

**RESOLUTION No. 22/23-13
CITY OF DAYTON, OREGON**

A Resolution Adopting Public Works Design Standards Update No. 14

WHEREAS, on October 6, 2006, the Dayton City Council adopted Resolution No. 06/07-11, A Resolution Adopting City of Dayton Public Works Design Standards (hereafter called "Standards"), and amended on February 5, 2007, by Resolution No. 06/07-27, A Resolution Adopting Public Works Design Standards Update No. 1; and on January 7, 2008, by Resolution No. 07/08-17, A Resolution Adopting Public Works Design Standards Update #2; and Resolution No. 07/08-31, A Resolution Adopting Public Works Design Standards Update #3; and Resolution No. 09/10-31, A Resolution Adopting Public Works Design Standards Update #4; and Resolution No. 12/13-35, A Resolution Adopting Public Works Design Standards Update #5; and Resolution No. 13/14-5, A Resolution Adopting Public Works Design Standards Update #6; and Resolution No. 15/16-10 A Resolution Adopting Public Works Design Standards Update #7; and Resolution No. 17/18-9 A Resolution Adopting Public Work Design Standards Update #8; and Resolution No. 19/20-2 A Resolution Adopting Public Work Design Standards Update #9; and Resolution No. 19/20-19 A Resolution Adopting Public Work Design Standards Update #10; and Resolution No. 20/21-12 A Resolution Adopting Public Work Design Standards Update #11; and Resolution No. 21/22-29 A Resolution Adopting Public Work Design Standards Update #12; and on October 17, 2022 by Resolution No. 22/23-04 A Resolution Adopting Public Work Design Standards Update #13; and

WHEREAS, the Standards are subject to change as both the City's needs change and the industry standards change, or if errors are discovered in the document; and

WHEREAS, certain information in the Standards needs to be updated or changed.

The City of Dayton resolves as follows:

- 1) **THAT** Update No. 14 to the City of Dayton Public Works Design Standards, (attached hereto as Exhibit A and by this reference incorporated herein) is hereby adopted; and
- 2) **THAT** this resolution shall become effective immediately upon adoption.


ADOPTED this 5th day of June 2023.

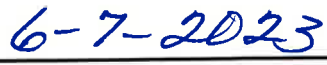
In Favor: Mackin, Frank, Sandoval-Perez, Maguire, Marquez, Wildhaber, and Hildebrandt

Opposed: None.

Absent: None.

Abstained: None.


Trini Marquez, Mayor


Date of Signing

ATTESTED BY:


Melissa A. York, City Recorder


Date of Enactment

Attachment - Exhibit A

City of Dayton

PUBLIC WORKS DESIGN STANDARDS

*Last Updated ~~June~~ **October 2023***
Originally adopted September 2006

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- ▶ For trench backfill and surface restoration, see Details 301 - 304

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PREFACE

These design standards have been developed by the City of Dayton to provide a uniform set of standards for public improvements. The intent of these standards is to provide guidelines for the construction of public facilities that will provide an adequate service level for the present as well as for future development. The format has been kept brief and no attempt has been made to cover all possible situations or to provide lengthy explanations.

These design standards are intended to be used in conjunction with the City's PWCS - Public Works Construction Standards (*ie. the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), most recent edition except as otherwise noted herein*). The PWCS are subject to the material, equipment and provisions specified in these PWDS. In the event of discrepancies between the requirements in these PWDS and the Public Works Construction Standards (PWCS) or between the text of these PWDS and the City standard details, the more stringent requirements as determined by the City Engineer and Public Works Director shall apply.

Copies of these design standards can be obtained from City of Dayton, Oregon , PO Box 339 , Dayton, OR 97114 .

It is anticipated that revisions to the design standards will be made from time to time. The date appearing on the title page is the date of latest revision of the text portion of the standards. The date appearing on the details is the date of latest revision of that particular detail.

CITY OF DAYTON
Public Works Design Standards

Division 1

General Requirements

DIVISION 1 GENERAL REQUIREMENTS

1.1 GENERAL

- a. These Public Works Design Standards will be cited routinely in the text as the "Standards" or "PWDS".
- b. Wherever specific supplementary standards are indicated (ie. ASTM C-150), it shall be understood to mean the latest revision thereof.
- c. Pronouns & Captions. In interpreting these Standards, it is understood that: (1) if the context so requires: (a) the singular pronoun shall be taken to mean and include the plural pronoun; (b) the masculine pronoun shall be taken to mean the feminine and the gender neutral pronoun as may be applicable; and (2) all captions used therein are intended solely for the convenience of reference and shall in no way limit any of the provisions of these Standards.
- d. These Standards shall apply to all improvements within existing and proposed public right-of-way and public utility easements, to all improvements to be maintained by the City, and to all infrastructure improvements for which the Municipal Code and/or the Development Code requires review and/or approval by the City. These Standards are to be guidelines for designers and developers in preparing their drawings and for City staff in reviewing drawings. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.
- e. Requests submitted for variances to these Standards shall be based on topography, right-of-way, geography or existing physical conditions which impose an unreasonable economic hardship on the applicant (as determined by the Public Works Director). Requests for variances must demonstrate (to the satisfaction of the City) that the proposed variance meets the intent of the standards and will not compromise safety, will not disproportionately impact other properties (as determined by the City), and will not ~~or~~ cause an increase in maintenance by the City.
- f. PWCS. The City currently has physical standards for the construction of streets and related work, sanitary sewers, storm drains and structures and waterlines which cover the standard construction requirements for these facilities within the City of Dayton *(Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), subject to the material, equipment and provisions specified in these PWDS)*. Standard Specifications are hereinafter referred to as Public Works Construction Standards (PWCS) and can be viewed at Dayton City Hall or the Public Works Department, and can be purchased on-line through the link at:
<https://5207--62.myuplinxstore.com/franchise/index.htm>.

- g. In the case of conflicts between the text of these design standards and the City standard details, or between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director shall apply. Acceptable materials shall be as outlined in these Design Standards.
- h. All other utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as City standards.
- i. Traffic Control Devices shall meet the standards of the current Manual on Uniform Traffic Control Devices, including Oregon amendments.
- j. All other work not covered by the above standards shall conform to the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), most recent edition.
- k. All applicant/developers are hereby notified that the requirements of the PWDS must be addressed during the design & construction of any improvements which are required due to land use decisions. This applies whether or not specific PWDS requirements are referenced during the land use approval process, noted in the land use findings or included in the land use approval conditions *(since land use approval conditions cannot incorporate or list every code or standard requirement that may be required for a particular project)*.

PWDS are NOT Land Use Regulations. It is important to be aware that the PWDS ~~(and Oregon Fire Code – OFC)~~ requirements are not land use regulations *(similar to how the requirements of the Oregon Fire Code/OFC or building codes are not land use regulations)*, and thus the PWDS do not directly impact the decision of whether to approve or deny any land use application, and do not directly control what level of infrastructure improvements are required as land use conditions of approval for any particular development. Approval or denial of land use decisions should be based on the land use regulations, even though if land use conditions may reference the PWDS & OFC provisions in order to clarify the specifics about extent of improvements which may be required (ie. those improvements required in order to provide service to or mitigate impacts from the development, or when such references are intended to make the applicant aware of specific design/construction standards that must be addressed during the design/construction phase of the development) ~~(since land use approval conditions cannot incorporate or list every code or standard requirement that may be required for a particular project)~~.

1.2 PURPOSE

- a. The purpose of these Standards (PWDS & PWCS) is to provide a consistent policy under which certain physical aspects of infrastructure and public utility design will be implemented. Most of the elements contained in this document are infrastructure and Public Works oriented and most are related to the development, land division and/or platting process.

However, it is intended that these PWDS ~~they~~ apply to both public and private work

designated and covered herein.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City residents.
- c. The objective is to develop Standards which will:
 - 1) be consistent with current City Ordinances, municipal code and/or development code.
 - 2) provide design guidance criteria to the private sector for the design of infrastructure and public improvements within the City of Dayton.
 - 3) provide infrastructure and public utility improvements designed in a manner to allow economical future maintenance.
 - 4) Develop minimal franchise and/or private utility standards for systems which will impact or potentially impact public streets and/or public utility systems.

1.3 ENGINEERING POLICY

- a. The engineering policy of the City of Dayton requires strict compliance with ORS 672 & other state rules for professional engineers, as administered by OSBEELS (*Oregon State Board of Examiners for Engineering and Land Surveying*). The following requirements shall be applicable to the evaluation and design of streets, grading plans, vehicular access & parking areas, sanitary sewers, storm drain systems (*including detention systems*), and water distribution and associated storage facilities.
 - 1) All engineering drawings, reports, or documents designated herein or intended to provide engineering design or engineering recommendations shall be prepared by a professional Civil Engineer registered in the State of Oregon, or by a subordinate employee under the engineer's direction, and shall be stamped with the engineer's seal (*and signed by the engineer for final documents*) to indicate responsibility for them and that they were prepared by or under the supervision and control of the licensed engineer (*the licensed engineer requirement may not apply to designs by franchise utility companies, unless otherwise required by OSBEELS*). Per OAR 820-025-0015, stamped engineered designs which are not final (*and which are not signed by the engineer*) shall be "marked as "preliminary", "not for construction", . . . or with some similar wording to indicate that the documents are not intended to represent the final work product of the [engineer]."
 - 2) It shall be the Design Engineer's responsibility to review any proposed

extension, modification or improvement of infrastructure or a public utility systems with the City prior to proceeding with 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/her 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 standards have not been met.

- 3) Detail Sheet Stamping. Per interpretations issued by the OSBEELS Professional Practices Committee (December 2016), the design engineer shall seal and sign drawing sheets containing standard details (*whether prepared by the City or other agencies*), since the details are incorporated into the larger design which is under the responsible charge of the design engineer. It shall be the Design Engineer's responsibility to review any and all standard details incorporated into the design (*whether prepared by the City or other agencies*), and verify that they are applicable to and appropriate for the proposed design.
- 4) Any engineer having submitted to the City false or inaccurate information of a material nature will be warned of their conduct, and OSBEELS may also be advised.

1.4 DEFINITIONS AND TERMS

a. Unless otherwise defined in these Standards, the following definitions, terms and abbreviations shall apply whenever used.

- 1) ADA: Americans with Disabilities Act, including any amendments thereto, and all applicable federal rules, ~~and~~ regulations and guidelines implementing the ADA, including but not limited to the current version of the Public Right-of-Way Accessibility Guidelines (PROWAG).
- 2) As-built Drawings: Drawings prepared by the Design Engineer, ~~signed and dated~~ (and reviewed by the city representative) ~~indicating the drawings have been reviewed~~ and revised, if necessary based on the City's review, to accurately show all as-built conditions and construction details.
- 3) City: The City of Dayton, Oregon.
- 4) 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.
- 5) Definition of Words: Wherever, in these Standards, the words directed,

required, permitted, ordered, designated or words of like importance are used, they shall be understood to mean the direction, requirement, permission, order or designation of the City Engineer and Public Works Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or to the satisfaction of ~~to~~ the Director.

- 6) Developer: The individual or individuals, partnership, business, firm, company or corporation named as applicant in a permit, a permit application, or agreement with the City, who undertakes development and/or construction of property and/or infrastructure within the jurisdiction of the City (*including their agents, employees, representative and/or contractors*). Also referred to as the development team. May be the same or different from the Owner.
- 7) 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.
- 8) Director: The ~~D~~irector of the Public Works Department of the City of Dayton or his/her authorized representative.
- 9) Dwelling Unit: A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, eating and sanitation.
- 10) Easement: Areas along the alignment of streets, sidewalks or utilities which are outside of a dedicated street right-of-way. Easements to the City shall be prepared on standard City easement forms granting (*to the City*) access & easement rights along the utility line or facility, and formalizing the terms and conditions of the easement, and which shall be recorded in the County records by the development team after review & approval by the City.
- 11) Equal: Whenever any material, article, device, product, or fixture is indicated or specified by proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers which meet the criteria in this paragraph, and shall be deemed to be followed by the words "or approved equal" unless otherwise indicated in the specifications, on the drawings or by City standards. The decision relative to equivalency will be by the Public Works Director or his/her designee, and shall be final. A proposed item of material or equipment will be considered an "or equal" when, in the exercise of reasonable judgment, the Public Works Director or his/her designee determines that; (1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics, and 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed

project as a functioning whole, and 3) it has a proven record of performance and availability of responsive service, and 4) it will not materially increase anticipated maintenance or operating costs by the City or require stocking of specialty tools, parts, equipment or materials not otherwise required, and 6) it is compatible and interchangeable with existing system components of the same type and function. Requests for review of "or equal" or "substitute" items shall be in writing, shall include all documentation for a complete review, and will not be accepted from anyone other than the Contractor performing the work.

- 12) Fire Chief: The chief officer of the local fire department or fire district serving the jurisdiction, or his/her authorized representative (OFC 202).
- 13) Fire Code Official: The fire chief or other designated authority charged with administration and enforcement of the Oregon Fire Code, or his/her authorized representative (OFC 202).
- 14) Fire Lane: A fire apparatus access road as defined in the Oregon Fire Code, including turnarounds where required (OFC 202).
- 15) Multiple Family Dwelling: A building or portion designed thereof for occupancy by two or more families, living independently of each other.
- 16) Manufacturer's Name: Any manufacturer's name, specification, catalog number, or type used herein is specified by make in order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are ~~comparable-equal~~ with this established standard, as determined by the City.
- 17) Owner: Any individual, partnership, firm or corporation by whom the Design Engineer has been retained or who, as a property owner or representative of a property owner, is making arrangements with the City for development of property or infrastructure (*see also Developer*).
- 18) Person: Individual, firm, corporation, association, agency or other entity.
- 19) Plans: See Construction Drawings.
- 20) Preliminary Review: Review of the construction drawings by the City as outlined in these standards. All City comments and provisions of these design standards must be addressed prior to final review and approval for construction.
- 21) PROWAG: Public Right-of-Way Accessibility Guidelines, see ADA.
- 22) PWCS: Public Works Construction Standards, consisting of Oregon Standard Specifications for Construction (OSSC (ODOT/APWA)), subject to the material and equipment specified in these PWDS. See also PWDS 1.1.f.

- 23) PWDS: Dayton Public Works Design Standards, consisting of this manual.
- 24) Residential User: The owner, lessee, or occupant of a single dwelling unit in one structure.
- 25) Right-of-Way: 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, county or state shall have the exclusive right to install and maintain streets and public utilities.
- 26) Roadway: All of that portion of the right-of-way used, for vehicle movement, which exists between the curbs (or outside edge of shoulders where curbs do not exist) or proposed curbs or proposed curb lines. See also Street.
- 27) Shall: The term is considered a mandatory obligation, and synonymous with the phrase "has a duty to" when referring to a capable actor, and with the word "must" when referring to a requirement regarding an inanimate object or a status.
- ~~27~~28) Single Family Dwelling: Any residential building designed to house one family.
- ~~28~~29) Standard Details: The drawings of structures or devices commonly used ~~on~~ for infrastructure work within the City work and referred to on the construction drawings. Also ~~called~~ sometimes referenced as Standard Plans or Standard Drawings.
- ~~29~~30) Street or Road: Any public highway, road, street, avenue, alley, way, easement or right-of-way to be used for vehicle movement.
- ~~30~~31) Substantial Completion (Public Works): Substantial Completion is that degree of completion of the project's facilities and operating systems sufficient to provide the City and the public the full time, uninterrupted, and continuous beneficial use and operation of the work, and after (i) all required functional and acceptance testing has been successfully completed; (ii) all final Public Works, building, plumbing, mechanical and electrical inspections required have been completed and any identified critical defective or incomplete work replaced or corrected; and (iii) all required record drawings and maintenance bonds have been submitted and accepted by the City. The terms "substantially complete" and "substantially completed" as applied to all or part of the work refer to Substantial Completion thereof.
- ~~31~~32) Substantial Completion (for building permits in residential subdivisions under HB 2306): Effective 1/1/2020, HB 2306 prevents a city from denying a building permit on the basis that the supporting infrastructure is not entirely completed in a subdivision. If a residential subdivision is built, the city must have a process to allow the builder to seek building permits upon "substantial completion" of the infrastructure required as a condition of development.

As defined in HB 2306, “*Substantial completion*” means the city, county or other appropriate public body has inspected, tested and found acceptable under applicable code requirements, unless the parties agree to a lower standard: (A) The water supply system; (B) The fire hydrant system; (C) The sewage disposal system; (D) The storm water drainage system, excepting any landscaping requirements that are part of the system; (E) The curbs; (F) The demarcating of street signs acceptable for emergency responders; and (G) The roads necessary for access by emergency vehicles.”

Per HB 2306 also allows the City to require that if all improvements are not complete, “*The developer, declarant or owner, to secure the completion of the remaining public improvements included as conditions of development for the residential subdivision: (A) Obtains and maintains a bond; or (B) Undertakes an alternative form of financial guarantee, if any, that is acceptable to, but may not be required by, the city or county.*”

Also per HB 2306, a city may decline to issue the certificate of occupancy “*for any residential dwellings if all conditions of development are not fully completed or the conditions for the release of the bond are not fulfilled.*”

~~32)33)~~ Substitute: If in the sole discretion of the Public Works Director or his/her designee, an item of material or equipment proposed by the Contractor does not qualify as an “or equal” item as defined above, or requires a change to the design or to the configuration of the project in order to be utilized, it will be considered as a proposed “substitute”. The decision relative to acceptability of substitute items will be by the Public Works Director or his/her designee, and shall be final. In addition to the review criteria for “equal” items, the written request for review of a substitute item shall document whether use of the proposed substitute item will require any changes to adapt the design to the proposed substitute item (*and to what extent*), and shall identify the timeframe required to complete such design changes, and that there will not be any cost or other impact to the City due to any such required design changes.

~~33)34)~~ Survey Cut Sheets: Sheets of tabulated survey data, indicating stationing, structures, fittings, angle points, beginning of curve, points on curve, end of curves, staking offset, various elevations and offset utility cuts.

~~34)35)~~ Traveled Way: That portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.

~~35)36)~~ UGB: Urban Growth Boundary.

1.5 LOCATION OF UTILITIES WITHIN RIGHT-OF-WAY OR EASEMENT

- a. The City standard details indicate the general required location for each utility within the public right-of-way.

- b. In general, new franchise utilities are to be installed within street frontage PUEs where such easements exist or are proposed in conjunction with the development or project (unless otherwise approved by the Public Works Director on a case-by-case basis).
- c. General Separation Requirements. Installation of franchise or private utilities in a common trench with public water, sanitary sewer or storm drain mainlines is prohibited.

- 1) Horizontal Separation. Unless otherwise approved by the Public Works Director and the City Engineer, a minimum of 5 feet of horizontal separation must be maintained between City utilities (ie. mainlines, as well as service laterals within the ROW or City easements) ~~public~~ and private or franchise utilities except at crossings, as well as between ~~water or~~ fire service lines and public, private or franchise utilities.

Separation between water service lines or fire service lines and sanitary sewer service lines located within a public right-of-way or within a City utility easement shall be a minimum of 5 feet.

Note: Once the water, sewer and/or storm service lines exit the road right-of-way or are outside of the City utility easement limits, separation may be reduced to that allowed by the OPSC or other applicable regulations.

- 2) Vertical Separation. Unless otherwise required by the Public Works Director and the City Engineer, a minimum of 6-inches of vertical separation must be maintained between public and private or franchise utilities at crossings, as well as between water or fire service lines and private or franchise utilities. Greater vertical separation is required between sanitary sewer pipelines & potable pipelines, as summarized elsewhere in these standards.
- d. Franchise Utility Limitations in City Easements. Franchise utilities or private utilities shall not be placed in City utility (ie. water, sewer or storm) easements, unless specifically directed in writing to do so by the Public Works Director, subject to separation requirements in excess of minimums as dictated by the Public Works Director.
- e. Franchise utility plans shall be submitted to Public Works Director and the City Engineer for review prior to installation. All franchise utility street crossings shall be installed at right angles to the street centerline, and all crossings of water, sewer or storm mainlines or service lines/laterals shall be as close to perpendicular as feasible.
- 1) Plowing In of Utilities Prohibited in ROW or City Easements. Use of cable/conduit plowing for installation of franchise or private utilities within public right-of-ways or City utility easements is prohibited, unless specifically authorized by the Public Works Director on a case-by-case basis. Any such authorization shall be based on a demonstration by the applicant that there are no existing City or franchise utilities crossing the proposed plow alignment, or

within 10 feet parallel with the proposed plow alignment.

- f. Utility service companies proposing to install major utility systems larger than typically required to serve local users and which cannot conveniently be relocated in the future will be required to prepare detailed drawings showing how the proposed system can be installed within the right-of-way without conflicting with existing or proposed City utilities.

Drawing requirements may include but not be limited to plan and profile of proposed systems based on a detailed topographic survey.

- g. Utility/Infrastructure Modifications Required Due to Changes on Private Property.

- 1) If changes are made to private property which requires modifications to and/or relocation of City utilities/infrastructure which is installed on private property (*ie. changes including but not limited to changes in finish grade, changes in surface type, change in use of the property, construction of structures, etc.*), such modifications and/or relocation shall be completed by the property owner or Developer at their sole expense, as directed by the City.
- 2) When modifications to and/or relocation of City utilities/infrastructure are required due to changes on private property, such modifications and/or relocation shall comply with current City standards, and shall be reviewed and approved in accordance with these PWDS.

1.6 PROVIDING FOR NEW & FUTURE DEVELOPMENT

- a. All public improvements shall be designed as a logical part of the development of the surrounding area, as required or approved by the City Engineer and Public Works Director.
- b. Storm drain systems and sanitary sewers shall be sized to accommodate the entire drainage basin which they will ultimately serve.
- c. To & Through. Utilities and street improvements shall be extended to the boundaries of the development (*ie. to and through*) so as to provide for future extensions to the adjoining areas and prevent adjoining properties from becoming landlocked.

In the case of utilities, this shall also 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.

Where existing roadway improvements do not extend to the proposed development or the existing roadways to the proposed development are not adequate to serve the development or do not meet current City standards, the developer may be required to improve the roadways to the development, at the developer's expense. (moved up from below)

- d. Master Plan Sizing/Sizing for Future Growth. The City may require over-sizing of utility lines to accommodate future growth of the City. Water, sewer and storm drain mainlines shall be sized to comply with recommendations in the applicable master plan documents or maps.
- e. Upgrading Existing Utilities. Where existing City utility lines do not adjoin the proposed development or the capacity of existing lines is inadequate, or are smaller than the minimum size allowed under the PWDS, or where the size does not match the applicable utility master plan documents or maps, the developer will be required to extend new utility lines to the development as necessary, and extend them through the property or to the end of the property frontage as required to provide for service to adjacent properties, at the developer's expense.
- f. Connection of Existing Utilities. Existing City utilities crossed, intercepted by or in the vicinity of new utility lines or facilities shall be connected to the new City utility system at locations as required by the City Engineer and Public Works Director. Existing City utility lines which are parallel with, or which are replaced or superseded by the new utility lines (*as determined by the City*), shall be abandoned or removed as part of the project (*and existing facilities or structures served by the abandoned lines shall be connected to the new system as applicable*), as required by the City Engineer and Public Works Director.
- ~~g. Where existing roadway improvements do not extend to the proposed development or the existing roadways to the proposed development are not adequate to serve the development, the developer may be required to improve the roadways to the development, at the developer's expense. (moved up)~~
- h.g. SDC Credits & Oversizing Reimbursement, etc.

- 1) The requirement by City standards that offsite or oversized street and/or offsite or oversized utility improvements must be completed "at the developer's expense" does not preclude the developer from applying under any SDC credit, oversizing reimbursement or reimbursement district procedures which may be authorized by the City Council or otherwise provided for by City code.

However, applications for any reimbursements via SDC credits, oversizing reimbursements, reimbursement districts or other means shall be the sole responsibility of the developer, and the developer shall not rely on any such applications or verbal indications by any parties until any such applications have been approved in writing by the applicable decision making authority.

The developer is hereby put on notice that approvals regarding any credit or reimbursement eligible infrastructure improvements associated with this project should be formalized with the applicable decision making authority prior to issuance of Public Works permit(s). Any other approach taken or sequence followed shall be at the developer's sole risk.

- 2) Unless otherwise explicitly authorized by the City Council under the applicable provisions of the Municipal Code, such credits or reimbursement shall be limited to the actual documented material cost difference between the improvement actually constructed and minimum improvement otherwise required under the applicable City code or standards.

1.7 TIME LIMITS FROM DRAWING APPROVAL TO CONSTRUCTION

- a. 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 of the construction drawings shall be null and void.

Renewal of the approval for the construction drawings may result in additional conditions to update City standard details, meet new standards, changed conditions or new information discovered since the original approval.

1.8 PHASED DEVELOPMENT

- a. In the case of a development approved to be constructed in phases, the construction drawings and infrastructure constructed for each phase shall be capable of standing alone.
- b. Approval by the City of construction drawings for each phase of a phased development shall be independent of the approval for all other phases.
- c. The intent of these requirements is that the construction drawing review requirements, and the time limits between approval of the construction drawings by the City and the time by which construction must begins, shall apply to each phase independently.

1) Construction drawings shall be subject to the PWDS & City standard details, specifications, policies and procedures, construction drawing review, and permit fees of the Public Works Department in effect at the time the construction drawings are approved for construction (ie. each phase shall be subject to the standards in effect at the time each such phase is ready for permit & start of construction).

2) Any updates to the PWDS and/or City standard details that occurs between phases of a development shall apply to all subsequent phases.

1.9 REVIEW PROCEDURE

- a. Site/street/utility/access/parking/fill/grading cConstruction drawings (*plans*) and other engineering documents shall be submitted for review and approval by Public Works Director and/or the City Engineer prior to issuance of Public Works permits required by these Standards, and prior to issuance of building permits for structures served by

such required infrastructure improvements.

Detailed provisions covering the review procedures and permitting requirements for street, grading, site and utility construction are contained in Appendix G of these standards. The following is an overview of these requirements.

- b. Pre-design Conference: The developer and developer's engineer are required to schedule a meeting with the Public Works Director and the City Engineer after land use approval (*see also PWDS G.2.e*) and prior to submitting design drawings of the proposed or required improvements for detailed review by Public Works *(as well as for cases where land use approval is not required)*.

Mandatory Attendance. Attendance at the predesign meeting by the developer's engineer-of-record and a representative of the developer is mandatory (*virtual attendance may be allowed at the sole discretion of the Public Works Director, on a case-by-case basis, only when in-person attendance is not possible and approved in advance*).

This requirement shall apply for any project where a Type B Public Works permit is required (*including for new fire service lines, fire lanes, etc.*), as well as for Type A Public Works permit projects where deemed appropriate by the Public Works Director.

The purpose of this predesign meeting is to ensure, to the extent feasible, that the development team & developer's engineer understand applicable PWDS requirements relating to the civil design, including how applicable land use conditions might impact the design (*ie. the goal is to ensure that all parties are moving along the same path toward the same end goal, and share a common understanding of the project scope and design requirements*).

- 1) A minimum of 5 working days prior to the predesign meeting, it shall be the responsibility of the developer or the developer's engineer to provide the City Engineer with copies of the following *(NOTE: see PWDS 1.10.b.1 for drawing sheet size requirements for all civil design sheets)*:
 - a) Base maps and topographic surveys showing existing streets and utilities within and adjacent to the property, and along and/or required proposed utility & infrastructure alignments (*on-site and offsite, limits as required by the PWDS*), and;
 - b) A plan or narrative summary detailing how each of the planning conditions of approval (*ie. land use conditions*) and how each of the infrastructure issues identified by Public Works comments (*prior to or during the land use process*) will be satisfied (*as applicable*), and;
 - c) Scaled plan view drawings showing existing and proposed lot layouts (*sizes and dimensions*), proposed and/or required street, sidewalk and/or utility (*water/sewer/storm*) alignments and improvement limits

and conceptual layouts, existing grade contours and designation of where significant cuts or fills will be required, general alignment of any proposed retaining walls, limits of proposed or required right-of-way dedications and easements (*on-site and offsite, addressing the requirements of PWDS, the development code, planning conditions of approval, and known agency requirements*), and;

- d) Preliminary profiles or invert/slope information along gravity sewer and storm alignments (*including proposed rim elevations for all manholes, catch basins, & other structures*), demonstrating the ability to meet the depth and slope requirements of the PWDS, and;
- e) Verification that the elevations shown are based on the vertical datum specified in the PWDS, as well as information on the drawings showing the location and limits of any flood plain or wetlands within the development or along offsite street/utility alignments (*as well as information on the status of any required wetland permits*), and;
- f) List of (*and justification for*) any known variances to the PWDS requirements which will be necessary based on the preliminary layout, street and utility drawings required above, and;
- g) A current title report(s) covering all property where utility construction will occur (*which includes a list of all existing easements, restrictions, and other encumbrances, including copies of deeds, easements or other restrictive documents referenced in that report*) [a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy], and;
- h) A geotechnical report is typically required for sites with existing or proposed fills,
- i) Other information requested by the Public Works Director or the City Engineer.

2) PreDesign Meeting Prior to Building Permit Review (*commercial, industrial, public & multifamily projects*).

- a) For commercial, industrial, public & multifamily projects, City standards require that any necessary civil drawings for work required under a Public Works permit need to be approved by Public Works prior to issuance of building permits (*Note: single family residential projects require that the infrastructure improvements be substantially complete and accepted by the City prior to issuance of any building permits*).

Therefore, in order to ensure that such building permit application drawings address (*or account for*) applicable infrastructure or utility

requirements necessary under any such Public Works permit, building permit applications should not be submitted nor reviewed until after the predesign meeting has been held (for projects where a Type B Public Works permit and a predesign meeting is required).

- b) After the predesign meeting is held for commercial, industrial, public & multifamily projects, the development team may submit building permit applications & building drawings for concurrent review by the building official for required building permits (ie. building permit review in parallel with the civil drawings being reviewed by Public Works for any required Public Works permits), at the sole risk of the developer.

Any such parallel review of building drawings shall be subject to the condition that building permits shall not be issued until after the civil drawings have been approved by Public Works.

The development team will be responsible to make any modifications to the building permit drawings which may be required due to improvements shown by the final approved civil drawings (prior to issuance of the building permits, as applicable).

- c. Construction Drawings for Review: After the pre-design meeting, for single family residential developments, three (3) sets of complete full size construction drawings (addressing all issues noted in the pre-design meeting) shall be submitted to the City for preliminary review (or provide full size pdf copies of the construction drawings and all associated documentation for review).

For commercial, industrial and multifamily residential developments, four (4) sets of complete full size construction drawings (addressing all issues noted in the pre-design meeting) shall be submitted to the City for preliminary review (or provide full size pdf copies of the construction drawings and all associated documentation for review).

Submittal requirements are as outlined herein, and shall include a unit price engineer's estimate acceptable to the City Engineer and any required review fees (see also PWDS G.7).

Incomplete submittals will be returned without review.

- d. Review Comments, Resubmittals:

- 1) Upon completion of the preliminary review, the City will return one (1) set of drawings outlining the required revisions (~~with~~including redline drawings, a review letter or memo, or email as applicable).
- 2) In order to be entitled to further review, the applicant's engineer must address each comment of the prior review(s), and make all required corrections. All

resubmittals and responses to comments must appear throughout to be a bona fide attempt to result in complete drawings fully conforming to City standards.

- 3) Return without Review. The City reserves the right to return, without review, revised drawings and/or submittals which have not been updated to addressed all previous review comments.
- 4) Resubmittals shall consists of a minimum of three (3) sets of full size drawings for single family residential developments, and a minimum of four (4) sets of full size drawings for commercial, industrial and multifamily residential developments (or provide full size pdf copies of the construction drawings and all associated documentation for follow-up review), ~~unless the City and the City Engineer allows pdf submittals of the revised drawings.~~
- e. Franchise Utility Coordination by Developer's Engineer. Once the preliminary review has been completed by the City and required revisions made, the Developer's engineer shall circulate the drawings to all utility service companies within the City, and bring any conflicts to the attention of the City Engineer and Public Works Director. Prior to installation of any franchise utilities, all proposed drawings from utility service companies must be provided to the City for review.
- f. Coordination of Other Agency Approvals by Developer's Engineer. The Developer's engineer shall submit the drawings to all other agencies with jurisdiction as applicable, and bring any conflicts to the attention of the City Engineer and Public Works Director. Prior to final City approval of the construction drawings, approvals from other agencies with jurisdiction must also be received where applicable, including but not limited to the Oregon Health Authority – Drinking Water Services (OHA-DWS), Department of Environmental Quality (DEQ), Oregon Department of Transportation (ODOT), Yamhill County, fire districts and railroads wherein each has jurisdiction.
- g. The applicant is responsible for the coordination with the various utilities and agencies during design and construction. The utilities and agencies may include those shown in the Appendix.
- h. Upon final approval of the drawings for a Type B permit, submit ~~the~~ a minimum number of ~~ten (10)~~ copies of the final revised drawings to the City Engineer to be stamped as approved for construction, as required in Appendix G (see also Appendix G for Type A permit requirements). Additional sets may be submitted for approval stamping at the developer's option.
 - 1) No changes shall be made between the final verification set of drawings reviewed ~~approved~~ by the City and the drawing sets submitted to the City for approval stamping to be stamped, without the express written approval from the Public Works Director & the City Engineer ~~City~~.
 - ~~1)a)~~ Any unauthorized changes introduced into the final drawings submitted for approval stamping will invalidate the final drawing approval (regardless of whether or not the City Engineer or Public

Works Director have signed the drawings as approved).

If unauthorized changes are subsequently discovered, a stop work order will be issued until the issue is resolved.

- 2) The development team may make additional copies of the stamped approved plans for dispersal to their team members as applicable.
- i. Prior to issuance of the Public Works street or utility construction permits, the Developer shall provide the City with the following:
 - 1) Copy of an approved *(by City Attorney)* Developer/City Construction Agreement signed and notarized by the Developer, the Developer's engineer and the Developer's prime contractor.
 - 2) Any required permit fees.
 - 3) Recorded copies of all required off-site easements *(with exhibit maps)* and off-site right-of-way dedications, as well as on-site easements and on-site right-of-way dedications, and any recorded maintenance agreements required by City standards, shall be submitted before construction permits are issued, with the following exception.
 - a) For subdivisions or partitions where all public utilities will be constructed prior to the recording of a final plat, the execution and recording of the on-site easement documents and on-site right-of-way dedications, as well as recorded agreements relating to on-site or off-site improvements, can be done in conjunction with the final plat.
 - b) Split Permits, Easement Requirements. If the Public Works Director, at his/her sole discretion, approves a request by the development team to split the City Public Works construction permits into segments, so that the certain work can be commenced while the detailed civil/site/utility construction drawings for the remainder of the improvements *(offsite or onsite)* are completed and reviewed, such split permits shall not be issued until after any identified offsite easements have been acquired by the development team, and recorded copies of the easements have been provided to the City.
 - 4) All easements documents *(as well as ROW dedications, easement quit-claim deeds, or similar documents)* shall include a legal description and a "to-scale" exhibit map (containing the information required under PWDS 1.11), and easements to the City shall use the City's standard forms. Legal descriptions and exhibit maps shall be submitted for review and approval by the City review and approval prior to recording.
 - 5) Proposed Construction Schedule.

- 6) Certificates of insurance, minimum limits as outlined in the Appendix. City of Dayton and City Engineer shall be covered as additional insured.
 - 7) Evidence of Worker's Compensation coverage from contractor performing the work.
 - 8) Any required Construction Deferral/Waiver of Remonstrance agreements.
 - 9) Any required performance bonds.
 - 10) Other submittals specific to this project, including any required approvals from applicable state agencies, such as DEQ (*sewer & 1200C erosion control as applicable*), OHA-DWS (*water as applicable*), DSL, ODOT, etc. The City reserves the right to require evidence that any and all such required approvals have been received (*and copies provided to the City as applicable*) prior to issuing final approval of the construction drawings and/or issuing a construction permit.
- j. Approval of plans by the City Engineer or Public Works Director for issuance of a City Public Works street/site/utility construction permit does not relieve the developer, contractor or engineer from obtaining any and all reviews and permits required under the building, plumbing or electrical codes that any portions of the work may be subject to, or from any requirements under County, ODOT or other agency permits or approvals required for the project.

1.10 CONSTRUCTION DRAWING SUBMITTAL REQUIREMENTS

- a. Survey: *All topographic surveys shall be based from an official benchmark acceptable to the City, and be based on the NAVD 1988 datum to match the FEMA flood map elevations. Existing elevation benchmarks that are based on the NGVD 1929 datum shall utilize the appropriate conversion factor to convert to the NAVD 1988 datum. All temporary benchmarks for construction purposes are to be based off accepted City benchmarks.*

Based on the NOAA VertCon website, the current conversion (*for this area*) from 1988 to 1929 datum is about 3.356 feet – see http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl for specific conversions by location.

****All designs subject to a Type B Public Works Permit shall be based off of a complete topographic survey of the entire project site, adjacent right-of-ways, areas adjacent to the project site and outside of adjacent to right-of-ways as necessary to provide all design elements required by these PWDS, and all offsite areas where improvements are proposed or required, including but not limited to the following.**

- 1) ****Surface features, including complete & accurate topographic information, extended to the full limits required by these PWDS.**
- 2) ****Subsurface features & subsurface utility alignments.**

- 3) ****Existing utilities (*public and private*)** within and adjacent to the project site and/or limits of improvements.
 - 4) ****Property lines & all survey monuments** within or adjacent to the limits of the required topographic survey.
 - 5) ****Right-of-way lines & centerline monuments.**
- b. **Drawing Submittal:** The drawing submittal shall include the following as applicable unless otherwise approved by the City Engineer. The following is a general overview of drawing requirements, but is not intended to be exclusive. All requirements of the individual divisions of the standards shall be satisfied.

Since projects subject to a Type B Public Works Construction Permit vary greatly in size and complexity, not all provisions in this section will apply to all projects. For instance, small projects in improved areas which do not involve any street improvements or extensions of water, sewer or storm drain mainlines will not need to provide profiles for these facilities. To assist the design engineer, the minimum elements required of all designs subject to a Type B Public Works construction permit are designated as summarized in the sentence below.

****The elements in this section 1.10 which are marked by an (**) are required to be included on the drawings for all projects subject to a Type B Public Works construction permit (see PWDS G.5).** All other elements not so designated are only required if the project involves improvements or infrastructure referenced in the non-designated paragraphs or sentences. If there are questions due to the unusual nature of a project, these should be discussed with the Public Works Director and City Engineer at the predesign conference (PWDS 1.9.b).

1) ****Drawing Sheet Size.** Construction drawings shall be submitted on 22" x 34" blackline sheets unless otherwise approved by the City Engineer.

a) Drawing layouts shall be configured to provide adequate blank space around the sheet perimeter to allow full size and half size drawings to be printed on standard printers/plotters without cutting off any text or images, and to allow the entire border to be shown.

b) All drawings submitted for review and/or approval shall be stapled and bound into sets (*unless pdf submittals are allowed by Public Works Director & the City Engineer*).

2) ****Review Fees. Payment of** City Public Works plan review fees as required (drawing review comments or other review feedback will not be provided prior to receiving any such required review fees).

3) ****Variance/Deviation Summary Required.** A written summary of all deviations from the PWDS requirements, and written justification for any variance requests (*see section 1.12*). It is the responsibility of the design

engineer to submit a written request for any proposed deviations or variances from City standards (*see PWDS 1.12.a.3*).

- 4) ****Cover Sheet** (*with all information required under PWDS 1.10.d*)
- 5) ****Overall drainage, utility and street/site lighting plan.**
- 6) Site grading plan where applicable.
- 7) Site layout & dimensioning plan with complete callouts and/or labels, including property dimensions, all parking areas, access driveways, fire lanes, ADA compliant pedestrian access routes, as well as building locations, separations & setbacks, etc., as well as other applicable information.
- 8) **Fire Access Plan.** Fire vehicle access plan ~~where applicable~~ as required to demonstrate compliance with OFC fire apparatus access requirements (commercial, industrial, public, parking lot, private street, common driveway, flaglot, MHP, RV park, PUD, etc.), as well as information showing the access route around the building exterior as may be required by the Fire Code Official.
- 9) Plan and profile for the following public utilities:
 - a) Streets
 - b) Water as specified
 - c) Sanitary sewers
 - d) Storm drains
- 10) ****Erosion control plans** (*reflecting erosion control measures during construction, and also reflecting a post construction site runoff plan as required by general City or County stormwater permits, or by project DEQ stormwater or water quality permits*).
- 11) ****Details ~~shall to~~ be Included on Drawing Sets.** All applicable City sStandard details shall be included on the construction drawings sheets. City standard dDetails shall be placed in numerical order on the detail sheets, for ease of reference during construction.
- 12) ****Stamped storm drainage calculations, including storm drainage basin maps.**
- 13) **Geotechnical Report.** A geotechnical report for the development site and other impacted properties is required for sites with (a) any existing or proposed fills, (b) existing slopes steeper than 3H:1V, (c) existing or proposed retaining walls on the development property or on contiguous properties, (d) if stormwater infiltration is proposed, or (e) where there are other geotechnical concerns identified by the City Engineer or the Public Works Director.
- 14) **Title Report.** ****A current title report which includes a list of all existing easements, restrictions, and other encumbrances on ~~each~~ property where**

construction will occur, including full copies of deeds, easements or other restrictive documents referenced in the title report (*a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy*).

- 15) **Recorded copies of all easements and right-of-way dedications required in conjunction with the project, with the exception noted under PWDS 1.9.i.3 for subdivisions or partitions where all public utilities will be constructed prior to the recording of a final plat. Easements shall be worded such that no trees, permanent structures or improvements including parallel fences or parallel utilities shall be placed or constructed on the easement. Easements shall be a constant width between manholes, valves or other in-line structures, unless otherwise required by the Public Works Director and/or the City Engineer (*ie. for example, where required to avoid leaving a sliver of property between the easement boundary and adjacent property lines or right-of-ways*). Easement width shall be based on the deepest portion of the line between such structures. See the Appendix for standard easement forms.
- 16) **Proposed utility plans from all franchise utilities (*prior to final review*).
- 17) Cost Estimate. **Engineer's unit price construction cost estimate acceptable to the City Engineer or unit price bid results (*estimate to be submitted with initial review drawings and shall be updated as applicable when final review drawings are provided*). Cost estimates shall include all work covered under the PWDS (*excluding work covered by buildings permits for structures*). In addition to all grading, streets, water/sanitary sewer/storm drainage, driveways, parking, etc. to be constructed with the project, estimates shall include line items for street lighting and franchise utility trenching & conduit, as well as trenching & installation of street lighting conduits, junction boxes and pole bases as applicable.
- 18) Design Vehicle Turning Radius. For all developments (*other than single family subdivisions and/or partitions conforming with OFC requirements*), provide a summary of the largest design vehicles (*including emergency/fire vehicles*) which will need to access the development (*including vehicle size, & dimensions & turning radius*), as well an exhibit showing turning-radius wheel-path templates for the design vehicle (*auto-turn or equivalent*).
 - a) The development team shall be responsible to coordinate with the Fire Code Official regarding the size and turning radius of the largest emergency/fire vehicle which will need to access the site, and provide this information to the Public Works Director and City Engineer in conjunction with drawings submitted for review.
- 19) The submittal may also be required to include a traffic study and a traffic control plan.

- 20) The development team is responsible for submitting construction drawings & associated plans to other agencies with jurisdiction as may be required, in the format required by those other agencies.

c. General

- 1) **A title block shall appear on each sheet of the drawing set and shall be placed in the lower right-hand corner of the sheet, across the bottom edge of the sheet or across the right-hand edge of the sheet. The title block shall include the name of the project, the sheet title and number, the name of the engineering firm, engineer's stamp (either signed by the engineer, or marked as preliminary as noted under PWDS 1.3.a.1), date and revision blocks.
- 1)2) Revision Blocks. Revision blocks shall be filled in on the cover sheet and on each drawing sheet containing revisions from previously submitted or previously reviewed signed drawings.
- 2)3) Plan North. ***By City convention and to minimize confusion regarding directions, for areas northerly of Palmer Creek, "plan" north (for purposes of design drawings) is considered to be parallel with the numbered streets (1st Street through 9th Street). North arrows (true north and plan north where applicable) shall be shown on each sheet containing plan views and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.*
- 3)4) Allowable Scales. ***The scale shall be 1"=10', 20', 40' or 50' horizontal and 1"=2', 4' or 5' vertical for all drawings except structural or mechanical drawings. The scale of corresponding plan views and profiles shall be the same.*
- 4)a) ****In cases where streets or public utilities exist or will be reconstructed, plan view scales shall not exceed 1" = 20'.**
- 5) ***Each plan, profile and detail shall be labeled under the drawing. The horizontal & vertical scale for the plan, profile, or detail shall be noted under the title. Details not drawn to scale shall be so noted.*
- 6) ***Details. All detail drawings, including applicable City standard detail drawings, shall be included on the drawing sheets.*
- 7) ***A complete legend of all symbols used shall be provided at the front of each drawing set or on the appropriate pages. In general, existing utilities shall be shown with a lighter line weight than proposed utilities.*
- 8) ***Letter size shall not be smaller than 0.10-inch high (to allow text on half size drawings to be legible & readable).*
- 8)9) List Address & Tax Lot Number for All Existing Properties Shown. In addition to other identifying information (lot or parcel numbers, etc.), all plan view sheets shall include tax lot & address numbers of all existing lots or existing

parcels within or adjacent to the development (including properties on the far side of streets fronting the development areas shown on the various plan view sheets).

d. Cover Sheet

1) The first sheet (*Cover Sheet*) of all drawing sets shall include the following as a minimum:

- a) **Project name.
- b) **Design Engineer's name, address, telephone and fax number, and email address & /website.
- c) **Developer's name, address and telephone number, and email address.
- d) **Vicinity Maps showing the location of the project in respect to the nearest major street intersection and a minimum of 500 feet around the site.
- e) **Legend including all symbols and line types used on the construction drawings. Where there is insufficient room on the cover sheet, the legend can be included on a subsequent sheet.
- ~~f) **General construction notes matching format and content of notes in the Appendix. Where there is insufficient room on the cover sheet, the notes can be included on a subsequent sheet.~~
- ~~g)f) **Sheet index located near lower right corner.~~
- ~~h)g) Infrastructure Summary Table. Include a summary table listing the number of lineal feet of new public streets and public mainline utilities to be constructed. Identify the length of new streets and/or utilities under County or ODOT jurisdiction separately from those under City jurisdiction. Do not include existing streets or utilities that are being replaced as part of the project with the same length, or private streets or utilities. List the size and type (*domestic, irrigation, etc.*) of all water meters proposed. Do not include length of sewer or storm service laterals.~~
- ~~i)h) Land Use Docket Number. **The City Planning Department file or docket number shall be listed for projects which required land use approval.~~
- ~~i) **City Notes. General City construction notes and testing table matching format and content of notes in PWDS Appendix B.~~

Where there is insufficient room on the cover sheet, the notes can be

included on a subsequent sheet.

e. ****Overall Drainage, Utility and Street/Site Lighting Plan.**

1) The overall drainage and utility plan shall show the following as a minimum:

- a) ****The location and elevation of a National Geodetic Survey, United States Geological Survey, State Highway, Yamhill County or City of Dayton bench mark which the elevations shown are based shall be shown or noted. Temporary bench marks on or near the project site shall also be shown.**
- b) ****Right-of-way lines, property lines, easement lines (*including those outside the project but intersecting or within 150 feet of the project boundaries*).**
 - (1) *This distance can be reduced with written approval from the Public Works Director, but in all cases shall extend to the far side of right-of-ways and show property lines and improvements on the far side of the street along the entire property frontage, as well as showing enough of the adjacent properties to clearly illustrate drainage patterns, setbacks and utility issues.*
- c) ****Show (& list the recording reference numbers of) all existing easements affecting the project property (on-site & off-site), and provide callouts with blanks for the proposed new easements (*the recording references for proposed easements are to be inserted at the as-built stage*).**
- d) ****Existing and proposed streets, curbs, sidewalks, handicap ramps and driveways within the project and within 150 feet of the project boundaries (*see exception allowed under 1.10.e.1.b.1 above*).**
- e) ****Existing and proposed sanitary sewers, storm drains, waterlines and appurtenances within the project and within 150 feet of the project boundaries (*see exception allowed under 1.10.e.1.b.1 above*).**
- f) ****Existing franchise and private utilities within the project and within 150 feet of the project boundaries (*see exception allowed under 1.10.e.1.b.1 above*).**
- g) ****Lot or parcel numbers, street names and other identifying labels (*including tax lot and address numbers for all existing properties shown*). New street names are subject to the approval of the City.**
- h) ****Location and description of existing survey monuments, including but not limited to street monuments, property monuments, section corners,**

quarter corners and donation land claim corners within or adjacent to the limits of the work area.

- i) **Public and franchise/private utilities and other facilities to be relocated.
- j) Street light and site/parking light locations based on a City spacing standards or a photometric design acceptable to the City, subject to City approval for location and maximum spacing (*see PWDS 2.28.jh & 2.32*).
- k) Methodology proposed for individual lot drainage. Direction of drainage arrows and the following letter legend shall be used:

Symbol	Lot drains to:
C	Curb
P	Piped Storm Drain
S	Subsurface Disposal
→	Flow Direction

- l) The location of all curb weepholes shall be shown unless otherwise clearly defined or noted on the drawings.
- m) **Existing drainage patterns within the project and within 150 feet of the project boundaries (*see exception allowed under 1.10.e.1.b.1 above*).
- n) Floodplain, floodway and wetland boundaries, including floodplain elevation with FEMA map reference.

f. Site **Layout & Dimensioning** Plans & Grading Plans

- 1) The site layout & dimensioning plans shall show property dimensions, all parking lot and site access improvements and dimensions, including all vehicular & pedestrian access routes (*including fire lanes*), curbs, as well as building locations, separations & setbacks, etc., as well as other applicable information.
 - a) All compact parking spaces shall be identified on the drawings, and noted to be permanently labeled (*signs or durable pavement markings*).
 - b) Parking lot drawings shall identify which parking spaces are designated for service by the EV charging infrastructure (*required or proposed*), as well as showing / dimensioning the alignment for the required conduit to serve the parking spaces identified for EV charging.

- 2) A grading plan is required for subdivisions, multi-family, commercial, ~~or~~ industrial or public developments, and for partitions involving street improvements or cuts/fills.
- 3) A site plan and grading plan is required for projects subject to site design review, including as well as all commercial, industrial, public or multi-family developments.
- 4) The grading plan shall show proposed finished grade and parcel corner elevations, with the existing and proposed contours shown at maximum one (1) foot intervals and extended a minimum of 100 feet beyond the improvements. Extremely flat sites will require contour intervals closer than 1 foot as necessary to clearly illustrate proposed grading and drainage slopes and limits.
- 5) The grading plan shall show all drainage systems and proposed erosion control facilities, including swales along property lines as required to intercept uphill surface runoff and convey it to an approved point of disposal.
- 6) Finish Grading vs. FEMA Flood Elevations. Unless otherwise allowed by the City under an applicable land use approval or otherwise required under an applicable development code provision, grading plans shall be designed such that all finish grades (ie. ground surface after completion of grading work associated with a development permit) within building envelopes are a minimum of 1 foot above the FEMA 100 year flood elevations.

g. Fire Vehicle Access Plan (plan view) (moved up from below)

- 1) Where fire lanes are required, provide fire vehicle access plan drawing(s) illustrating the fire truck routes along all fire lanes and turnarounds within the project, to all hydrants, and to within 150 feet of the exterior wall of any building (OFC 503.1.1) unless a distance exception is approved in writing by the Fire Code Official.
- 2) Include dimensions and widths along all fire lanes & turnarounds, as well as widths and dimensions for fire lane easements & turnarounds. Ensure that fire lane widths & clearances shown account for any bollards provided to protect hydrants, buildings or other structures.
- 3) Show & label all vehicular gates to be provided, with notes to provide Knox boxes or other entry means approved by the Fire Code Official.
- 4) Designate location of all fire lane/no parking signs and fire lane curb painting.
- 5) Show & label all fire hydrants (public & private) and FDCs, as well showing or noting curb painting at fire hydrant & FDC locations (ie. 10 feet each way from hydrants per Detail 503 & ORS 811.550(16), and painted curb length at FDC locations as required by the Fire Code Official, 20 foot minimum).

- 6) If not included on the drawings, a separate worksheet exhibit shall be provided for review illustrating the fire truck turning-radius wheel-path templates (autoturn or similar) along all fire lanes and turnarounds within the project, based on the actual fire apparatus to be used (use design vehicle as directed by the Fire Code Official).

g-h. Drainage Calculations

- 1) **A summary of drainage and detention calculations, including basin maps, shall be presented in a clear, concise and complete manner on the site grading or drainage plan sheets, or on a separate sheet.
 - a) These calculations shall address all runoff into the drainage system and downstream capacity.
 - b) Where applicable, include information (*on the drawings as noted above*) such as:
 - Design methodology (*rational or SBUH*),
 - Design storms & design rainfall intensities used,
 - Basin areas,
 - Runoff coefficients used,
 - Design flow and pipe capacity at key points along the storm system improvements, including where flow from upstream property enters the site (*add note if there is no existing or future upstream flow into the system*),
 - Downstream capacity at the connection point of the project drainage system to the existing system, etc.,

--as well as key detention system information, such as:

 - Detention volume required,
 - Detention volume provided,
 - Where drain rock is used for detention storage, include the volume of rock, rock void ratio, and total volume of rock void space,
 - Predesign flow rate & design storm(s),
 - Post construction design runoff to detention system & design storm(s),
 - Design out-flow rate & design storm(s),
 - Primary & emergency overflow elevation & location,
 - Orifice size & elevation,
 - Orifice capacity, including head above orifice at design flow,
 - Overflow route capacity (emergency overflow route shall to be shown and/or identified on the drawings), etc.
 - c) If required by the City, areas contributing flow to each inlet must be computed separately and each inlet with contributing area shall be

designated and shown on an accompanying contour map work sheet.

h.i. Plan Views

- 1) General: **Information required on the overall utility plan shall be shown on the plan views as applicable, including tax lot & address numbers of all existing lots, ~~or~~ existing parcels and buildings shown within or adjacent to the development (including properties on the far side of streets fronting the development areas shown on the various plan view sheets). In addition, the following shall be shown:
 - a) **Utilities and vegetation in conflict with the construction or operation of the street and public utilities. Vegetation to include trees greater than 6 inches in diameter (*measured at 4½ feet above soil line-DBH*) and landscape plantings within the right-of-way and easement areas.
 - b) Public and franchise or private utilities to be relocated.
 - c) Match lines with sheet number references.
 - d) **All existing survey monuments within or adjacent to project work areas.
 - e) Additional information as outlined below or as required by the City based on unique or unusual features of the project.
 - f) Show Future Curblines where Applicable. Where existing streets are not fully improved, or where less than full street improvements are being constructed, show the location & alignment of future curblines and intersection curb radii, so that the location of utilities being installed are clearly defined in relation to the future street improvements (*this requirement also applies to water/sewer/storm mainline improvements which are constructed without streets improvements, unless specifically waived by the City*).
- 2) Streets (plan view)
 - a) Street stationing shall be tied to existing property corners, centerline of intersections, and/or existing street monuments.
 - b) **Location, alignment and stationing of **existing streets and proposed street centerline and curb faces.

**Location of all curbs, driveways, edge of pavement, sidewalks, etc. shall be dimensioned from right-of-way centerline, easement boundary or other means so that its location is clearly defined.
 - c) Bearing of all street centerlines.

- d) Horizontal curve data of street centerline and curb returns, including stationing of point of tangency and point of curvature, length of tangent, length of centerline curve, delta angle, radius point, and centerline radius.
- e) Location of existing and proposed street centerline monuments.
- f) Centerline stationing of all intersecting streets.
- g) Curb return plan view details (*scale not to exceed 1" = 10', with all running slopes & cross slopes of sidewalks, pedestrian ramps & landings labeled*) and separate curb return profiles (showing gutter grades at face of curb) for all curb returns with pedestrian ramps, to demonstrate compliance with PROWAG requirements. Where centerline street grades and cross slope street grades of both intersecting streets is less than 1% (*including through the entire intersection*), the City Engineer may allow plans to show only top of curb elevations along curb returns at quarter-points on the curb return detail views.
- h) Location of the low points of street grades and curb returns.
- i) Crown lines along portions of streets transitioning from one typical section to another.
- j) Location, alignment & dimensions of all street frontage sidewalks, including sidewalks to be constructed with the project and sidewalks which are deferred to a future date. Sidewalks to be constructed with the project and those deferred to the future shall be clearly designated, and all required sidewalk easements shown & labeled.
- k) For residential projects or multi-tenant commercial projects, the location of CBU mailboxes shall be shown (*location must be acceptable to the local postmaster*), and the ADA access path to the CBU mailboxes must be designated per OSSC 1111, with a note designating that the CBU and the required ADA access path to the CBU must be constructed prior to City acceptance of the street improvements.
- l) Partial street improvements must be based on a full street design for a full urban improvement (*ie. provide full design as if the entire street were being constructed as part of project, including design of sidewalks & driveway approaches, reconnection to existing driveways, etc. on both sides, as well as storm drainage design for both sides of the street and associated intersections, etc.*), with the portion actually to be constructed as part of the project being clearly designated on the plans.

Where partial street improvements cross or intersect with other public or private streets, the partial (*interim*) intersection design must be

based on a full intersection design, including but not limited to showing proposed and future ADA compliant pedestrian ramps on all corners, storm drainage for the entire intersection, etc.

- m) For streets which are anticipated to experience significant truck traffic (*as determined by the City Engineer or Public Works*), and for driveways or access points which will accommodate truck traffic and/or emergency/fire vehicles, turning-radius wheel-path & vehicle-path templates shall be included with the drawings to demonstrate that the proposed improvements allow vehicular turning movements without encroaching onto sidewalks or crossing curbs outside of the defined driveway or vehicular access path.

3) Storm Drains (plan view)

- a) **Location, stationing and **size of **existing and proposed storm drains and appurtenances. Show drainage facilities upstream and downstream of the project as required to illustrate conditions affecting the design.

Where profile views are not provided (for private storm lines), the slope, rim/invert elevations and depth of cover, etc. shall be shown/labeled along all pipe alignments.

- b) **Drainage facilities located outside of public right-of-ways shall be stationed from the downstream end. For all manholes, catch basins, etc, located in or adjacent to streets, drainage facility stationing shall correspond to the street stationing.

- c) Mainline stationing of all service tees.

- d) **Location of all manholes, cleanouts (*including storm lateral cleanouts*), junction boxes, pipelines, ditches, etc. shall be dimensioned from right-of-way centerline, easement boundary, property line or other means so that its location is clearly defined.

- e) All manholes and other structures shall be numbered (*or lettered*) with a designation unique to the project and stationed to facilitate checking the plan views with the profile.

- ~~f) **Alignment, size and depth at property line or easement line of proposed storm drain laterals, as well as distance tie from property line cleanout to nearest property corner.~~

- ~~f) **The following information shall be provided for all storm drain service laterals.~~

(1) Mainline stationing

- (2) Alignment
- (3) Size
- (4) Length of service lateral
- (5) Depth at property line or easement line
- (6) Distance ties from property line cleanout to nearest property corner
- (7) Location of property line cleanout.
- g) Size, depth, pipe material and class, length of storm pipe, class of backfill and surface restoration shall be clearly shown or called out on the plan view, unless this information is shown on a profile view.

4) Sanitary Sewer (plan view)

- a) ****Location, stationing and **size of **existing and proposed sanitary sewers and appurtenances.**

Where profile views are not provided (for private sanitary lines), the slope, rim/invert elevations and depth of cover, etc. shall be shown/labeled along all pipe alignments.

- b) All sanitary sewers shall be stationed from downstream manholes to upstream manholes.
- c) ****Location of all manholes, cleanouts, pipelines, ditches, etc. shall be dimensioned from right-of-way centerline, easement boundary or other means so that its location is clearly defined.**
- d) Mainline stationing of all service tees.
- e) All manholes, cleanouts and other structures shall be numbered (*or lettered*) with a designation unique to the project and stationed to facilitate checking the plan views with the profile.
- f) ****Existing City sewer manholes numbers shall be used for all existing manholes or mainline cleanouts shown.**

- (1) Following acceptance by the City, each new sanitary sewer manhole and new mainline cleanout shall be identified on the as-builts with a number provided by the City. The design ID number or letter shall remain on the as-builts next to the City assigned number (*use parenthesis to differentiate*).

