland Bureau of Environmental Services (BES) in its stormwater management manual. However, the City Engineer may impose additional requirements or require changes to those standards as deemed appropriate for the City of Dundee.
- b. The standards for BES can be found online at:
 - i. BES: <http://www.Portlandonline.com/bes/>
- c. Runoff volumes and flow rates shall be determined in accordance with the hydrologic calculation methods contained in Section 5.1d - Stormwater Quantity of these Design Standards.
- d. As required in Section 5.1d to use another analytical method acceptable to the City Engineer (e.g., the Santa Barbara Urban Hydrograph Method, XP-SWMM and SCS 1A storm, etc.), the water quality design storm event shall be 0.83-inches per 24-hour period.
- e. All areas subject to vehicular use must be routed to an approved water quality facility.

D. STORMWATER QUANTITY

1. The storm drainage system shall ensure that the 25 year storm shall show free flowing conditions through the existing and proposed stormwater conveyance system, including the water quality and detention facilities from the development site to the receiving water or up to one (1) mile, whichever is less.
2. The stormwater conveyance system (piped flow) shall be designed to meet the design storm frequency as shown on Table 5.1.
3. The use of a low impact development design is encouraged in order to minimize runoff and the overall stormwater quantities required to be detained, infiltrated or conveyed.

Table 5.1 - Design Storm Frequency	
Area	Design Storm Frequency
Residential Areas	10-Year Storm
Commercial And High Value Districts	10-Year Storm
Trunk Lines (18" Pipe And Larger)	25-Year Storm
Minor Creeks And Drainage Ways (Not Shown As A Flood Plain On The Flood Insurance Rate Map (Firm))	50-Year Storm
Major Creeks (Shown As A Flood Plain On The Firm)	100-Year Storm

4. RUNOFF CALCULATIONS

- a. Drainage Areas
 - i. All designs shall identify drainage areas within and upstream of the development. In undeveloped drainage areas, drainage calculations shall separately consider existing drainage patterns and post-developed drainage patterns.
- b. Analytical Methods
 - i. The Design Engineer is not limited to any one method for calculating runoff. Drainage Basins less than 25 acres in size may be analyzed using the rational method. Basins larger than 25 acres and systems with ponds, swales or any other volume sensitive system, including all detention and water quality facilities, must use an analytical method acceptable to the City Engineer.
 - ii. If use of a Santa Barbara Urban Hydrograph (SBUH) based computer program is proposed for use in sizing storm drain pipes for peak discharge, all cn parameters shall be as or more conservative than the equivalent runoff coefficients listed in these Design Standards.
 - iii. The City Engineer reserves the right to verify all calculations using any method, and require larger pipe sizes if the those calculations result in higher flows than the utilized methodology.

5. RATIONAL METHOD

a. The rational method calculation shall be made as follows:

$$Q = CIA$$

Q = peak flow (cubic feet/second)

C = runoff coefficient

I = rainfall intensity (inches/hour)

A = drainage area (acres)

b. Runoff Coefficient “C”

The runoff coefficient is difficult to estimate because it represents the interaction of many complex factors including surface ponding, infiltration, antecedent moisture, ground cover conditions, ground slopes, and soil type. The actual runoff coefficient for a given drainage basin can best be approximated by calculating a weighted average of all distinct surface types:

$$C_{av} = \frac{\sum C_x A_x}{A_{total}}$$

Table 5.2: Average Runoff Coefficient “C” Values			
	Flat 0% To 2%	Rolling 2% To 10%	Hilly Over 10%
Developed Surface Types:			
Impervious Areas	.9	.9	.9
Gravel Pavement	.5	.55	.6
Landscape Areas (Except Lawns)	.3	.35	.4
Lawns	.17	.22	.35
Undeveloped Surface Types:			
Meadow, Pasture, Or Farm	.25	.3	.35
Mixed	.15	.2	.25
Woodland And Forest	.1	.15	.2
Development Types:			
Commercial Development	.8	.85	.9
Industrial Development, Heavy	.7	.8	.9
Dense Residential (Over 6 Units/Acre)	.7	.75	.8
Industrial Development, Light	.6	.7	.8
Normal Residential (3 To 6 Units/Acre)	.5	.55	.6
Light Residential (1 To 3 Units/Acre)	.35	.4	.45
Parks	.15	.2	.25

c. Rainfall Intensity "I"

The cumulative rainfall intensity shall be derived from Figure 5.1. The design storm interval is typically based on the longest time of concentration for the drainage area.

Figure 5.1: ODOT Zone 8 IDF Curve

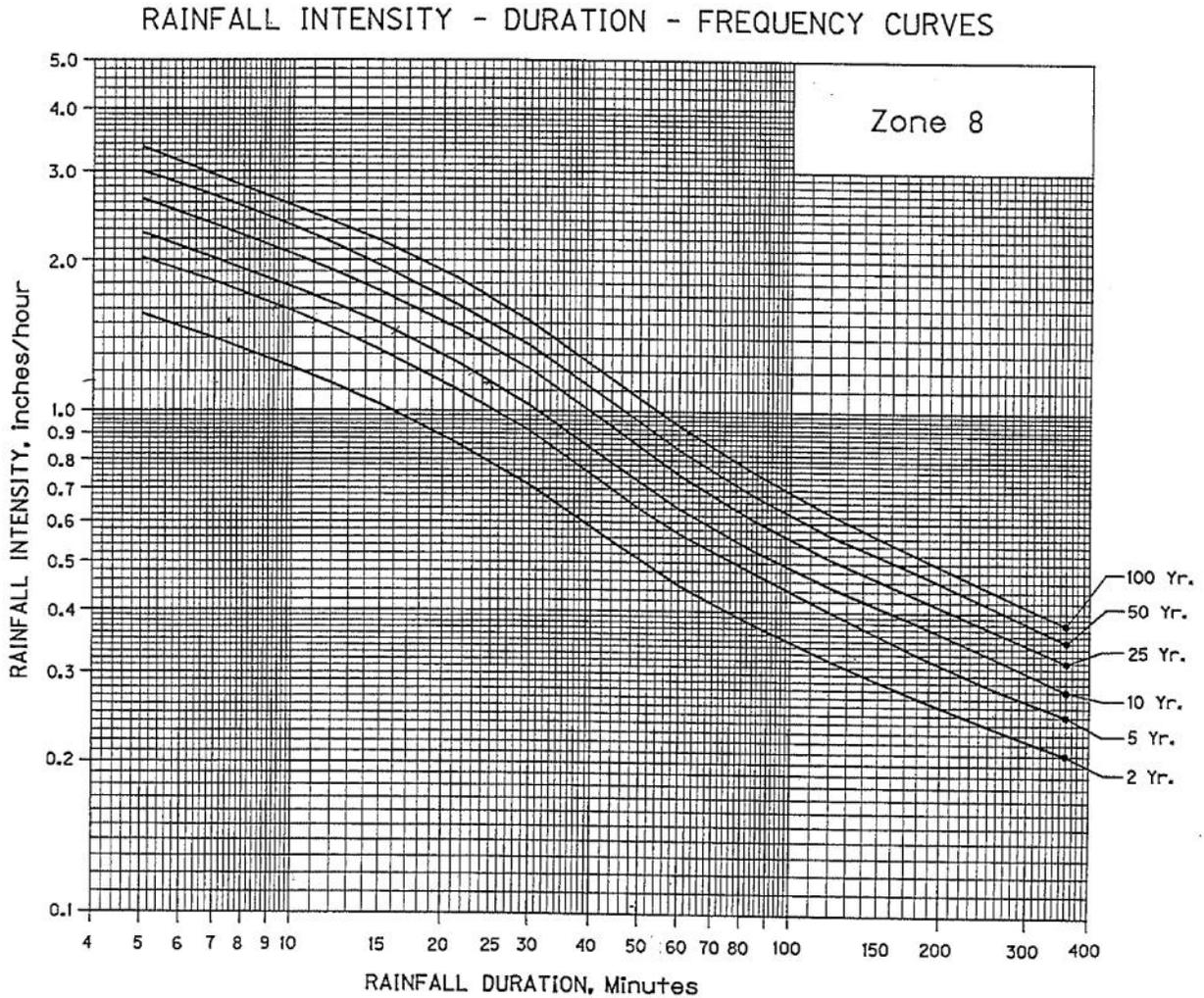


Table 5.3: ODOT Zone 8 IDF Curve Data

Rainfall Duration (Min)	Rainfall Intensity, inches/hour				
	5 year Storm	10 year Storm	25 year Storm	50 year Storm	100 year Storm
5	2.01	2.25	2.63	3.00	3.35
6	1.90	2.12	2.50	2.81	3.12
7	1.81	2.01	2.35	2.68	2.95
8	1.71	1.91	2.24	2.55	2.80
9	1.65	1.83	2.14	2.43	2.69
10	1.60	1.78	2.07	2.33	2.58
11	1.51	1.70	1.98	2.25	2.48
12	1.48	1.65	1.90	2.18	2.40
13	1.41	1.60	1.85	2.10	2.31
14	1.38	1.55	1.79	2.01	2.24
15	1.32	1.50	1.72	1.95	2.19
20	1.13	1.30	1.50	1.69	1.90
25	1.00	1.14	1.35	1.50	1.69
30	0.91	1.02	1.21	1.36	1.51
35	0.82	0.92	1.10	1.21	1.38
40	0.75	0.84	0.98	1.11	1.24
45	0.69	0.78	0.92	1.02	1.15
50	0.64	0.73	0.85	0.95	1.08
55	0.60	0.68	0.80	0.89	1.00
60	0.57	0.64	0.75	0.84	0.94
70	0.53	0.59	0.68	0.76	0.85
80	0.49	0.54	0.63	0.70	0.78
90	0.46	0.52	0.59	0.66	0.74
100	0.44	0.49	0.56	0.62	0.69
110	0.42	0.47	0.53	0.60	0.66
120	0.40	0.45	0.51	0.57	0.63
130	0.385	0.44	0.49	0.55	0.60
140	0.37	0.42	0.48	0.53	0.58
150	0.36	0.41	0.46	0.52	0.56
160	0.35	0.40	0.45	0.50	0.54
170	0.34	0.39	0.44	0.49	0.53
180	0.33	0.38	0.43	0.48	0.52

6. TIME OF CONCENTRATION “TC”

- a. Calculations for time of concentration should be divided into two segments: sheet flow and controlled flow. For the first 300 feet of overland flow, the sheet flow time of concentration can be calculated with the kinematic wave equation:

$$T_c = 0.93 L^{0.6} N^{0.4} S^{-0.3}$$

Tc = flow time (minutes)

L = overland flow length (feet)

N = manning’s roughness coefficient (see table 5.4)

I = rainfall intensity (inches/hour) (see figure 5.1)

S = average slope of overland area (foot/foot)

Table 5.4: Manning’s Roughness Coefficients For Overland Sheet Flow	
Surface Types:	N
Impervious Areas	0.014
Gravel Pavement	0.02
Developed: Landscape Areas (Except Lawns)	0.08
Undeveloped: Meadow, Pasture, Or Farm	0.15
Developed: Lawns	0.24
Undeveloped: Mixed	0.30
Undeveloped: Woodland And Forest	0.40
Development Types:	N
Commercial Development	0.015
Industrial Development, Heavy	0.04
Industrial Development, Light	0.05
Dense Residential (Over 6 Units/Acre)	0.08
Normal Residential (3 To 6 Units/Acre)	0.20
Light Residential (1 To 3 Units/Acre)	0.30
Parks	0.40

- b. For overland flow distances greater than 300 feet, sheet flow typically becomes shallow concentrated flow. The average velocity for this flow can be determined from Figure 5.2 (source: 1972 Soil Conservation Service Handbook), in which the average velocity is a function of watercourse slope and surface type. For open channels, Manning’s Equation should be used to estimate average flow velocity. Once velocity is calculated, time of concentration can be calculated as follows:

$$T_c = L/V$$

Tc = Flow Time (Seconds)

V = Flow Velocity (Feet/Second)

L = Flow Length (Feet)

- c. For land in pre-development condition, the minimum time of concentration shall be 10 minutes.
- d. For developed residential and commercial/industrial property, the maximum time of concentration will be 10 minutes unless calculations by an acceptable method show the time to be longer.

E. DETENTION

1. GENERAL REQUIREMENTS

- a. All stormwater runoff originating from and/or draining to any proposed development shall be detained, controlled, and/or conveyed in accordance with these Design Standards. When existing conditions make stormwater detention impractical for all or a portion of a proposed development, the City Engineer may permit compensatory storage volume to be provided in another location within the drainage basin. The total runoff within the drainage basin shall not exceed the allowable release rate.
- b. Detention requirements may be modified in the following situations at the discretion of the City Engineer:
 - i. Developments in critical drainage basins with history of flooding or other drainage problems.
 - ii. Developments which require an orifice size less than 2-inches in diameter.
 - iii. Projects for which detention may increase peak flows of the downstream storm system such as direct outflow to a major waterway.
 - iv. Drainage basins with adequate regional detention facilities.
 - v. Other special conditions that the City Engineer deems necessary to warrant an increase or reduction in detention capacity or allowable release rate.
 - vi. Single family residences.
- c. Detention facilities shall be open basins or ponds located outside the public right-of-way. Other configurations, such as underground pipes, vaults, or gravel-filled trenches, shall be approved by the City Engineer on a case-by-case basis. Infiltration systems may be subject to the Underground Injection Control (UIC) program and registration requirements administered by DEQ.
- d. Stormwater runoff should not flow through the detention system, but instead should flow through the conveyance system. Stormwater runoff should enter the detention system only as redirected by the flow restriction device. When flow through a detention system is approved by the City Engineer, a well-defined low flow channel shall be required.
- e. All aspects of public health, safety, maintenance, nuisance abatement, and vector control must be carefully reviewed in every drainage control system plan. Protective measures are often necessary and shall be required whenever appropriate. The protective measures themselves shall not constitute hazards or nuisances as defined in other applicable codes or standards.
- f. The impact of a 100 year event system failure should be analyzed for effects to the proposed development, adjacent properties, elements of on-site and off-site private storm systems, and elements of the public drainage system.

- g. Detention system designs shall minimize frequency, difficulty, and expense of future maintenance. Control structures shall be designed to operate automatically, minimizing operation and maintenance requirements. Maintenance of closed private detention or conveyance systems such as underground pipes, gravel-filled trenches, and both underground and surface vaults shall be the responsibility of the property owner or owner's association. The City may require evidence of a legal and enforceable funding mechanism for operation, maintenance, repair, and replacement of closed private detention systems.
- h. Multiple-use detention facilities (i.e., parks, playgrounds, tennis courts, basketball courts, parking lots) are encouraged if such a design complies with all other requirements in these Design Standards.

2. DETENTION VOLUME CALCULATIONS

- a. Allowable Outfall
 - i. The total outflow from a development shall not exceed the historic, pre-developed 5 year design storm runoff from the development area. The City Engineer may further modify the allowable outflow in critical drainage areas. Regardless of the existing pre-developed surface condition, the runoff characteristics for calculating allowable outflow shall typically equal "undeveloped, mixed" as shown in table 5.2 and table 5.4 and "fallow or minimum tillage cultivation" as shown in figure 5.2.
 - ii. Often, small drainage areas within a site are not practical to detain and must flow undetained from the site. Impervious areas of undetained runoff shall be calculated and subtracted from the allowable total outflow through the orifice or other flow-control structure.

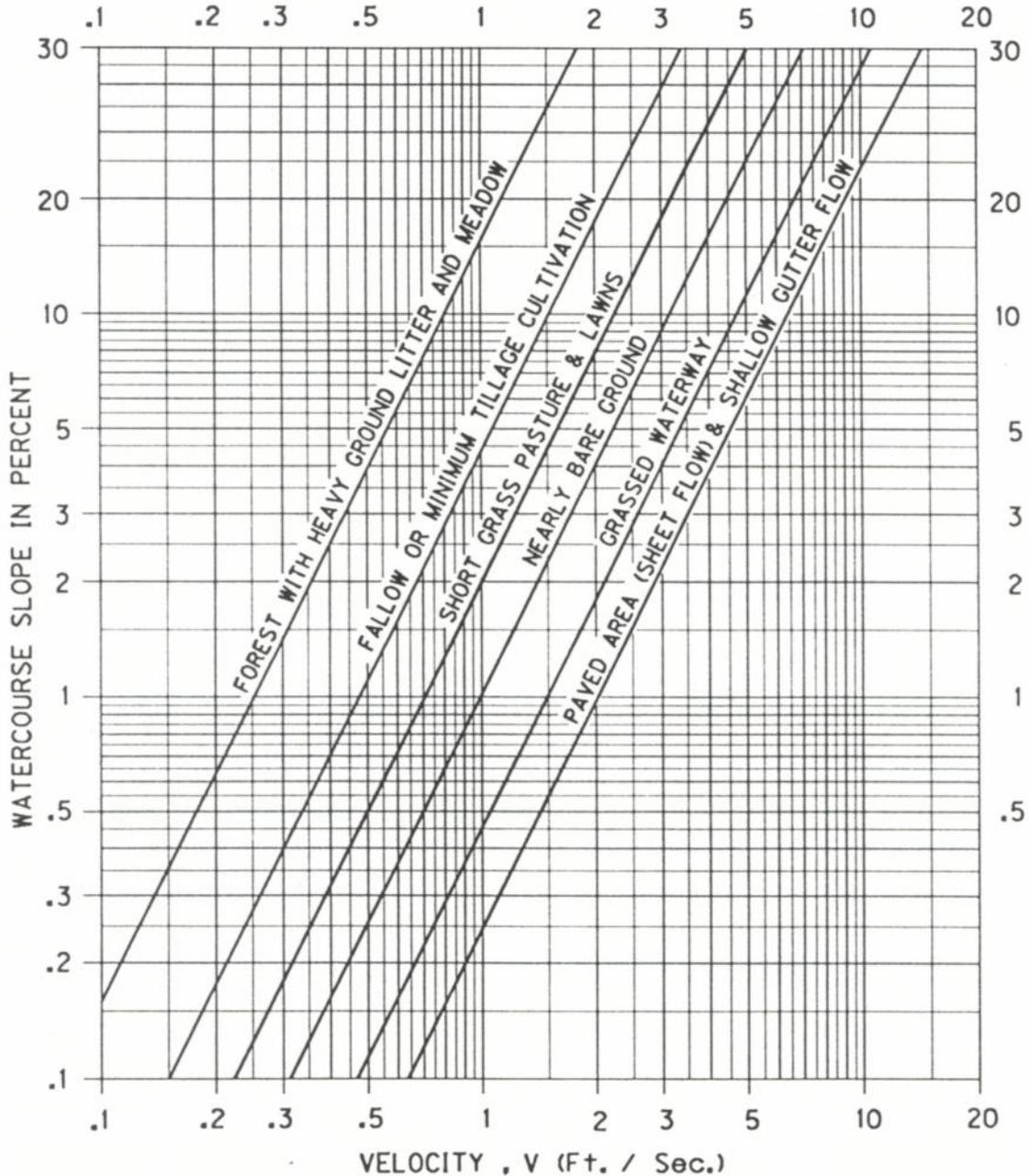


Figure 5.2: Average Velocity of Shallow Concentrated Flow

b. Outlet Control

- i. Outflow is typically restricted through an orifice, usually located within a manhole or other junction structure. Orifices shall be a minimum of 2-inches on public systems and 1-inch on private systems unless otherwise approved or required by the City Engineer. The orifice diameter shall always be greater than the thickness of the orifice plate.

- ii. Multiple orifices may be necessary to meet the flood control design storm performance for a detention system. However, extremely low flow rates may result in orifices that are prone to clogging. In these cases, retention facilities that do not rely on orifice structures may be used to the maximum extent possible to meet flow control requirements. Large projects may also result in high flow rates that necessitate excessively large orifice sizes that are impractical to construct. In such cases, several orifices may be located at the same elevation to reduce the size of each individual orifice.
- iii. Orifice sizes shall be established based on the following equation:

$$D = 6.073 \sqrt{\frac{Q}{H}}$$

D = Orifice Diameter (Inches)

Q = Allowable Outflow (CFS)

H = Maximum Head (Feet). The Vertical Distance From The maximum water surface elevation to the outlet pipe invert (or to the ten-year water surface elevation at the outlet if above the pipe invert).

c. Detention Volume

- i. The detention volume shall be sufficient to detain a 50-year design storm of any duration without overflow. The required detention volume is determined from the storm duration with the greatest difference between total cumulative runoff and allowable cumulative outflow.

F. STORMWATER CONVEYANCE

1. GENERAL CONDITIONS

- a. Conveyance systems shall be designed and constructed in compliance with requirements of all applicable Federal, State, and local agencies. Written authorization of approval from other jurisdictions may be required at the City Engineer’s discretion.

2. STORMWATER DISPOSAL

- a. Surface or subsurface drainage, caused or affected by development, shall not flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred, but shall be collected and conveyed to a point of disposal as approved.
- b. The point of disposal for all stormwater within a development may be a storm drain pipe, open channel, curb and gutter, or other approved facility. The City Engineer shall approve all points of disposal. Infiltration systems may be subject to the UIC program and registration requirements administered by DEQ.
- c. When private property must be crossed in order to reach an approved point of disposal, it shall be the developer's responsibility to acquire a recorded drainage easement from the private property owner meeting the approval of the City Engineer. The drainage facility installed must be a closed conduit system. Temporary drainage facilities, when approved, must be engineered to contain the stormwater without causing erosion or other adverse effects to the private property.
- d. As a condition of development, all developments will be required to provide public storm drainage systems to serve adjacent upstream parcels. This shall include the extension of storm drain lines in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the storm drain system is located in the street right-of-way. This shall include extension to the far side of streets fronting or adjacent to the development as required to avoid work within or under these streets in the future. This shall include storm drains which are oversized to provide capacity for upstream development.
- e. Direct outfalls greater than 6 inches in diameter to open channel waterways shall typically be designed by a professional engineer licensed in the state of Oregon. Outfalls shall be constructed to minimize the potential for erosion and other potential damage to the waterway banks. Outfall designs shall address erosion and scouring within the waterway upstream and downstream of the outfall structure.

3. STORM LINE REQUIREMENTS

- a. The minimum pipe size shall be no less than 12 inches for storm systems within the public right-of-way, unless approved otherwise by the City Engineer.
- b. The minimum pipe size shall be no less than 10 inches for storm laterals serving a single catch basin.
- c. When two parallel pipes are installed in lieu of a box culvert, the minimum separation between the pipes shall be one (1) foot or 1/3 the diameter, whichever is greater. This requirement may be waived if the void between the pipes below the spring line is filled by grouting or other approved method.
- d. Maximum joint deflection shall be per manufacturer's recommendation.

4. STORM LATERAL REQUIREMENTS

- a. Storm laterals from private drains to inlets may be a minimum of 6 inches, and shall have a cleanout installed at the easement or property line.
- b. For new mainline and lateral construction, catch basin laterals of 10 feet or less in length and 10 inches in diameter or less may connect to the main line with a shop-fabricated 90 degree tee, provided the connection is located not more than 100 feet from a manhole or cleanout on the main line and the main line is a minimum of 12-inches or larger in diameter.
- c. Laterals draining private property may be connected directly to an existing main line provided the lateral diameter is 8-inches or less and is no more than half the diameter of the main line. The hole in the main line shall be made with a drill designed for cutting the mainline pipe material. The connection shall be properly grouted or otherwise connected to provide a strong, leak-proof joint. The lateral shall not project inside the main line. For new construction the connection shall be made with a manufactured fitting.
- d. Construction of the storm service laterals shall be of the same quality and meet the same requirements as the public storm drain with regard to materials, water-tightness, and location. These storm drains shall conform to the current Oregon Specialty Plumbing Code and local plumbing codes and restrictions.
- e. Storm drain laterals shall be provided as required to prevent roof and surface drainage from flowing across pedestrian access routes.
- f. Additional laterals must be stubbed into the property lines sufficient to serve all residential parcels where such service or future partition would require new streets be cut to install such services.

5. SLOPE REQUIREMENTS

- a. Mean Velocity
 - i. Storm drains shall be at a grade which produces a minimum mean velocity of 2 ½ feet per second (fps) when flowing full, based upon manning's pipe friction formula using a roughness coefficient of not less than 0.013 for smooth wall pipe and 0.024 for corrugated wall pipe, or the pipe manufacturer's recommendations, whichever is greater.
 - ii. An absolute minimum mean velocity of 2.0 fps may be used upon the approval of the City Engineer.
 - iii. Where mean velocities greater than 10 fps are attained, the pipe material shall be ductile iron and measures must be taken to protect structures against erosion and displacement. In addition, energy dissipaters may be required.
- b. Storm drains shall be laid with uniform slope between structures.
- c. A maximum grade of 20% should be used in the design of storm line systems, unless approved by the City Engineer.
- d. Design Engineers are cautioned not to specify storm drains of sizes which are obviously larger than is necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements, i.e., a 12-inch pipe for a 10-inch pipe to acquire a decrease in slope.

6. PIPE ALIGNMENT AND LOCATION

- a. Alignment within the street right-of-way shall conform to Appendix A, Standard Details.
- b. Storm lines shall be laid on a straight alignment between junctions. All changes of direction shall be made at a manhole or other approved structure.
- c. Lines 15 inches in diameter and smaller may be laid on horizontal curves conforming to the street curvature provided the radius of the horizontal curve is not less than 200 feet. Variance for horizontal curves shall be reviewed by the City Engineer on a case-by-case basis.
- d. Storm system alignments shall accommodate future planned projects. Where storm drains are parallel to other utilities, their vertical and horizontal alignment shall allow for future side connections to main and lateral storm drains while avoiding conflicts with parallel utilities and abrupt changes in vertical grade.
- e. Installation of private utilities in a common trench with storm drain lines shall be prohibited.

7. STORM DRAIN COVER AND UTILITY CROSSINGS

- a. Storm drain lines shall have a minimum cover of 30 inches from the top of the pipe to the finish surface. Pipes designed with less than 30 inches of cover shall be approved by the City Engineer on a case-by-case basis and may require special bedding and/or backfill, load calculations, manufacturer's specifications, specific pipe materials, or other additional requirements.
- b. Where storm lines cross other utilities, the crossing should be made as close to 90 degrees as possible. Utility crossings with less than 6 inches of vertical separation shall be backfilled with controlled density backfill or other approved material. Utility crossings with 6 inches or greater vertical separation may require granular or other special backfill as specified by the City Engineer.
- c. Separation of utilities must meet Oregon DEQ and OHA DPH requirements.

8. UNDERGROUND WARNING TAPE

- a. Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all service laterals and all mainlines not located under sidewalks or paved portions of public streets.
- b. Underground warning tape shall be placed a minimum of 12 inches and a maximum of 18 inches below the finish ground surface, and shall be continuous the entire length of the service laterals installed from the mainline to the back of the public utility easement. Where required for mainlines not located under sidewalks or paved portions of public streets, the warning tape shall be continuous between manholes or cleanouts.

9. JUNCTIONS

a. General

- i. Manholes, catch basins or junction boxes shall be required at the following locations or as determined by the City Engineer:
- ii. All changes in horizontal or vertical alignment, all pipe junctions with present or future storm drains, and all changes in pipe size.
- iii. Junctions shall be spaced no greater than four-hundred (400) feet apart.

b. Catch Basins

i. General

- 1) All Catch basins shall conform to the latest requirements of the OSSC.
- 2) Catch basins may be used for the junction of pipes 15-inches in diameter or less where the depth from rim to invert is less than 4 feet.
- 3) Catch basins shall be designed to completely intercept the 5 year design storm gutter flow.
- 4) All catch basins shall be stamped “dump no pollutants, outfalls to stream”
- 5) Catch basins shall have a sump at least fifteen (15) inches below the lowest invert to collect sediment and debris.

ii. Location

- 1) The maximum length of curb and gutter which may be drained by a catch basin is 500 feet.
- 2) The maximum impervious area which may be drained by a catch basin is 20,000 square feet.
- 3) Catch basins shall be installed where the improvement ends on all streets terminating on a descending grade, and piped to an approved point of disposal.
- 4) Catch basins on corners shall not be located in front of handicap access ramps.

c. Manholes

- i. Manholes location, sizing, vertical drop and rim elevations shall conform to the requirements outlined under Section 3, Sanitary Sewers.

10. OPEN CHANNELS

- a. Bank slopes shall be 3H: 1V or flatter unless otherwise required by the City Engineer.
- b. The maximum allowable design velocity shall be 7 fps.
- c. The minimum allowable design velocity shall be 2 fps.

- d. All piped discharges to open channels shall be mitered to match the channel side slope and include a reinforced concrete collar of 6 inch minimum thickness to prevent settling or erosion of the pipe trench at the discharge location and to protect the end of the pipe. Unless otherwise approved by the City Engineer, the concrete collar shall extend from the channel bottom to the top of the bank.
- e. Grates shall be provided on all inlets or outlets 18 inches or larger unless otherwise specifically approved by the City Engineer, as well as at any locations required by the Public Works Supervisor to accommodate maintenance or mowing requirements.
- f. Bank stabilization shall not reduce the carrying capacity of the water course. Bank stabilization designs shall consider the 10-year flow velocities of pipe outlets and 25-year flow velocities of open channel waterways. Where stones are placed within existing bank slopes, the bank shall typically be excavated a minimum of 18 inches or 1.5 times the size of the largest stone being used, whichever is greater.
- g. Flow from the outfall structure shall be directed downstream, typically no less than 30 degrees from perpendicular to the waterway flow. The outfall invert shall typically be located at the normal low water level of the waterway. Outfalls to waterways shall be consolidated and otherwise minimized as determined by the City Engineer.

11. EASEMENTS

- a. Storm drains shall be located within the public right-of-way. Storm drains in easements will only be allowed by written approval of the City Engineer.
- b. Minimum storm drain easement widths shall be according to table 5.7 below, unless authorized by the City Engineer. Easements shall be a constant width between manholes or other in-line structures and be based on the deepest portion of the line between such structures.

Table 5.7: Minimum Storm Drain Easement Width		
Minimum Width		
Pipe Diameter	Depth To Invert	
	6 Feet	> 6 Feet
10-15 Inches	12 Feet	12 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert
18-24 Inches	16 Feet	16 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert
>24 Inches	20 Feet	20 Feet Plus 2 Feet For Each Foot (Or Fraction Thereof) Deeper Than 6 Feet To Invert

- c. The conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for storm drain purposes. Under no circumstances shall a building or structure, tree or fence be placed over a storm drain pipe or easement. This shall include overhanging structures with footings located outside the easement.

- d. Easement locations for public storm lines shall allow unobstructed vehicle access for City maintenance. Junction and inlet structures in easements shall be accessible for City maintenance at all times.
- e. Common easements may be permitted, subject to the approval of the City Engineer.
- f. Open channels located outside of public right-of-ways shall be provided with an easement width as follows:
 - i. For channel width less than 14 feet at top of banks: channel width plus 12 feet on one side and 2 feet on the other
 - ii. For channel width greater than 14 feet at top of bank: channel width plus 12 feet on both sides.
- g. Any easement on a side slope may be required to be wider by the City Engineer than the minimum specified.
- h. All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the developer.

5.2 MATERIALS

A. GENERAL

1. Unless otherwise approved by the City Engineer, materials used for the construction of public stormwater facilities shall conform to the current OSSC, the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the City's Construction Standards (DCS).
2. In the case of conflicts between the provisions of these Design Standards and the DCS, the more stringent as determined by the City Engineer shall apply. Acceptable materials shall be as outlined in these Design Standards.
3. It is not intended that materials listed herein are to be considered acceptable for all applications. The Design Engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.

B. UNDERGROUND WARNING TAPE

1. Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
2. The tape shall be safety green and shall be provided with the legend "Caution Buried Storm Drain Line Below" or approved equivalent printed continuously down the length of the tape.

C. BORE CASINGS AND ACCESSORIES

1. Carrier pipe used in bore casings shall be ductile iron or as otherwise specified herein.
2. Bore casing and carrier pipe design and installation shall conform to the requirements outlined under Section 2, Water.

D. PIPE SIZE AND MATERIALS

1. Unless otherwise approved by the City Engineer, storm drain pipe materials shall conform to the following:
 - a. Ductile Iron (up to 30")
 - i. Ductile iron pipe shall be Class 52 pipe conforming to AWWA C-151, and cement-mortar lined and seal coated in accordance with AWWA C104.
 - b. Non-Reinforced Concrete (CP) and Reinforced Concrete (RCP) Pipe (all sizes)
 - i. Joints shall be bell and spigot with an O-ring as specified or shown on the drawings and conforming to the following:
 - 1) Bell and spigot joints shall be sealed with flexible watertight gaskets meeting or exceeding all requirements of Federal Specifications SS-S-06210 (GSA, FSS Washington, DC) "Sealing Compounds, Preformed Plastic for Pipe Joints," Type 1 ropeform. Such gaskets may be RAMNEK as manufactured by K.T.Snyder Co., Inc., of Houston, Texas; KENTSEAL No.2 joint sealant as manufactured by Hamilton Kent Mfg., Co., of Kent, Ohio, or approved equal.
 - 2) O-ring joints shall conform to ASTM c443. The gaskets shall conform to material requirements of ASTM c361.
 - c. Polyvinyl Chloride (PVC) Pipe
 - i. ASTM D3034 (up to 15")
 - 1) Pipe and fittings shall conform to ASTM D3034, SDR 35.
 - 2) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, sdr rating, and ASTM classification.
 - 3) The joints shall conform to ASTM d3212, joints for drain and sewer plastic pipes using flexible elastomeric seals.
 - ii. ASTM F679 (18"-36")
 - 4) Pipe and fittings shall conform to ASTM F679, SDR 35.
 - 5) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, sdr rating, and ASTM classification.
 - 6) The joints shall conform to ASTM d3212, joints for drain and sewer plastic pipes using flexible elastomeric seals.
 - iii. C900 (up to 12")
 - 1) Pipe and fittings shall conform to AWWA C900, DR 25.
 - 2) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, sdr rating, and ASTM classification.

- 3) The joints shall conform to ASTM D3139, joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- iv. A-2000 (up to 36")
 - 1) Pipe and fittings shall conform to ASTM F949.
 - 2) Pipe and fittings shall have integrally formed smooth interior pipe surface.
 - d. High Density Polyethylene (HDPE) Pipe
 - i. ADS Sanitite HP (12"-60")
 - 1) Pipe and fittings shall have integrally formed smooth interior pipe surface.
 - e. Corrugated Metal (CMP) Pipe
 - i. Ultra Flow or Smooth Core (18" and up)
 - f. Pipe Joints
 - i. Except as otherwise specified, joints for pipe shall be watertight joints using elastomeric ring gaskets. The gaskets shall be securely fixed into place so that they cannot be dislodged during joint assembly.
 - ii. The gaskets shall be of a composition and texture which is resistant to common ingredients of drainage, including oils and groundwater, and which will endure permanently under the conditions of the proposed use.
 - g. Pipe Accessories
 - i. Fittings shall be of the same material as the pipe, molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations as required.
 - ii. Manufactured fittings shall be used for all connections to existing or new storm drains.
2. Uniform pipe material shall be used on each pipe run between structures.
 3. Special requirements for use of jointed HDPE pipe for slopes exceeding 6% for or cover depths greater than 10 feet may be required by the City Engineer.
 4. Pipe cover shall be as specified by the current OSSC standard drawing by type of pipe.
 5. Pipe materials shall be as specified in the current OSSC unless otherwise specified below.
 6. Pipe materials and sizes other than listed above shall be determined on a case by case basis.

E. STORM DRAIN STRUCTURES

1. CATCH BASINS

- a. Catch basin construction and dimensions shall conform to Appendix A, Standard Details. Side inlet grated catch basins shall be required.
- b. Catch basin frame and grate shall conform to Standard Details, and shall be fabricated of structural steel, ASTM A7, A36 or A273.
- c. Solid lids on junction boxes shall be minimum 3/4-inch steel plate, and shall be provided with at least one lifting hole. Junction boxes located in a travel lane shall have a manhole frame and cover.

2. MANHOLES

- a. Except as modified herein, precast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to the requirements outlined under Division 4, Sanitary Sewers and as shown in the Standard Details.
- b. Steps shall not be required for manholes 4 feet or less in depth (rim to invert).
- c. Manhole castings for storm manholes shall have 16-hole lids.
- d. Pollution/flow control manholes shall be provided with a 30-inch diameter casting and lid.

3. CONCRETE (CAST-IN-PLACE)

- a. All concrete shall conform to the requirements of OSSC Section 00440, Commercial Grade Concrete, 3300 psi minimum.

DIVISION 6: EROSION CONTROL

6.1 EROSION CONTROL

A. GENERAL

1. The Standards established by this chapter are intended to represent the minimum Design Standards for land altering activities such as clearing, grading, and erosion control work. Compliance with these Design Standards does not relieve the designer of the responsibility to apply sound professional judgment to protect the health, safety, and welfare of the general public. Additionally, since these are minimum standards, special site conditions and environmental constraints may require a greater level of protection than would normally be required under these Design Standards. The designer must apply these Design Standards bearing in mind these constraints.
2. This section supplements the OSSC Standard Specifications
3. Conditions may change after land altering activities, or construction has started due to unforeseen conditions. Design elements of the proposed project may have to be changed to comply with the conditions of any permits, codes and regulations, or these Design Standards.
4. The primary objective of this chapter is the control of erosion at its source as a means of controlling water pollution, flooding, and habitat damage downstream. Typical examples of techniques for source control are limiting cleared areas, especially on steep terrain or adjacent to other sensitive areas; seasonal limits on work; mulching, hydroseeding or covering cleared areas as soon as work has finished; control of land use in sensitive areas; and establishment and maintenance of setbacks and buffer areas.
5. Secondary containment measures must be provided to back up the above measures in case of failure. These backup measures include desilting ponds and sediment traps, filter fencing and straw bales, catch basin filtration, and management plans. Both source control and containment measures are mandatory to protect property, lives, and habitat.
6. Land alteration activities include those activities which are commonly referred to as:
 - a. Clearing: the act of vegetation removal from the land surface by mechanical or chemical means – often referred to as land clearing.
 - b. Grubbing: the act of root vegetation removal from beneath the surface of the earth - usually in association with clearing.
 - c. Excavation: the mechanical removal of earth material.
 - d. Filling: deposition of earth material placed by artificial means.
 - e. Grading: excavation or filling or combination thereof.
 - f. Compaction: densification of earth material by artificial means.
 - g. Stockpiling: temporary deposition of earth material placed by artificial means.
 - h. Stabilizing: counteracting the actions of gravity, wind, or water.

B. SEASONAL LIMITS

1. Land alteration activities shall be limited by the seasonal limitations specified below:
 - a. When land alteration activities are interrupted by heavy rain, operations shall not be resumed until the City determines that erosion control facilities are operating satisfactorily;
 - b. Work shall be stopped and the site shall be secured from erosion at any time when weather conditions change or the threat of heavy rain makes erosion problems likely, as determined by the City; from October 1st through April 30th, no soils shall remain exposed for more than two days. From May 1st through September 30th, no soils shall remain exposed for more than seven days; and
 - c. No earthwork shall take place on slopes in excess of 25% between the dates of October 1st and May 1st. This period may be shortened or extended by the City.

C. PRESERVATION OF EXISTING VEGETATION

1. Existing vegetation shall be preserved whenever possible.
2. All excavations and fills in the proximity of trees and shrubs shall be kept outside the dripline of said trees and shrubs. The dripline of said trees and shrubs shall be clearly marked with orange construction fencing.

D. TEMPORARY EROSION/SEDIMENTATION CONTROL

1. Prior to any land alteration activity, devices for interception of all runoff from the cleared area shall be installed. Said interception shall preclude discharging silt-laden runoff from the proposed land development to downstream properties to the maximum extent possible with the best available technology. Said interception shall cause all silt-laden runoff to be conveyed by open swale or other means to whatever temporary facility is necessary or required to remove silt from said runoff prior to discharge to downstream properties. Sequence of work shall be specified on the plans.
2. Care shall be taken so as to deposit no material from sites of land alteration activity onto public rights-of-way and/or adjoining properties. If such depositions occur, it shall be the responsibility of the contractor to immediately remove such material and restore to the original conditions.
3. Since site conditions may change rapidly during construction due to construction activity, weather, and other factors, it should be anticipated that the approved erosion control measures might become ineffective. Under special conditions, additional measures may be required by the City Engineer, in order to control erosion and sedimentation.
4. The types of erosion and sedimentation controls as outlined in the Oregon DEQ (Erosion and Sediment Control Manual) shall be utilized in such combination as is necessary to achieve the level of erosion control required by these Design Standards and meet water quality objectives. Erosion control facilities shall be periodically inspected and maintenance performed in order to ensure their proper functioning as required by the approved erosion and sedimentation control management plan.

5. All developments shall implement erosion control plan(s) as required by the following:
- a. BMPs. BMPs shall be selected, designed, and maintained in accordance with the Oregon DEQ (Erosion and Sediment Control Manual). Outlet protection shall also include energy dissipation structures or devices that retard peak flows to non-erosive conditions.
 - b. Access. Construction vehicle access shall be limited, wherever possible, to only one (1) route. Access points shall be stabilized with 2- to 4-inch diameter gravel to minimize tracking of sediment (mud) onto public roads. Evidence of tracking of material from a construction site may require construction activities to cease until corrections are made. Vehicles not performing a construction activity shall not be permitted off-street. Worker personal vehicles shall be parked on adjacent streets or other approved areas.
 - c. Roadways. If sediment is transported onto a road surface, the roads shall be cleaned thoroughly at the end of the workday, or more often if necessary. Significant soil deposits shall be removed from roads by shoveling or sweeping. Street washing, which must be approved by the City Engineer, shall be allowed only after sediment is removed in this manner. Prior to washing, all inlets and down-stream facilities must be protected.
 - d. Clearing limits. At the site, clearly mark all clearing limits and/or any easements, setbacks, sensitive/critical areas and their buffers, trees, and drainage courses.
 - e. Exposed soils. All exposed and un-worked soils shall be stabilized by suitable application of BMPs, including but not limited to sod or other vegetation, plastic covering, mulching, or application of ground base on areas to be paved. All BMPs shall be selected, designed, and maintained in accordance with the Oregon DEQ (Erosion And Sediment Control Manual). Construction materials such as lumber shall be delivered and stored on designated locations that are stabilized and protected from erosion.
 - f. Staging. Sediment ponds and traps, perimeter dikes, sediment barriers, and other BMPs intended to trap sediment on-site shall be constructed as a first step in grading. These BMPs shall be stabilized and functional before land alteration activities take place. Earthen structures such as dams, dikes, and diversions shall be seeded and mulched according to the timing noted above.
 - g. Infiltration systems. Permanent infiltration systems shall be isolated and protected from sedimentation by sediment traps, sacrificial systems, duplicate systems, or redundant systems.
 - h. Waterways. Properties and waterways downstream from development sites shall be protected from erosion due to increases in the volume, velocity, and peak flow rate of stormwater runoff from the project site. Acceptable BMPs include temporary or permanent detention ponds and temporary infiltration BMPs limiting the discharge from a 2-year storm to one-half the pre-development 2-year storm peak runoff rate.

- i. Water bodies and adjacent properties. Water bodies and adjacent properties shall be protected from sediment deposition by appropriate use of vegetative buffer strips, sediment barriers or filters, dikes, mulching, or by a combination of these measures and other appropriate BMPs. Each owner, builder, or permit holder shall install and maintain inlet protection on storm drain inlets impacted from construction activity on their site.
- j. Conveyance systems. All temporary on-site conveyance channels shall be designed, constructed, and stabilized to prevent erosion from the expected velocity of flow from a 2-year, 24-hour frequency storm for the developed condition. Stabilization adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches shall be provided at the outlets of all conveyance systems.
- k. Storm inlets. All storm drain inlets shall be protected so that stormwater runoff shall not enter the conveyance system without first being filtered or otherwise treated to remove sediment. BMPs shall be selected, designed, and maintained in accordance with the Oregon DEQ (Erosion and Sediment Control Manual).
- l. Storm outfalls. All storm outfalls will be designed to prevent scouring at the outfall discharge and provide velocity reduction prior to discharge to the receiving channel. All outfalls shall be provided with a rock splash pad or other approved erosion control measure according to the Oregon DEQ (Erosion and Sediment Control Manual).
- m. Maintenance. All erosion and sediment control BMPs shall be inspected, maintained, and repaired as needed to ensure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with the bmp manual or approved site plan. Damaged BMPs shall be replaced or repaired.
- n. Underground Utility Construction. The construction of underground utility lines shall be subject to the following criteria:
 - i. Where feasible, no more than 500 feet of trench shall be opened at one time.
 - ii. Excavated material shall be placed to minimize runoff into the trench and adjacent roadway consistent with safety and space considerations.
 - iii. Trench dewatering devices shall discharge into a sediment trap or sediment pond.
 - iv. BMPs shall be used to control erosion during and after construction.
 - o. Construction Site Dewatering. Dewatering devices shall discharge into a sediment trap or sediment pond.
 - p. Control of pollutants other than sediment on construction sites. All pollutants other than sediment that occur on-site during development shall be handled and disposed of in a manner that does not cause contamination of stormwater.
- 6. Removal of temporary BMPS. All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on-site. Disturbed soil areas resulting from removal shall be permanently stabilized.

E. PERMANENT EROSION CONTROL AND VEGETATION RESTORATION

1. Permanent erosion control shall be required per the requirements of the Oregon DEQ (Erosion and Sediment Control Manual).
2. Vegetation shall be restored on those areas of the site disturbed by the land alteration activity which are not covered by permanent impervious surface improvements (i.e. buildings, parking lots, etc.) At the earliest possible time consistent with appropriate planting times. The soil shall be stabilized prior to vegetation restoration since vegetation alone cannot provide an effective erosion control cover and prevent soil slippage on a soil that is not stable due to its texture, structure, water movement, or excessive slope.
3. In no case will the period between the land alteration activity and final and complete restorative, or permanent erosion control, vegetation planting for a given project or project phase be longer than one year. Said planting shall restore the vegetation on site to a condition equal to or better than the pre-development condition to the maximum extent possible. Temporary erosion and sedimentation control measures shall be maintained in full operating condition for all areas to be restored until said restoration is complete and the site fully stabilized.

F. 100-YEAR FLOOD PLAIN

1. Encroachments, including fill, new construction, substantial improvements, and other development within the regulatory floodway that would result in any increase in flood levels during the occurrence of the 100-year flood discharge shall be prohibited.
2. Delineation of the 100-year flood plain shall be in accordance with the elevations established by the u.s. geological survey's flood insurance study (latest published edition) for the u.s. department of housing and urban development.

G. LAND ALTERATION ACTIVITIES ON ENVIRONMENTALLY SENSITIVE LANDS

1. Land alteration activities shall be prohibited in environmentally sensitive areas, unless otherwise approved.

H. ENVIRONMENTAL PROTECTION DURING CONSTRUCTION

1. GENERAL POLICY AND REQUIREMENTS

- a. It is the policy of the City of Dundee to require temporary and permanent measures for all construction projects to lessen the adverse effects of construction on the environment. The contractor shall properly install, operate, and maintain both temporary and permanent works as provided in this section to protect the environment during the term of the project.
- b. The City may, in addition, require that a construction project be scheduled so as to minimize erosion or other environmental harm.
- c. Nothing in this section shall relieve any person from the obligation to comply with the regulations or permits of any federal, state, or other local authority.

2. For all projects, the prohibitions and regulations of this section shall apply. The City Engineer may temporarily suspend the work or require additional protection measures if it appears, based upon observed conditions of the project, that the current measures are insufficient to prevent environmental harm and that such suspension or additional measures will prevent or minimize such harm.

3. AIR POLLUTION CONTROL

a. Dust shall be minimized to the extent practicable, utilizing all measures necessary, including but not limited to:

- i. Sprinkling haul and access roads and other exposed dust-producing areas with water. Obtaining water from a hydrant will require specific authorization from the applicable water jurisdiction.
- ii. Applying DEQ-approved dust palliatives on access and haul roads.
- iii. Establishing temporary vegetative cover.
- iv. Placing wood chips or other effective mulches on vehicle and pedestrian use areas.
- v. Maintaining the proper moisture condition on all fill surfaces.
- vi. Pre-wetting cut and borrow area surfaces.
- vii. Use of covered haul equipment.

b. Fumes, smoke, and odors.

- i. Tires, oils, paints, asphalts, coated metals, or other such materials will not be permitted in combustible waste piles, and will not be burned at the construction site. They will be removed from the site in accordance with DEQ rules and regulations as they are no longer deemed necessary for use in the construction process.
- ii. Open burning shall not be permitted unless approved by the Dundee Fire Department, and shall be subject to the following requirements.
 - 1) Open burning shall not be permitted within 1,000 feet of a structure or within 250 feet of the drip line of any standing timber or flammable growth.
 - 2) Open burning shall not be permitted during a local air inversion or other climatic conditions that may result in a smoke pall hanging over a built-up area or community.
 - 3) Open burning shall not be permitted when climatic and moisture conditions are contributing to high danger of forest or range fires as determined by City, State, or Federal authorities.
 - 4) All open burning shall be constantly attended by a crew with a supply of firefighting tools and equipment. The number and size of fires shall be limited to such that the attendant crew can adequately control them.

4. MAINTAINING SURFACE WATER QUALITY

- a. Construction between stream banks shall be kept to a minimum.
- b. Pollutants such as fuels, lubricants, bitumen's, raw sewage, and other harmful materials shall not be discharged into the public storm drainage system or near rivers, streams, or impoundments.
- c. Sterilizing water from water line construction activities shall not be directly discharged into the public storm drainage system.
- d. The use of water from a stream or impoundment shall not result in altering the temperature of the water body enough to affect aquatic life.

5. FISH AND WILDLIFE HABITAT PRESERVATION

- a. The construction shall be done in a manner to minimize the adverse effects on wildlife and fishery resources.
- b. The requirements of local, state, and federal agencies charged with wildlife and fish protection shall be adhered to by the entire construction work force.

6. CONTROL OF NOISE LEVELS

- a. Construction noise shall be minimized by the use of proper engine mufflers, protective sound reducing enclosures, and other sound barriers. Construction activities producing excessive noise that cannot be reduced by mechanical means shall be restricted to locations where their sound impact is reduced to a minimum at the edge of the work area. All construction noise shall be in accordance with ORS 467.030 and Dundee Municipal Code Section 8.16.030.

7. NATURAL VEGETATION

- a. As far as is practicable and as required through a land use approval; the natural vegetation shall be protected and left in place. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment.
- b. During clearing operations, trees shall not be permitted to fall outside the work area. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place. All remaining debris from cutting or removing trees is to be removed from the site. The natural grade is to be restored and reseeded.

8. HISTORICAL AND ARCHAEOLOGICAL AREAS

- a. When burial sites, buried camp areas, village sites, and other distinctive archaeological or historical items are uncovered, or other items suspected of being of historical or archaeological significance are encountered, the developer shall report the matter to the City Engineer and the State Historic Preservation officer. Construction operations shall be stopped until the appropriate authorities can examine the area and give clearance to proceed with the work.
- b. Under the Natural Historic Preservation Act, State Historic Preservation Officers shall be notified when historical or archaeological items are unearthed.

9. USE OF PESTICIDES

- a. The use of pesticides including insecticides, herbicides, defoliants, soil sterilants, and so forth, must strictly adhere to federal, state, county, and local restrictions. Time, area, method, and rate of application must be approved by all relevant authorities and their requirements followed.
- b. All materials delivered to the job site shall be covered and protected from the weather. None of the materials shall be exposed during storage. Waste material, rinsing fluids, and other such material shall be disposed of in such a manner that pollution of groundwater, surface water, or the air does not occur. In no case shall toxic materials be dumped into drainage ways.
- c. All personnel shall stay out of sprayed areas for the prescribed time. All such areas should be fenced, appropriately signed, or otherwise protected to restrict entry.

I. CONTRACTOR CERTIFICATION

1. All development activities performed by licensed contractors shall be supervised by an individual who shall have successfully completed formal training in erosion and sediment control during construction by a recognized organization acceptable to the City Engineer. A certification of successful completion of such training shall be submitted at the preconstruction conference. This shall not apply to residential homeowners constructing their own development activity.

J. SITE RESTORATION AND CLEANUP

1. The contractor shall keep the premises clean and orderly at all times during the work and leave the project free of rubbish or excess materials of any kind upon completion of the work. During construction, the contractor shall stockpile excavated materials so as to do the least damage to adjacent lawns, grassed areas, gardens, shrubbery, trees, or fences, regardless of the ownership of these areas. All excavated materials shall be removed from these areas, and these surfaces shall be left in a condition equivalent to their original condition and free from all rocks, gravel, boulders, or other foreign material. Stockpiling of construction materials shall not be allowed on existing public rights-of way.
2. All existing storm systems adjacent to the project area shall be cleaned and flushed with a vacator truck and/or sewer jetter, and original drainage restored. Sediment, rock, and other debris shall be collected and disposed of in a proper manner. In no case shall debris be flushed down a storm or sanitary sewer for disposal. All damaged/impaired storm facilities, irrigation, and house drainage pipes, drain tiles, sewer laterals and culverts shall be repaired expeditiously.
3. All areas disturbed by the contractor's operations inside dedicated rights-of-way or easements shall be restored to original condition. Areas outside of the easements or rights-of-way which are disturbed by the contractor's operations shall be restored to their original or better condition in a method acceptable to the property owner. The contractor shall obtain a written release from such property owners for any claims of injury or property damage prior to final acceptance of the work by the City.

4. STREET CLEANUP

- a. The contractor shall 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. If any spilled material poses an erosion control threat, it shall be cleaned immediately. Cleaning shall be by grader and front-end loader, supplemented by power brushing and hand labor, unless otherwise approved by the City. The contractor shall follow the City's erosion control procedures as detailed in these Design Standards.
- b. As soon as practical after completion of all paving and gravel shoulder resurfacing, the contractor shall remove all dirt, mud, rock, gravel, and other foreign material from the paved surface and storm drainage system.