- g) ****The following information shall be provided for all sanitary sewer service laterals.**

- (1) Mainline stationing
- (2) Alignment
- (3) Size

- (4) Length of service lateral
- (5) Depth at property line or easement line
- (6) Distance ties from property line cleanout to nearest property corner
- (7) Location of property line cleanout.

h) Size, depth, pipe material and class, length of sanitary sewer pipe, class of backfill and surface restoration shall be clearly shown or called out on the plan view, unless this information is shown on a profile view.

5) Water Distribution (plan view)

- a) **Location, callouts, stationing (*where applicable*) and **size of **existing and proposed water mains and appurtenances, fittings, bends, thrust blocks, straddle blocks, retainer glands or other restraint devices, couplings, domestic water or fire service lines, meter boxes, backflow devices or vaults, etc.

Fire Service drawings conform with the requirements listed under PWDS 5.19.c.

Where profile views are not provided (*for private water lines*), the slope, rim/invert elevations and depth of cover, etc. shall be shown/labeled along all pipe alignments.

- b) Each valve and fire hydrant shall be identified and stationed to facilitate checking the plan views with the profile.
- c) **Location of all waterlines, hydrants, water meters, backflow devices, etc. shall be dimensioned from right-of-way centerline, easement boundary, adjacent property corner or other means so that its location is clearly defined.
- d) Waterline stationing shall be independent of the street stationing, unless otherwise approved by the City Engineer on a case-by-case basis where waterline profiles are not required.
- e) Size, depth, pipe material and class, length of water pipe, ~~and~~ class of backfill and surface restoration shall be clearly shown or called out on the plan view, unless this information is shown on a profile view.

~~6) Site Layout & Dimensioning Plan (plan view)~~ moved up

- ~~a) The site layout & dimensioning plans shall show all property dimensions, all parking lot and site access improvements and dimensions, including all vehicular & pedestrian access routes (*including fire lanes*), curbs, as well as building locations, separations & setbacks, etc., as well as other applicable information.~~

7) Fire Vehicle Access Plan (plan view) moved up

- a) ~~Where fire lanes are required, provide fire vehicle access plan drawing(s) illustrating the fire truck routes along all fire lanes and turnarounds within the project, to all hydrants, and to within 150 feet of the exterior wall of any building (OFC 503.1.1) unless a distance exception is approved in writing by the Fire Code Official.~~
- b) ~~Include dimensions and widths along all fire lanes & turnarounds, as well as widths and dimensions for fire lane easements & turnarounds. Ensure that fire lane widths & clearances shown account for any bollards provided to protect hydrants, buildings or other structures.~~
- c) ~~Show & label all vehicular gates to be provided, with notes to provide Knox boxes or other entry means approved by the Fire Code Official.~~
- d) ~~Designate location of no parking signs and fire curb painting.~~
- e) ~~Show & label all fire hydrants (public & private) and FDCs, as well showing or noting curb painting at fire hydrant & FDC locations (ie. 10 feet each way from hydrants per Detail 503 & ORS 811.550(16)).~~
- f) ~~If not included on the drawings, a separate worksheet exhibit shall be provided for review illustrating the fire truck turning radius wheel-path templates (autoturn or similar) along all fire lanes and turnarounds within the project, based on the actual fire apparatus to be used (design vehicle as directed by the Fire Code Official).~~

i.j. Profile Views

- 1) General: Profile views shall conform to the requirements and show the information outlined under this section as applicable:
 - a) Profile views shall be to the same horizontal scale and on the same sheet as the corresponding plan view.
 - b) Match lines with sheet number references.
- 2) Streets (profile view)
 - a) Original ground & finish grade profile along the centerline and curbs as appropriate. For off-set or super-elevation cross-sections, both curbs shall be profiled.

Ditch invert profiles shall be shown where curbs are not to be constructed.

Profiles at intersections or cul-de-sacs shall be extended to the back of

the far side PUE as a minimum, ~~or and~~ to the top/bottom of cut or fill slopes where applicable, whichever distance is greater.

- b) Stationing, elevations and percent slopes for centerline or top of curb profiles.
- c) Beginning point of all vertical curves, points of vertical intersection, end of vertical curve, length of vertical curve, K-value and design speed, and low point of vertical curve if a sag curve.
- d) Profile Extension. Show the pProjection of the profile of streets that may be extended or reconstructed in the future. The projected profile shall extend a minimum of 200 feet beyond the proposed work limits. The City may require profiles to be extended further where necessary due to topography or to demonstrate ability to tie to existing streets. Projected profiles shall be designed to be compatible with the constraints of the terrain.
- e) The top of curb profiles for all cul-de-sacs, including vertical curves for any grade changes exceeding 1%, with a K-value not less than 3.
- f) Separate curb return profiles (*showing gutter grades at face of curb*) for intersection curb returns in accordance with requirements under PWDS 1.10.gh.2.g. The location of all pedestrian ramps shall be indicated and labeled on the curb return profiles to demonstrate that the design grade along the gutter pan is less than 2% at the pedestrian ramp throat.
- g) Street Cross Section Profiles. Unless otherwise approved or required by the City, cross sections showing existing and proposed finish grade shall be shown at 50 foot intervals to demonstrate that the proposed street grades match the surrounding grades and address drainage concerns, as well as to determine the need for slope easements, as well as at existing driveways or other access ways.

Unless otherwise approved by the City in existing developed areas, the cross sections shall extend a minimum of 50 feet beyond the right-of-way line where existing cross slopes are less than five percent (<5%) and a minimum of 25 feet beyond the right-of-way line where existing cross slopes are greater than five percent (>5%).

- h) Profiles for partial street improvements shall include information for both the turnpike construction (*including ditch profiles as applicable*), as well as future street curb profiles, including full street cross section profiles.

3) Storm Drain (profile view)

- a) Profile of existing and proposed ground surface along centerline of pipe,

with rim and pipe inverts at each manhole, catch basin, etc.

- b) Manholes and other appurtenances shall be numbered (*or lettered*) with a designation unique to the project and stationed to match the corresponding plan view.
- c) Size, slope, pipe material and class, length of storm pipe and class of backfill between consecutive manholes, catch basins, junction boxes or cleanouts.
- d) Crossings. All existing or proposed public and franchise or private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.
- e) Existing drainage facilities, including offsite facilities upstream and downstream which affect the design (*ie. size, capacity and/or slope of upstream and downstream system*).
- f) Profiles for ditch and creek flow lines shall be extended as appropriate to illustrate conditions affecting the design beyond the project, both upstream and downstream. Existing channel cross sections and typical new channel cross sections shall also be shown.
- g) Profile Extension. Where mainline storm cleanouts are approved for storm lines which will be extended in the future, plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next manhole or catch basin shall be included (*without mainline grade breaks between structures*).

4) Sanitary Sewer (profile view)

- a) Profile of existing and proposed ground surface along centerline of pipe, with rim and pipe inverts at each manhole.
- b) Manholes and other appurtenances shall be numbered (*or lettered*) with a designation unique to the project and stationed to match the corresponding plan view.
- c) Size, slope, pipe material and class, length of sewer and class of backfill between consecutive manholes.
- d) Crossings. All existing or proposed public and franchise or private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.
- e) Profile Extension. Where mainline sewer cleanouts are approved (see PWDS 4.16.b.1), plan and profile showing the alignment and depth of the anticipated future extension from the proposed cleanout to the next

manhole shall be included (*without mainline grade breaks between manholes*).

5) Water Distribution (*profile view*)

- a) Profiles. Waterline profiles shall be provided for all waterlines within existing right-of-ways or along alignments paralleled (*within 15 feet*) or crossed by existing public utilities.

Waterline profiles will not be required for new waterlines within new right-of-ways unless required to illustrate and/or prevent conflicts with proposed utilities.

- b) Profile of existing and proposed ground surface along centerline of pipe, as well as existing and proposed pavement surface of adjacent streets (*where applicable*).
- c) Show the location of valves, fittings, fire hydrants and other appurtenances, with all valves and fire hydrants numbered and stationed to match the corresponding plan view.
- d) Size, pipe material and class, depth of cover and class of backfill and surface restoration.
- e) Crossings. All existing public and private utilities crossing the profile and any existing utilities which potentially are in conflict with construction of the improvements.

1.11 EASEMENTS, ETC.

- a. ****City Easements.** Utility easements to the City (*in a form acceptable to the City and conforming to the PWDS requirements*) shall be provided and recorded for any City utilities (*or fire lanes*) outside of public street right-of-ways (*see requirements in following section for private easements*).
- 1) **City Easement Widths.** The minimum utility easement widths and property line offset requirements are referenced in subsequent PWDS sections for Storm Drain, Sanitary Sewer and Water. The developer's engineer shall verify that widths and extents of easements (*to the City*) fully comply with standards per PWDS 5.15.d (*water*), PWDS 4.15.d (*sewer*), PWDS 3.12.d (*storm*) or PWDS 2.31.c (*common driveways/fire lanes*) based on the final approved design.
 - 2) Other recorded easements/instruments affecting City access and/or interests (*ie. fire lane easements, detention system easements & maintenance agreements, grease interceptor maintenance agreements, common driveway maintenance agreements, etc.*) shall also be in a form acceptable to the City and conforming to the PWDS requirements.
 - 3) **See also Easement Procedure Summary on cover page of Appendix D.**
- b. ****Legal Description & Exhibit Map Required.** All recorded easements (*including private easements required by City standards*) or right-of-way dedication documents shall include a legal description of the easement or ROW area ~~and~~**AND** a "to-scale" exhibit map, except for easements created by a plat, in which case the recorded easement documents may reference the easement as shown and labeled on the plat.
- 1) **Exhibit Maps.** The easement or ROW boundary & area shall be clearly shown and labeled on the exhibit map, and include all information/callouts required to illustrate the information contained in the legal description, including point of beginning, bearings and distances if applicable, distances along property lines from the nearest property corner(s) to the easement alignment shall be shown on the exhibit map, etc., as well as deed callouts or lot/parcel numbers (*for the property containing the easement*) and street names as required to clearly show the location of the easement in relation to affected property(s)ies.
 - a) In addition to deed callout or lot/parcel numbers, exhibit maps shall also list the tax lot number & address of the properties shown (*both grantor & grantee property*), as supplemental information for reference & orientation only.
 - b) In order to comply with ORS 93.600, use of a tax lot number and/or an address as the ONLY means to describe property is not considered to

be legally adequate as a legal description (for use in a recorded document).

- 2) Legal descriptions and exhibit maps shall be submitted for review and approval by the City Engineer and/or Public Works Director ~~review and approval~~ prior to recording.
 - a) ~~Per ORS 93.600, use of a tax lot number and/or an address as the ONLY means to describe property is not legally adequate as a legal description, for use in a recorded document.~~
 - 3) Exhibit maps not drawn and plotted to scale, or not containing the information required above, or which do not match the utility or access alignments shown on the final approved construction drawings, or which do not match the widths required to meet City standards. will be returned for revision.
- c. **Prohibited within Easements Granted to the City.** Property owners shall not plant, build, construct, or create *(nor permit others to plant, build, construct, or create)* any fills, trees, buildings or other structures, including fences or parallel utilities, on or within an easement granted to the City which might interfere with the use by the City of the easement for the defined purposes, or which might interfere with the normal operation, inspection, access to or maintenance of the utilities within the easement, including excavation for repairs or replacement if necessary. In addition to permanent structures, prohibited structures shall include sheds, decks, footings or overhanging portions of structures which are located outside of the easement.
- 1) Access gates acceptable to the Public Works Director shall be installed in fences which the City allows to be constructed across ~~an~~the easement granted to the City.
 - 2) The property owner shall not construct cuts or fills within or on the easement area without express written approval by the City, since this will interfere with the use of the easement for the purposes for which it was granted. Fills will make the utilities less accessible for inspection and/or maintenance, and cuts may result in inadequate cover over said utilities, and either will result in access points *(manholes, inlets, valves, cleanout or meter boxes, etc.)* no longer being at the proper grade. Any such approval by the City *(which approval may be granted or withheld at the City's sole discretion)*, shall be contingent on the property owner performing all work required by the City in order to mitigate impacts due to such cuts or fills, including reconstructing or resetting the utilities and appurtenances as directed by the City at the property owner's expense. It is understood and agreed that the City may remove *(or require removal by the Grantor)* any physical obstructions including buildings, overhangs, fences, trees, shrubbery or fill material, and abate any use of the easement if the City finds that the physical obstruction or use will interfere with the City utility or the City's ability to access, maintain or repair the City utility, and that such removal or abatement may be completed

(including if removal by property owner is required) without recompense to the property owner(s) (except to the extent that such recompense or reimbursement may be specifically included in the recorded easement documents).

- 3) The City acknowledges that the property owner may generally use the easement area for access driveways and/or permitted parking *(except that parking is not allowed in fire lane easement areas)*, or similar uses which are allowed by the City.
- d. ****Street Frontage PUE.** Where PUEs do not already exist, projects Easements shall include minimum eight (8) foot public utility easements (PUE) for franchise utilities along all lot lines fronting public or private streets, as well as easements for fire hydrants, sewer & storm drainage property line cleanouts & water meters where set behind the sidewalk, cluster mail box pads, and sidewalks at driveway crossings *(when they must be widened or jogged back to meet ADA standards)*, pedestrian ramps at intersections, city street light poles, etc. which may be located behind sidewalks and just outside of the public right-of-way.

The requirement for PUEs may be waived by the City on a case-by-case basis where the right-of-way widths are adequate to accommodate all existing and future franchise utilities AND zero setbacks are allowed on the property by City code.

- 1) Wording on Plat. PUEs created by a plat should include wording similar to the following, with PUE (plat wording to be acceptable to the both Public Works and the County Surveyor).

"We hereby create a utility easement as shown along the public right-of-ways for franchise utilities and also dedicate to the City of Dayton along said utility easement a waterline, sanitary sewer, storm drain and public sidewalk easement."

- 2) Construction of a building or a structure within the PUE is prohibited, including footings or overhanging portions of structures located outside the easement. If the City allows a retaining wall or a fence to be constructed within or across a PUE, an encroachment license agreement shall be executed and recorded against the property stipulating that the property owner will be responsible for any restoration costs associated with removal and reconstruction of said retaining wall or fence if such removal is required to service, maintain or repair utilities installed within the PUE, whether by the City or by any franchise utility company.
- 3) Where easements for City water, sewer or storm drain mainlines are proposed or exist along street frontages, new PUEs shall be located outside of (and separate from) City utility easements *(except at crossings)*, to prevent future installation of franchise or private utilities parallel with City pipelines within the City easements ~~parallel with City pipelines~~.

- e. ****Private Easements.** Private utility easements a minimum of ten (10) feet wide (*centered on the utility pipe and offset from common property lines*) shall be provided for all franchise utilities, private water, sanitary sewer and storm drains, ditches or channels outside of public right-of-ways and outside the boundaries of the property being served, or which are extended across the development property in order to provide service to other properties.

Private access easements shall also be provided for any driveway, sidewalk or path crossing property other than the one being served, and shall include provisions defining who is responsible for repair and/or maintenance costs for the subject improvements.

Acquisition of such private easements shall be the sole responsibility of the entity requesting or installing the private utilities, pipes, ditches or channels, sidewalks or pedestrian paths, or driveways and other access routes.

- 1) Extension of private water, sanitary sewer and storm drain laterals across adjacent private property is typically only allowed where it is the only feasible method of providing utility service to a development property.
 - 2) Any proposal for extension of private water, sanitary sewer and storm drain laterals across adjacent private property instead of from a street frontage shall not be allowed as a substitute for the PWDS requirement to extend mainline utilities across the frontage of development property (*ie. to & through*) in order to provide for such services and to allow for future extension, as required under PWDS 1.6.c, d & e.
 - 3) Required Language for Private Easements. While the City does not dictate the specific form required for use on the private easements noted above (*ie. including both required utility easements and required access easements*), the easement forms used for private easements required by City standards shall (*in addition to referencing the legal description and exhibit map defining the easement boundaries*)
 - (A) define which properties the private easement is to the benefit of (*by legal description & also as shown on the exhibit map*),
 - (B) define who is responsible for repair and/or maintenance costs associated with the easement.
 - (BC) include provisions that the easement cannot be extinguished without explicit written authorization from the City, and
 - (CD) include language that the easement will not be extinguished by the doctrine of merger (*unless the properties are consolidated into a single legal lot of record*).
- f. ****Recorded copies of all required easements, dedications and/or agreements (both public & private)** shall be submitted to the City Engineer and the Public Works Director prior to start of construction, with the exception noted under PWDS 1.9.i.3 for subdivisions or partitions where all public utilities will be constructed prior to the

recording of a final plat. All recording costs shall be borne by the Developer.

- g. When requested by Public Works or the City Engineer, a digital drawing shall be submitted containing the final alignment & boundaries of all new easements associated with the development. The drawing shall be in Autocad format, and shall include lot lines, right-of-way lines and easement lines each on separate layers.

1.12 PUBLIC WORKS VARIANCES TO DESIGN STANDARDS

a. Request for Public Works Variance to Specifications/Standards

- 1) Public Works variances to specifications or standards may be requested as outlined below.
- 2) In considering Public Works variance requests, the City, at its sole discretion, will seek input from individuals and/or agencies which may have information that would be relevant to the decision making process.
- 3) It is to be noted that if the requested variance involves public safety, the City will rule in favor of safety.
- 4) It is the responsibility of the design engineer to submit a written request for any proposed deviations or variances from City standards. Failure by the City to detect a deviation from *(or the need for a required variance of)* the PWDS requirements during drawing review does not constitute an default approval of said variance, unless the variance was requested in writing as outlined below and approved by the City.

b. Public Works Variance Process

1) Submittal

- a) Requests for Public Works variance shall be submitted in writing to the City Engineer. This written request shall state the desired Public Works variance, the reason for the request and a comparison between the specification/standard and the variance as far as performance, etc.
- b) Any variance of these Standards should be documented and referenced to a nationally accepted specification/standard. The use thereof shall not compromise public safety or the intent of the City's Standards *(as determined by the Public Works Director and City Engineer)*.

2) City's Review

- a) The Public Works variance request shall be reviewed by the City Engineer who shall make one of the following decisions:
 - (1) Approve as is,

- (2) Approve with changes, or
 - (3) Deny with an explanation.
 - b) Approval of a request shall not constitute a precedent.
 - c) For Public Works variances which will result in increased maintenance or increased future costs by the developer (*or the future property owners*), the variance request must be concurred with in writing by the developer/property owner prior to final approval by the City.
- 3) Appeal
- a) Applicant may appeal the City Engineer's decision to the City Manager. Applicant may appeal the City Manager's decision to the City Council.
- c. Criteria for Variance of Specification Standards
- 1) The City Engineer may grant a Public Works variance to the adopted specifications or Standards when all of the following conditions are met:
 - a) Topography, right-of-way or other geographic conditions impose an unreasonable economic hardship on the applicant (*as determined by the Public Works Director*) and an equivalent alternative is proposed which can accomplish the same intent. Variances to self-imposed hardships shall not be allowed. The variance requested shall be the minimum variance which alleviates the hardship.
 - b) Demonstration that the requested Public Works variance is a minor change to a specification or standard required to address a specific design or construction problem which, if not enacted, will result in an undue hardship (*note: additional cost or time required in order to provide the specific pipe, fittings or equipment required by City standards shall not typically be a justification for a variance request*).
 - c) An alternative design is proposed which will provide a plan equal or superior to these Standards. In considering the alternative, the City Engineer and/or Public Works Director shall consider appearance, durability, cost of maintenance by the City, public safety and other appropriate factors.

1.13 PRECONSTRUCTION CONFERENCE

- a. Following approval of the civil/site/street/utility drawing package by applicable agencies with jurisdiction, a preconstruction conference shall be scheduled with the City before issuance of the public works construction permits, at a location in Dayton approved by the City. The purpose of the conference is to discuss the construction schedule and timing of the civil/site/street/utility work which requires coordination, as well as

to provide the opportunity for parties from the construction team and various agencies/entities involved to meet and coordinate as may be necessary, and answer contractor questions regarding the work shown on the approved drawings.

- b. Mandatory Attendance. In addition to a City representative, the meeting is to include the following parties from the development team (*the development team is responsible for inviting these parties*):

- Developer's representative.
- Developer's engineer of record during construction.
- Prime contractor.
- Street/site/utility subcontractor(s) (*if different than the prime contractor*).

Development/Construction Team Contact List. The development team is responsible for providing the City with a written list of the names and full contact information (*including mailing addresses, ~~and~~ email addresses & cell phone numbers*) of all persons attending the preconstruction conference on behalf of the development, design or construction teams.

- c. Agency & Utility Company Notification. The development team shall be responsible for notifying the franchise and private utility companies (*as well as the County Public Works and ODOT if applicable*) of the time and location of the preconstruction conference, and requesting that a representative of each agency and 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 or emails sent to the utility companies are acceptable.

- d. The developer, prime contractor and/or the street/site/utility subcontractor shall provide the following prior to or at the preconstruction conference.

- Overall bar-chart project schedule (*for the street/site/utility work*)
- Listing of supervisory personnel and two emergency after hours contact persons.
- Materials testing lab (*and outside inspection entity if applicable*).
- List of subcontractors & major materials suppliers to be utilized by the prime contractor and the street/site/utility subcontractor for work under the Public Works Permit.
- Certificates of insurance from the contractor performing the site/street/utility work, minimum limits and format as outlined in PWDS Appendix E. The City and Westech Engineering (*as City Engineer*) shall be covered as additional insured. The City is to be named as the certificate holder.

- e. Evidence of Worker's Compensation coverage from the contractor or subcontractor(s) performing the site/street/utility work.

1.14 CONSTRUCTION OBSERVATION, INSPECTION & TESTING

a. General

- 1) Periodic Inspection. All infrastructurepublic construction associated with development shall be inspected or periodically observed by a professional engineer licensed in the State of Oregon (*or a qualified individual under the engineer's supervision*) as required in the Developer-City Construction Agreement.

The City reserves the right to inspect any and all work at its discretion. The Contractor shall be responsible to notify the City prior to all testing, to allow City staff to be present at said testing.

Copies of all test reports shall be submitted to the City as soon after completion of testing as is feasible. Failure to provide test reports in a timely manner may result in the issuance of a stop work order by the City, until such reports are provided.

City designed & funded projects may be inspected by Public Works Director or the City Engineer (*or their authorized designees*) as applicable and as determined by the City.

- 2) An engineer whose firm, or any member of the firm, has a corporate, partnership or any form of real property interest in the development for which the improvements are required cannot be designated engineer-of-record. The engineer-of-record's relationship to the project must be solely that of a professional nature.
- 3) It shall be the policy of the City not to provide full time inspection services for non-public funded public improvements, including public access parking lots and fire lanes.
- 4) It shall be the Developer's responsibility to provide an engineer to perform periodic inspection and/or construction observation services for improvements which are designed and permitted under these PWDS, at the developer's expense.
- 5) These inspection and construction observation requirements are not applicable to individual sidewalk, driveway or service lateral permits for single residences. If the project scale is such that the retention of an independent engineer-of-record is not warranted, the Developer may request that the City provide these services.

If the City agrees to provide these services (*at the City's sole discretion*), the Developer shall be responsible to reimburse the City for any costs incurred for these inspection and/or construction observation services.

b. City Activities

- 1) Services provided by the City shall include:
 - a) Liaison between the engineer-of-record and the City;
 - b) Monitoring of work progress and performance testing as deemed desirable;
 - c) The performance of administrative and coordination activities as required to support the processing and completion of the project;
 - d) The issuance of stop work orders upon notifying the engineer-of-record and/or the Contractor of the City's intention to do so.
 - e) Operate all valves, including fire hydrants, on existing waterlines.
- 2) In addition, the City shall be notified a minimum of 48 business hours (2 *business days*) prior to the following tests and inspections so that a City representative may be present to witness the inspections or tests. Testing shall be started and completed during normal City business hours.
 - a) Streets (*public streets, private streets/fire lanes*)
 - (1) Curb inspection;
 - (2) Subgrade testing and/or proof rolls;
 - (3) Base rock testing & proof rolls;
 - (4) AC pavement placement and testing;
 - b) Sanitary Sewers
 - (1) Mandrel testing of sewer mainlines;
 - (2) Air testing of sewer mainlines *and laterals*;
 - (3) Vacuum testing of sewer manholes (*after paving or final surface restoration*);
 - (4) Video inspection of sewer mainlines (*after completion of manhole channeling*);
 - c) Storm Drains
 - (1) Mandrel testing of storm drain mainlines;
 - (2) Video inspection of storm drain mainlines (*after completion of manhole channeling*);
 - d) Water Distribution System
 - (1) Pressure tests of water mainlines, service lines to meters or backflow devices, hydrants, etc.;
 - (2) Disinfection of water mainlines, service lines, hydrants, etc. (*see App. B notes for procedures*).
 - (3) Bacteriological Testing (*see App. B notes for procedures*).

c. Developer's Engineer-of-Record's Activities

- 1) The engineer-of-record must be registered to practice engineering in the State of Oregon. Material testing which is not performed by the engineer-of-record must be accomplished by a recognized testing firm or another registered engineer.
- 2) ***The engineer-of-record must personally perform all activities marked by an (*) and must supervise all individuals performing other delegated activities.**
- 3) The following minimum activities are required of the developer's engineer-of-record:
 - a) *Execute a form accepting responsibility and verifying that he/she has been retained as engineer-of-record during the construction of the project (*ie. the Developer-City Construction Agreement*):
 - b) *Attend the preconstruction conference and ensure that approved construction drawings are distributed to contractor, subcontractors and franchise utility companies.
 - c) Obtain and use a copy of City-approved construction drawings and specifications during construction;
 - d) Coordinate to ensure that the City is notified 48 business hours (2 *business days*) before the start of construction or resumption of work after shutdowns, except for normal resumption of work following Sundays or holidays.
 - e) Call to the City's attention within two (2) working days all drawing changesdiscrepancies and/or required modifications, material changes, stop work orders, or errors or omissions in the approved drawings or specifications.
 - f) Maintain records which contain at least the following information and submit copies to the City on a weekly basis:
 - (1) Any Site Visits during the previous week
 - (a) Date and time of site visits
 - (b) Weather conditions, including temperature
 - (c) A description of construction activities
 - (2) Statement of directions to modifyehange drawings, specifications, stop work, reject materials or other work quality actions;
 - (3) Public agency contacts which result in drawing modificationsehanges or other significant actions;

- (4) Perceived problems and action taken;
 - (5) Results of fFinal and staged inspections and testing (*notify & coordinate with City to allow City representative to attend any testing during regular business hours*);
 - (6) CopiesReeords of all material, soil and compaction test results.
- g) Construction Staking. The engineer of record shall either (1) provide all surveying services necessary to stake the project prior to and during construction, and as necessary to prepare as-built drawings when the project is complete, or (2) confirm that these surveying services are being provided separately (*by the developer or by the contractor*), all in conformance with City Standards.
- (1) Construction staking shall be adequate to ensure that all streets, sidewalks, water, sewer, storm drainage and other improvements & utilities are properly installed to design alignments & grades, as well as with respect to easements, right-of-ways and property lines.
 - (2) All construction staking shall be all be clearly marked on lathe in the field for reference by the Contractor, inspectors, etc. during construction. Construction staking shall be adequate to ensure that all streets, sidewalks, water, sewer, storm drainage and other improvements & utilities are properly installed to design alignments & grades, as well as with respect to easements, right-of-ways and property lines. All construction staking shall be all be clearly marked on lathe in the field for reference by the Contractor, inspectors, etc. during construction. Even when GPS is used during construction, adequate field staking shall be provided to allow verification of locations, alignments, depths, etc. during construction and inspection.
- h) Review and approve all pipe, aggregate, concrete, A.C. and other materials submittals to ensure their compliance with City Standards, and provide any submittal review comments to the City Engineer and/or Public Works Director;
- i) *Approve all drawing or specification modificationsechanges in writing and obtain City approval prior to the performance of the work;
- j) Periodic Inspection. Provide periodic construction observations of construction activities as required to ensure all finished work end products meets City standards and specifications;
- k) *Perform (or verify that they are performed) Review material, compaction and other tests required to ensure City specifications are met;

- l) Periodically check that curb, storm drain work and pavement grades are in substantial conformance with approved drawings;
- m) For pavement construction, perform the following stage construction observations and record the date that each is verified:
 - (1) Curbs are built to line and grade;
 - (2) Subgrade meets grade and compaction specifications;
 - (3) Base rock meets grade and compaction specifications;
 - (4) Leveling course meets grade and compaction specifications;
 - (5) Wearing course meets grade and compaction specifications.
- n) For sanitary and storm drain construction, perform the following stage construction observations and record the date that each is verified:
 - (1) Sewers are installed to proper line and grade;
 - (2) Trenches are properly backfilled and compacted;
 - (3) Air testing and video inspections are performed according to standard procedures.
- o) For grading, verify that the grading plan, as staked, will result in acceptable slopes along exterior property lines, proper onsite and offsite drainage, and erosion control.

p) Design or Drawing Revisions or Modifications.

- (1) During construction, any revisions, modifications or changes proposed to the approved drawings and/or design must be requested in writing by the engineer-of-record, submitted to the City Engineer and Public Works Director.

The request shall include revisions to applicable drawing sheets as required to illustrate the proposed modifications, as well as a narrative summarizing the proposed revisions and why they are necessary.

- (2) While field discussions may occur between the City and Contractor personnel regarding modifications, any changes proposed must be formalized through the engineer-of-record.

p)q) Request for Final Inspection by City. When the engineer-of-record believes that the project is complete *(based on his/her inspections with the Contractor)*, the engineer-of-record shall notify the City that the project is ready for final inspection. The request shall be accompanied by the following.

- (1) Punchlist by Engineer-of-Record. In conjunction with this notification, the engineer-of-record shall also provide the City

with a complete and detailed summary of any items which remain to be completed.

(2) Draft As-Built for Review. A complete set of black-line as-built drawings for review by Public Works and the City Engineer;

(2)r) Punchlist Verification by Engineer-of-Record. Prior to requesting followup inspections, the engineer-of-record and contractor shall provide the City with verification that all items on any previous checklists/punchlists have been completed (*submittal of a hand annotated copy of the previous checklist/punchlist is acceptable*).

q)s) Completion Report by Engineer-of-Record. File a completion report which contains:

(1) Completion Letter. ~~A The original of the~~ project completion letter from the engineer-of-record ~~certification~~ verifying that the work under the Public Works permit was completed in substantial conformance with the approved construction drawings;

(2) Final As-Built. A complete set of ~~final black-line~~ as-built drawings ~~to the for review by~~ Public Works Director and/or the City Engineer (*see following "As-Built" section for specific requirements.*);

(3) Test Results. ~~Include copies of the The~~ results of storm, sewer and manhole tests, video inspections, waterline tests, as well as material tests, compaction tests (*backfill, subgrade, baserock & pavement*) and soil analysis as applicable.

As noted above, all test reports are to be submitted to the City as soon as feasible after testing is completed, but the completion report is to contain copies of all test reports compiled into a single package.

(4) ADA Verification. Written verification that all installed ADA ramps, sidewalks and exterior pedestrian access routes (*those covered under the Public Works permit*) have been checked and comply with current ADA and City standards.

(5) A copy of any required forms and/or certifications submitted to DEQ for sanitary sewer improvements (for the City's records).

(6) A copy of any required forms and/or certifications submitted to OHA-DWS for water system improvements (for the City's records).

(7) A copy of any required completion forms and/or certifications submitted to agencies in relation to any state/federal permits (ie. wetlands, etc.) required for the project (for the City's records).

r) ~~Submit final reproducible as-built drawings conforming to the requirements outlined herein.~~

s)t) Cost Information for Maintenance Bonding. Provide information summarizing the cost of the improvements which must be covered under any required maintenance bonds (*see PWDS G.15 for bond amounts & bond periods*).

1.15 WARRANTY INSPECTIONS :

- a. Warranty inspections will be performed by Public Works staff or the City Engineer near the end of the warranty period (*typically during the last month of the warranty period, unless circumstances dictate otherwise*).
- b. Re-inspection of the sanitary sewer and storm drainage systems by cleaning & TV inspection shall be performed within the last month of the warranty period. Based on the results of the TV inspections and/or the City's warranty inspections, additional warranty tests may include mandrel testing or low pressure air testing. The results of these test(s) will be used by the Public Works Director to determine if final acceptance of the system is warranted and what corrective work is required prior to final acceptance. The cost of these re-inspections, retesting (*where required by the City*) and any corrective work shall be the responsibility of the Developer.
- c. The warranty period will not be considered to be complete, and maintenance bonds will not be released until after all warranty inspections are finished and any resulting corrective work is completed.

1.16 AS-BUILT DRAWINGS

- a. As-built or record drawings prepared by the design engineer (*or engineer-of-record*) are required whenever the work results in new or modified public improvements (*as well as private improvements designed under the provisions of the PWDS*) and shall describe all revisions to the previously approved construction drawings.
- b. Complete Sets Required. As-built or record drawing sets shall include all drawing sheets which were included in the original ~~approved~~ construction drawing set approved by Public Works for all work covered under the PWDS (*including copies of architectural site plans or other drawing sheets which were included as part of the approved construction drawing set*), plus any additional sheets required to illustrate and document approved changes.
- c. The engineer-of-record shall utilize information from the Contractor's field record

drawings, the engineer's field inspections, and the as-built survey as applicable to ensure that the as-builts accurately reflect as-built conditions.

- d. As-Built Survey, Minimum Requirements. Unless otherwise approved by the City Engineer, as-built drawings for ~~public~~ sanitary sewer systems and public storm drains (as well as structures, pipes, & channels and berms [side slopes, top elevation & width] relating to stormwater detention or stormwater quality systems, including inlets, outfalls and/or overflows) shall be based ~~from off of~~ an as-built survey (rim, invert, slope, alignment, etc.) ~~completed conducted~~ by a licensed land surveyor registered ~~to practice~~ surveying in the State of Oregon.

~~d.1)~~ The as-built survey shall also include ties for any other utilities or improvements which were constructed differently from that shown on the approved construction drawings.

2) The Public Works Director and/or the City Engineer may require additional as-built survey information be provided if there appear to be discrepancies between the draft as-built drawings submitted and the constructed improvements.

- e. Show all below grade franchise or private utility vaults and street crossing, as well as all above grade transformers, pedestals, etc.

- f. Distance Ties to Sewer & Storm Cleanouts. The location of all cleanouts on service lines shall be shown on the as-builts (*sanitary sewer and storm drain*) based on distance ties from two permanent points. The tie points shall be immovable structures, such as property pins, street monuments or the center of manholes.

- g. City Numbers for Sewer Manholes, Cleanouts, etc.

- 1) The new sanitary sewer manholes and/or mainline cleanouts will be assigned City numbers by the City at the as-built stage. City sewer manhole numbers shall be shown on the as-built drawings in parenthesis next to the design manhole designation.

2) Street Names & MH ~~N~~umbers.

a) Street Names. If street names are changed, the new street name shall be shown on the as-built drawings in parenthesis next to the original design street names.

~~2)b)~~ MH Numbers. Since the inspection reports, TV inspection reports, etc, will reference the design street names and design sewer manhole numbers, the as-builts need to retain the design information (*in addition to showing the new City sewer manhole numbers and as-built street names*) to allow reference to the construction report documents.

- h. Recording References on As-Builts. The recording references for the easement documents for all existing or required public and private easements shall be included on

the as-built drawings (*as well as listing the beneficiary of each easement*), as well as recording references for construction deferral agreements, maintenance agreements, etc.

- i. Draft As-Built Required Prior to Final Inspection. Legible black-line copies of the as-built drawings shall be submitted to the City prior to the final walkthrough inspection and for review prior to submittal of the final as-builts.
- j. Final As-Builts.
 - 1) Following the final walkthrough and review of preliminary as-builts by the City, submit approved full size as-built drawings (*complete sets*) on mylar or vellum to the Public Works Director, as well as full-size as-builts in electronic format (pdf) to the Public Works Director and the City Engineer.

Additionally, two paper sets of final as-builts shall be submitted to Public Works and one set to the City Engineer.
 - 2) Subject to approval in writing by the Public Works Director (*case-by-case basis*), as-built or record drawing sets for private improvements only (*ie. those designed under the provisions of the PWDS*) may be provided as full size pdf sets only, other than sheets including pipes & channels relating to stormwater detention systems, outfalls and/or overflows (*for which hard copy sheets are required as noted above*).
- k. CAD File Information Required, Digital Parcel/Lot/Space/ Easement/ROW Map~~Digital~~
Parcel/Lot/ROW Map.
 - 1) In addition to the mylar or vellum as-builts, a digital map shall be submitted to the City Engineer on a USB storage device (or download link) showing the final configuration of lot lines and right-of-way lines within or fronting the development, as well as easement boundary lines (*for manufactured home parks, PUDs, RV parks, apartments, commercial industrial developments, etc., include vehicle access routes & space boundaries, etc.*).
 - 2) The drawing shall be in Autocad format, with lot lines, right-of-way lines, and easement lines, etc. each on separate layers.
 - 3) Other than lot lines and right-of-way lines (*& other information noted above*), the only other information shown shall be limited to street names and the name of the development.

CITY OF DAYTON
Public Works Design Standards

Division 2
Streets

DIVISION 2 STREETS

2.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to:
- 1) provide design guidance criteria to the private sector for the design of public and private streets within the City;
 - 2) establish standard right-of-way widths and improvement requirements for the appropriate street classifications;
 - 3) require the use of design and materials to provide streets with a minimum practical design life of not less than 30 years.
 - 4) ensure the development of a street system which will:
 - a) be of adequate design to handle the traffic needs for the City of Dayton;
 - b) be designed in a manner to allow economical future maintenance;
- Alternate materials and methods will be considered for approval on the basis of these objectives.
- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

2.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public and private streets and associated facilities in the City of Dayton and applicable work within the City's service areas.
- b. All properties shall be provided with access to a public or private street, 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.
- c. ADA & PROWAG Applicability.
- 1) New Construction: Newly constructed facilities within the project limits

(whether within or outside of the public right-of-way) shall be made to comply with ADA and PROWAG standards as applicable. Designers are encouraged to reference the complete PROWAG document for additional information on work associated with the public right-of-way (www.access-board.gov).

- 2) Alterations: When alterations are made to the pedestrian circulation path (including pedestrian crossings), the pedestrian access route shall be made to comply with ADA and PROWAG standards as applicable, to the maximum extent feasible within the scope of the project. Alterations shall not be allowed to gap pedestrian circulation paths in order to avoid compliance with ADA and PROWAG standards (*see USDOT/USDOJ memos in Appendix F for more detailed information*).
- a) When elements are altered or added to existing facilities in a manner that does not alter or impact the pedestrian circulation path, the pedestrian circulation path is not required to be modified. However, elements that are added shall be made accessible to the extent required by ADA or PROWAG standards.
 - b) Sidewalk improvements or replacement which includes or impacts curb ramps, landings or turning spaces will trigger a requirement to upgrade the affected ramp, landing or turning space.
 - c) Street resurfacing (including overlays) is an alteration which triggers the requirement to upgrade curb ramps if it involves work on a street or roadway spanning from one intersection to another, or spanning a mid-block pedestrian crossing.
 - d) Accessibility improvements are not required for work that is considered as maintenance. Examples of work considered to be maintenance include, but are not limited to, the following.
 - Painting and/or other traffic control surface markings, excluding delineations of new accessible parking spaces.
 - Crack filling & sealing
 - Slurry seals or chip seals
 - Localized high friction treatments
 - Minor street patching (*less than 50% of the pedestrian street crossing area*)
 - Minor sidewalk repair which does not include or impact curb ramps, landings or turning spaces.
 - Filling potholes
 - e) If a project includes work which is not included in the lists above, or which consists of a combination of several maintenance items occurring at or near the same time, the City will determine whether the project should be considered maintenance or an alteration.

2.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
 - 1) Intersections with State highways
 - 2) Intersections with railroads
 - 3) Commercial/Industrial entrances
 - 4) Signalized Intersections
 - 5) Bridges *(including private bridges for fire lanes, see OFC 503.2.6)* or ~~Culverted Stream Crossings or fish passage culverts, including private bridges for fire lanes (see OFC 503.2.6).~~
 - 6) Bus/Transit stops.
- b. Review and approval of the above special items by the City Engineer and Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

Bridges or culverts on fire lanes shall also be subject to review & approval by the fire code official per OFC 501.3.

2.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 2.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested. Any and all such requests shall be submitted in writing to the Public Works Director prior to City approval of the design drawings.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards *(also see "equal" & "substitute" definitions under PWDS 1.4).*
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer. When requested by the City, full design calculations shall be submitted for review with the request for approval.

2.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.

- b. Detail drawings shall be included on the construction drawings for all street system components including but not limited to typical sections, curbs, sidewalks, handicap ramps, drainage facilities, etc.

2.6 CITY STANDARD DETAILS

- a. City sStandard details included in the Appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the City standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable City standard details shall be included on the construction drawings. Details shall be placed in numerical order on the detail sheets, for ease of reference during construction.

2.7 EXISTING STREET CLASSIFICATIONS

- a. The classification of arterials and collectors is established by the Dayton Comprehensive Plan and other documents, while industrial and commercial streets are established by the surrounding land use designation. Streets currently designated as arterial and collector streets are as outlined below.
 - 1) Arterial:
 - Ferry Street (Hwy 233)
 - 3rd Street (Hwy 221)
 - Dayton Bypass (Hwy 18)
 - 2) Collector:
 - Church Street
 - Ash Street
 - Flower Street
 - 8th Street
 - Fletcher Road
 - 3) Commercial/Industrial Streets include those streets within or fronting commercial or industrial zones.

2.8 OTHER JURISDICTIONS

- a. Other than the City, there are two other agencies with jurisdiction over streets or roads within the City Limits. These agencies are the Oregon Department of Transportation (ODOT) and Yamhill County.

- b. In all cases, the City design standards shall be considered to be the minimum allowable standards for any streets within the City Limits. ODOT and Yamhill County may have additional or more stringent requirements. Approval from ODOT and Yamhill County will be required prior to construction activities on any street or road under their jurisdiction.

2.9 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to street systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Standard Specifications for Construction – OSSC (ODOT/APWA) shall also apply.
- 1) Abbreviations: Acceptable abbreviations for pavement materials are as follows:
 - a) AC - Asphalt Cement *(also ACP – Asphalt Cement Pavement)*
 - b) PCC - Portland Cement Concrete
 - 2) Alley: A public right-of-way not more than 20 feet and not less than 10 feet in width, which intersects with a public street.
 - 3) 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.
 - 4) Bike Lanes: A designated travel-way for bicyclists which is established within the roadway directly adjacent to the outside vehicular lane or on the shoulder.
 - 5) Bike Path: A designated travel way for bicyclist which is completely separated from the vehicular travel lanes and is within independent right-of-ways or easements.
 - 6) Bike Route: A designated travel-way for bicyclists which can be shared with vehicular traffic. The roadway is designated with signs for bicycling *(may or may not include no pavement markings for the bike route or delineation of parking spaces, as determined by the City-is-used)*.
 - 7) Clear Vision Area: A triangular area on a lot at the intersection of two streets, a street and a driveway 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.
 - 8) Collector Street: A centrally located street for moving traffic from arterials to local streets.

- 9) Contraction Joint: A joint to prevent uncontrolled cracking in the sidewalk or pavement structure, consisting of a tooled joint and aggregate separation.
- 9)10) Cross Slope (Pedestrian Path): The grade that is perpendicular to the direction of pedestrian travel.
- 10)11) Cross Slope (Vehicle Path): The grade that is perpendicular to the direction of vehicular travel.
- 11)12) Crosswalk: See Pedestrian Street Crossing.
- 12)13) Curb Ramp: A ramp that cuts through or is built up to the curb. Curb ramps can be perpendicular, parallel, or a combination of parallel and perpendicular.
- 13)14) Detectable Warning: Detectable warnings consist of small, truncated ~~coneseomes~~ built in or applied to a walking surface that are detectable by cane or underfoot. On pedestrian access routes, detectable warning surfaces indicate the boundary between a pedestrian route and a vehicular route for pedestrians who are blind or have low vision. Detectable warnings shall contrast visually with the surrounding sidewalk surface.
- 14)15) Downstream Intersection: The nearest intersection from a driveway located in the direction of traffic flow of the nearest lane of the abutting street.
- 15)16) Expansion Joint: A joint to control ~~eracking~~ expansion and potential heaving in the sidewalk or pavement structure and filled with preformed expansion joint filler.
- 16)17) Grade: The degree of inclination of a road, sidewalk or slope, in the direction of travel.
- 17)18) Half Street Improvement: Where allowed by the development code, half street improvements shall fully comply with the fire lane requirements of the Oregon Fire Code, including provision of additional width if on-street parking is allowed. Generally half-street improvements are allowed only if the other side of the street was previously improved and the current development is required to complete the street improvement to full urban width (*three-quarter street improvements are the minimum typically required if there are frontage improvements required in conjunction with development, and where the far side of an existing or new the-street will be improved in the future in conjunction with other developments*). See PWDS 1.10.h.2 for full street design requirements in conjunction with partial street improvements.
- 18)19) Intersection: The meeting point of two streets having at least three legs.
- 19)20) 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.

20)21) Longitudinal Joint: A joint which follows a course approximately parallel to the centerline of the roadway.

21)22) Natural Grade: The grade with the land in an undisturbed state.

22)23) One-Way Driveway: A driveway of either vehicular ingress or egress, but not both.

23)24) Parking Space: A designated space in a parking area for the parking of one motor vehicle. An off-street parking space is a designated space for the parking of one motor vehicle, which is located on private property rather than on a public street.

24)25) Pedestrian Access Route: A continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path (*typically concrete, pavement or similar hard surface*), whether located within or outside of the public right-of-way.

25)26) Pedestrian Circulation Path: A prepared exterior or interior surface provided for pedestrian travel in a public right-of-way, as well as accessible pedestrian routes required on sites or facilities which are open for access by the public or as otherwise required by applicable codes (*typically concrete, pavement or similar hard surface*).

26)27) Pedestrian Street Crossing: A marked or unmarked route, providing and accessible path to travel from one side of the street to the other. Pedestrian street crossings are a component of the pedestrian access route and/or the pedestrian circulation path.

27)28) PROWAG: See definition in Division 1.

28)29) Running Slope: The grade that is parallel with the direction of pedestrian travel.

29)30) Sidewalk: A walkway or pathway ~~right-of-way deeded,~~ dedicated, and designated for the use of non-motorized vehicles and pedestrians.

30)31) Streets or Roads: Any public highway, road, street, avenue, alley, easement or right-of-way used or to be used for vehicle movement. Full street improvements include curb and sidewalk on both sides, storm drainage and fully improved in accordance with these standards.

31)32) Structures: Those structures designated on the standard plans as catch basins, manholes, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these standards are included in the standard construction specifications detail drawings in PWDS Appendix A.

32)33) Superelevation: The vertical distance between the heights of the inner and outer

edges of pavement on horizontal curves.

~~33)~~34) Three-Quarter (3/4) Street: A ± 75 percent portion of the ultimate width of a street, but not less than $25\frac{1}{2}$ feet from face of curb to edge of pavement, usually along the edge of a development, where the remaining portion of the street ~~will~~shall be provided when adjacent property is developed. 3/4 street improvements include curb, piped storm drainage and sidewalk on one side, storm drainage improvements stubbed across the street for future catch basins on the unimproved side, and a full depth gravel shoulder per PWDS 2.19.c & drainage facilities on the non-curbed side of the street.

~~34)~~35) Transition: The taper between portions of a street with different pavement widths.

~~35)~~36) Transverse Joint: A joint which follows a course approximately perpendicular to the centerline of the roadway.

~~36)~~37) Travelled Way: That portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.

~~37)~~38) 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.

~~38)~~39) Turning Space: An area at the top or bottom of a curb ramp, providing a space for pedestrians to stop, rest, or change directions.

~~39)~~40) Turnpike Street: Any public street, road or right-of-way which has been paved for vehicular movement and does not have curbs on either side of the street.

~~40)~~41) Two Way Driveway: A driveway functioning as both an ~~an~~ vehicular exit and entrance.

~~41)~~42) Upstream Intersection: The nearest intersection from a driveway located in the direction opposite the traffic flow of the nearest lane of the abutting street.

2.10 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the City s~~Standard d~~Details. ~~This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).~~
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director 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.

3)4) Material/Equipment Submittals from Contractor Required. Per Section G-1300, construction submittals shall be provided by the Contractor for review by the City, for all material & equipment which will be incorporated into work covered under the PWDS.

b. **AC Pavement**

- 1) Bituminous Material: The asphalt cement shall be PG 64-22 and shall meet the requirements of OSSC (ODOT/APWA) 00744.11, Asphalt Cement & Additives.
- 2) AC Design Mix:
 - a) AC pavement shall meet the requirements of OSSC (ODOT/APWA) 00744, hot mixed Asphalt Concrete Pavements (ACP), 3/4" dense graded mix (*base course*) or 1/2" dense graded mix (*leveling or wearing course*) as summarized below.
 - (1) Where noted on the drawings, Class B pavement refers to the 3/4" dense graded mix, and Class C refers to 1/2" dense graded mix.
 - b) AC pavement for local public streets shall be Level 2 Job Mix Formula (JMF).
 - c) Unless otherwise specified or shown on the drawings, AC pavement for private streets and parking lots shall be Level 2 Job Mix Formula (JMF).
 - d) Unless otherwise Where-identified on the drawings and specifically approved by the agency with jurisdiction, AC pavement for collector or arterial streets shall be Level 3 Job Mix Formula (JMF).
- 3) AC mix design shall be submitted to the City for review and approval prior to use.

c. **Granular Baserock**

- 1) Granular baserock shall conform to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve. Gradation shall be as follows:
 - a) Base Rock: 1½"-0

- b) Leveling Rock: 3/4"-0
- c) Alternate single size 1"-0 aggregate as approved by the Engineer.

d. **Concrete (Cast-in-Place)**

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi min @ 28 days, max 5" slump, 4.5% air ($\pm 1.5\%$).
- 2) Concrete mix design shall be submitted to the City for review and approval prior to use.

e. **Street Lights**

- 1) Unless otherwise approved by the City Engineer and Public Works Director, street light poles shall be fiberglass poles designed to produce a 25-foot mounting height, with a mounting arm per the City standard details and conforming to power company requirements & details. Poles shall be grey or brown in color, have a natural finish, and be provided with a direct bury base sleeve for landscape areas, and a precast concrete pole foundation for sidewalk areas where required by the Public Works Director or the City Engineer.
- 2) Unless otherwise approved by the City Engineer and Public Works Director, all luminaries shall be Cobrahead flat lens type using a 49 watt LED cobrahead fixture (*ie. equivalent to 100 watt high pressure sodium*) and photoelectric control relay.
- 3) All street lighting materials, including wire, and installation procedures shall meet current requirements for maintenance by the local electric utility company. Any line extension fees shall be the responsibility of the developer.

f. **Geotextile Fabric.**

- 1) Unless otherwise required by City Engineer, geotextile fabric shall conform with OSSC (ODOT/APWA) 02320, Geosynthetics, with minimum property values conforming to Table 02320-1 as noted below.
- 2) Reinforcement Fabric. Unless heavier is specified or noted on the drawings, reinforcement fabric (*for over-excavation or under embankments*) shall be non-woven fabric (*Propex Geotex 1001, Mirafi 1000N, Linq 250EX or approved equivalent*), or woven fabric (*Propex Geotex 250ST, Mirafi 550X, Linq GTF250, or approved equivalent*). Slit film fabrics are not allowed.
 - a) Minimum for non-woven: grab tensile strength of 315 lbs; tear strength of 110 lb, puncture strength of 620 lbs; AOS of 30.
 - b) Minimum for woven: grab tensile strength of 200 lb; tear strength of 80 lb, puncture strength of 430 lbs; AOS of 30.
- 3) Separation Fabric. Unless heavier is specified or noted on the drawings,

separation fabric (*where successful proofroll allows compaction testing of subgrade to be waived*) shall be non-woven fabric (*Propex Geotex 601, Mirafi 160N, Linq 150EX or approved equivalent*), or woven fabric (*Propex Geotex 200ST, Mirafi 500X, Linq GTF200, or approved equivalent*). Slit film fabrics are not allowed.

- a) Minimum for non-woven: grab tensile strength of 113 lb; tear strength of 41 lb, puncture strength of 223 lbs; AOS of 30.
- b) Minimum for woven: grab tensile strength of 180 lb; tear strength of 68 lb, puncture strength of 371 lbs; AOS of 30.

- 4) Drainage Fabric. Unless heavier fabric is specified or noted on the drawings, drainage fabric shall be conform with Type 2 Drainage Geotextile (OSSC/ODOT/APWA 02320), non-woven fabric (*Propex Geotex 601, Mirafi 160N, Linq 150EX or approved equivalent*). Slit film or woven fabrics are not allowed.

- a) Minimum for non-woven: grab tensile strength of 160 lb; tear strength of 56 lb, puncture strength of 310 lbs; AOS of 40.
- b) Minimum for woven: grab tensile strength of 250 lb; tear strength of 90 lb, puncture strength of 495 lbs; AOS of 40.

- 5) Riprap Fabric. Unless heavier is specified or noted on the drawings, fabric under riprap shall be conform with Type 2 Riprap Geotextile (OSSC/ODOT/APWA 02320), non-woven fabric (*Propex Geotex 1071, Mirafi 1120N, Linq 275EX or approved equivalent*). Slit film or woven fabrics are not allowed.

- a) Minimum for non-woven: grab tensile strength of 200 lb; tear strength of 80 lb, puncture strength of 430 lbs; AOS of 40.
- b) Minimum for woven: grab tensile strength of 315 lb; tear strength of 110 lb, puncture strength of 620 lbs; AOS of 40.

g. **Pavement Markings.**

- 1) Public Streets & Walkways, City Owned Parking Lots. All stop bars, crosswalk striping and other roadway or parking lot marking and emblems shall be 125 mil thick pre-formed skid resistant thermoplastic with intermix glass beads (*Premark BD by Ennis-Flint, or OptaTrac by Geveko Markings*).
- 2) Installation of thermoplastic markings shall be by methods and by a contractor approved by Public Works Director.
- 3) Paint may be used for curb painting where required (*fire hydrants, no parking, etc.*), and for private parking areas, private accesses and private streets (*except for stop bars at public street intersections*).

2.11 IMPROVEMENT STANDARDS BY STREET CLASSIFICATION

- a. The table below summarizes the improvement standards for each road classification.

IMPROVEMENT REQUIREMENTS		
Street Classification	Min. Right-of-Way Width	Curb to Curb Width
Arterial Ferry Street, 3 rd Street/Wallace Road	case-by case	case-by case
Collector ¹	60'	36'
Commercial/Industrial	60'	36'
Local III ^{2,3} (<i>provides access to ≥80 dwelling units or serving ≥800 ADT or ≥320,000 ft²</i>)	50'	34'
Local II ^{2,3} (<i>provides access to 20-79 dwelling units or serving 200-799 ADT or ≥80,000 ft²</i>)	48'	32'
Local I ^{2,3} (<i>provides access to ≤19 dwelling units or serving ≤190 ADT or <80,000 ft²</i>)	46'	30'
Residential Cul-de-sac ^{2,3}	Width per local street criteria above	Width per local street criteria above
Cul-de-sac Bulb (Residential)	45' radius	38' radius
Alleys	20	18' ⁵
<p>Parking both sides typical all streets except as noted.</p> <p>¹Collector street widths determined on a case by case basis (LUDC 7.2.302.04), with widths noted above as typical minimums.</p> <p>²See LUDC 7.2.302.04 for additional information.</p> <p>³Parking both sides for all local streets and cul-de-sacs (LUDC 7.2.302.04).</p> <p><u>OFC Notes:</u></p> <ul style="list-style-type: none"> • For reference, the minimum clear widths required for fire apparatus access roads (<i>fire lanes</i>) under the Oregon Fire Code (OFC) may take precedence in some situations (<i>20' fire lane width required where there are no fire hydrants, 26' fire lane width required for streets with fire hydrants, OFC 503 & OFC App. D</i>). • Fire lanes up to 26 feet wide shall have fire-lane/no-parking signs posted on both sides, while fire lanes wider than 26 feet (<i>but less than 32 feet</i>) shall be posted on one side (OFC D103.6.1&2). • The OFC requirements cannot be modified solely by a land use approval. <p>⁵ Width listed refers to driveable paved width, whether or not curbs are provided or required. Where curbs are not provided, gravel shoulders shall be provided on each side of paving to the extent possible.</p> <p><u>Notes:</u></p> <ul style="list-style-type: none"> -If a land use variance is granted for no parking on one or both sides of the street, curb(s) along the no parking side(s) shall be painted and signed for no parking at time of street construction. -Right-of-way widths must be adequate to accommodate the specified street, curb, and sidewalk widths (<i>including planter strips if required</i>), while allowing a <u>minimum</u> of 0.5 feet from the back of sidewalk to the right-of-way line to ensure that survey monuments are not disturbed during construction or reconstruction of sidewalks (<i>see also ORS 209.140-155 & 92.044.7</i>). 		

- b. The number of travel lanes for arterial and major collector roads shall be determined by the volume of traffic. The City may require additional turning lanes where required by Public Works Director or a traffic engineer's report evaluating the need for additional

turning lanes.

- c. Additional pavement and right-of-way width may be required to accommodate turning lanes, parking and bike lanes.

2.12 STREET DESIGN MINIMUM SECTIONS

- a. The street design shall result in streets which:
 - 1) are of adequate design to handle the traffic needs of the City,
 - 2) are designed in a manner to allow economical future maintenance, and,
 - 3) provide a minimum practical pavement design life of 30 years for all streets.
- b. The minimum pavement section for public streets *(and private streets which provide vehicular access to the public)* shall conform to the following table, *based on the classification/use of each street segment*. These pavement sections are based on subgrade compacted to 95% of AASHTO T-180 (Modified Proctor). Where subgrades cannot be compacted and tested to this standard *(or if subgrades are not compacted by choice)*, a thicker baserock section will be required.

MINIMUM PAVEMENT SECTIONS		
Street Classification	AC Pavement Thickness (inch)	Baserock Thickness ³ (inch)
Arterial ¹	4	15
Collector	4	12
Commercial	4	12
Industrial	4	15
Local Residential (III) ²	3½	12
Local Residential (I, II) ²	3½	10
Cul-de-sac (Residential)	3½	10
Private Street (3 or more dwelling units)	3	9
Alley in Residential Zone ³	2½	9
Alley in Commercial Zone ³	3	10
¹ – Thicker baserock & AC sections may be required by ODOT or Yamhill County wherein each has jurisdiction. ² – See LUDC 7.2.302.04 for additional information on Class I, II & III streets. ³ – Assumes alleys are not used as primary vehicular access route, in which case public street rock & AC sections will be required. ³ – Minimum baserock thickness assuming subgrade compacted to 95% of Modified Proctor and passes a proofroll. Thicker baserock sections over fabric are required otherwise <i>(for uncompacted subgrades or subgrades which are not tested to verify compaction)</i> . Thicker rock & AC sections may be required by the Public Works Director where heavier location		

traffic exists or is anticipated.

- c. 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 trucks, where overlays are proposed, or any other conditions that may significantly affect the pavement structure design.
- d. Where required by the City, the design of overlays shall include non-destructive falling weight deflectometer tests or other tests approved by the City Engineer and the preparation of an engineering analysis of street improvements required for the design life required with all anticipated traffic, including truck traffic.
- e. Unless otherwise approved by the City Engineer, pavement designs shall be based on AC pavement conforming to OSSC (ODOT/APWA) 00744, hot mixed Asphalt Concrete Pavements (ACP), for standard duty mix and compacted to a minimum of 91% of maximum density (*at all locations*) as determined by the Rice Standard Method.

2.13 OVERLAYS

- a. All AC pavement overlays shall include non-woven fabric specifically designed for use with AC pavement.
- b. 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.
- c. Design of overlays shall be based on an analysis of the existing pavement condition by a registered professional engineer experienced in the design of pavements, and shall result in the minimum practical design life as specified. Unless otherwise approved by the City Engineer, testing of the existing pavement shall include the following as a minimum.
 - 1) Coring of the street at maximum 50 foot intervals to establish the thickness and condition of existing pavement and aggregate base.
 - 2) Non-destructive falling weight deflectometer tests on the existing pavement proposed for overlay.
 - 3) Preparation of an engineering analysis of overlay thickness required to provide the specified design life with all anticipated truck traffic.
- d. Areas of existing pavement and baserock which exhibit deflection or alligator cracking or have otherwise failed shall be excavated and replaced with new compacted baserock and AC pavement prior to the overlay. Baserock and AC pavement repair thicknesses shall match standard section thicknesses. All cracks greater than 1/8-inch in width 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 digout areas must be approved by the City Engineer prior to the placement of the final fabric and overlay.