DIVISION 7: RECLAIMED WATER

7.1 DESIGN CRITERIA

A. APPLICABILITY

1. These Design Standards shall govern construction and upgrade of all public reclaimed water distribution facilities (purple pipe) in the City of Dundee and applicable work within the reclaimed water service area.
2. Permanent reclaimed water distribution facilities shall be provided to all properties designated within the zone established by the Water Master Plan or the City of Dundee City Council in accordance with these Design Standards. This shall generally be interpreted to mean that permanent reclaimed water distribution facilities shall be provided for existing legal lots of record at the time development occurs, and for new legal lots of record created by a major or minor partitioning or subdivision of land at the time of partitioning or subdivision.
3. SPECIAL ITEMS
 - a. The design of the following are considered special items and are not covered in detail in these Design Standards:
 - i. Water Distribution Pump Stations
 - ii. Reservoirs
 - iii. Pressure Regulating Devices
 - iv. Flow Measurement Devices
 - v. Bridge Crossings
 - vi. Creek Or Stream Crossings
 - b. Review and approval of the above special items by the City Engineer shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval. Special items may also require review and approval by the Oregon Department of Environmental Quality.

B. GENERAL REQUIREMENTS

1. Reclaimed water distribution systems will be designed to the following general requirements:
 - a. Meet all expected irrigation demands within the established zone for the specified design life;
 - b. Have sufficient structural strength to withstand all external loads which may be imposed;
 - c. Be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
 - d. Meet all design requirements of the Oregon Department of Environmental Quality (DEQ). Alternate materials and methods will be considered for approval on the basis of these objectives.

C. RECLAIMED WATER SYSTEM CAPACITY

1. CALCULATION REQUIREMENTS

- a. Design capacities shall be determined by consideration of the following factors and assumptions:
 - i. Area to be serviced, both immediate, adjacent and buildout.
 - ii. Current and projected land use within the areas to be served.
 - iii. Commercial, industrial, institutional and governmental users to be served.
 - iv. Changes in any of the above factors which are likely to occur within a foreseeable time period.

2. DEMAND ASSUMPTIONS

- a. In the absence of consumption data or other reliable information, the following factors may be assumed:
 - i. Peak hour demands as follows:
 - 1) 10gpm per single family residential
 - 2) 6gpm per dwelling unit for multiple family residential
 - 3) 14gpm per acre for commercial/industrial development
 - 4) 144gpm per acre for parks
 - ii. Demand for unique installations such as parks shall be calculated on an individual basis.

D. HEAD LOSS CALCULATION REQUIREMENTS

1. Head loss shall be determined by the hazen-williams equation based on the following coefficients:

Table 2.2 – Hazen Williams Coefficients	
Pipe Diameter	C Value
All pipe sizes	120

E. VELOCITY AND PRESSURE REQUIREMENTS

1. Velocities in reclaimed waterlines shall normally range from three (3) to six (6) feet per second for average demand to a maximum velocity of ten (10) feet per second for maximum day demand plus fire flow.
2. Private systems shall limit velocities as required by the Oregon State Plumbing Specialty Code, Installation Standards.
3. Normal working pressure in the distribution system should be approximately 70 psi with a range of 40 psi to 100 psi.
4. The minimum working pressure for all mechanical joint fittings of a diameter ranging from 4 to 24 inches shall be 350 psi.

5. The reclaimed water system shall have sufficient capacity to maintain 40 psi at the property line, and to provide sufficient volumes of water at adequate pressures to satisfy the maximum expected daily consumption.

F. LOOPING

1. The distribution system shall be looped at all possible locations.
1. All reclaimed water lines shall be looped and valved such that the removal of any single line segment from service will not result in capacity losses below those specified.
2. Permanent dead-ends shall have a permanent thrust restraint system.

G. MINIMUM DEPTH

1. The standard minimum cover over buried reclaimed waterlines within the street right-of-way or easements shall be 36 inches from the finished grade, except that a minimum of 40 inches cover shall be required for reclaimed water lines in fill slopes.
2. Finish grade shall normally be determined as follows:

Table 2.4 – Finish Grade

Mainline Location	Finish Grade
Under Sidewalk In Right Of Way	Top Of Curb
In Front Of Curb	Gutter
In Cut Slope Behind Sidewalk	Top Of Curb
Fill Slopes	Perpendicular From Pipe To Surface
Easements	Finish Grade At Pipe Centerline

3. Where the reclaimed waterline is located in the cut side slope, in an undeveloped right-of-way, or along a roadway developed at less than ultimate width (including sidewalks), reclaimed waterlines shall be placed at a depth sufficient to ensure that 36-inches of cover is maintained at the time of final construction of the roadway.

H. RECLAIMED WATERLINE REQUIREMENTS

1. MINIMUM LINE SIZE

Minimum sizes for reclaimed waterlines shall be as follows:

Table 2.5 – Mainline Size Requirement	
Minimum Diameter	Type of mainline
6-Inch	Minimum size public reclaimed waterline.
8-Inch	Minimum size reclaimed waterline distribution system for the public reclaimed water system. Looping back into the distribution grid shall be at intervals as required by the City, but shall generally not exceed 600 feet.
10-Inch And Larger	As required for transmission mains and distribution mains in commercial and industrial areas to serve the required demand

2. ALIGNMENT AND LOCATION

a. General Requirements

- i. Reclaimed water lines shall generally be parallel to the right-of-way or easement lines
- ii. Unless otherwise required by the City Engineer, reclaimed water lines shall generally be located on the south and west sides of the right-of-way.

b. Location with Regard to Other Utilities

- i. Reclaimed waterlines shall be separated from all other utilities by a minimum of 5 feet.
- ii. Reclaimed waterlines shall generally be separated from water mainlines by a minimum of 10 feet. In no case shall the separation be less than 5 feet or as required by OAR Chapter 333, Division 61.
- iii. Water main crossings
 - 1) Where water mainline crosses below or within 18 inches vertical separation above a reclaimed waterline or lateral, one full length of ductile iron pipe shall be centered at point of crossing.

3. LOCATION IN EASEMENTS

- a. Unless otherwise specified or authorized by the City, minimum easement widths for reclaimed waterlines shall be 15 feet for normal depth lines.
- b. Reclaimed waterlines in easements will be allowed only in cases where it is required in order to loop and avoid a permanent dead end condition if required by a capacity analysis, and only after all reasonable attempts to loop the mainlines in a right-of-way have been exhausted.
- c. When reclaimed waterlines in easements are approved by the City, the easement shall be centered on the line, and the line shall be offset a minimum of 6 feet from any property line.
- d. The conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for the reclaimed waterline purposes. Under no circumstances shall a building or structure, trees, ornamental landscaping or fence be placed over a reclaimed waterline or easement. Prohibited structures shall include footings, decks and overhanging portions of structures located outside the easement.
- e. Easement locations for public reclaimed waterlines serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit unobstructed vehicle access for maintenance.
- f. Common placement in the easement of water and a reclaimed waterline may be allowed under certain conditions subject to approval by the City Engineer. Easements wider than the minimum will be required.
 - i. Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet OHA PHD requirements.
- g. All easements must be furnished to the City for review and approval prior to recording.

I. VALVES

1. SIZES

- a. In general, valves shall be the same size as the mains in which they are installed.
- b. Unless otherwise approved or required by the City Engineer, valves shall conform to the following table.

Valve Size	Static Pressure	Valve Style
10- Inch and Smaller	<120 Psi	Gate Valve
12-Inch & Larger	All Pressures	Butterfly Valve

- c. Valve types and materials shall conform to the requirements of these Design Standards and the OSSC Standard Specifications for waterlines.

2. LOCATION

- a. Distribution system valves shall be located at the tee or cross fitting as nearly as possible.
- b. There shall be a sufficient number of valves so located that not more than four (4) and preferable three (3) valves must be operated to effect any one particular shutdown. The spacing of valves shall not exceed 400 feet generally.
- c. A tee-intersection shall be valved on two (2) branches and a cross-intersection shall be valved on three branches.
- d. Hazardous crossings (i.e. creek, railroad, freeway crossings, etc.) shall be valved on each side of the crossing.
- e. Distribution branches on transmission mains shall be spaced not more than 800 feet apart where practical and shall be valved and plugged.
- f. Transmission reclaimed waterlines shall have valves at spacings as required by the City Engineer.

J. SERVICE LINES

1. GENERAL REQUIREMENTS

- a. The use of pumps on a service line to provide adequate pressure to a subdivision lot or property located above the pressure level of the supply main shall be prohibited.
- b. Each legal lot of record shall be connected by a separate reclaimed water service line connected to the public reclaimed waterline. Combined reclaimed water service lines will not be permitted.

2. SIZES

- a. Standard service line sizes are 1-inch, 1 1/2-inch and 2-inch. Service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

Table 2.7 – Minimum Service Size

Type Of Service	Minimum Service Size
Residential Service	1-Inch
Triple Residential Service (Triplexes Only)	1½-Inch
Commercial Service	1-Inch Minimum
Note: The Next Larger Service Size May Be Required For Lots Large.	

- b. The reclaimed water service line on the private side of the meter may not be larger than one nominal pipe size larger than the service line size.
- c. Commercial services shall not be smaller than 1-inch. For new streets or streets being cut for service installation, far side commercial services shall be installed in a 3-inch minimum size PVC sleeve.
- d. Service piping shall be equal to the meter size.

3. PRESSURE REGULATING VALVES

- a. All new service lines shall be equipped with an approved pressure regulating valve installed on the private side of the meter within an approved underground box.

4. TAPPING REQUIREMENTS

- a. Tapping requirements for reclaimed water service lines shall be with an approved service saddle,

5. LOCATION

- a. The service lines shall normally extend from the main to a point 6 inches behind the back of the right-of-way line. A curb stop and meter box shall be located at the termination of the service line.
- b. In general, individual service connections shall terminate in front of the property to be served.

K. METERS

1. GENERAL REQUIREMENTS

- a. All reclaimed water meters within the service area prescribed by the City of Dundee will be furnished and installed by the City at the request and expense of the customer. The service line, meter box and all piping within the meter box must be installed by the developer.

2. LOCATION

a. General

- i. Meters shall be located at the termination of the City service line.
- ii. A public utility and access easement shall be provided to and around any meter box intended set on private property. The easement shall be sized to provide a minimum of five (5) foot clear around the meter box or vault on all sides.

b. 1 inch through 2 inch meters

- i. Meters shall be located on private property adjacent to the public right-of-way to allow reading and maintenance. Meters must be accessible with a crane truck to within 10 feet of the installation with a 10 foot vertical clearance.
- ii. The meter, vault and piping are to be protected from freezing, vandals and vehicles. The area around the vault must be sloped in such a manner to prevent storm water from ponding over or running into the vault.
- iii. A minimum 3 foot clear space must be provided around the vault to provide ample working space for maintenance.

3. METER BOXES

- a. Meter boxes shall be provided by the developer for each reclaimed water service and meter location. Double set meters (2 meters in 1 box) are not allowed.
- b. Meter boxes shall be set level to finish grade. The developer or builder shall be responsible for setting meter boxes and services to finish grade prior to installation of reclaimed water meters by the City.

L. UNDERGROUND WARNING TAPE

1. Detectable or non-detectable acid and alkali-resistant safety warning tape shall be provided along all reclaimed waterlines.
2. Underground warning tape shall be placed a minimum of 12 inches and a maximum of 15 inches below the finish ground surface, and shall be continuous the entire length of the reclaimed waterline as specified.

M. BORED CROSSINGS

1. Bore casing size shall be adequate to permit proper construction of the carrier pipe to the required lines and grades. Carrier pipe used in bore casings shall be as specified herein.
2. All bore crossings shall be provided with casing spacers and end seals. Casing spacer configuration shall conform to the manufacturer's recommendations, but in no case shall less than three (3) spacers per length of pipe be used.
3. In order to prevent over-belling of flexible pipe while installing it through the casing, provide a method for restricting movement between the assembled bell and spigot conforming to the manufacturer's recommendations.

4. The design of the bore crossing shall include the following as a minimum:
 - a. Casing and carrier pipe materials and dimensions, including outside bell diameters of the carrier pipe.
 - b. Details for any part of the system which must be changed as a result of the boring operation.
 - c. Bore and receiving pit backfill material and compaction requirements.

7.2 MATERIALS

A. GENERAL

1. Unless otherwise approved by the City Engineer, materials used for the construction of public reclaimed waterlines shall conform to the most current version of the Oregon Standard Specifications for Construction, the minimum requirements outlined herein and as shown on the Standard Details. This listing is not intended to be complete nor designed to replace the any of the city required standards.
2. In the case of conflicts between the provisions of these Design Standards and the OSSC, the more stringent as determined by the City Engineer shall apply. Acceptable materials shall be as outlined in these Design Standards.
3. It is not intended that materials listed herein are to be considered acceptable for all applications. The Design Engineer shall determine the materials suitable for the project to the satisfaction of the City Engineer.

B. PIPE

1. Reclaimed water distribution pipe shall be C900 pipe, purple in color.
2. All ductile iron pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of one (1) mil thick unless otherwise specified.

C. FITTINGS

1. MECHANICAL JOINT FITTINGS

- a. All mechanical joint (MJ) tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C153.
- b. The minimum working pressure for all mechanical joint (MJ) fittings 4-inches through 24-inch in diameter shall be 350 psi.

2. FLANGED FITTINGS

- a. All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48 inches in diameter shall be cast iron or ductile iron fittings in conformance with AWWA c110.
- b. The minimum working pressure for all flanged cast iron or ductile iron fittings shall be 250 psi.

D. COUPLINGS

1. Couplings shall be limited in their application to connection of new pipe work to existing reclaimed waterlines, temporary installations, and where specifically approved by the City Engineer.
2. Couplings shall be mechanical joint solid sleeve or mechanical joint split sleeve type couplings consisting of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts.
3. Mechanical joint couplings shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.
4. Solid sleeve couplings shall be Clow F-1208 or approved equivalent. Split sleeve couplings shall be Mueller H-785 or approved equivalent.
5. Dresser-type couplings are not an approved option unless specifically approved by the City Engineer. Applications shall be limited to transitions between pipe types for which mechanical joint couplings are not available.

E. MAIN LINE VALVES

1. GENERAL

- a. All mainline valves and appurtenances shall have the name, monogram, or initials of the manufacturer cast thereon. They shall be built and equipped for the type of operation as specified herein or as shown on the drawings.
- b. Valve Operators
 - i. All valve operators shall be totally enclosed traveling nut type manual operators, sealed and lubricated for underground service.
 - ii. All buried valves shall be supplied with a 2-inch square operating nut. Nuts shall have a flanged base on which shall be cast an arrow at least 2-inch long with the word "open" cast on the nut to clearly indicate the direction of opening.
 - iii. Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Extension stem shall extend to within 12-inches (maximum) of the finished ground surface and shall be provided with spacers to center the stem in the valve box.
- c. Valve Boxes
 - i. All buried valves shall be provided with valve boxes as shown on the Standard Details.
- d. Gate Valves
 - i. All gate valves shall be resilient wedge gate valves conforming to the requirements of AWWA C-509, except as herein modified.

- ii. Gate valves shall be epoxy coated iron-body, resilient wedge non-rising stem gate valves. The wedge shall be cast iron completely encapsulated in an elastomer covering with polymer guide bearing caps on each side. The valves shall have a full diameter waterway with no grooves or recesses at the valve seat location. Flanges, where required, shall be 125 pound, full faced, drilled per ANSI B16.1.
 - iii. Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and a minimum test pressure 300 psi.
 - iv. Gate valves shall be Mueller A-2360, Waterous Series 500 or approved equivalent.
- e. Butterfly Valves
- i. All butterfly valves shall conform to AWWA C504, except as herein modified.
 - ii. Butterfly valves shall be epoxy coated short body type AWWA Type-B valves. Flanges, where required, shall be 125 pound, full-faced, drilled per ANSI B16.1.
 - iii. Valve operators shall be enclosed traveling nut type manual operators, sealed and lubricated for underground service, and shall be rated for submerged operation up to ten (10) psi (± 23 feet).
 - iv. Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 150 psi and a minimum test pressure 300 psi.
 - v. Butterfly valves shall be Pratt Groundhog Series, or approved equivalent.
- f. Shop Painting
- i. All valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C550.

F. SERVICE PIPE AND FITTINGS

1. All services that are saddle tapped shall use ductile iron service saddles with stainless steel bolts and clamps. All ductile iron service saddles shall be furnished with a fusion bonded epoxy coating conforming to the requirements of AWWA C-550.
2. Unless otherwise shown on the drawings, residential service pipe shall be one (1) inch in diameter.
3. One (1) inch services
 - a. Unless otherwise specified herein, reclaimed water service lines shall be seamless Type K copper pipe, conforming to AWWA C500, 160 psi rated.
 - b. All corporation stops shall be brass ball valve corporation stops rated to 300 psi with iron pipe thread inlet and compression outlet to adapt copper pipe. Corporation stops shall be Ford FB-1100 or approved equivalent.
 - c. Each individual reclaimed water service line shall be equipped with a locking ball valve meter stop assembly at the inlet to the meter. All meter stop assemblies shall be brass with copper pipe connector as appropriate and outlet for meter coupling.
 - d. Meter stops for 1-inch meters shall be locking angle ball valves with CTS pack joint inlet. 1-inch meter stops shall be Ford BA43-242W and Ford BA43-444W, respectively, or approved equivalent.
 - e. Service line couplings shall be CTS pack joint style couplings. Couplings shall be Ford C44 coupling or approved equivalent.

4. 1½ Inch and Larger Services

- a. 1½ inch and 2 inch reclaimed water service lines shall be seamless type k copper pipe, conforming to AWWA C800, 160 psi rated.
- b. 1½ inch and 2 inch reclaimed water services shall be provided with high bypass copper setters for flanged meters, Ford 70 Series or approved equivalent conforming to Standard Details.
 - i. The coppersetter shall be provided with ball valves on the inlet and outlet, with inlet valve provided with a lock wing and the outlet valve provided with a handle.
 - ii. The bypass line shall be 1-inch diameter minimum, and shall be provided with a lockwing ball valve.

G. RECLAIMED WATER METER BOXES

1. Unless otherwise approved by the City Engineer, all meter boxes must be as shown below:

Table 2.9 - Reclaimed Water Meter Boxes			
Meter Size	Non-Traffic Area	Traffic Area	Inside Dimensions
1 Inch	1armorcast A6001946pcx12	1armorcast A6001946pcx12	13" X 24"
	Lid A6001866r	Lid A6001866	
1 ½ Inch	1armorcast A6001640pcx12	1armorcast A6001946pcx12	17" X 30"
	Lid A6001643r	Lid A6001643	
2 Inch	1armorcast A6001640pcx12	1armorcast A6001946pcx12	17" X 30"
	Lid A6001643r	Lid A6001643	

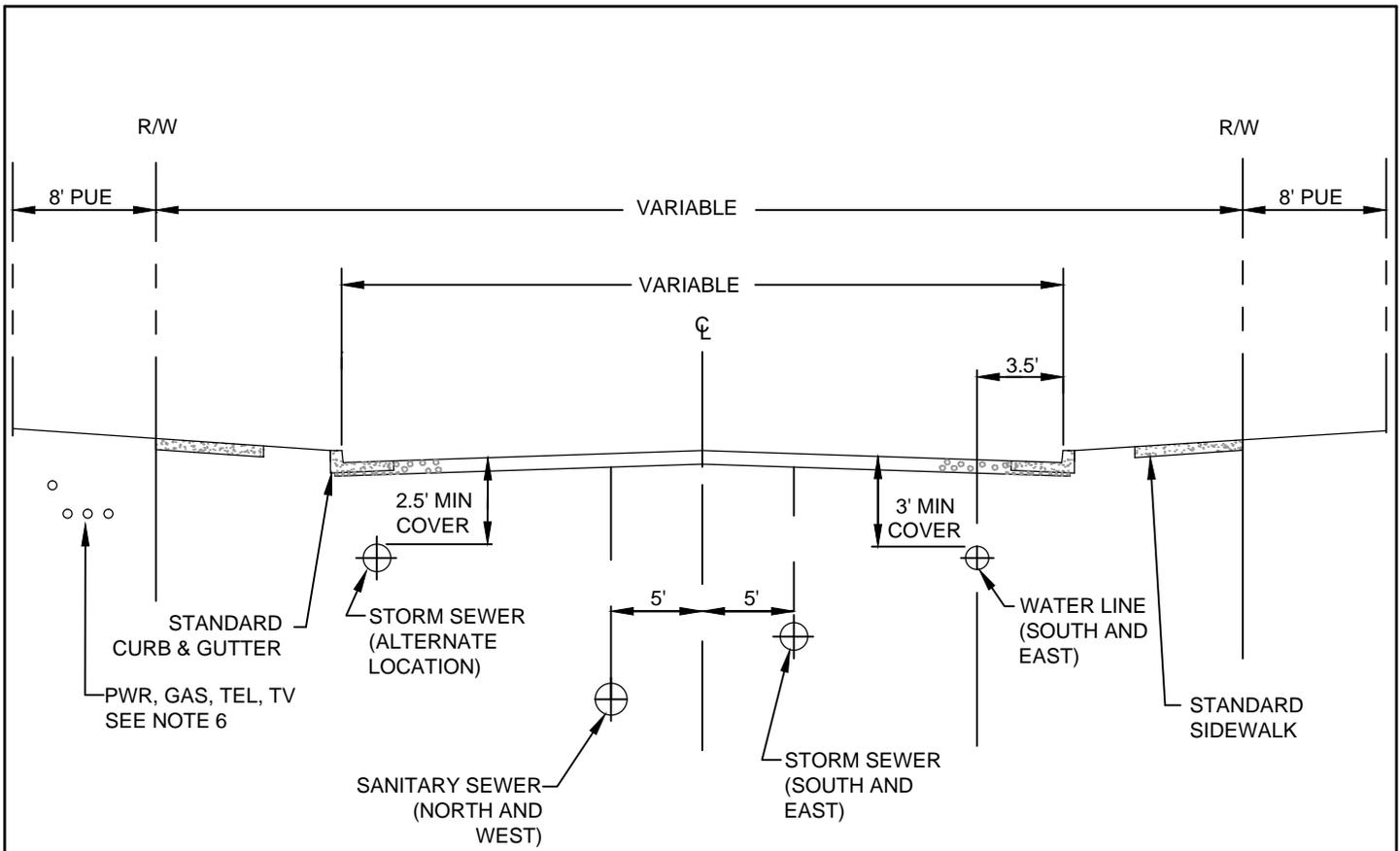
- 2. Meter boxes outside of traffic areas shall be polymer concrete boxes with nonskid polymer concrete covers and hinged reading lids.
- 3. Meter boxes within traffic areas shall be polymer concrete boxes with one piece traffic rated covers.
- 4. All meter boxes shall be provided with knockouts for touch-read sensors.

H. UNDERGROUND WARNING TAPE

- 1. Underground warning tape shall be detectable or non-detectable acid and alkali resistant safety warning tape. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
- 2. The tape shall be purple and shall be provided with the legend "caution buried reclaimed water line below" or approved equivalent printed continuously down the length of the tape.

I. BORE CASINGS AND ACCESSORIES

- 1. Casing shall be welded smooth steel pipe conforming to the requirements of ASTM A-53 or approved equal, with a minimum yield strength of 35,000 psi



NOTES:

1. UTILITIES SHALL BE LOCATED AS SHOWN UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. THE SANITARY SEWER ZONE SHOWN ABOVE IS THE PREFERRED CORRIDOR IN WHICH SEWERS ARE TO BE LOCATED, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. SEE DIVISION 3 - SEWER FOR SANITARY SEWER MINIMUM DEPTH REQUIREMENTS.
4. LATERALS AND P/L CLEANOUTS TO BE INSTALLED DURING CONSTRUCTION OF SANITARY SEWER MAINS.
5. THE SEPARATION BETWEEN WATER LINES AND SEWER LINES, SUBJECT TO APPROVAL BY THE CITY ENGINEER, MAY BE LESS THAN 10 FEET, AS PER OREGON DEPT. OF HUMAN SERVICES RULES, CHAPTER 6, PUBLIC WATER SYSTEMS.
6. UNITY TRENCH PER UTILITY COMPANY REQUIREMENTS ON OPPOSITE SIDE OF STREET FROM WATER LINE.

LAST REVISION DATE:

OCTOBER 2010

TYPICAL UTILITY LOCATIONS

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

100

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NUMBER	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
RD250	THRUST BLOCKING	NO EXCEPTION TAKEN
RD254	HYDRANT INSTALLATION	NO EXCEPTION TAKEN
RD255	FIRE HYDRANT BOLLARD	NO EXCEPTION TAKEN
RD258	VALVE BOX AND OPERATOR EXTENSION ASSEMBLY	NO EXCEPTION TAKEN
RD262	TYPICAL MAIN DEAD-END BLOWOFF ASSEMBLY	NO EXCEPTION TAKEN
RD266	MANUAL AIR-RELEASE ASSEMBLY ($\frac{3}{4}$ "	NO EXCEPTION TAKEN
RD274	$\frac{3}{4}$ " TO 2" WATER SERVICE CONNECTION	NO EXCEPTION TAKEN
RD286	ROOT BARRIER	NO EXCEPTION TAKEN
RD300	TRNCH BACKFILL, BEDDING, PIPEZONE AND MULTIPLE INSTALLATIONS.	NO EXCEPTION TAKEN
RD302	STREET CUT	NO EXCEPTION TAKEN
RD306	CONCRETE ENCASEMENT, CRADLE AND CAP DETAILS	NO EXCEPTION TAKEN
RD308	BORE CASING DETAIL	NO EXCEPTION TAKEN

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:

AUGUST 2015

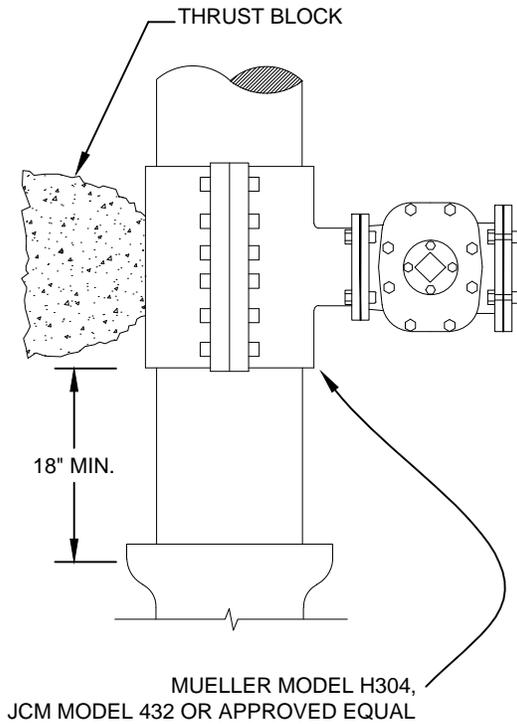
OSSC ACCEPTABLE
WATER STANDARD
DRAWINGS

CITY:

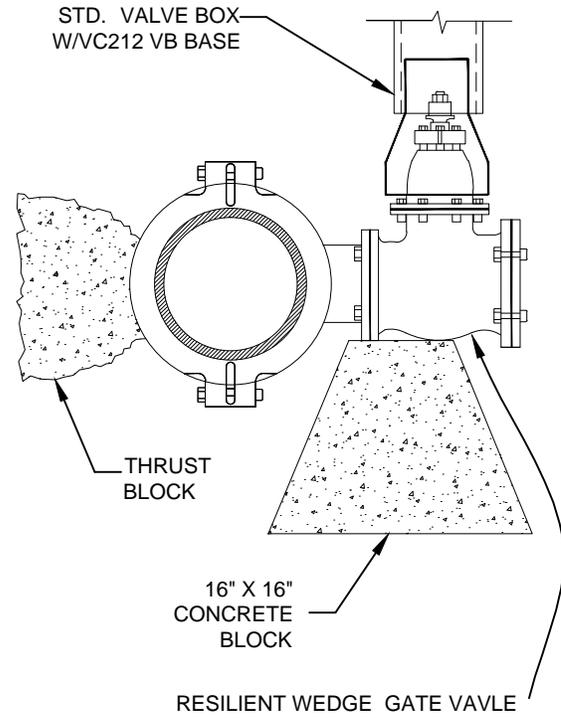
DUNDEE, OREGON

DRAWING NUMBER:

200



TOP VIEW



SIDE VIEW

NOTES:

1. WATER MAIN SHALL BE CLEANED BEFORE ATTACHING SLEEVE
2. WATER TAPPING SLEEVE SHALL BE ALL STAINLESS STEEL WITH FULL PERIMETER GASKET.
3. TAPPING VALVE SHALL BE EPOXY COATED PER AWWA C-550.
4. SLEEVE AND VALVE SHALL BE PRESSURE TESTED BEFORE MAKING TAP. PRESSURE TEST AND TAP SHALL BE MADE IN THE PRESENCE OF AN AUTHORIZED CITY REPRESENTATIVE.
5. APPROVED TAPPING MACHINE SHALL BE USED TO MAKE TAP.
6. 3/4" GRANULAR BACKFILL SHALL BE PAVED AND COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.
7. THRUST BLOCKING REQUIREMENTS SHALL BE DETERMINED BY THE ENGINEER.
8. TAP SHALL BE , MADE NO CLOSER THAN 18" FROM NEAREST JOINT.
9. SLEEVE AND VALVE SHALL BE WRAPPED WITH 8 MIL PLASTIC PRIOR TO CONCRETE PLACEMENT.
10. CONCRETE BLOCK(S) SHALL COMPLETELY SUPPORT TAPPING TEE AND VALVE.
11. CONTRACTOR SHALL COORDINATE ALL TAPS WITH CITY AND PERFORM ALL TAPS WITH PUBLIC WORKS STALL PRESENT.

LAST REVISION DATE:

AUGUST 2015

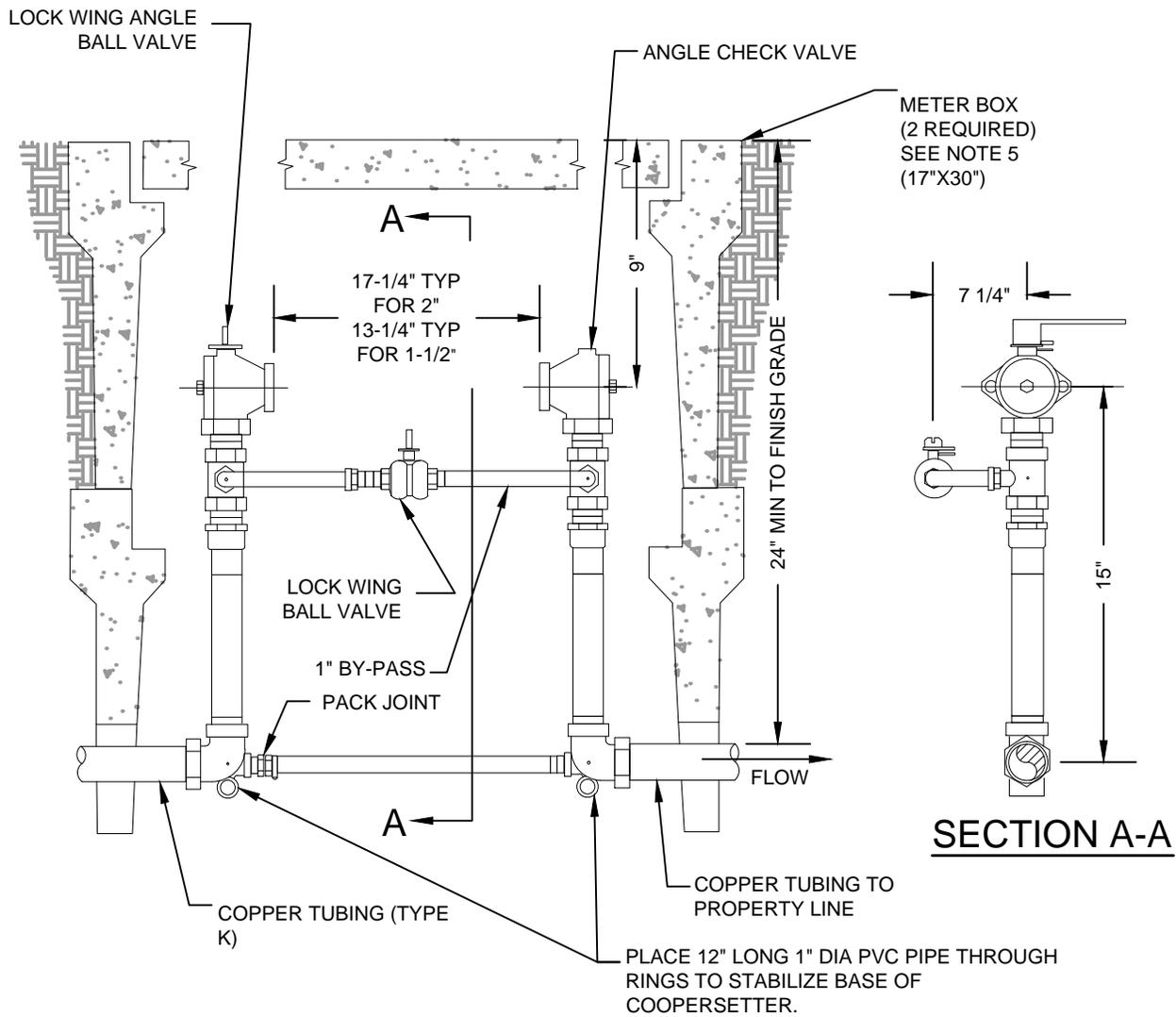
TAPPING TEE
AND VALVE

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

201



NOTES:

1. METERS SET TO BE FORD COPPERSETTER #B-95082 WITH RAISED LOCKING BYPASS OR APPROVED EQUAL.
2. SUBSTITUTES FOR ANY MATERIALS SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
3. ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% OPTIMUM DENSITY PER AASHTO T-18D.
4. SET FRONT OF METER BOX 3-INCHES BEHIND SIDEWALK (TYPICAL) FOR CURBLINE WALKS. NO METERS ON PRIVATE PROPERTY WITHOUT A RECORDED EASEMENT.
5. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY. METER BOX TO BE ARMORCAST. A6001640PCX12 W/A6001643 LID IN TRAFFIC AREAS. A6001640PCX12 W/A6001643R ELSEWHERE. PROVIDE WITH KNOCKOUTS FOR TOUCH-READ SENSORS.
6. WATER METER SET BY CITY FORCES. COPPERSETTER, METER BOX, & ALL FITTINGS PROVIDED BY DEVELOPER.
7. SEE DETAIL 210 FOR TAPPING REQUIREMENTS.

LAST REVISION DATE: OCTOBER 2010	
1-1/2 INCH AND 2 INCH METER SET WITH 1INCH HIGH BY-PASS	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 202

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NUMBER	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
RD300	TRNCH BACKFILL, BEDDING, PIPEZONE AND MULTIPLE INSTALLATIONS.	NO EXCEPTION TAKEN
RD302	STREET CUT	NO EXCEPTION TAKEN
RD306	CONCRETE ENCASEMENT, CRADLE AND CAP DETAILS	NO EXCEPTION TAKEN
RD308	BORE CASING DETAIL	NO EXCEPTION TAKEN
RD310	SHALLOW/DEEP TRENCH SERVICE CONNECTION, BLOCKING AND MARKERS	NO EXCEPTION TAKEN
RD336	STANDARD MANHOLE DETAILS	NO EXCEPTION TAKEN
RD338	STANDARD SANITARY SEWER MANHOLE	FLAT TOP MANHOLES TO BE USED FOR ALL MANHOLES LESS THAN 6 FEET FROM RIM TO INLET
RD344	STANDARD MANHOLE BASE SECTION	NO EXCEPTION TAKEN
RD354	CARRY-THROUGH MANHOLE	NO EXCEPTION TAKEN
RD356	MANHOLE FRAMES AND COVERS	NO EXCEPTION TAKEN
RD360	MANHOLE FRAME ADJUSTMENT	NO EXCEPTION TAKEN
RD362	SANITARY CLEANOUT	NO EXCEPTION TAKEN

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:
AUGUST 2015

OSSC ACCEPTABLE
SEWER STANDARD
DRAWINGS

CITY:
DUNDEE, OREGON

DRAWING NUMBER:
300

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NO.	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
RD115	MONUMENT BOX	NO EXCEPTION TAKEN
RD130	BOLLARDS	NON-REMOVABLE BOLLARDS SHALL BE CONCRETE FILLED WITH ROUNDED CONCRETE CAP
RD610	ASPHALT CONCRETE PAVEMENT (ACP) DETAILS	NO EXCEPTION TAKEN
RD700	CURBS	E=6", MOUNTABLE CURBS NOT PERMITTED WITHOUT APPROVAL OF THE CITY ENGINEER. 3" PVC WEEPHOLES TO BE LOCATED AT DRIVEWAY AND AT LOW POINTS IN CURB, 2 PER LOT MAXIMUM.
RD701	DRAINAGE CURBS	NO EXCEPTIONS TAKEN
RD705	ISLANDS	NO EXCEPTION TAKEN
RD706	TRAFFIC SEPARATORS AND TRANSITIONS	NO EXCEPTION TAKEN
RD707	ISLAND NOSE TREATMENTS	NO EXCEPTION TAKEN
RD710	ACCESSIBLE ROUTE ISLAND	NO EXCEPTION TAKEN
RD715	APPROACHES AND NON-SIDEALK DRIVEWAYS	NO EXCEPTION TAKEN
RD720	SIDEWALKS	NO EXCEPTION TAKEN
RD740	SEPARATED SIDEWALK DRIVEWAYS OR ALLEYS (OPTIONS H, I AND J) LOCAL JURISDICTIONS	TYPE J DRIVEWAY REQUIRES ADVANCE APPROVAL FROM THE CITY ENGINEER
RD745	CURB LINE SEIDEWALK DRIVEWAYS OR ALLEYS (OPTIONS K AND L) LOCAL JURISDICTIONS	NO EXCEPTION TAKEN
RD750	CURB LINE SIDEWALK DRIVEWAYS OR ALLEYS (OPTIONS M AND N) LOCAL JURISDICTIONS	TYPE M & N DRIVEWAYS REQUIRE ADVANCE APPROVAL BY THE CITY ENGINEER
RD755	SIDEWALK RAMP DETAILS	NO EXCEPTION TAKEN
RD756	SIDEWALK RAMP PLACEMENT OPTIONS CURB RADII ≤ 15'	DRAWING TO USED ON ALL RADII UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER
RD757	SIDEWALK RAMP PLACEMENT OPTIONS CURB RADDII > 15'	REQUIRES ADVANCE APPROVAL BY THE CITY ENGINEER. TYPES J, K & L SHALL NOT BE PERMITTED.
RD759	TRUNCATED DOME DETECTABLE WARNING SURFACE DETAILS & LOCATIONS	DUNDEE STANDARD COLOR TO BE RED

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:

AUGUST 2015

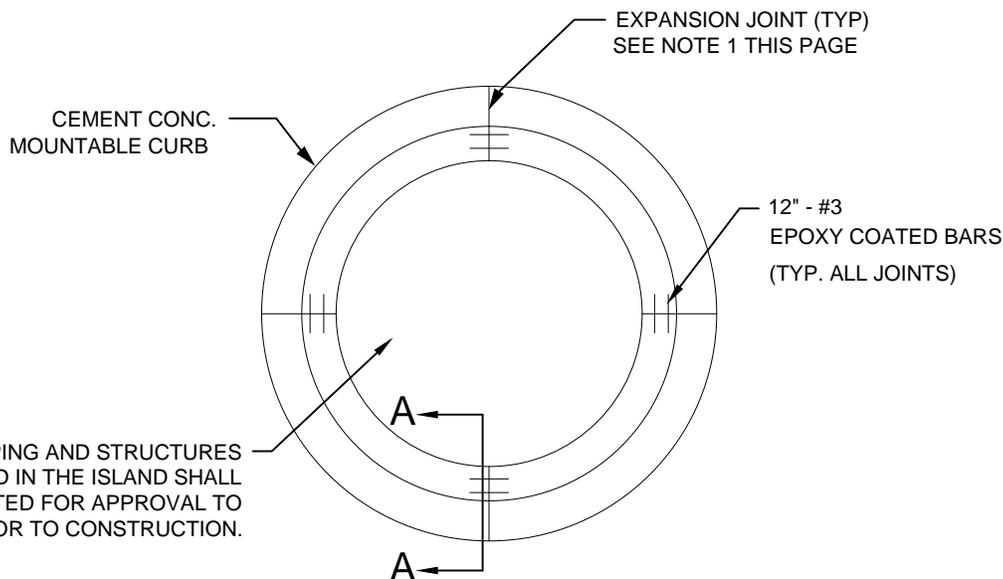
OSSC ACCEPTABLE
STREET STANDARD
DRAWINGS

CITY:

DUNDEE, OREGON

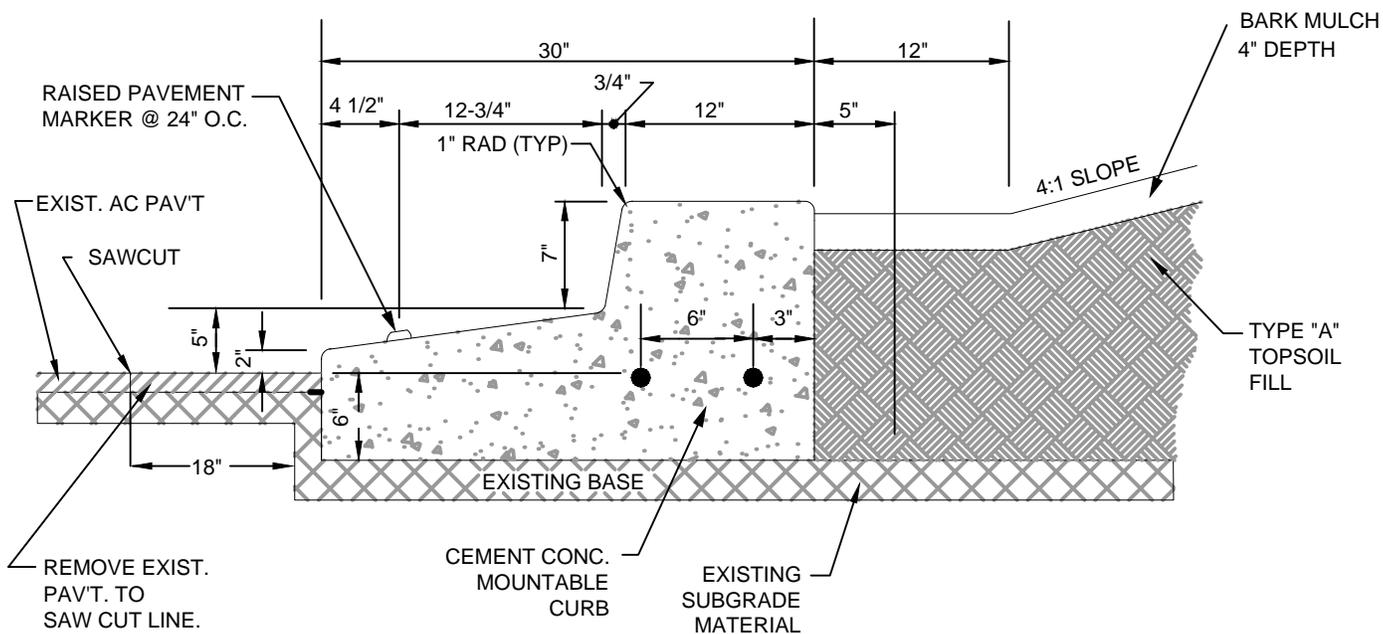
DRAWING NUMBER:

400



ALL LANDSCAPING AND STRUCTURES
CONSTRUCTED IN THE ISLAND SHALL
BE SUBMITTED FOR APPROVAL TO
THE CITY PRIOR TO CONSTRUCTION.

PLAN VIEW



SECTION A-A

NOTE:

EXPANSION JOINT MATERIAL SHALL
BE 3/8" THICK PREMOLDED JOINT
FILLER FULL THICKNESS OF
CONCRETE

LAST REVISION DATE:

OCTOBER 2010

TRAFFIC CIRCLE

CITY:

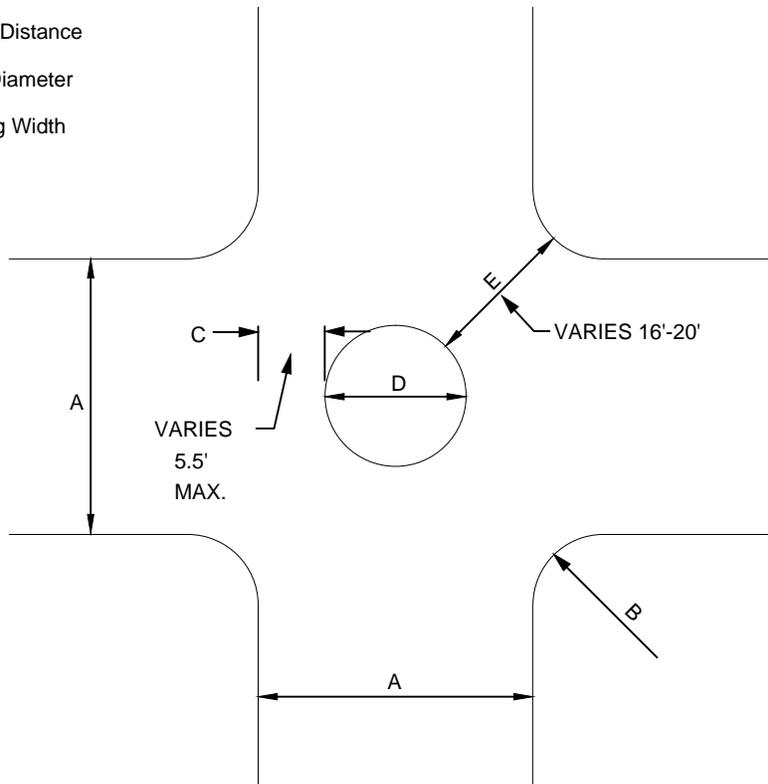
DUNDEE, OREGON

DRAWING NUMBER:

411

LEGEND:

- A Street Width
- B Curb Return Radius
- C Off-Set Distance
- D Circle Diameter
- E Opening Width



INTERSECTION DIAGRAM

OPTIMUM CRITERIA

<u>IF C =</u>	<u>THEN</u>	<u>E WILL BE</u>
5.5' MAX		16'MIN
5.0'		17' +
4.5'		18' +
4.0'		19' +
3.5' OR LESS		20'

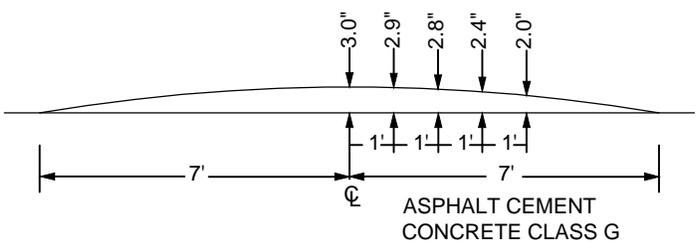
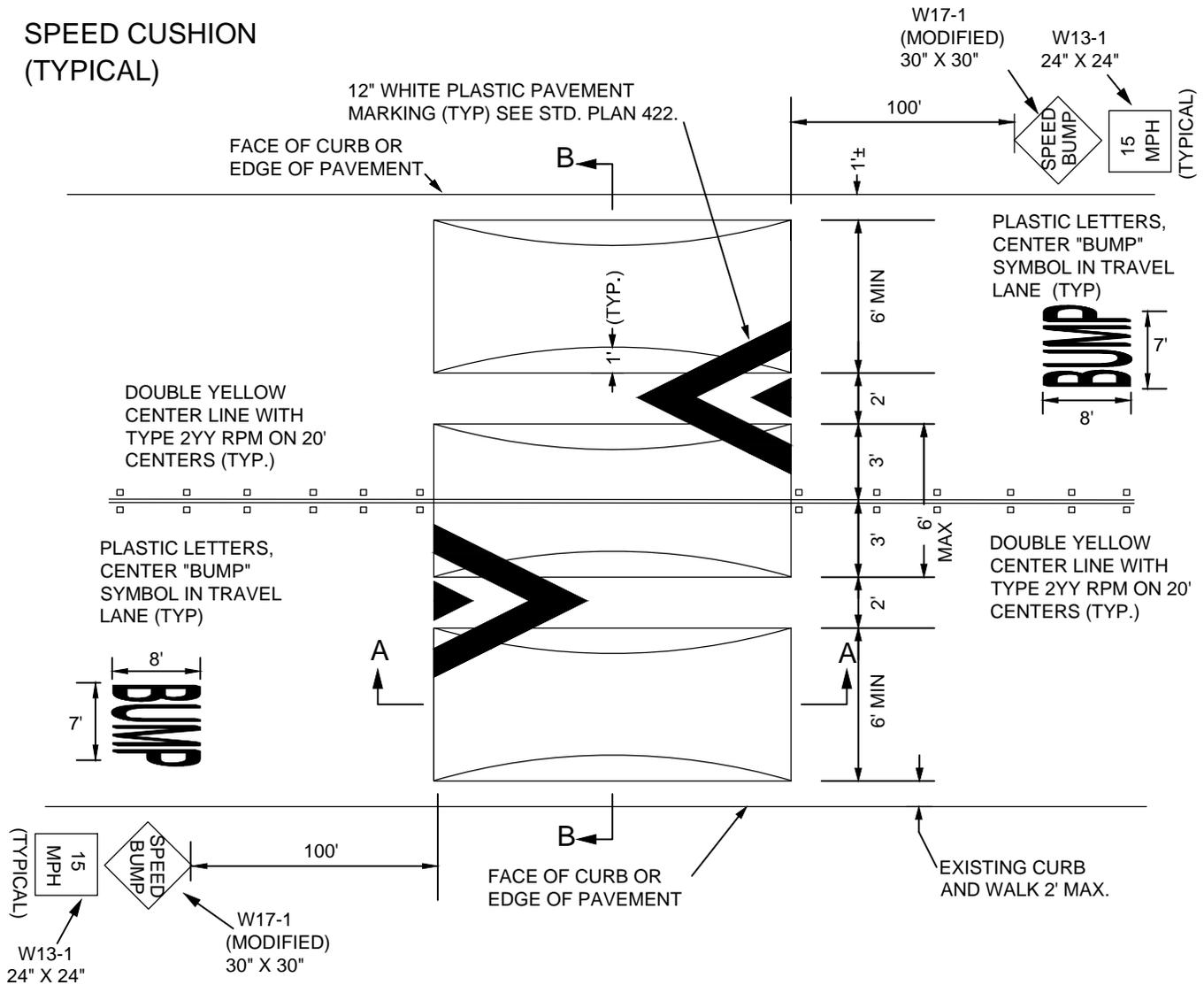
LAST REVISION DATE:
OCTOBER 2010

TRAFFIC CIRCLE
INTERSECTION
DIAGRAM

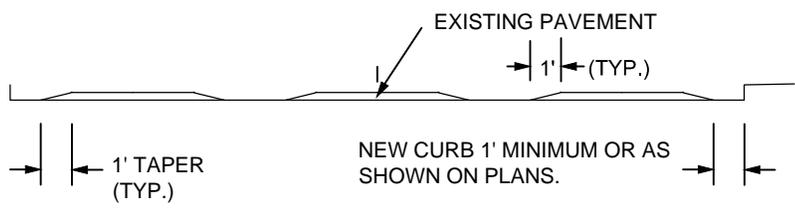
CITY:
DUNDEE, OREGON

DRAWING NUMBER:
412

SPEED CUSHION (TYPICAL)



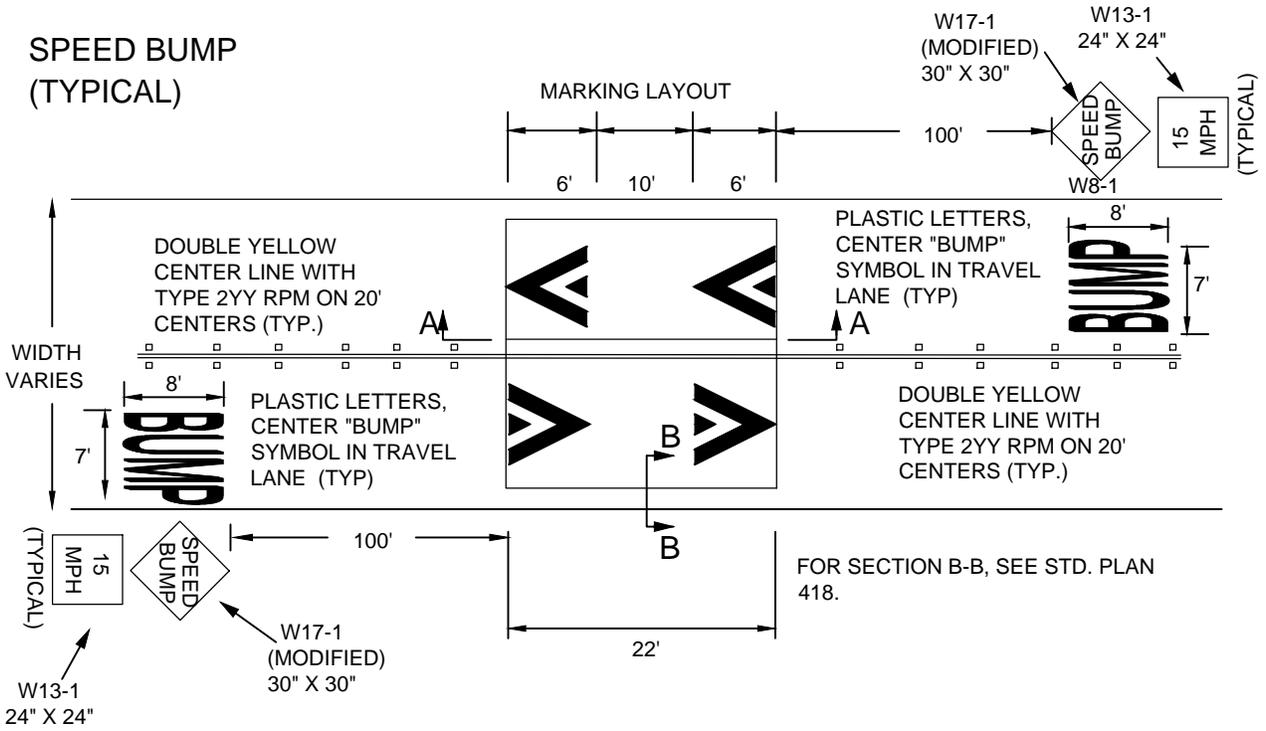
SECTION A-A
PARABOLIC CROWN
N.T.S.