- e. Overlay fabric shall be Petromat as manufactured by Amoco Fabrics & Fiber Company, 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.
- f. Asphalt overlays shall include grinding as required to allow the minimum overlay thickness at existing paving, catch basins, gutter pans and other structures which cannot be raised to grade. Unless otherwise approved by the City Engineer, all existing manholes, valve boxes and other structures shall be raised to grade before the overlay. Structures raised to grade following placement of the overlay shall have the pavement sawcut around the structure as required by the City Engineer and a reinforced PCC concrete patch placed around the structure.
- g. Any existing survey monuments within AC pavement overlay areas shall be provided with a monument box to City and County Surveyor standards, installed prior to overlay paving, unless the Public Works Director allows the survey monuments to be reset by a licensed surveyor to finish pavement grade with aluminum caps (*case-by-case basis*).

2.14 **HORIZONTAL ALIGNMENT**

- a. Horizontal centerline alignments of improvements shall be parallel with the centerline of the right-of-way. Centerline of the proposed street extensions shall be aligned with the centerline of corresponding existing streets.
- b. Unless required to match curvature of existing right-of-ways, horizontal curves shall be to an even 5 feet, and shall meet the minimum requirements listed below:

MINIMUM HORIZONTAL CURVE RADIUS	
Street Classification	Minimum Horizontal Curve Centerline Radius
Arterials	300 feet
Collectors and Continuing Residential Streets	200 feet
Commercial/Industrial	250 feet
Cul-de-sac	160 feet
Alleys and Private Streets	100 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.	

- e. ~~Staggering or T 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 200 feet from an opposing intersection. Moved down~~
- d. ~~Streets intersecting an arterial or collector street but not continuing through the arterial or collector street along the same horizontal alignment (ie. a staggered or tee intersection) shall not be located within 300 feet of another street intersecting the opposite side of the arterial or collector street. Similarly, opposing intersections of local streets shall be separated by not less than 200 feet.~~

2.15 MONUMENTATION

- a. In accordance with ORS 92.060 Subsection (2) and/or 209.15 Section 2, the centerline of all street right-of-way shall be monumented 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.
- b. Any existing or new street or property survey monuments within the paved street improvement areas, driveways, sidewalks or other hard surface areas or areas subject to vehicular traffic shall be set flush with the finish pavement surface with 2-inch aluminum caps. The City reserves the right to require monument boxes per City standard details where directed by the Public Works Director.
- c. The following street centerline monuments shall be set as a minimum:
 - 1) All centerline - centerline intersections.
 - 2) The centers of all cul-de-sacs.
 - 3) Curve points in accordance with ORS 92.06 and 209.15.
- d. All public utilities within the right-of-way shall be placed in positions that do not interfere with centerline monumentation.

2.16 INTERSECTIONS & PEDESTRIAN CROSSINGS

- a. Staggering or T intersections at collectors and arterials shall be avoided within 300 feet of an opposing intersection. Intersections of local streets shall not be offset less than 200 feet from an opposing or adjacent intersection.
 - b. Streets intersecting an arterial or collector street but not continuing through the arterial or collector street along the same horizontal alignment (ie. a staggered or tee intersection) shall not be located within 300 feet of another street intersecting the opposite side of the arterial or collector street. Similarly, opposing-intersections of local streets shall be separated by not less than 200 feet.
- a-c. Intersection Angle. The interior angle at intersecting streets shall be kept as near to

ninety degrees (90°) as possible and in no case shall it be less than seventy-five degrees (75°).

b.d. Centerline Horizontal Tangents.

- 1) There shall be a straight horizontal tangent section on each leg of an intersection having a length not less than shown in the table below.
- 2) The length of the horizontal tangent on each leg shall be measured from the extension of the curbline of the intersected street.
- 3) Where streets are not fully improved, horizontal tangent length shall be measured from the future curb location.

Street Classification	Minimum Horizontal Tangent Length (ft)
Arterial	100
Collector	75
Commercial/Industrial	75
Residential	50

e.e. Primary & Secondary Street Designation.

- 1) The designation of primary streets versus secondary streets for intersection design shall be made by the City Engineer.

d.f. Intersection Street Grades.

- 1) The maximum street grade through intersections and within the landing area (*vertical intersection approach as defined below*) shall be 5% for the primary street and 2% for the secondary street, or as required to meet ADA and PROWAG standards where applicable.

e.g. Vertical Intersection Approach.

- 1) The beginning of secondary street vertical curve at intersections (*from the cross-slope of the primary street to the centerline/curb street grade of the secondary street*) shall not begin prior to the end of curb radius unless otherwise approved or required by the City Engineer based on detailed drawings showing compliance with all ADA and PROWAG standards.
- 2) Vertical intersection approaches shall have straight street grades within the

limits specified, with no more than a 1% grade break from the adjacent intersection cross slope (*street grade break at the curbline extension*).

f.h. Intersection Pedestrian Street Crossing.

- 1) A pedestrian street crossing (*marked or unmarked as approved by the City*) shall be provided for all legal crossing location as required by state law, unless the City Engineer determines that a crossing should not be provided based on consideration of safety and traffic issues. Pedestrian street crossings shall comply with requirements for pedestrian access routes herein and PROWAG standards.
- 2) Sidewalk access ramps meeting current ADA and PROWAG standards shall be provided at all corners of intersections where crossing is permitted, regardless of curb type (*or absence of curb*).
- 3) Street Grades at Pedestrian Crossings. The street cross slope for pedestrian street crossings at intersections shall not exceed 2% maximum at crossings of secondary streets, nor 5% maximum at crossings of primary streets.
- 4) The pedestrian grade of the pedestrian street crossing (*along the pedestrian access route*) shall not exceed 5% maximum at any point in the crossing, including at gutter pans.

g.i. Midblock Pedestrian Street Crossing.

- 1) Unless specifically approved in writing by the City Engineer, mid-block pedestrian street crossings are not permitted.
- 2) Street Grades at Pedestrian Crossings. Where pedestrian access routes are contained within midblock street crossings, the pedestrian cross slope (*cross slope of the pedestrian street crossing*) shall be permitted to equal the street grade, unless otherwise required by PROWAG.
- 3) The pedestrian grade of the midblock pedestrian street crossing (*along the pedestrian access route*) shall not exceed 5% maximum at any point in the crossing, including at gutter pans.

- h.j. Curb Radius.** 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.

MINIMUM INTERSECTION CURB RADIUS ¹				
Street Classification	Arterial Street	Collector Street	Commercial/Industrial Strt	Local Street
Arterial Street	35 feet	-	-	-
Collector Street	30 feet	30 feet	-	-
Commercial or Industrial Str.	35 feet	35 feet	35 feet	-
Local Street	25 feet	25 feet	30 feet	20 feet
¹ Smaller or alternate curb radius may be required or approved by Public Works Director on a case-by-case basis, including the use of pedestrian bulbouts on wider streets where deemed applicable by Public Works Director or the City Engineer. Larger radius may be required by Public Works Director to accommodate truck turning movements.				

- i.k. Street Signs.** All newly platted or newly improved streets shall be posted with a name sign approved by the City. In the case of development, installation of any required street signs or traffic control signs shall be the responsibility of the developer.

2.17 VERTICAL ALIGNMENT AND STREET GRADES

- a. Street grades shall be designed to allow drainage to the curb of areas within the public right-of-way, as well as lot drainage. In general, this requires the curbs of new streets be set a minimum of 6-inches below existing grade.
- b. Unless otherwise approved in writing by the City Engineer and Public Works Director and applicable City planning authorities, street grades shall not exceed the following:
 - 1) Collectors - 6%
 - 2) All others -6% except as noted below
12% maximum, with 12% grades not exceeding 100 feet in length and not at intersections.
 - 3) Notwithstanding these maximum street grades, street grades through intersections and intersection approaches must allow for the installation of pedestrian ramps & pedestrian crossings conforming to PROWAG standards.
- c. Minimum tangent street gradients shall be 0.4% along the crown and curb for all streets (*Type A curb & gutter required*).

- d. Streets intersecting with streets not constructed to full City standards shall be designed to match both present and future vertical alignments of the intersected street. The requirements of these standards shall be met for both present and future conditions.
- e. Street 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 the tangent street grades ($K = L/A$).

Vertical curve length shall not be less than the length computed from the formula $L = K \cdot A$ (ie. K value shall not be less than the values listed below), where:

L = length of vertical curve in feet

K = vertical curve design constant (K-value)

A = algebraic difference between the tangent street grades each way.

DESIGN CONTROL FOR VERTICAL CURVES BASED ON STOPPING SIGHT DISTANCE		
Design Speed MPH	Crest Vertical Curve, Minimum K-value	Sag Vertical Curve, Minimum K-value
15 ¹	3	10 (8 ²)
20	7	17
25	12	26
30	19	37
35	29	49
40	44	64
45	61	79
50	84	96
55	114	115
¹ Applies only to vertical curves in alleys or at the intersection of a secondary street (<i>side street</i>) to a primary (<i>thru</i>) street (ie. <i>transition from primary street cross slope to street grade of secondary street</i>). ² Reduction in K-Value (<i>for sag curves on secondary street intersections</i>) which is allowed provided the intersection is fully illuminated with a street light (<i>per these standards</i>) adjacent to the sag vertical curve.		

- f. Street grades, intersections and super-elevation transitions shall be designed to not allow concentrations of stormwater to flow across travel lanes.

- g. Slope easements shall be dedicated or obtained for the purposes of grading outside of the right-of-way or to ensure that roadway fill slopes are not disturbed.

2.18 STREET CROSS SECTIONS AND STREET CROSS SLOPES

a. General

- 1) Cross-slope of the street section shall be two percent (2%) unless otherwise approved by the City Engineer, based on a demonstration by the design engineer that PROWAG standards are met..
- 2) Symmetrical street cross sections with opposite curbs at the same level are preferred.
- 3) Off-set crown cross-sections are acceptable only where required due to sidehill lies and to match existing facilities. Off-set crowns shall not exceed 12 inches between the high curb and the low curb, and the crown location shall not be less than 12 feet from the face of curb.
- 4) Inverted crown sections are not acceptable for public streets.
- 5) Shed roof cross sections are not acceptable for public streets, except within and immediately adjacent to street intersections. The design of shed cross sections shall include provisions to avoid concentrated drainage sources from flowing across the pavement surface.

b. Superelevation

- 1) Use of superelevations shall be prohibited unless specifically authorized by the City Engineer. Criteria for approval of the use of superelevations shall generally conform to the requirements for variances as outlined under Division 1.
- 2) Off-set crown sections are not acceptable as super elevation sections.
- 3) Maximum superelevation allowed for City streets shall be five percent (5%) *(except at intersections or pedestrian crossings where lesser slopes are required by PROWAG)*.
- 4) Super elevation transitions shall be designed to not allow concentrations of storm water to flow over the travel lanes.

2.19 GRADING WITHIN PUBLIC RIGHT-OF-WAY

- a. Grading for local street and commercial/industrial classifications shall not exceed the following cross slopes:

- 1) From curb to 1 foot behind the sidewalk: One & half (1.5%) upward.

- 2) From 1 foot behind sidewalk to property line: 5H:1V upward or downward.
 - 3) Within the street frontage public utility easement (PUE): 5H:1V upward or downward.
 - 4) Outside of right-of-way and public utility easement (PUE): 2H:1V up or down outside the public utility easement.
 - 5) Along the edge of turnpike streets (*from the back of the gravel shoulder*): 3H:1V downward, unless otherwise approved on a case-by-case basis by the Public Works Director and City Engineer.
- b. Side slopes may be increased to 2H:1V up or down within 2 feet from the back of the sidewalk with approval from the City Engineer and affected utilities.
 - c. Where street improvements do not include curbs along both sides of a street, the design shall include a full depth gravel shoulder on the non-curbed side (*1' minimum width, wider shoulder may be required by the Public Works Director to address site specific circumstances*), and shall address collection of storm water drainage on the non-curbed side of street improvements. Where ditches are necessary along the non-curbed side (*ie. where ground does not slope away from the street*), ditches shall conform with PWDS requirements and City standard details (*including driveway culverts which meet City standards*), and shall drain to an approved point of disposal.

2.20 CURBS AND GUTTERS

- a. All streets shall include curbs on both sides except in the situations of interim width improvements. The minimum tangent curb gradients shall be as outlined under Section 2.16, 'Vertical Alignment'.
- b. The standard curb for City Streets shall be Type A curb and gutter for all road classifications.
 - 1) Use of Type C curbs for public streets requires written approval by the City Engineer for each location proposed, and is typically limited to replacement of short lengths of existing Type C curbs (*other than at new driveway approaches*), use at raised pedestrian crossing islands, or where required by County or ODOT standards.
 - 2) Where Type A curb and gutter is installed along the edge of existing paved streets (*where pavement widening is not required, and where changes to the vertical alignment or cross slope is not required*), the pavement shall generally be sawcut at the edge of the gutter pan and the new curb & gutter placed against the sawcut, in order to minimize the need for street patching and repaving.
- c. The ends of all curbs shall be tapered downward to prevent damage to vehicle tires.

- d. A six (6) inch curb exposure is normally required on residential streets and streets with curb and gutter. A seven (7) inch exposure may be required by the Public Works Director on streets where Type C curbs are allowed. Greater curb exposure shall also be provided where required by ODOT standards (*including near railroad crossing as required by ODOT rail*).
- e. Three (3) inch diameter curb weep holes shall be provided through curbs with inverts 1-inch above the gutter line, at the locations outlined below. Drain pipe shall be provided under all sidewalks to connect to all curb weep holes (*drain pipe under sidewalks shall extend 12-inches behind back of sidewalk and be capped*). The location of all weep holes shall be shown or defined on the drawings as outlined in Division 1.
 - 1) Opposite existing or anticipated roof drain downspouts (*minimum 2 per lot*).
 - 2) At 16 foot on center along low areas where curb top is above adjacent ground.
 - 3) At 16 foot on center adjacent to bank areas to receive groundwater.
- f. When new curbing is being placed, a stamp shall be placed to mark where each water, sanitary sewer or storm drain service lateral crosses the curbline. 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". The impression for a sanitary sewer service shall be the letter "S". The impression for a storm drain service shall be the letter "D".

2.21 SIDEWALKS & MULTI-USE ACCESS ROUTES

- a. Unless otherwise allowed by the Development Code and/or approved through the Planning Department, sidewalks shall be provided on both sides of curbed streets for all road classifications, as well as for private streets.
- b. Monolithic curb & public sidewalk placement is not permitted (*ie. curb concrete & public sidewalk concrete shall be placed separately, except where approved by the City at pedestrian ramps*).
- c. Drain pipe shall be installed under sidewalks as required to connect to all curb weep holes or other storm drain facilities. Surface discharge of roof drains or other drain pipes across sidewalks is not allowed, nor is the sheet flow from parking lots, commercial/industrial driveways, common residential driveways, or concentrated flow from long flaglot driveways allowed to flow across sidewalks.
- d. All sidewalks shall fully comply with all ADA and/or PROWAG standards as applicable. Handicap access ramps meeting current ADA and PROWAG standards shall be provided at all corners of intersections where crossing is permitted, regardless of curb type (*or absence of curb*), and at the ends of all sidewalks.
- e. Handicap access ramps shall be located so as to avoid conflict with storm drain catch basins.

- f. Sidewalks shall be constructed of concrete, and shall be a minimum of 4-inches thick except at driveway crossings and pedestrian ramps, which shall be a minimum of 6-inches thick (*8-inch thickness required for commercial type driveways*).
- g. Multi-Use paths shall be a minimum of 4-inches thick concrete (*any pathways used for maintenance vehicle access to utilities shall be 6" thick & reinforced with #4 bar at 12" OC EW, unless 8" concrete thickness is provided*).
- h. Sidewalks shall meet the minimum widths outlined below. The location of sidewalks within the public right-of-way shall be as approved by the City during the design process.

MINIMUM SIDEWALK WIDTHS		
Street Classification	Min. Sidewalk Width from back of curb	Location unless otherwise approved
Ferry Street & 3 rd Street (<i>ODOT R.O.W. outside of CBO overlay zone</i>)	6 ft or current ODOT standard	Curbline
Within CBO overlay zone ^{1, 2}	8 ft from property side, plus ±4' concrete planter strip to curblines ³	Property Side ⁴ to Curblines
Collector Street	5 ft	Curblines
Commercial or Industrial Str.	5 ft	Curblines
Local Street	5 ft	Curblines
¹ This sidewalk standard applies to all properties within the CBO (Central Business Overlay) zone (<i>except for properties along 3rd Street where existing curbs do not exist, or for properties fronting non-curbed streets where new curbs are not required as a condition of development</i>). This does not apply to the frontage of Courthouse Square Park, as this property is outside of the CBO zone. ² Sidewalks meeting the CBO zone standard are not required for properties within the CBO zone which contain only single-family residential structures (<i>until such time as the use of those properties changes to commercial, or such time as those properties are redeveloped to a commercial use</i>). ³ Sidewalk improvements in the CBO zone shall also include tree wells and street trees at ±30-40 foot spacing (<i>actual spacing to be as directed by Public Works Director, based on property & building/door layouts, driveway locations, etc</i>). ⁴ Property line sidewalks are typically offset 6" to 1' from the rights-of-way line in order to avoid conflicts with right-of-way and property monuments.		

- i. Water meters, utility poles, etc. are not permitted within sidewalks unless authorized in writing by the Public Works Director.
- j. Where single or clustered mailboxes or other objects are within a sidewalk, the sidewalk shall be widened to provide clearance equal to the required sidewalk width. For retrofit installations only where specifically approved in writing by Public Works Director, the sidewalk clear space may be reduced to 48 inches minimum, provided that all other

PROWAG requirements are satisfied. All existing mailboxes shall be set on new posts at the time of sidewalk construction.

- k. Sidewalks to be constructed in conjunction with street improvements or to be provided as part of a development may be deferred at the City's option until building construction except for the following situations:
- 1) Arterial or collector streets fronting corner lots.
 - 2) Sidewalks along streets from which vehicular access to the fronting lot is restricted.
 - 3) Sidewalks fronting existing structures.
 - 4) Offsite sidewalks not abutting the property within the development.
 - 5) Pedestrian walkways not along public streets.
 - 6) Sidewalks fronting non-buildable tracts or parcels.
 - 7) All required ADA pedestrian curb ramps within or adjacent to public or private streets, as well as sidewalks required for ADA compliant pedestrian access to CBU mailboxes.
 - a) CBU mailbox location must be acceptable to the local postmaster, and provide for ADA compliant access.
 - b) A pedestrian curb ramp must be located within 50 feet of the CBU (Oregon Structural Specialty Code 1111.4.1).
 - c) Installation of CBU mailboxes within the curb radius at street intersections is prohibited.
 - 8) Existing sidewalks which do not meet City or ADA standards which must be replaced in conjunction with a development.
- l. In all cases where the construction of a sidewalk is deferred, all grading work required for future construction of the deferred sidewalks shall be completed by the developer at the time of street and utility construction, including weepholes through the curb for future rain drain pipes.
- m. Sidewalk Grades & Vertical Alignment. Except for pedestrian street crossings (*see Section 2.16, Intersections & Pedestrian Crossings*), the sidewalk grade for pedestrian access routes contained within the public right-of-way shall not exceed the general grade of the adjacent street.
- n. Sidewalk/Pathway Separation from Vehicle Route: Where sidewalks or pathways are parallel and adjacent to a driveway or street (*public or private*), they shall be raised

six inches and curbed, or separated from the driveway/street by a 3 foot minimum landscape strip, a landscape berm, bollards, or other physical barrier. If a raised path is used, the ends of the raised portions must be equipped with curb ramps.

- o. Temporary transitions acceptable to the City shall be provided at points where sidewalks terminate, except where otherwise approved by Public Works Director and the City Engineer (*typically limited to cases where the pedestrian access route does not continue beyond the end of the sidewalk, and subject to a "sidewalk ends" sign being installed on a post conforming with ODOT detail TM240, which post is also shown on Detail 212*).
- p. Sidewalk Maintenance. City standards require that "*Maintenance of sidewalks, curbs, and planter strips is the continuing obligation of the adjacent property owner.*"

2.22 CLEAR VISION AREA

- a. Clear vision areas shall be maintained at each driveway access to a public street and on each corner of property at the intersection of two streets, a street and an alley, or a street and a railroad.
- b. No fence, wall, sign or structure that would impede visibility between three (3) feet and eight (8) feet shall be established in the clear vision area, nor any planting or hedge taller than three (3) feet in height (*except for tree trunks with all branches and foliage removed to a height of eight (8) feet above grade*). Measurement shall be made from the top of curb or, where no curb exists, from the street centerline grade.
- c. The clear vision area shall consist of a triangular area, two sides of which are right-of-way lines or a right-of-way line and access easement line. Where right-of-way lines have rounded corners, the right-of-way lines shall be extended in a straight line to the point of intersection and so measured. The third side of the triangle shall be a line connecting the non-intersecting ends of the other two lines.
- d. For single use residential driveways, the clear vision area shall consist of a triangular area, two sides of which are the curb line and the edge of the driveway. Where no curbs exist, the future location of the curb based on full street improvements shall be used.

- e. The following measurements shall establish the clear vision areas:

CLEAR VISION AREA MEASUREMENTS	
Type of Intersection	Measurement Along Each Lot Line or Drive Edge ¹
Controlled Intersection (Stop sign/signal)	20 feet
Uncontrolled Intersection ($\geq 60'$ r/w)	30 feet
Uncontrolled Intersection ($< 60'$ r/w)	40 feet
Commercial/Industrial Driveways	20 feet
Common Use Residential Driveways & Alleys	20 feet
Single Residential Driveways	10 feet
¹ At the intersection of different classification streets, the measurement shall apply to the measurement along the right-of-way line as specified for each street classification.	

- f. The preceding provisions shall not apply to the following:

- 1) A public utility pole.
- 2) A tree trimmed (*to the trunk*) to a line at least eight (8) feet above the level of the intersection.
- 3) An official warning sign or signal.
- 4) A place where the natural contour of the ground is such that there can be no cross visibility at the intersection.

2.23 CUL-DE-SACS, TURNAROUNDS

- a. Cul-de-sacs shall be as short as possible and shall have a maximum length of 400 feet long and serve no more than 18 dwelling units unless otherwise approved by the Planning Commission.
- b. The City standard details show the minimum requirements for cul-de-sac turnaround areas. Other turnaround geometries may be used when conditions warrant and the City Engineer approves the design and application of its use. Cul-de-sacs in commercial or industrial developments shall provide adequate turnarounds for the type of vehicle serviced by the street, as approved by the City Engineer.

- c. The minimum curb radius for transitions into cul-de-sacs bulbs shall be 25 feet and the right-of-way radius shall be sufficient to maintain the same right-of-way to curb spacing as in the adjacent portion of the street.
- d. The finished pavement grade from the center point of cul-de-sac turnarounds to the curb shall not be less than two and one-half percent negative (-2.5%).
- e. Cul-de-sac curb profiles shall be provided with a smooth vertical alignment. Curbline grade changes in excess of 1% shall use a vertical curve, with a K-value not less than 3.

2.24 STUB STREETS, VEHICULAR NON-ACCESS PROVISIONS

- a. Stub streets which allow for future extensions shall include a reserve strip at the terminus of the right-of-way provided by deed or plat conveyance to the City. The reserve strip shall be at least one foot in width and extend the full width of the right-of-way.
- ~~b. A vehicular non-access easement to the City (or a reserve strip tract) may also be required along new street right-of-ways which front on undeveloped property. Where a reserve strip is allowed, it may be counted as part of the required right-of-way width.~~
- ~~e.b. Vehicular Non-Access Easement or Reserve Strip.~~ A vehicular non-access easement to the City (or a reserve strip tract) is also required along public or private street frontages or common driveways where vehicular access is not allowed (*such as the non-access frontage of corner lots, one end of double frontage lots, street right-of-ways fronting on undeveloped property, non-access frontages along common driveways, etc.*). Where a reserve strip is allowed, it may be counted as part of the required right-of-way width
- ~~d.c.~~ A paved turn around shall be provided for stub streets with lengths greater than 300 feet, or as required by the Oregon Fire Code (*150 foot maximum length without turnaround per OFC D103.4, unless otherwise approved by the Fire Code Official*).
- ~~e.d.~~ Permanent barricades shall be placed at the end of all stubbed roads without a cul-de-sac turnaround. Vehicular access from the end of stub streets is prohibited unless explicitly authorized in writing by the City (*specific City Council approval typically required for any such permanent vehicular access from the end of stub streets*).

2.25 TRANSITIONS

- a. Street width transitions from a narrower width to a wider width (*based on the direction of traffic flow in the travel lane adjacent to the taper*) shall be designed with a 10:1 taper. Delineators, as approved by the City, shall be installed to mark the edges of the transition.
- b. Street width transitions from one width to a narrower width (*based on the direction of traffic flow in the travel lane adjacent to the taper*), 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 (EP – Edge of Pavement)

- c. 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 (*ie. thirty-five (35) foot spacing for thirty five (35) MPH*).
- d. 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.

2.26 SUBSURFACE DRAINAGE

- a. Subsurface street drainage must be considered in the design of each street. Subsurface drains shall be designed and constructed per the standard drawing details or the recommendations of the soils report.
- b. Subsurface drains shall connect and drain into the storm drainage system at catch basins, curb inlets, gutter inlets, manholes or road side ditches. Surcharge from the storm drainage system shall not be allowed to back up into the subsurface drains. Alternative subsurface drainage measures may be used if approved by the City.

2.27 ACCESSIBLE ON-STREET PARKING

- a. Accessible on-street parking shall be provided as required by PROWAG, or as required by any planning approval for development projects, whichever is more stringent.
- b. Where on-street parking is provided on the block perimeter (*block perimeter is defined as both sides of a street between two adjacent cross street intersections*) and the parking is marked or metered, ADA accessible parking spaces shall be provided in accordance with PROWAG Table R214. Where marked or metered parking on part of the block perimeter is altered, the minimum number of accessible parking

spaces required is based on the total number of marked or metered parking spaces in the block perimeter.

- 1) Accessible on-street parking spaces shall conform with the requirements of PROWAG, and shall conform with City parking space or ADA dimensions, whichever is more stringent.
- 2) Accessible on-street parking spaces shall be located as close to an accessible curb ramp as possible. Unless the accessible on-street parking spaces are provided adjacent to the intersection (*ie. at the block end*), an accessible curb ramp shall be installed at the accessible parking location.
- 3) Access aisles adjacent to head-in or angled on-street parking shall be a minimum of 8 feet in width. Parallel accessible on-street parking will require a 5 feet wide access aisle between the parking space and the curb.
- 4) Access aisles shall extend the full length of the parking spaces they serve, where access aisles are required by PROWAG standards. Access aisles (*a minimum of 8 feet in width*) shall extend from the accessible on-street parking space to the accessible curb ramp.
- 5) Slopes within the accessible on-street parking space and access aisle shall not exceed 2% in any direction.

2.28 PARKING LOTS & LOADING ZONES

- a. Minimum pavement sections for parking lots or loading zones shall conform to the following, over compacted subgrade:

PARKING LOT MINIMUM PAVEMENT SECTIONS		
Classification	Pavement Thickness (inch)	Baseroack Thickness (inch)
Parking Lot Access Route & Delivery/Loading Zones	3 (AC)	10
Parking Lot	2½ (AC)	7
The minimum pavement sections shown assume competent compacted subgrade and normal light traffic loading, and may not be adequate for all locations, soil conditions or types of development. The developer and/or design engineer shall be responsible to verify adequacy of proposed sections for the use intended. See PWDS 2.30.f for requirements where use of durable non-paved surfaces is proposed.		

- b. Access routes through parking lots which are to be used (1) by delivery trucks, service vehicles or fire trucks, or (2) by automobiles in excess of 500 vehicles per day, shall

conform to the minimum access route section outlined above.

- c. Parking Lot Layout Dimensions. The dimensions for the design and layout of parking facilities shall conform to the minimum requirements shown on the City sStandard dDetails. In the event of discrepancies between the minimums in the PWDS standard details and the minimums in the development code, the larger minimums will typically apply as determined by the City (*ie. for instance, if minimum parking space dimensions in the PWDS are greater than minimums listed in the development code, the larger space requirements will control since the greater size will still comply with the minimum under the development code. The same applies to minimum drive aisle widths required in the development code, the PWDS or the Oregon Fire Code*).
- d. Minimum Slopes. Parking lots and associated driveways shall maintain adequate drainage facilities to prevent water ponding or ice formation, and to prevent stormwater from sheet flowing across sidewalks. In general, this requires a minimum cross slope of two percent (2%) perpendicular with contour lines, except where flatter slopes are required for ADA compliant pedestrian walkways. In no case shall cross slopes less than one percent (1%) be allowed at any point. All drainage facilities shall conform to the requirements of Division 3 of these Design Standards.
- e. Parking Lot Curb Radius. Curves and corners along vehicular travel lanes within the parking facilities shall have a minimum curb radius of 15 feet except for emergency access lanes, where a minimum curb radius of 28 feet shall be required, unless a smaller radius is approved by the Fire Code Official (*OFC 503.2.4 & OFC Fig D103.1*).
- f. Overhang Over ROW or P/L Prohibited. Bumper guards or wheel barriers shall be installed so that no portion of the largest design vehicle projects or encroaches into the right-of-way or over the adjoining property (*assuming 3 foot minimum truck bumper overhang*).
- g. Parking Lot Curb Style. Curbs abutting head-in parking stalls shall be a Type C or Type A curbs, unless wheel stops are provided (*with front [vehicle side] of wheel stop set 2 feet from the curbline or edge of the pavement*). Extruded curbs may typically be used elsewhere.
- h. Sidewalk/Walkway Width with Head-In Parking. Sidewalks or walkways abutting head-in parking stalls shall be a minimum of 6 feet wide (*excluding curb width*), unless wheel stops are provided (*front [car side] of wheel stop to be set 2 feet from the face of curb*).
- i. Curb Overhang Allowance, Standard Parking Space Reduction. For purposes of sizing single loaded parking stalls (*without wheel stops*) which abut 6-inch curbs and 6 foot wide sidewalks or planter areas, a maximum 1 foot bumper overhang may be assumed for standard size parking stalls (*ie. standard parking stall length may be reduced by a maximum of 1 foot from the length listed on the City sStandard dDetails*).

- 1) Length of compact parking stalls are not to be reduced.

j. Lighting. Parking lots and associated access driveways shall be provided with security lighting configured to minimize the intrusion of lighting across property lines glare onto adjacent property (*see PWDS 1.10.e.1 j*).

1) Parking areas shall have lighting to provide of 0.2 foot-candles to 4.0 foot-candles of illumination over parking spaces and walkways, measured at ground level. The uniformity ratio must be 20:1 or less. Where enhanced security is demonstrated to be necessary, the Planning Commission may approve a range of 0.5 foot-candles to 7.5 foot-candles, with a maximum uniformity ration of 15:1.

2) Lighting must be directed downward and shielded.

3) Light poles within 50 ft of a residential district or residential use, riparian zone, or wetland must not exceed 12 feet. The City may require house side shields where deemed appropriate.

4) Freestanding lighting structures cannot be taller than 35 feet in the industrial district, and 25 feet in all other districts unless otherwise approved in writing by the City Engineer.

5) The use of laser source light or any similar high intensity light is prohibited. The operation of searchlights is prohibited.

j-6) Wall pack and/or bollard lights may be utilized as the sole source of driveway & parking lot lighting only in locations where they will not need to shine over vehicles to light the parking lot, and it is demonstrated that wall pack lights will not shine onto adjacent property.

k. Delivery and/or loading zones shall be sized & configured as required under local zoning/land use regulations, and shall have limits marked on the pavement & be signed for such use.

1) If any on-street delivery/loading zone is proposed, such area is NOT allowed to infringe on or block standard vehicular travel lanes along public streets or public alleys, unless specific & detailed approval is granted for a delivery/loading zone on an alley by all agencies with jurisdiction (including approval under the applicable City land use approval or variance process), including conditions specifying the maximum time vehicles can be parked in the loading zone, and specifying times, if any, when use of the loading zone is NOT not allowed.

2) In no case shall delivery/loading zones be allowed to block designated fire lanes.

3) The limits of any on-street loading zone shall be marked on the pavement with durable pavement markings per City standards. Paint may be used to mark the limits of loading zones located outside of public right-of-ways.

- 4) If a delivery/loading zone in an alley or public street is approved as noted above, and if it will block or partially block a vehicular travel lanes, construction drawings shall be submitted for approval showing the dimensioned location and size of the proposed delivery loading zone, ~~and~~. The drawings shall call out durable pavement markings, as well as signage designating the maximum time any single vehicle can be parked in the loading zone, as well as the times of day and/or specific days when loading is NOT allowed (based on time limits as dictated by the City).

a) Unless otherwise approved in writing by the City, the maximum time an on-street loading zone may be occupied by any vehicle shall be 90 minutes, and the on-street loading zone may be occupied for no more than 4 hours during any one day, with use of the on-street loading zone prohibited from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m.

l. Use of durable non-paved parking lots shall be subject to approval by the City on a case-by-case basis, subject to meeting all City standards & requirements as summarized below for driveways or other vehicle maneuvering areas on private property.

m. Required Provisions for Electric Vehicle Charging. As required under HB 2180, OAR 918-460-0200, the State of Oregon created requirements (implemented by the BCD under permanent rules adopted on 6/30/2022) for certain newly constructed buildings (A-commercial buildings under private ownership, B-multifamily residential buildings with five or more residential dwelling units {excluding townhouses as defined under ORS 197.758}, or C-mixed use buildings consisting of privately owned commercial spaces and five or more residential dwelling units) to provide the necessary infrastructure (consisting of installed conduit and electrical service capacity per ORS 455.417 or space to provide additional future service capacity) for the future installation of level 2 electric vehicle chargers at 20 percent of the building's associated parking spaces (parking in garages or in parking lots).

Site plans submitted for review by Public Works must identify which parking spaces are designated for service by the EV charging infrastructure, as well as showing / dimensioning the alignment for the required conduit to serve the parking spaces identified for EV charging.

In general, these EV charging requirements apply to "newly constructed buildings and newly constructed garages or parking areas located on the site and serving the following building types, excluding townhouses as defined in ORS 197.758":

- 1) Commercial buildings under private ownership (20% for building permits submitted after 7/1/2022);
- 2) Multifamily residential buildings with five or more residential dwelling units (20% for building permits submitted after 7/1/2022); and
- 3) Mixed-use buildings consisting of privately owned commercial space and five

or more residential dwelling units (20% for building permits submitted after 7/1/2022).

2.29 DRIVEWAY SPACING & LOCATION

- a. No more than one driveway per property shall be permitted in residential zones except for duplexes (*which can have two driveways*).
- b. Where possible, driveways for corner properties (*corner lot*) shall be located on the lowest classification street and as far from the intersection as possible.
- c. Driveways on through lots shall be located on the lowest classification street.
- d. Residential driveways of adjoining properties shall have a minimum of 15 feet clear between the edges of the driveways.
- e. Location of all driveways serving commercial, industrial or multifamily facilities shall be approved by the City.
- f. Driveways shall be separated from an intersection by a minimum of 30 feet or one-half the lot frontage, whichever is greater.

2.30 DRIVEWAYS, DRIVEWAY APPROACHES, ALLEYS

- a. Driveways shall conform to the City ~~of Dayton's~~ Standard ~~d~~Details. Curb removal for driveways shall be by saw cutting or grinding that produces a smooth surface.
- b. Sidewalks crossing driveway approaches shall be concrete per City standards.

c. Driveway Approaches.

- 1) All driveway or alley approaches shall be paved or otherwise hard surfaced as specified. In cases where durable non-paved surfaces meeting City standards are allowed, driveways and alleys shall be provided with a minimum 10 foot paved or concrete extension of the approach beyond the back of sidewalk location in all cases (measured from back of future sidewalk location for turnpike streets).
- ~~e. Driveway approaches shall be constructed to meet current ADA and PROWAG standards at all locations where sidewalks cross or will cross the driveway.~~
- d.2) Driveway approaches on curbed streets shall be constructed of concrete, and shall be a minimum of 6-inches thick (8-inch minimum for commercial type driveways). Driveway approaches on turnpike (non-curbed) segments may be either concrete or asphalt.
- 3) Driveway approaches shall be constructed to meet current ADA and PROWAG standards at all locations where sidewalks cross or will cross the

driveway.

e.d. Driveways Not to Block Drainage. Driveways shall be constructed so that they do not block drainage along the street.

f.e. Driveways, ~~etc.~~ & other vehicle maneuvering areas to be paved. All driveways, parking areas, and vehicle maneuvering areas on private property shall be paved with asphalt, concrete or comparable surfacing (*LUDC 7.2.303.09.A*), except where the use of durable non-paving material is approved by the City on a case-by-case basis, where proposed or required to reduce surface water runoff and protect water quality. Where durable non-paved surfaces are proposed within driveways, parking areas, or other vehicle maneuvering areas on private property, such surfaces shall meet the minimum requirements summarized below, subject to case-by-case approval by the Public Works Director and the City Engineer.

f. Durable Non-Paved Vehicle Maneuvering Surfaces.

- 1) Durable non-paved ~~surfaces~~ vehicle maneuvering areas shall be subject to review and approval by the Public Works Director, and will require a maintenance agreement acceptable to the City be recorded against the property.
- 2) The type of durable non-paved surface proposed shall allow for the installation of permanent marking of parking spaces, driving lanes, fire lanes & turnarounds, etc. (*ie. where permanent surface painting is not feasible, permanent colored surface delineators specifically designed for use with the durable non-paved surface proposed shall be provided and installed*).
- 3) Durable non-paved vehicle maneuvering areas shall be concrete pavers and compacted baserock specially designed for commercial/industrial loading, or shall be the TrueGrid ProPlus Commercial/Industrial Grade Paver system, or approved equal.
 - a) Granular rock sections under durable non-paved surfaces shall be designed for the heaviest design vehicle loads (*including for fire trucks where vehicle lanes are required for fire apparatus access to the buildings*), with the design stamped by a licensed professional engineer.
 - (1) The minimum baserock sections required in the PWDS for different uses assumes installation over competent compacted subgrade, and may not be adequate for all soil conditions. The development team shall be responsible to verify adequacy of proposed minimum sections for the use intended. Thicker baserock sections shall be provided where installation over uncompacted subgrade (*for infiltration purposes*) is proposed.
 - b) If open-graded angular rock is proposed under the durable non-paved

surface (based on site specific infiltration testing per City standards), geotextile fabric shall be required between the subgrade and open-graded base stone, as well as providing drainage fabric between the open-graded base stone and the top wearing surface.

(1) Where open-graded angular rock is proposed, a perforated pipe overflow system shall be provided where overflow would otherwise flow onto adjacent private property or across sidewalks.

c) Where permanent colored surface delineators are required, they shall be yellow TrueGrid SuperSpot or equal, in order to meet City standards that permanent maintenance free parking delineation be provided.

d) Wheel Stops installed shall be compatible with the type of durable non-paved surface installed (TrueGrid wheelstops where TrueGrid system is used).

e) Pavement and other hard surfaces shall be installed before installation of the durable non-paved surfaces.

f) Signs shall be provided to designate any compact parking spaces located on durable non-paved surfaces, if any are provided (marking or signing of compact spaces is required by City standards).

g) All ADA accessible parking spaces (and pedestrian walkways serving such accessible parking spaces) shall be hard surfaced with pavement or concrete.

h) All dumpster enclosures (and loading pads in front of dumpster enclosures) shall be hard surfaced with pavement or concrete.

g. In cases where non-paved surfaces are allowed, driveways and alleys shall be provided with a minimum 10 foot paved or concrete extension of the approach beyond the back of sidewalk location in all cases (from back of future sidewalk location for turnpike streets). (moved up)

h-g. Common Use, Commercial & Industrial Driveways.

- 1) Common/Multiple use, commercial or industrial type driveways (as well as any driveway exceeding 10% slope) shall be paved completely (see provisions under PWDS 2.31 for fire lane paving).
- 2) Common driveways serving multiple lots and flag lot driveways over 150 feet in length shall be provided with an emergency turnaround meeting the requirements of the Public Works Director, or as required by the Oregon Fire Code.

i.h. Single family residential driveways: Driveway shall be a minimum of 12 feet wide and a maximum of 24 feet wide at the property line (LUDC 7.2.303.09.C). See other applicable provisions under PWDS 2.30 for residential driveway apron requirements on turnpike streets.

j.i. New alleys shall be paved.

j. Alleys (or unimproved street ROW) Used as Driveways or Vehicular Access.

1) Existing alleys or unimproved street right-of-ways used as driveways (vehicular access) for new structures or remodeled/reconfigured existing structures *(whether or not land use approval is required)* shall be paved to City standards from the improved public street from which vehicular access is taken, along the entire portion of the alley or unimproved ROW used as a driveway or vehicular access *(including turning/backing areas as applicable)*.

k.2) Pavement width shall meet applicable minimum width required for commercials/industrial driveways, common driveways or fire lanes, or as required by applicable City approvals, whichever is greater.

l.k. The angle between a driveway centerline and the parallel vehicle travel lane shall be between 75 degrees and 105 degrees.

m.l. Maximum Driveway Slope. Maximum slope of driveways shall not exceed 15%. See requirements regarding driveway design for future street improvements.

n.m. Driveways to Accommodate Future Street Improvements. For driveways connecting to a street that has not been improved to its ultimate width, the driveway profile (*ie. vertical profile*) shall be designed to allow for future street widening without reconstruction of the driveway. Driveways on turnpike or streets narrower than standard shall be constructed such that the surface of the driveway matches the future back of sidewalk elevation (*ie. future back of sidewalk elevation to be based on design street width and cross slope per current City standards, assuming the future street will be centered in the future right-of-way unless otherwise directed by the City*). This requirement applies both to new driveways and to existing driveways reconstructed in conjunction with street improvements. See also 2.30 provisions above regarding driveway grades constructed so that it does not block drainage along the street.

o.n. Setback to Garage. Unless otherwise approved in writing by the City, garages or carports shall be set back a minimum of 20 feet from property lines, or from the edge of an access easement where common driveways cross properties, or from the edge of a driveway or sidewalk which serves multiple units on the same property, whichever is further *(ie. in order to accommodate full size pickups or service vehicles without encroaching into a vehicle travel path or sidewalk)*.

2.31 PRIVATE STREETS, COMMON DRIVEWAYS, FLAGLOTS, FIRE LANES

- a. Private streets serving 3 or more single family lots or parcels shall be constructed to the same cross sectional specifications (*AC & rock sections*) as public streets for similar uses.
- 1) The width of private street shall match the minimum width specified for public streets serving similar uses, unless narrower widths are approved by the City in conjunction with the land use approval process (*residential private streets shall meet the minimum width for residential cul-de-sacs, depending whether on-street parking is proposed on one side or both sides*). For private streets approved without on-street parking, the minimum width shall not be less than 24 feet minimum (*except where wider widths are required by the OFC*).
 - 2) Private streets or common driveways shall be provided with sidewalks or pedestrian walkways (*serving all structures*) meeting PWDS requirements and as required by City code and/or planning approval.
 - 3) Private streets shall be located within a separate tract (*5 feet minimum wider than the street & sidewalk widths*) under the common ownership or under the control of all lots/parcels taking legal access from the private street, and shall have a recorded maintenance agreement and a recorded fire lane easement conforming to OFC requirements.
 - 4) Maximum Cross Slope. Unless otherwise approved by the City Engineer and the Fire Code Official, cross slope for common driveways, private streets and fire lanes (*including within fire lane turnarounds*) shall not exceed limits for public streets (*typically 5% maximum*).
- b. A turn-around shall be required for any private residential street, common driveway, fire lane or flagstem driveway which has only one outlet and which is in excess of 150 feet long, or which serves more than two residences, or as required by the Oregon Fire Code. Non-residential private streets serving more than one ownership shall provide a turn-around if in excess of 200 feet long and having only one outlet, or as required by the Oregon Fire Code. Turn-arounds for private streets shall be either a circular turn-around with a minimum paved radius of 35 feet, or a tee or hammerhead turnaround conforming to the City standard details, or as required by the Oregon Fire Code.
- c. Pavement sections and widths for private streets, common driveways, flaglot drives or partition access easements serving single family lots or parcels shall conform to the following (*driveways for commercial, industrial or multi-family developments shall conform with commercial driveway & parking lot access requirements – see details*):

MINIMUM PAVEMENT WIDTH AND SECTIONS (SF homes or duplexes)			
Classification ^{5, 6}	Minimum ¹ Paved Width ²	Pavement Thickness (inch)	Baseroack Thickness ⁸ (inch)
Private Streets serving 3 to 6 lots or parcels ^{3, 4}	20 ft*	3 (AC)	9
Fire Lane minimum (<i>match street section where more than 6 residences, or match parking lot access route where applicable</i>)	*sidewalk required on one side ⁴	8 (PCC)	2
Common Drives serving 2 lots or parcels ^{1, 3} (<i>wider widths required for fire lanes</i>)	20 ft	2½ (AC)	8
		6 (PCC)	2
Flag Lot Driveway serving one single family lot or parcel ¹ (<i>wider widths required for fire lanes</i>)	12 ft	2½ (AC)	6
		6 (PCC)	2
Partition Access Easement (1 dwelling unit on a single lot or parcel) with a sole use driveway ^{1, 7} (<i>wider widths required for fire lanes</i>)	12 ft	2½ (AC)	6
		6 (PCC)	2
Partition Access Easement (2 dwelling units on a single lot or parcel) with a sole use driveway ^{1, 7} (<i>wider widths required for fire lanes</i>)	16 ft	2½ (AC)	6
		6 (PCC)	2
Residential driveway aprons on a turnpike street (no curbs), for portion within ROW ¹ .	D/W width	2½ (AC)	6
	24 ft max	6 (PCC)	2
<p>¹ – Wider pavement widths may be required by the local Fire Code Official or where necessary to meet Oregon Fire Code (OFC) requirements (<i>20' minimum typical</i>). Fire Lanes shall be designed to support 60,000 lb fire apparatus per OFC D102.1. Also, OFC 503.1.1 requires that a fire lane (<i>ie. fire apparatus access road</i>) extend to within 150 feet of the furthest point on any building exterior 1st story wall. <u>See PWDS 2.30 for maximum slopes for driveways, and OFC D103.2 for maximum slope along fire lanes.</u></p> <p>² – Paved width shall be measured from the face of curb where curbs exist.</p> <p>³ – See LUDC 7.2.302.07 for private street standards. Also, a recorded <u>access easement & maintenance agreement</u> is required for common driveways serving two or more lots or parcels, or for private streets.</p> <p>⁴ – Sidewalk to City standards required along <u>at least</u> one side of <u>a</u> private street for <u>its</u> entire length (LUDC 7.2.302.07.B.4), <u>configured to provide pedestrian access to all lots or parcels utilizing the private street (see PWDS 2.31.a).</u></p> <p>Provide PUE along one side of street easement for franchise utilities. <u>See PWDS 2.24 for vehicular non-access requirements where applicable.</u></p> <p>⁵ – All common residential driveways & private streets shall be designated as fire lanes and signed for no parking, and shall meet the fire apparatus access road requirements of the Oregon Fire Code where applicable.</p> <p>⁶ – See PWDS 2.29.d for hard surfacing requirements adjacent to sidewalks.</p> <p>⁷ – See LUDC 7.2.302.08. Recorded maintenance agreement is required.</p> <p>⁸ – Minimum baseroack thickness assuming subgrade compacted to 95% of Modified Proctor and passes a proofroll. Thicker baseroack sections over fabric are required otherwise.</p> <p>Note: Easement widths for fire lanes or driveways across other property, or tracts containing private streets, are to be a minimum of 5 feet wider than the paved or improved width (see also Detail 220).</p>			

- d. Flaglot Drive Earthwork & Grading. As a minimum, all grading for single flag lot drives shall be completed by the developer at the time of street and utility construction, whether or not paving is required at the time of street construction.
- e. Common Use Driveway & Fire Lane Paving. Common use driveways and fire lanes shall be paved by the developer at the time of street and utility construction to ensure that they are serviceable prior to building permit issuance per Oregon Fire Code requirements (OFC 501.4), unless an exemption is granted by the Fire Code Official and the Public Works Director to allow paving to occur prior to occupancy.
 - 1) If such an exception is granted to defer paving, the common driveway and/or fire lane shall be improved with granular baserock to a sufficient depth to accommodate all truck and construction loads during building construction, typically corresponding to the City's standard over-excavation baserock section as a minimum.

2.32 STREET LIGHTING

- a. Street lighting design shall be provided as part of the street design and/or development process at the developer's cost. Street lights shall be located as near as possible to lot line extensions and not in the middle of lots.
- b. Spacing and location of street lighting shall be approved by the City based on City spacing standards or a photometric design, subject also to the location and spacing standards summarized herein. The design and installation of street lights shall be paid for by the developer, including any redesign costs required to comply with City spacing or location standards. Any line extension fees shall be the responsibility of the developer.
- e. ~~Any street light relocation, if requested by a resident or developer, must be approved by the Public Works Director, and the resident or developer will be responsible for the cost of such relocation. (moved down)~~
- d. ~~Unless otherwise approved by Public Works Director and the utility company, street lights shall be installed a minimum of 1 foot behind curbline sidewalks. (moved down)~~
- e. ~~Street lights may be installed between the curb and property line sidewalks provided the street light is a minimum of 3 feet behind the face of curb and 1 foot from the sidewalk. (moved down)~~

f.c. Location & Spacing. Street lights shall be placed at all street intersections and at cul-de-sac bulbs. Unless otherwise approved by the City, street light spacing shall not exceed 200 feet or 3 lot widths, whichever is less. As noted above in paragraph 1.1(d) of these standards, lesser spacing must be used whenever required in writing by the City, based on public safety concerns or by a photometric design.

1) Unless otherwise approved by Public Works and the utility company, street lights shall be installed a minimum of 1 foot behind curblane sidewalks.

2) Street lights may be installed between the curb and property line sidewalks provided the street light is a minimum of 3-feet behind the face of curb and 1 foot from the sidewalk.

d. Street Light Relocation. Any street light relocation, if requested by a resident or developer *(or where relocation is required in conjunction with new development)*, must be approved by the Public Works Director, and the resident or developer will be responsible for the cost of such relocation.

g.e. Pedestrian Lighting. Where pedestrian paths or offsite sidewalks are required in conjunction with a development project, street lights or pedestrian lighting *(acceptable to the Public Works Director)* shall be provided along the sidewalks or paths where adequate lighting does not already exist.

2.33 BARRICADES AND GUARDRAILS

- a. Guardrails shall be provided on all streets with downhill slopes which drop 6 feet or more at greater than 3H:1V slopes.
- b. Guardrail installation shall be based on information found in AASHTO publication "Guide for Selecting, Locating and Designing Traffic Barriers."
- c. Guardrails shall be designed and constructed per ODOT's "Standard Drawings for Design and Construction."
- d. Permanent barricade installation shall be based on the "Manual of Uniform Traffic Control Devices." Basically red and white reflectorized Type III barricades shall be used at the end of a street, conforming with Detail 225. 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 signs shall be used at the end of the sidewalk or pedestrian/bike path, mounted on a post conforming with ODOT detail TM240, which post is also shown on Detail 212.

2.34 BIKEWAYS

- a. Bikeway locations shall be determined by the City. Bikeway facilities shall meet the requirements of this document and the American Association of State Highway and Transportation Officials publication, Guide for Development of New Bicycle Facilities.

as amended and adopted by the Oregon Department of Transportation.

- b. A bikeway may be constructed adjacent to the curb within the pavement area.
- c. Structural sections of bikeway facilities on streets shall conform to that of the street or be integral with the curb.
- d. Bikeways not within a street shall be constructed as concrete multi-use paths per PWDS 2.21-f.
- e. Design Standards regarding horizontal alignment, grade, sight distance, intersections, signing, marking, structures, drainage and lighting shall conform to the AASHTO Standards. When bikeways are integrated with a curb, all inlet grates shall be designed to protect the bicyclist from the grate or opening.

2.35 STREET SIGNS

- a. Street signs shall be installed on all new or reconstructed public and private streets. Street names for all newly platted streets shall be approved by the City.
- b. All street signs (*material, color, wording, etc.*) shall conform to OSSC (ODOT/APWA) Specifications, City Standards, and the Manual of Uniform Traffic Control Devices (MUTCD). Location and type of signs shall conform with MUTCD and City Standards.
- c. Signs along County or State right-of-ways shall be approved by the County or ODOT as appropriate.
- d. All signs shall be ordered, installed and paid for by the developer. Street names and sign types shall be approved by the City prior to placement of the sign order.

2.36 CUTTING EXISTING STREETS & RESTORATION REQUIREMENTS

- a. Any street pavement cuts shall be repaired to PWDS standards and details, including any work by or for franchise utility companies. 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. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces, pavement which does not drain, or pavement with cracks or discontinuities along edges between new pavement and existing pavement or curbs shall be repaired to the satisfaction of the City, prior to final acceptance of the work.
- b. Unless otherwise approved in writing by Public Works Director, sawcuts or trenches within arterial or collector streets shall meet same requirements (*below*) as for cutting new streets (*ie. pavement less than 5 years old*).
- c. Street cuts in PCC concrete streets or concrete driveway aprons shall be restored as

required by the City Engineer.

- d. Pavement more than 5 years old. All trench cuts, ~~or~~ widening or extending of existing paved streets *(those which do not meet the overlay/inlay requirements below)* shall include a bench grind along the joint between the new AC and existing AC per City standard details *(to avoid a full depth joints)*, unless otherwise specifically approved by the City Engineer and Public Works Director for driveway cuts, private street cuts or public streets where existing asphalt is inadequate to support the bench grind.
- 1) Where utility work or other improvements along a street result in more than 50% of the paved road width being removed or damaged, a full width overlay *(or grind & inlay covering the entire width of the street)* shall be provided, limits as summarized below and as outlined in PWDS 2.13.
- e. Pavement less than 5 years old. **No street in the City shall be cut by a contractor, developer or utility company within 5 years of construction, reconstruction or overlay unless approved by the City Engineer and authorized in writing by the City Council.** This time period may be extended in one (1) year increments by resolution by the City Council on a case-by-case basis. In the event that the City allows a street to be cut within the time limit outlined herein, the trench in AC pavement streets shall be restored as follows:
- 1) Unless otherwise approved in writing, the trench shall be backfilled above the pipe zone with a Controlled Low Strength Material (CLSM) backfill *(with an unconfined compressive strength less than 200 psi)* as approved by the City Engineer and Public Works Director. The mix design shall be submitted to the City and approved prior to cutting the street.
 - 2) The trench edges shall be over-cut square and straight to a minimum width of 6-inches from each edge of the trench following completion of the backfill and prior to the final patch work.
 - 3) An asphalt wearing course of Class C mix shall be placed in two lifts to a minimum compacted depth of 4-inches or the depth of the existing pavement, whichever is greater.
 - 4) After the trench cut is plugged as noted above, the street shall be repaved with an overlay or an inlay based on the minimum requirements summarized below, and as approved by the City Engineer and the Public Works Director.
 - a) The overlay shall cover the cut area to a minimum compacted depth of 2-inches and extend a minimum of 50 feet beyond the cut area in each direction along the street. Unless otherwise approved by the City Engineer and the Public Works Director, the overlay shall encompass the entire paved width of the street. A 2-inch deep edge grind shall be provided along all gutter or curblines to allow the new pavement to match gutter or curb grades and at each end to allow the new pavement

to match existing pavement grade. Edge grinds shall be tapered to allow the full overlay depth at all locations. Butt grinds at the end of overlays shall be a minimum of 25 feet in length.

- b) As an alternate to a full width overlay, a grind and inlay may be provided as follows. The grind & inlay shall be 2-inch minimum, or half the pavement depth, whichever is greater (*3" maximum*). Unless otherwise approved by the City Engineer and the Public Works Director, the grind & inlay shall extend a minimum of 15 feet in each direction (*parallel with curbline*) beyond any trench cut, and all inlays shall extend a minimum of 5 feet (*perpendicular to curb*) beyond any trench cut limits, with pavement limits extended as required to ensure that pavement joints do not fall in a wheel track. If the minimum inlay limits extend beyond the street centerline, it is to encompass the entire street width.

- 5) The overlay *or inlay* shall meet all requirements as outlined in PWDS 2.13, Overlays. A strip of Petrotac fabric shall be installed over all trench patch joints.

If this 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 said pavement patches for a period of two (2) years, and during that time shall repair to the City's satisfaction any of the patches which become settled, cracked, broken or otherwise faulty."

CITY OF DAYTON
Public Works Design Standards

Division 3

Stormwater Management

DIVISION 3 STORMWATER MANAGEMENT

3.1 PURPOSE

a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a stormwater management system which will:

- 1) be of adequate design to safely manage all volumes of water generated upstream and on the site to an approved point of disposal;
- 2) provide points of disposal for stormwater generated by existing upstream properties and future upstream developments;
- 3) prevent the uncontrolled or irresponsible discharge of stormwater onto adjoining public or private property;
- 4) prevent the capacity of downstream channels and storm drainage facilities from being exceeded, unless downstream improvements to increase capacity are provided as part of the project;
- 5) have sufficient structural strength to resist erosion and all external loads which may be imposed;
- 6) maximize the use of the City's natural drainage system;
- 7) be designed in a manner to allow economical future maintenance;
- 8) require the use of design and materials to provide a system with a minimum practical design life of not less than 50 years.
- 9) shall not negatively impact existing water quality.

Alternate materials and methods will be considered for approval on the basis of these objectives.

b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

3.2 APPLICABILITY

a. These Standards shall govern all construction and upgrading of all public and private drainage and associated facilities in the City of Dayton and applicable work within the City's 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 Dayton and within all off-street parking and loading

areas.

- b. All storm water 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.
- c. Permanent storm drain facilities shall be provided to serve all properties within the City of Dayton in accordance with these Standards. This shall generally be interpreted to mean that permanent storm drainage facilities shall be provided for the following types of development:
 - 1) Existing legal lots of record at the time development occurs;
 - 2) All partitions and subdivisions;
 - 3) Developments entailing construction which will change the point of discharge of surface waters, the quantity of discharge, or will discharge water at a higher velocity than that of the preconstruction discharge rate.
 - 4) Construction or reconstruction of public or private streets and temporary detours;
 - 5) Developments entailing construction in or adjacent to any existing stream or watercourse including intermittent streams.

3.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
 - 1) Stormwater Pump Stations and Force Mains
 - 2) Siphons
 - 3) Water Quality Facilities
 - 4) Energy Dissipators
 - 5) Flow Measurement Devices
 - 6) Bore Crossings
 - 7) Concrete Box Culverts (*where standard culverts are not feasible*)
- b. Review and approval of the above special items by the City Engineer and the Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

3.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 3.12.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested. Any and all such requests shall be submitted in writing to the Public Works Director prior to City approval of the design drawings.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards (*also see "equal" & "substitute" definitions under PWDS 1.4*).
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and the Public Works Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

3.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all storm drain appurtenances including but not limited to manholes, catch basins, junction boxes, ditch inlets, service lateral connections, outlet structures, riprap outlets, detention facilities, water quality features, rain gardens, etc.

3.6 CITY STANDARD DETAILS

- a. City sStandard details included in the Appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the City standard details, the more stringent as determined by the City Engineer and Public Works -Director shall apply.
- c. As required by Division 1 of these standards, all applicable City standard details shall be included on the construction drawings. Details shall be placed in numerical order on the detail sheets, for ease of reference during construction.

3.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to stormwater systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.
- 1) Abbreviations: Acceptable abbreviations for showing types of new and existing pipe materials and facilities on the plans are as follows:
 - a) AC - Asbestos Cement
 - b) CAP - Corrugated Aluminum Pipe
 - c) CI - Cast Iron
 - d) CHDPE - Corrugated High Density Polyethylene
 - e) CMP - Corrugated Metal Pipe (*Aluminum*)
 - f) CP - Non-reinforced Concrete Pipe
 - g) DI - Ductile Iron
 - h) HDPE - High Density Polyethylene
 - i) PVC - Polyvinyl Chloride
 - j) RCP - Reinforced Concrete Pipe
 - 2) Building Drain: The building drain is that part of the lowest piping of the drainage system which receives the discharge from stormwater drainage pipes inside or within 5 feet of the outside walls of the building and conveys it to the building sewer, which begins five (5) feet outside the building wall or building foundation.
 - 3) Building Storm Drain: That part of the piping of a stormwater drainage system which begins at the connection to the building drain and conveys stormwater to an approved point of disposal.
 - 4) Catch Basin: An approved receptacle designed to receive surface drainage and direct it to a stormwater collection system.
 - 5) 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 ~~—~~ \oplus 1/2-inch of rainfall in a 24-hour period from October through March.
 - 6) Detention: The holding of runoff for a short period of time while releasing it to the downstream drainage system at a controlled rate.
 - 7) 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.

- 8) Impervious Areas/Surfaces: Those hard surface areas located upon real property which either prevent percolation of water into the land surface or reduce the percolation rate which existed under natural conditions prior to development. Also surfaces which cause water to run off the land surface in greater quantities or at increased flow rates than under natural conditions which existed prior to development. Common impervious surfaces include but are not limited to rooftops, driveways, parking lots or storage areas, sidewalks, patios, etc.
- 9) Natural Location: The location of those channels, swales, and other non-man-made drainage conveyance systems as defined by the first documented topographic contours existing for the subject property either from maps or photographs.
- 10) 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.
- 11) Peak Discharge: The maximum water runoff rate determined for the design storm.
- 12) Pre-Development Conditions. Defined as a site with natural vegetation on native soil, unless otherwise approved in writing by the City Engineer and the Public Works Director, based on the storm system having adequate remaining available downstream capacity for the site being developed (*as defined in these standards*), based on calculations and storm system modeling provided by the developer's engineer to the satisfaction of the City.
- 13) Private Storm Drain: A storm drain located on private property serving parking lot catch basins or more than one structure on the same legal lot of record premises, and not operated or maintained by the City.
- 14) Public Storm Drain: Any storm drain in a public right-of-way or easement operated or maintained by the City.
- 15) Receiving Body of Water: Creeks, streams, lakes, and other bodies of water into which runoff is naturally or artificially directed.
- 16) 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.
- 17) Remaining Available Downstream Capacity. See description/definition under "Detention Facilities" section of these standards.
- 18) 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.

- 19) Sedimentation: Deposition of erosional debris and soil sediment displaced by erosion and transported by water from a higher elevation to an area of lower gradient where sediments are deposited as a result of slack water.
- 20) Terrace: A relatively level step constructed in the face of a slope for drainage, erosion control and maintenance purposes.
- 21) Trunk Drainage System: That portion of the drainage system which receives waters from upstream land areas in excess of 20 acres, or with pipe diameters of 18-inches or larger. The drainage system may consist of watercourses or man-made facilities such as pipes, ditches, and culverts.
- 22) Wetlands: As defined by the Division of State Lands and the US Army Corps of Engineers.

3.8 MATERIALS

a. **General**

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the City Standard Details. ~~This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).~~
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director 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.
- ~~3)4)~~ Material/Equipment Submittals from Contractor Required. Per Section G-1300, construction submittals shall be provided by the Contractor for review by the City, for all material & equipment which will be incorporated into work covered under the PWDS.
- ~~4)5)~~ Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

- b. **Pipe Type By Cover Depth:** Unless otherwise approved by the City Engineer, storm drain pipe materials shall conform to the table below. Uniform pipe material shall be used on each pipe run between structures. Special requirements for use of jointed HDPE pipe for slopes exceeding 6% for or cover depths greater than 10 feet are listed in the following table.

ALLOWABLE STORM DRAINAGE PIPE BASED ON COVER DEPTH	
<input type="checkbox"/> COVER DEPTH <input type="checkbox"/> (from finish grade)	10" – 18" DIAMETER
Less than 1½' Cover	Class 50 Ductile iron pipe with bell & spigot joints and rubber gaskets.
1½' to 2½' Cover	Pipe specified for lesser depths -OR- Class 3, ASTM C-14 non-reinforced concrete pipe with bell & spigot joints and rubber gaskets. -OR- PVC pipe conforming to AWWA C900 DR 18 with bell and spigot joints and rubber gasket.
2½' to 10' Cover	Pipe specified for lesser depths -OR- PVC pipe conforming to ASTM D-3034 solid wall PVC SDR 35 (6"-15") or ASTM F-679 PVC solid wall SDR 35 (18") with bell and spigot joints and rubber gasket -OR- HDPE (High Density Polyethylene) pipe conforming to AASHTO M-252 (8"-10") or AASHTO M-294 (12"-18"). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.
More than 10' Cover	Case by case basis.
<input type="checkbox"/> COVER DEPTH <input type="checkbox"/> (from finish grade)	21" – 30" DIAMETER
Less than 1½' Cover	Class 50 Ductile iron pipe with bell & spigot joints and rubber gaskets.
1½' to 2½' Cover	Pipe specified for lesser depths -OR- Class IV (minimum), ASTM C-76 reinforced concrete pipe with bell & spigot joints and rubber gaskets -OR- PVC pipe conforming to AWWA C900 DR 18 with bell and spigot joints and rubber gasket.
2½' to 10' Cover	Pipe specified for lesser depths -OR- ASTM F-679 PVC solid wall SDR 35 pipe with bell and spigot joints and rubber gasket -OR- HDPE (High Density Polyethylene) pipe conforming to AASHTO M-294. For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.
More than 10' Cover	Case by case basis.
GREATER THAN 30" DIAMETER, OTHER PIPE MATERIALS - Case by case basis.	
Driveway Culverts or Open Storm Inlets: Pipe type based on cover depth, minimum size 12-inch diameter (<i>or size based on flow capacity, adjacent existing street crossing or storm drain size, whichever is greater</i>).	
Pipe End Protection: PVC or HDPE pipe is not allowed for culverts or for exposed inlets/outfalls without structures unless concrete end caps are provided (<i>6" min thickness, typically 12" larger than pipe OD unless larger size required by Public Works Director</i>).	
Detention Systems. Piping associated with detention systems (<i>ie. including detention pipe where applicable, piping between the detention basin & the flow control manhole, overflow piping, etc.</i>) shall conform with the minimum requirements of this table. This pipe material table also does not apply to other <u>private</u> storm piping which fully complies with the material <u>and</u> slope requirements of the Oregon Plumbing Specialty Code (OPSC).	

c. **Storm Drain Pipe**

1) **Ductile Iron**

- a) Ductile iron storm pipe shall be Class 50 pipe conforming to AWWA C-151, and cement-mortar lined and seal coated in accordance with AWWA C-104.

2) **Non-Reinforced Concrete Pipe (CP)**

- a) Non-reinforced concrete pipe and specials shall conform to AASHTO M86 (ASTM C-14), Class 3 minimum.
- b) 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 C-443. The gaskets shall conform to material requirements of ASTM C-361.

3) **Reinforced Concrete Pipe (RCP)**

- a) Reinforced concrete pipe shall meet the requirements of AASHTO M170 (ASTM C-76) Class IV minimum.
- b) Joints shall be O-ring type in conformance with non-reinforced concrete pipe joint and gasket specifications above.

4) **PVC Pipe**

- a) Pipe and fittings shall conform to ASTM D-3034, SDR 35 or ASTM F 679, SDR 35 as outlined above.
- b) Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM classification.
- c) The joints shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

5) **High Density Polyethylene Pipe (HDPE)**

- a) Pipe and fittings shall have integrally formed smooth interior pipe surface.
- b) Pipe and fittings shall conform to the requirements as listed in the table above.
- c) HDPE (High Density Polyethylene) pipe conforming to AASHTO M-252 (8"-10") or AASHTO M-294 ($\geq 12"$). For slopes less than 6% the pipe shall be ADS N-12 IB ST, Hancor Sure-Lok F477, or approved equal. For slopes greater than 6% the pipe shall be ADS N-12 IB WT, Hancor Blue Seal, or approved equal with watertight pressure testable fittings.

d. **Joints**

- 1) 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.
- 2) 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.

e. **Pipe Accessories**

- 1) 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.
- 2) Manufactured fittings shall be used for all connections to existing or new storm drains.

f. **Catch Basins**

- 1) Catch basin construction and dimensions shall conform to the City sStandard dDetails. Side inlet grated catch basins shall be required.
- 2) Catch basin frame and grate shall conform to City standard details, and shall be fabricated of structural steel, ASTM A-7, A-36 or A-273.
- 3) 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.

g. **Manholes**

- 1) 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 City standard details.
- 2) Storm manholes shall be equipped with permanent factory installed steps to provide a continuous ladder of 12-inch center-to-center rung spacing. Steps shall be same as specified for sanitary sewer manholes. Steps shall not be required for manholes 4 feet or less in depth (*rim to invert*).
- 3) Manhole castings for storm manholes shall have 16-hole lids.
- 4) Unless otherwise required by the Public Works Director, connections to existing storm manholes shall comply with the requirements for manhole taps on sanitary sewer manholes, as outlined under Division 4, Sanitary Sewers and as shown in the City standard details (*except for vacuum testing requirement*).
- 5) Pollution/Flow Control Manhole Lids
 - a) Unless otherwise required by the Public Works Director, pollution/flow control manholes shall be provided with a 24-inch diameter casting and lid, with a separate access hole with a cast iron cleanout box & lid over the orifice, as shown on the City standard details.

h. **Mainline Storm Cleanouts**

- 1) Except as modified herein, mainline storm cleanouts (*where approved by the City*) shall conform to the requirements outlined under Division 4, Sanitary Sewers and as shown in the City standard details.
- 2) A 3,300 psi concrete collar is required for cleanouts located outside of paved areas. The shaft or chimney of the cleanout shall be a minimum of 8-inches in diameter.

i. **Concrete (Cast-in-Place)**

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi min @ 28 days, max 5" slump, 4.5% air ($\pm 1.5\%$).

j. **Underground Warning Tape**

- 1) Warning tape shall conform with the requirements noted on the City standard details and standard construction notes (*6-inch width, green color & "Caution:*

Buried Storm Line Below” or approved equivalent printed continuously down the length of the tape).

- 2) 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.

k. **Toning Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with storm pipe (*both public & private*). Insulation shall be green in color for storm piping.
- 2) Wire shall penetrate into manholes and catch basins within 18 inches of the rim elevation.

l. **Warning Tape**

- 1) Warning tape shall conform with the requirements noted on the City standard details and standard construction notes (*6-inch width, color & “Caution: Buried _____ Below” wording as required for pipeline being installed*).

m. **Bore Casings and Accessories**

- 1) Carrier pipe installed inside steel ~~used in~~ bore casings shall be Ductile Iron or PVC as specified herein.
- 2) Bore casing and carrier pipe design and installation shall conform to the requirements outlined under Division 5, Water Distribution.

3.9 GENERAL DESIGN CONSIDERATIONS

a. **General Requirements**

- 1) The design of storm drainage systems shall include provisions to adequately control runoff from all public and private streets and the roof, footing, and area drains of residential, multifamily, commercial and industrial developments, and to provide for the future extension of the storm drainage system to serve the entire drainage basin.
- 2) Approved Point of Disposal: All storm water runoff shall be conveyed to an approved point of disposal as summarized below. In the case of private development, the developer shall pay all costs associated with designing and constructing the facilities necessary to meet this requirement.

- 3) Allowable Discharge: The design storm peak discharge from the subject property may not be increased from conditions existing prior to the proposed development except where it can be satisfactorily demonstrated by the applicant that there is no adverse impact to downstream properties, and that the "remaining available downstream capacity for the site being developed" (*per PWDS 3.18.b*) is not exceeded.
- 4) Public storm drains within easements will be permitted only upon a showing that drainage cannot be provided from within a right-of-way. Minimum easement widths shall be as outlined herein.
- 5) Gravity Flow: Where possible, all public & private storm drains shall be designed to flow by gravity to an existing or new storm drain system without lift stations.
- 6) Self-Cleaning. Except for pollution control or water quality structures, all storm drain system components shall be designed to be self-cleaning to the extent possible.

b. **Approved Point of Disposal**

- 1) Surface or subsurface drainage (*caused or affected by changing of the natural grade of the existing ground or removal of natural ground cover or placement of impervious surfaces*) shall not be allowed to flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred unless written approval is first granted by the all agencies with jurisdiction and by affected property owners, and all such drainage shall be collected and conveyed in an approved manner to an approved point of disposal.
- 2) The approved point of disposal for all stormwater may be a storm drain, existing well defined open channel or creek as approved by the City Engineer and the Public Works Director. Acceptance of proposed point of disposal will depend upon the prevailing site conditions, condition and capacity of existing downstream facilities, and feasibility of alternate design.
- 3) When private property must be crossed in order to reach an approved point of disposal (*or if downstream improvements are required across private property in order to provide required capacity or depth*), 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 and the Public Works Director.
- 4) Where existing open channels must be improved to provide adequate slopes and/or capacity for design flows, the design and construction of such on-site or downstream off-site improvements shall be the developer's responsibility, including acquisition of access rights for surveying, design and construction of such improvements.

- 5) New drainage facilities installed must be a closed conduit system. Temporary drainage ditch facilities, when approved, must be engineered to contain the stormwater without causing erosion or other adverse effects to the private property.

c. **Providing for Future Development & Collection of Upstream Drainage**

- 1) To & Through. As a condition of building/infrastructure construction/development, all developments will be required to provide public storm drainage systems *(or private storm drainage systems where approved by the City)* to serve adjacent upstream parcels in order to provide for the orderly development of the drainage area, as well as connection *(to the new system)* of existing storm lines or laterals crossed or intercepted by the new storm lines *(including manholes or catch basins which can be served by the new storm lines)*, at locations as required by the City Engineer and Public Works Director *(see also PWDS 1.6.e)*.

- 2) The requirement above shall include the extension of storm drain lines in easements across the property as required to collect drainage from adjoining upstream/uphill properties, and across street frontages of the property to adjoining properties when the storm drain system is located in the street right-of-way.

This shall also 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 requirements above shall include storm drains which are oversized to provide capacity for future upstream development, or as required to meet the minimum sizes shown in the applicable storm master plan *(see also PWDS 1.6.h)*.
- 4) Swales along Property Lines to Intercept Upstream Drainage. Where swales along property lines are necessary to intercept uphill surface runoff, the swales shall be a minimum of 1 foot in depth *(3H/1V max side slopes)* and inlets shall be provided at spacing & location acceptable to the City Engineer *(typically on the upstream side of each property line crossed, unless otherwise approved)*.

d. **Design Factors**

- 1) The following factors as a minimum shall be addressed in the design of storm drain systems and determination of design flows.
 - a) Drainage basin to be served.
 - b) Topography of the area
 - c) Depth of excavation

- d) Soils conditions
- e) Land use within the area to be served.
- f) Projected population within the area to be served at build-out.
- g) Flows from commercial, industrial or institutional users.
- h) Condition and size of existing storm drains
- i) Location of approved disposal point
- j) Maintenance, including accessibility for cleaning and inspection personnel and equipment.

3.10 DESIGN CALCULATIONS AND CAPACITY

a. Design Calculations

- 1) Design calculations shall be submitted for all drainage facilities and shall be stamped by a professional engineer licensed in the State of Oregon. Peak flows shall be calculated using either the Rational Method or the Santa Barbara Urban Hydrograph (SBUH) method, subject to requirements herein and direction from the City Engineer and/or other agencies with jurisdiction..
 - a) A summary of these drainage calculations, including basin maps, shall be included on the site plan drawings (*see PWDS 1.10.g*).
- 2) Rational Method: One method used for calculating peak flows from small drainages less than 200 acres is the Rational Method.
 - a) Peak design discharges shall be computed using the rational method formula, $Q=CiA$, where Q = flow in cfs, C = runoff coefficient, i = rainfall intensity, and A = area in acres.
- 3) SBUH: Another method of involves the use of the Santa Barbara Urban Hydrograph (SBUH) method to develop runoff hydrographs using 24 hour storm data for the local area, based on current NOAA Atlas 24 hour isopluvials for Oregon.
 - a) For Dayton, the 24-hour precipitation values from the NOAA Atlas 2, Volume X, for use with the SBUH method are as follows (*ODOT design rainfall intensities may differ*):
 - (1) 5-YR 24-Hr = 2.7"
 - (2) 10-YR 24-Hr = 3.2"
 - (3) 25-YR 24-Hr = 3.7"
 - (4) 50-YR 24-Hr = 4.2"
 - b) The City Engineer reserves the right to verify all calculations using the Rational Method, and require larger pipe sizes if the Rational Method calculations result in higher flows than the SBUH methodology.

b. **Design Storm**

- 1) **Rational Method Rainfall Intensity-Duration Curve** - The rainfall intensity-duration-frequency (IDF) curve for use under the Rational Method in the City of Dayton is the ODOT Zone 7 IDF curve (*enclosed herein*).
- 2) **Rational Method Design Frequency** - The intensity-duration design frequency for use under the Rational Method is based on the time of concentration for the area and the size of the drainage facility. The adopted criteria are listed in the following table.

Rational Method - DESIGN STORM FREQUENCY¹	
AREA	FREQUENCY
Residential areas ²	10-year storm
Commercial and high value districts ²	10-year storm
Trunk lines (<i>18" pipe and larger</i>)	25-year storm
Minor creeks, open channels and drainage ways (<i>not shown as a flood plain on the Flood Insurance Rate Map (FIRM)</i>)	50-year storm
Major creeks/channels (<i>shown as a flood plain on the FIRM</i>)	100-year storm
¹ See PWDS 3.10.a.3 regarding design storm when SBUH methodology is used for pipe sizing.	
² See categories below for trunk lines, creeks, open channels, drainage ways, etc. in these areas.	

- 3) **SBUH Design Storm for Pipe Sizing:** Where Santa Barbara Urban Hydrograph (SBUH) based computer program is proposed for use in sizing storm drain pipes, a 50 year 24 hour SBUH storm event must be used in lieu of the 10 year or 25 year rational storm frequency to provide equivalent capacity for peak discharge.

ODOT IDF Curve Tabular Data

ODOT IDF curve plot

c. **Runoff Coefficients**

- 1) The Rational Method coefficients of runoff "C" are listed below (*ie. for use with rational method calculations*). Use of coefficients other than those listed must be based on field investigations which demonstrate conclusively that the proposed coefficients are justified. See requirements above for CN runoff curve numbers required for use with Santa Barbara Urban Hydrograph (SBUH) calculations.

Rational Method - RUNOFF COEFFICIENTS			
SOIL COVER	FLAT TERRAIN S<2%	ROLLING TERRAIN 2%<S≤10 %	STEEP TERRAIN S>10%
Cultivated Land	0.30	0.35	0.40
Parks & Cemeteries	0.15	0.20	0.30
Woodlands & Forests	0.10	0.15	0.20
Meadows & Pasture Land	0.25	0.30	0.35
1) Single-family residential in urban areas, except corner lots with duplex potential	0.40	0.45	0.50
2) Gravel parking lots	0.50	0.55	0.60
3) Mobile home parks	0.60	0.65	0.70
4) Multi-family residential, zero-lot-line single-family residential and potential duplex lots in single-family residential	0.70	0.75	0.80
Highly impermeable (<i>roofs and paved areas</i>)	0.90	0.90	0.90

- 2) All CN parameters (*runoff curve number*) used for SBUH calculations shall be as conservative or more conservative than the equivalent Rational Method runoff coefficients listed in these standards.

d. **Time of Concentration**

- 1) For land in a pre-development condition, the minimum time of concentration from the most remote point in the basin to the first defined channel (*ie. gutter, ditch or pipe*) shall be 10 minutes.
- 2) For developed residential and commercial/industrial property, the maximum post-development time of concentration from the most remote point in the

development to the closest inlet shall be 10 minutes, unless calculations by an acceptable method show the time to be longer for very large developments.

3.11 OPEN CHANNELS

- a. Within the UGB, creation of new open channels will not generally be allowed, and existing open channels shall be rerouted at the time of development so as not to be located in backlot areas of residential developments or other non-residential backlot areas without maintenance vehicle access along one side of the open channel.
 - 1) Where open channels are allowed by the City, ditches or open channels shall be offset from lot lines, such that maintenance access can be provided and survey monuments are not required to be set within the open channel.
- b. For reasons of maintenance and safety, bank slopes generally shall be 3H:1V or flatter unless otherwise required by the Public Works Director or the Public Works Director. Unless otherwise required by Public Works Director or the City Engineer, open channels shall generally be provided with a minimum of 1 foot freeboard above the design high water level, where required to ensure that the channel does not overflow onto private property between periods when the ditch is mowed or cleaned by the agency with jurisdiction.
- c. The maximum allowable design velocity shall be 7 fps.
- d. The minimum allowable design velocity shall be 2 fps. The installation of a concrete lined low-flow channel may be required to achieve minimum velocity necessary to ensure that the channel is self-cleaning to the extent feasible.
- e. Unless otherwise approved by the City Engineer, all piped discharges to open channels (*existing or new*) shall be mitered to match the channel side slope and include a reinforced concrete collar (*6" minimum thickness*) to prevent settlement or erosion of the pipe trench at the discharge location, and to protect the end of the pipe. Unless otherwise approved by the Public Works Director and the City Engineer, the concrete collar shall extend from the channel bottom to the top of bank. Grates shall be provided on all inlets or outlets 18" or larger unless otherwise specifically approved by the Public Works Director and the City Engineer, as well as at any locations required by the Public Works Director to accommodate maintenance or mowing requirements.
- f. If grated inlets are provided at locations where swales or open channels flow into a piped storm drainage system, such grated inlets shall be slanted or mitered to match the channel end slope (*to minimize the risk grates blinding off with debris during storm events*).
 - 1) The overflow path where stormwater will be routed if the grated inlet is obstructed by debris shall be identified to verify that water will not flow onto private property which does not normally receive such flows or otherwise

cause downstream damage.

3.12 STORM DRAIN ALIGNMENT AND LOCATION

a. General

- 1) Generally, storm drains shall be laid on a straight alignment between catch basins and between manholes.
 - a) Where approved by the City Engineer & the Public Works Director, lines 15-inch 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.
 - b) Variance for horizontal curves on larger size pipes shall be reviewed by the City Engineer on a case by case basis.
- 2) Where storm drains are being designed for installation parallel to other utility pipe or conduit lines, the vertical location shall be in such a manner that will permit future side connections of main or lateral storm drains and avoid conflicts with parallel utilities without abrupt changes in vertical grade of main or lateral storm drains.

b. Storm Drain Location in Relation to Water and Sewer Lines and Other Utilities

- 1) Public storm drainage lines shall be separated from all other parallel public utilities by a minimum of 5 feet between utility centerlines unless otherwise approved in writing by the Public Works Director and the City Engineer, but in all cases a minimum of 3 foot clear separation shall be provided.
- 2) Installation of franchise or private utilities in a common trench with storm drain lines shall be prohibited.

c. Storm Drain Location in Street Right-of-Ways

- 1) Unless otherwise approved by the City Engineer and the Public Works Director, storm drain lines shall generally be located in the street right-of-way within six (6) feet of the face of curb.
- 2) Variance for horizontal curves on larger size pipes shall be reviewed on a case-by-case basis for approval by the City Engineer.

d. **Storm Drain Location in Easements, Easement Widths, Maintenance Access Requirements**

- 1) Minimum Easement Widths: Unless otherwise specified or authorized by the City, minimum easements widths for storm drains shall be as follows:

MINIMUM STORM DRAIN EASEMENT WIDTHS		
Storm Drain Diameter	Depth to Invert	
	≤ 6 feet	> 6 feet
10 - 15 inches	12 feet	12 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
18 - 24 inches	16 feet	16 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
> 24 inches	20 feet	20 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
Note: Easements shall be a constant width between manholes or other in-line structures. Easement width shall be based on the deepest portion of the line between such structures.		

- 2) Open channels located outside of public right-of-ways shall be provided with easement widths as follows:
- a) Channel width less than 14 feet at top of banks: Channel width plus 12 feet on one side and 2 feet on the other, configuration as approved by the Public Works Director to facilitate maintenance access.
 - b) Channel width greater than 14 feet at top of banks: Channel width plus 12 feet on both sides.
- 3) Public storm drains in easements will be allowed only after all reasonable attempts to place the mains in a right-of-way have been exhausted. All easement installations must be approved in writing by the City Engineer and the Public Works Director on a case-by-case basis.
- 4) Offset. When storm drains in easements are approved by the City, the storm line shall be offset a minimum of 6 feet from any property line or easement boundary, or 1/3 the required easement width (*rounded up to the nearest foot*), whichever is greater.
- 5) Easement locations for public storm drain lines serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit an unobstructed vehicle

access for maintenance by City forces.

- 6) **Maintenance Access Requirements.** Where required by the Public Works Director, public storm drain lines or detention systems located outside of developed street right-of-ways (*public or private*) will require maintenance access similar to that required for sewers under PWDS 4.15.d (*ie. all-weather access lanes required along mainlines and/or for access to manholes including flow control manholes, inlets or other structures, maintenance agreement, etc.*).
- 7) City standards require that easements granted to the City 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 or tree be placed over a storm drain pipe or easement, nor shall any parallel fences or parallel utilities be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.
- 8) Common placement in the easement of a sanitary sewer and storm drain line may be allowed under certain conditions subject to approval by the City Engineer and the Public Works Director. Easements wider than the minimum may be required.
- 9) **Franchise Utility Limitations in City Easements.** Franchise utilities shall not be placed in City utility easements unless approved in writing by the Public Works Director, subject to separation requirements in excess of minimums as dictated by Public Works Director.
- 10) Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet City, Oregon State Department of Environmental Quality (DEQ) and OHA-DWS requirements.
- 11) **Public Works Review/Approval Required prior to Recording.** All easements must be furnished to the City Public Works and City Engineer for review and approval prior to recording. All recording costs shall be borne by the Developer.

3.13 STORM DRAIN MINIMUM PIPE SIZE

- a. Public mainline, lateral or connector pipe storm drains shall not be less than 10-inches inside diameter, and shall begin at a structure and terminate at an approved point of disposal.
- b. Per 3.8.b (table), driveway culverts (*or any other pipe specifically approved with an open inlet end*) shall be a minimum of 12-inches diameter. Larger diameters shall be provided where required for flow capacity or where required to match the size of

adjacent existing street crossings or storm drain pipes.

- c. When two parallel pipes are installed in lieu of a box culvert, the minimum separation between the pipes shall be one foot or 1/3 the diameter, whichever is greater. This requirement may be waived if the void between the pipes below the springline is filled by grouting or other approved method.

3.14 STORM DRAIN MINIMUM COVER

- a. All storm drains shall be laid at a depth sufficient to protect against damage by traffic (*see table under PWDS 3.8.b*) and to drain building footings where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the storm drain alignment.
- b. Under normal conditions minimum cover shall be 24-inches above the top of the pipe in paved areas and 30-inches at all other locations.
- c. In areas of relatively flat terrain, the design engineer must demonstrate that sufficient depth is provided at the boundary of the development to properly drain the remainder of the upstream basin area tributary to the site.

3.15 STORM DRAIN MINIMUM SLOPE & ROUGHNESS COEFFICIENT

- a. All storm drains shall be laid on a grade which will produce a mean velocity (*when flowing full*) of at least 2½ feet per second, based upon Manning's pipe friction formula using a roughness coefficient as noted below.
 - 1) Roughness Coefficient:
 - a) A minimum “n” value of 0.013 shall be used in Manning’s formula for the design of all smooth wall pipe and 0.024 for corrugated wall pipe, or per the pipe manufacturer’s recommendations, whichever is greater. The use of higher “n” values for existing pipe may be required by the City Engineer as deemed necessary by the City.
 - b) In theory, new PVC and HDPE pipes have manufacturer’s “n” value of 0.009 to 0.012. However, sand, dirt and rock and other deposits tend to build up in pipes over time. Hence, an “n” value of less than 0.013 will not be considered for approval.

- b. The minimum acceptable slopes for various pipe sizes and types are listed below:

MINIMUM STORM DRAIN PIPE SLOPES <i>(for 2½ fps velocity)</i>	
Inside Pipe Diameter (inches)	Smooth Wall (n=0.013) % Slope (ft/100 ft)
10	0.39
12	0.30
15	0.23
18	0.18
21	0.14
24	0.12
27 & larger	0.10

- c. In general, gradients greater than those shown above are desirable and are particularly recommended on connector pipes and the upper ends of laterals.
- d. The minimum grade may be reduced from the above table to produce an absolute minimum velocity of 2.0 fps upon approval of the City Engineer. Cases requiring a flatter grade than permitted above shall also be reviewed on a case by case basis for approval by the City Engineer.
- e. Engineers are cautioned not to specify sewers of sizes which are obviously larger than necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements (*ie. a 15-inch pipe for an 12-inch pipe to acquire a decrease in slope*).
- 1) In cases where using a larger pipe is the only option available to serve a development (*as demonstrated by the design engineer to the satisfaction of the Public Works Director and the City Engineer*), the larger pipe size so installed shall not be considered as a justification for the developer to be eligible for oversizing or SDC reimbursement.
- f. Storm drains shall be laid with uniform slope between structures.
- g. Grades (*slopes*) shall be determined to the pipe invert at the edge of the catch basin or manhole and lengths to the center of the catch basin or manhole.
- h. The difference between the inlet pipe slope (Si) and outlet pipe slope (So) at any catch basin or manhole shall not exceed 25 percent.

- i. Storm drains on slopes of 20 percent or more shall be anchored with concrete anchor walls or other restraining methods approved or specified by the City.
- j. Where velocities greater than fifteen (15) feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes against erosion and displacement by shock. This may be accomplished by installing one additional manhole to decrease the slope or to split a 90° horizontal direction change into two 45° incremental changes.

3.16 UNDERGROUND WARNING TAPE & TONING / TRACER WIRE

- 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 PUE. Where required for mainlines not located under sidewalks or paved portions of public streets, the warning tape shall be continuous between manholes or cleanouts.
- c. All storm piping (*both public lines and private lines serving parking lots, detention basins, etc.*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with green sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe with each end accessible from the surface through a manhole, cleanout or catch basin.

3.17 MANHOLES AND CATCH BASINS

a. General

- 1) All junctions between storm drains shall be made at manholes, catch basins or detention basins.
- 2) Manholes or junction boxes shall be required at the following locations or as determined by the City Engineer:
 - a) All changes in horizontal or vertical alignment. Minor horizontal curvature in pipe less than 15 degrees may be allowed, (*without manholes or cleanouts*), depending on pipe size, street alignment, degree of curvature and reason. Maximum joint deflection shall be per manufacturer's recommendation.
 - b) All connections unless otherwise noted herein.
 - c) All changes in pipe size.
 - d) At a spacing no greater than five hundred (500) feet.

- 3) Catch Basin Lead Connection. For new storm mainline and/or new catch basin 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 "T", provided the connections is located not more than one hundred (100) feet from a manhole or cleanout on the main line and the main line is a minimum of 15-inches or larger in diameter.

4) Storm Lateral Connections, Maximum Diameter.

- a) ~~In lieu of connecting to manholes, catch basins or junction boxes,~~
sStorm drain laterals draining a single legal lot private property may be connected directly to the public main line, provided the private storm lateral diameter is 8-inches or less and is no more than half the diameter of the main line (all other connections shall be to manholes, catch basins or junction boxes).

- 4)b) Unless otherwise approved by Public Works Director, the connection to the mainlines shall be with an Inserta-Tee connection so as to provide a strong, leak-proof joint. The lateral pipe shall not project inside the main line beyond the gasket (video inspection verification may be required, at the discretion of the Public Works Director).

b. Catch Basins

1) General

- a) Side inlet grated catch basins shall be used at all locations. Exceptions will be considered on a case by case basis.
- b) Catch basins may be used for the junction of pipes 15-inches in diameter.
- c) Maximum Catch Basin Depth. As noted on City standard details, catch basins shall typically not be deeper than 4 feet from the gutter grade to the outlet pipe invert. Deviation requires a written request & justification from the design engineer, and approval by the City Engineer.
- d) Catch basins shall be designed to completely intercept the 5 year design storm gutter flow.

2) Catch Basin Locations

- a) Maximum Gutter Length Drained. The maximum length of curb and gutter which may be drained by a catch basin is 500 feet.
- b) Maximum Area Drained. The maximum impervious area which may be drained by a catch basin is 20,000 square feet.

- c) Descending Stub Streets or Curbs Ends. Catch basins shall be installed where the improvement ends on all streets and/or curbs terminating on a descending grade, and piped to an approved point of disposal.
- d) Catch basins in the middle of blocks shall be located within 5 feet of the extension of a common property line.
- e) Catch basins shall be installed at all low spots, whether on private or public property, and shall be connected to a storm drainage facility.
- f) Catch Basins in Relation to Pedestrian Ramps.
 - (1) Catch basins shall not be located in front of pedestrian access ramps.
 - (2) Catch basins shall be set to minimize gutter flows across new pedestrian access ramps to the extent practicable, as determined by the Public Works Director and City Engineer.

Catch Basin Uphill of Pedestrian Ramps. A catch basin shall be set on the uphill side of pedestrian ramps, unless otherwise approved on a case-by-case basis.

- g) Maintenance of Private Catch Basins. In order to ensure compliance with City requirements regarding stormwater discharge, all catch basins on private property (*parking lots, etc.*) which drain to a public storm system shall be provided with a recorded agreement allowing for inspection entry by Public Works Director, unless catch basins are located within a City easement, or otherwise covered by a detention system maintenance agreement. Maintenance of private catch basins and private stormwater systems shall be an ongoing responsibility of the property owner, whether or not a maintenance agreement is recorded.

3) Drop Across Catch Basin Structure

- a) The vertical drop across flow-through storm drain catch basins shall not be less than 0.1 feet.

c. Manholes

1) Manhole Size

- a) Manhole size shall conform to the requirements outlined under Division 4, Sanitary Sewers and the City standard details.

2) Manhole Location

- a) Manholes shall be installed at all pipe junctions where the depth from rim to invert exceeds 4 feet or where the pipe is 18-inches in diameter or greater. Exceptions will be reviewed on a case by case basis.

3) Drop Across Manhole Structure

- a) The vertical drop across storm drain manholes shall conform to the requirements outlined under Division 4, Sanitary Sewers.
- b) Match Crowns. Where storm pipes of different sizes enter the same manhole, the design shall generally provide that the crowns of the smaller incoming pipes are set at or above the same elevation as the outlet pipe crown. Deviation requires a written request & justification from the design engineer, and approval by the City Engineer.
- c) Opposing Inlet Pipes with Significantly Differing Slopes. In cases where two pipes discharge into a manhole from opposite directions and one pipe has a slope more than 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 $\frac{1}{2}$ the pipe diameter, whichever is greater, above invert of the steeper pipe.

4) Rim Elevation

- a) The rims of all manholes located within paved or other hard surfaced areas (*or where paved pads are required around manholes per City standard details*) shall be set to finished grade. Manholes outside of these areas shall be set above finish grade as shown on the City standard details.
- b) 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. Mainline Storm Cleanouts

- 1) Mainline storm cleanouts will not be approved as substitutes for manholes or terminal catch basins. Cleanouts shall only be allowed at the upper end of main storm lines less than 150 feet long which will be extended on the same grade and alignment during the next construction phase of a multiphase development, and which do not have any laterals.
- 2) All mainline cleanouts will be considered on a case-by-case basis and approved by the City Engineer and the Public Works Director. 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.

3.18 **DETENTION FACILITIES**

a. **Where Required**

- 1) Peak storm water runoff shall be controlled by detention facilities for -the following:
 - a) All commercial, industrial, public and multi-family developments.
 - b) Projects~~Parking-lots~~ with 10,000 square feet or more of impervious area.
 - c) All other developments where such control is needed to prevent the capacity of the downstream system from being exceeded.
- 2) Developers shall be responsible for demonstrating to the satisfaction of the City Engineer that the downstream system has capacity for the proposed flows.
- 3) Developers proposing to not provide detention or control shall be responsible for demonstrating to the satisfaction of the Engineer that such control is not necessary.

b. **Allowable Runoff Rate (Outflow) (also remaining available downstream capacity)**

- 1) Peak runoff rate shall be limited to that which would occur in a 5-year frequency storm with pre-development conditions as defined above, or the *remaining available downstream capacity for the site being developed*, whichever is more stringent.
- 2) Remaining Available Downstream Capacity. Remaining available downstream capacity is defined as the downstream capacity unused during the design storm event. The *remaining available downstream capacity for the site being developed* is that portion of the remaining available downstream capacity equivalent to the ratio of the site being developed to the total undeveloped land in the basin.

c. **Detention Facility Siting & Maintenance**

- 1) Unless otherwise approved by the City Engineer and Public Works Director, all detention facilities shall be located on private property. Detention facilities located within a public right-of-way shall be configured as piped detention facilities (*ie. surface detention within right-of-way is not allowed*).
- 2) Detention Easement & Maintenance Responsibility. All detention facilities

shall be maintained by the property owner or Home Owner's Association (*or similar entity acceptable to the City*), including but not limited to cleaning and maintenance of outlet/flow control structures, irrigation (*via a permanent irrigation system*), mowing, etc.

- a) Maintenance shall be assured through a recorded maintenance agreement acceptable to the City (see Appendix D).
- b) All detention basins, with the exception of parking lot detention basins, shall be within a storm/detention and access easement to the City.

3) **Flow Control Structure Maintenance Access Requirements.** Unless otherwise approved in writing by the Public Works Director, provisions for all weather maintenance vehicle access to detention flow control structure shall be installed by the developer (*see also PWDS 3.12.d.6*).

4) **Irrigation & Landscaping.**

- a) Grass and a permanent automatic underground irrigation system shall be provided and installed by the developer for open detention basins outside of parking lots (*number of zones as required based on basin size and full irrigation coverage of interior & exterior slopes & bottom*).
- b) Irrigation controllers shall be mounted in a secure location, and shall be battery or solar powered unless a permanent power supply is installed and provided by the developer (*as approved by the Public Works Director and the City Engineer*).
- c) Any deficiencies in the irrigation system coverage or irrigation controllers during the warranty period shall be corrected by the contractor.

d. **Detention Facility Design**

1) **General**

- a) All detention facilities and drainage calculations shall be designed and stamped by a Professional Engineer registered in the State of Oregon. Detention facilities shall be designed to protect public and private property.
- b) Unless otherwise approved by the City Engineer, all open detention basins (*as well as ~~including~~ detention chambers with open bottoms*) shall be designed as off-stream storage basins, sloped to drain completely between design storms.

(1) Open detention basins approved as flow-through systems (rather than off-stream storage) shall be limited to applications where such configuration is required by other permits (wetland, water quality, etc.), and shall be provided with fencing around the perimeter of the basin.

c) The water level in the receiving stream during the design storm event must be lower than the bottom of the detention basin, unless otherwise approved by the City Engineer and the Public Works Director on a case-by-case basis.

e)d) Volume Excluded from Detention Storage Calculations. Any portion of the detention ~~system basin~~ below the design water level in the receiving stream or storm system, or below the outlet pipe invert elevation or below the highest seasonal groundwater level (for open basins or detention systems with open bottoms), may not be utilized for storage volume in detention calculations (for open basins or underground detention systems with open bottoms and/or for pipe systems utilizing open-graded drainage stone for storage volume, any volume which does not drain out completely between storms shall be excluded from storage volume calculations).

2) Detention ~~System Basin~~ Storage Capacity

a) Detention facilities shall have storage capacities to detain the greater of the following:

- (1) The difference between a 5-year frequency storm with pre-development conditions and a 25-year frequency storm under developed conditions.
- (2) The difference between the *remaining available downstream capacity for the site being developed* (as defined above) under design storm conditions and a 25 year frequency storm under developed conditions.

3) Detention System Orifice

a) The orifice size and the hydraulic head shall be adjusted to produce the allowable outflow based on the following formula:

$$D = 6.166 \left(\frac{Q}{H^{1/2}} \right)^{1/2}$$

Where:

D = Orifice diameter in inches.

Q = Discharge in cubic feet per second.

H = Hydraulic head above the orifice in feet.

- b) To prevent excessive plugging, the minimum orifice diameter shall be 1½-inches. The orifice shall be located in a pollution control manhole in an accessible location outside of the detention basin.
- c) The outlets of all detention basins shall be provided with suitable debris barriers designed to protect the outlet from blockage or plugging.
- d) Flow control orifice assemblies shall substantially conform with the general configuration shown on the City standard details, as approved by the Public Works Director and the City Engineer (*even if installed in a structure other than a manhole as shown on the details*).
 - (1) Details for alternate structures to house the flow control assembly shall be drawn to scale, and to demonstrate that the assembly fits in the proposed structure while allowing for equivalent maintenance & cleaning access.
 - (2) If an alternate flow control outlet assembly is proposed which does not allow for continuous outflow from the detention system equivalent to the predevelopment flowrate, the detention storage volume shall be increased to compensate for antecedent rainfall which reduces the available detention storage prior to the start of the design storm event.

4) Detention Overflow System

- a) The detention facility shall have a primary overflow system with the capacity to pass a 50-year frequency storm. Detention basin overflows shall discharge into a public storm drain facility or the natural drainage course for the drainage basin where the development is located (*without flowing across adjacent property where a recorded easement or an established natural drainage channel does not exist*), and shall be designed to minimize the impact to downstream systems (*the design engineer shall identify the flow path that overflow water will follow to demonstrate that this requirement is satisfied*).
- b) Primary Overflow. The primary overflow elevation shall be a minimum of 1 foot below the top of the ~~top of the~~ structure designed to contain the water.
- c) Emergency Overflow. The design engineer shall also demonstrate how emergency overflow (*for flows which exceed the primary overflow capacity*) will get from the detention basin to an approved downstream storm system without causing damage to the detention system or adjacent properties.

(1) If an emergency overflow channel is proposed from an open

basin, it shall, as a minimum, consist of 18" minimum depth of riprap, placed over geotextile fabric which is extended to the surface of the ground at the edge of the riprap, with a minimum flow depth of 12-inches and 3H:1V side slopes.

The riprap shall be either grouted or have all voids filled with ¾"-0 granular baserock to prevent water flow through the riprap and erosion of the underlying subgrade.

The channel shall be extended to the point where flow will not cause erosion damage during an emergency overflow event (ie. to a natural channel or other area where the flow will spread out and flow velocities will be minimal).

- d) As a minimum, ~~t~~The design of detention facilities shall ensure that primary or secondary (*emergency*) overflow or system failure will not cause flooding in any habitable building area.

5) Open Detention Basins

- a) Water Depth - At maximum storage, the maximum allowable water depth shall not exceed 5 feet.
- b) Freeboard - The maximum water surface elevation at overflow shall be a minimum of 1.0 feet below the top of the structure (*curb, bank, berm, etc.*) designed to contain the water.
- c) Detention Basin Side Slopes & Top Width, Fencing –

(1) The interior side slopes for detention basins shall be no steeper than 4H:1V. Exterior side slopes shall be no steeper than 3H:1V for maintenance.

(1)(2) Steeper interior side slopes or retaining walls may be used where approved by the Public Works Director and if access to the detention facility is restricted by chain link or other approved fencing a minimum of six (6) feet high. Chain link fences, posts & hardware along or adjacent to public right-of-ways shall be vinyl coated.

(3) Detention basins configured as flow-through systems shall be provided with fencing around the perimeter of the basin.

(2)(4) Unless greater width is required based on site specific geotechnical or maintenance access considerations, dikes surrounding open basin detention systems shall generally have a minimum top width of 4 feet.

- d) Detention Basin Bottom Slope - See PWDS 3.18.d.1.b above. Except for basins designed as water quality basins with underdrain systems, ~~t~~The bottom of all open constructed and graded detention basins shall be sloped a minimum of 1% towards the outlets to allow the basin to for drainage out completely between storms.

Flatter slopes will require the use of a concrete valley gutter or similar method as approved by the City Engineer.

- e) Detention Basin Maintenance and/or Mowing Access, Gates – Provisions for maintenance and/or mowing access shall be provided for interior and exterior slopes, and for the bottom of open basins *(provide an access ramp if mowing is required and side slopes exceed 4H:1V, or provide concrete or similar access steps if mowing is not required, with a locking gate in any fence provided, in order to provide for security and maintenance/mowing access).*

6) Parking Lot Detention Basins (water storage in paved areas)

- a) Depth - The maximum water depth for parking lot detention basins shall be 1 foot.
- b) Freeboard - The maximum water surface elevation at overflow shall be a minimum of 0.25 feet below the top of any and all structures designed to contain the water. Landscape berming is typically not allowed for containing water on parking lot detention basins.
- c) The maximum water level (*overflow*) in parking lot detention basins shall be a minimum of 1 foot below the lowest habitable floor elevation of buildings within the proximity of the basin.
- d) No Driveway or Fire Lane Encroachment. No parking lot detention basin water storage areas shall be located within the primary ingress/egress portions of the site. Parking lot detention basins shall be designed to provide a minimum 11 foot wide unflooded emergency access route at maximum water level conditions (*ie. overflow conditions*), and shall not encroach into designated fire lanes.

7) Piped or Arched Bottomless Underground Detention System

- a) Piped Detention. Unless otherwise approved for systems with fabric wrapped open graded drainage stone, piped detention systems shall be designed as a watertight subsurface pipeline (*ie. solid wall pipe*).~~and~~

All pipes shall be sloped a minimum of 0.1% towards the outlet to drain.

- (1) Inspection/Maintenance Access - A pollution control manhole

with an orifice shall be provided at the downstream end of the piped detention system, and a standard manhole shall be provided at the upstream end.

- (2) Pipe type shall be based upon the depth of cover and loading conditions as specified herein.
- (3) If piped detention is proposed which utilizes open-graded drainage stone for water storage, the drainage stone shall be complete encapsulated in geotextile fabric, and shall match the requirements summarized below for arched bottomless chambers, including provisions for drainage of the rock void storage volume between storms.

b) Arched Bottomless Chambers. Where open-bottom arched subsurface stormwater detention chambers are proposed, they shall be designed as off-stream storage basins (PWDS 3.18.d.1.b), and licensed as infiltration systems by DEQ as applicable.

- (1) Fabric Base Liner. Where sediment or debris can enter the chambers (*ie. an isolation row*), a double layer of continuous geotextile fabric (*without seams*) shall be provided on top of the angular stone foundation rock, extended laterally beyond the base legs of the arched detention chambers for a distance per manufacturer's recommendations, to allow the chambers to be cleaned of silt or debris with a hydro-cleaner/jet-vac as applicable.
- (2) Cleaning Access. A manhole shall be provided at the downstream end of each isolation chamber row, to allow for hydro-cleaner access and sediment/debris removal.
- (3) Chamber Outlet Pipe Invert. The chamber system shall be configured with the outlet pipe invert even with or lower than the fabric base liner, so that sediment and debris can be pulled from the chambers during cleaning. Details or notes defining this configuration shall be included on the design drawings.

Where a chamber outlet cap with a 24" outlet is necessary in order to match the base liner invert (*as is necessary for many chamber styles*), it is acceptable to install an eccentric reducer on the outlet pipe stub to reduce the pipe size to that appropriate for the design flowrates (*12" minimum typical where cleaning is required*).

- (4) Inspection/Maintenance Access - Inspection ports and/or maintenance access points shall be provided at intervals meeting manufacturer's recommendations (*upstream end and*

midpoint of each chamber row as a minimum).

- (5) Piped Cross Connections. If parallel chambers are proposed without each row having a piped inlet, cross connection pipes between chamber rows shall be provided (*at each end of each chamber*). The cross connection pipes may be raised above the chamber floor to prevent sediment from flowing from the isolation chamber to the remaining chambers.
- (6) Chamber Slope and/or Drainage Between Storms. If the chamber bottoms are not sloped to drain out between storms, they shall be provided with an underdrain system connected to the outlet manhole in order to fully drain the chambers ~~accomplish this~~.

c) Open-Graded Drainage Stone.

- (1) Bedding stone under arched chambers and embedment surrounding the chambers (or surrounding perforated pipe) shall be clean, crushed, angular quarry stone, generally 3/4" – 2" gradation size unless otherwise approved (clean rock without fines).
- (2) Open-graded stone shall be laboratory tested to demonstrate minimum 40% void ratio for water storage.

Even if the proposed open-graded stone is tested with a void ratio greater than 40%, design parameters for sizing open-graded stone storage sections shall generally not exceed 45% void ratio, in order to account for variability between tested and supplied stone.
- (3) Open-graded stone shall be completely encapsulated in geotextile drainage fabric conforming with chamber manufacturer recommendations and drawing notes.

- e)d) Easement widths shall conform to the minimum requirements outlined herein.

3.19 PRIVATE STORM DRAINAGE COLLECTION SYSTEMS

- a. Private storm drainage collection systems shall be designed in conformance with main line standards specified herein when plumbing code grade requirements of Oregon Plumbing Specialty Code (OSPC) cannot be met. The private storm drainage collection systems shall conform to the detention requirements contained herein as applicable.

b. These provisions of the PWDS do not, nor are they intended to supersede the Oregon Plumbing Specialty Code (OPSC), but are intended to allow the design engineer flexibility in the design of private storm drainage systems where the OPSC minimum slope requirements cannot be satisfied.

b.c. Piped Connection Location. Private storm drainage collection systems (*serving more than one legal lot of record*) connecting to a piped public storm system shall be connected at an existing or new manhole, catch basin or junction box.

3.20 INFILTRATION SYSTEMS, DRYWELLS AND FRENCH DRAINS

a. Infiltration systems, drywells and french drains are not allowed as the exclusive method for draining public right-of-ways but may be used for developments on private property for buildings, paved driveways, parking and loading spaces, subject to the all of the following conditions:

- 1) There are no public storm drain facilities, available within a reasonable distance of the development as determined by the City Engineer. The need to acquire easements across private property to access a public storm drain facility that is within a reasonable distance shall not be grounds for allowing an infiltration system unless all other criteria are met.
- 2) Site Specific Infiltration Testing Required. If a design based on stormwater infiltration are proposed, soils infiltration tests shall be performed by a registered Professional Geotechnical Engineer licensed in the State of Oregon to document the permeability and infiltration capacity. The Geotechnical Engineer shall develop a recommended infiltration testing methodology using test methods and sound engineering principles appropriate to the specific site being tested (*test methods proposed must demonstrate infiltration capacity of the site soils, as opposed to percolation capacity*). A detailed summary of the proposed methodology and test procedures shall be submitted to the City Engineer a minimum of 7 business days in advance of the proposed testing, for review and comment by the City Engineer.

Infiltration tests shall be conducted at the location and depth of the proposed infiltration facility. The Geotechnical Engineer shall perform a field evaluation of the soils to demonstrate that the highest seasonal water table is not within 5 feet of the ground surface, or within 2 feet of the bottom of the proposed infiltration facility. A final infiltration report stamped by the Geotechnical Engineer shall be provided with the design drawings submitted for review by the City.

- 3) Reserve Capacity. The system shall be engineered to ensure that adequate reserve capacity is available. Adequate reserve capacity shall include all runoff assuming the maximum amount of impervious area allowed by City Code based on zoning.

~~3)4)~~ Replacement Area Agreement. The system, ~~and~~ shall include an instrument recorded against the property reserving a area adequate for a replacement infiltration system equal in size to the primary system.

~~4)5)~~ Grease & Fines Removal, Maintenance Agreement. Provisions shall be made for grease and fines removal, including recording of a maintenance agreement (*acceptable to the City Engineer & City Attorney*) against the property.

~~5)6)~~ The site shall be graded so that it does not drain onto a public right-of-way without a storm drain system or neighboring property in the event that the drywell or french drain fails. The site and adjacent down gradient areas shall have no history of groundwater surfacing or being within 12-inches of the ground surface during the wet winter months, and shall not have field tile systems which may convey the infiltration water onto neighboring property.

~~6)7)~~ The design shall include pretreatment conforming with Oregon DEQ standards for groundwater injection wells, shall be acceptable to the City Engineer, and shall be approved by and registered with DEQ prior to final plan approval by the City.

b. DEQ Registration Required. Where drywells, french drains or other infiltration systems are authorized & allowed, they shall be registered with the Oregon DEQ to the extent required by DEQ under OAR 340-044-005 through 340-044-055 prior to final approval by the City and construction (*in addition to the standards above*). Only DEQ "rule authorized" infiltration systems are acceptable, unless otherwise approved by DEQ and the City Engineer. Under these DEQ regulations, stormwater dry wells are "rule authorized" if they meet certain standards as determined by DEQ (*conformance with current DEQ/EPA standards must be confirmed prior to submittal for review by the City*). These standards restrict the use of dry wells under the rule authorized provisions to the following.

- 1) No other method of storm water disposal, including construction or use of surface discharging storm sewers or surface infiltration systems, is appropriate. An appropriate method shall protect groundwater quality and may consider management of surface water quality and watershed health issues.
- 2) No domestic drinking water wells are present within 500 feet of the injection system.
- 3) The injection system does not exceed a depth of 100 feet and the bottom of the infiltration structure is a minimum of 10 feet above the highest seasonal groundwater level.

c. It should be noted that DEQ standards consider water draining from building roof areas (*that has not been mixed with any other stormwater*) differently, in that it can be discharged in a dry well without the same level of treatment required for other types of runoff, although it must still comply with the City and DEQ criteria above and

receive DEQ approval prior to final City approval or construction.

3.21 STORM DRAIN SERVICE LATERALS

- a. As a minimum criterion, 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, watertightness, and location. In addition, these storm drains shall conform to the State and local plumbing codes and restrictions.
- b. Storm drain laterals shall be installed for any residential lots which do not have finish grades that slope 2% minimum from the back of the building envelope to the top of the fronting curb (*ie. so as to allow both the roof and footing drains to flow to the fronting curb weep holes*). In all cases, storm drain lines shall be provided as required to prevent roof drainage or concentrated surface drainage from flowing across pedestrian access routes or onto adjacent properties.
- c. Storm Lateral Connection Location.
 - 1) Storm drainage service laterals (*serving a single legal lot of record*) shall not tie into public storm manholes unless approved by City Engineer and Public Works Director on a case-by-case basis. Where allowed, lateral inverts shall provide a minimum of 0.5 feet fall across the manhole, or the lateral shall match crowns with the outlet pipe, whichever is higher.
 - 2) Connection of a storm lateral to a public catch basin is allowed, subject to approval by the Public Works Director.
 - 2)3) Storm drain laterals serving more than a single legal lot of record (*or larger than 8-inch diameter*) shall be connected to an existing or new manhole, catch basin or junction box, unless otherwise approved by the City Engineer and Public Works Director on a case-by-case basis.
- d. Easement Requirement. An easement shall be recorded for any storm lateral which encroaches on or crosses any legal lot property other than one being served.
- e. Storm Service Lateral Cleanouts.
 - 1) A cleanout (*set in a cleanout box conforming with City standard details*) shall be installed at the right-of-way or easement line for all storm drain service laterals. The storm drain service lateral shall extend beyond the property line/storm easement boundary cleanout to the back of any PUE fronting the right-of-way or easement, or to the far side of easements for public utilities, whichever is further.
 - 2) Where storm laterals are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot

being served (*whichever is farther*) in conjunction with the development infrastructure construction.

- 3) For long storm laterals, a cleanout to City standards shall be installed on the upstream side of any intermediate property lines crossed (*including on the upstream side of the property line where the lateral crosses onto the property being served*), as well as at maximum 100-foot intervals beyond the right-of-way or easement cleanout, and at bends as required by the Oregon Plumbing Specialty Code (OPSC).

f. Minimum Storm Lateral Diameter and Slope.

- 1) For storm service laterals connected to storm mainlines, manholes or catch basins, the minimum inside diameter of a storm drain lateral shall be four (4) inches and shall be equal to or greater than the building drain or private site storm drain diameter.

~~f.2)~~ Typical minimum diameter for multi-family, commercial, ~~or industrial~~ or public properties shall be 6-inch (*in part to avoid the need to cut public streets in the future, if a more intense use is proposed for the property, which results in increased flows*).

- 3) Storm service lateral slope shall be uniform from the mainline connection to the property line (or easement) cleanout, and shall conform with the City standard details (2% minimum).

- g. Additional storm laterals must be stubbed into the property lines sufficient to serve all residential parcels (*including those which can be further partitioned in the future*) where such service or future partition would require that new streets be cut to install such services, or where the service line must cross intervening property to provide such future service.

- h. Curb/Gutter Marking. Where storm drain laterals tied to storm mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the City standard details and standard notes.

- i. Storm Laterals Crossing Other Property. Unless otherwise approved by Public Works Director on a case-by-case basis, where storm drain laterals are necessary to serve/drain parcels which are located to the rear of and above (*in elevation*) another parcel which fronts a right-of-way that contains a storm drain mainline, the storm drain lateral serving the upper parcel must be directly connected to such storm mainline, and shall not daylight through a curb weephole.

- 1) In all cases, the storm lateral from the rear parcel shall be located within a private utility easement granted by the lower property owner, where it crosses the lower property.
- 2) In addition to any cleanouts required by the OPSC, there must also be a

cleanout installed at the right-of-way boundary where the lateral serving the upper property exits the lower property into the right-of-way (*ie. property line cleanout at the ROW line*).

- j. Perpendicular. Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, storm drain laterals shall be installed from the mainline to the property line perpendicular to the street centerline.

~~k.1)~~ Permanent installation of storm service laterals parallel with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.

k. Backlot Storm Drain Systems and Area Drain Locations.

- 1) Where lots are proposed or required to be served by backlot drainage systems (*ie. public or private drainage system outside of the public right-of-way*), each lot shall be provided with an approved private area drain at the lowest back corner of the lot in order to provide for positive drainage of the lot and to prevent roof & surface drainage from flowing onto adjacent properties.

l. Private Storm Pump Systems.

- 1) As noted under PWDS 3.9.a.5, gravity storm service is required where possible. Installation of private storm pumps is not typically allowed except with express prior written approval by the Public Works Director and/or the Building Official as applicable (*written approval during building permit review where Type B Public Works permits are not required, and prior to submittal of project design drawings for review otherwise*).
- 2) A private storm pump system shall not be allowed to serve more than one legal lot of record.
- 3) Any private storm pump stations approved by the City shall meet standards established by the Oregon Plumbing Specialty Code (OPSC), the Public Works Director (*see PWDS 3.3*) and other applicable codes or standards (*whichever is more stringent*).
 - a) Per OPSC Chapter 11, capacity of each private storm pump shall be designed based on the maximum projected roof or paved area to be handled and rainfall intensities per OPSC Table D101.1 for western Oregon (*0.014 gpm per square foot*).
 - b) In areas with the potential for seasonal high groundwater levels, the storm pump system basin shall be anchored with concrete or equivalent method to prevent floatation.
 - c) The storm pump system discharge shall be equipped with a swing check valve to prevent backflow from the discharge line into the

receiving basin, and with an isolation valve located on the discharge side of the check valve (*per OPSC 1101.6.2.5*). The sump pump check valve shall be placed in a suitable location and/or box/vault that provides adequate access for inspection, repairs and replacement (*provide unions on both sides of check valves in facilitate removal for cleaning and/or replacement*).

- d) Per OPSC 1101.14, any storm pump system serving any “public use” shall have duplex alternating pumps arranged to function alternatively in normal use and independently in case of overload, clogging or mechanical failure. Duplex pump systems shall be equipped with an accessible visible and audible alarm activated in the event of pump failure (*overload, mechanical failure or high water condition*).
 - e) Drawings shall be submitted for review by Public Works Director and/or the Building Official as applicable, with enough information to allow review of design features, including listing of the area being drained and the design flowrates as noted above. Provide cut sheets and manufacturer’s information for the proposed pumps & controls, anchor block or ballast sizing, etc.
 - f) Unless larger piping sizes are required by the Plumbing Official (*based on OPSC capacity sizing noted above*), discharge lines from the pumped storm system to the discharge point should be a minimum diameter of 1½-inches.
- 4) Easements. The developer shall be responsible for obtaining and recording private utility & access easement(s) for any portions of the storm pump discharge system (*including piping*) which encroaches on or crosses a legal lot other than that being served by the private storm pump system.
- 5) An operation & maintenance agreement acceptable to the City shall be recorded against the property.

CITY OF DAYTON
Public Works Design Standards

Division 4

Sanitary Sewer

DIVISION 4 SANITARY SEWER

4.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a sanitary sewer system which will:
- 1) be of adequate design to carry the expected flow, within the design life, and at sufficient depth to serve all adjacent properties;
 - 2) have sufficient grade to maintain a minimum velocity of two (2) feet per second when flowing full;
 - 3) have sufficient structural strength to withstand all external loads which may be imposed;
 - 4) be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
 - 5) be economical and safe to build and maintain;
 - 6) prevent infiltration and inflow of ground and surface waters.
 - 7) 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.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

4.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public sanitary sewer and associated facilities in the City of Dayton and applicable work within the City's service areas.
- b. Permanent sanitary sewer facilities shall be provided to serve all properties within the City of Dayton in accordance with these 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.

- c. 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 civil engineer licensed in the State of Oregon, and provided design of private improvements to these public standards is not prohibited by the plumbing code or building official.