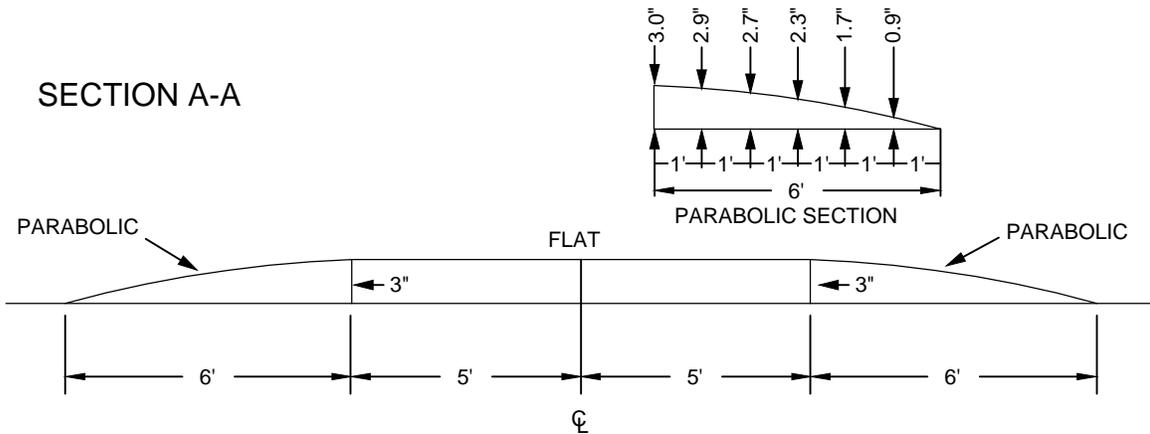
SECTION B-B

LAST REVISION DATE: OCTOBER 2010	
SPEED CUSHION	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 414

SPEED BUMP (TYPICAL)



SECTION A-A



LAST REVISION DATE:

OCTOBER 2010

22' SPEED CUSHION

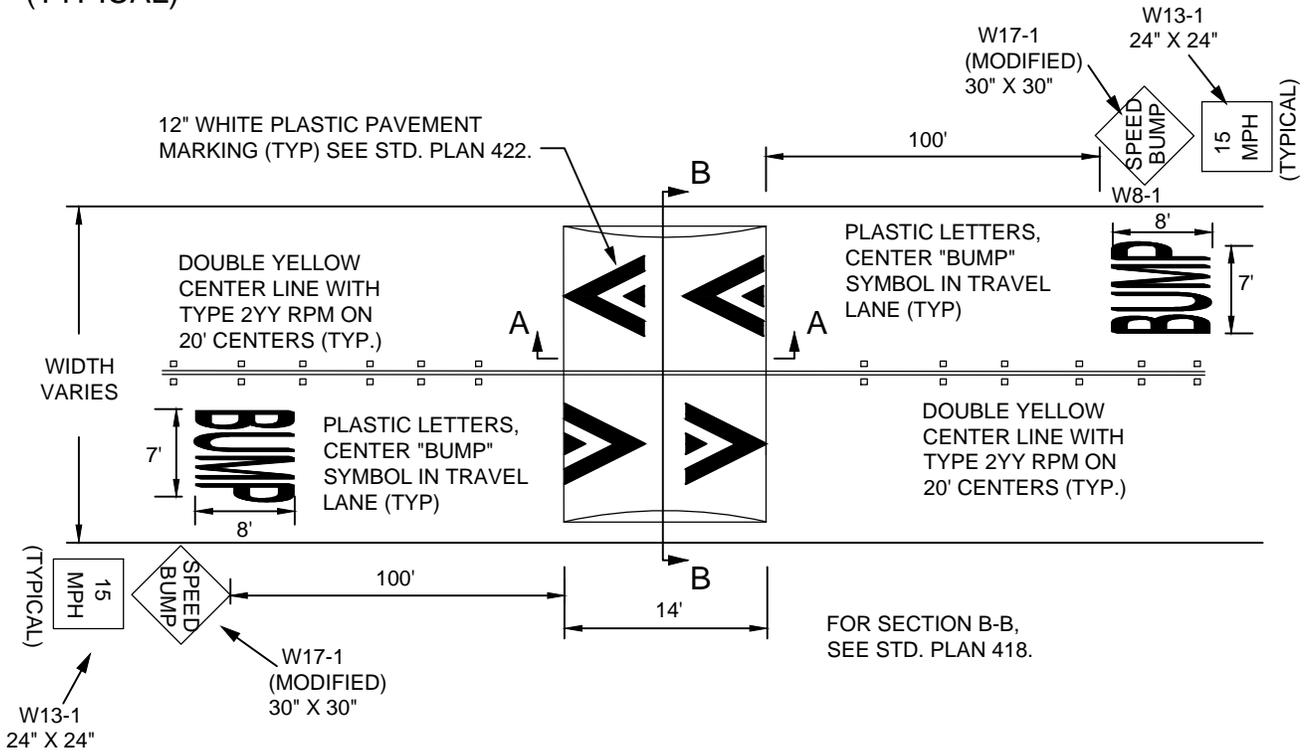
CITY:

DUNDEE, OREGON

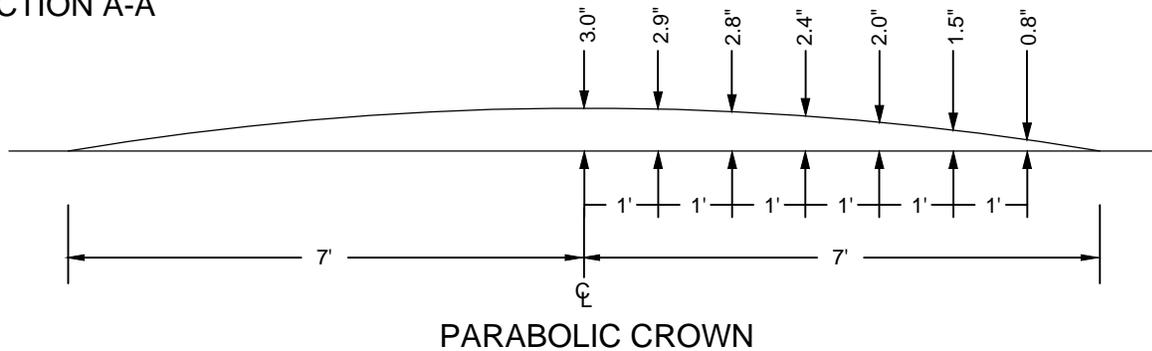
DRAWING NUMBER:

415

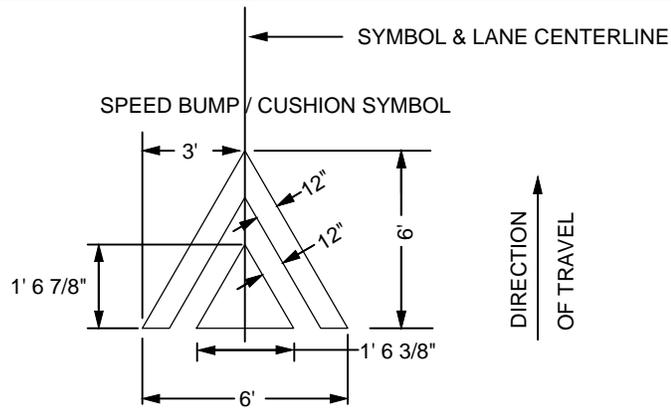
**SPEED BUMP
(TYPICAL)**



SECTION A-A

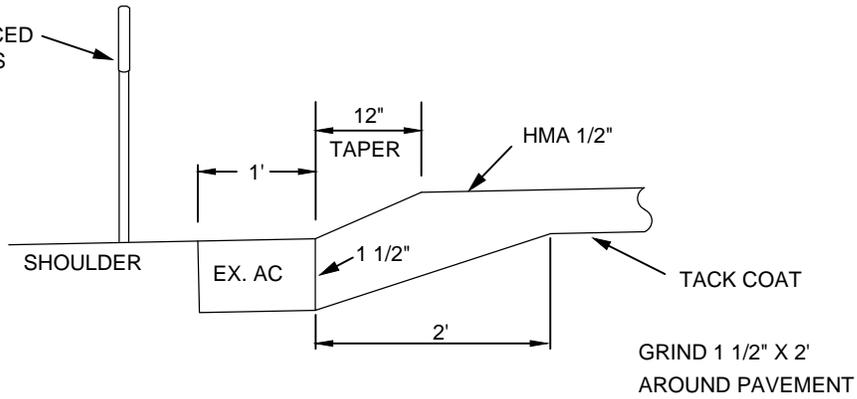


LAST REVISION DATE: OCTOBER 2010	
14' SPEED CUSHION	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 416

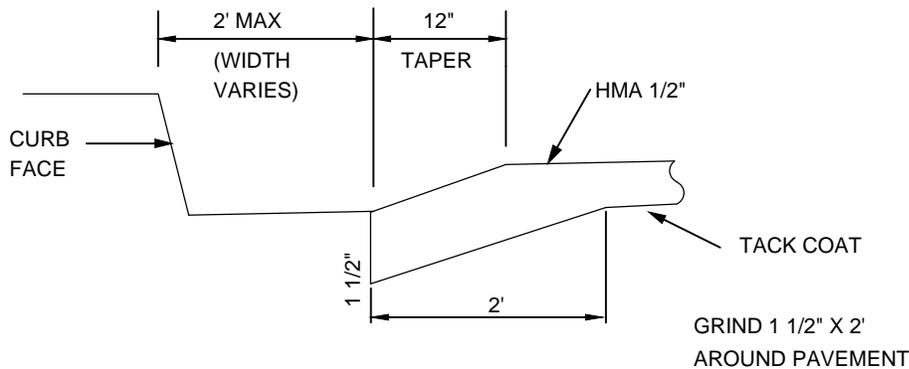


SECTION B-B

ROADSIDE DELINEATOR PLACED AT CENTER OF SHOULDER AS NEEDED TO DISCOURAGE VEHICLES FROM DRIVING AROUND SPEED BUMP. (OPTIONAL)

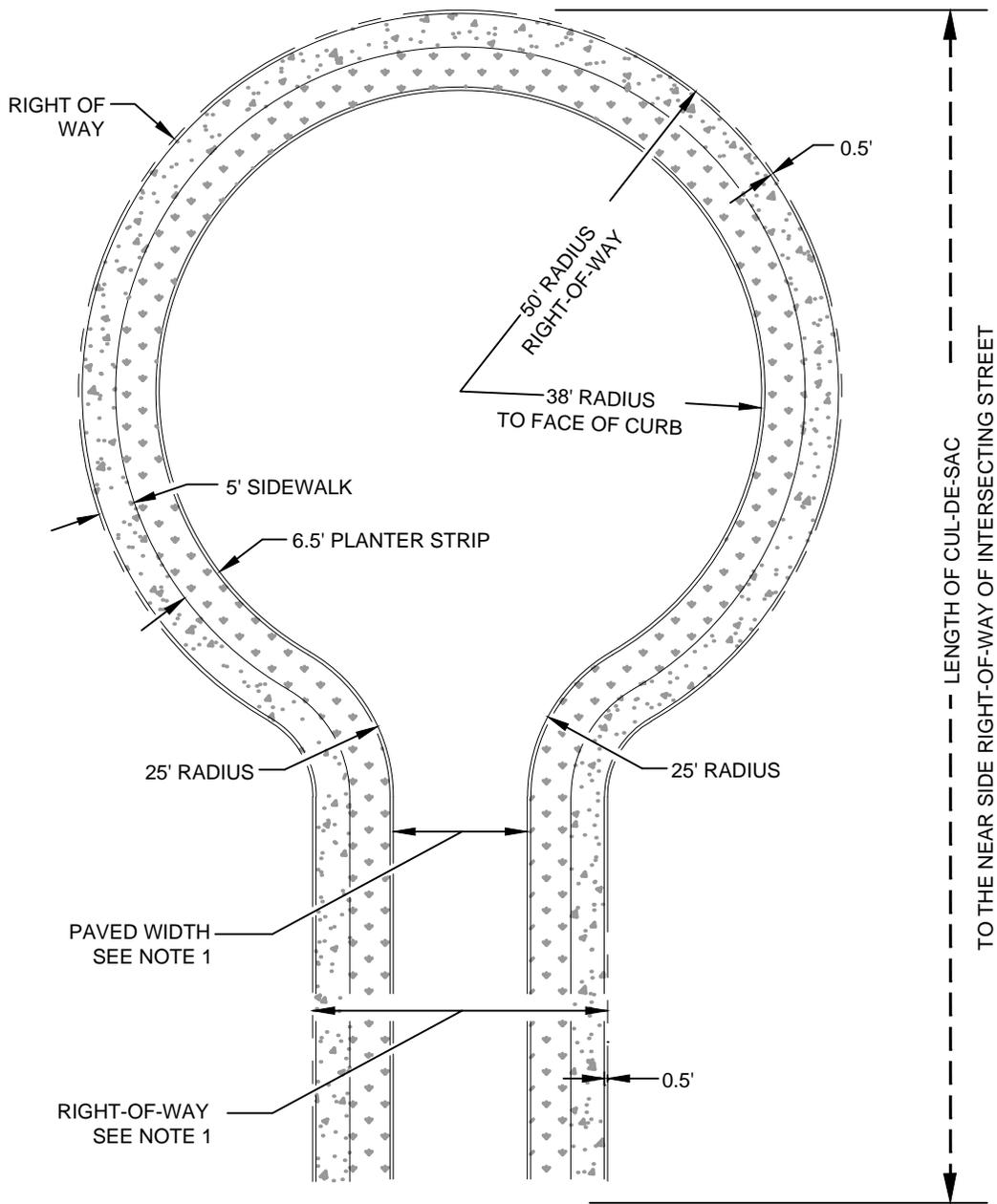


EDGE DETAIL FOR STREETS WITHOUT CURBS



EDGE DETAIL FOR STREETS WITH CURB

LAST REVISION DATE: OCTOBER 2010	
SPEED CUSHION DETAILS	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 417



NOTES:

1. SEE STANDARD DWG 401 FOR LOCAL STREET RIGHT-OF-WAY AND PAVED WIDTH STANDARDS.
2. LENGTH OF CUL-DE-SAC SHALL NOT EXCEED 400 FEET.
3. ON A CUL-DE-SAC SERVING ONLY RESIDENTIAL USES AND HAVING NO MORE THAN FIVE ABUTTING RESIDENTIAL UNITS, THE DIMENSIONS OF THE CUL-DE-SAC BULB MAY BE REDUCED TO PROVIDE:
 - a. A MINIMUM 24 FOOT RADIUS TO FACE OF CURB,
 - b. A MINIMUM 30 FOOT RADIUS TO RIGHT OF WAY,
 - c. A MINIMUM 5 FOOT WIDE CURB TIGHT SIDEWALK (MEASURED FROM BACK OF CURB) WITH EASEMENTS FOR STREET TREES AND STREET LIGHTING OUTSIDE OF THE RIGHT OF WAY.

LAST REVISION DATE:

OCTOBER 2010

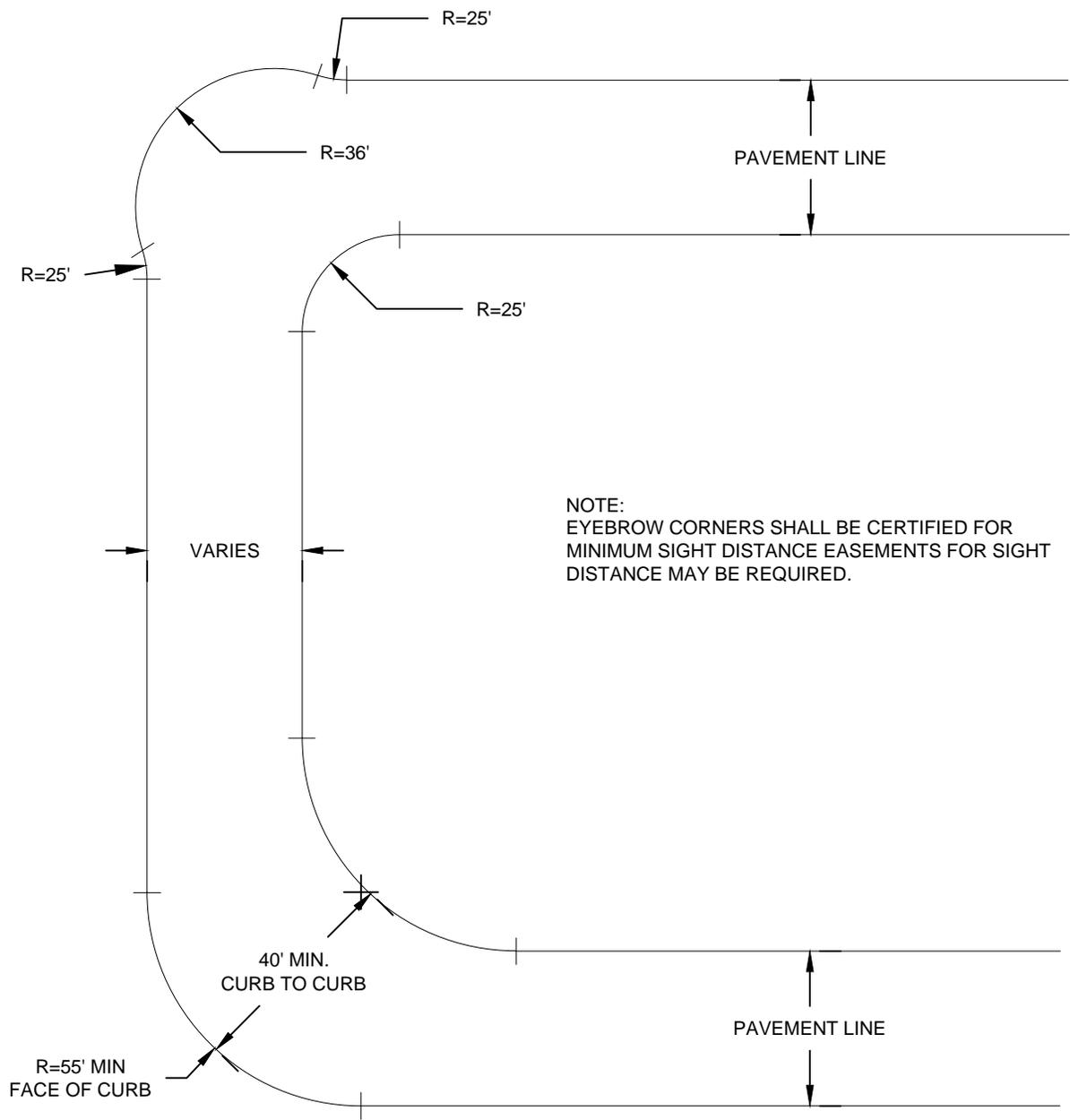
STANDARD
CUL-DE-SAC
(RESIDENTIAL)

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

431

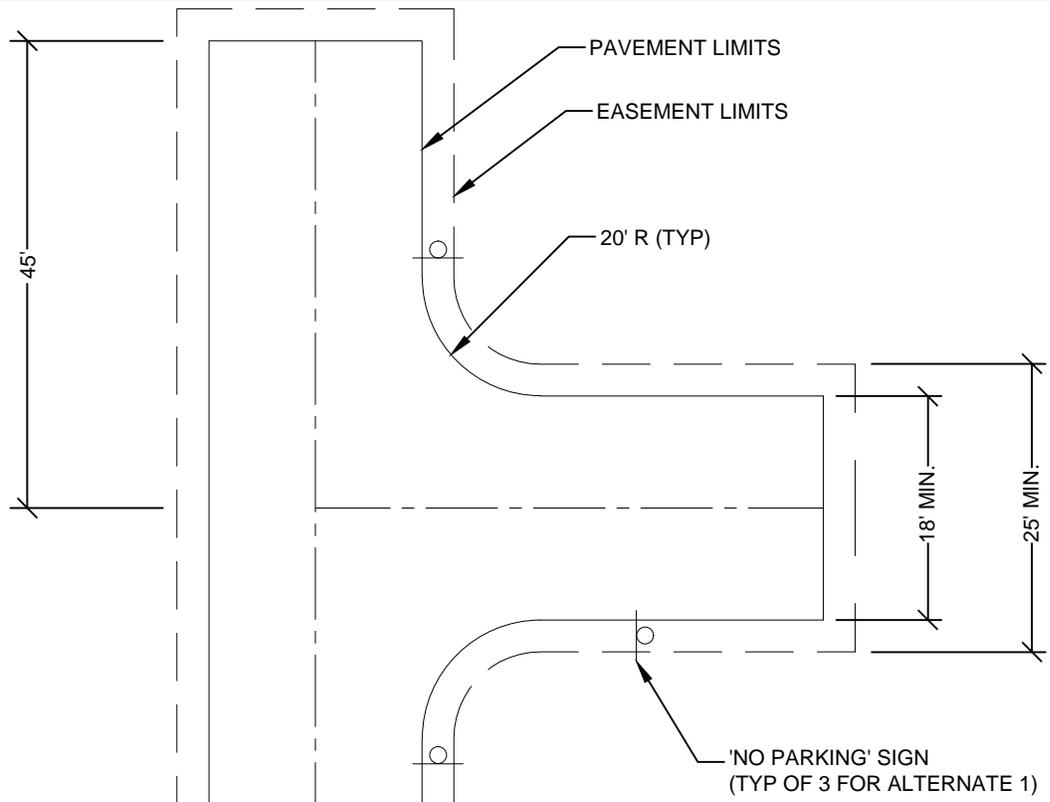


LAST REVISION DATE:
OCTOBER 2010

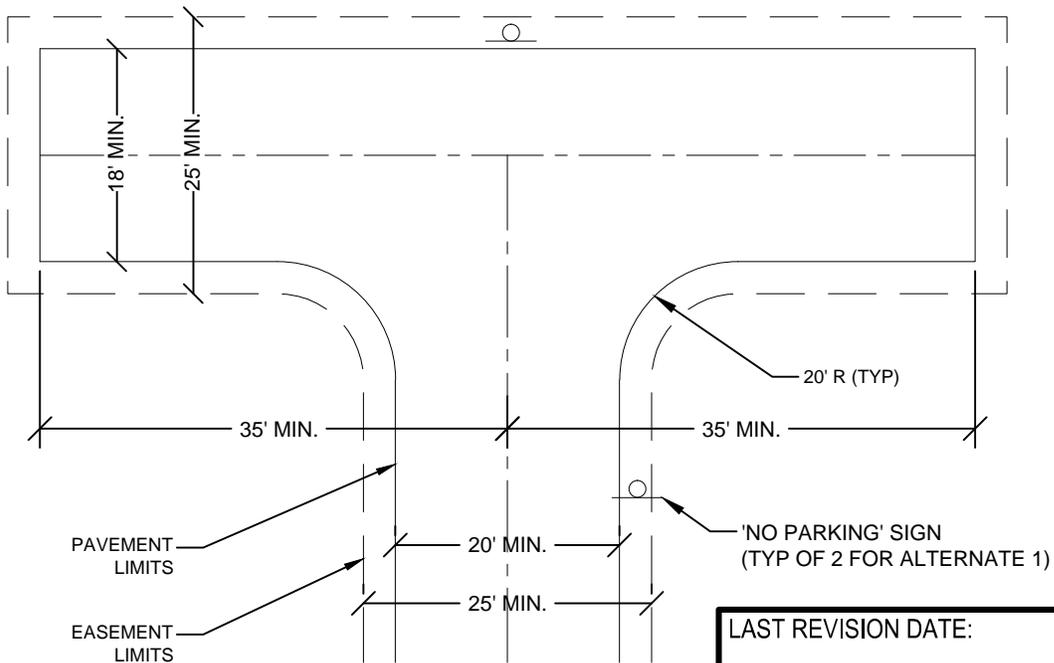
EYEBROW
CORNER

CITY:
DUNDEE, OREGON

DRAWING NUMBER:
432



ALT 2



ALT 1

NOTES:

1. 'NO PARKING, FIRE LANE' SIGNS REQUIRED WITHIN LIMITS OF ACCESS EASEMENT AND TURNAROUND.
2. THESE ARE TYPICAL MINIMUM DESIGNS. ALTERNATE DESIGNS SHALL MEET THE APPROVAL OF THE LOCAL FIRE MARSHALL.
3. PAVEMENT DIMENSIONS SHOWN REFER TO TOTAL DRIVABLE WIDTH BETWEEN CURBS IF PRESENT.