4.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
- 1) Sewerage Pump Stations *(public or private)*
 - 2) Sewer Force Mains *(public or private)*
 - 3) Siphons
 - 4) Relining or Insitu Reconstruction of Existing Sewers
 - 5) Internal Sealing of Existing Sewers
 - 6) Wastewater Treatment Plants
 - 7) Pretreatment Facilities
 - 8) Energy Dissipators
 - 9) Regulating Devices
 - 10) Flow Measurement Devices
 - 11) Mitigation of Hydrogen Sulfide and/or Hazardous Gases
 - 12) Common Private Sanitary Sewers (where approved by City)
- b. Review and approval of the above special items by the City Engineer and Public Works Director shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

4.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 4.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested. Any and all such requests shall be submitted in writing to the Public Works Director prior to City approval of the design drawings.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards *(also see "equal" & "substitute" definitions under PWDS 1.4)*.
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.

- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and Public Works Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

4.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all sanitary sewer appurtenances including but not limited to manholes, cleanouts, metering manholes, lateral connections, etc.

4.6 CITY STANDARD DETAILS

- a. City sStandard details included in the appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the City standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable City standard details shall be included on the construction drawings. Details shall be placed in numerical order on the detail sheets, for ease of reference during construction.

4.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to sanitary sewer systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.
 - 1) Abbreviations: Acceptable abbreviations for showing types of new and existing pipe materials on the plans are as follows:
 - a) AC - Asbestos Cement
 - b) CI - Cast Iron
 - c) CP - Non-reinforced Concrete Pipe
 - d) DI - Ductile Iron
 - e) HDPE - High Density Polyethylene
 - f) PVC - Polyvinyl Chloride
 - g) RCP - Reinforced Concrete Pipe
 - 2) Building Drain: The building drain is that part of the lowest piping of the

drainage system which receives the discharge from waste and other drainage pipes inside the walls of the building and conveys it to the building sewer, which begins five feet outside the building wall (*building foundation*).

- 3) 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.
- 4) Collection Sewer: Lateral and mainline sanitary sewers.
- 5) Collection System: Facilities maintained by the City for the collecting, conveying, pumping and controlling of wastewater.
- 6) Contact Cooling Water: Water which is used as a medium for carrying away excess heat from apparatus, appliance, mechanism or device in 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. Contact cooling water is considered to be a process wastewater and may require pretreatment prior to discharge into the City's sewer system.
- 7) 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 system.
- 8) Drainage Waste: Stormwater, groundwater, surface drainage, subsurface drainage, spring water, well overflow, roof drainage, or other like drainage other than sewage or industrial waste.
- 9) Fixture Unit Equivalents: The unit equivalent of plumbing fixtures as tabulated in the Oregon Plumbing Specialty Code (OPSC).
- 10) Flow: The wastewater flow from an industry, institution or house connection (*daily average*).
- 11) Industrial Waste: A water borne waste and wastewater from an industrial user.
- 12) Lateral Sewer: Any public sanitary sewer which has no other common sanitary sewers discharging into it.
- 13) Mainline Sewer: Any public sanitary sewer which receives flow from one or more lateral sewers.
- 14) 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 in which, in the course of cooling process, is not mixed or co-mingled with any other substance or used as a means of carrying off any other substance, in suspension or in solution, thereby exiting such cooling process in substantially the same condition, save for temperature, as when it entered.

- 15) 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.
- 16) Private Collection System/Private Sewer: A privately owned and maintained sanitary sewer system installed to serve multi-unit structures on single ownership properties, which cannot legally be further divided, such as apartments, mobile home parks and schools or installed in commercial or industrial developments.
- 17) Property Line Cleanout: A cleanout (*to City standards*) is installed on a sanitary sewer service lateral and which is located at or near the point where the sewer service lateral leaves the public right-of-way (*at or near the point where it leaves the public sewer easement for sewer mainlines not constructed in public right-of-ways*). This general term applies even if said cleanouts are not installed directly on the property line or easement boundary. Other cleanouts between the Property Line Cleanout and the building (*whether or not installed on other property lines crossed*) are private cleanouts which must conform with the Oregon Plumbing Specialty Code (OPSC) standards.
- 18) Public Sewer: Any sanitary sewer in the public right-of-way or easement operated and maintained by the City.
- 19) Sewer Service Lateral: That portion of the building sewer from the right-of-way line (*or easement boundary*) to a public sanitary sewer, private sanitary sewer, individual sanitary sewage disposal system, or other point of disposal. Lateral maintenance responsibility. The entire portion of the sanitary sewer lateral and building sewer from the building to the public mainline shall be the sole responsibility of the property owner for maintenance and/or repair, whether or not a property line cleanout exists (DMC 8.1.5). The required property line cleanout for new services or rehabilitated existing services is required to allow the service lateral to be located, as well as to facilitate cleaning and maintenance of the portion of the sewer lateral under City streets, and decrease the likelihood of having to cut or excavate City streets.
- 20) Sewage: The wastewater derived from human habitation and use of buildings for residential, institutional or commercial purposes, excluding storm waters and industrial waste.
- 21) Structures: Those structures designated on the plans as manholes, siphons,

junctions or diversion facilities, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these Standards are included in the standard construction specifications.

- 22) 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.

4.8 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the City Standard Details. ~~This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).~~
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director 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.~~
- ~~3)4) Material/Equipment Submittals from Contractor Required. Per Section G-1300, construction submittals shall be provided by the Contractor for review by the City, for all material & equipment which will be incorporated into work covered under the PWDS.~~
- ~~4)5) Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.~~

b. Non-Pressure PVC Sewer Pipe

- 1) Pipe and fittings fifteen (15)-inches in diameter or less shall conform to ASTM D-3034, SDR 35.
- 2) Pipe and fittings eighteen (18) through twenty-seven (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.
- 4) The joints shall conform to ASTM D-3212, Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

c. **Pressure PVC Sewer Pipe**

- 1) Where approved by the Public Works Director, PVC pressure pipe shall conform to the requirements of AWWA C-900 (*design stress of 4000 psi*), NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions. Pipe shall be PVC pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 18.
- 2) Restrained joint PVC pipe shall be used in locations and configurations as required by the City Engineer (*Diamond Lok-21, Eagle Loc 900, TerraBrute CR, CertaLok C900 or approved equal, as approved by the City Engineer and Public Works Director for the specific application*).

d. **Ductile Iron Pipe**

- 1) Ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151.
- 2) Ductile iron sewer pipe shall be minimum Class 50 thickness for non-pressure applications, Class 52 for pressure applications.
- 3) All ductile iron pipe and fittings shall be cement-mortar lined and seal coated in accordance with AWWA C-104.
- 4) 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 1 mil thick unless otherwise specified.

e. **Joints**

- 1) 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.
- 2) 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.

f. **Pipe Fittings & Couplings**

- 1) 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.
- 2) Couplings for gravity PVC Pipe (D3034 or F679) to other PVC pipe.
 - a) Couplings shall be gasketed solid sleeve slip PVC couplings (*gasketed no stop coupling designed to be slid fully onto the pipe on one side of*

the connection, and then slid back over and centered on the joint).

- b) Flexible couplings shall not be used to connect pipe joints on new pipe systems, or to connect same diameter PVC pipe.

3) 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 MaxAdaptor Coupling (*by Gripper Gasket LLC*) or approved equal, consisting of an EPDM rubber gasket, high impact polyamide (nylon) securing cage & stainless steel securing clamp assembly & hardware (*Fernco style rubber couplings are not allowed on mainline pipe joints or connections, or on sewer laterals between the mainline and the back of the street frontage PUE*).

4) Pressure Pipe Couplings.

- a) Pressure couplings shall be limited in their application to connection of new pipe work to existing pressure sewer pipelines, temporary installations, and where specifically approved by the City Engineer.
- b) Mechanical joint couplings shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.
- c) Couplings on pressure sewer force mains shall meet the requirements as for water mainline pipe, except as otherwise required or approved by the City Engineer on a case-by-case basis.

g. **Manholes**

1) General

- a) Precast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to the requirements of ASTM C-478 except as modified herein. Reinforcing in transition sections shall be equal to the requirements of that specified for wall sections of the larger diameter.
- b) Unless otherwise approved, all joints between manhole sections shall be keylock or O-ring type conforming to ASTM C-443.

- c) Precast base sections shall be of monolithic construction and shall be manufactured such that the base riser section is integral with the base slab.
- d) The bottom of the precast base section shall be a minimum of six (6) inches thick, and contain a minimum of 0.32 sq. inches of reinforcing steel each way in the top of the slab.
- e) Sanitary sewer manhole bases shall be provided with core-drilled openings and flexible manhole-to-pipe connectors for the connection of stubouts.

2) Manhole Steps

- a) Sanitary sewer manholes shall be equipped with permanent factory installed steps to provide a continuous ladder of 12-inch center-to-center rung spacing. Steps shall not be required for manholes 4 feet or less in depth (*rim to invert*).
- b) Manhole steps shall be of polypropylene plastic reinforced with a 1/2-inch grade 60 reinforcing rod, with reflectors on the top outside edges.
- c) There shall be no more than 30 inches from the manhole rim and the rung of the top step.

3) Manhole Grade Rings

- a) 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 eighteen (18) inches in height.

4) Manhole Frame and Cover Assemblies

- a) Castings shall be cast iron conforming to the requirements of ASTM A-48, Class 30, and shall match the dimensional requirements of the City standard details.
- b) Standard frames and covers shall be used for all paved areas. Sanitary sewer manhole lids shall have 2 holes (*as opposed to storm manhole lids, which have 16 holes*).
- c) 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.

5) Manhole Inflow Protector Lid Inserts

- a) All sanitary sewer manholes in low areas which are subject to flooding or water ponding (*including all lawn, landscape or gravel areas, or low areas of parking lots, or manholes closer than 4 feet clear of parking lot curblines or existing/future street curbs, adjacent to ditches, etc.*) shall be provided with inflow protector lid inserts.
- b) Manhole lid inserts shall be made of ABS or HDPE plastic, and shall include integral lifting lugs on each side of the insert allowing removal with a manhole hook (*lift straps are not an acceptable alternate to the integral lifting lugs*).

The insert body shall be manufactured to match the dimensions and style of each specific manhole frame & cover.

Each insert shall be provided with a factory installed closed cell neoprene gasket bonded to the underside of the insert rim, designed for wet or dry conditions.

Manhole lid inserts shall be ManPan Classic manhole inserts, or approved equal (*proposed alternatives must match all features to be considered an equal*).

- c) Where required by the Public Works Director for specific manholes, manhole inserts shall be provided with an integral clog free vent rubber check valve by Tideflex.

6) External Mastic Wrap on Manhole Joints & Pickholes.

- a) External mastic wrap joint seal (*9-inch minimum width*) shall be installed on all manhole barrel joints and pickholes after assembly, prior to backfilling (*Bidco External Joint Wrap BW-9T by Telleborg, or equal*).
- b) External mastic wrap joint seal (*9-inch minimum square*) shall be installed over all pickholes after grouting and prior to backfilling (*Bidco External Joint Wrap BW-9T by Telleborg, or equal*).
- c) Clean MH Exterior Prior to Mastic Wrap Installation. The exterior of the manhole barrels adjacent to each joint shall be clean (*under the mastic wrap*) to ensure a good seal. A wire brush shall be used to clean the exterior surface under the mastic wrap as required to remove all dirt, loose particles or deleterious material.
- d) Plastic Pallet Wrap for Use Over Joint Wrap Mastic. The mastic wrap over manhole joints shall be held in place with plastic stretch wrap (*ie. pallet wrap plastic*) to hold the mastic wrap in place during backfilling

(ie. to protect the external mastic wrap from displacement during backfill installation &/or compaction). Plastic wrap shall be installed immediately after the mastic wrap is placed (a minimum of three layers of plastic wrap shall be used over each joint or pickhole covered).

h. **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 outside of paved areas.
- 2) A 3,300 psi concrete collar is required for cleanouts located outside of paved areas.
- 3) The shaft or chimney of the cleanout shall be a minimum of 8-inches in diameter, except for 6-inch lines, which shall have a chimney diameter of 6-inches.

i. **Underground Warning Tape**

- 1) Warning tape shall conform with the requirements noted on the City standard details and standard construction notes *(6-inch width, green color & "Caution: Buried Sewer Line Below" or approved equivalent printed continuously down the length of the tape).*
- 2) 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.

j. **Toning / Tracer Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be green in color for sewer piping.
- 2) Wire shall penetrate into manholes within 18 inches of the rim elevation.

k. **Bore Casings and Accessories**

- 1) Carrier pipe installed inside steel ~~used in~~ bore casings shall be Ductile Iron or PVC as specified herein.
- 2) Bore casing and carrier pipe design and installation shall conform to the requirements outlined under Division 5, Water Distribution.

4.9 GENERAL DESIGN CONSIDERATIONS

a. 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) Gravity Flow: Where possible, all sanitary sewers shall be designed to flow by gravity to an existing or new sewer without sewage lift stations.
- ~~4) To & Through. As a condition of sewer service, 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, as well as connection (to the new system) of existing sewer lines or laterals crossed or intercepted by the new sewer lines, at locations as required by the City Engineer and Public Works Director (see also PWDS 1.6.e). This shall include the extension of sewer 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 trunk sewers which are oversized to provide capacity for upstream development, or as required to meet the minimum sizes shown in the applicable sewer master plan (see also PWDS 1.6.h). (moved down)~~
- ~~5) Storm water, including street, roof or footing drainage, shall not be discharged into the sanitary sewer system but shall be removed by a storm drainage system separate from the sanitary sewer system. (moved down)~~
- ~~6) Unpolluted (noncontact) cooling waters shall not be discharged into sanitary sewers. (moved down)~~
- 7)4) Public sewers within easements will be permitted only upon a showing that services cannot be provided from a line within a right-of-way. Minimum easement widths shall be as outlined herein, but in no cases shall easements narrower than 15 feet be considered.
- 8)5) Prohibited Discharges to Sewer System:
 - a) Storm water, including street, roof or footing drainage, shall not be discharged into the sanitary sewer system but shall be removed by a storm drainage system separate from the sanitary sewer system.

b) Unpolluted (noncontact) cooling waters shall not be discharged into sanitary sewers.

a)c) State and Federal laws and regulations and the sewer use ordinance restrict the disposal of certain chemicals and/or constituents into the sewer system and/or a Publicly Owned Treatment Works (POTW).

b)d) Only water or waste that will have no harmful affects on the sewage collection system or treatment system, and that will not endanger persons exposed to the wastes will be considered for discharge into the sewerage system. Prohibited discharges are not listed in their entirety herein (see sewer use ordinance and/or DEQ regulations for more complete list), but generally include rainwater, stormwater or groundwater of any type, waters or wastes with a pH lower than 5.5 or higher than 9.5, radioactive isotopes, high concentrations of suspended solids or BOD, fats/oils/greases, septic tank or sewer holding tank effluent, other potentially corrosive or explosive liquid, etc.

b. Providing for Future Development

1) To & Through. As a condition of sewer service, 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, as well as connection (to the new system) of existing sewer lines or laterals crossed or intercepted by the new sewer lines, at locations as required by the City Engineer and Public Works Director (see also PWDS 1.6.e).

2) This shall include the extension of sewer 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 also 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) This shall include trunk sewers which are oversized to provide capacity for upstream development, or as required to meet the minimum sizes shown in the applicable sewer master plan (see also PWDS 1.6.h).

c. Providing for Future Development

1) To & Through. As a condition of sewer service, 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, as well as connection (to the new system) of existing sewer lines or laterals crossed or intercepted by the new sewer lines, at locations as required by the City Engineer and Public Works Director (see also PWDS 1.6.e).

- 2) This shall include the extension of sewer 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 also 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) This shall include trunk sewers which are oversized to provide capacity for upstream development, or as required to meet the minimum sizes shown in the applicable sewer master plan (see also PWDS 1.6.h).

b.d. Sewer Design Factors

- 1) The following factors as a minimum shall be addressed in the design of sanitary sewers and determination of design flows.
- a) Drainage basin to be served.
 - b) Topography of the area
 - c) Depth of excavation
 - d) Service lateral elevations
 - e) Soils conditions
 - f) Land use within the area to be served.
 - g) Projected population within the area to be served at build-out.
 - h) Per capita sewage flow.
 - i) Flows from commercial, industrial or institutional users.
 - j) Infiltration and Inflow
 - (1) Infiltration allowance for new facilities.
 - (2) Infiltration and inflow from existing facilities.
 - k) Maximum hourly and peak instantaneous flows
 - l) Condition and size of existing sewers
 - m) Location of WWTP
 - n) Pumping requirements
 - o) Maintenance, including accessibility for cleaning and inspection personnel and equipment.

4.10 DESIGN PERIOD

a. Mainline and Lateral Sewers

- 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.

b. Trunk Sewers

- 1) 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.

4.11 SEWER DESIGN BASIS & CAPACITY

a. Design Basis

- 1) Generally, sewers shall be designed to carry the peak domestic, commercial and industrial contributions, plus infiltration/inflow from the individual gravity service laterals, sewer mains and manholes. Where more detailed information is not available, new sewer systems within the City may be designed on the basis of the following flows.

- a) Residential domestic flows: 100 gal/capita/day (gpcd)
- b) Schools, non-residential students & staff: 25 gpcd
- c) Commercial, non-residential customers
 - (1) Restaurant/Cafe: 40 gal/day/seat
 - (2) Tavern/Bar: 50 gal/day/seat
- d) Laundries, self-service: 500 gal/day/machine
- e) Infiltration/Inflow
 - (1) New facilities: 1,600 gal/acre/day
 - (2) Existing facilities: As measured.

- 2) Assumed flows from types of establishments not listed above shall be as approved by the City Engineer.

- b. **Sewer Capacity:** Generally, sewers should be designed to carry, when flowing full but not surcharged, not less than the following plus existing or planned flows from upstream properties:

- 1) **Lateral and Mainline Sewers:**

- a) For new installations serving new areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus I/I allowance.
- b) For new installations serving existing sewer areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus

an additional I/I allowance based on existing conditions.

2) Trunk Sewers:

- a) For new installations serving new areas, minimum peak design flow shall not be less than 3 times the design sanitary flow plus I/I allowance.
- b) For new installations serving existing sewered areas, minimum peak design flow shall not be less than 4 times the design sanitary flow plus an additional I/I allowance based on existing conditions.

3) Roughness Coefficient:

- a) 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.
 - b) In theory, new PVC sewers have manufacturer's "n" value of 0.009. However, sand and grit as well as slime build up on the pipe walls over time tend to render a true "n" value of 0.013. Hence, an "n" value of less than 0.013 will not be considered for approval.
- 4) It is recommended that design calculations include estimates of average, maximum and minimum daily flows. The submission of design calculations will not ordinarily be required, but engineers should be prepared to substantiate pipe sizes, layout, population estimates, land uses or other design assumptions as may be requested.

4.12 SEWER MINIMUM SIZE

- a. Public lateral or mainline sewers shall not be less than eight (8) inches in diameter, or as required to meet the minimum sizes shown in the applicable sewer master plan (*see also PWDS 1.6.h*), unless approved in writing by DEQ and the City Engineer.

4.13 SEWER 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. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the sewer alignment.

- b. Under normal conditions (*where it can be demonstrated that the required 18" vertical clearance can be maintained between sewer laterals and water mainlines*), sanitary sewers in residential areas shall be placed in the street with the following minimum cover (*ie. cover over the pipe*):
- 1) Lateral and Mainline Sewers - Seven (7) Feet
 - 2) Trunk Sewers:
 - a) In the roadway - Seven (7) feet
 - b) In easements - Eight (8) feet
 - 3) Where the topography is relatively flat and existing sewers are shallow (*five feet or less*) and cannot practically be lowered, the minimum cover may be reduced to four (4) feet. Cover depths less than four (4) feet will require the approval of the City Engineer, and will require the installation of Class 50 ductile iron pipe (*corrosion resistant mortar lined*) or C900 PVC, DR 18.
- c. Mainline and lateral sewers shall be placed in the street at a depth sufficient to drain building sewers on the low side of the street, including for new residential subdivisions. Deviation from these standards will be considered on a case-by-case basis when the following circumstances exist and the required documentation is submitted.
- 1) Underlying rock strata: A request in writing must be submitted to the City Engineer together with a soils report including a plan and profile certifying bed rock exists below the undisturbed ground surface at all investigated alignments.

4.14 SEWER MINIMUM SLOPE & ROUGHNESS COEFFICIENT

- a. 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 using minimum roughness coefficient of 0.013 or the pipe manufacturer's recommendations, whichever is greater.

- b. The minimum acceptable slopes for various pipe sizes are listed below:

MINIMUM MAINLINE PIPE SLOPES	
Inside Pipe Diameter (inches)	% Slope (feet per 100 feet)
(private sewers only)	
6	0.60
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12
21	0.10
24 & larger	Case-by-Case

- c. In general, gradients greater than those shown above are desirable and are particularly recommended on the upper ends of lateral sewers.
- d. Sewers shall be laid with uniform slope and alignment between manholes.
- e. Engineers are cautioned not to specify sewers of sizes which are obviously larger than necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements (*ie. a 10-inch pipe for an 8-inch pipe to acquire a decrease in slope*).
- 1) In cases where using a larger pipe is the only option available to serve a development (*as demonstrated by the design engineer to the satisfaction of the Public Works Director and the City Engineer*), the larger pipe size so installed shall not be considered as a justification for the developer to be eligible for oversizing or SDC reimbursement.
- f. Grades (*slopes*) shall be determined to the pipe invert at the edge of the manhole and lengths to the center of the manhole.
- g. The difference between the inlet pipe slope (Si) and outlet pipe slope (So) at any manhole shall not exceed 25 percent.
- h. Sewers on slopes of 20 percent or more shall be anchored with concrete anchor walls or other restraining methods approved or specified by the City.

- i. Where velocities greater than fifteen (15) feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes against erosion and displacement by shock. This may be accomplished by installing one additional manhole to decrease the slope or to split a 90° horizontal direction change into two 45° incremental changes.

4.15 SANITARY SEWER ALIGNMENT AND LOCATION

a. General

- 1) Sewer mainlines shall be laid on a straight alignment and uniform slope between consecutive manholes.
- 2) Horizontal and vertical curves or bends in sanitary sewermainlines are not permitted.

b. Sanitary Sewer Location in Relation to Water Lines and Other Utilities

- 1) Sanitary sewer pipemainlines ~~and lateral mainlines~~ shall be separated from all other utilities by a minimum of 5 feet clear for normal depth pipelines. Greater separation may be required for deeper pipelines as directed by the Public Works Director.
- 2) Sanitary sewer pipemainlines *(including sewer service lines)* ~~and lateral mainlines~~ shall generally be separated from water mainlines and water service lines by a minimum of 10 feet unless otherwise approved in writing by the Public Works Director and the City Engineer. In no case shall the separation be less than 5 feet or as required by OAR 333-061 based on vertical separation.
- 3) Water Main & Water Service Crossings
 - a) Where new sanitary sewer lines cross above or within 18-inches vertical separation below a waterline, such sewer mains and/or laterals shall have one full length of approved PVC *(or approved equal)* sewer pipe centered at the point of crossing per OAR 333-061-0050(9).

c. Sewer Location in Streets

- 1) Unless otherwise approved or required by the City Engineer and Public Works Director, sanitary sewers shall generally be located in the street right-of-way five (5) feet from the street centerline on the low side of the street *(sewer mainlines shall typically be installed on the uphill / high side of centerline in areas where the area below the sewer alignment consists of steep slopes or other areas with stability concerns, as determined by the City Engineer or Public Works Director)*.
 - a) Unless otherwise approved by the City Engineer and Public Works

Director, horizontal alignment of new sewer mainlines shall be parallel with the centerline of the right-of-way.

- b) In general, manholes or cleanouts shall be located outside of gutter areas or other locations where surface water inflow is likely to occur during storm events.
- 2) Where sewer alignments cross the street centerline, the design shall demonstrate that the requirements of ORS 92.044(7) are satisfied with relation to street centerline monuments (*ie. utility infrastructure is not to be placed within 1 foot of a survey monument location shown on a plat*).
- 3) If streets have curved alignments, the minimum distance between manholes or sewer lines and the curb face shall be as listed below. For streets improved to less than full width, the location shall be measured from the future curb location. The intent is to prevent a conflict with new storm drain lines while still providing for the least number of manholes required to transverse the curve.
 - a) Center of manhole to curb face: 6-feet minimum.
 - b) Sewer centerline to curb face: 6-feet minimum.
- d. **Sewer Location in Easements, Easement Widths, Maintenance Access Requirements**
 - 1) Offset: When sewers in easements are approved by the City, the sewer line shall be offset a minimum of 6 feet from any property line or easement boundary, or 1/3 the required easement width (*rounded up to the nearest foot*), whichever is greater.
 - 2) Sewers in easements will be allowed only after all reasonable attempts to place the mains in a right-of-way have been exhausted. All easement installations must be approved in writing by the City Engineer and Public Works Director on a case-by-case basis.
 - 3) Easement locations for public sewer mains serving a PUD, apartment complex or commercial/industrial development shall be in parking lots, private drives or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.
 - 4) **Maintenance Access Requirements**. All sewer mainlines shall be located within developed street right-of-ways, or installed along all-weather access lanes along alignments approved by the Public Works Director.
 - 4)a) Except where precluded by steep slopes, all-weather maintenance access lanes (*minimum 12' width, minimum section as defined below*) shall extend along the entire length of off-street sewers unless

otherwise specifically authorized in writing by the Public Works Director.

- b) Where there are steep slopes along the sewer alignments which preclude all-weather access along the entire sewer alignment (*as determined by the City*), the access lanes shall extend to encompass all manholes or lateral connections located outside of the improved right-of-way.

If installation of a sewer main along alignments without a maintenance access road is approved by the City Engineer and Public Works Director, the minimum easement width may be increased as determined by the Public Works Director at his/her sole discretion (*typically by 5 feet wider minimum in flatter areas, and by 10 feet wider minimum for steep hillside areas*).

- c) Where all-weather access lanes are located outside of parking lots, private streets, fire lanes or private driveways, the easement along the access lane alignment shall include provisions that maintenance of the all-weather access lanes shall be the responsibility of the owner of the property on which the access lane is located.

- d) Show all maintenance access lanes on the drawings, including dimensions and standard details for rock, AC and/or other surface sections (*minimum 3" AC (Class C) over 10" compacted baserock typical (1.5% design cross slope typ), unless alternate surfacing is approved by the Public Works Director*). Maintenance access lanes which also serve as sidewalks or multi-use paths shall be concrete as required under PWDS 2.21-~~f~~.

- e) Pavement Compaction (*public & private roads & maintenance access routes*). AC Pavement shall be compacted to a minimum of 91% of maximum density (*at all locations*) as determined by the Rice standard method, based on nuclear density testing.

- 5) City standards require that easements granted to the City shall not be used for any purpose which would interfere with the unrestricted use for sewer main purposes. Under no circumstances shall a building or structure or tree be placed over a sanitary sewer main or sewer easement, nor shall any parallel fences or parallel utilities be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.

- ~~6) All easements must be furnished to the City for review and approval prior to recording. All recording costs shall be borne by the Developer.~~

- ~~7)6) Minimum Easement Widths:~~ Unless otherwise specified or authorized by the

City, minimum easements widths for sanitary sewers shall be as follows:

MINIMUM SANITARY SEWER EASEMENT WIDTHS		
Sewer Diameter	Depth to Invert	
	≤ 6 feet	> 6 feet
8 - 10 inches	15 feet	15 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
12 - 15 inches	20 feet	20 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
> 15 inches	25 feet	25 feet plus 2 feet for each foot (<i>or fraction thereof</i>) deeper than 6 feet to invert.
Note: Easements shall be a constant width between manholes or other in-line structures. Easement width shall be based on the deepest portion of the line between such structures.		

~~8)7)~~ Easement widths shall vary from the minimum by even foot increments. Sewers with a nominal inside diameter of 24 inches or larger will require wider easements than outlined above.

~~9)8)~~ Common placement in the easement of a sanitary sewer and storm drain line may be allowed under certain conditions subject to approval by the City Engineer and Public Works Director. Easements wider than the minimum may be required.

~~10)9)~~ Franchise Utility Limitations in City Easements. Franchise utilities shall not be placed in City utility easements unless approved in writing by the Public Works Director, subject to separation requirements in excess of minimums as dictated by Public Works Director.

~~11)10)~~ Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet City, Oregon State Department of Environmental Quality (DEQ) and OHA-DWS requirements.

~~12)11)~~ Public Works Review/Approval Required prior to Recording. All easements must be furnished to the City Public Works and City Engineer for review and approval prior to recording. All recording costs shall be borne by the Developer.

e. **Sewer Location in Relation to Streams and Drainage Channels**

- 1) Generally, the top of all sanitary sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line, and to allow restoration of the stream bottom.

In general, as much cover as possible shall be provided. If less than 3 foot of cover is provided, the sewer shall be protected by a reinforced concrete slab centered over the sewer main (set 6" minimum above the pipe, 6" minimum thickness w/#4 bars at 12" O.C E.W, and extending a minimum of 3 feet beyond the width of the trench).~~encased in concrete, CDF or CLSM backfill (with an unconfined compressive strength less than 200 psi) as approved by the Public Works Director. Design shall include provisions to prevent floatation of the pipe during concrete, CDF or CLSM backfill placement.~~

- 2) Perpendicular. Sewers crossing streams or drainage channels shall be designed to cross the stream as nearly perpendicular to the stream channel as possible and shall be free from change of grade at the crossing.
- 3) Sewers located along streams shall be located outside of the stream bed and sufficiently separated from the stream to allow for future possible stream channel widening (*separation required is at the discretion of the Public Works Director*).
- 4) All manhole covers ~~at or below~~ or less than 2 feet above the 100 year flood elevation shall be provided with leakproof manhole inflow protector lid inserts as specified.
- 5) Pipe material at crossings shall be Class 50 ductile iron with an 18 foot length of pipe centered on the stream or drainage channel centerline. The ductile iron pipe shall extend to a point where a 1H:1V slope from the top of the bank and sloping away from the channel centerline intersects the top of the pipe.
- 6) Installation of sewers in a steel casing pipe ~~Concrete encasement~~ will be required when the above cover requirements can-not be met, with PVC sewer pipe installed through the casing per City details. ~~Concrete caps in lieu of concrete encasement are not acceptable.~~ Each deviation from the above requirements will be reviewed on a case-by-case basis.

4.16 MANHOLES AND MAINLINE CLEANOUTS

a. General

- 1) Sewer service laterals shall not be connected into manholes unless approved in writing by the City Engineer and the Public Works Director on a case-by-case basis. Where lateral connections to manholes are allowed, the crown of the lateral pipe shall be installed at or above the crown of the manhole outlet pipe, or as required to provide a minimum of 0.35' fall across a 48-inch manhole, whichever is greater.

b. Mainline Sewer 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 which will be extended on the same grade and alignment during the next construction phase of a multiphase development, and which does not have any laterals.

- 2) All mainline cleanouts will be considered on a case-by-case basis and approved by the City Engineer and the Public Works Director. 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.

c. **Manhole Size**

- 1) For pipe 21-inches in diameter and smaller, the minimum diameter of manholes shall be 48 inches.
- 2) For pipe larger than 21-inches to 27-inches in diameter, the minimum diameter of manholes shall be 60 inches.
- 3) For pipe larger than 27-inches in diameter, the minimum diameter of manholes shall be 72 inches unless otherwise approved by the City Engineer.
- 4) Larger manholes may be required for multiple pipe connections, multiple pipe connections or acute angle pipe connections (*as directed by the Public Works Director or the City Engineer*).
- 5) Manholes sizes for drop structures or metering manholes will be reviewed on a case-by-case basis.

d. **Manhole Location:**

- 1) Manholes shall be placed at the following locations:
 - a) Upper end of all lateral sewers, except as provided above.
 - b) Every change in grade or alignment of a sewer.
 - c) Every change in size of a sewer.
 - d) Each intersection or junction of sewers, excluding service laterals 6-inches or less in diameter.
 - e) Adjacent to the center radius point of a cul-de-sac.
 - f) 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.
 - g) At intervals of 450 feet or less.
- 2) Where practical, manholes shall be located at street intersections. All manholes from which future sewer line extensions are anticipated, shall have a pipe stub designed and installed at the grade and direction of the anticipated

sewer main extension.

Pipe stubs shall be a minimum of eight inches in size and shall protrude at least 2 feet outside the manhole base (*unless a longer length is required by the Public Works Director or the City Engineer to avoid cutting new streets when the line is extended in the future, or to extend past potentially conflicting existing utilities*), and shall end with a watertight gasketed cap acceptable to Public Works Director (*except that a cleanout may be required for longer stubs*).

- 3) Manholes shall not be located in the curb or in the gutter. Placement of manholes behind the curb shall be reviewed on a case-by-case basis for approval. Consideration shall be given to those sewer or public utility lines which already exist behind the curb.
- 4) Two manholes shall be installed when the horizontal deflection angle between two inlet pipes is an acute angle less than or equal to 80°. The intent of this requirement is to prevent side sewer connections from discharging into manholes against the direction of flow through the manhole. Such manholes shall be spaced a minimum of 10 feet clear from each other.

e. **Manhole Rim Elevation**

- 1) The rims of all manholes located within paved or other hard surfaced areas (*or where paved pads are required around manholes per City standard details*) shall be set to finished grade. Manholes outside of these areas shall be set above finish grade as shown on the City standard details.
- 2) 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.
- 3) The rims of all manholes located outside of paved or other hard surfaced areas shall be set 6-inches above surrounding finish grade. Finish grade shall be defined as the final ground surface after grading and landscaping, as shown on the standard manhole rim adjustment details.
- 4) Manholes within easements shall have lockdown lids only where specifically required by Public Works Director.

f. **Drop Across Manhole Structure**

- 1) Generally, the minimum vertical drop across a 4-foot diameter manhole is required as shown below (*drop across larger diameter manholes shall be increased to provide the equivalent channel slope across the manhole*).
 - a) Straight through runs: 0.1' minimum drop
 - b) Bends greater than 45°: 0.2' minimum drop

- c) For laterals connected to manholes, see PWDS 4.18 (*prior written approval required*).
- 2) Maximum vertical drop across a 4-foot diameter manhole shall not exceed 18-inches with a beaver slide channel (*drops of more than 18-inches invert to invert require an inside drop assembly*).
- 3) Match Crowns. Where sewer pipes of different sizes enter the same manhole, the design shall generally provide that the crowns of the smaller incoming pipes be set at or above the same elevation as the outlet pipe crown. Deviation requires a written request & justification from the design engineer, and approval by the City Engineer.
- 4) Opposing Inlet Pipes with Significantly Differing Slopes. In cases where two pipes discharge into a manhole from opposite directions and one pipe has a slope more than 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 $\frac{1}{2}$ the pipe diameter, whichever is greater, above invert of the steeper pipe.
- 5) Manhole Flow Channels
 - a) Flow channels in manholes shall be of such shape (*semi-circular bottoms*) and slope to provide smooth transition between inlet and outlet sewer size/ invert to minimize turbulence and to ensure that the manhole channels are self-cleaning.
 - b) 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.
 - c) Beaver slide channels shall be shaped to allow the insertion of a 6-inch diameter by 3-foot long TV camera into the downstream sewer.

g. **Drop Manholes**

- 1) Drop manholes shall only be used in extreme cases of slope difference between existing and proposed sewer lines or when very special conditions exist such as a conflict with existing facilities which cannot be relocated.

All drop manhole installations must be approved in writing by the Public Works Director on a case-by-case basis.

- 2) Drop assemblies shall be provided for pipe lines 12 inches in diameter and smaller when entering a manhole with an invert more than 18 inches above the invert of the outlet line. The vertical displacement shall be measured at the inside manhole walls and not the manhole centerline.

Pipe lines larger than 12-inches shall be introduced into the manhole at the

manhole invert, unless otherwise approved by the Public Works Director on a case-by-case basis.

- 3) When allowed, inside drop manholes shall be a minimum of 60 inches in diameter. All inside drops shall be constructed with pipe per the City standard details, with stainless steel support structures. No partitions will be allowed.

h. **Manhole Taps**

- 1) When an existing manhole is tapped to install a new sewer which will drain into the manhole, the crown of the new sewer shall generally match the crown of the existing pipes.
- 2) 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.
- 3) A detail drawing showing the steps, bench and proposed connection is required for connections to existing manholes.
- 4) The drawing shall include notes to the effect that openings for connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. 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.
- 5) Unless otherwise approved by the City Engineer, manhole steps shall be installed in any manhole which does not have existing steps, and which is connected to or otherwise altered in any way (*per the standard construction notes, sealing & vacuum testing of all such existing sanitary sewer manholes connected to or altered is also required, including manholes with rim adjustments or when paving around existing sanitary sewer manholes*).

i. **Metering & Sampling Manhole**

- 1) A metering and sampling manhole shall be installed on all systems meeting one of the following criteria:
 - a) A private sewer which contributes more than 5,000 gallons per day to the public sewer, unless waived by the Public Works Director on a case-by-case basis.
 - b) A private sewer which serves separate legal lots of record more than one structure on the same premises (private collection system), unless waived by the Public Works Director on a case-by-case basis.
 - c) Industry or business which discharges high strength wastewater or

wastewater with characteristics not commonly found in domestic sewage.

- 2) The minimum size sewer line upstream of the metering/sampling manhole structure shall be six (6) inches.
- 3) Metering and sampling manholes shall include permanent provisions for continuous and composite refrigerated sampling, continuous flow monitoring and recording, and flow paced sampling.
 - a) Separate conduits shall be provided between the metering & sampling enclosure and the metering/sampling manhole so that the flow meter cable/wires and the sample tubing are not installed in the same conduit sleeve.
 - b) All bends in the conduit sleeves for the flow meter cable/wires and the sample tubing shall be long radius bends.
- 4) Sampling and flow monitoring may be required at the discretion of the City Engineer and Public Works Director.
 - a) All machinery, equipment, supplies and labor required to carry out the sampling and flow monitoring program shall be provided by the Developer (*equipment to be mounted in lockable insulated heated FRP enclosures acceptable to the Public Works Director*), and shall meet the City's prior approval.
 - b) Owner of the property being served shall be responsible for all permits & installation costs associated with providing, installing and connecting the conduit(s) and power to the metering & sampling enclosures, and for the ongoing power costs.
- 5) A recorded access easement & maintenance agreement will be required for each such monitoring/metering manhole.

4.17 WORK ON EXISTING SEWERS

a. General

- 1) Connections of new service laterals to existing sewers shall be made watertight. Connection shall be made where possible to existing tees or wyes previously installed and capped. In all cases, the integrity of the existing tee or wye shall be verified by Public Works Director prior to connection (*see also PWDS 4.18.d for requirements relating to reuse of existing service laterals*).
- 2) Where tees or wyes for connection are absent or unusable, connection of service laterals into existing sewer lines shall be made with approved

couplings or service saddles. Taps shall be installed without protrusion into or damage to the existing sewer, and shall result in a watertight connection.

- 3) Service lateral connections to existing AC gravity pipe shall be with approved service saddles. Connections to all other types of existing gravity pipes shall use Insert-a-Tee type fittings. A note shall be added to the drawings stating that the coring machine for Insert-a-Tee couplings shall be anchored in accordance with the manufacturer's recommendations.

- 4) Existing Sewer Slope & Condition Verification.

- a) As a condition of connecting to and/or extending sewer mainlines, the design shall include verification that the existing downstream sewer is in adequate condition and with adequate capacity to handle the new flows, and otherwise conforms with City standards.

- b) This shall include verification of existing sewer slopes and alignments downstream of the connection point (*as part of the design topographic survey*), AND cleaning/TV inspection of existing mainlines which meet any of the following conditions: (a) existing or design slopes less than 1.0% or (b) have had a history of flow or maintenance problems, or (c) end with mainline cleanouts, or (d) existing mainline will be replaced as part of the project, or (e) existing downstream mainlines are located in easements outside of public right-of-ways.

- (1) Costs for survey, title research, inspection, cleaning and TV inspection are the responsibility of the development team.

- c) The TV inspection shall be conducted by an approved technical service, using a track or wheel propelled self-leveling auto-focus pan-head camera which is equipped to make audio-visual recordings of the TV inspections on USB storage device.

- (1) 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 (*with the ball in contact with the pipe invert*). The pipe shall contain sufficient water to reveal low areas or reverse grades during the TV inspection.

- (2) The USB storage device and written report (*or download link and pdf report*) shall be delivered to the City Engineer and the Public Works Director.

- d) Unless otherwise approved in writing by the City Engineer, this survey verification (*including verification that downstream sewers outside of public right-of-ways are located within easements in compliance with current City standards*) and TV inspection shall be done as part of the design process (*approval by the City to defer this pre-design TV*

inspection work shall not relieve the Developer and/or the developer's contractor of the responsibility to correct problems subsequently discovered). If the development team uses sewer TV inspections previously performed by the City or others, any discrepancies discovered during construction shall remain the developer's entire responsibility.

- e) The design shall include provisions to correct any adverse grade conditions, broken/obstructed pipe or other conditions found in the existing sewer which, in the opinion of the City Engineer, may cause sewer backups or significant access or maintenance issues upon extension of the mainline and connection of additional services, or sewer alignments which are not located within public right-of-ways or within recorded easements conforming with City standards. Any corrections of adverse conditions shall occur prior to extending the mainline or setting new manholes.

b. Manholes over Existing Sewers

- 1) In general, existing sewers shall be cut out to allow installation of new precast manholes (*with approved pipe coupling to existing pipe each way*), unless otherwise approved by the Public Works Director and the City Engineer on a case-by-case basis.
- 2) Where cast-in-place manholes are explicitly approved (*in writing by both the Public Works Director and the City Engineer, on a case-by-case basis as a PWDS variance*) to be constructed over existing sanitary sewers, such manholes shall conform to the requirements of OSSC (ODOT/APWA) 490.41, Manholes Over Existing Sewers and the following (*with notes addressing these requirements added to the drawings on the sheet where the cast-in-place manhole is shown*).
 - a) Two Waterstop Grouting Rings by Trelleborg (*or approved equal*) shall be installed on each pipe (*one centered on the manhole wall thickness, with the splice joint down, and the other outside of the first with the joint opposite & upward*) prior to concrete placement for the manhole base. Adequate concrete shall be placed on the outside of the manhole barrel doghouse notch to fully encapsulate the second grouting ring.
 - b) The top of the existing pipe shall not be ~~cut broken~~ out until after the completion of the manhole vacuum test and inspection of the new manhole by City staff to verify that there is not visible leakage.
 - c) Notes to this effect shall be placed on the construction drawings.

- c. Maintaining Sanitary Sewer Flows. The construction of sewer improvements that impact existing sewers shall address the following, including notes on the drawings.

- 1) All existing sanitary sewer system components shall remain in service through the construction operations unless specific exceptions are approved in writing by Public Works Director and the City Engineer, and written approval from each affected property owner.
- 2) Sewer service from upstream and affected properties must be maintained unless such written approval is granted. The methods used to maintain sewer flows shall be the Contractor's design, subject to approval by the City. Required methods of conveying sewer flows may include, but are not limited to, bypass pumping, use of flow through plugs with periodic release of sewage flows, etc. The bypass system shall be capable of conveying flows when the sewers are flowing full. Normal unrestricted flows shall be restored at the end of each work day. Bypass systems left in place or operated outside normal working hours shall be monitored continuously by the Contractor personnel unless alternate arrangements proposed by the Contractor are acceptable to the City (*ie. high level & pump fail alarm callouts, etc.*). The Contractor shall provide for City review all submittal information required to demonstrate (*to the satisfaction of the City*) compliance with these requirements.
- 3) Contractor shall be responsible for all costs related to maintaining sewer flows, as well as all costs for cleanup, damages and fines resulting from any sewerage spill or overflow associated with any methods used to convey sewage flows during construction.

4.18 SEWER SERVICE LATERALS

a. General

- 1) Sewer service laterals are building sewers as defined above. Minimum size & slope shall be as summarized below and per the City standard details.
- 2) Easement Requirement. An easement shall be recorded for any sewer lateral which encroaches on or crosses any legal lot property other than one being served.
- 3) Sewer Lateral Connection Location. Sewer service laterals shall not tie into manholes unless approved by City Engineer and Public Works Director on a case-by-case basis.
 - 3)a) Where connection to manholes is allowed, lateral inverts shall provide a minimum of 0.5 feet fall across the manhole, or the lateral shall match crowns with the outlet pipe, whichever is higher.
- 4) As a minimum criterion, construction of the sewer service lateral shall be of the same quality and meet the same requirements as the public sewer with regard to materials, watertightness, and location. In addition, these sewers shall conform to the State and local plumbing codes and restrictions. No roof,

surface, foundation, or stormwater drain lines shall be connected to the public sewers or service laterals.

5) Separate/Additional Sewer Service Laterals.

- a) Each legal lot of record shall be provided with a separate sewer service lateral connected to the public sewer main or approved private sewer main. Combined sewer service laterals will be permitted only when the property cannot legally be further divided. An example of this is a residential lot with a house and detached garage or shop with plumbing fixtures *(see PWDS 4.19.a)*.
- b) Duplexes, Condos, etc. Separate sewer service laterals shall be installed to serve each side of duplex lots. Separate sewer service laterals shall be installed to serve each unit of condominiums, or to serve each unit of developments with separate detached dwelling units *(except where otherwise approved by the Public Works Director for RV & MH parks, separate detached accessory dwelling units on single family lots which can connect to the primary structure sewer service, etc.)*.
- c) Additional sanitary sewer laterals must be stubbed into the property lines sufficient to serve all residential parcels *(including those which can be further partitioned in the future)* where such service or future partition would require that new streets be cut to install such services, or where the service line must cross intervening property to provide such future service.

6) Curb/Gutter Marking. Where sanitary sewer laterals connect to sewer mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the City standard details and standard notes.

7) Perpendicular. Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, sewer service laterals shall be installed from the mainline to the property line perpendicular to the street centerline.

7)a) Permanent installation of sewer service laterals parallel with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.

8) Backwater Valve. For reference only, OPSC 710.1 requires that a private backwater check valve be installed on the private building sewer when a drainage fixture is installed on a floor level that is lower than the top of the nearest upstream manhole or cleanout structure. In all cases, this backwater valve shall be installed on the private side of the property line cleanout *(backwater valve is typically installed between the cleanout just outside the*

building and the building wall).

While this backwater valve is a private item covered under the OPSC (*ie. not under Public Works jurisdiction for inspection or maintenance*), property owners and homebuilders may wish to consider using a backwater valve designed to allow inspection, cleaning and maintenance to be performed from the surface (*such as the Clean Check by Rectorseal*). Failure to install a backwater valve per OPSC requirements will not result in any liability by the City (*for either cleanup or repairs*) in the event there is a sewage backup into a building which would have been prevented by an operable backwater valve installed as required by the OPSC. Any backwater valve shall be installed so that it remains accessible at all times for inspection, maintenance and replacement of valve parts.

b. Minimum Sewer Lateral Diameter and Slope

- 1) The minimum inside diameter of any residential sewer service lateral shall be four (4) inches, and shall be equal to or greater than the building plumbing stub (*building drain*) diameter.
- 2) The minimum inside diameter of sewer service laterals to serve multifamily dwellings or serving commercial, ~~or industrial~~ or public buildings or properties shall be six (6) inches (*in part to avoid the need to cut public streets in the future, if a more intense use is proposed for the property, which results in increased flows*).
- 2)3) Where service lateral sizing larger than the minimum is necessary, fixture unit equivalents shall be determined in accordance with the Oregon Plumbing Specialty Code (OPSC).
- 4) Sewer service lateral slope shall be uniform from the mainline connection to the property line (or easement) cleanout, and shall conform with the City standard details (2% minimum).
- 3)5) Sewer service laterals for townhouses and similar cluster housing developments shall be installed on a uniform slope from the main line sewer connection to a point five (5) feet from the end of the building drain conforming to the above requirements.

c. Service Lateral Cleanouts

- 1) A cleanout (*set in a cleanout box conforming with City standard details*) shall be installed at or near the right-of-way line or sewer easement boundary line for all sanitary sewer service laterals, at a location acceptable to Public Works Director. The sanitary sewer service lateral shall extend beyond the property line/sewer easement boundary cleanout to the back of any PUE fronting the right-of-way or easement, or to the far side of easements for public utilities, whichever is further.

- a) Where sewer laterals are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot being served (*whichever is farther*) in conjunction with the development infrastructure construction.
 - 2) For long sewer service laterals, a cleanout to City standards shall be installed on the upstream side of any intermediate property lines crossed (*including on the upstream side of the property line where the lateral crosses onto the property being served*), as well as at maximum 100-foot intervals beyond the right-of-way or easement cleanout, and at bends as required by the Oregon Plumbing Specialty Code (OPSC).
 - 3) Unless otherwise approved by the City Engineer, sewer service laterals shall have at least four (4) feet of cover from finish grade (*typically sidewalk grade*) at the right-of-way or easement line. Generally, the topography of the property will dictate how deep the service line must be.
- d. Existing Sewer Service Laterals
- 1) The City is under mandate from the Oregon Department of Environmental Quality (DEQ) to reduce infiltration and inflow (I/I) of storm runoff and groundwater into the City's sanitary sewer system. A significant portion of the (I/I) problems in the City's sewage collection system are attributable to leaking sewer service laterals or drains connected to service laterals. DEQ and City standards require that "No person shall discharge or cause to be discharged any storm water, surface water, groundwater, roof runoff, subsurface drainage to any sanitary sewer." The City requires applicants to demonstrate compliance with this ordinance by testing existing sanitary sewer service laterals (*at the expense of the applicant*) which are proposed for continuing use (see Dayton Municipal Code 8.1.3.5 & 8.1.1.6).
 - 2) Unless waived in writing by Public Works Director (*for newer PVC laterals*), all existing sewer service laterals shall be air tested from the mainline to the building to verify that it is free of leaks or defects. The service laterals shall be tested at 4 to 5 psi, and a loss of 0.5 psi in 15 seconds constitutes a test failure. The service lateral shall be replaced if defective. Cleanouts per PWDS (& *plumbing code*) requirements shall be installed on existing sanitary sewer service laterals which are proposed for continuing use (*ie. those which do not already have cleanouts*).
 - 3) If existing sewer service laterals are abandoned or not used, the sewer lateral shall be plugged watertight at the mainline in a manner acceptable to Public Works Director. All such plugged mainlines shall be inspected by Public Works prior to being covered, and may be TV inspected during the winter following the end of the first year of service to verify that the plug remains watertight. Any excavation, repairs or surface restoration required to correct

leaking plugged laterals will be the responsibility of the party performing the original work.

e. Grease Removal.

- 1) Provisions acceptable to Public Works shall be made for grease removal for any installations with commercial or similar kitchens, or other applications as required by Public Works.
- 2) Unless otherwise approved by Public Works, a minimum two compartment exterior gravity grease interceptor vault (*1000 gallon minimum*) shall be provided, particularly in any application where hot water or steam cleaning of commercial type kitchens is utilized. Larger sizes shall be provided as required by 2017 Oregon Plumbing Specialty Code (OPSC) table 1014.3.6 (*gravity grease interceptor sizing*).
- 3) Outlet Sampling. Provisions shall be included to allow for sampling of the grease interceptor vault effluent (*ie. details for outlet junction box, vertical drop cleanout or equivalent shall be included on the drawings*).
- 4) Any proposal for a gravity grease interceptor vault smaller than 1,000 gallon capacity shall include documentation that the unit is sized per the requirements of the 2017 OPSC table 1014.3.6 (*or current edition*).
- 5) A maintenance agreement (acceptable to the Public Works Director and City Attorney where applicable) shall be recorded against the property.
- 6) Property owner shall provide the City with a copy of a maintenance contract with a certified grease removal company, and copies of cleaning and/or maintenance work orders.

f. Private Sewer Pump Stations.

- 1) As noted under PWDS 4.9.a.3, gravity sewer service is required where possible. Installation of private sewer pump stations is not allowed except with express prior written approval by the Public Works Director and the City Engineer on a case-by-case basis (*during land use approval where applicable, and prior to submittal of project design drawings for review otherwise*).
- 2) Single Lot Served. A private sewer pump station shall not be allowed to serve more than one legal lot of record. Moved up from below
- 2)3) Any private sewer pump stations approved by the City shall meet standards established by the Public Works Director and the City Engineer (see PWDS 4.3), the Oregon Plumbing Specialty Code (OPSC) and other applicable codes or standards (*whichever is more stringent*).

Copies of the private sewer pump station standards will be made available to

engineers after conceptual approval of the approach by the Public Works Director and the City Engineer.

3)4) When private sewer pump stations are approved for use, detailed design drawings shall be submitted for review by Public Works as part of the development drawings, illustrating the basis-of-design for the pump, tank & all accessories meeting City standards, including the following.

- a) Details showing and callouts listing all applicable manufacturer information for the selected system, including make, model, size of pump and tank, cut sheets as applicable.

Per OPSC 710.9, any sewage pump system serving any "public use" shall have duplex alternating pumps.

- b) Anchor block or ballast sizing & buoyancy calculations.
- c) Callouts and/or drawings specifying control panels & features proposed for installation, including an accessible visible and audible alarm activated in the event of pump failure (*overload, mechanical failure or high water condition*) as required under OPSC 710.9, etc.

4) ~~Single Lot Served. A private sewer pump station shall not be allowed to serve more than one legal lot of record.~~

5) Septic & Holding Tanks Prohibited. Pumping from septic tanks or other similar holding tanks is expressly prohibited.

6) Recorded Agreement Required. An operation & maintenance agreement acceptable to the City shall be recorded against the property.

4.19 PRIVATE SANITARY SEWER COLLECTION SYSTEMS

a. Each legal lot of record shall be provided with a separate sewer service lateral connected to the public sewer main, unless otherwise approved by the City on a case-by case basis.

1) Any proposed combined private sewer serving more than one legal lot shall be approved by the Public Works Director and the City Engineer on a case-by-case basis, based on findings that separate sewer service laterals are not feasible or possible give the specific and unique conditions at the site, and that extension of a public sewer main through the property to serve additional upstream properties in the future is not necessary or possible. Approval of any such common sewer main or common sewer service shall not serve as a precedent for any future approvals.

2) If a private common sewer is approved, a Private Common Shared Sewer Maintenance Agreement acceptable to the Public Works shall be recorded against each legal lot served by the private common sewer, and a copy of the

recorded agreement returned to the City prior to finalization of the approval and commencement of construction.

a.b. Private collection system sewers shall be designed in conformance with main line standards specified herein when plumbing code grade requirements of Oregon Plumbing Specialty Code (OPSC) Section 1106 cannot be met.

- 1) A manhole is required at the connection to the City system.
- 2) A monitoring/metering manhole may be required at the property line upstream from the manhole connection at the City main (*see PWDS 4.16.i*), unless waived by the City on a case-by-case basis.

A recorded access easement & maintenance agreement with the City will be required for each such monitoring/metering manhole.

b.c. These provisions of the PWDS do not, nor are they intended to supersede the Oregon Plumbing Specialty Code (OPSC), but are intended to allow the design engineer flexibility in the design of private sewer systems where the OPC minimum slope requirements cannot be satisfied.

e.d. PWDS 4.18, Sewer Service Laterals, must be used for sewer service lines in the system with the following exceptions:

- 1) The minimum size sewer line upstream of the monitoring manhole structure shall be six (6) inches.

e. Manhole Inflow Protector Lid Inserts on Private Manholes. Unless otherwise approved in writing by the Public Works Director on a case-by-case basis, ALL private sanitary sewer manholes shall be provided with inflow protector lid inserts meeting City standards (*Manpan Classic inserts*), whether or not such inserts are specifically shown or noted on the drawings.

d.f. See requirements and criteria under PWDS 4.18.f relating to private sewer pump stations.

4.20 UNDERGROUND WARNING TAPE & TONING / TRACER WIRE

- 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 PUE. Where required for mainlines not located under sidewalks or paved portions of public streets, the warning tape shall be continuous between manholes or cleanouts.

- c. All sanitary piping (*both public lines and private lines within right-of-way or easements*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with green sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe, with each end accessible from the surface through a manhole or cleanout.

CITY OF DAYTON
Public Works Design Standards

Division 5

Water Distribution

DIVISION 5 WATER DISTRIBUTION

5.1 PURPOSE

- a. In addition to the purposes outlined under Division 1 of these Design Standards, the purpose of these Standards is to ensure the development of a water distribution system which will:

- 1) be of adequate design to meet all expected domestic, commercial and industrial demands including fire flows within the design life;
- 2) have sufficient structural strength to withstand all external loads which may be imposed;
- 3) be of materials resistant to both corrosion and erosion with a minimum design life of 75 years;
- 4) be economical and safe to build and maintain;
- 5) meet all design requirements of the Oregon Health Authority – Drinking Water Services (OHA-DWS).

Alternate materials and methods will be considered for approval on the basis of these objectives.

- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by professional design engineers.

5.2 APPLICABILITY

- a. These Standards shall govern all construction and upgrading of all public water distribution and associated facilities in the City of Dayton and applicable work within the City's service areas.
- b. Permanent water distribution facilities shall be provided to serve all properties within the City of Dayton in accordance with these 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.

5.3 SPECIAL ITEMS

- a. The design of the following are considered special items and are not covered in detail in these Standards:
 - 1) Water Distribution Pump Stations (*capable of providing design flows with largest single pump out of service*).
 - 2) Reservoirs
 - 3) Public Wells
 - 4) Water Treatment Plants
 - 5) Pressure Regulating Devices
 - 6) Flow Measurement Devices
 - 7) Relining of the Existing Water Mains
 - 8) Chemical Addition or pH Adjustment
 - 9) Bridge Crossings
 - 10) Creek or Stream Crossings
- b. Review and approval of the above special items by the City Engineer and Public Works Director 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 OHA-DWS as applicable.

5.4 APPROVAL OF ALTERNATE MATERIALS AND METHODS

- a. Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in Paragraph 5.1, Purpose. Persons seeking such approval shall make application in writing to the City Engineer and Public Works Director. Approval of any major deviation from these Standards shall be in written form. Approval of minor matters will be made in writing, if requested. Any and all such requests shall be submitted in writing to the Public Works Director prior to City approval of the design drawings.
- b. Any alternate must meet or exceed the minimum requirements set forth in these Design Standards (*also see "equal" & "substitute" definitions under PWDS 1.4*).
- c. The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations and other pertinent information.
- d. Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the City Engineer and Public Works Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

5.5 CONSTRUCTION DRAWINGS

- a. Construction drawings shall conform to the requirements of Division 1 of these Design Standards.
- b. Detail drawings shall be included on the construction drawings for all water system appurtenances including but not limited to valves, blowoffs, hydrants, service connections, couplings, etc.

5.6 CITY STANDARD DETAILS

- a. City sStandard details included in the appendix are supplemental to the text of these design standards and show the City's minimum requirements for the construction of certain standard system components.
- b. In the case of conflicts between the text of these design standards and the City standard details, the more stringent as determined by the City Engineer and Public Works Director shall apply.
- c. As required by Division 1 of these standards, all applicable City standard details shall be included on the construction drawings. Details shall be placed in numerical order on the detail sheets, for ease of reference during construction.

5.7 DEFINITIONS AND TERMS

- a. In addition to the definitions contained in Division 1 of these Standards, the following definitions may apply particularly to water distribution systems. Unless otherwise defined in these Design Standards, the following definitions and abbreviations shall apply whenever used. Other definitions as outlined in the Oregon Plumbing Specialty Code (OPSC) shall also apply.
 - 1) Abbreviations: Acceptable abbreviations for showing types of new and existing pipe materials on the plans are as follows:
 - a) CI - Cast Iron
 - b) DI - Ductile Iron
 - c) PVC - Polyvinyl Chloride
 - d) STL - Steel
 - e) AC - Asbestos Cement
 - 2) 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.
 - 3) Approved Backflow Prevention Assembly: An assembly that has been investigated and approved by the OHA-DWS for preventing backflow.

- 4) Backflow: The flow of water or other fluids in a direction opposite to the normal flow. (See *Back-Siphonage*.)
- 5) Back-Siphonage: The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a negative or reduced pressure in such pipe.
- 6) 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.
- 7) 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 device, 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.
- 8) Customer Water Supply System: The water supply system of a building, premises or private system consists of the all supply pipe from the customer side of the water meter, including water service pipes, and the necessary connecting fittings, control valves, pipe and all appurtenances carrying or supplying potable water in or adjacent to the building premises served.
- 9) Distribution Mains: All mains which are not designated as transmission mains, and which are used for supply the individual consumer. As a general rule these are the smaller mains in the water supply system.
- 10) Distribution System: Distribution main pipelines, pumping stations, valves and ancillary equipment used to transmit water from the supply source to the service line.
- 11) 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.
- 12) 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. The purpose of this assembly is to provide double check valve protection for the distribution system and at the same time provide partial metering of the fire system showing any system leakage or unauthorized use of water.
- 13) Fire Hydrant Assembly: Fire hydrant, hydrant lead, mainline hydrant valve, mainline tee, and thrust restraint at the hydrant and the mainline tee.
- 14) Fire Protection Services: A connection to the public water main intended only for the extinguishment of fires and flushing necessary for its proper maintenance. All fire services connected to building sprinkler systems and/or

private fire hydrants shall have a double check detector assembly. The connection of the fire protection service to the public mainline shall be the service connection, and the entire portion of the fire protection service from the isolation valve at the public mainline connection to the building shall be the sole responsibility of the property owner for maintenance and/or repair (*ie. as a private service line*). Domestic services taps are not allowed on fire protection services or fire hydrant leads.

- 15) Fixture Unit Equivalents: The unit flow or demand equivalent of plumbing fixtures as tabulated in the Oregon Plumbing Specialty Code (OPSC).
- 16) Hydrant Lead: The line connecting the fire hydrant to the City main or private fire line.
- 17) Irrigation Service: A metered connection intended for seasonal use and delivering water which is not discharged to the sanitary sewer.
- 18) ISO: Insurance Service Office.
- 19) Mainline Hydrant Valve: The isolation valve between the City water main or private fire line and the fire hydrant.
- 20) OHA-DWS: Oregon Health Authority, Drinking Water Services.
- 21) Oregon Plumbing Specialty Code (OPSC): The Uniform Plumbing Code, current edition as revised by the State of Oregon, called the "Oregon Plumbing Specialty Code."
- 22) Potable Water: Water which satisfactory for drinking, culinary and domestic purposes and meets the requirements of the health authority having jurisdiction.
- 23) Private Distribution System: A privately owned and maintained water distribution system serving an industrial or commercial subdivision or a multi-building development on a single lot served through a master meter installed at the approved location. Private distribution systems must have a single entity responsible for the system. Resale of water without written approval of the City shall be prohibited.
- 24) 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.
- 25) 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. Transmission mains may or may not supply individual consumers, but they are sized and located to transport water from centralized points of distribution to various points of interconnection with the grid system and centralized points of consumption.

- 26) Uniform Plumbing Code: The Uniform Plumbing Code adopted by the International Association of Plumbing and Mechanical Officials, current edition as revised by the State of Oregon, called the "Oregon Plumbing Specialty Code."
- 27) Water Main: A water-supply pipe for public or community use.
- 28) Water Master Plan: The Water System Evaluation and Master Plan for the City of Dayton, Oregon, most recent revisions.

5.8 MATERIALS

a. General

- 1) Unless otherwise approved by the City Engineer, materials shall conform to the minimum requirements outlined herein and as shown on the City's Standard Details. ~~This listing is not intended to be complete nor designed to replace the City's Public Works Construction Standards (PWCS).~~
- 2) In the case of conflicts between the provisions of these design standards and the PWCS, the more stringent as determined by the City Engineer and Public Works Director 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 OHA-DWS.
- ~~4)5)~~ Material/Equipment Submittals from Contractor Required. Per Section G-1300, construction submittals shall be provided by the Contractor for review by the City, for all material & equipment which will be incorporated into work covered under the PWDS.
- ~~5)6)~~ Granular backfill shall be ¾"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

b. Pipe

- 1) PVC (AWWA C-900)
 - a) PVC pressure pipe 4-inches through 24-inches in diameter shall conform to the requirements of AWWA C-900-16 (*design stress of 4000 psi*),

NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions. Pipe shall be PVC pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 18.

2) Ductile Iron

- a) Where ductile iron pipe is used for water distribution, pipe shall be Class 52 ductile iron pipe with push-on joints conforming to AWWA C-151, and cement-mortar lined and seal coated in accordance with AWWA C-104 (*ductile iron pipe threaded for flanges shall be Class 53*).
- b) 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 1 mil thick unless otherwise specified.
- c) All ductile iron pipe within a single project shall be of the same manufacturer.

3) Rubber-ring gaskets for push-on joints shall be furnished by the pipe manufacturer to ensure compatibility with the gasket groove in the push-on bell end. Gaskets shall be suitable for the specified pipe sizes and pressure.

4) Restrained joint PVC pipe shall be used in locations and configurations as required by the City Engineer (*Diamond Lok-21, Eagle Loc 900, TerraBrute CR or approved equal, as approved by the City Engineer and Public Works Director for the specific application*).

c. **Bolts & Nuts for MJ Joints & Flanged Joints**

1) Mechanical Joints

- a) MJ joints shall be provided with corten tee-head bolts and nuts (*ASTM A242, high strength, low alloy steel conforming with AWWA C-111*).

2) Flanged Joints

- a) As a minimum, all nuts and bolts used for flanged joints shall conform to the requirements of ASME/ANSI B18.2.1 and shall be high strength, low carbon steel conforming to the requirements of ASTM A-307 Grade B, zinc plated steel conforming with AWWA C-111.

3) Areas with Corrosion Concerns

- a) For any areas where required by Public Works Director, MJ and flanged joints shall be provided with bolts and nuts (*low alloy steel conforming with AWWA C-111*) coated with a zinc base coat and a Xylan fluoropolymer top coating (*or approved equal*) for corrosion control and to control thread friction torque during tightening (*Romac*

R-Blue, TriPac 2000 Blue or approved equal).

d. **Fittings**

1) **Mechanical Joint Fittings**

- a) All 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 C-153.
- b) The minimum working pressure for all MJ cast iron or ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi.
- c) **Retainer Glands for MJ Joints**
 - (1) Retainer gland casting bodies shall have all surfaces fusion bond powder coated (*polyester or nylon based*) after pretreatment with a phosphate wash, rinse & sealer coating (*Mega-Bond or approved equal*).
 - (2) Retainer gland set wedge bolts and set wedge assemblies shall have all surfaces coated with a minimum of two coats of fluoropolymer coating or approved equal coating (*to control thread friction torque during tightening of set wedges*).
 - (3) Retainer glands for use on MJ joints shall be "Mega-Lug" as manufactured by EBAA Iron Inc. (*color coded based on the type of compatible pipe*), or approved equal.

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 C-110.
- b) The minimum working pressure for all flanged cast iron or ductile iron fittings shall be 250 psi.

e. **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) Mechanical joint couplings shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic

and leakage testing.

- 3) Unrestrained Couplings. Unrestrained mechanical joint sleeve couplings and adapters shall be long-style solid sleeve type couplings consisting of a fusion bond epoxy coated ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts (*zinc plated*). Unrestrained long sleeve couplings shall be Tyler Pipe, UFCO, Star, Sigma or approved equal. Hymax Wide Range Couplings are allowed as an alternative to unrestrained MJ sleeve couplings.
- 4) Restrained Couplings. Unless otherwise specifically specified or noted on the drawings, restrained sleeve couplings up to 12-inch diameter shall be Krausz Hymax Grip Coupling, or approved equal (*Romac Alpha Coupling*), consisting of a fusion bond epoxy coated two bolt coupling with all cast components (*end rings, center ring, bolt guides, gripper teeth*) of ductile iron, NBR gaskets, stainless steel hardware, stainless steel bolts & anti-gall e-coated nuts.

Restrained couplings outside of the available size ranges for the specified restrained couplings shall be MJ long-style solid sleeve type couplings (as specified above for unrestrained couplings) with retainer glands per City standards (MegaLug or approved equal).

- 5) Dresser type couplings are not an approved option unless specifically approved by the Public Works Director. Applications shall be limited to transitions between pipe types for which mechanical joint couplings are not available.

f. **Mainline 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.

2) Valve Operators

- a) All valve operators shall be totally enclosed traveling nut type manual operators, sealed and lubricated for underground service.
- b) All buried valves shall be supplied with a 2-inch square operating nut, and shall open to the left (*ie. counterclockwise*). 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.
- c) 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 twelve (12) inches (*maximum*) of the finished ground surface and shall be provided with spacers which will center the stem in

the valve box.

3) Valve Boxes (VB)

- a) All buried valves shall be provided with new valve boxes, including new valves installed by the Contractor, or existing valves which are excavated around as part of the work, and existing valves which are located within newly paved, newly concreted or newly graveled surfaces.
- b) Valve boxes shall conform to City sStandard dDetails *(reuse of existing valve boxes will only be allowed is they fully conform with current City standard details, are accurately centered on the valve nut, are clean of excess rock or debris around the valve nut, and are approved in writing by the City)*. All valve boxes shall be provided with 3034 PVC riser pipes, length as required.
- c) All valve boxes noted above *(new and reused existing valves)* shall be provided with VC212 self centering valve box bases with integral rubber fingers to exclude rock from around the valve nut, as manufactured by 3 Dimensional Contracting, or approved equivalent.

4) Gate Valves (GV)

- a) For criteria regarding acceptable location for use of gate valves, see Section 5.16.
- b) All gate valves shall be resilient wedge gate valves conforming to the requirements of AWWA C-509, except as herein modified.
- c) Gate valves shall be epoxy coated iron-body, resilient wedge non-rising stem gate valves. The wedge shall be cast iron completely encapsulated in a 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.
- d) Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and a minimum test pressure of 300 psi.
- e) Gate valves shall be Mueller A-2360, Waterous Series 500 or approved equivalent.

5) Butterfly Valves (BFV)

- a) For criteria regarding acceptable location for use of butterfly valves, see Section 5.16.
- b) All butterfly valves shall conform to AWWA C-504, except as herein modified. Butterfly valves shall be provided with standard gearing so as

to match the same number of turns as a gate valve of the same size (3 x diameter plus 1 turn to open or closed).

- c) 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.
- d) 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 10 psi (± 23 feet).
- e) Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 150 psi and a minimum test pressure of 300 psi.
- f) Butterfly valves shall be Pratt Groundhog series, or approved equivalent.

6) Valve Coating

- a) All valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C-550.

g. Service Pipe and Fittings

- 1) For criteria regarding tapping requirements, see Section 5.19.
- 2) All services that are saddle tapped shall use ductile iron service saddles with stainless steel bolts and double strap clamps. All ductile iron service saddles shall be furnished with a fusion bonded epoxy or nylon coating conforming to the requirements of AWWA C-550, Romac 202NS, Ford FC202 or approved equal.
- 3) Unless otherwise required by the City Engineer or the Public Works Director, single residential service pipe shall be a minimum of 1-inch in diameter.
- 4) Unless otherwise approved by the City Engineer or the Public Works Director, commercial or industrial service pipe shall be a minimum of 1½-inches in diameter (*reducers to be installed at meter location as applicable*).
- 5) Compression Inserts. All service connections to HDPE service pipe shall be compression fittings, with 2-3/8" long inserts provided for all HDPE connections per manufacturer's recommendations (*AY McDonald 6133T CTS insert stiffener or equal*). All service connections to copper pipe shall be compression fittings.
- 6) No-Lead Service Brass. All service brass shall be manufactured from no-lead alloy conforming with UNS/CDA C89833, and shall have the letters "NL" cast into the body for proper identification.
- 7) Tracer Wire. A continuous 12 gauge solid core copper toning wire shall be installed along all non-copper water service lines from the mainline to the

meter box.

8) **1-inch Services**

- a) Unless otherwise specified herein, water service lines shall be blue HDPE tubing (*CTS, SDR 9, 200 psi rated*) conforming to AWWA C901 (ASTM D2239 & D2737), with long style compression inserts as specified above and Q style compression fittings (*Cencore or approved equal*). All water services shall be continuous HDPE without splices.
- 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 to HDPE copper tube size (CTS) pipe. Corporation stops shall be Ford FB-1100-4Q or approved equivalent.
- c) Each individual water service line shall be equipped with a full size 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 3/4-inch and 1-inch meters shall be 1-inch locking angle ball valves with compression inlet. 1-inch meter stops shall be Ford BA43-444WQ, or approved equivalent. Provide all services with a 1" x 3/4" adapter on the meter stop for each 1" service.
- e) Where permitted, service line couplings shall be compression style couplings. Couplings (*where approved by Public Works Director*) shall be Ford C44-44Q coupling or approved equivalent, with long style compression inserts as specified above.

9) **1½-inch and 2-inch Services**

- a) 1½-inch water service lines for shall be either blue HDPE tubing (*CTS, SDR 9, 200 psi rated*) conforming to AWWA C901 (ASTM D2239 & D2737), with long style compression inserts as specified above and Q style compression fittings (*Cencore or approved equal*), or Schedule 80 PVC pipe. All fittings on PVC pipe shall be Schedule 80 PVC. Use IPS Weld-On purple primer P70 with 711 glue or approved equivalent.
- b) 2-inch water service lines shall be Schedule 80 PVC pipe. All fittings shall be Schedule 80 PVC. Use IPS Weld-On purple primer P70 with 711 glue or approved equivalent.

- c) 1½-inch and 2-inch water services shall be provided with high bypass copper-setters for flanged meters, Ford VBB76-12HB-11-66 (1½") or VBB77-12HB-11-77 (2") high locking bypass or approved equivalent conforming to City standard details.
 - (1) The copper-setter shall be provided with ball valves on the inlet and outlet, with inlet valve provided with a lockwing and the outlet valve provided with a handle.
 - (2) The bypass line shall be 1-inch diameter minimum, and shall be provided with a lockwing ball valve.
- ~~d) 2-inch and larger services shall have a mainline tee with flanged side outlet, with a flange x MJ resilient wedge gate valve on the service leg of the tee. 2-inch services shall be provided with a 4" tee and valve, with restrained MJ plug tapped to accept the service pipe adapter (thread x compression) per City standard details.~~
- ~~d) 2-inch and larger services shall have a mainline tee with flanged side outlet and flange x MJ resilient wedge gate valve conforming the requirements specified herein.~~

10) **3-inch and Larger Services**

- a) 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 and the Public Works Director.
- b) All services 3-inch and larger shall be Class 52 ductile iron pipe, with ductile iron fittings. Provide retainer glands on all MJ joints, and field-lock type gaskets on all push-on joints.

Per See-PWDS 5.7, the entire portion of the fire protection service from the isolation valve at the public mainline connection to the building shall be the sole responsibility of the property owner for maintenance and/or repair for ownership and responsibility for fire protection service from mainline connection to building.
- c) 3-inch and larger services shall have a mainline tee with flanged side outlet and a flange x MJ resilient wedge gate valve conforming to the requirements specified herein.
- d) The meter assembly shall include a lockable bypass and may require a backflow preventer if required by Public Works Director.

11) **Fire Services**

- a) All fire service lines shall be reviewed on a case-by-case basis. Pipe and fittings shall be as required by the City Engineer and the Public Works Director.
- b) The portion of all fire services within the public right-of-way or within utility easements to the City shall be Class 52 ductile iron pipe, with ductile iron fittings. Provide retainer glands on all MJ joints, and field-lock type gaskets on all push-on joints.
- c) All fire service connections shall have a minimum 4-inch mainline tee with flanged side outlet and a flange x MJ resilient wedge gate valve conforming to the requirements specified herein.
- d) DCDA w/City Approved Meter. Each fire service connection shall be provided with a double check detector assembly with a City approved meter on the detector loop.

h. **Water Meter Boxes**

- 1) Unless otherwise approved by the Public Works Director, all meter boxes must be as shown below:

WATER METER BOXES ¹			
Service Line Size	Non-Traffic Area ²	Traffic Area ²	Inside Dimensions
3/4-inch & 1-inch	Box – DFW1324C4-12-BODY Lid – DFW132C-4T-LID ¹	Same	13” x 24”
1½-inch & 2-inch	Box – DFW2436C4-18-BODY Lid – DFW2436C-4T-LID ¹	Same	24” x 36”
3-Inch and larger	Vault built to Public Works requirements, w/ aluminum hatch, OSHA ladder, sump pump & lockable bypass.		

¹ Meter boxes and/or piping which do not provide all required clearances and spacing so as to allow installation of City’s standard meter (*without removing the box or vault, and without reconfiguring piping*) will be required to be reset or replaced by the developer or builder (*at their sole expense*), prior to installation of the meter.

² – See requirement below for AMR/AMI lid configuration.

- 2) Meter boxes shall be H20 rated polymer boxes with covers configured for AMR sensors and containing an embedded locator magnet.

i. **Fire Hydrants**

- 1) Unless otherwise required by the Dayton Fire District, 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 2½-inch hose ports (NST), one 4½-inch pumper port (NST) with Storz adapter as specified, 1½-inch pentagon nut, and barrel drains.
 - c) Fire hydrants shall be oriented so as to optimize access to ports, or as directed by the City Engineer or Fire Code Official.
 - d) Fire hydrants shall be Kennedy Guardian K81D, and shall be factory coated yellow with powder coat epoxy. Provide Storz adapter & cap per standards details.

j. **Mainline Blowoffs**

- 1) Mainline blowoffs shall conform with City sStandard dDetails.
 - a) **Primer Required.** For all PVC pipe with solvent cement joints, use of purple primer (*IPS Weld-On P70 Industrial Grade or equal*) is mandatory (*see also OPSC 605.12.2*), with gray medium body PVC cement (*IPS Weld-On 711 Industrial Grade or equal*).
- 2) Minimum allowable blowoff size shall be as outlined under Section 5.12. Blowoffs shall be sized to provide adequate flushing velocities as approved by the City Engineer.
- 3) Unless otherwise shown or authorized by the City Engineer, all blowoffs shall be provided with valve boxes and/or meter boxes as shown in the City sStandard dDetails.

k. **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 C-550.
- 3) Any company performing mainline taps shall be prequalified with the City prior

to performing any work on a project.

- 4) Contractors shall coordinate all taps with City Public Works and perform work with Public Works staff present.

l. **Underground Warning Tape**

- 1) Warning tape shall conform with the requirements noted on the City standard details and standard construction notes (*6-inch width, blue color & "Caution: Buried Water Line Below" or approved equivalent printed continuously down the length of the tape*).
- 2) 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.

m. **Toning / Tracer Wire**

- 1) A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be blue in color for potable water piping.
- 2) Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all valve boxes on all lines.

n. **Concrete (Cast-in-Place) Thrust Restraint.**

- 1) All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi min @ 28 days, max 5" slump, 4.5% air ($\pm 1.5\%$). Concrete mix design shall be submitted to the City for review and approval prior to use.
- 2) If hand mixed sack-crete type concrete is proposed by the Contractor and approved by the Public Works Director, it shall be a 4000 psi minimum mix (*approved by the City prior to use*), mixed with the minimum amount of water necessary for workability (*5" slump or stiffer*).
- 3) In no case will dry sack-crete (*either in bags or as loose mix*) be considered as an acceptable substitute for an approved concrete mix, placed as specified herein or on the drawing details.

o. **Bore Casings and Accessories**

- 1) Carrier pipe ~~installed inside steel used in~~ bore casings shall meet the minimum specifications contained herein. Casing pipe shall be of a size to permit proper

construction of the carrier pipe to the required lines and grades.

- 2) 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.
- 3) Minimum casing size and wall thickness shall be as outlined below. Casing wall thickness shall conform to these requirements or the requirements of the agency having jurisdiction, whichever is more stringent. Contractor shall be responsible for verifying the bell OD or casing spacer diameter required of actual carrier pipe provided or bore grades specified, as bell diameters or casing spacer requirements may vary between manufacturers. Casing diameter shall be increased as required to allow trimming of casing spacers on grade critical bores, or where required to provide additional clearance between bells and casing. The fact that certain carrier pipe types are listed in this table does not indicate that such pipe type is approved for any particular application (*ie. to avoid repetition, this table applies to water, sewer and storm drainage as applicable*).

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
<6"	10 OD / 9.5" ID	0.250 (1/4)
6" DI (CL 52, push-in joint) (Bell OD = ±8.9")	12" OD / ±11.5" ID	0.25 (1/4)
6" PVC C900 (DR 18) (Bell OD = ±8.43")	12" OD / ±11.5" ID	0.25 (1/4)
6" PVC D3034 (DR 35) (Bell OD = ±7.0")	12" OD / ±11.5" ID (18" min. if slope ≤ 2%)	0.25 (1/4) 0.375 (3/8)
8" DI (CL 52, push-in joint) (Bell OD = ±11.2")	14" OD / ±13.37" ID	0.312 (5/16)
8" PVC C900 (DR 18) (Bell OD = ±11.06")	14" OD / ±13.37" ID	0.312 (5/16)
8" PVC D3034 (DR 35) (Bell OD = ±9.36")	14" OD / ±13.37" ID (20" min. if slope ≤ 2%)	0.312 (5/16) 0.375 (3/8)
10" DI (CL 52, push-in joint) (Bell OD = ±13.25")	16" OD / ±15.37" ID	0.312 (5/16)
10" PVC C900 (DR 18) (Bell OD = ±13.57")	16" OD / ±15.37" ID	0.312 (5/16)
10" PVC D3034 (DR 35) (Bell OD = ±11.7")	16" OD / ±15.37" ID (24" min. if slope ≤ 2%)	0.312 (5/16) 0.50 (1/2)
12" DI (CL 52, push-in joint) (Bell OD = ±15.37")	18" OD / ±17.25" ID	0.375 (3/8)
12" PVC C900 (DR 18) (Bell OD = ±16.13")	18" OD / ±17.25" ID	0.375 (3/8)

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
12" PVC D3034 (DR 35) (Bell OD = ±13.94")	18" OD / ±17.25" ID (24" min. if slope ≤ 2%)	0.375 (3/8) 0.50 (1/2)
14" DI (CL 52, push-in joint) (Bell OD = ±17.85")	22" OD / ±21" ID	0.50 (1/2)
14" PVC C900 (DR 25) (Bell OD = ±17.94")	22" OD / ±21" ID	0.50 (1/2)
15" PVC D3034 (DR 35) (Bell OD = ±17.05")	22" OD / ±21.2" ID (24" min. if slope ≤ 2%)	0.50 (1/2) 0.50 (1/2)
16" DI (CL 52, push-in joint) (Bell OD = ±20")	24" OD / ±23" ID	0.50 (1/2)
16" PVC C905 (DR 25) (Bell OD = ±20.41")	24" OD / ±23" ID	0.50 (1/2)
18" DI (CL 52, push-in joint) (Bell OD = ±22.2")	26" OD / ±25" ID	0.50 (1/2) 0.50 (1/2)
18" PVC C905 (DR 25) (Bell OD = ±22.87")	26" OD / ±25" ID	0.50 (1/2) 0.50 (1/2)
18" PVC F679 (PS46) (Bell OD = ±20.85")	24" OD / ±23" ID (28" min. if slope ≤ 2%)	0.50 (1/2)
20" DI (CL 52, push-in joint) (Bell OD = ±24.3")	28" OD / 27" ID	0.50 (1/2)
20" PVC C905 (DR 25) (Bell OD = ±25.34")	28" OD / 27" ID	0.50 (1/2)
21" PVC F679 (PS46) (Bell OD = ±24.58")	28" OD / 27" ID (30" min. if slope ≤ 2%)	0.50 (1/2)
24" DI (CL 52, push-in joint) (Bell OD = ±28.5")	32" OD / ±31" ID	0.50 (1/2)
24" PVC C905 (DR 25) (Bell OD = ±30.27")	34" OD / 33" ID	0.50 (1/2)
24" PVC F679 (PS46) (Bell OD = ±27.65")	32" OD / 31" ID (34" min. if slope ≤ 2%)	0.50 (1/2)
27" PVC F679 (PS46) (Bell OD = ±31.16")	36" OD / ±34.75 ID	0.625 (5/8)
30" DI (CL 52, push-in joint) (Bell OD = ±34.95")	38" OD / ±36.75" ID	0.625 (5/8)
30" PVC C905 (DR 25) (Bell OD = ±37.12")	42" OD / ±40.75" ID	0.625 (5/8)
30" PVC F679 (PS46) (Bell OD = ±35.61")	42" OD / ±40.75" ID (44" min. if slope ≤ 2%)	0.625 (5/8)

Carrier Pipe Nominal Diameter (Inches)	Minimum ¹ Casing Pipe Diameter (Inches)	Casing Wall Minimum Thickness (Inches)
36" DI (CL 52, push-in joint) (Bell OD = ±41.4")	46" OD / ±44.75" ID	0.625 (5/8)
36" PVC C905 (DR 25) (Bell OD = ±44.43")	48" OD / ±46.75" ID	0.625 (5/8)
36" PVC F679 (PS46) (Bell OD = ±42.82")	48" OD / ±46.75" ID (50" min. if slope ≤ 2%)	0.625 (5/8)
42" PVC F679 (PS46) (Bell OD = ±49.61")	54" OD / ±52.75" ID (56" min. if slope ≤ 2%)	0.75 (3/4)
48" DI (CL 52, push-in joint) (Bell OD = ±54.71")	60" OD / ±58.5" ID	0.75 (3/4)
48" PVC F679 (PS46) (Bell OD = ±56.62")	60" OD / ±58.5" ID (64" min. if slope ≤ 2%)	0.75 (3/4)
¹ Casing diameter shall be increased as required to allow trimming of casing spacers on grade critical bores.		

- 4) The class of casing specified is based upon assumed superimposed loads and not upon the stresses resulting from jacking or boring operations. Any increase in casing strength to withstand jacking or boring operations shall be the responsibility of the Contractor.
- 5) Casing Spacers (Skids)
 - a) Casing spacers shall be Model SSI-8 for carrier pipes up to 18 inch diameter and Model SSI-12-2 for larger pipe sizes as manufactured by APS (*Advanced Products and Systems, Inc.*), or approved equivalent.
 - b) Casing spacers shall be bolt-on style with a shell made of at least two halves. The band material shall be manufactured of a minimum 14 gauge T-304 stainless steel. The runners shall be at least 7 inches long for SSI-8 models and 11 inches long for SSI-12 models, and manufactured of high abrasion resistant and low co-efficient of friction, glass filled polymer.
 - c) The spacer shall have a flexible EPDM liner having a minimum thickness of 0.090 inches, with a hardness of durometer "A" 85-90. The liner shall have a rating of no less than 60,000 VPM and water absorption of 1% maximum. All welds are to be chemically passivated and all hardware to be stainless steel.
 - d) All spacers used for grade critical gravity sewer and storm lines shall have field replaceable runners to allow for grade and elevation adjustment.

- e) A minimum of three (3) casing spacers per length of pipe shall be required, or 6-foot on center maximum spacing, whichever is greater.
- 6) End Seals.
 - a) Where casings are filled with sand (*gravity or non-pressure pipelines*), end seals shall be grout/masonry end caps with 4" minimum diameter sand feed and vent tubes at each end. The vent tubes shall be plugged with grout after the casing is filled with sand.
 - b) Where casings are not filled with sand (*pressure pipelines*), end seals shall be Model AC (*pull-on*) or Model AW (*wrap-around with pressure sensitive butyl mastic strips*) end seals as manufactured by APS, or approved equivalent, fastened to the casing and carrier pipe with stainless steel bands.

5.9 GENERAL DESIGN CONSIDERATIONS

- a. Unless otherwise approved or required by the Public Works Director and the City Engineer, the water distribution system shall have sufficient capacity to maintain 40 psi at the building side of the meter for one and two family dwellings. For other development, the distribution 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.
- b. Normal working pressure in the distribution system should be approximately 70 psi with a range of 40 psi to 100 psi.
- c. Head loss shall be determined by the Hazen-Williams equation based on the following coefficients.

Hazen-Williams Coefficients	
Pipe Diameter	C Value
8 Inches and Less	100
10 to 12 Inches	110
Greater than 12 Inches	120

- d. 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, where pressure headloss is not a concern. In general, maximum headloss for transmission and distribution mains should be limited to 3 feet per 1000 feet and 10 feet per 1000 feet respectively, provided that acceptable pressure can be

maintained under maximum design flow conditions.

- e. A 20 psi residual pressure under fire flow conditions shall be maintained at all meter service connections in the distribution system (*OAR 333-061-0025.7 & OAR 333-061-0050.8.e*), and positive pressure at all other locations. Generally, a maximum velocity of ten (10) feet per second under fire flow conditions will govern for sizing mains at all other locations of the service level where this criteria does not govern.
- f. For purposes of calculating projected headloss through a fire hydrant assembly, the maximum headloss values provided in AWWA C502, Table 5 shall be used (*13 psi headloss @ 1500 gpm through large steamer port*). Use of lower headloss values shall be based on a certified headloss curve from the hydrant manufacturer (*ie. based on City approved hydrant*), and the headloss through the 6-inch hydrant lead shall also be accounted for.
- g. Private systems shall limit velocities as required by the Oregon Plumbing Specialty Code (OPSC), Installation Standards.
- h. **Providing for Future Development**
 - 1) To & Through. As a condition of water service, all developments will be required to provide public water mains of sufficient size for fire protection to adjacent parcels, as well as connection (*to the new system*) of existing water lines, hydrants or services crossed or intercepted by or adjacent to the new waterlines, at locations as required by the City Engineer and Public Works Director (*see PWDS also 1.6.e*).
 - 2) 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 also 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.

Additional offsite extensions may be required at the direction of the City as required to provide required fire protection redundancy looping as applicable (see PWDS 5.11).
 - 3) This shall include waterlines that are oversized to provide capacity for required fire flows, or as required to meet the minimum sizes required by the PWDS, or by the applicable water master plan, whichever is larger (*see also PWDS 1.6.h*).
 - 4) In general, water distribution systems should be designed for maximum development of the service area with recognition of possible urban renewal, industrial expansion, etc.

5.10 WATER SYSTEM CAPACITY

a. General:

- 1) Waterlines shall be provided as required to meet the minimum sizes required by the PWDS or by the applicable water master plan, or as required to provide the required fire flows, whichever is larger (*see also PWDS 1.6.h*). In areas not addressed in the Water Master Plan, design capacities shall be determined by consideration of the following factors and assumptions:
 - a) Area to be serviced, both immediate and adjacent.
 - b) Current and projected population within the areas to be served.
 - c) Current and projected land use within the areas to be served.
 - d) Commercial, industrial, or institutional users to be served.
 - e) Changes in any of the above factors which are likely to occur within a foreseeable time period.
- 2) In the absence of consumption data or other reliable information, the following factors may be assumed:
 - a) 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 gal/ac/day for commercial development
 - (4) 10,000 gal/ac/day for industrial development
 - b) Demand for unique commercial installations, industrial users, PUD's, multiple and institutional developments shall be calculated on an individual basis.

b. Fire Flow Requirements

- 1) Unless otherwise approved or required by the City Engineer and the local Fire Code Official, the water system shall be designed to convey minimum fire flows as follows:

MINIMUM FIRE FLOW REQUIREMENTS**		
Location	Recommended Fire Flow (gpm)	Duration (hours)
Residential R-1	1,000	2
	1,500	2
	2,000	2
Commercial Residential CR	2,500	3
Public (Schools & Institutions)	4,000	4
Commercial/Industrial (C, I) New Facilities Existing Facilities	3,250	3
	up to 4,000	4
** These values are general planning values only, and do not supersede or take the place of Oregon Fire Code (OFC) (<i>summarized in OFC Appendix B</i>) or OBC fire flow requirements. Reductions may be allowed by the Fire Code Official for buildings with fire sprinkler systems. Higher values may be necessary based on the OFC, Fire Code Official or ISO requirements.		

- 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.

5.11 LOOPING

- a. The distribution system mains shall be looped at all possible locations.
- b. 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.
- c. The installation of permanent dead-end mains upon which fire protection depends and areas of large demands on single mains will not be permitted.

5.12 BLOWOFFS

- a. All dead-end mains shall terminate with a blowoff assembly or a fire hydrant.

- b. Permanent dead-ends shall have a permanent blow-off assembly and a permanent thrust restraint system. Permanent blowoffs in cul-de-sacs shall be located in front of the curb within five (5) feet from the curb face.
- c. Mains which can conceivably be extended at some later date shall have a mainline valve (*same size as mainline*) in front of the blowoff assembly, and a thrust restraint system which allows the mainline valve to be connected to without taking the line out of service.
- d. Blowoffs 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.

MAINLINE BLOWOFF SIZES	
Water Main Diameter	Minimum Blowoff Diameter
6 and 8-inch	2-inch
10 and 12-inch	4-inch
>12	As required

- e. The design engineer shall submit calculations showing that these flushing velocities can be satisfied.
- f. Temporary blowoffs larger than 2-inches in diameter shall have a valve conforming to the requirements contained herein for mainline valves.
- g. Temporary blowoffs, where required for cleaning new water mains, shall be located at the lower end of the line to be flushed whenever possible.

5.13 MINIMUM DEPTH

- a. The standard minimum cover over buried water mains within the street right-of-way or easements shall be thirty six (36) inches from the finished grade, except that a minimum of 40 inches cover shall be required for waterlines in fill slopes.

- b. Finish grade shall normally be determined as follows:

FINISH GRADE	
Mainline Location	Reference Finish Grade
Waterline under sidewalk in right-of-way	Top of curb
Waterline in front of curb	Gutter
Waterline in cut slope (<i>ie. waterline located behind and parallel with curb/sidewalk</i>)	Top of curb (<i>ie. cover depth measured from top of curb grade</i>)
Waterline in cut slope other than parallel with curbline	Perpendicular from pipe to surface
Fill slopes	Perpendicular from pipe to surface
Easement	Finish grade at pipe centerline

- c. 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.

5.14 MINIMUM MAINLINE SIZE

- a. Minimum sizes for water mains shall be as follows, or as required to meet the minimum sizes shown in the applicable water master plan, or as required to provide the required fire flows, whichever is larger (*see also PWDS 1.6.h*):

MAINLINE SIZE REQUIREMENTS	
Minimum Diameter	Type of Mainline
6-inch	Public lines in cul-de-sacs which cannot be looped in the future and which are beyond the fire hydrant envelope of 250 feet to the furthest point on any existing or future structure. Private fire line supplying either a single fire hydrant or a building fire suppression system. Looping of private fire lines which supply hydrants will be required.
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 & Larger	As required for transmission mains, distribution mains in industrial subdivisions, and fire lines supplying more than 1,500 gpm.

5.15 WATERLINE ALIGNMENT AND LOCATION

a. General

- 1) Water lines shall generally be parallel to the right-of-way or easement wherein they lie.
- 2) Unless otherwise required by the City Engineer, water lines shall generally be located on the south and west sides of the right-of-way wherein they lie, or on the high side of the right-of-way for hill side streets.

b. Waterline Location in Relation to Sanitary Sewer Lines and Other Utilities

- 1) Water mainlines and water service lines shall be separated from all other utilities by a minimum of 5 feet between utility centerlines unless otherwise approved in writing by the Public Works Director and the City Engineer, but in all cases a minimum of 3 foot clear separation shall be provided.
- 2) Water mainlines or water service lines shall generally be separated from sanitary sewer mainlines or sanitary sewer service lines by a minimum of 10 feet unless

otherwise approved in writing by the Public Works Director and the City Engineer. In no case shall the separation be less than 5 feet or as required by OAR 333-061 based on the actual vertical separation provided.

3) Sanitary Sewer Main Crossings

- a) Where a water mainline crosses below or within 18-inches vertical separation above a sanitary sewer main or lateral, one full length of waterline pipe shall be centered at point of the sewer crossing.

c. Waterline Location in Right-of-Ways

- 1) Unless otherwise approved by the City Engineer and Public Works Director, water mainlines shall generally be located in the street right-of-way along general alignments shown in the City standard details.
- 2) The distance between the mainline and the curb shall vary as little as possible. On curved streets, mains may be laid on a curve concentric with the street centerline with deflections no greater than the manufacturer's specifications, or mains may be laid in straight lines along the tangent between selected angle points to avoid conflicts with other utilities. The angle point and tangent section shall not be closer than 5 feet from the right-of-way line, nor more than 3 feet in front of the curb face.

d. Waterline Location in Easements, Easement Widths, Maintenance Access Requirements

- 1) Unless otherwise specified or authorized by the City, minimum easements widths for water mainlines (*as well as water service lines to meters or water meters located on private property*) shall be fifteen (15) feet for normal depth lines (*centered on the waterline*).
- a) Water mainlines with inside diameters larger than 12-inches will require wider easements (*20' minimum*).
- b) Wider easements may be required for waterlines with cover depths greater than 5 feet, on steep hillsides or where maintenance access concerns exist (*see d.6 below*), as determined by the City Engineer and/or Public Works Director.
- 2) 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.
- 3) Offset: When waterline in easements are approved by the City, the waterline shall be offset a minimum of 7½ feet from any property line or easement boundary, or 1/3 the required easement width where wider easements are

required (*rounded up to the nearest foot*).

- 4) Easement Limits around Meters, Hydrants, etc. The easement shall be sized to provide a minimum of five (5) foot clear on all sides around any meter box/vault, hydrant, ARV or similar structure located on private property.
- 5) 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 an unobstructed vehicle access for maintenance by City forces.
- 6) Maintenance Access Requirements. Where required by the Public Works Director, public waterline located outside of developed street right-of-ways will require all-weather maintenance access similar to that required for sewers under PWDS 4.15.d (*ie. all-weather access lanes along mainlines and/or for access to valves, meters, hydrants or other structures; maintenance agreement, etc.*).
- 7) City standards require that easements granted to the City 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 or ornamental landscaping be placed over a water mainline or easement, nor shall any parallel fences or parallel utilities be constructed within the easement (*access gates acceptable to the City shall be installed in fences which the City allows to be constructed across City easements*). Prohibited structures shall include decks, as well as footings or overhanging portions of structures located outside the easement.
- 8) 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 and Public Works Director. Easements wider than the minimum will be required.
- 9) Franchise Utility Limitations in City Easements. Franchise utilities shall not be placed in City utility easements unless approved in writing by the Public Works Director, subject to separation requirements in excess of minimums as dictated by Public Works Director.
- 10) Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet City and OHA-DWS requirements.
- 11) Public Works Review/Approval Required prior to Recording. All easements must be furnished to the City Public Works and City Engineer for review and approval prior to recording. All recording costs shall be borne by the Developer.

e. **Waterline Phased Construction**

- 1) Water mains installed by phased construction, which will be extended in the future, shall terminate with a mainline valve, blow off and permanent thrust restraint system which allows the mainline valve to be connected to without taking the line out of service.
- 2) All developments will be required to extend mains across existing or proposed streets for future extensions by the City or other developments. All terminations shall be planned and located such that new or existing pavement will not have to be cut in the future when the main is extended.
- 3) The construction plans for each phase shall be capable of standing alone, including provisions for looping and minimum fire flows.

f. **Waterline Location in Relation to Ditches and Drainage Channels**

- 1) Surface water crossings of mains shall be in accordance with OAR 333-061 and the requirements outlined herein. Waterline crossings of ditches, streams or other surface water channels shall be ductile iron pipe unless otherwise approved in writing by the Public Works Director.
- 2) Perpendicular. Water mains crossing ditches or drainage channels shall be designed to cross as nearly perpendicular to the channel as possible.
- 3) The following surface water crossings will be treated on a case-by-case basis:
 - a) Ditch or drainage channel crossing for pipes of 12-inch diameter and greater.
 - b) River or creek crossings requiring special approval from the Division of State Lands.
- 4) The minimum cover from the bottom of the ditch or drainage channel to the top of pipe shall be a minimum of thirty-six (36) inches unless otherwise approved by the City Engineer, Public Works Director and the OHA-DWS.
- 5) A scour pad centered on the water line will be required for mains where the potential for erosion exists as determined by the City Engineer and Public Works Director. The size and design of scour pads will be reviewed on a case-by-case basis by the City Engineer.

5.16 VALVES

a. Valve Sizes

- 1) In general, valves shall be the same size as the mains in which they are installed. Reducers for reconnection into existing water mains less than 8-inches in diameter (*or existing mains smaller than the new mainline*) shall be placed between the new valve and the existing line (*ie. the new valves shall be the same size as the larger mainline*).
- 2) Unless otherwise approved or required by the City Engineer, valves shall conform to the following table.

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

- 3) Valve types and materials shall conform to the requirements of these Design Standards and the Standard Construction Specifications.

b. Valve Location

- 1) Distribution system valves shall be located at the tee or cross fitting as nearly as possible, and set in locations where operation of all valves associated with said tee or cross will affect traffic on only one side of any street.
- 2) 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 be such that the length of any one shutdown in high value areas shall not exceed 500 feet nor 800 feet in other areas.
- 3) A water mainline tee-intersection shall be valved on all three branches and a water mainline cross-intersection shall be valved on all four branches (*this requirement does not apply to fire hydrant tees or service connection tees*).
- 4) Hazardous crossings (*ie. creek, railroad, freeway crossings, etc.*) shall be valved on each side of the crossing, and the waterline pipe shall be installed in a casing unless otherwise approved by the Public Works Director and the City Engineer on a case-by-case basis.

- 5) Distribution branches on transmission mains shall be spaced not more than 800 feet apart where practical and shall be valved and plugged.
- 6) Transmission water mains shall have valves at spacings as required by the City Engineer.

c. Mainline Tapping Tee & Valve

- 1) A tapping tee & valve to make connection to an existing, in-service line is only allowed in cases where the City determines that water service cannot be interrupted to cut in a tee or cross, and where the additional in-line valve is not needed for system isolation as outlined above.

d. Water Valve Operation

- 1) City forces shall operate all valves, including fire hydrants, on existing public water mains, on the public side of water meters, or at the connection of fire service lines to public water mains.

5.17 FIRE HYDRANTS

a. Hydrant Coverage

- 1) 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, at locations as required by Public Works or the City Engineer.

b. Hydrant Location & Availability

- 1) 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 mains. The hydrant lead shall be a minimum of 6-inches in diameter.
- 2) Hydrants shall be placed in locations approved by the City Engineer and the Fire Code Official, based on required distance from buildings (and/or required distance from any existing or proposed FDCs).
- 3) In general, hydrants shall be located at corner of each public & private street intersection where possible, and adjacent to entrance driveways for public, commercial or industrial type developments (unless otherwise approved by the City Engineer and the Fire Code Official).

Hydrants located at points other than intersections shall be located at the

extension of property lines where feasible (*offset as required only to avoid conflict with survey monuments per ORS 92.044.7*).

- 4) Unless otherwise approved by the City, hydrants shall be placed between the sidewalk and the property line.
- 5) No hydrant shall be installed within five (5) feet of an existing utility pole or guy wire nor shall a utility or guy wire be placed within five (5) feet of an existing hydrant.
- 6) Existing or new hydrant availability for a particular property will be determined by the City and Fire Code Official based on both distance and accessibility (*see also OFC C103.1 & C104*).
 - a) Existing hydrants on City streets are generally considered as available to properties on both sides of the street.
 - b) For purposes of new development, hydrants on the opposite side of an ODOT highway right-of-way are generally NOT considered to be available, unless specific prior written approval is granted by ODOT (*ie. since the Fire Department may need to lay hose across the highway and restrict traffic during emergencies*).
 - c) Hydrants on the opposite side of railroad tracks are NOT considered to be available.
 - d) Hydrants on or across adjacent properties are not considered available unless fire apparatus access roads (*fire lanes*) extend between properties, and easements are recorded to prevent obstruction of such roads (OFC C104.1).

c. Hydrant Valves

- 1) 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.
- 2) Hydrant valves shall be resilient wedge gate valves.
- 3) The hydrant valve shall be connected directly to the mainline tee using a flange joint.
- 4) If the length of the hydrant lead is greater than 30 feet, an additional gate valve shall be provided within 3 feet of the hydrant, but under no circumstances shall the valve be attached to the hydrant.

d. Hydrant Leads.

- 1) All hydrant leads shall be Class 52 ductile iron, 6" minimum diameter, with retainer glands at both ends.
- 2) Unless specifically approved in writing by Public Works Director for long hydrant leads, all hydrant leads shall consist of a single piece of pipe without joints. Any joints allowed on hydrant leads shall be provided with fully restrained gaskets (*Field-Lok or equivalent*).
- 3) Service taps on hydrant leads are prohibited.

e. Hydrant Bury & Exposure

- 1) Hydrant bury shall be sufficient to provide a minimum of 36-inches of cover over the hydrant lead. In no case shall the bury be less than the depth of the waterline from which the hydrant is served.
- 2) The hydrant shall be set such that the base of bottom flange bolts are a minimum of 2-inches and a maximum of 6-inches above finish grade following all landscaping and surface restoration.

f. Hydrant Operation & Use

- 1) No person other than Public Works Director staff shall operate or flow test fire hydrants without first obtaining written authorization from the Public Works Director. This hydrant use restriction shall not apply to fire department/fire district staff in the performance of their regular duties.
- 2) All hydrant flow tests shall be performed with Public Works staff present unless otherwise approved by the Public Works Director.
- 3) Opening or operating fire hydrants with any tool other than a standard hydrant wrench designed for that purpose is prohibited.

g. Fire Department Connections (FDC).

- 1) Per OFC 912.2, the location and configuration of any FDC shall be as approved by the Fire Code Official, including but not limited to considerations on how fire equipment will be staged to access the site and available hydrants, and how fire & emergency equipment will be staged in order to support access to the building by fire personnel (including but not limited to being located so that fire apparatus and associated hoses will not obstruct access to the building by other fire apparatus, nor unreasonably obstruct traffic to or around the site).
- 1)2) The distance from a fire hydrant to the fire department connection (FDC) shall not exceed 40 feet unless otherwise approved in writing by the Fire Code Official, but in no case shall a distance of greater than 60 feet be allowed.

~~2)3)~~ FDCs connections/risers and FDC supply lines shall be installed in conformance with provisions of the Oregon Fire Code and applicable NFPA standards (*including but not limited to installation of accessible ball drip valves, cover depths for freeze protection, etc.*), with specific location and configuration subject to approval by the Fire Code Official.

h. No Parking Designation at Hydrants and FDCs

- 1) Parking is prohibited for 10 feet each way from fire hydrants (*ORS 811.550(16)*) or from FDCs, where such parking would block unrestricted access to the hydrant or FDC from the fire apparatus access way.
- 2) Curbs adjacent to fire hydrants or FDCs shall be painted 10 feet each way per Detail 503. Areas without curbs shall be marked or signed for no parking as approved by the Fire Code Official.

5.18 AIR RELEASE VALVES

a. General

- 1) 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.
- 2) Where service taps cannot be used, an air release valve shall be permanently installed at high points on all water mains at all location where air can accumulate. An automatic air release valve shall be installed in a meter box or vault outside of the street at a location where flooding of the manhole or chamber will not occur.
- 3) Any ARV installed above grade (*ie. bridge crossings, etc.*) shall protected from freezing with a hotbox insulated enclosure and heat tape/heater, or other approved means.

b. Air Release Valve Piping

- 1) The open end of an air release pipe from automatic valves shall extend to the top of the manhole at least twelve inches above grade and provided with a screened, downward facing tee vent. Grade shall mean the existing ground elevation adjoining the meter box or vault (*see also Detail 518*).

5.19 WATER SERVICE LINES & METER LOCATION REQUIREMENTS

a. General

- 1) Booster Pumps. The use of private pumps on the public portion of a water service line (*ie. between the mainline and the meter*) ~~to provide adequate pressure to a subdivision lot or property located above the pressure level of the supply main~~ shall be prohibited.

Booster pumps installed on private property (*ie. beyond the water meter*), where required provide adequate pressure to a lot or property which is located above the pressure level of the supply main, shall require written authorization by the Public Works Director, subject to the installation of a premise isolation backflow device meeting City and state standards, located between the water meter and the booster pump.

- ~~2) Meter for Each Legal Lot. Each legal lot of record shall be provided with 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 detached garage or shop with plumbing fixtures.~~ Moved down.

- ~~3)2) Easement Requirement. An easement shall be recorded for any water service line which encroaches on or crosses any legal lot property other than one being served.~~

- ~~4)3) Separate City Water Meters for Specific Uses.~~

- ~~a) Meter for Each Legal Lot. Each legal lot of record shall be provided with at least one 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 detached garage or shop with plumbing fixtures.~~

- ~~a)b) Duplex & Triplex. Separate water services and separate meters shall be installed to serve each side of duplex lots, and each unit of triplex residential buildings unless otherwise approved by Public Works Director.~~

- ~~b)c) Condominiums, Detached Single Family Dwellings & ADUs. Separate water services and separate meters shall be installed to serve each unit of condominiums (or existing buildings proposed to be condominiumized) or to serve each unit of developments with separate detached dwelling units or single family lots with separate detached accessory dwelling units (*except where otherwise approved by City for RV parks – DMC 8.2.16.5*).~~

- d) Apartments. Four (4) or more attached units on a single legal lot of record will be considered as a multi-family apartment and served from a City common water meter, unless otherwise approved by the Public Works Director.
- e) Separate Commercial Buildings. Unless otherwise approved by the Public Works Director on a case-by-case basis, each building in a multi-building commercial development on a common property shall be provided with a separate water meter. Separate commercial or industrial uses located in a single common building (under a common ownership) may have a single or multiple water meters.
- f) Mixed Use Commercial/Residential. Mixed use commercial / residential buildings may be served from a common water meter, is specifically approved by the Public Works Director.
- g) Sub-Meters to be Private. Any submeters installed on the private side of a City water meter for water bill allocation shall be private and located on private property, and shall be the sole responsibility of the property owner for installation, maintenance, reading, etc.

~~5)4)~~ Water Services along Flagstem & Common Use Driveways. Where water service lines beyond the meter are required or shown along flagstem or common use driveways (*or which cross property other than that being served*), the pipe shall be extended to the end of the driveway or to the boundary of the lot being served (*whichever is farther*) in conjunction with the development infrastructure construction. The end of the service line shall be marked with a 2x4 post wired to the pipe stub, extending 18" above grade, with the toning wire stapled to the top of the marker post.

~~6)5)~~ Additional water service lines must be stubbed into the property lines sufficient to serve all residential parcels which can be further partitioned in the future where such future partition would require that the streets be cut to install such services, or where the service line must cross intervening property to provide such future service.

~~7)6)~~ Curb Stamping. Where water service lines are connected to water mainlines in the street, the top of curb and the gutter pan shall be stamped at the point of the service crossing as required by the City standard details and standard notes.

~~8)7)~~ Perpendicular. Unless otherwise approved in writing by the City Engineer and the Public Works Director on a case-by-case basis, water service lines shall be installed from the mainline to the property line perpendicular to the street centerline. Permanent installation of water service lines with the right-of-way is generally prohibited, except where extenuating circumstances exist which meet the variance criteria.

- 9)8) Private pressure reducing valves (PRV) may be required by Public Works Director in certain areas *(to be installed on the private side of water meters)*. The installation, maintenance and repairs of such devices shall be entirely the responsibility of the property owner.

b. **Water Service Sizes**

- 1) Standard service line sizes are 1-inch, 1½-inch, 2-inch, 4-inch, 6-inch and 8-inch *(4" service line required for 3" meters)*. Service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

MINIMUM SERVICE SIZE	
Type of Service	Minimum Service Size
Single residential service ¹	1-inch
Triple residential service (triplexes only)	1½-inch
Commercial/Industrial/ <u>Public</u> type Service ²	1½" minimum
Notes: ¹ . The next larger service size may be required for residential lots large enough to be partitioned into additional lots without a water main extension. ² . Commercial or industrial type service pipe smaller than 1½" requires prior approval by the City Engineer & Public Works Director <i>(it should be noted that, with approval from Public Works Director, reducers can be installed at the meter setter location as applicable if smaller meters are desired, and where maximum demand flows are demonstrated to be within operating limits of the smaller meter)</i> .	

- 2) Water service piping from the main to the meter shall be equal to or greater than the meter size. See documentation required in water meter sizing subsection below.
- 3) Commercial, public or industrial type water services shall not be smaller than 1½-inch *(reducers may be installed at the meter location to accommodate a smaller meter)*.
- For new streets or streets being cut for service installation, far side commercial, public or industrial services 2-inches or smaller diameter shall be installed in a 4-inch minimum size PVC sleeve.
- 4) For other than single family residential use, or for commercial / industrial / public type meters, or for 1½-inch and larger meters, applicable calculations must be submitted with the expected flow requirements and proposed usage, as summarized under water meter sizing criteria below.
- 5) Private Water Service Pipe Size Limits (beyond meter). Typically, the water service line on the private side of the meter may not be larger than one nominal pipe size greater than the meter size. Larger sizes shall be approved by Public Works prior to installation, to ensure that water usage and flowrates do not

exceed the recommendations for the meter being provided.

c. **Tapping requirements**

- 1) Tapping requirements for water service lines shall be as outlined below.

WATER SERVICE TAPPING REQUIREMENTS		
Service Size	Mainline Type	Tapping Requirements
1"	All pipe types	Service Saddle
1½"	All pipe types	Service Saddle
2" & larger	All pipe types	Mainline tee (<i>or tapping saddle</i>) with flanged valve

d. **Water Service Location**

1) **Domestic & Irrigation Services**

- a) The service lines shall extend from the main to the meter location shown on the City standard details. An angle meter stop and meter box shall be located at the termination of the service line.
- b) The meter stop shall be located such that the front of the meter box is the distance behind the curb or sidewalk as shown on the City standard details.
- c) 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.
- d) Domestic or irrigation service lines shall not be connected to fire protection services, including hydrant leads.

2) **Fire Service**

- a) A backflow prevention assembly (*with detector loop & detector meter*) shall be placed on fire service lines as required by the City (*located on private property outside of the public right-of-way or City easement*). See PWDS 5.7 for ownership and responsibility for fire protection service from mainline connection to the building.
- b) Plans for fire service lines shall meet the requirements outlined in PWDS Division 1, and shall be stamped by a licensed Civil Engineer. The portion of the fire service within the right-of-way or within utility easements to the City shall conform with PWDS 5.8.g,11 (*ie. CI 52 DI pipe*), and the remainder (*on private property*) shall conform with the

Oregon Fire Code and referenced standards, and shall be acceptable to the Fire Code Official.

- c) Drawings for fire services shall include cover sheet (*with information per PWDS 1.10*) & sheet index, vicinity map, scaled & dimensioned site plan showing 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 (*offset as required to avoid conflict with survey monuments per ORS 92.044.7*), location of proposed backflow assembly, proposed FDC location and location of & distance to fire hydrant proposed to serve the FDC (along an accessible route without obstructions acceptable to the Fire Code official), and shall include all applicable details required for construction of the fire service and appurtenances, including the location and style of meter on the backflow detector loop.

Profile views of new fire services or FDC service lines shall be provided where required by the City Engineer or Public Works Director in order to illustrate vertical alignments (high points/low points) or vertical clearances from existing utilities.

- d) Forward Flow Test Port & Drain (*see also Detail 559*).
- (1) A "Forward Flow Test Port" shall be provided for all fire service lines (*installed in the DCDA vault per City details for exterior DCDA assemblies, unless an alternate permanent "Forward Flow Test Port" location is approved in writing by Public Works and the Fire Code official, or if a private fire hydrant downstream of the DCDA is designated as the required "Forward Flow Test Port"*).
 - (2) The fire service design engineer is responsible for coordinating with the fire sprinkler system designer/installer to verify the flowrate required for the "Forward Flow Test" of the backflow device, and the fire sprinkler system installer shall coordinate to ensure that all connections, hose & flow measurement equipment (*Hose Monster or equal*) is provided as required to conduct the acceptance "Forward Flow Test" as required by NFPA 13.10.10.2.5.1.
 - (3) All components of the Forward Flow Test Port (*including connections, valves, etc., but excluding the fire hoses & flow measurement equipment*) shall remain in place to allow subsequent "Forward Flow Tests" to be conducted without any system modifications (*ie. the annual flow tests as required per NFPA 25.13.6.2.1*).

- (4) If the Forward Flow Test Port is installed inside a building, drains adequate to handle the full test flows shall be provided, unless provisions are included to direct the test flows to the exterior of the building in a location which will not cause damage to public or private property.
- e) Service taps on fire service lines are prohibited.

5.20 WATER METERS

a. General

- 1) Except as otherwise required, all water meters within the service area of the City of Dayton will be furnished and installed by City forces at the request and expense of the customer. The service line, meter box and all piping & fittings within the meter box must be installed by the developer.
- 2) All meters 1½-inches and larger shall be installed by a contractor retained by the developer, under the on-site inspection and subject to the approval of Public Works Director.
- 3) Calibration for Larger Meters. All meters 3-inch and larger shall be calibration tested after installation and prior to being placed in service. Testing shall be done by a qualified and trained water meter tester at the developer's expense. All test results shall be submitted to Public Works Director for review and approval.
- 4) A backflow preventer meeting City & State standards shall be provided and installed by the Contractor at locations acceptable to Public Works Director.

Any required backflow devices shall be tested and approved by the City (including submittal of test results to Public Works) prior to being placed in service.

- 5) Water Meter Sizing.
 - a) Meter Sizing Documentation Required. For other than single family residential use, or for commercial/industrial type meters, or for 1½-inch and larger meters, calculations, documentation and drawings as applicable must be submitted with the expected flow requirements and proposed usage, including a complete listing of fixture unit counts for all plumbing fixtures to be served by the proposed meter.
 - b) Fixture unit equivalents and demand curves (*used in determining the design flow rates to size water meters for other than separate single family uses*) shall be established in accordance with the Oregon Plumbing Specialty Code (*OPSC table 610.3 & Charts A103.1(1) &*

A103.1(2)).

The size of water meter required shall be based on standards determined by the Public Works Director (*based on OPSC fixture unit demand curves unless use of peak design demand flow is required for industrial type uses*), and will be based on use of the City's standard compound water meter for maximum accuracy.

- c) City meter sizing criteria will include factors to minimize excessive velocities in the water system, including velocities through meters and water service lines (*in order to reduce the risk of water hammer induced pipe breakages on the public and/or private side of the meter, and to maximize the useful lifespan of the water meters installed*).

Unless otherwise determined by the Public Works Director, default meter sizing (*and associated SDC charges*) will be based on the "High-Normal Flow Rate" (*for Compound Class II meters*) in Table 6-1 of AWWA M22 3rd Edition (*Sizing Water Service Lines and Meters*) published by the American Water Works Association (*AWWA*).

- (1) In no case shall velocities greater than 10 feet per second be allowed through water meters (*see also OPSC 610.12 & A107.1*).
 - (2) Sizing for systems with flushometer valves shall be in conformance with cumulative fixture unit counts listed on OPSC Table 610.10. In general, meters on systems serving a flushometer valve for a toilet or a urinal shall not be less than 1½-inch diameter (*Note: larger than 1½-inch meter size is typically required where multiple flushometer valve fixtures are served through a single meter*).
- d) Turbine style water meters will only be allowed where approved by the Public Works Director on a case-by-case basis (*at his/her sole discretion*), where projected flow patterns support the use of a turbine meter.
- (1) In cases where the Public Works Director allows the use of a turbine meter in place of a standard compound meter, any reduction in meter size (*due to the use of such turbine meter*) will not result in a reduction of applicable SDC fees.
 - (2) If turbine meters are allowed, and changes in future flow patterns result in reduced meter accuracy, the Public Works Director may require that the turbine meter be changed to a standard compound meter, at the customer's expense.

b. **Water Meter Location**

1) **General**

- a) Meters shall be located at the termination of the City service line, at locations as shown on the City standard details. Unless otherwise approved by the Public Works Director, meters shall be located within the right-of-way or easement containing the water mainline (*see PWDS 5.15.d.4 for easement limits around water meters located outside of public right-of-ways*).
- b) All meter locations shall be approved by the Public Works Director (*ie. based on access & maintenance considerations, and to minimize the length of service line between the mainline and meter to the extent feasible*).
- c) Unless otherwise approved by the Public Works Director on a case-by-case basis, meter boxes shall be located outside of driveways or other areas subject to vehicular traffic. Approval by the City for meters and meters boxes set in driveways or areas subject to vehicular traffic shall be contingent upon the Developer, builder or property owner providing a traffic rated meter box, including installation of a concrete collar around the box per City standards in traffic or gravel areas (*concrete is required both to provide lateral support for the meter box and the prevent gravel from covering the box lid*). After initial installation, the property owner shall be responsible to protect the meter box and meter from damage. Damaged meter boxes (*or concrete collars where required*) shall be repaired and/or replaced as directed by the City, at the property owner's expense.
- d) Water meters (*excluding detector loop meters on fire service lines where DCDA assemblies are approved to be installed inside of a building*) shall be located outside of buildings being served (~~including meters on fire service detector loops~~), at a location approved by the Public Works Director.
- e) Detector Meters Required on Fire Service Backflow Assemblies. Meters to City standards on fire service detector loops shall be installed at accessible locations acceptable to the Public Works Director, and reader heads shall be provided as required to allow the meter to be read without entering the building.
- e)f) Easement around Meter Box/Vault. A public utility and access easement to the City shall be provided to and around any meter boxes or meter vaults 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.

2) **3/4-inch through 2-inch Meters**

- a) In the right-of-way in a location that allows for easy reading and maintenance, at the location specified herein or shown on the City standard details.