LAST REVISION DATE:

OCTOBER 2010

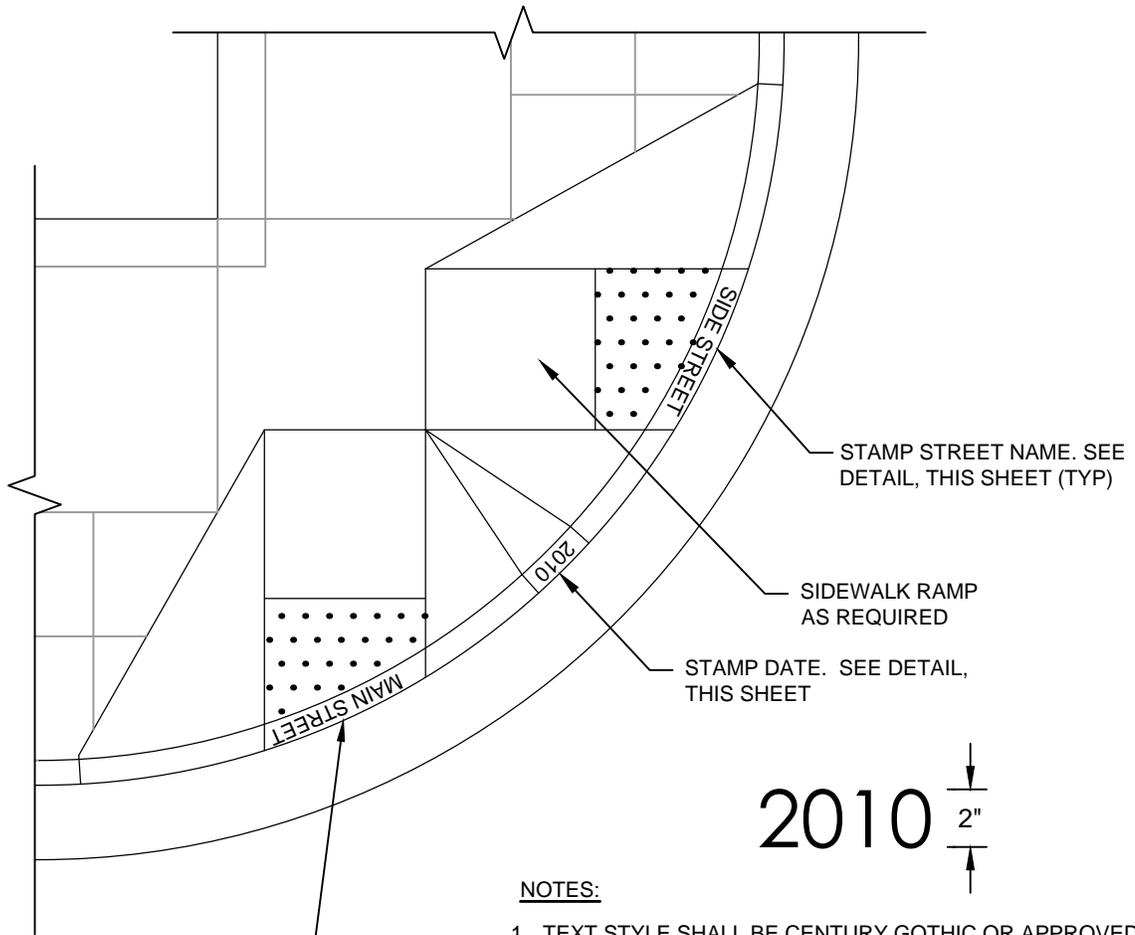
HAMMERHEAD
TURNAROUND
PRIVATE DRIVES
ONLY)

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

433



STAMP STREET NAME. SEE
DETAIL, THIS SHEET (TYP)

MAIN STREET 2"

NOTES:

1. TEXT STYLE SHALL BE CENTURY GOTHIC OR APPROVED EQUAL.
2. CONTRACTOR SHALL SUBMIT STAMP SAMPLE FOR CITY APPROVAL PRIOR TO STAMPING.
3. FAILURE TO STAMP STREET NAMES WILL REQUIRE CURB REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
4. STAMP SHALL BE PLACED WITHIN 30 MINUTES OF CONCRETE POUR AND SHALL BE CLEARLY VISIBLE AFTER CURING.

STREET NAME STAMP DETAIL

NTS

NOTES:

1. TEXT STYLE SHALL BE CENTURY GOTHIC OR APPROVED EQUAL.
2. CONTRACTOR SHALL SUBMIT STAMP SAMPLE FOR CITY APPROVAL PRIOR TO STAMPING.
3. FAILURE TO STAMP STREET NAMES WILL REQUIRE CURB REPLACEMENT AT THE CONTRACTORS EXPENSE.
4. STAMP SHALL BE PLACED AT LOCATIONS INDICATED ON PEDESTRIAN RAMP DETAILS.
5. STAMP SHALL BE PLACED WITHIN 30 MINUTES OF CONCRETE POUR AND SHALL BE CLEARLY VISIBLE AFTER CURING.
6. STAMP SHALL CORRESPOND WITH THE YEAR OF PROJECT CONSTRUCTION.

DATE STAMP DETAIL

NTS

LAST REVISION DATE:

OCTOBER 2010

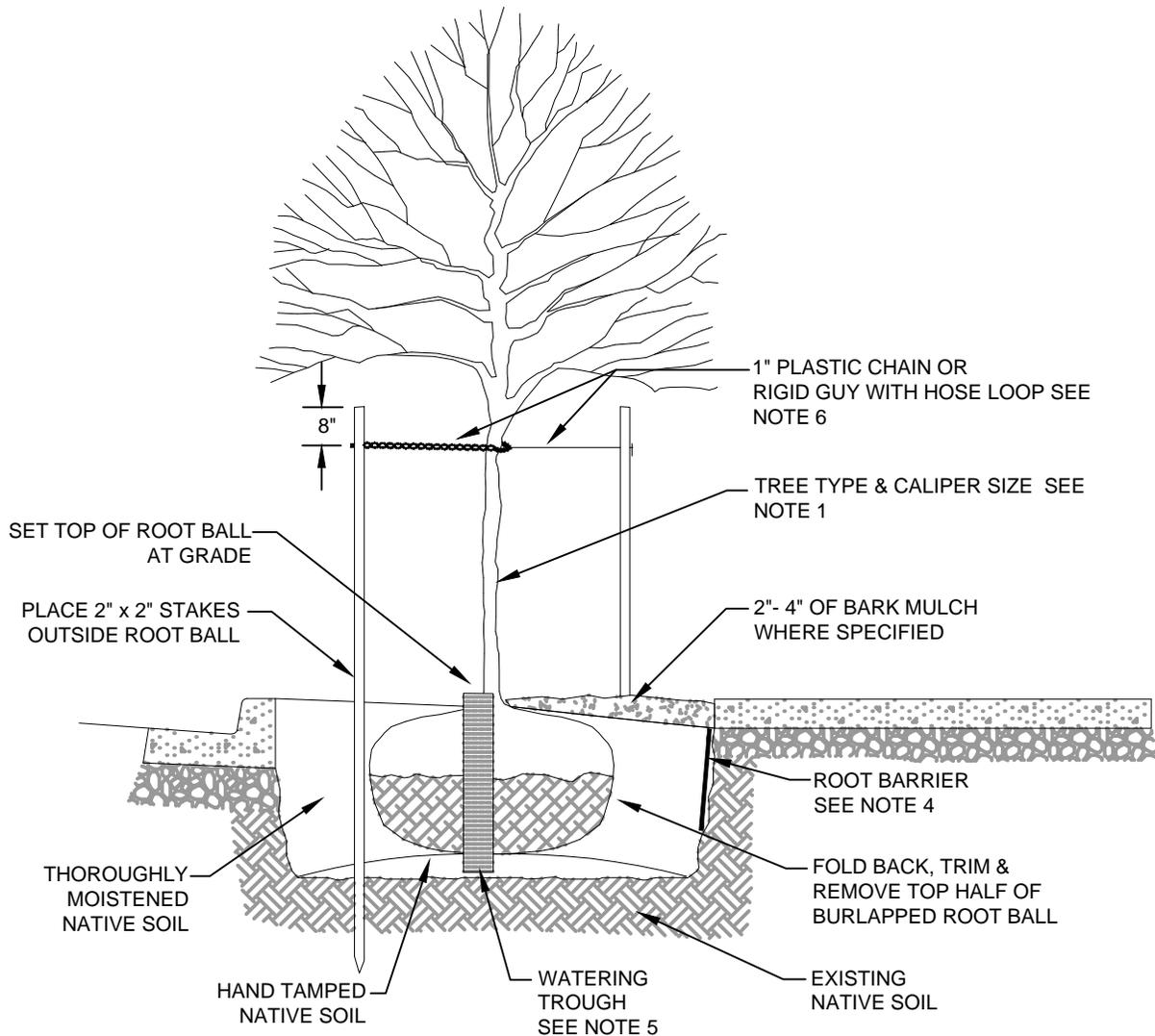
INTERSECTION
CURB STAMPING

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

434



CROSS-SECTION

NOTES:

1. TREE SPECIES AND CALIPER SIZE ARE TO BE APPROVED BY THE CITY ARBORIST.
2. ADJUST PLANTING LOCATIONS SO THAT TREE CROWN OR ROOT BALL DOES NOT CONFLICT WITH ABOVE OR BELOW - GROUND UTILITIES.
3. DO NOT UNDERMINE CURB OR SIDEWALK WHEN EXCAVATING.
4. AN 18 INCHES DEEP, ROOT BARRIER SHALL BE ADDED WHERE REQUIRED BY THE CITY ARBORIST.
5. OPPOSITE TREE STAKES, PROVIDE TWO, 3 INCH DIAMETER ADS PERFORATED PIPE WATERING TROUGHS, FILLED WITH PEA GRAVEL.
6. PROVIDE A LOOP IN CHAIN LOCK OR GUY HOSE LARGE ENOUGH TO ALLOW FOR TRUNK GROWTH.
7. TREE STAKES ARE TO BE REMOVED FOLLOWING THE REQUIRED ESTABLISHMENT PERIOD.

LAST REVISION DATE:

OCTOBER 2010

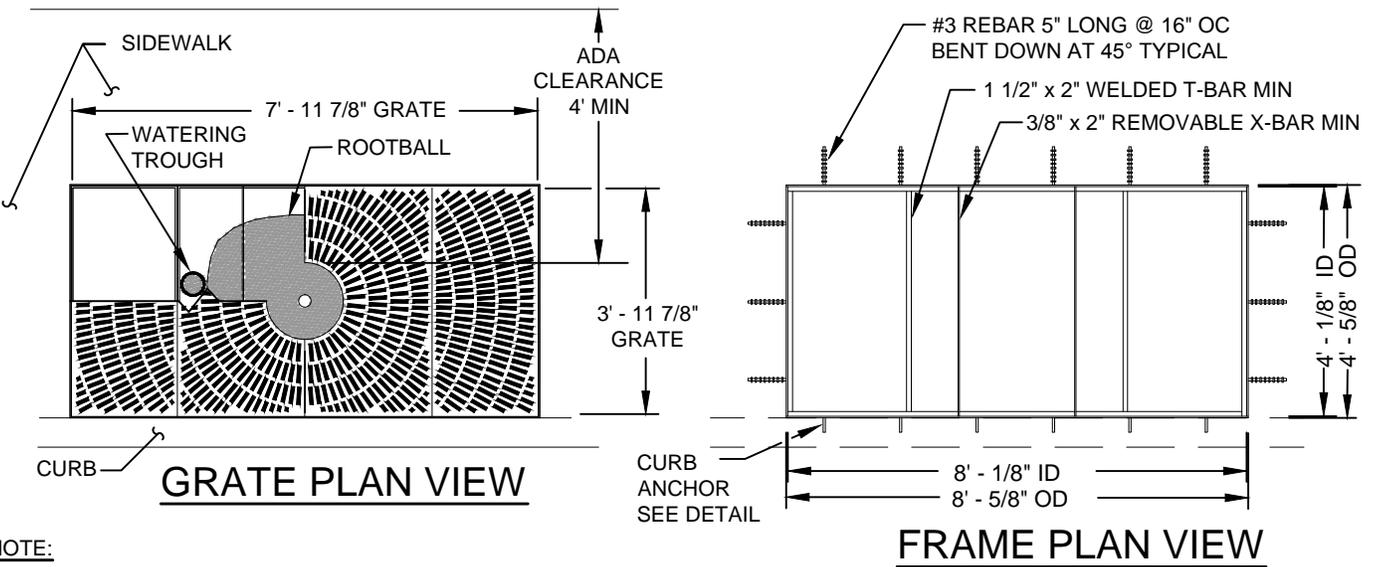
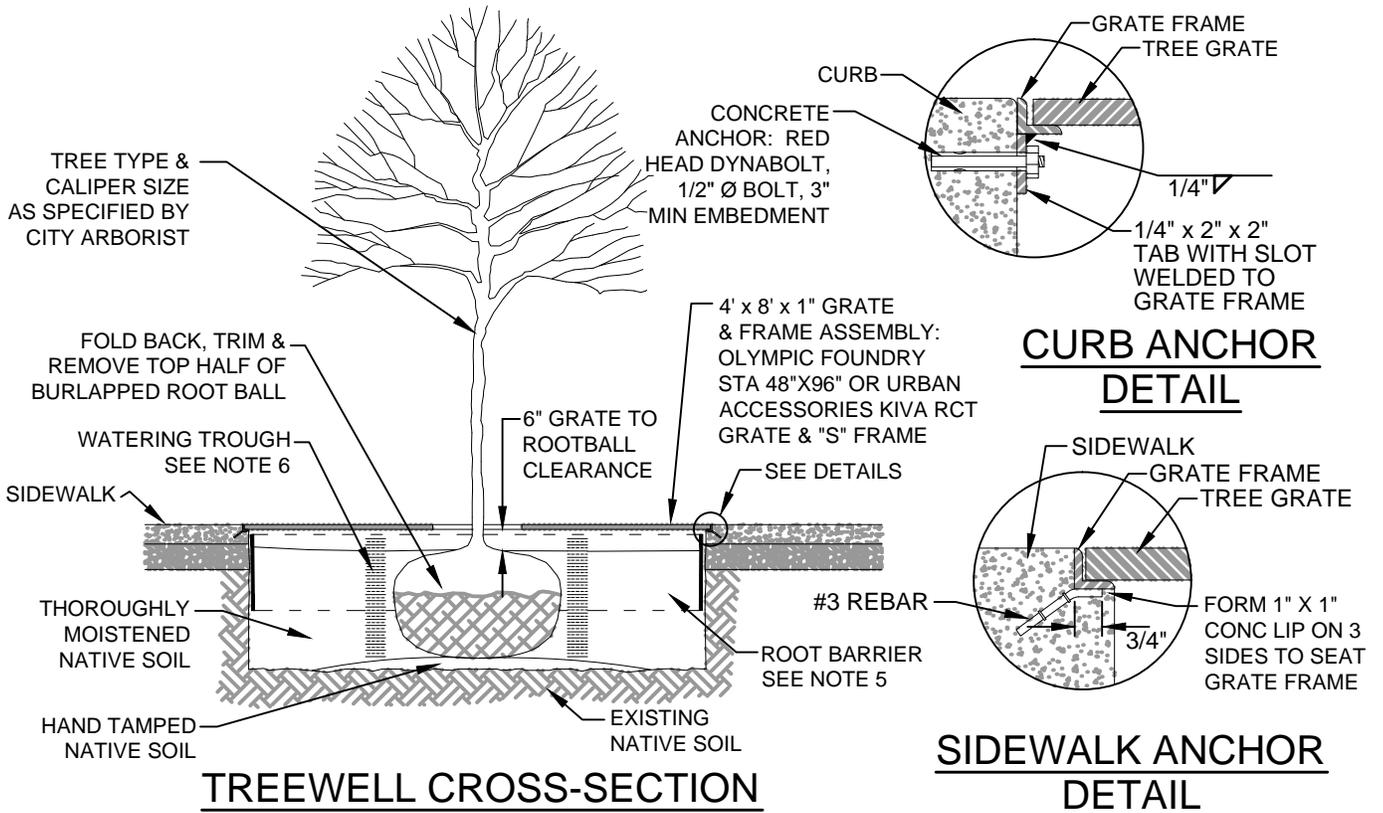
STANDARD
SIDEWALK
TREWELL

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

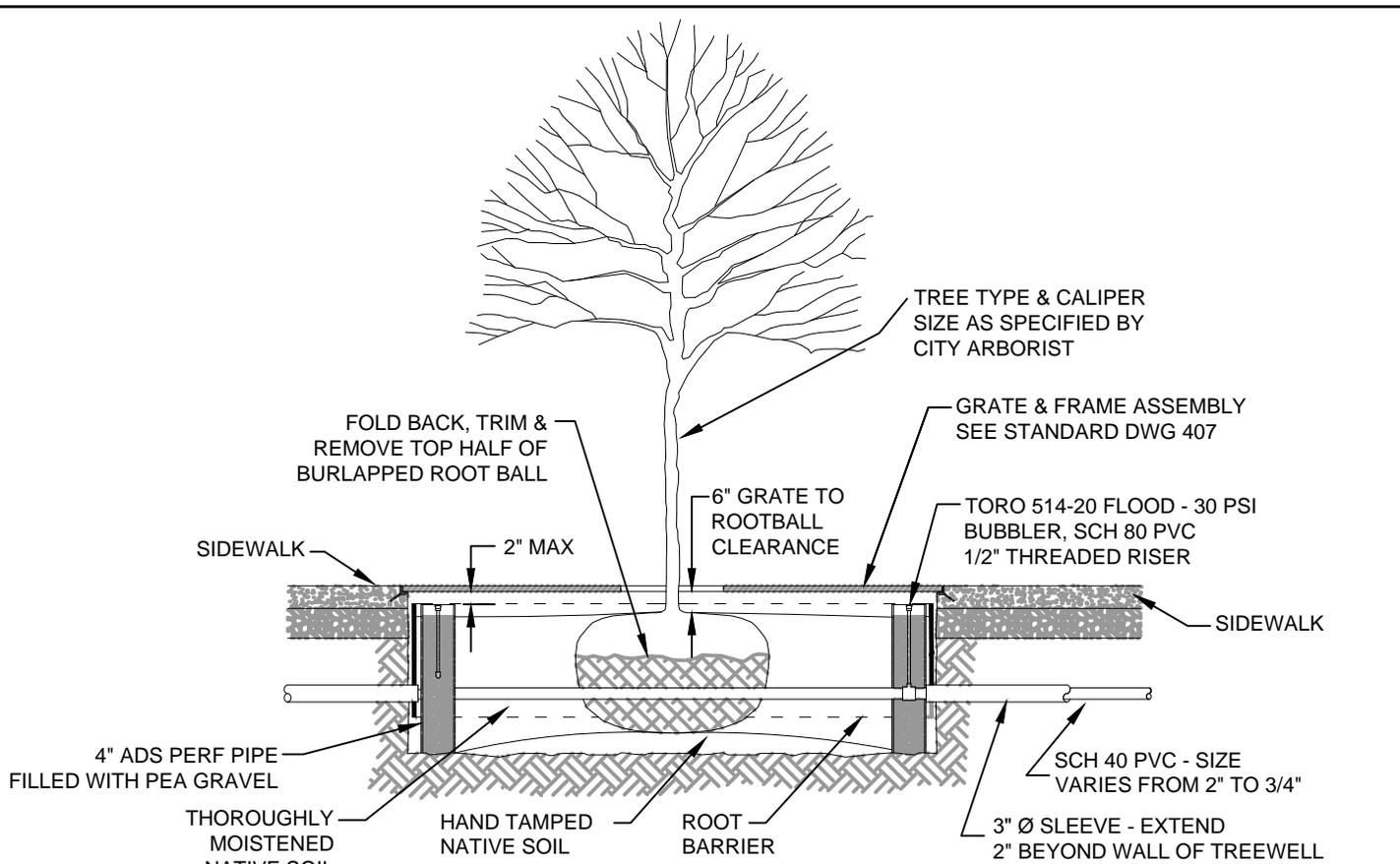
441



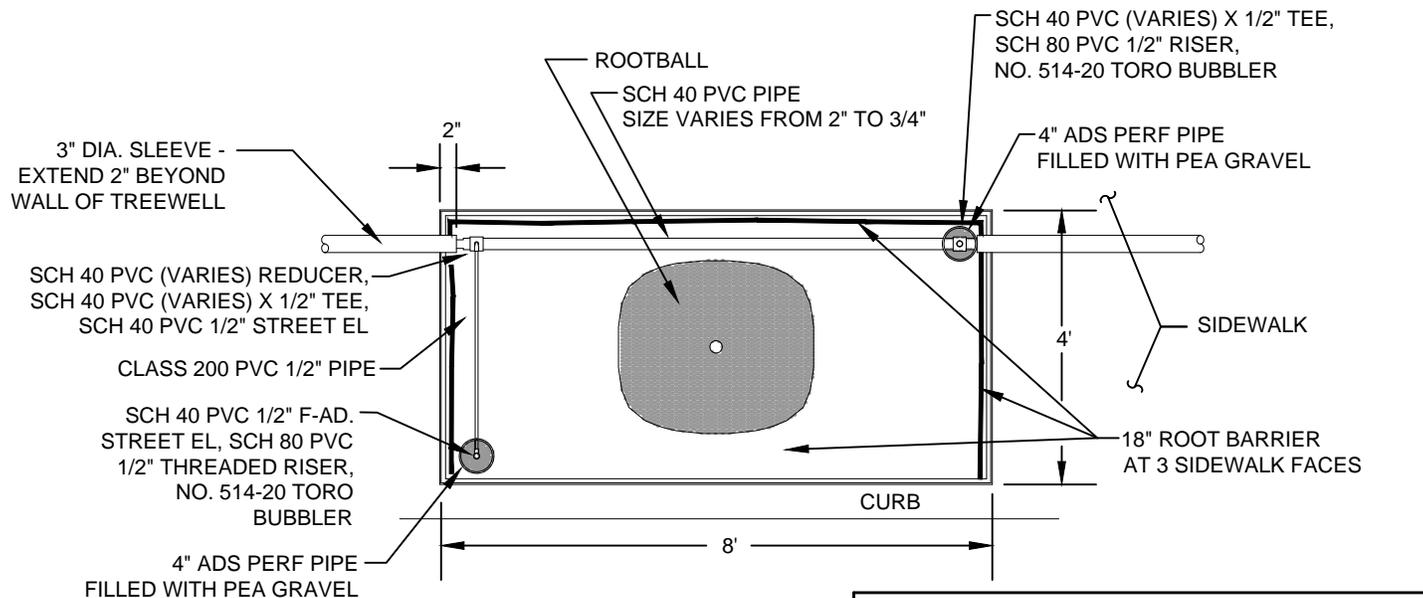
NOTE:

1. GRATES ARE TO BE MADE OF CAST IRON WITH A NATURAL FINISH.
2. CASTINGS WILL BE 3/4 INCH THICK IN 4 PIECES.
3. THE CENTER OPENING SHALL BE 16 INCH DIAMETER WITH A BREAKOUT AT 23-1/2" INCHES.
4. SLOTTED PENETRATIONS SHALL BE NO GREATER THAN 3/8 INCH WIDE.
5. AN 18 INCH DEEP ROOT BARRIER SHALL BE PLACED AT BOTH SIDES AND ALONG SIDEWALK FACE.
6. PROVIDE TWO, 3 INCH DIAMETER ADS PERFORATED PIPE WATERING TROUGHS FILLED WITH PEA GRAVEL.
7. DO NOT UNDERMINE CURB OR SIDEWALK WHEN EXCAVATING.
8. ADA CLEARANCE SHALL BE 4 FEET AS SHOWN, UNLESS OTHERWISE PERMITTED BY THE CITY ENGINEER.

LAST REVISION DATE: OCTOBER 2010	
CURB TIGHT SIDEWALK TREEWELL WITH GRATE	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 442



TREEWELL CROSS-SECTION



TREEWELL PLAN VIEW

LAST REVISION DATE: OCTOBER 2010	
TREEWELL IRRIGATION	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 443

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NO.	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
TM200	SIGN INSTALLATION DETAILS	NOTE 2) ADD: 1' MINIMUM F BEHIND CURB AND RESTRICTED R/W IF ADJACENT TO PARKING OR BIKE LANE
TM490	CROSSWALK CLOSURE DETAILS	NO EXCEPTION TAKEN
TM501	PAVEMENT MARKING STANDARD DETAIL BLOCKS	NO EXCEPTION TAKEN
TM503	PAVEMENT MARKING STANDARD DETAIL BLOCKS	CW ONLY PERMITTED AT SIGNALIZED INTERSECTIONS, CW-SC NOT PERMITTED, USE CW-SC2 ON DET4580
TM505	RAIL CROSSING PAVEMENT MARKINGS	NO EXCEPTION TAKEN
TM530	INTERSECTION PAVEMENT MARKINGS (CROSSWALK, STOP BAR. & BIKE LANE STENCIL)	REPLACE CW-SC WITH CW-SC2 IN STAGGERED CONTINENTAL LAYOUT, STANDARD CROSWALK BARS AT INTERSECTION FOR SIGNALIZED INTERSECTIONS ONLY.
TM681	SIGNAL POLE MOUNTS	NO EXCEPTION TAKEN
TM687	PERFERATED STEEL SQUARE TUBE (PSST) ANCHOR FOUNDATION	NO EXCEPTION TAKEN
TM800	TABLES, ABRUPT EDGE AND PCMS DETAILS	NO EXCEPTION TAKEN
TM820	TEMPORARY BARRICADES	NO EXCEPTION TAKEN
TM840	CLOSURE DETAILS	NO EXCEPTION TAKEN
TM841	INTERSECTION WORK ZONES	NO EXCEPTION TAKEN
TM842	SIGNALIZED INTERSECTION DETAILS	NO EXCEPTION TAKEN
TM850	2-LANE, 2-WAY ROADWAYS	NO EXCEPTION TAKEN
DET4560	PAVEMENT MARKING DETAIL BLOCKS	NO EXCEPTION TAKEN

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:

AUGUST 2015

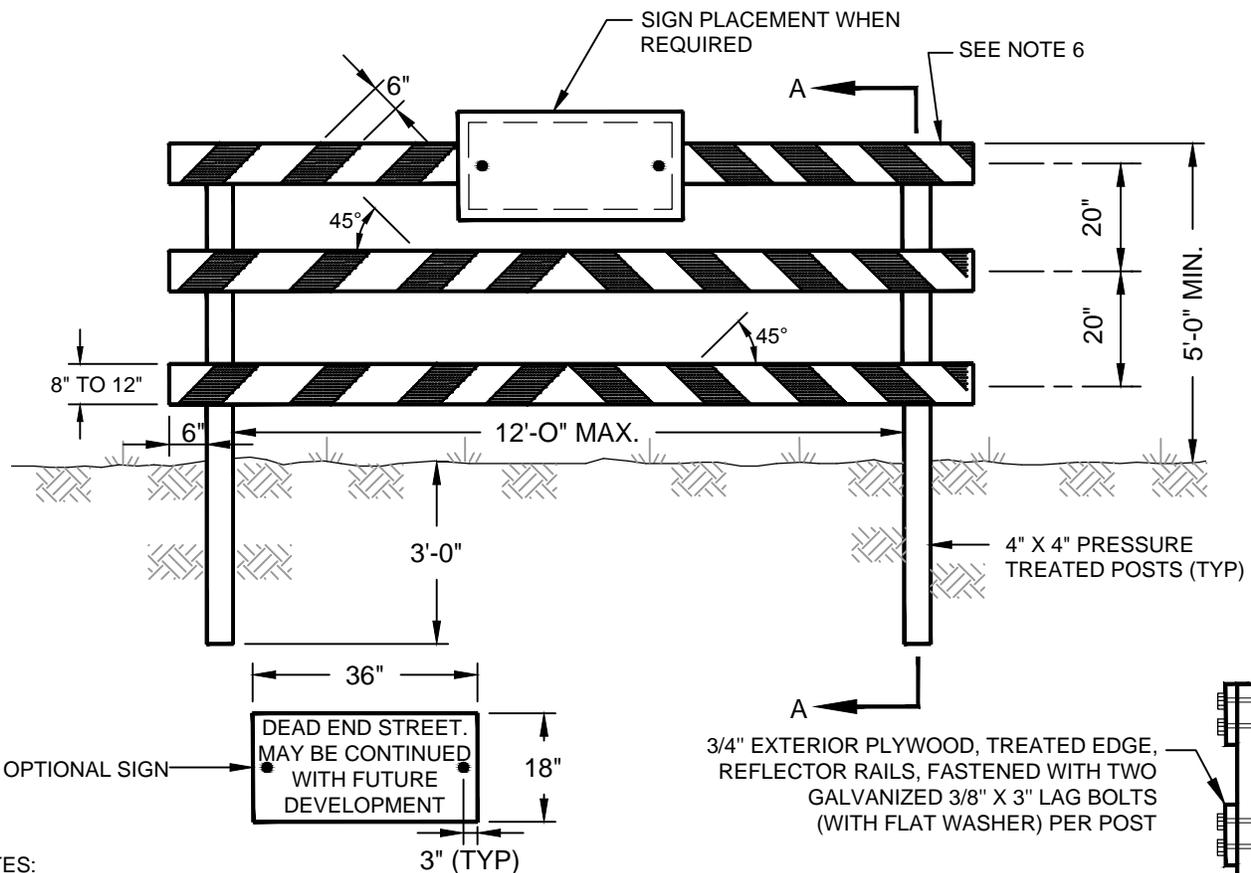
OSSC ACCEPTABLE
TRAFFIC STANDARD
DRAWINGS

CITY:

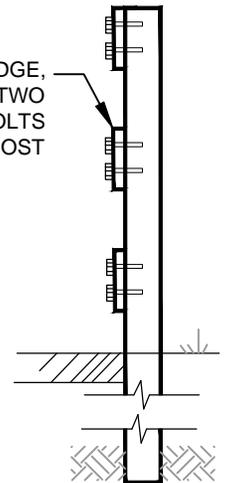
DUNDEE, OREGON

DRAWING NUMBER:

450



3/4" EXTERIOR PLYWOOD, TREATED EDGE, REFLECTOR RAILS, FASTENED WITH TWO GALVANIZED 3/8" X 3" LAG BOLTS (WITH FLAT WASHER) PER POST



SECTION A-A

NOTES:

1. BARRICADES SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS MODIFIED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT).
2. MARKINGS FOR BARRICADE RAILS SHALL BE ALTERNATE WHITE AND RED STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES), UTILIZE HIGH INTENSITY PRISMATIC REFLECTIVE SHEETING.
3. THE ENTIRE AREA OF WHITE AND RED STRIPES SHALL BE REFLECTIONIZED SO AS TO BE VISIBLE UNDER NORMAL ATMOSPHERIC CONDITIONS FROM A MINIMUM DISTANCE OF 1,000 FEET WHEN ILLUMINATED BY THE LOW BEAMS OF STANDARD AUTOMOBILE HEADLIGHTS. THE PREDOMINANT COLOR FOR OTHER BARRICADE COMPONENTS SHALL BE WHITE.
4. BARRICADE SECTION SHALL EXTEND ACROSS THE ENTIRE STREET AREA. WHERE BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, THE STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING. WHERE BOTH RIGHT AND LEFT TURNS ARE ALLOWED, THE CHEVRON STRIPING SHALL SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE. RAILS SHALL BE PLACED BOTH FRONT AND BACK OF BARRICADE IF REQUIRED FOR TWO-WAY TRAFFIC. RAILS SHALL BE THE SAME SIZE. FOR WIDER APPLICATIONS, MULTIPLE SECTIONS, SPACED NO FURTHER THAN 4" SHALL BE USED.
5. RAILS SHALL BE PLACED BOTH ON THE FRONT AND BACK OF THE BARRICADE IF REQUIRED FOR TWO-WAY TRAFFIC. RAILS SHALL BE THE SAME SIZE.
6. LUMBER SHALL BE STANDARD GRADE OR BETTER.
7. IF SIGN IS REQUIRED, FIELD DRILL TWO HOLES TO ACCOMMODATE GALVANIZED 3/8" MACHINE BOLT, WASHER AND NUT. THE SIGN SHALL BE INSTALLED SO THAT THE CENTER RAIL IS NOT COVERED.