3) 3 Inch and Larger Meter:

- a) On private property adjacent to the public right-of-way to allow reading and maintenance. It must be accessible with a crane truck to within ten feet of the installation with a ten foot vertical clearance.
 - b) 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.
 - c) A minimum three foot clear space must be provided around the vault to provide ample working space for maintenance.
 - d) All 3-inch and larger meters shall be provided with a remote readout head approved by Public Works Director which is located such that it can be read without entering the meter vault.
 - e) A sump pump shall be installed and maintained in the meter vault (*of all meters larger than 2-inch*) by the property owner, discharging to a storm drain or other location approved by Public Works Director. Owner of the property being served shall be responsible for all permits & installation costs associated with providing, installing and connecting conduit(s) and power to the meter vault for the sump pump and/or freeze protection, and for the ongoing power costs.
 - (1) Where conduit(s) connect to building basements, and where conduits are installed flat or slope toward the building, the conduits shall be swept up to an above grade junction box mounted on the exterior wall of the building, to avoid the potential for groundwater drainage into the basement if the buried conduit is cracked or broken in the future.
 - f) The configuration of the lockable bypass shall be acceptable to Public Works Director.
- 4) The meter, with approval by the City, may be located in the same vault with a backflow prevention device, provided a completed dimensioned design is submitted with a request for variance.

c. **Meter Boxes**

- 1) 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.

- 2) Meter boxes for water meters 2" & smaller shall be set level to finish grade (*vaults for larger meters shall be set to grades as shown by City standard details*). The Developer, builder or property owner shall be responsible for setting meter boxes and services to finish grade prior to initial installation and approval of water meters by the City.
- 3) Meter boxes that do not provide all required clearances and spacing so as to allow the City to install a standard meter without removing the box, will be required to be reset or replaced by the developer or builder (*at their sole expense*), prior to installation of the meter by the City.

5.21 PRIVATE WATER SYSTEMS

- a. General design considerations for private water systems shall conform to requirements set forth by the OHA-DWS, by the Oregon Plumbing Specialty Code (OPSC) (*Chapter 10*), and these Design Standards.
- b. All public water mains within private developments shall be in public right-of-way or exclusive easements to the City of Dayton and shall conform to these design standards. Each connection of the private water system to the City system shall be through an approved backflow prevention assembly and master meter.
- c. Requirements for capacity, materials, looping, valves, fire protection, service lines and meters shall also be applicable to design within PUD areas.
- d. 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.

5.22 BACKFLOW PREVENTION

a. General

- 1) All backflow assemblies shall be testable, and ~~shall be tested include provisions for testing~~ by a certified backflow testing person or organization, with copies of the test results submitted to Public Works, prior to being placed in service.
- 2) An approved backflow prevention assembly (*with an approved metering system where applicable*) shall be required for each use in the following instances:
 - a) As determined by the City Cross Connection Specialist and OHA-DWS requirements.
 - b) When a private line must be extended from or looped between two (2) or more City mains in order to obtain the required flow and the resultant loop is no benefit to the City grid system.

- c) On all fire services, which shall also include a detector loop & detector meter style & configuration as approved by Public Works Director (regardless of whether or not the fire service double check assembly is located inside or outside of a building).
 - d) On any private water lines serving multiple buildings or parcels or on a private distribution system attached to the City's distribution system *(with or without a master meter)*.
 - e) When an auxiliary water supply exists on the property being served, including but not limited to a domestic or irrigation well, or an irrigation system supplied from a surface water source *(see OAR 333-061 Table 42)*.
 - f) Where a booster pump or pressure tank exists on the service line to the property being served, or on any extensions of *(or connections to)* the service line serving the property.
- 3) An approved reduced pressure backflow prevention assembly with an approved metering system shall be required for service connections in high hazard areas as determined by the City Engineer and Public Works Director or City Cross Connection Specialist.
 - 4) The backflow assemblies must meet the City approved assembly standards, which standards are taken from the current approved list of assemblies maintained by the OHA-DWS.
 - 5) RP backflow devices shall be provided with drains per OHA-DWS standards. Unless installed indoors or in weather proof above grade enclosures, all backflow assemblies shall be installed in a box or vault approved by Public Works Director. Sump pumps per City standard details shall be provided for all double check assemblies installed in vaults *(3" & larger size)*. Owner of the property being served shall be responsible for all permits & installation costs associated with providing, installing and connecting conduit(s) and power for required sump pumps and/or freeze protection, and for the ongoing power costs. Conduits required for connecting OS&Y valve tamper switches to fire alarm control unit shall also be the responsibility of the owner of the property being served.
- a) Where conduits connect to building basements, and where conduits are installed flat or slope toward the building, the conduits shall be swept up to an above grade junction box mounted on the exterior wall of the building, to avoid the potential for groundwater drainage into the basement if the buried conduit is cracked or broken in the future.

b. Backflow Location

- 1) The approved backflow prevention assembly shall be installed on the property being served in a place accessible for City inspection and for testing and located as follows:
 - a) Before any branch, immediately downstream of the meter; or
 - b) If not metered, at the property line; or
 - c) If in the building, before the first branch or hazard being controlled or as determined by the City Cross Connection Specialist.
- 2) If installed outside the building being served, it shall be placed at or adjacent to the property line or easement line in a vault or structure in accordance with the manufacturer's recommendations and as approved by the Public Works Director. Vaults must have a sump and be watertight.
 - a) Easement around Box/Vault. A public utility and access easement to the City shall be provided to and around any backflow assembly set on private property (*ie. when installed outside of the building being served*). The easement shall be sized to provide a minimum of five (5) foot clear around the box or vault on all sides.

c. Backflow Thermal Expansion Issues.

- 1) As noted under OAR 333-061-0070(2.b), "'Thermal Expansion' means the pressure increase due to a rise in water temperature that occurs in water piping systems when such systems become "closed" by the installation of a backflow prevention assembly or other means, and will not allow for expansion beyond that point of installation."
- 2) It is the responsibility of the property owner and/or water user to provide a thermal expansion tank or other means approved by the Oregon Plumbing Specialty Code (OPSC) to address thermal expansion concerns in the private water system piping downstream of any backflow device or pressure regulator where applicable (*see OPSC 608.2&3 for expansion tank requirements*).
- 3) This section shall be considered to be written notice to the premise owner and water user of these thermal expansion concerns, and notice of the responsibility of the premise owner and/or water user to address these concerns (*see OAR 333-061-0070(9.b.A.iii)*).

5.23 UNDERGROUND WARNING TAPE & TONING / TRACER WIRE

- a. 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.

- 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 mainline as specified.
- c. All water pipe (*both public lines and private lines within right-of-way or easements*) shall have an electrically conductive tracer wire, 12 gauge minimum size single strand insulated copper with blue sheathing, installed in the trench for the purpose of locating the pipe in the future. The tracer wire shall run the full length of the installed pipe, with each end extended to within 12-inches of the surface through a valve box or meter box.

5.24 **MAINLINE BORED CROSSINGS**

- a. Casing size shall be adequate to permit proper construction of the carrier pipe to the required lines and grades. Carrier pipe installed inside steel ~~used in~~ bore casings shall be as specified herein.
- b. 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 3 spacers per length of pipe be used.
- c. In order to prevent over-belling of PVC or other flexible pipe while installing it through the casing, provide a method for restricting movement between the assembled bell and spigot conforming with the manufacturer's recommendations.
- d. The design of the bore crossing shall include the following as a minimum:
 - 1) Casing and carrier pipe materials and dimensions, including outside bell diameters of the carrier pipe.
 - 2) Details for any part of the system which must be changed as a result of the boring operation (*manhole, headwall, etc.*).
 - 3) Bore and receiving pit backfill material and compaction requirements.

CITY OF DAYTON
Public Works Design Standards

Standard Detail Drawings & Sample Test Report Forms

Appendix A

Note:

1) Per PWDS 1.10.b.9, the applicable City standard details shall be included on construction drawings submitted for City review and approval. See also PWDS 1.3.a.3 for detail sheet stamping requirements where engineered drawings are required.

2) Per PWDS 1.2.b, the City standard details are intended to assist but not to substitute for competent work by design professionals where applicable. As noted in the PWDS, the City standard details illustrate the minimum requirements and materials required by the Public Works Department for the construction of certain standard system components, and are thus not considered to be final documents until incorporated into a design approved by the City,

STORM SEWER MANDREL TEST REPORT

Project Location: (City)	Project Name:
Inspector: (Print)	Date: (Separate Report Required for Each Test Session)
Mandrel Diameters Verified? Yes / No	

Station (& Manhole #)		Size & Material	Length (ft)	Results	Backfill Compaction Completed?	Date Sewer Flushed & Cleaned	Comments
From	To						
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		

1. Mandrel testing shall conducted on a manhole to manhole (or cleanout) basis and shall be done after the line has been completely flushed out with water.
2. Mandrel testing shall be conducted after trench backfill and compaction has been completed.
3. The mandrel diameter shall be 95% of the pipe initial inside diameter. The inspector shall verify the diameter of each mandrel used during each test session.

STORM PIPELINE TV INSPECTION REPORT

Page ____ of ____

Date:	Client: City:				Basin No.	
Technician:	Inspector:	Weather:	Cleaned By:		Report No.	Tape No.
From M.H. #: Street:	Pipe Dia. (in)	Joint Length (ft)	Section Length (ft)	Joint Type:	Pipe Material	To M.H. #: Street:

PIPELINE DATA; Cleanliness: _____ Alignment: _____ Grade: _____ Age: _____ %Est. Leaking Joints: _____ Other: _____ _____				
	Footage	Problem Code	Comments	I/I (gpm)
PROBLEM CODE LEGEND: BP = Broken Pipe CC = Circumferential Crack LC = Longitudinal Crack G = Break in Grade L = Leak PJ = Pulled Joint PT = Protruding Tap ST = Service Tap SL = Service Left SR = Service Right RT = Roots U = Unpassable				
PIPE MATERIAL LEGEND: AC = Asbestos Cement CIP = Cast Iron Pipe C(M) = Conc., Mortar Joint C(R) = Conc., Rubr. Gasket Jnt DI = Ductile Iron Pipe PVC = Polyvinylchloride Pipe TC = Terra Cotta VC = Vitrified Clay				
TURNAROUND: Requested (Date/time): _____ Authorized (Date/time): _____				

MANHOLE VACUUM TEST REPORT

Project Location: (City)				Project Name:			
Inspector: (Print)				Date: (Separate Report Required for Each Test Session)			
Testing Company: (Name & Phone #)							

Manhole No.	Manhole Diameter (inch)	Manhole Depth (ft)	Surface Restoration Complete?	Time Required ³ (sec)	Time to Drop from 10" Hg to 9" Hg (sec)	Results	Comments
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	

1. All adjacent surface restoration shall be completed prior to conducting manhole acceptance tests, including finish paving and final adjustments to grade. Any test conducted prior to completion of surface restoration shall be considered informal, and will not count for acceptance.
2. The vacuum test head seal shall be inflated in accordance with the manufacturer's recommendations, but in all cases the grade rings and casting shall be included in the test. A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches.
3. The manhole shall pass if the time for the vacuum reading to drop to 9-inches meets or exceeds the values indicated on the following table. Times for deeper depths as required by the City Engineer. Note: Visible groundwater infiltration or leakage constitutes a failed test.

REQUIRED MANHOLE VACUUM TEST TIMES			
Manhole Depth (feet)	Required Time (sec)		
	48-inch diameter	60-inch diameter	72-inch diameter
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
18	40	52	65
20	45	59	73
22	50	65	81

SANITARY SEWER AIR TEST REPORT

Project Location:					Project Name:					
Inspector: (Print)					Date: (Separate Report Required for Each Test Session)					
TV Inspection Required? Yes / No					Mandrel Testing Completed?					
Verify that all sewer laterals and associated cleanouts installed and cleanout risers are visible at or above finish grade? Yes / No					Verify that all franchise utilities which cross sewer laterals have been installed and trenches backfilled? Yes / No					
Station (& Manhole #)		Main/ Lateral	Size & Material	Total Length (ft)	C ¹	K ¹	Test Time (Seconds) for Pressure Drop Shown (psi)			Comments
From	To						Required ²	4.0 - 3.5	3.5 - 2.5	
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								

¹ For C and K values, see table and formulas on reverse side.

² For total C \leq 1.0, test time (seconds) required = 2 times K
 For total C > 1.0, test time (seconds) required = 2 times (K/C)

TEST PROCEDURE

1. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig (or higher pressure as required to address groundwater). *Increase the test pressure by 0.433 psi for each foot of average ground water depth over the exterior crown of the pipe under test, with the maximum test pressure not to exceed 9.0 psi.*
2. Add air slowly until the internal air pressure is raised to 4.0 psig (or higher pressure as required due to groundwater).
3. After required test pressure is reached, allow 2-minutes minimum for air temperature to stabilize, adding only the amount of air required to maintain pressure.
4. After the temperature stabilization period, disconnect the air supply.
5. Record the time required for the internal air pressure to drop from 3.5 psi (or higher as required due to groundwater backpressure) to 2.5 psi (or higher as required due to groundwater backpressure). If this time exceeds the required time (or if there is less than 1.0 psi pressure drop), the test is successful.

ACCEPTANCE: The tested sewer section shall be considered acceptable if the pressure drop during the test time is less than 1.0 psi from the starting pressure.

SEWER AIR TEST C AND K VALUES

Pipe Size (inch)	C-Value ¹ per foot length	K-Value ² per foot length
4	0.00155	0.176
6	0.00233	0.396
8	0.00311	0.704
10	0.00388	1.100
12	0.00466	1.584
15	0.00582	2.475
18	0.00699	3.564
21	0.00815	4.851

$$^1 C = 0.0003882dL$$

Where d = diameter (inches)

$$^2 K = 0.011d^2L$$

L = Length (ft)

Example:

Air Test a system consisting of two mainline segments as follows:

Segment 1: 395 feet of 8-inch mainline, 100 feet of 4-inch laterals, and 35 feet of 6 inch laterals.

Segment 2: 200 feet of 8-inch mainline, 30 feet of 4-inch laterals, and 20 feet of 6 inch laterals.

Station (& Manhole #)		Main/ Lateral	Size & Material	Total Length (ft)	C ¹	K ¹	Test Time (Seconds) for Pressure Drop Shown (psi)			Comments
From	To						Required ²	4.0 - 3.5	3.5 - 2.5	
0+00 MH A1	3+95 MH A2	Main	8" PVC	395	1.227	278.1	310/1.46= 212			Pass / Fail
		Laterals	4" PVC 6" PVC	100 35	0.155 0.082	17.6 13.86	212*2= 414 sec			
		Totals			1.464	309.54				
3+95 MH A2	5+95 MH A3	Main	8" PVC	200	0.621	140.8	2*154= 308 sec			Pass / Fail
		Laterals	4" PVC 6" PVC	20 30	0.047 0.047	5.28 7.92				
		Totals			0.714	154.0				

Note: For total C \leq 1.0, test time (seconds) required = 2 times K

For total C > 1.0, test time (seconds) required = 2 times (K/C)

The tested sewer section shall be considered acceptable when tested as described herein if the section under test does not loose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface.

SANITARY SEWER MANDREL TEST REPORT

Project Location: (City)	Project Name:
Inspector: (Print)	Date: (Separate Report Required for Each Test Session)
Mandrel Diameters Verified? Yes / No	

Station (& Manhole #)		Size & Material	Length (ft)	Results	Backfill Compaction Completed?	Date Sewer Flushed & Cleaned	Comments
From	To						
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		

1. Mandrel testing shall conducted on a manhole to manhole (or cleanout) basis and shall be done after the line has been completely flushed out with water.
2. Mandrel testing shall be conducted after trench backfill and compaction has been completed.
3. The mandrel diameter shall be 95% of the pipe initial inside diameter. The inspector shall verify the diameter of each mandrel used during each test session.

Page ____ of ____

[illegible]

WATERLINE PRESSURE TEST REPORT

Project Location:	Project Name:	Date:
Inspector: (Print)	Waterline to be tested. From Station:	To Station:
Verify that all in-line valves, including hydrant mainline valves, are open? Yes / No		
Verify that all corp stops are open? Yes / No		
Verify that pressure gauge is mounted at high point of line to be tested? Yes / No If no, correct for elevation difference (<i>ie. add 0.433 psi per foot elevation difference</i>).		
System Static Pressure (psi):	Starting Pressure (psi): (greater of 150 psi or 1.5 times static)	Ending Pressure (psi):
Pipe Lengths & ϕ 's:	Starting Time:	Ending Time (2 hours minimum):
Volume Required to Reach Initial Test Pressure (gal):	Allowable Leakage (gal): (2 times table or calculated value below)	Measured Leakage (gal):
TEST RESULTS: Pass / Fail		

ALLOWABLE LEAKAGE PER 1,000 FEET OF PIPELINE - gph (NOTE: double the values from table below for a 2 hour test)

Test Pressure <i>psi</i>	NOMINAL PIPE DIAMETER - in.									
	3	4	6	8	10	12	14	16	18	20
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84

If the pipeline under test contains various diameters, the allowable leakage shall be the sum of the allowable leakage for each size.
No additional leakage allowance will be given for fire hydrant assemblies or valves.

Sample: 700' 8" and 55' 6" pipe. $\rightarrow \rightarrow 0.74 \text{ gph} / 1,000' \times 700' + (0.55 \text{ gph} / 1,000' \times 55') = 0.548 \text{ gph} \times 2 \text{ hours} = \sim 1.1 \text{ gallon allowable leakage loss.}$

Allowable leakage based on: $L = SD(P)^{1/2} / 133,200$

Where:

L = allowable leakage, in gallons per hour

D = nominal diameter of the pipe, in inches

S = length of pipe tested, in feet

P = test pressure during the leakage test, in psig

Regardless of leakage, maximum pressure drop during test period shall not exceed 5 psi over the 2 hour test period.

Any visible leaks shall be repaired regardless of the whether or not the pipeline meets leakage allowance.

TEST PROCEDURE

1. Apply hydrostatic pressure by pumping water from an auxiliary supply basin. Accurately determine the amount of water required to reach the initial test pressure by refilling the supply basin with a calibrated container following pressurization of pipeline.
2. Monitor test pressure for 2 hour period.
3. At the completion of the test period, re-pressurize the pipeline by pumping water from the auxiliary supply basin (*mark the water surface level in the auxiliary supply basin prior to re-pressurization*).
4. **Accurately determine the amount of water required to reach the test pressure by refilling the supply basin to the marked line with a calibrated container following re-pressurization of pipeline.** If the measured leakage is less than the allowable leakage, the test is successful.

Reference: For summary of disinfection & bacteriological testing procedures, see construction notes under Appendix B.

DOMES SHALL BE WET-SET REPLACEABLE PANELS

(ADA SOLUTIONS (CAST-IN-PLACE, BRICK RED) OR EQUAL)

INSTALL TRUNCATED DOME DETECTABLE WARNING SURFACE AS SHOWN & SPECIFIED, **FULL WIDTH OF RAMP THROAT**.

SPACING: D=1.6" MIN. TO 2.40" MAX
0.65" MIN CLEAR BETWEEN DOME BASES

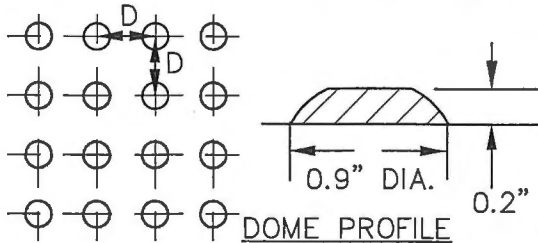
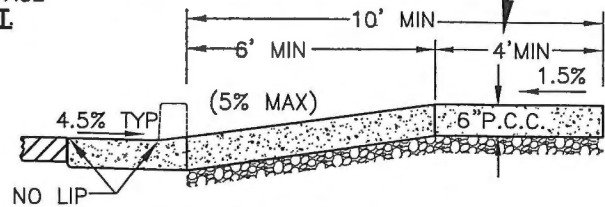


FIGURE A: TRUNCATED DOME DETAIL

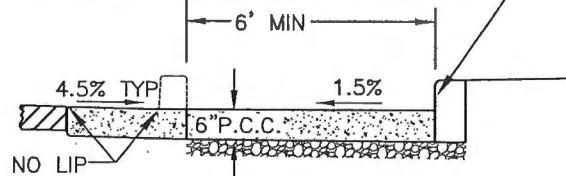
5' WIDE TURNING SPACE REQUIRED WHERE LANDSCAPE CURB PROVIDED.



SECTION A

TOOLED CONTRACTION JOINTS TYPICAL AT 5' INTERVALS (BROOM FINISH, NO SLICKS)

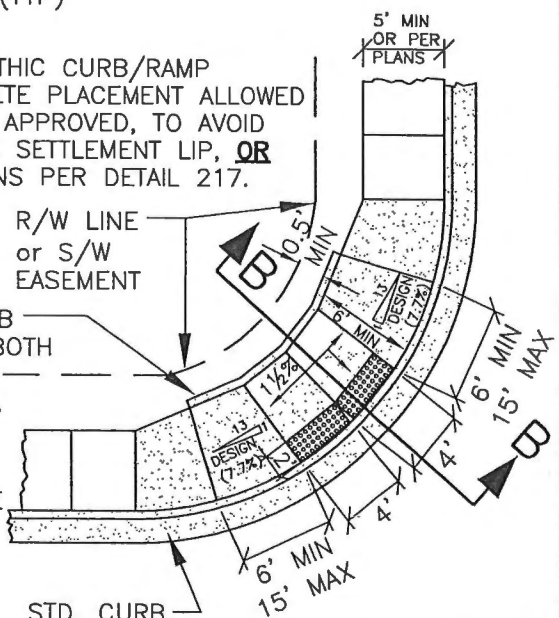
6" LANDSCAPE CURB EXPOSURE WHERE REQUIRED, SEE NOTE 9



SECTION B

10% MAX SLOPE ON WINGS (TYP)

MONOLITHIC CURB/RAMP CONCRETE PLACEMENT ALLOWED WHERE APPROVED, TO AVOID FUTURE SETTLEMENT LIP, OR USE PINS PER DETAIL 217.



GUTTER SLOPE AROUND RADIUS 2% MAX
(SEE SECTION B)

EXTEND LIMITS OF LANDING SIDEWALK AS REQUIRED TO COMPLY WITH LONGITUDINAL SLOPE LIMITS SHOWN.

R/W LINE or S/W EASEMENT

STD. CURB & GUTTER

GUTTER SLOPE 2% MAX AT CURB RAMP
(SEE SECTION A)

6" WIDE LANDSCAPE CURB TO END OF TRANSITION BOTH WAYS WHERE REQUIRED, SEE NOTE 9, ALL RAMPS.

GENERAL NOTES:

1. SEE NOTE & DETAIL (TOP LEFT) FOR REQUIRED REPLACEABLE DOME STYLE & COLOR (PANEL OR RADIUS STYLE ALLOWED).
2. SEE TYPICAL STREET SECTIONS FOR SIDEWALK WIDTH.
3. ALL RAMPS AND TRANSITIONS SHALL BE ADA & PROWAG COMPLIANT.
4. LANDINGS & TURNING AREAS SHALL HAVE A MIN. WIDTH & DEPTH OF 4 FEET.
5. CROSS SLOPES SHOWN ARE MEASURED FROM HORIZONTAL.
6. **SHADED SIDEWALK & RAMP AREAS TO BE CONSTRUCTED W/STREET IMPROVEMENTS, AND SHALL BE 6" THICK CONCRETE.**
7. DROP CURBS FOR HANDICAP RAMPS SHALL BE CONSTRUCTED WITH NO LIP AT THE GUTTER LINE OR EDGE OF PAVEMENT.
8. **TYPICALLY PROVIDE CATCH BASIN UPHILL OF PEDESTRIAN RAMP.**
9. PROVIDE 6-INCH WIDE CONCRETE LANDSCAPE CURB AT BACK OF RAMP IF REQUIRED TO RETAIN LANDSCAPING, OR TO CONTAIN GUTTER DRAINAGE (IE. FOR DOWNHILL SLOPES BEHIND RAMP).
10. PROVIDE 4" MIN. COMPACTED BASEROCK UNDER ALL S/W.
11. **WHERE GRADE LIMITS SHOWN CANNOT BE SATISFIED (IE. FOR APPROACH, LANDING OR WINGS), CONSTRUCT RAMP SHOWN ON DETAIL 214B & TRANSITION TO CURBLINE SIDEWALK.**
12. DESIGN RUNNING SLOPE OF SIDEWALK APPROACH TO LANDINGS SHALL TYPICALLY NOT EXCEED 1V:13H (7.7%), BUT SHALL NOT REQUIRE THE LENGTH TO EXCEED 15 FEET.

ALL CONCRETE SHALL BE 3300 PSI @ 28 DAYS, MAX 5" SLUMP, 4.5% AIR (±1.5%).

LAST REVISION DATE:

DEC 2022

NEW

**INTERSECTION CURB RAMPS
CURB LINE SIDEWALKS
LOCAL STREETS (ALT LAYOUT)**
(NTS)

DAYTON, OR

DETAIL NO.

214A1

DOMES SHALL BE WET-SET REPLACEABLE PANELS

(ADA SOLUTIONS (CAST-IN-PLACE, BRICK RED) OR EQUAL)

INSTALL TRUNCATED DOME DETECTABLE WARNING SURFACE
AS SHOWN & SPECIFIED, **FULL WIDTH OF RAMP THROAT.**

SPACING: D=1.6" MIN. TO 2.40" MAX
0.65" MIN CLEAR BETWEEN DOME BASES

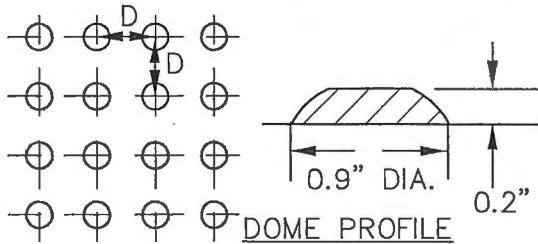
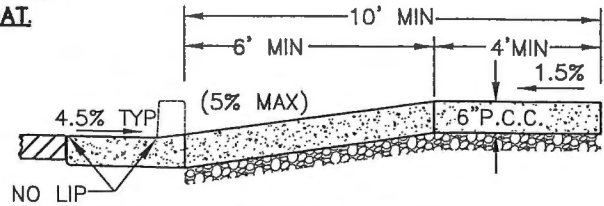


FIGURE A: TRUNCATED DOME DETAIL

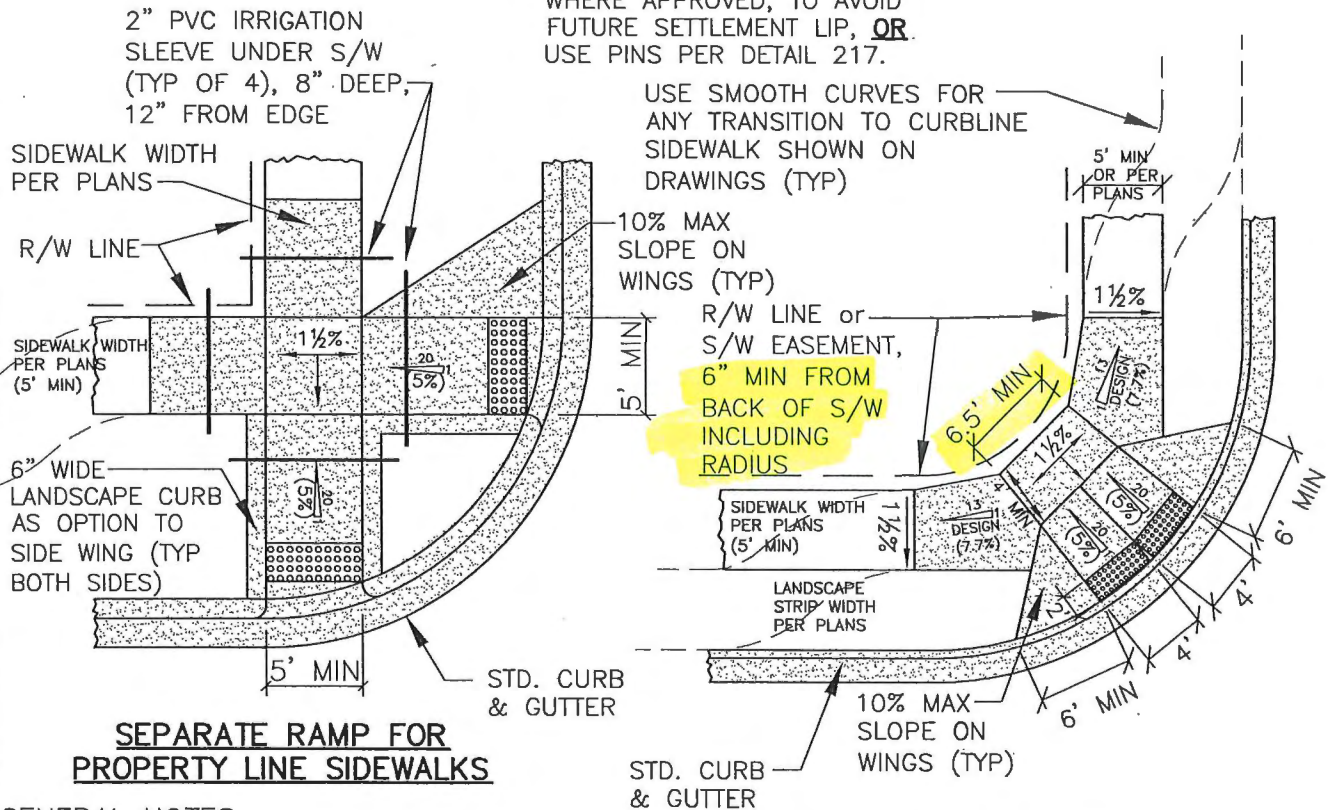


SECTION

TOOLED CONTRACTION JOINTS TYPICAL AT
5' INTERVALS (**BROOM FINISH. NO SLICKS**)

MONOLITHIC CURB/RAMP
CONCRETE PLACEMENT ALLOWED
WHERE APPROVED, TO AVOID
FUTURE SETTLEMENT LIP, OR
USE PINS PER DETAIL 217.

USE SMOOTH CURVES FOR
ANY TRANSITION TO CURBLINE
SIDEWALK SHOWN ON
DRAWINGS (TYP)



SEPARATE RAMP FOR PROPERTY LINE SIDEWALKS

GENERAL NOTES:

1. SEE NOTE & DETAIL (TOP LEFT) FOR REQUIRED REPLACEABLE DOME STYLE & COLOR (PANEL OR RADIUS STYLE ALLOWED).
2. SEE TYPICAL STREET SECTIONS FOR SIDEWALK WIDTH.
3. ALL RAMPS AND TRANSITIONS SHALL BE ADA & PROWAG COMPLIANT.
4. LANDINGS & TURNING AREAS SHALL HAVE A MIN. WIDTH & DEPTH OF 4 FEET.
5. CROSS SLOPES SHOWN ARE MEASURED FROM HORIZONTAL.
6. **SHADED SIDEWALK & RAMP AREAS TO BE CONSTRUCTED W/STREET IMPROVEMENTS, AND SHALL BE 6" THICK CONCRETE.**
7. DROP CURBS FOR HANDICAP RAMPS SHALL BE CONSTRUCTED WITH NO LIP AT THE GUTTER LINE OR EDGE OF PAVEMENT.
8. TYPICALLY PROVIDE CATCH BASIN UPHILL OF PEDESTRIAN RAMP.
9. PROVIDE 4-INCH MIN RADIUS ON ALL RETURNED CURBS.
10. PROVIDE 4" MIN. COMPACTED BASEROCK UNDER ALL S/W.
11. DESIGN RUNNING SLOPE OF SIDEWALK APPROACH TO LANDINGS SHALL TYPICALLY NOT EXCEED 1V:13H (7.7%), BUT SHALL NOT REQUIRE THE LENGTH TO EXCEED 15 FEET.

DOUBLE RAMPS FOR PROPERTY LINE OR CURBLINE SIDEWALKS (SEE SECTION A)

ALL CONCRETE SHALL BE 3300 PSI @ 28
DAYS, MAX 5" SLUMP, 4.5% AIR (±1.5%).

LAST REVISION DATE:

JAN 2023

INTERSECTION CURB RAMPS PROPERTY LINE SIDEWALKS LOCAL STREETS

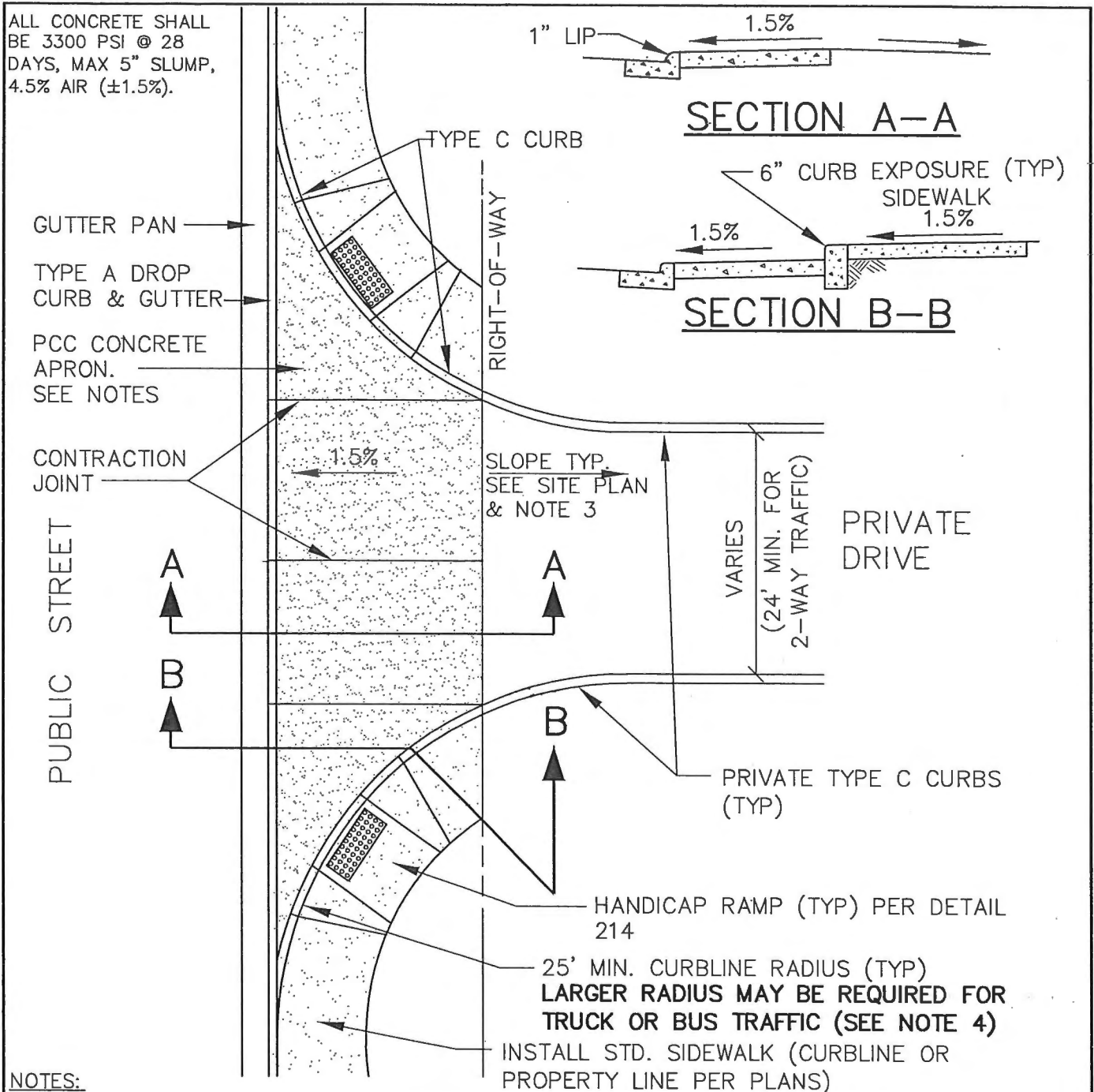
(NTS)

DAYTON, OR

DETAIL NO.

214B

ALL CONCRETE SHALL
BE 3300 PSI @ 28
DAYS, MAX 5" SLUMP,
4.5% AIR ($\pm 1.5\%$).



NOTES:

1. WHERE APPROVED BY THE CITY ENGINEER & PUBLIC WORKS DIRECTOR, "DUSTPAN" STYLE COMMERCIAL DRIVEWAYS PER DETAILS 212 OR 213 MAY BE USED (BASED ON CONCRETE THICKNESS/REINFORCING AS NOTED HEREIN).
2. CONCRETE APRON BE 8" MIN. THICK 3300 PCC WITH #3 REBAR @ 12" O.C. EACH WAY, OR 6"x6" 10 GA. WELDED WIRE MESH, SET ON 3" DOBIES (IE. 3" CLEAR TO BASEROCK).
3. MIN. 4" OF 3/4"-0" COMPACTED GRANULAR BASEROCK (TYPICAL UNDER ALL SIDEWALKS AND CONCRETE DRIVEWAY APPROACHES).
4. PRIVATE CATCH BASINS ARE REQUIRED BEHIND DRIVEWAY APRON IF THE DRIVEWAY OR THE PARKING LOT BEYOND DRIVEWAY APRON SLOPES & DRAINS TOWARD THE STREET (OR ACROSS A PEDESTRIAN PATH).
5. TURNING RADIUS OF ANTICIPATED LARGEST VEHICLE TO BE VERIFIED DURING DESIGN.
6. MONOLITHIC CURB & DRIVEWAY APRON PLACEMENT IS NOT PERMITTED (IE. CURB CONCRETE & DRIVEWAY APRON CONCRETE SHALL BE PLACED SEPARATELY).

LAST REVISION DATE:
DEC 2022

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WESTECH ENGINEERING, INC.

**COMMERCIAL/INDUSTRIAL
DRIVEWAY APPROACH,
HIGH-VOLUME/TRUCK OPTION**
(NTS)

DAYTON, OR

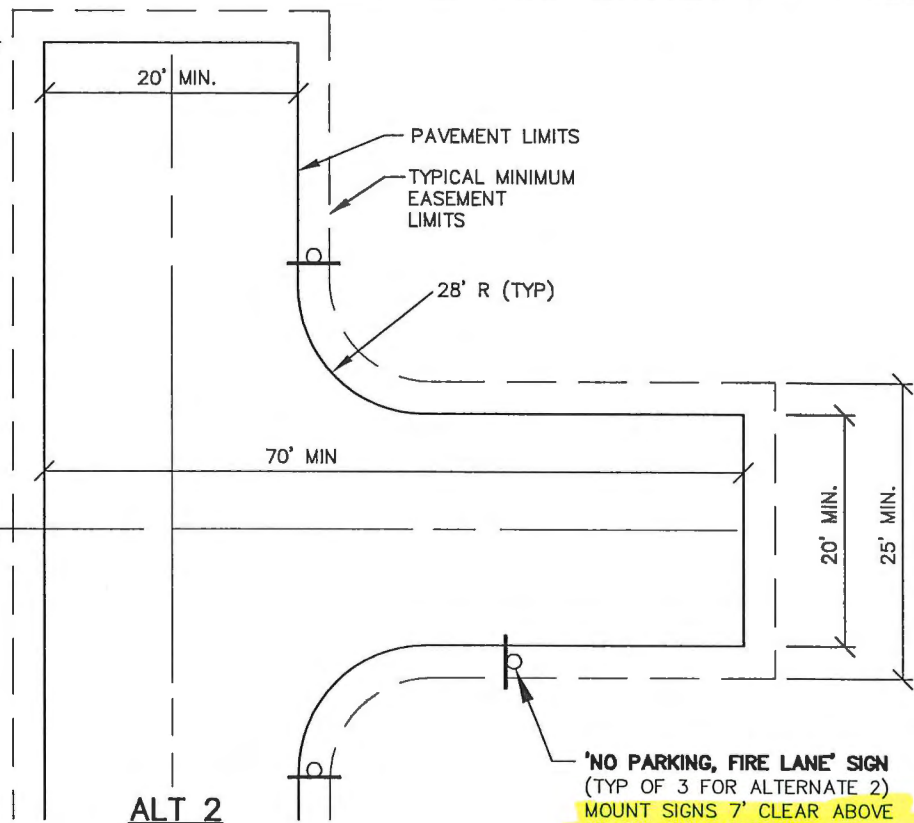
DETAIL NO.
216

FIRE CODE NOTES:

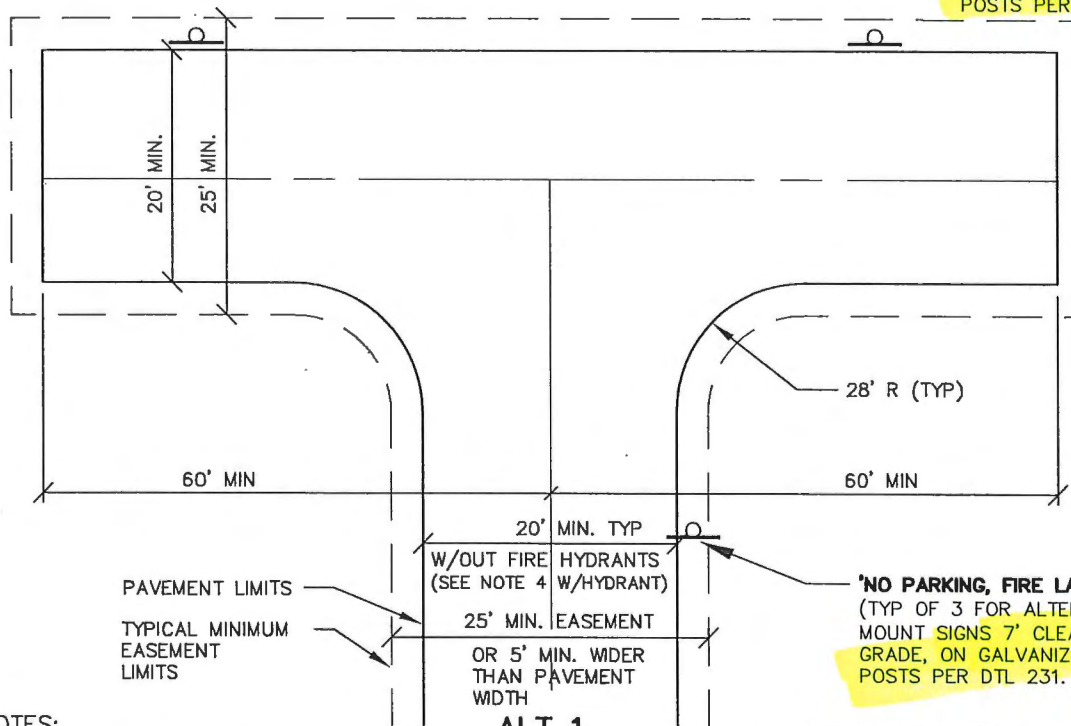
- A) FIRE LANES, TURNAROUNDS & ASSOCIATED IMPROVEMENTS SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE OREGON FIRE CODE (OFC).
- B) GRADES ALONG FIRE LANES OR ALONG TURNAROUND AREAS SHALL NOT EXCEED 10% WITHOUT PRIOR WRITTEN APPROVAL FROM THE FIRE CODE OFFICIAL (OFC D103.2).
- C) NARROWER FIRE LANE WIDTHS BEYOND TURNAROUND MUST BE APPROVED IN WRITING AS AN EXCEPTION BY THE FIRE CODE OFFICIAL (OFC 503.2.2)

BASEROCK & PAVEMENT:

- A) MIN FIRE LANE & TURNAROUND BASEROCK & PAVEMENT THICKNESSES ARE SPECIFIED UNDER PWDS 2.31.c (3" AC/9" BASEROCK OR 8" PCC/2" BASEROCK, EITHER OVER COMPACTED SUBGRADE).
- B) OTHER DURABLE HARD SURFACES SHALL PROVIDE EQUIVALENT BEARING STRENGTH (SEE PWDS 2.30.f). PLAIN GRAVEL SURFACES DO NOT MEET CITY STANDARDS.



ALT 2

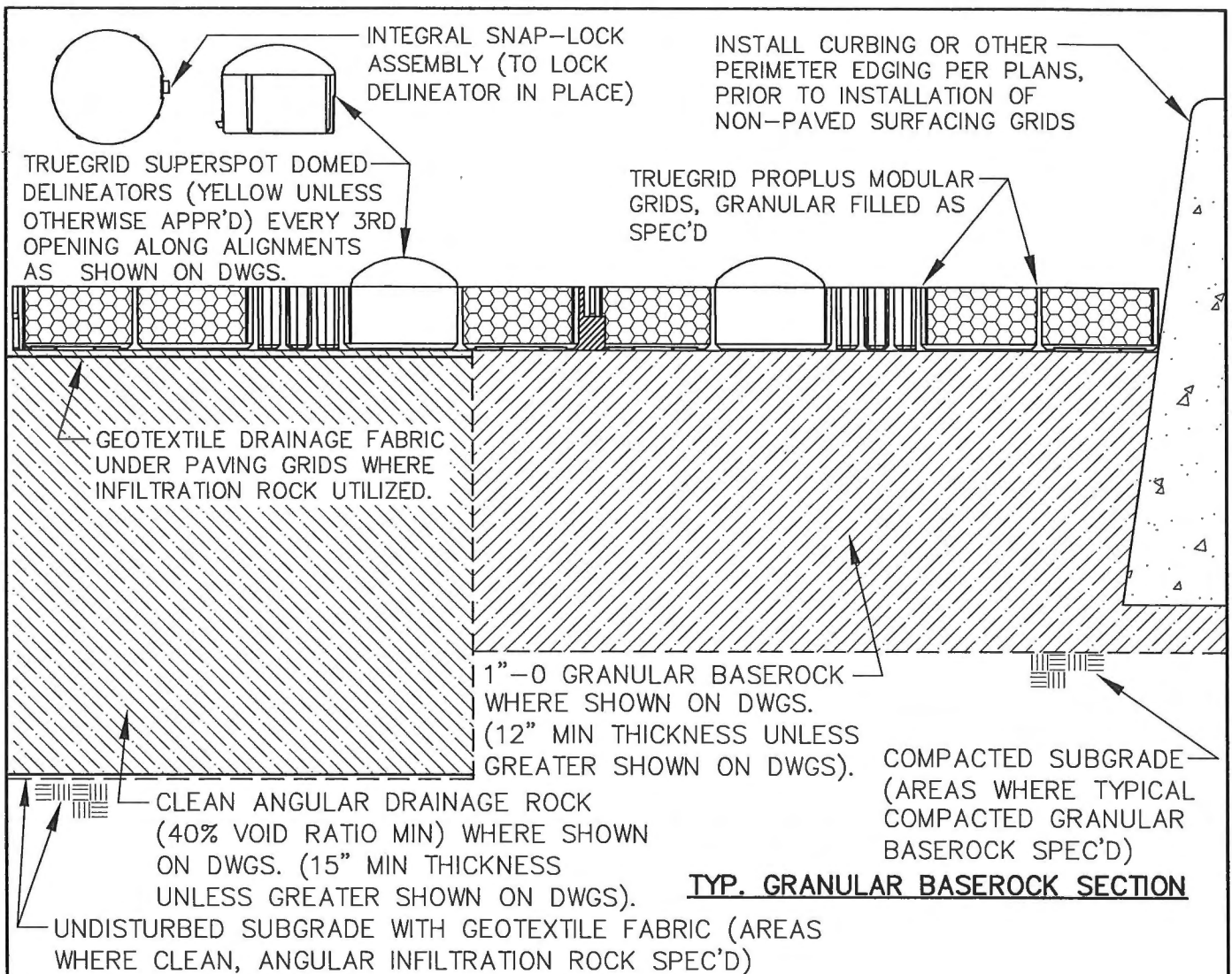


ALT 1

NOTES:

1. 'NO PARKING/FIRE LANE' ALUM SIGNS REQUIRED AT TURN-AROUND AS SHOWN, & AT 50 FOOT MAXIMUM INTERVALS ALONG LENGTH OF FIRE LANE (SIGN SIZE/WORDING PER OFC D103.6, SIGNS TO BE SET ON ALTERNATING SIDES OF STEM FOR FIRE LANE WIDTHS ≤26 FEET).
2. THESE ARE TYPICAL MINIMUM DESIGNS AS REQUIRED BY THE 2019 OFC D103.4 & FIGURE D103.1. ALTERNATE DESIGNS SHALL MEET THE APPROVAL OF THE LOCAL FIRE CODE OFFICIAL.
3. FIRE LANES & TURNAROUNDS MUST BE PAVED OR HARD SURFACED AS NOTED ABOVE. PAVEMENT DIMENSIONS SHOWN REFERS TO TOTAL DRIVABLE WIDTH BETWEEN CURBS (IF CURBS ARE PRESENT).
4. 26' MIN. PAVEMENT WIDTH REQ'D AT FIRE HYDRANTS (OFC D103.1), FOR 20 FEET MINIMUM EACH WAY FROM HYDRANT.

LAST REVISION DATE: DEC 2022	COPYRIGHT 1996 WESTECH ENGINEERING, INC.
FIRE CODE/FIRE LANE HAMMERHEAD TURNAROUND (PRIVATE DRIVES ONLY) (NTS)	
DAYTON, OR	DETAIL NO. 220



TYP. DRAINAGE ROCK SECTION

NOTES:

1. UNLESS OTHERWISE SHOWN ON APPROVED DRAWINGS, BASEROCK UNDER PAVING GRIDS SHALL BE 1"-0 GRANULAR BASEROCK (OR 3/4"-0), COMPACTED TO 95% OPTIMUM PER AASHTO T-180. TYPICAL MODULAR GRID FILL SHALL BE 3/4"-0 GRANULAR BASEROCK.
2. WHERE INFILTRATION CONFIGURATION IS SHOWN ON APPROVED DRAWINGS, DRAINAGE STONE UNDER PAVING GRIDS SHALL BE CLEAN, CRUSHED, ANGULAR QUARRY STONE WITH 3/4"-2" GRADATION SIZE. MODULAR GRID FILL SHALL BE 1/2" CLEAN ANGULAR STONE.
3. A PERFORATED PIPE TIED TO A PIPED OVERFLOW SHALL BE PROVIDED FOR ANY INFILTRATION SYSTEM WHICH COULD OTHERWISE OVERFLOW ONTO ADJACENT PRIVATE PROPERTY OR ACROSS SIDEWALKS (PIPE NOT SHOWN IN THIS DETAIL).
4. WHEEL STOPS FOR INFILTRATION CONFIGURATION (WHERE PROVIDED) SHALL BE PINNED IN PLACE WITH #4 REBAR, LENGTH AS REQUIRED TO EXTEND 24" MINIMUM INTO THE SUBGRADE BELOW THE DRAINAGE ROCK.
6. **CURBS & OTHER ADJACENT HARD SURFACES SHALL BE INSTALLED BEFORE INSTALLATION OF MODULAR SURFACING GRIDS. THE CONTRACTOR SHALL VERIFY THAT THE PROPOSED GRID GRADE ELEVATIONS MATCH OTHER SURFACES, BASED ON THE SLOPES SHOWN ON THE DRAWINGS AND ANY SPECIFIED CURB EXPOSURE. MODULAR GRIDS SHALL BE SET FLUSH W/ADJACENT HARD SURFACES OR SLIGHTLY RECESSED (1/4" MAX). ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER PRIOR TO PLACEMENT OR CONSTRUCTION.**

LAST REVISION DATE:

NOV 2022

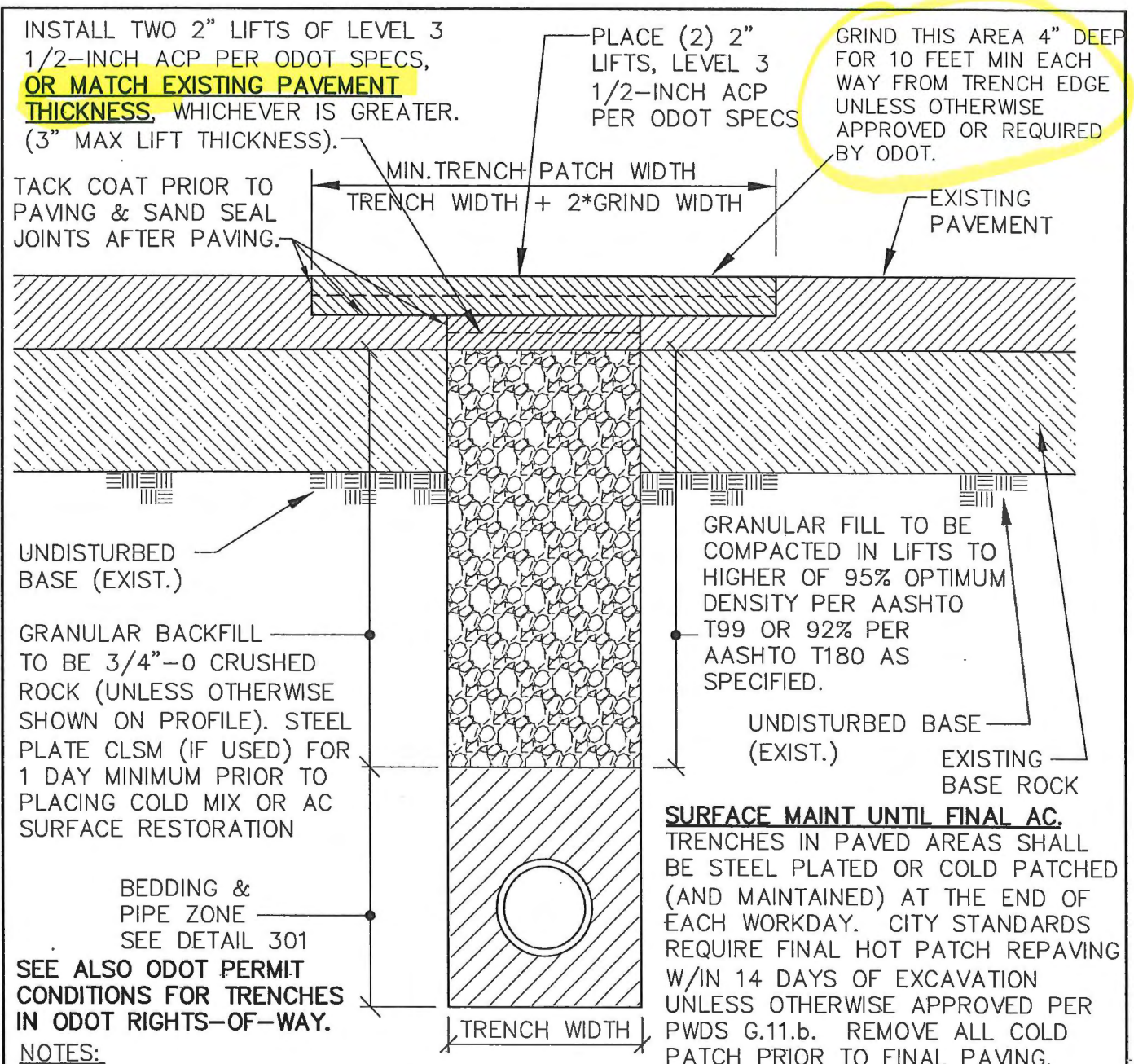
**TRUEGRID PROPLUS
INDUSTRIAL GRADE MODULAR
NON-PAVED SURFACE SYSTEM**

(NTS)

DETAIL NO.

DAYTON, OR

240



1. COMPACT ALL ACP LIFTS TO 91% OPTIMUM DENSITY PER RICE STANDARD METHOD.
2. ASPHALT EMULSION TACK COAT SHALL BE USED TO SEAL THE ACP TO THE EDGES OF THE EXISTING AC PAVEMENT. ALL AC PAVEMENT CUTS SHALL BE VERTICAL, CLEAN & ASPHALT SAND SEALED ALONG ALL EDGES AFTER INSTALLATION.
3. ALL PAVEMENT CUT AREAS SHALL BE COLD PATCHED OR PLATED AT THE END OF EACH WORK SHIFT, & THE PLATES OR PATCH MAINTAINED UNTIL FULL PAVEMENT RESTORATION IS MADE WITH ACP. COLD PATCH (IF USED) SHALL BE REPLACED WITH HOT MIX ACP WITHIN TIMEFRAME DIRECTED IN WRITING BY THE ODOT DISTRICT MANAGER OR MANAGER'S REPRESENTATIVE.
4. ACP SHALL BE A COMMERCIALY PRODUCED PLANT MIXTURE CONFORMING TO ODOT STANDARDS, OSSC 00744 (OLD "B" OR "C" DESIGNATION ON CITY DETAILS REFERS TO AGGREGATE SIZE ONLY).
5. 48" MINIMUM COVER IS REQUIRED FOR ALL GAS, ELECTRIC, TELEPHONE, FIBER OPTIC AND OTHER POTENTIALLY DANGEROUS/HIGH IMPACT UTILITY FACILITIES, ALL OTHER FACILITIES REQUIRE 36" MINIMUM COVER DEPTH.

LAST REVISION DATE:

NOV 2022

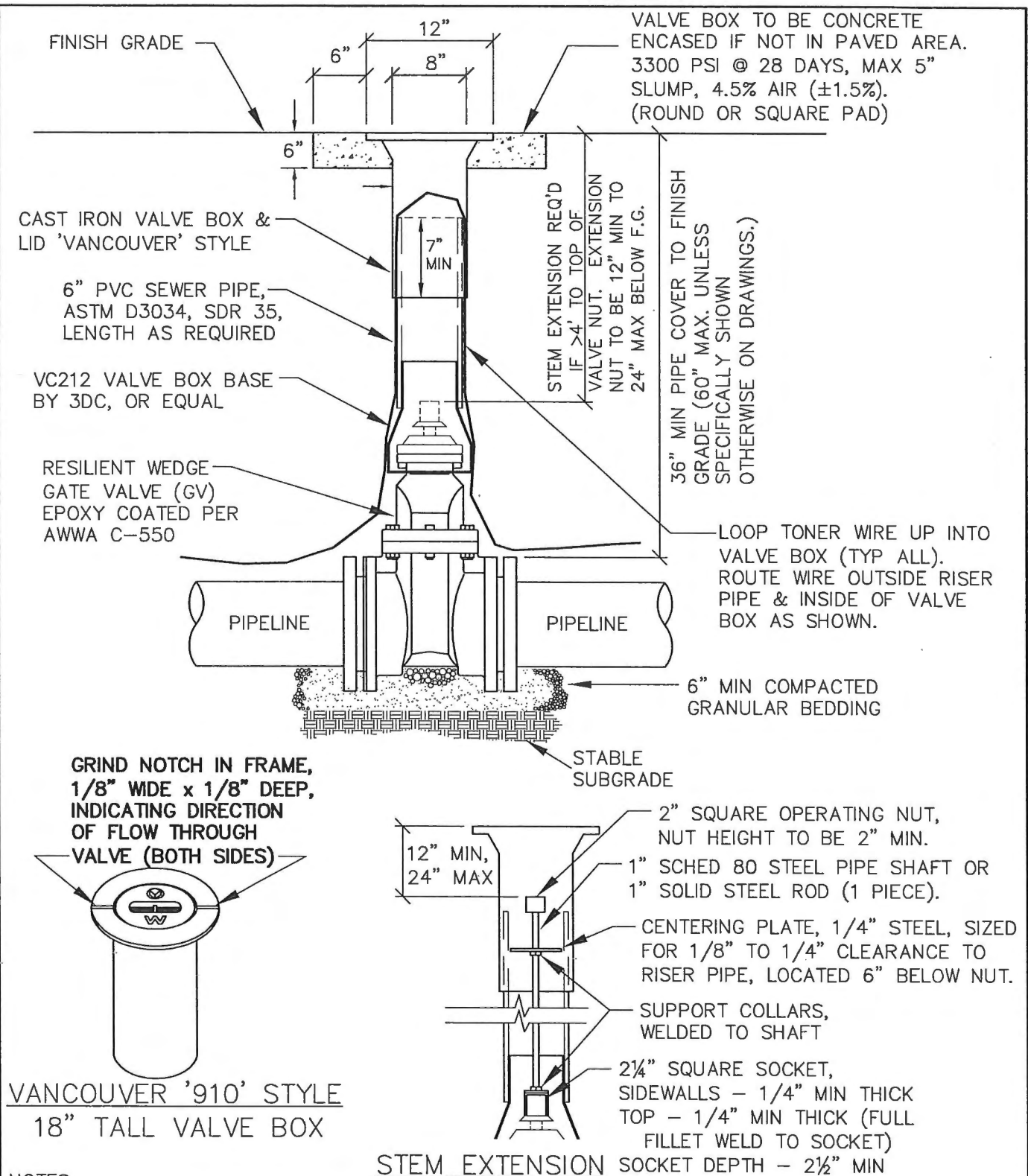
**ODOT TRENCH CROSSING,
TRENCH BACKFILL &
SURFACE RESTORATION**

(NTS)

DETAIL NO.