FOR TEMPORARY BARRIER SEE WSDOT STANDARD PLAN H-2.

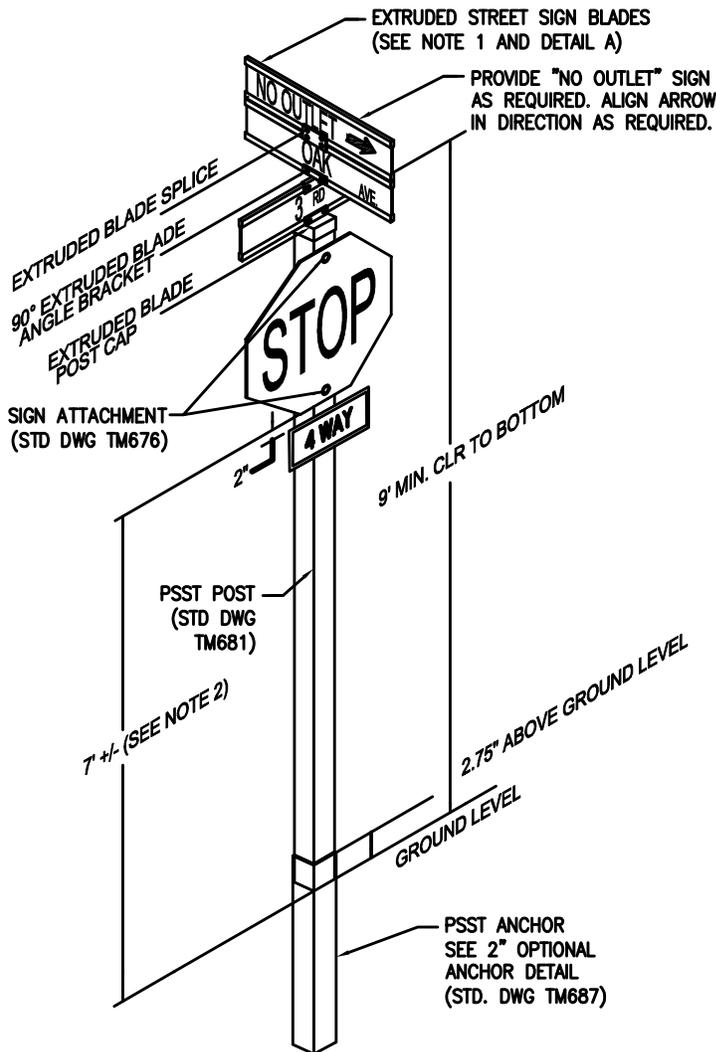
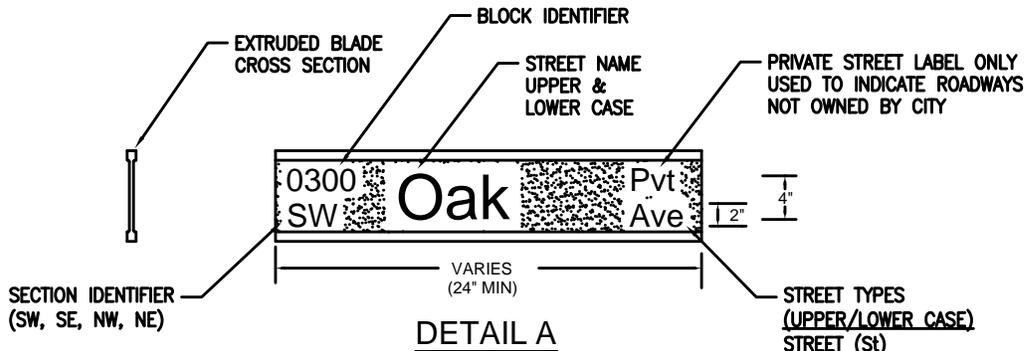
LAST REVISION DATE:

OCTOBER 2010

**STREET
BARRICADE**

CITY:
DUNDEE, OREGON

DRAWING NUMBER:
451



SIGN NOTES:

1. DOUBLE FACED ALUMINUM EXTRUDED BLADE STREET NAME SIGNS SHALL BE TYPE "G1" OR "G2" ON BOTH SIDES. SIZES SHALL BE STANDARD HEIGHTS OF 6", 30", 36", AND 42" UNLESS OTHERWISE SPECIFIED.
2. MINIMUM MOUNTING HEIGHT 6'-8" FOR PRIMARY SIGN AND 4'-0" FOR SECONDARY SIGN (SEE DRAWING RESTRICTIONS).
3. LETTERING ALL LETTERS AND NUMBERS USED TO FABRICATE A STREET NAME SIGN SHALL BE HIGH INTENSITY SILVER USING 3M SCOTCHLITE BRAND. THERE ARE TWO SIZES OF LETTERS THAT MAKE UP A STREET NAME SIGN. FOR PREFIXES, SUFFIXES, AND BLOCK NUMBERS A SERIES 'C' IS USED. THE ACTUAL NAME OF THE STREET IS A SERIES 'B'. ALL STREET NAME SIGNS SHALL HAVE BLOCK NUMBERS, AS ASSIGNED BY THE CITY, WHEN INSTALLED BY CONTRACTOR.
4. MISCELLANEOUS STREET NAMES SHALL BE APPROVED BY THE PLANNING COMMISSION PRIOR TO THE SIGNS BEING FABRICATED AND INSTALLED.
5. HOT DIP GALVANIZE AFTER FABRICATION STANDARD. CONFORM TO THE ASTM SPECIFICATIONS A123 FOR GALVANIZING.
6. ALL POSTS SHALL BE CAPPED AS APPROVED BY THE ENGINEER WHEN STREET NAME SIGNS ARE NOT REQUIRED.

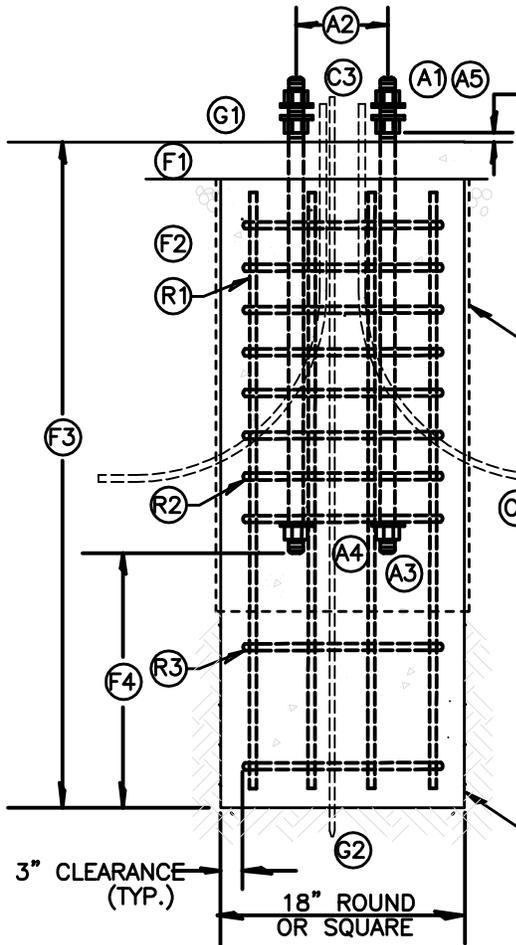
LAST REVISION DATE: AUGUST 2015	
STANDARD STREET SIGN	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 452

GROUND ROD

- G1.- MINIMUM 3" EXPOSURE AT TOP OF FOUNDATION, WITHIN BOLT CIRCLE.
- G2.- GROUND ROD SHALL BE MINIMUM 5/8" DIA. X 8 FT LONG, COPPER CLAD.

ANCHOR BOLTS

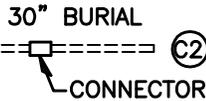
- A1.- (4) 1" Ø ASTM A449 ANCHOR BOLTS PER SPECIFICATIONS
- A2.- BOLT CIRCLE DIAMETER TO MATCH POLE BASEPLATE
- A3.- ANCHOR BOLTS SHALL HAVE HEADS, OR NUTS WITH THE THREADS STAKED AT TWO PLACES BELOW THE NUT, EMBEDDED IN FOUNDATION.
- A4.- ANCHOR BOLTS SHALL BE 39" LONG WITH 32" EMBEDMENT IN CONCRETE.
- A5.- 3/4" BOLT PROJECTION AS RECOMMENDED BY THE MANUFACTURER.



CONDUIT

- C1.- CONDUIT SHALL BE RGS IN CONCRETE WITH 6" MINIMUM STUB-OUT.
- C2.- SERVICE AND FEED CONDUITS SHALL BE RGS OR PVC, AS REQUIRED.
- C3.- STUB UP TO WITHIN 4" FROM HAND HOLE.

POUR FOOTING USING SONOTUBE (48" MIN. DEPTH)



REINFORCEMENT

- R1.- VERTICAL REBAR SHALL BE 7-#6 EQUALLY SPACED INSIDE OF HOOPS.
- R2.- HOOPS SHALL BE #4 X 12" O.D., SPACED 4" O/C FROM TOP OF FOUNDATION TO END OF ANCHOR BOLTS.
- R3.- HOOPS SHALL BE #4 X 12" O.D., SPACED 12" MIN. FROM THE ANCHOR BOLTS TO BOTTOM OF FOUNDATION.

POUR FOOTING AGAINST UNDISTURBED MATERIAL

NOTE

90 DEGREE BENDS IN ANCHOR BOLTS WILL NOT BE PERMITTED.

FOUNDATION

- F1.- THE TOP 3 1/2" OF FOUNDATIONS SHALL BE INTEGRATED INTO SIDEWALK.
- F2.- THE FOUNDATION SHALL CURE A MINIMUM OF FOURTEEN (14) DAYS PRIOR TO POLE INSTALLATION OR TORQUING OF THE ANCHOR BOLTS.
- F3.- FOUNDATION DEPTH (PD) :
 21 FOOT POLES 60" DEEP
 30 FOOT POLES 84" DEEP (AVER. SOIL) 102" DEEP (POOR SOIL)
- F4.- THERE SHALL BE A MINIMUM OF 17" FOUNDATION BELOW THE ANCHOR BOLT HEADS.

**18" CAST-IN-PLACE
STREET LIGHT POLE
FOUNDATION**

LAST REVISION DATE:

AUGUST 2015

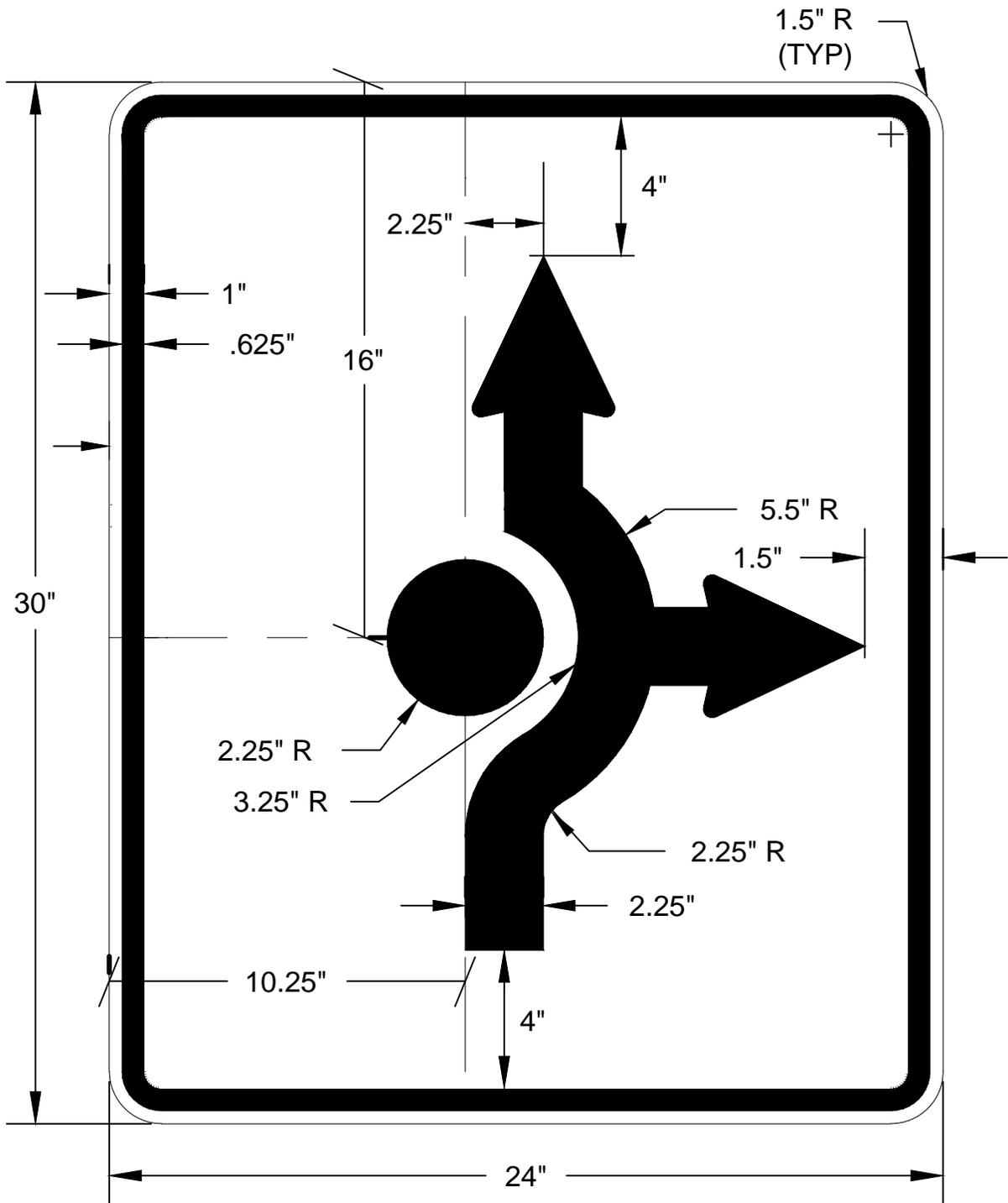
DOWNTOWN LIGHT
POLE BASE
(HIGHWAY 99W)

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

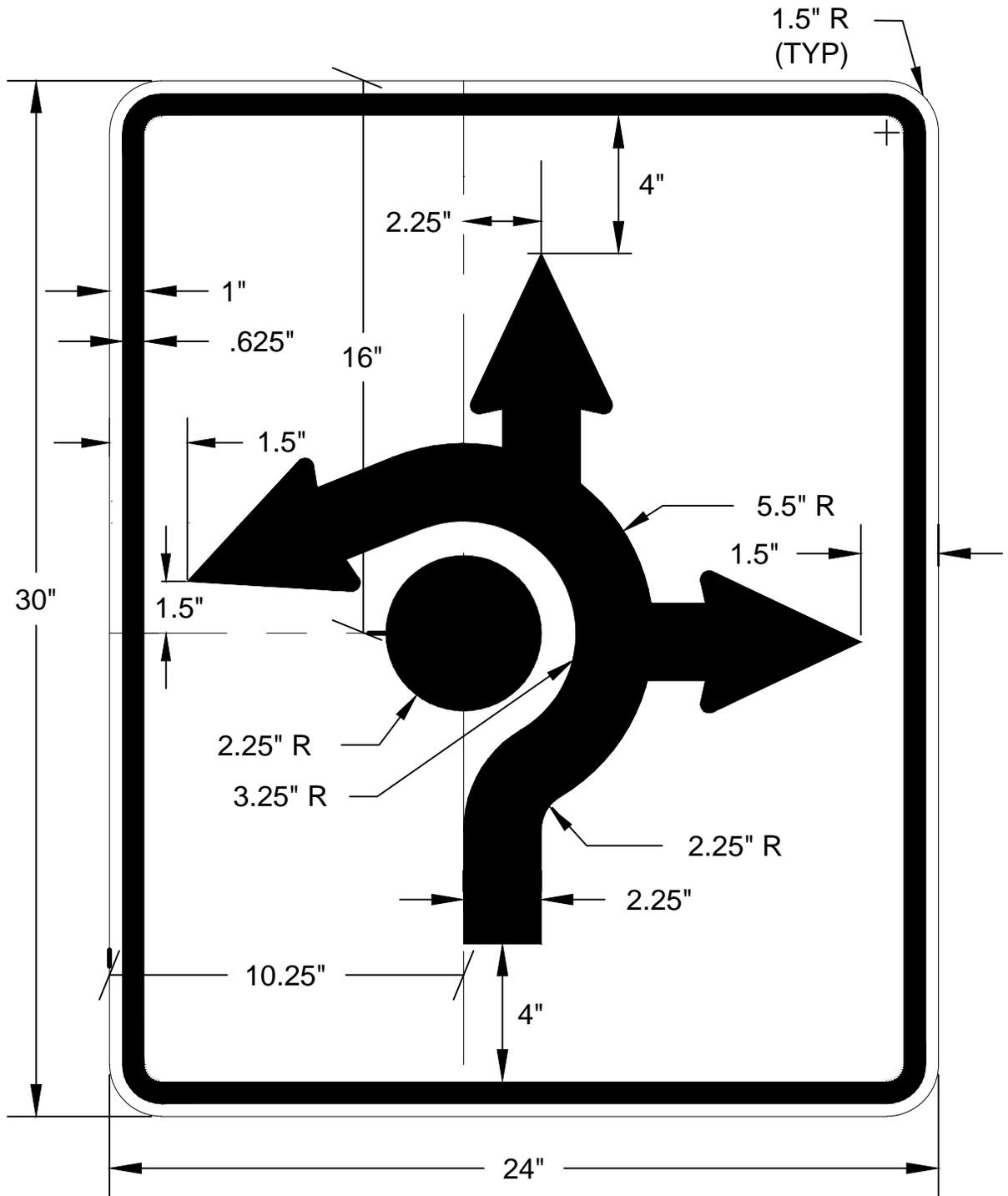
453



* BLACK LEGEND ON
 WHITE BACKGROUND
 (REFLECTORIZED)

SEE DETAIL 413 FOR
 ARROWHEAD DIMENSIONS

LAST REVISION DATE: OCTOBER 2010	
TRAFFIC CIRCLE SIGN DETAIL 2	
CITY: DUNDEE, OREGON	DRAWING NUMBER: 462



*BLACK LEGEND ON
WHITE BACKGROUND
(REFLECTORIZED)

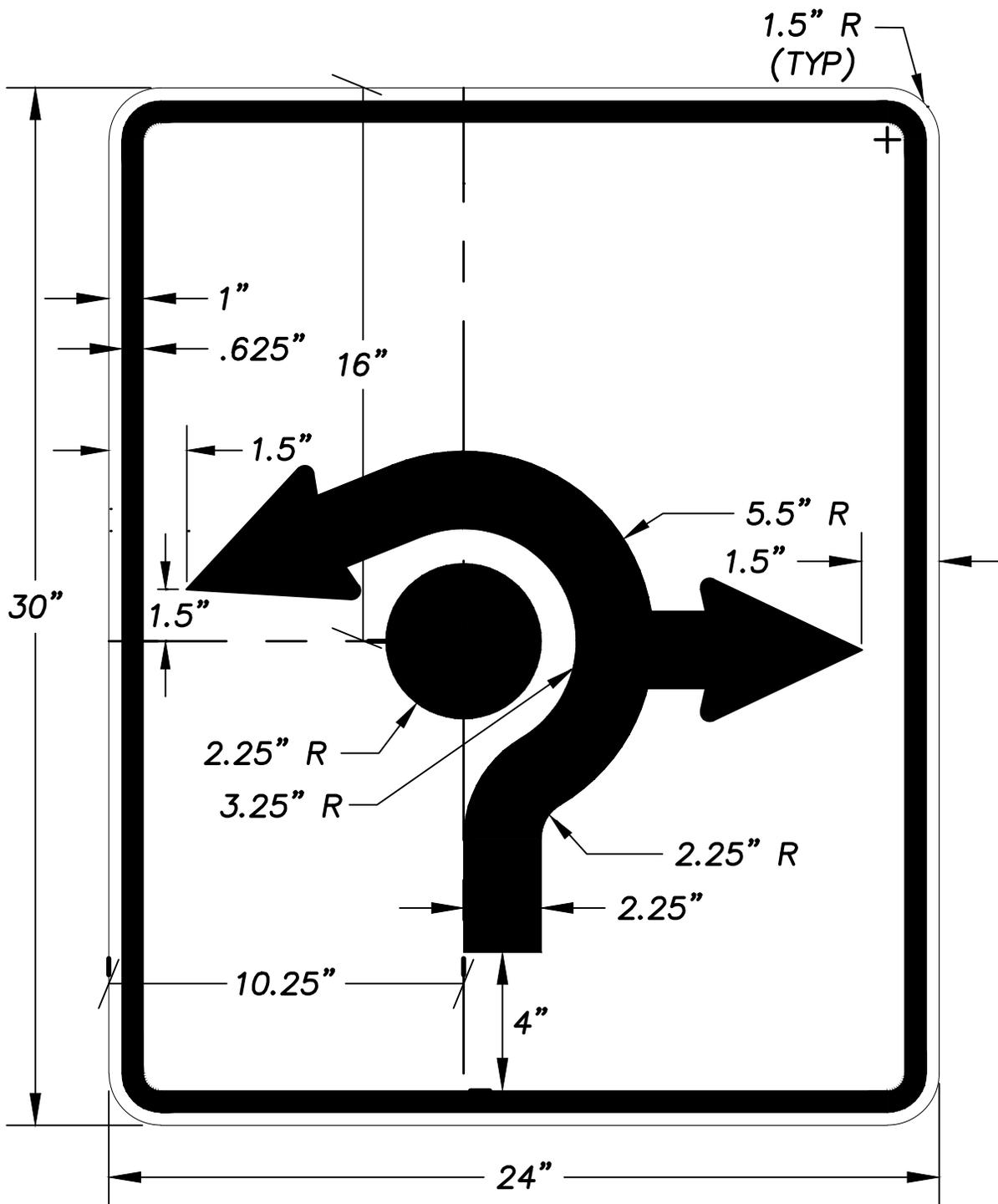
SEE DETAIL 413 FOR
ARROWHEAD DIMENSIONS

LAST REVISION DATE:
OCTOBER 2010

TRAFFIC CIRCLE
SIGN DETAIL 3

CITY:
DUNDEE, OREGON

DRAWING NUMBER:
463



*** BLACK LEGEND ON
WHITE BACKGROUND
(REFLECTORIZED)**

**SEE DETAIL 413 FOR
ARROWHEAD DIMENSIONS**

LAST REVISION DATE:

OCTOBER 2010

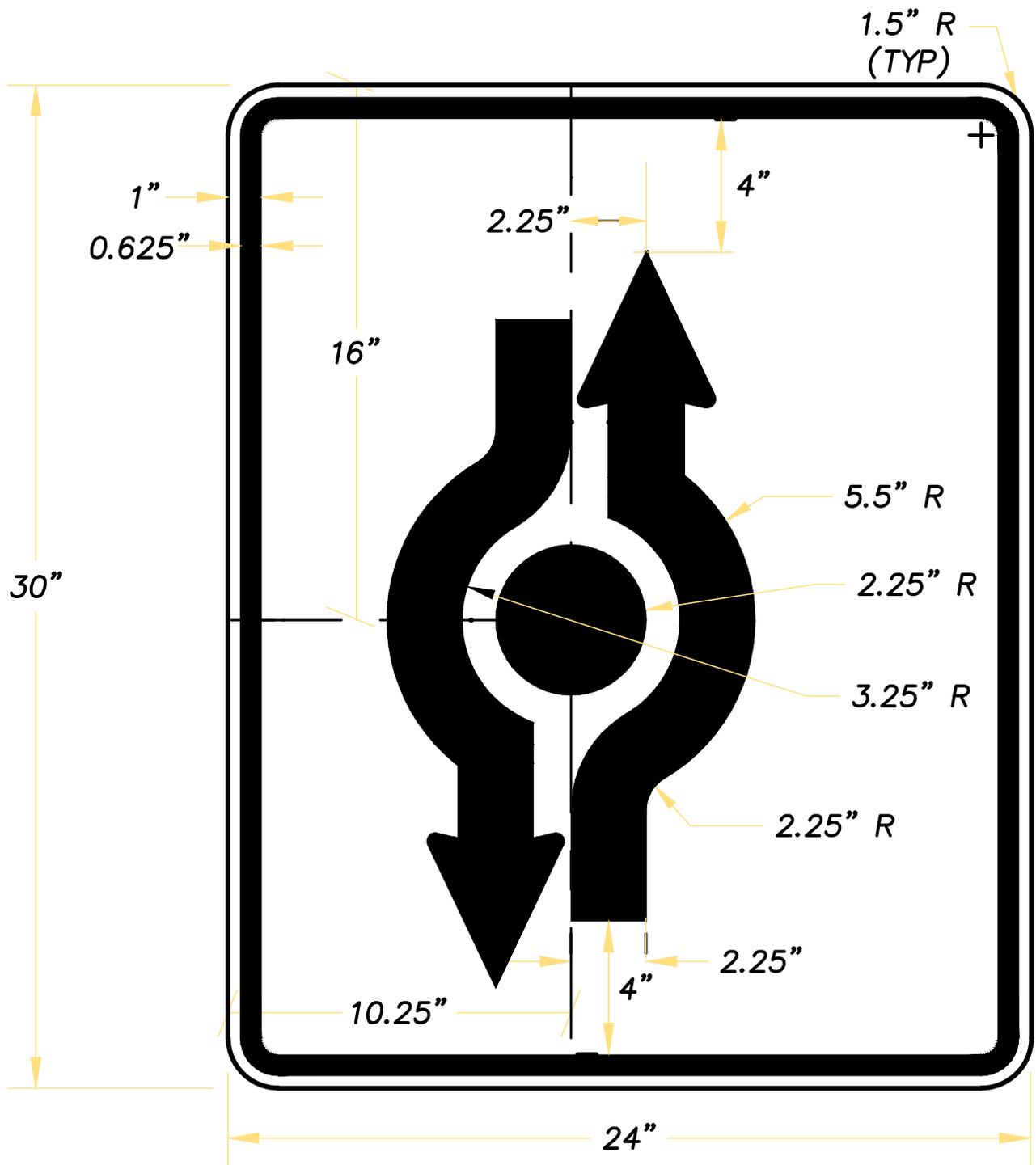
TRAFFIC CIRCLE
SIGN DETAIL 4

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

464



*** BLACK LEGEND ON
WHITE BACKGROUND
(REFLECTORIZED)**
**SEE DETAIL 413 FOR
ARROWHEAD DIMENSIONS**

LAST REVISION DATE:

OCTOBER 2010

TRAFFIC CIRCLE
SIGN DETAIL 5

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

465

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NO.	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
RD300	TRNCH BACKFILL, BEDDING, PIPEZONE AND MULTIPLE INSTALLATIONS.	NO EXCEPTION TAKEN
RD302	STREET CUT	NO EXCEPTION TAKEN
RD306	CONCRETE ENCASEMENT, CRADLE AND CAP DETAILS	NO EXCEPTION TAKEN
RD308	BORE CASING DETAIL	NO EXCEPTION TAKEN
RD310	SHALLOW/DEEP TRENCH SERVICE CONNECTION, BLOCKING AND MARKERS	NO EXCEPTION TAKEN
RD335	STANDARD STORM SEWER MANHOLES	FLAT TOP MANHOLES TO BE USED FOR ALL MANHOLES LESS THAN 6 FEET FROM RIM TO INVERT
RD336	STANDARD MANHOLE DETAILS	NO EXCEPTION TAKEN
RD339	PIPE TO STRUCTURE CONNECTIONS	NO EXCEPTION TAKEN
RD342	SHALLOW MANHOLES	NO EXCEPTION TAKEN
RE343	24 INCH MANHOLES	ALTERNATE B ONLY, ALTERNATE IS NOT PERMITTED
RD344	STANDARD MANHOLE BASE SECTION	NO EXCEPTION TAKEN
RD346	LARGE PRECAST MANHOLE	NO EXCEPTION TAKEN
RD354	CARRY-THROUGH MANHOLE	NO EXCEPTION TAKEN
RD356	MANHOLE FRAMES AND COVERS	NO EXCEPTION TAKEN
RD360	MANHOLE FRAME ADJUSTMENT	NO EXCEPTION TAKEN
RD364	CONCRETE INLETS TYPE G-1, G-2, G-2M & G-2MA	NO EXCEPTION TAKEN
RD365	FRAMES & GRATES FOR CONCRETE INLETS	NO EXCEPTION TAKEN
RD368	CONCRETE INLETS TYPE M-E, M-O, B & B-SL	NO EXCEPTION TAKEN
RD370	DITCH INLET TYPE D	NO EXCEPTION TAKEN
RD371	CONCRETE INLET BASE TYPE CG-3	NO EXCEPTION TAKEN
RD372	CONCRETE INLET TOP, OPTION 1 TYPE CG-3	NO EXCEPTION TAKEN
RD376	MISCELLANEOUS DRAINAGE STRUCTURES, SIPHON BOX, INLET CAP & INLET ADJUSTMENT	SIPHON BOX NOT PERMITTED

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:

AUGUST 2015

OSSC ACCEPTABLE
STORM STANDARD
DRAWINGS

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

500

THE FOLLOWING LATEST VERSION OF THE OREGON STANDARD DRAWINGS PUBLISHED BY APWA/ODOT SHALL BE USED AS A CITY OF DUNDEE STANDARD WITH DUNDEE SPECIFIC REQUIREMENTS IN PARENTHESES:

OSSC STANDARD DRAWING NO.	OSSC STANDARD DRAWING NAME	DUNDEE EXCEPTION TO DRAWING
RD1000	CONSTRUCTION ENTRANCE	NO EXCEPTION TAKEN
RD1005	CHECK DAMS TYPES 1, 3 AND 4	NO EXCEPTION TAKEN
RD1006	CHECK DAMS TYPE 2 AND 6	NO EXCEPTION TAKEN
RD1010	INLET PROTECTION TYPE 2, 3, 6 AND 7	NO EXCEPTION TAKEN
RD1015	INLET PROTECTION TYPE 4	NO EXCEPTION TAKEN
RD1030	SEDIMENT BARRIER TYPE 2, 3 AND 4	NO EXCEPTION TAKEN
RD1032	SEDIMENT BARRIER TYPE 8	NO EXCEPTION TAKEN
RD1040	SEDIMENT FENCE	NO EXCEPTION TAKEN
RD1055	SLOPE AND CHANNEL MATTING	NO EXCEPTION TAKEN
RD1060	TIRE WASH FACILITY TYPE 1 AND 2	NO EXCEPTION TAKEN
RD1065	SEDIMENT TRAP	NO EXCEPTION TAKEN
RD1070	CONCRETE TRUCK WASH OUT	NO EXCEPTION TAKEN

STANDARD DRAWING PUBLISHED BY APWA/ODOT NOT LISTED SHALL NOT BE USED WITHOUT PRIOR APPROVAL BY THE PUBLIC WORKS DEPARTMENT

LAST REVISION DATE:

AUGUST 2015

OSSC ACCEPTABLE
EROSION CONTROL
STANDARD DRAWINGS

CITY:

DUNDEE, OREGON

DRAWING NUMBER:

600

APPENDIX B - STANDARD CONSTRUCTION NOTES:

GENERAL NOTES:

1. Contractor shall procure and conform to all construction permits required.
2. Contractor shall procure a right-of-entry permit from ODOT State Highway Division for all work within the State right-of-way and conform to all conditions of the permit.
3. Contractor shall procure a right-of-entry permit from affected railroads for all work within the railroad right-of-way and conform to all conditions of the permit.
4. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction.
5. All materials and workmanship for facilities in street right-of-way or easements shall conform to approving agencies' construction specifications wherein each has jurisdiction, including but not limited to the City, County, Oregon Health Division (OHD) and the Oregon Department of Environmental Quality (DEQ).
6. Unless otherwise approved by the Public Works Supervisor, construction of all public facilities shall be done between:
 - 7:00 a.m. to 8:00 p.m. Pacific Standard Time, Mondays – Fridays;
 - 7:00 a.m. to 9:00 p.m. Pacific Daylight Time, Mondays – Fridays;
 - 9:00 a.m. to 6:00 p.m. Pacific Standard Time, on Saturdays; and
 - 9:00 a.m. to 7:00 p.m. Pacific Daylight Time, on Saturdays.Per city ordinance 8.16.030 Noise
7. The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet applicable agency requirements and provide a completed project.
8. Contractor to notify City, County, ODOT and all utility companies a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other requirements of ORS 757.541 to 757.571.
9. Any inspection by the City, County or other agencies shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the applicable codes and agency requirements.
10. Contractor shall erect and maintain barricades, warning signs, traffic cones per City, County and ODOT requirements in accordance with the MUTCD (including Oregon amendments). Access to driveways shall be maintained at all times. All traffic control measures shall be approved and in place prior to any construction activity.
11. Record Drawings. The Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record any approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered. These field record drawings shall be kept up to date at all times and shall be available for inspection by the City upon request.
12. Upon completion of construction of public facilities, Contractor shall submit a clean set of field record drawings containing all as-built information to the Design Engineer for use in the preparation of As-Built drawings for submittal to the City.
13. The Contractor shall submit a suitable maintenance bond prior to final payment where required by public and/or private agencies having jurisdiction.
14. Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more is disturbed.

15. Elevations shown on the drawings are based from _____(City; OSHD, etc) Bench Mark_____, Elevation_____ (adjusted _____), consisting of a_____(brass cap; monument, etc) Located at_____, *which is based on the NVGD 1929 datum corresponding to the FEMA flood map elevations.*

EXISTING UTILITIES & FACILITIES:

16. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232-1987).
17. The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify sizes and locations of all existing utilities prior to construction.
18. The Contractor shall locate and mark all existing property and street monuments prior to construction. Any monuments disturbed during construction of the project shall be replaced by a Registered Land Surveyor at the Contractor's expense. The monuments shall be replaced within a maximum of 90 days, and the County Surveyor shall be notified in writing as required by ORS 209.150.
19. Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non-invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade modifications without delaying the work. If grade modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer shall obtain approval from the City Engineer prior to construction.
20. All existing facilities shall be maintained in-place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better-than-original condition and to the satisfaction of the City Engineer.
21. Utilities, or interfering portions of utilities, that are abandoned in place shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities.
22. Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.
23. Any septic tanks encountered during construction shall be pumped out. Contractor shall break bottom of tank: out and backfill with pea gravel unless otherwise required by public agencies having jurisdiction. Septic tank removal to be in accordance with County sanitarian requirements.
24. Any wells encountered shall be abandoned per state of Oregon water resources department requirements.
25. Any fuel tanks encountered shall be removed and disposed of per State of Oregon OEQ requirements. Backfill with compacted granular material.

GRADING, PAVING & DRAINAGE:

26. Contractor to review soils report prepared by _____, and conform to all recommendations listed in the report.
27. The Contractor shall be responsible for managing construction activities to insure that public streets and right-of-ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.
28. Unless otherwise noted, all grading, rocking and paving to conform to ODOT Specifications, 2008 edition.
29. Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as approved by the engineer or as shown on the drawings. Protect all roots two inches in diameter or larger.
30. Strip work limits, removing all organic matter which cannot be compacted into a stable mass. All trees, brush and debris associated with clearing, stripping or grading shall be removed and disposed of off-site.
31. Immediately following fine grading operations, compact subgrade to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Subgrade must be inspected and approved by the City prior to placing embankments or base rock.
32. All fill within public right-of-ways and easements shall be engineered. Additionally, any fill outside of public right-of-ways which is over 2 feet in depth shall be engineered. Engineered fill shall be constructed in 6" lifts. Each lift shall be compacted to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).
33. Unless otherwise shown on the drawings, straight grades shall be run between all finish grade elevations and/or finish contour lines shown. Finish pavement grades at transition to existing pavement shall match existing pavement grades or be feathered past joints with existing pavement as required to provide a smooth, free draining surface.
34. Crushed rock shall conform to the requirements of ODOT 02630.10 (Dense Graded Base Aggregate). Compact to 95% of the maximum dry density per AASHTO T-180 test method (Modified Proctor). Prior to placing AC pavement, written compaction test results for baserock and trench backfill must be received by the City, and a proof-roll (witnessed by the City) must be performed.
35. A.C. Pavement shall conform to section 00745 (Asphalt Concrete Pavement) ODOT Standard Specifications for standard duty mix. AC Pavement shall be compacted to a minimum of 91% of maximum density as determined by the Rice standard method.
36. Paving of streets shall not be allowed until after completion of all required testing and inspection of new water, sewer and storm drain lines under paved areas, and review and approval of the private (franchise) utility plans by the City Engineer.
37. All existing or constructed manholes, cleanouts, monuments, gas valves, water valves and similar structures shall be adjusted to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie.
38. Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V.

39. All planter areas shall be backfilled with approved top soil minimum 8" thick. Stripping materials shall **not** be used for planter backfill.
40. Contractor shall hydroseed all exposed slopes and disturbed areas which are not scheduled to be landscaped.
41. Grading shown on the drawings is critical to functioning of detention system and shall be strictly followed.
42. Contractor shall coordinate and ensure that detention pond volumes are inspected and approved by public agencies having jurisdiction prior to paving and landscaping.

CURBS & SIDEWALKS:

43. Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.
44. Contractor shall provide minimum 2-weep holes per lot in curb to provide for lot drainage. One weep hole shall be located 5 feet from the property line on the low point in the lot frontage. Weep holes shall also be provided as required for additional drainpipes shown on the drawings. Contractor shall install drainpipe (smooth wall PVC or ABS) from each weep hole to the back of sidewalk location prior to acceptance of the curbing by the City, and shall connect to existing drain piping where such piping exists within or adjacent to the right-of-way or easement.
45. Curbs shall be stamped with an 'S', 'D' or a 'W' at the point where each sanitary sewer, storm drain or water service lateral crosses the curb, respectively. Letters shall be a minimum of 2 inches high.
46. Contractor shall construct handicap access ramps at all intersections in accordance with current ADA requirements.
47. Sidewalks and driveways shall be constructed to the full thickness shown.
48. Where trench excavation requires removal of PCC curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut and removed at a tooled joint unless otherwise authorized in writing by the City. The sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

PIPED UTILITIES:

49. Contractor shall coordinate and pay all costs associated with connecting to existing water, sanitary sewer and storm sewer facilities.
50. Unless otherwise noted, materials and workmanship for water, sanitary sewer and storm sewer shall conform to ODOT Specifications, 2008 edition.
51. The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.
52. **Bedding and Backfill.** All pipes shall be bedded with minimum 6-inches of 3/4" minus crushed rock bedding and backfilled with compacted 3/4" minus crushed rock in the pipe zone (crushed rock shall extend a minimum of 12-inches over the top of the pipe in all cases). Crushed rock trench backfill shall be used under all improved areas, including

sidewalks. Granular trench backfill shall be compacted to 92% of the maximum dry density per AASHTO T-180 test method (Modified Proctor).

53. Contractor shall arrange for and pay all costs to abandon existing sewer and water services not scheduled to remain in service.
54. All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.
55. The end of all utility stubs shall be marked with a painted 2-x-4 (white for sanitary sewer, green for storm) and wired to pipe stub. Type of utility (i.e. sewer, storm, etc) and depth below grade to pipe invert shall be clearly labeled on the marker post.
56. Contractor shall provide all materials, equipment and facilities required for testing all utility piping in accordance with City construction specifications.
57. **Tracer Wire.** All non-metallic water, sanitary and storm sewer piping located outside of the public right-of-way or not laid in straight lines between structures shall have an electrically conductive insulated 12 gauge copper tracer wire the full length of the installed pipe using blue wire for water and green for storm and sanitary piping. Tracer wire shall be extended up into all valve boxes, and manholes and catch basins. Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole.
58. **Warning Tape.** Detectable or non-detectable acid and alkali resistant safety warning tape shall be provided along the full length of all sanitary sewer and storm drain service laterals and along all water, sanitary sewer and storm drain mainline segments not located under sidewalks or paved portions of public streets. Underground warning tape shall be continuous the entire length of service laterals installed from the mainline to the back of the PUE.
59. No trenches in roads or driveways shall be left in an open condition overnight. All such trenches shall be closed before the end of each work day and normal traffic flows restored.

WATER:

60. City forces to operate all valves, including fire hydrants, on existing public mains.
61. All water mains shall be Class 52 ductile iron. All fittings 4-inches through 24-inches in diameter shall be ductile iron fittings in conformance with AWWA C-153 or AWWA C-110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24 inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.
62. All water mains to be installed with a minimum 36 inch cover to finish grade unless otherwise noted or directed. Service lines to be installed with a minimum 30 inches cover within the right-of-way. Deeper depths may be required as shown on the drawings or to avoid obstructions.
63. Thrust restraint shall be provided on all bends, tees and other direction changes per local jurisdiction requirements and as specified or shown on the drawings. Unless otherwise approved by the City Engineer, all valves shall be flange connected to adjacent tees or crosses.

64. Water service pipe on the public side of the meter shall be Type K soft copper tubing conforming to ASTM B-88.
65. Unless otherwise noted, water service pipe on the private side of the meter shall be Schedule 40 PVC.
66. Domestic and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction.
67. Contractor shall install temporary plug and blowoff as required at the end of waterline for flushing, testing and chlorination.
68. The work shall be performed in a manner designated to maintain water service to buildings supplied from the existing waterlines. In no case shall service to any main line or building be interrupted for more than four (4) hours in any one day. Contractor shall notify the City and all affected residents and businesses a minimum of 24 business hours (1 business day) prior to any interruption of service.
69. **Sanitary Sewer & Waterline Crossings.** Where sanitary sewer lines cross above or within 18-inches vertical separation below a waterline, sewer mains and/or laterals shall be replaced with C-900 PVC pipe (DR 18) at the crossing in conformance with OAR 333. Center one full length of AWWA C-900 PVC pipe at point of crossing. Connect to existing sewer lines with approved rubber couplings. *Note: For an 8-inch waterline with 36-inches cover, lateral inverts within 5.67 feet (68-inches) of finish grade must be C-900 PVC.*

SANITARY SEWER:

70. Unless otherwise shown, sanitary sewer pipe shall be PVC in conformance with ASTM 03034, SDR 35. All other appurtenances and installation to conform to the City specifications.
71. All precast manholes shall be provided with integral rubber boots. Where manholes with integral rubber boots are not used, a shear joint shall be provided on all mainlines within 1.5 feet of the outside face of the manhole. Lockdown lids required on all manholes outside of public right-of-way.
72. Openings for connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. Connections to be watertight and shall provide a smooth flow into and through the manhole. Small chipping hammers or similar light tools which will not damage or crack the manhole base may be used to shape channels. Use of large pneumatic jackhammers shall be prohibited. Unless otherwise approved in writing by the City Engineer, manhole steps shall be installed in any manhole tapped which does not have existing steps.
73. **Leakage Testing.** Sanitary sewer pipe and appurtenances shall be tested for leakage. Leakage tests shall include an air test of all sewer mains and laterals prior to paving, and a separate air test of all sewer mains and laterals following excavation and backfilling of any franchise utility trenches or other utility work that crosses sanitary sewer laterals. All manholes shall be vacuum tested following completion of paving or final surface restoration. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS.
74. **Cleaning.** Prior to mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from the mainlines and manholes. Failure to clean all dirt,

rock and debris from pipelines prior to TV inspection will result in the need to re-clean and re-TV the sewer lines.

75. **Mandrel Testing.** Contractor shall conduct deflection test of flexible sanitary sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.
76. **TV Inspection.** Upon completion of all sewer construction, testing and repair, the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with ODOT 00445.74 to determine compliance with grade requirements of ODOT 00445.40.b. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on DVD. Unless otherwise approved in writing by the Public Works Supervisor, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection to determine the depth of any standing water. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The DVD and written report shall be delivered to the City.
77. Prior to or concurrent with connection to a sanitary sewer lateral, it shall be demonstrated to the City that the sewer lateral is not obstructed. This shall be accomplished by "snaking" the service lateral downstream of the connection point to the mainline, or similar method acceptable to the City. City personnel or authorized agent shall be present during the "snaking" or other demonstration method.

STORM DRAIN:

78. Storm drain pipe materials to conform to the construction drawings and City requirements. Contractor shall use uniform pipe material on each pipe run between structures unless otherwise directed or approved. Jointed HDPE pipe shall not be used for slopes exceeding ten percent (10%).
79. Catch basins and junction boxes shall be set square with buildings or with the edge of the parking lot or street wherein they lie. Storm drain inlet structures and paving shall be adjusted so water flows into the structure without ponding water.
80. Unless otherwise approved by the City Engineer, all storm drain connections shall be by manufactured tees or saddles.
81. Sweep (deflect) storm drain pipe into catch basins and manholes as required. Maximum joint deflection shall not exceed 5 degrees or manufacturers recommendations, whichever is less.
82. Unless otherwise specified or directed, install storm drain pipe in accordance with manufacturer's installation guidelines.
83. Cleaning. Prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.
84. Mandrel Testing. Contractor shall conduct deflection test of flexible storm sewer pipes by pulling an approved mandrel through the completed pipe line following trench compaction. The diameter of the mandrel shall be 95% of the initial pipe diameter. Test shall be conducted not more than 30 days after the trench backfilling and compaction has been completed.

STREET LIGHTS:

85. Street lights shall be installed after all other earthwork and public utility installations are completed and after rough grading of the property is accomplished to prevent damage to the poles.
86. Street lights poles shall be set to a depth as specified by the manufacturer, but not less than 5 feet.
87. Street light poles shall be installed within one degree ($\pm 1^\circ$) of plumb.

PRIVATE UTILITIES:

88. Unless otherwise shown on the drawings and approved in writing by all jurisdictions having authority, new and relocated private utilities (power, cable TV, telephone & gas) shall be installed underground in conjunction with the development.
89. Contractor shall coordinate with gas, power, telephone, and cable TV company for location of conduits in common trenches, as well as location of vaults, pedestals, etc. Unless otherwise approved in writing by the City, all above-grade facilities shall be located in PUEs (where PUEs exist or will be granted by the development), and otherwise shall be placed in a location outside the proposed sidewalk location. Installation of private utilities in a common trench with or within 3 feet horizontally of paralleling water, sanitary sewer or storm drains is prohibited.
90. Power, telephone and TV trenching and conduits shall be installed per utility company requirements with pull wire. Contractor shall verify with utility company for size, location and type of conduit prior to construction, and shall ensure that trenches are adequately prepared for installation per utility company requirements. All changes in direction of utility conduit runs shall have long radius steel bends.
91. Contractor shall notify and coordinate with private utilities for relocation of power poles, vaults, etc. to avoid conflict with City utility structures, fire hydrants, meters, sewer or storm laterals, etc.

EROSION CONTROL NOTES:

92. Approval of this erosion/sedimentation control (ESC) plan does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.)
93. The implementation of these ESC plans and the construction, maintenance, replacement and upgrading of these ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation landscaping is established.
94. The boundaries of the clearing limits shown on this plan shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing limits shall be permitted. The flagging shall be maintained by the applicant/contractor for the duration of construction.
95. The ESC facilities shown on this plan must be constructed in conjunction with all clearing and grading activities, and in such a manner as to insure that sediment and

sediment laden water do not enter the drainage system, roadways, or violate applicable water standards.

96. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and to ensure that sediment and sediment laden water do not leave the site.
97. The ESC facilities shall be inspected daily by the applicant/contractor and maintained as necessary to ensure their continued functioning.
98. The ESC facilities on inactive sites shall be inspected and maintained a minimum of once a month or within the 48 hours following a storm event.
99. At no time shall more than one foot of sediment be allowed to accumulate within a trapped catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.
100. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to insure that all paved areas are kept clean for the duration of the project.

Sediment Fences

101. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6 inch overlap, and both ends securely fastened to the post.
102. The filter fabric fence shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 18 inches.
103. The standard strength filter fabric shall be fastened securely to stitched loops installed on the upslope side of the posts, and 6 inches of the fabric shall be extended into the trench. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to the existing trees.
104. Sediment fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.
105. Sediment fences shall be inspected by applicant/contractor immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

Gravel Construction Entrances

106. The area of the entrance shall be cleared of all vegetation, roots, and other objectionable material. The gravel shall be placed to the specified dimensions.
107. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public right-of-way.
108. The entrance may require periodic top dressing with 2" stone as conditions demand, and repair and/or cleanout of any structures used to trap sediment.
109. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately.

APPENDIX C – UTILITY COMPANIES AND AGENCIES:

The following is a summary list of utility companies with utilities within the City, as well as public agencies with jurisdiction within the City. This summary is not necessarily complete or up to date, and is included solely for benefit of the developer, and is not intended to indicate all utilities or agencies which must be contacted or from which approvals must be obtained.

CATEGORY	UTILITY / AGENCY	PHONE #/ CONTACT NAME	ADDRESS
City Hall	Dundee City Hall	(503) 538-3922	PO Box 220 620 SW 5th Street Dundee, Oregon 97115
City Utilities	Dundee Public Works	(503) 538-6700	PO Box 220 620 SW 5th Street Dundee, Oregon 97115
City Planner	Dundee Public Works	503-538-3922 Jessica Nunley	PO Box 220 759 N. Highway 99W Dundee, OR 97115
Fire Chief	Dundee Fire Department	(503) 554-8442 John Stock	PO Box 220 759 N. Highway 99W Dundee, OR 97115
Gas	NW Natural Gas	(503) 721-2449	220 NW 2nd Ave Portland, Oregon 97209
Power	PGE	(503) 463-4321	121 SW Salmon Street Portland, OR 97204
Telephone	Frontier		
TV	Comcast	(503) 605-6158	
Oregon State Highway	ODOT District 3	(503) 378-2874	
County Roads	Yamhill County Public Works	(503) 434-7515	2060 Lafayette Avenue McMinnville, OR 97128
Sanitary Sewer	Dept of Environmental Quality (DEQ) Western Region	(503) 378-8240	750 Front St. NE, Suite 120 Salem, OR 97301-1039
Water System	Oregon Health Division (OHD) Drinking Water Section	503-434-7439	DHS-Drinking Water Program PO Box 14450 Portland, OR 97293-0450