DAYTON, OR

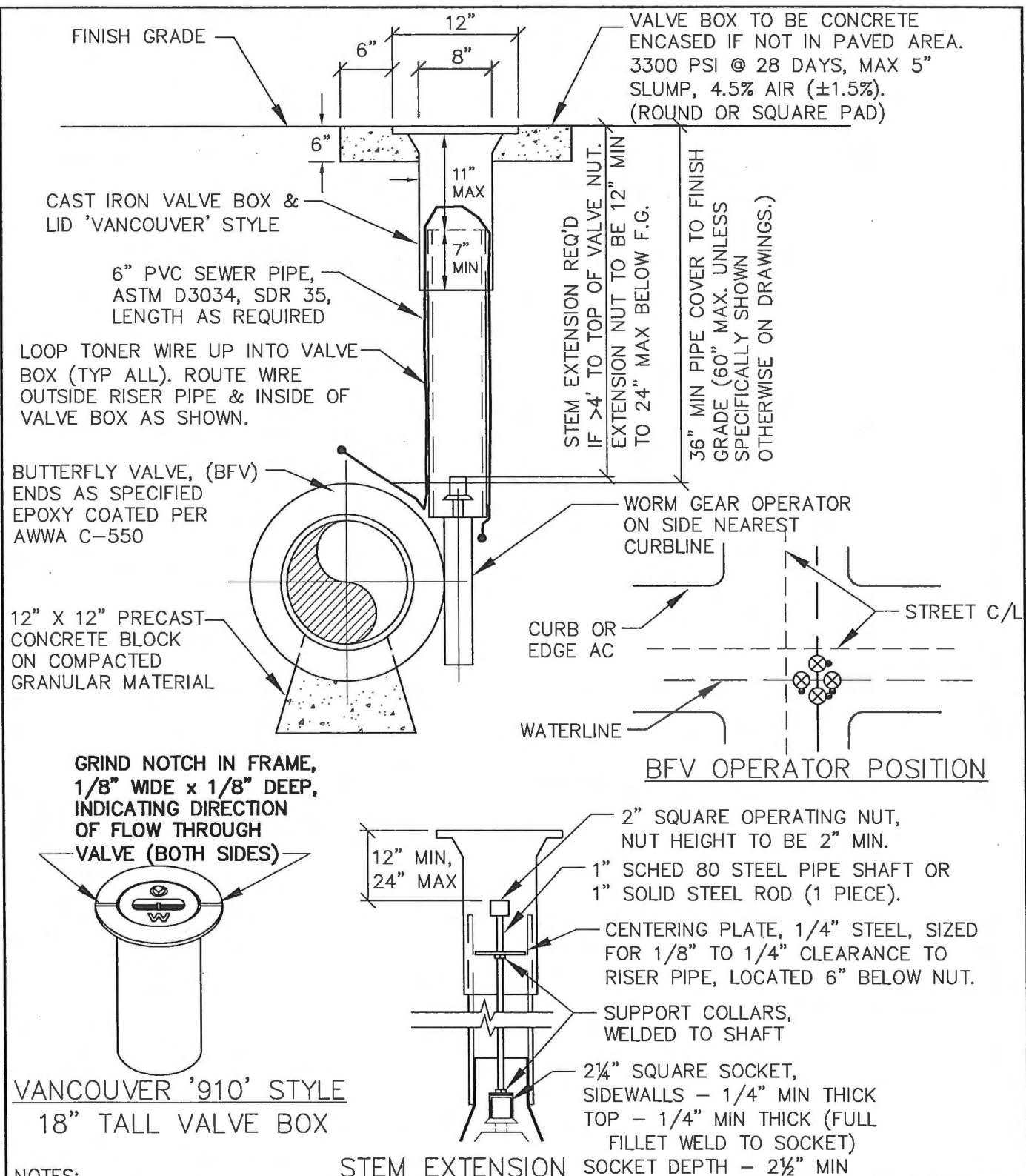
302D



NOTES:

1. GV SHALL CONFORM TO AWWA C-509.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT, INSTALLED ON VALVE BOX BASE AS SHOWN.
3. VALVE BOX TOP SHALL BE ADJUSTED TO FINISHED GRADE.
4. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.
5. VALVE BOX LIDS ON PRESSURE SEWERS TO READ "S" OR "SEWER".
6. COMPLETELY CLEAN OUT ALL VALVE BOX COVER PICKHOLES PRIOR TO REQUESTING FINAL INSPECTION.

LAST REVISION DATE: DEC 2022	JO # STANDARD
GATE VALVE AND VALVE BOX DETAIL	
(NTS)	
DAYTON, OR	DETAIL NO. 501

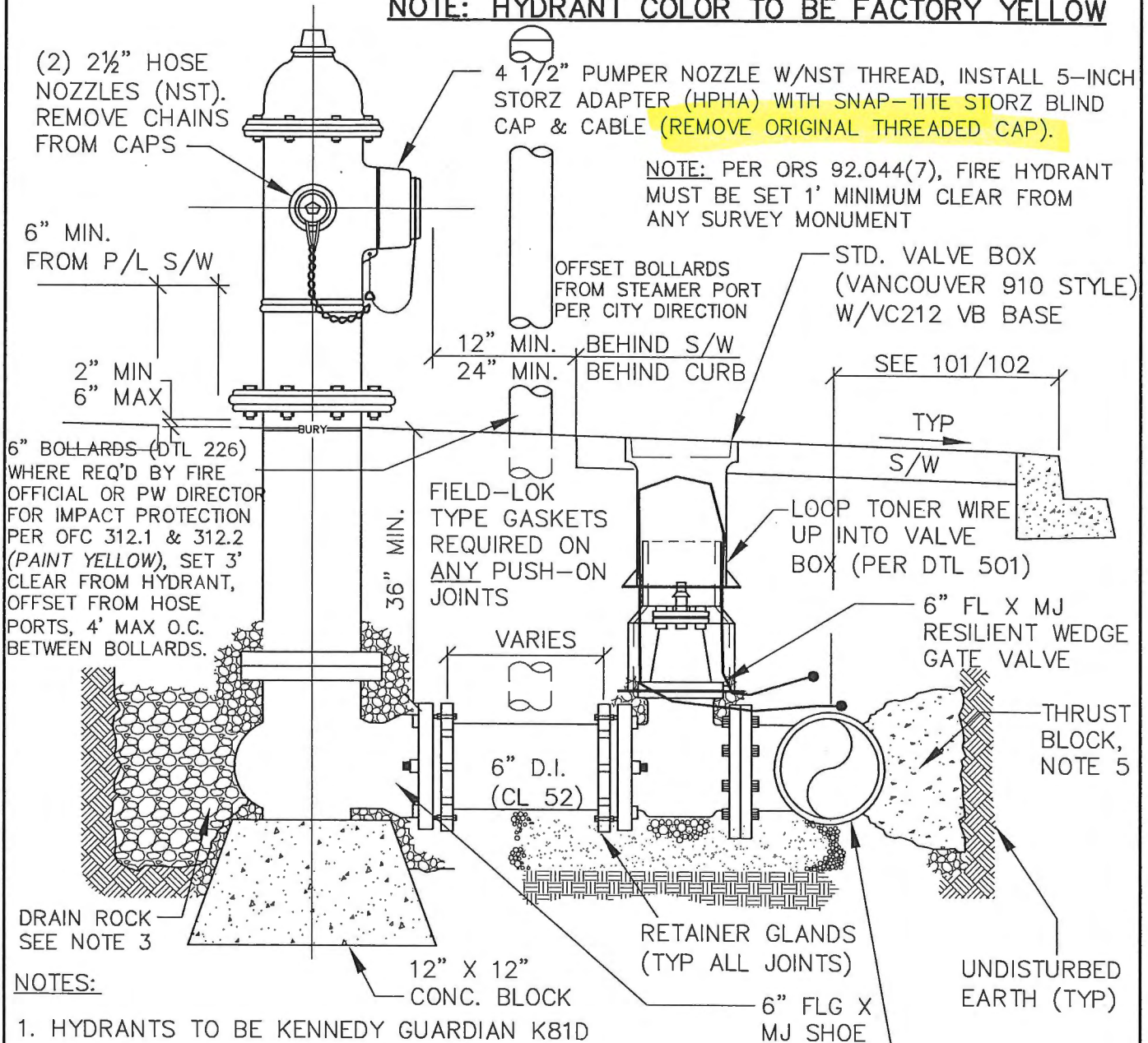


NOTES:

1. BFV SHALL BE SHORT BODY TYPE B PER AWWA C-504.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
3. VALVE BOX TOP SHALL BE ADJUSTED TO FINISHED GRADE.
4. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.
5. BFV ACTUATOR TO BE LOCATED ON THE CURBLINE SIDE OF WATERLINE AS SHOWN. INSTALL DI SPOOLS OR FLEX ADAPTER IF REQUIRED FOR ACTUATOR CLEARANCE.
6. COMPLETELY CLEAN OUT ALL VALVE BOX COVER PICKHOLES PRIOR TO REQUESTING FINAL INSPECTION.

LAST REVISION DATE: DEC 2022	JO # STANDARD
BUTTERFLY VALVE AND VALVE BOX DETAILS	
(NTS)	
DAYTON, OR	DETAIL NO. 502

NOTE: HYDRANT COLOR TO BE FACTORY YELLOW



NOTES:

- HYDRANTS TO BE KENNEDY GUARDIAN K81D WITH FULL SIZE (5¼") FOOT VALVE.
- ALL FITTINGS IN CONTACT WITH CONCRETE SHALL BE WRAPPED IN PLASTIC.** HYDRANT DRAIN HOLES TO REMAIN OPEN TO DRAIN ROCK AND OPERATIONAL.
- 1-1/2" TO 3/4" CLEAN DRAIN ROCK SHALL BE PLACED TO A MIN. OF 6" ABOVE DRAIN OUTLET.
- WHERE PLANTER STRIP EXISTS, HYDRANT SHALL BE PLACED SO FRONT PORT IS A MIN. OF 24" BEHIND FACE OF CURB.
- THRUST BLOCK AT STANDARD 6" FIRE HYDRANT TEE SHALL HAVE MIN. 3.7 SQ. FT. BEARING AREA.
- ALL HYDRANTS SHALL BE SET PLUMB.
- FOR HYDRANT LEADS LONGER THAN 30', AN ADDITIONAL GATE VALVE SHALL BE PROVIDED WITHIN 3 FT. OF THE HYDRANT.
- RESTRAIN ALL JOINTS ON ALL HYDRANT LEADS. RETAINER GLANDS SHALL TO BE USED IN LEIU OF THRUST BLOCK BEHIND HYDRANT.
- PAINT CURB (TOP & FACE) YELLOW 10 FEET EACH WAY FROM HYDRANT & INSTALL REFLECTIVE BLUE TRAFFIC MARKER @ STREET CENTERLINE.

LAST REVISION DATE:

FEB 2023

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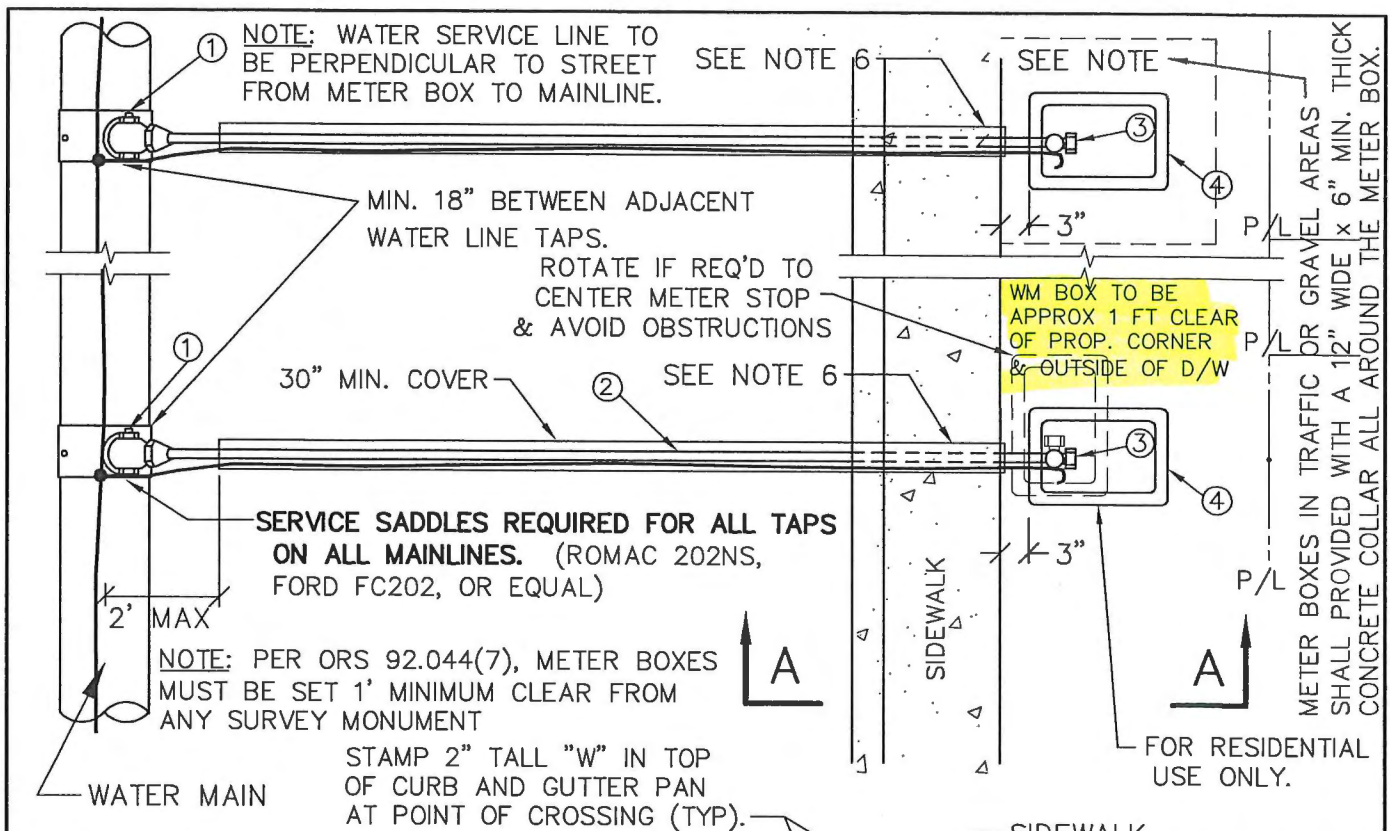
**STANDARD
FIRE HYDRANT ASSEMBLY**

(NTS)

DETAIL NO.

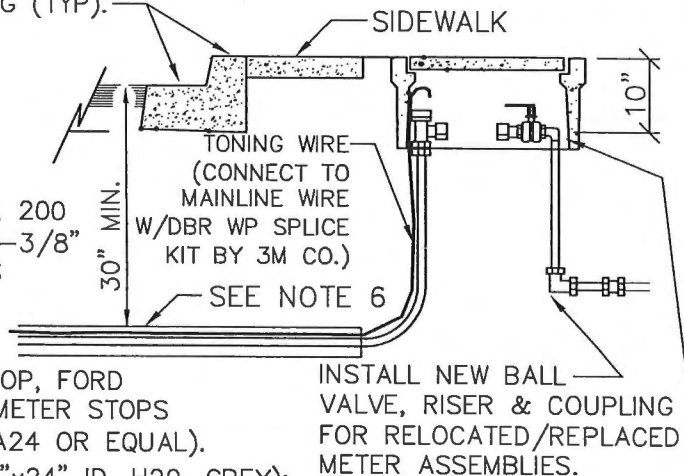
DAYTON, OR

503



MATERIALS:

- ① 1" BALL STYLE CORPORATION STOP FORD FB-1100. SET AT 30° ANGLE UP FROM HORIZONTAL.
- ② 1" CENCORE BLUE HDPE (CTS OD, SDR 9, 200 PSI) CONFORMING TO AWWA C901, USE 2-3/8" LONG INSERTS ON COMPRESSION FITTINGS (McDONALD 6133T). SINGLE RESIDENTIAL SERVICE: 1" TYP
- ③ 1" BALL STYLE LOCKING ANGLE METER STOP, FORD BA43-444WQ OR EQUAL. PROVIDE ALL METER STOPS WITH 1" x 3/4" METER ADAPTER (FORD A24 OR EQUAL).
- ④ WATER METER BOX PER PWDS 5.8.h.1 (13"x24" ID, H20, GREY): -DFW1324C4-12-BODY W/ DFW1324C-4T-LID. PROVIDE METER BOXES WITHOUT KNOCKOUTS FOR SENSOR HEADS.



SECTION A-A

NOTES:

1. SUBSTITUTES FOR ANY MATERIALS SHOWN SHALL BE APPROVED BY THE PUBLIC WORKS DIRECTOR.
2. ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% MAX. DENSITY DETERMINED BY AASHTO T-180.
3. SET FRONT OF METER BOX BEHIND BACK OF SIDEWALK LOCATION AS SHOWN.
4. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY.
5. 1 1/2-INCH MIN. PIPE SIZE FOR COMMERCIAL SERVICES.
6. FAR SIDE COMMERCIAL SERVICES SHALL BE INSTALLED IN A 4" MIN DIA SCHED 40 PVC SLEEVE WHICH BEGINS 2' FROM MAIN AND EXTENDS TO BACK OF FAR SIDE SIDEWALK.
7. TRACER WIRE SPLICES SHALL USE WATERTIGHT CONNECTION, TYPE DBR DIRECT BURY SPLICE KIT BY 3M COMPANY (OR EQUAL).

METER COUPLING (TAIL), BALL VALVE W/HANDLE (NO PADLOCK TABS), COMPRESSION OUTLET & 90° ELBOW. PROVIDE PRIOR TO WATER METER INSTALLATION.

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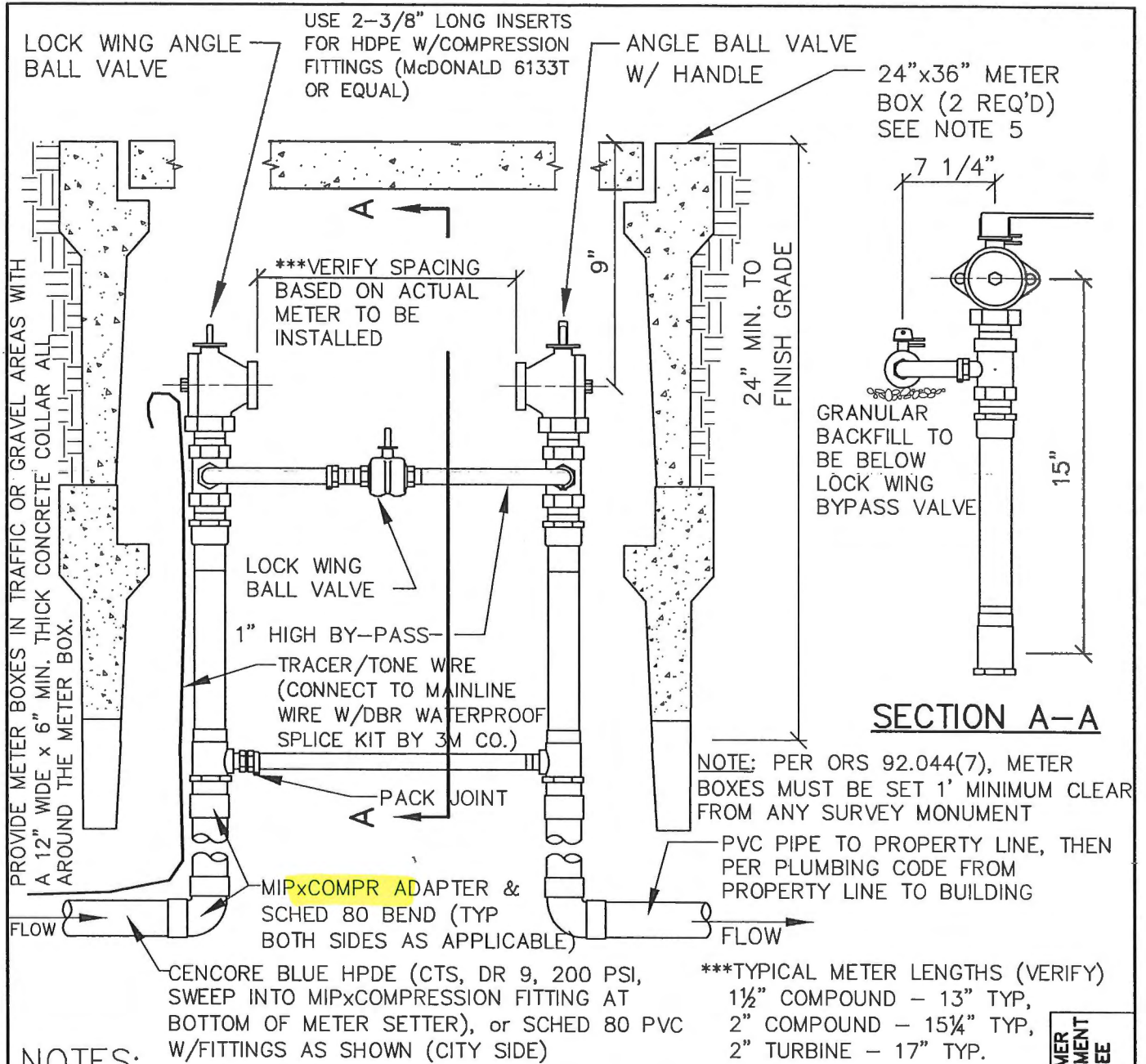
TYPICAL 1" WATER SERVICE (HDPE SERVICE LINE)

(NTS)

DAYTON, OR

DETAIL NO.

515



NOTES:

- METERSET TO BE FORD 70 SERIES COPPERSETTER, #VBB86-15HB-11-66 (1½") OR #VBB87-15HB-11-77 (2") WITH RAISED LOCKING BYPASS OR APPROVED EQUAL.
- SUBSTITUTES FOR ANY MATERIALS SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
- ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING ¾" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% OPTIMUM DENSITY PER AASHTO T-180.
- SET FRONT OF METER BOX 3-INCHES BEHIND SIDEWALK (TYPICAL) FOR CURBLINE WALKS. NO METERS ON PRIVATE PROPERTY WITHOUT A RECORDED EASEMENT.
- METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY. METER BOX PER PWDS 5.8.H.1 (24"x36" ID, H20, GREY)
- DFW2436C4-12-BODY W/ DFW2436C-4T-LID.
PROVIDE WITHOUT KNOCKOUTS FOR SENSOR HEADS.
- COPPERSETTER, METER BOX, & ALL FITTINGS PROVIDED BY CONTRACTOR. CONTRACTOR TO VERIFY DIMENSIONS & CLEARANCE BASED ON ACTUAL METER TO BE PROVIDED BY THE CITY. WATER METER INSTALLED BY CONTRACTOR UNDER CITY INSPECTION & APPROVAL.
- SEE DETAIL 517 FOR TAPPING REQUIREMENTS.
- THREADED FEMALE PVC FITTINGS ARE NOT ALLOWED.**

***TYPICAL METER LENGTHS (VERIFY)
 1½" COMPOUND - 13" TYP,
 2" COMPOUND - 15¼" TYP,
 2" TURBINE - 17" TYP.

USE OF PURPLE PVC PRIMER
 ON ALL PVC SOLVENT CEMENT
 JOINTS IS MANDATORY (SEE
 ALSO OPSC 605.12.2).

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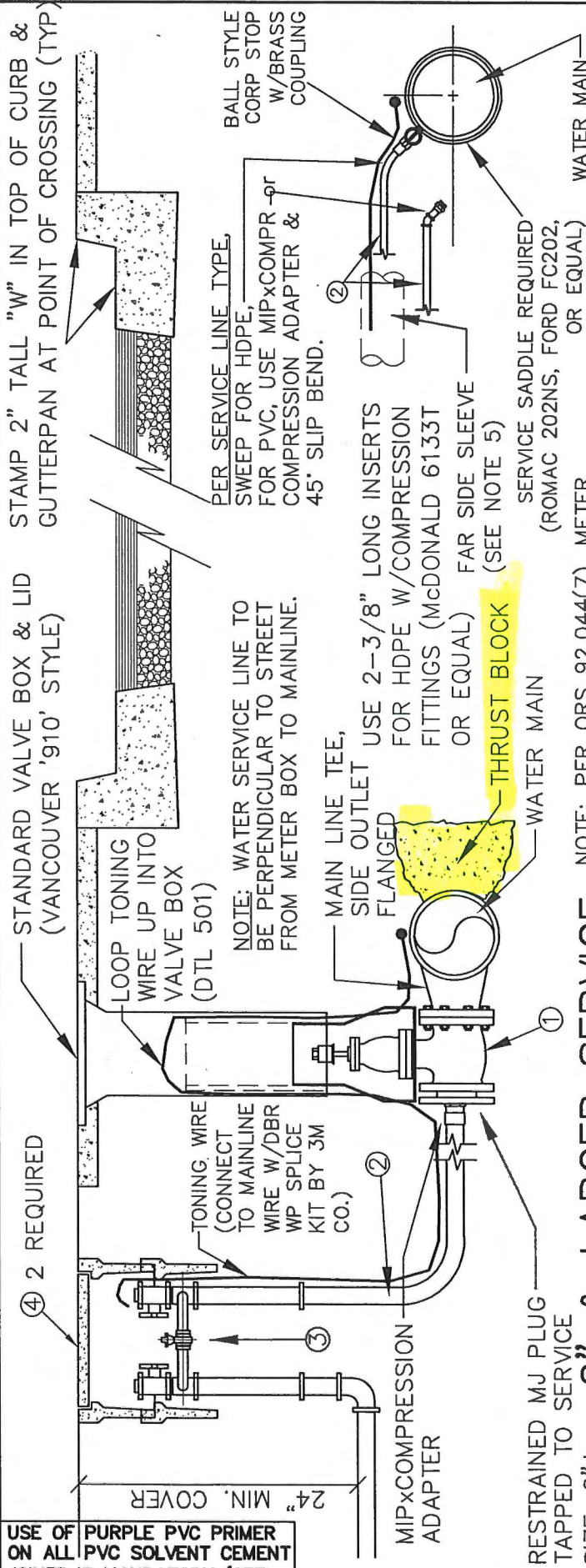
**1-1/2" AND 2" METER SET
 W/1" HIGH BY-PASS
 (HDPE or PVC SERVICE LINE)**

(NTS)

DAYTON, OR

DETAIL NO.

516



USE OF PURPLE PVC PRIMER ON ALL PVC SOLVENT CEMENT JOINTS IS MANDATORY (SEE ALSO OPSC 605.12.2).

2" & LARGER SERVICE

MATERIALS

1. FLG X MJ RESILIENT WEDGE GATE VALVE PER AWWA C-509. 4" DIA. OR SERVICE SIZE, WHICHEVER IS LARGER. EPOXY COATED PER AWWA C-550.
2. CENCORE BLUE HDPE (CTS, DR 9, 200 PSI, $\leq 2"$ ϕ) W/OUT JOINTS OR SCHEDULE 80 PVC PIPE & FITTINGS PER DETAIL 516 (30" MIN COVER TO METER). **FEMALE THREADED PVC FITTINGS ARE NOT ALLOWED. FOR SERVICES $> 2"$ ϕ , USE CL 52 DI PIPE. FOR SERVICES $\leq 2"$ ϕ , SEE DTL 516 FOR CONFIG. AT METER BOX.**
3. METER STOP ASSEMBLY W/BYPASS PER PUBLIC WORKS REQUIREMENTS. SEE DETAIL 516 FOR 1-1/2" & 2" SERVICES (DTL 523-526 FOR LARGER).
4. METER BOX FOR 1-1/2" AND 2" SHALL BE PER DETAIL 516. USE TRAFFIC RATED VERSION OF BOX/LID FOR TRAFFIC AREAS. METER VAULT FOR LARGER SERVICE PER PUBLIC WORKS REQUIREMENTS. PROVIDE WITHOUT KNOCKOUT FOR SENSOR HEADS.

1-1/2" SERVICE

NOTES

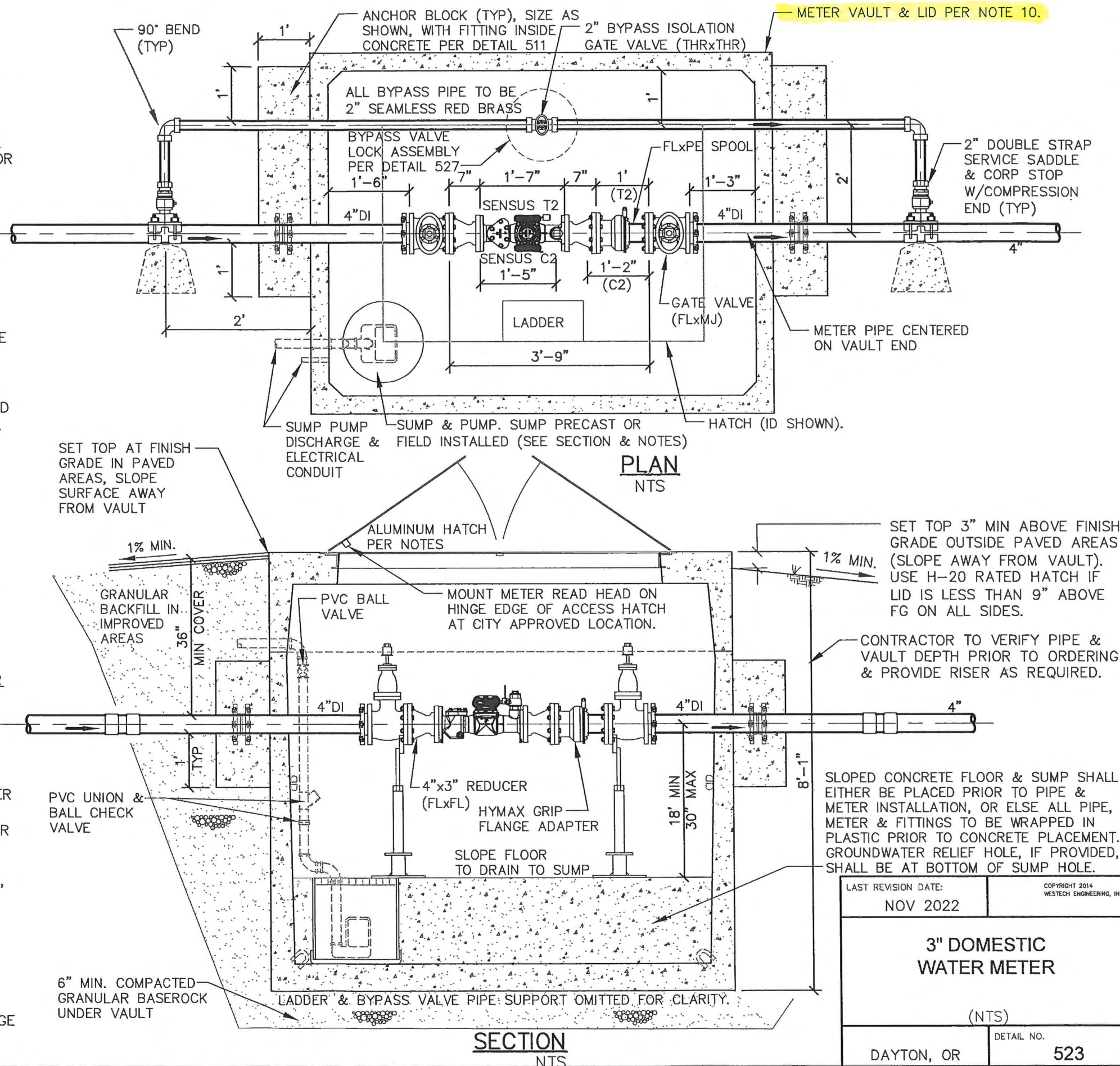
1. SUBSTITUTES FOR ANY MATERIAL SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
2. ALL PIPE AND STRUCTURE ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 95% MAX DENSITY AS DETERMINED BY ASHTO T-180.
3. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER AND FITTING ASSEMBLY.
4. CUSTOMER SHALL INSTALL AN APPROVED BACKFLOW PREVENTION DEVICE ON PRIVATE PROPERTY IMMEDIATELY DOWNSTREAM OF WATER METER IF REQUIRED BY PUBLIC WORKS.
5. FAR SIDE COMMERCIAL SERVICES SHALL BE INSTALLED IN A 4" MIN DIA SCHED 40 PVC SLEEVE WHICH BEGINS 2' FROM MAIN AND EXTENDS TO BACK OF FAR SIDE SIDEWALK.
7. METER BOXES IN TRAFFIC OR GRAVEL AREAS SHALL PROVIDED WITH A 12" WIDE x 6" MIN. THICK CONCRETE COLLAR ALL AROUND THE METER BOX.

NOTE: PER ORS 92.044(7), METER BOXES MUST BE SET 1' MINIMUM CLEAR FROM ANY SURVEY MONUMENT

LAST REVISION DATE: MAY 2023		COPYRIGHT WESTECH ENGINEERING, INC.	
TAPPING REQUIREMENTS, 1-1/2" AND LARGER SERVICE (HDPE or PVC SERVICE LINE) (NTS)			
DAYTON, OR		DETAIL NO.	517

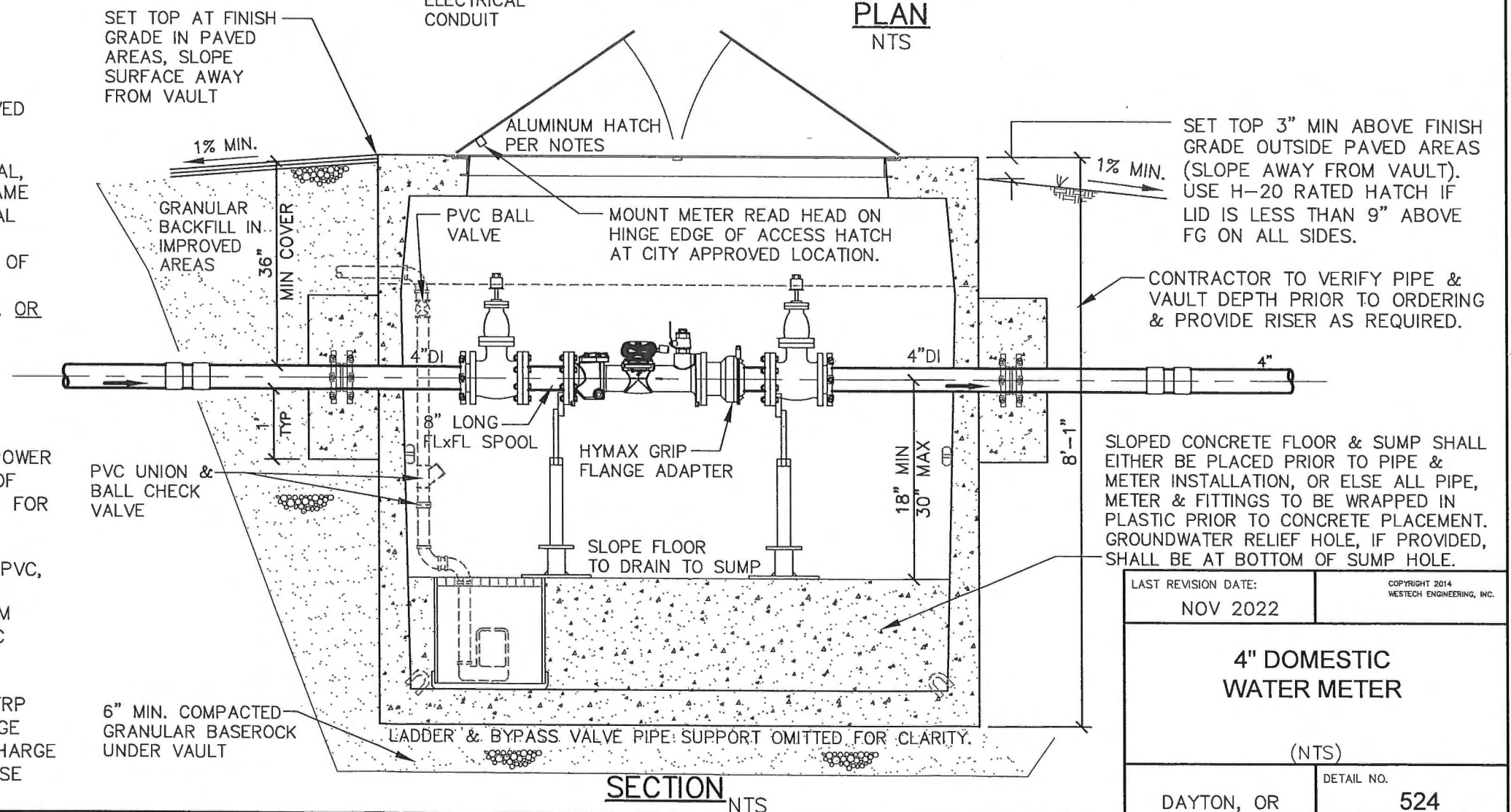
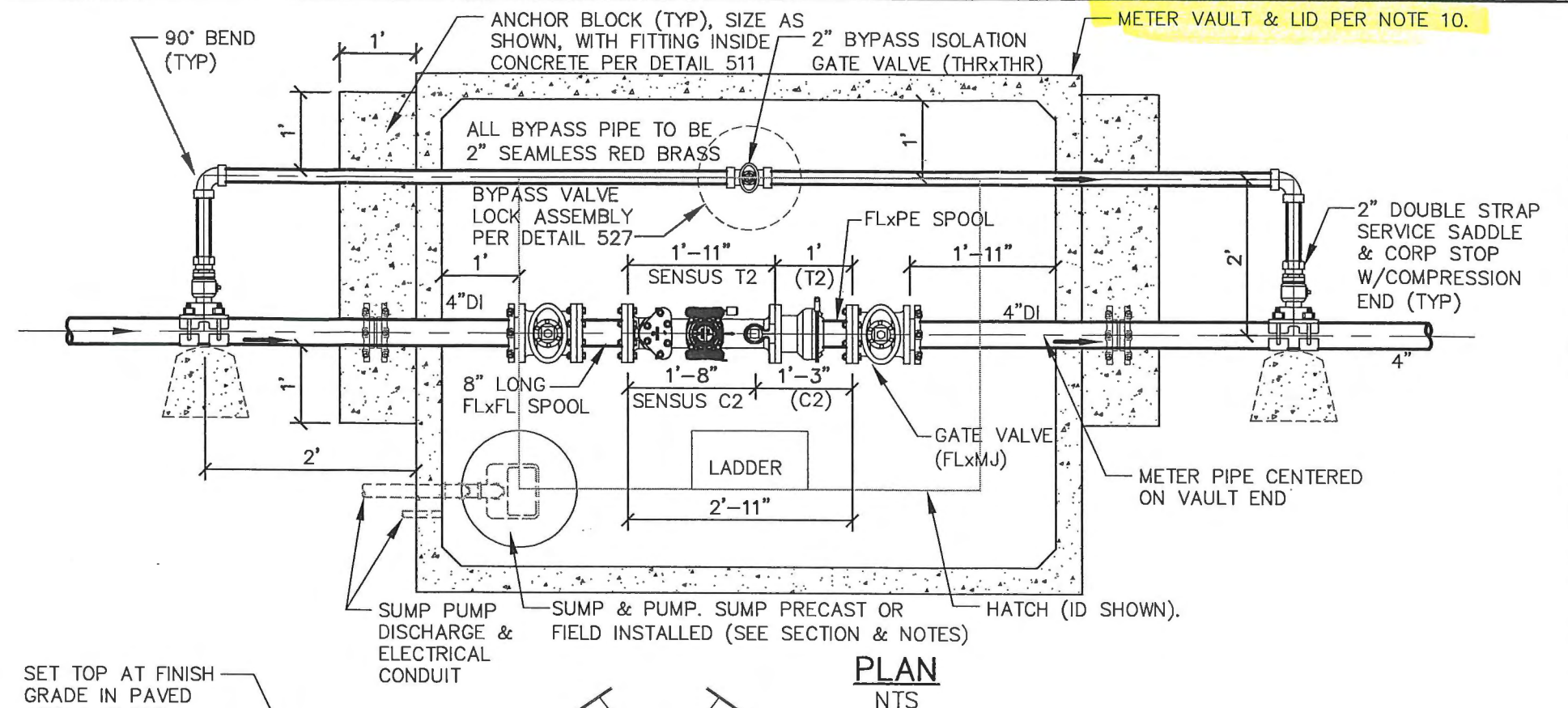
NOTES:

1. METER VAULT & PIPING SHALL CONFORM TO REQUIREMENTS OF ALL PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
2. METER VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY UNLESS OTHERWISE APPROVED (RECORDED EASEMENT TO THE CITY REQUIRED FOR ANY METER ON PRIVATE PROPERTY).
3. ALL MATERIALS (EXCEPT THE METER) SHALL BE FURNISHED & INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL INSTALL A TEMPORARY SPACER SPOOL BETWEEN METER ISOLATION VALVES FOR TESTING. THE TEMPORARY SPOOL SHALL MATCH THE LENGTH OF THE ACTUAL METER TO BE PROVIDED BY THE CITY.
4. PIPING INSIDE VAULT & THROUGH WALLS TO BE CL 52 DUCTILE IRON, EXCEPT AS OTHERWISE SHOWN.
5. METER WILL BE SUPPLIED BY THE CITY, BUT SHALL BE INSTALLED (AFTER PRESSURE & OTHER TESTING OF METER VAULT PIPING) BY THE CONTRACTOR UNDER CITY INSPECTION AND APPROVAL.
6. ISOLATION VALVES IN METER VAULT SHALL BE NON-RISING STEM GATE VALVE (EPOXY COATED) WITH 2-INCH SQUARE OPERATING NUT.
7. ALL MJ CONNECTIONS (INCLUDING BYPASS LINE FITTINGS) SHALL BE ASSEMBLED WITH RETAINER GLANDS (EBBA MEGA-LUGS OR APPROVED EQUAL). ROMAC ALPHA FC ALLOWED AS EQUAL FOR HYMAX GRIP FC.
8. ALL PIPE OPENINGS SHALL BE CORE DRILLED (REGARDLESS OF PRESENCE OF 'KNOCKOUTS'), AND SEALED WATERTIGHT WITH NON-SHRINK GROUT.
9. PIPE SUPPORTS SHALL BE GALVANIZED STANDON S89 OR APPROVED EQUAL AT EACH ISOLATION VALVE AND AT BYPASS VALVE.
10. METER VAULT TO BE UTILITY VAULT 687-WA OR APPROVED EQUAL, CONFORMING WITH ASTM C-857. PROVIDE ALUMINUM ANGLE FRAME HATCH (48"x 72" MIN) BY USF FABRICATION OR APPROVED EQUAL (HATCH COVER TOP TO BE SAND BLASTED NON-SLIP).
 - (1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
 - (2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
11. METER VAULT SHALL BE PROVIDED WITH AN OSHA APPROVED GALVANIZED STEEL LADDER AND ALUMINUM LADDER SAFETY EXTENSION. ATTACH TO VAULT WITH STAINLESS STEEL BOLTS.
12. CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
13. SUMP PUMP DISCHARGE PIPE SHALL BE 1½-INCH SCHEDULE 40 PVC, PROVIDED WITH UNION (FOR PUMP REMOVAL), CHECK VALVE AND ISOLATION BALL VALVE. CONNECT DISCHARGE TO GRAVITY STORM DRAIN OR CURB WEEP HOLE (AT LOCATION APPROVED BY PUBLIC WORKS).
14. SUMP TO BE 18" ROUND CONCRETE PIPE OR EQUAL. PROVIDE FRP GRATE (OR SLOTTED MH LID) WITH COPED CUTOUT FOR DISCHARGE PIPING (IE. LID TO BE REMOVABLE WITHOUT DISASSEMBLING DISCHARGE PIPING). SUMP TO BE LARGE ENOUGH & DEEP ENOUGH TO HOUSE PUMP & FLOAT, AND KEEP WATER LEVEL BELOW SLOPED FLOOR.



NOTES:

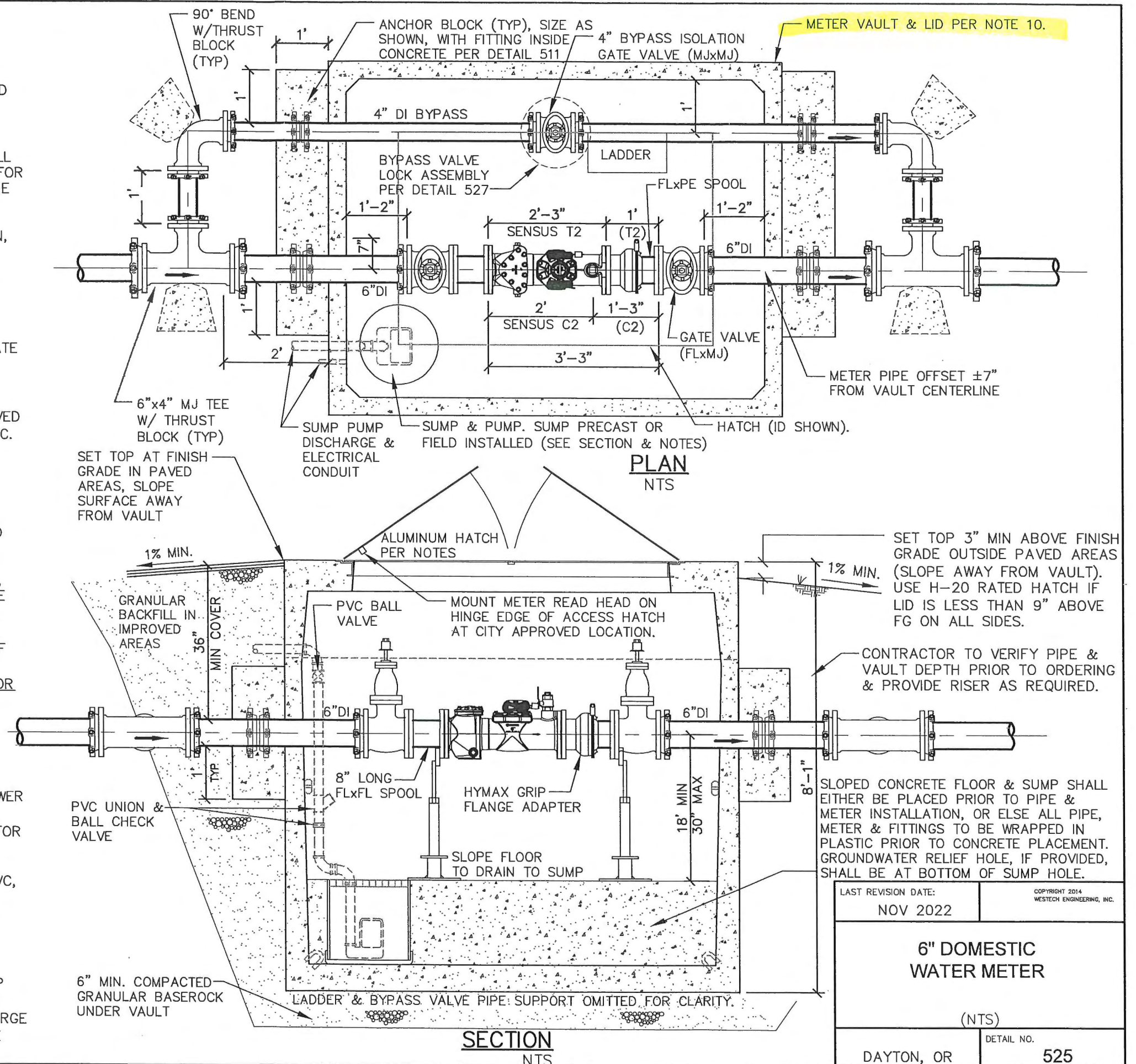
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 - TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
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- CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
- SUMP PUMP DISCHARGE PIPE SHALL BE 1½-INCH SCHEDULE 40 PVC, PROVIDED WITH UNION (FOR PUMP REMOVAL), CHECK VALVE AND ISOLATION BALL VALVE. CONNECT DISCHARGE TO GRAVITY STORM DRAIN OR CURB WEEP HOLE (AT LOCATION APPROVED BY PUBLIC WORKS).
- SUMP TO BE 18" ROUND CONCRETE PIPE OR EQUAL. PROVIDE FRP GRATE (OR SLOTTED MH LID) WITH COPEDED CUTOUT FOR DISCHARGE PIPING (IE. LID TO BE REMOVABLE WITHOUT DISASSEMBLING DISCHARGE PIPING). SUMP TO BE LARGE ENOUGH & DEEP ENOUGH TO HOUSE PUMP & FLOAT, AND KEEP WATER LEVEL BELOW SLOPED FLOOR.



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4" DOMESTIC WATER METER	
(NTS)	
DAYTON, OR	DETAIL NO. 524

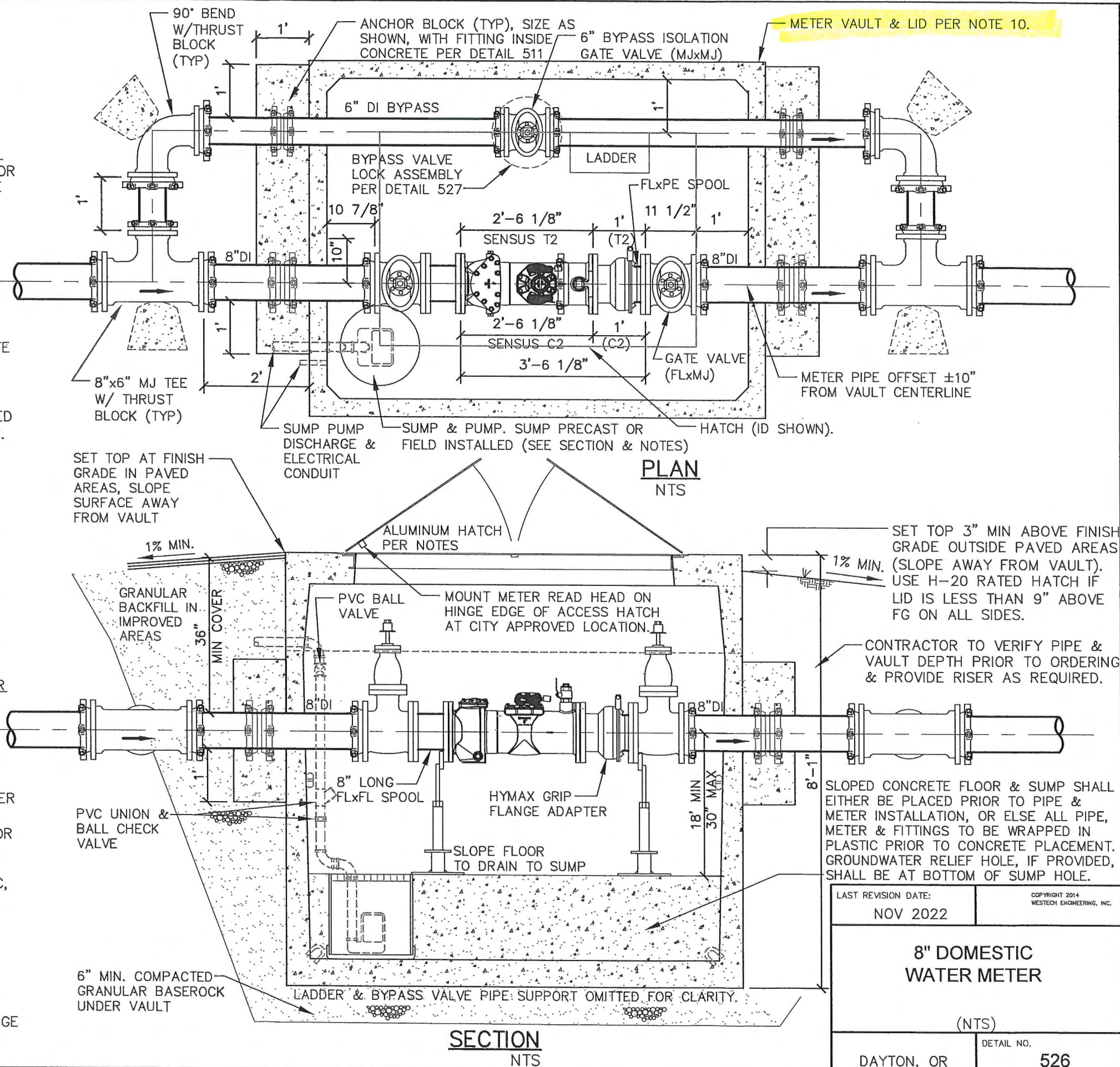
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PAD MOUNTED FIBERGLASS INSULATED ENCLOSURE W/HEATER, HOT BOX MODEL AS SHOWN ON TABLE (OR APPROVED EQUIVALENT). ANCHOR ENCLOSURE TO CONCRETE PAD PER MANUFACTURER'S REQUIREMENTS.

RPBA DIAMETER	HOT BOX MODEL
1"	HB1
1½"	HB1
2"	HB1.5

ELECTRICAL RECEPTACLE FOR HEAT TAPE (GFI). PROVIDE HEAT TAPE OR ENCLOSURE HEATER FOR ALL ABOVE GRADE PIPING. MOUNT RECEPTACLE 18" ABOVE SLAB ON TOP OF RIGID CONDUIT OR ON UNI-STRUT.

NOTE: VERIFY HB SIZE FOR OTHER CONFIGURATION OR MODEL OF RPBA DEVICE, TO ENSURE 3" MIN CLEARANCE AT EACH END (OAR 333-061-0071).

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) MFR'D BY FEBCO, MODEL 825YA (OR APPROVED EQUAL)

DO NOT OBSTRUCT ENCLOSURE OPENINGS (TYP)

WYE STRAINER
12" MIN.
TYP (ALL WAYS)
SCH 80 PVC PIPE, TYPICAL BOTH VERTICAL RISERS

4" CONCRETE PAD

SURFACE PER PLAN SLOPE TO DRAIN

3" PIPE SLEEVE
FIELD LOCATE (TYP 2)

ELECTRICAL CONDUIT & WIRE TO POWER SOURCE. COORDINATE AS REQ'D TO PROVIDE 120V POWER.

MIN. 2" COMPACTED GRANULAR BASEROCK

COMPACTED SUBGRADE

SCHEDULE 40 PVC FROM WATER SERVICE, SIZE AS SHOWN ON PLANS

USE OF PURPLE PVC PRIMER ON ALL PVC SOLVENT CEMENT JOINTS IS MANDATORY (SEE ALSO OPSC 605.12.2).

SCHEDULE 40 PVC TO BUILDING. SIZE AS SHOWN ON PLANS

NOTES:

1. RPBA— REDUCED PRESSURE BACKFLOW ASSEMBLY.
2. INSTALLATION OF RPBA & ENCLOSURE SHALL MEET OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPBA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY, AND COPIES OF TEST REPORTS PROVIDED TO CITY.
4. RPBA & ENCLOSURE SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. ENCLOSURES SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON HEIGHT OF REDUCED PRESSURE ASSEMBLY.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE BACKFLOW ASSEMBLY.
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. ALL CONCRETE SHALL BE 3,300 PSI @ 28 DAYS, MAX 5" SLUMP, 4.5% AIR (±1.5%).
10. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
11. RPBA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.
12. FINISH GRADE TO SLOPE AWAY FROM ENCLOSURE SLAB AT 2% MIN. SLOPE.
13. AFTER CONSTRUCTION COMPLETION & ACCEPTANCE, PROPERTY OWNER IS RESPONSIBLE TO ENSURE FREEZE PROTECTION IS PLUGGED IN & WORKING DURING COLD WEATHER PERIODS AS NECESSARY.

LAST REVISION DATE:

DEC 2022

JO #

STANDARD

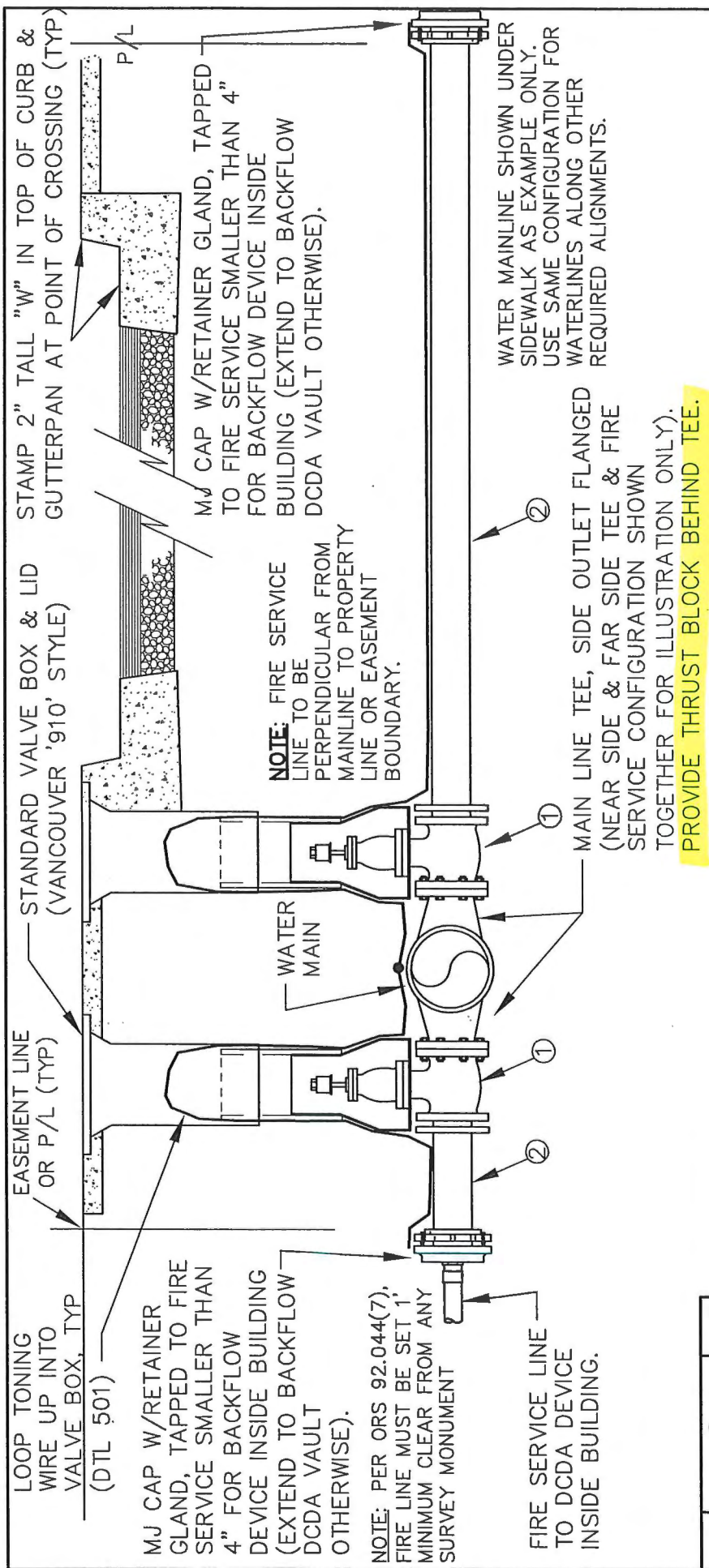
2" AND SMALLER REDUCED PRESSURE BACKFLOW ASSEMBLY

(NTS)

DAYTON, OR

DETAIL NO.

541



MATERIALS

- ① FLG X MJ RESILIENT WEDGE GATE VALVE (PER AWWA C-509), 4" DIA. MINIMUM OR FIRE SERVICE SIZE, WHICHEVER IS LARGER. VALVE TO BE EPOXY COATED PER AWWA C-550. PROVIDE APPROVED RETAINER GLAND ON MJ JOINT.
- ② CLASS 52 DUCTILE IRON PIPE REQUIRED WITHIN RIGHT-OF-WAY OR EASEMENT BOUNDARY OR TO DCDA VAULT (WHERE DCDA NOT INSTALLED IN BUILDING), TYP. 4" DIA OR FIRE SERVICE SIZE, WHICHEVER IS LARGER. FIELD-LOK STYLE GASKETS REQUIRED ON ALL PUSH-ON JOINTS BETWEEN MAINLINE VALVE AND DCDA VAULT.

NOTES

1. SUBSTITUTES FOR ANY MATERIAL SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
2. ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% MAX DENSITY AS DETERMINED BY ASHTO T-180.
3. FIRE SERVICE LINE BEYOND PROPERTY OR EASEMENT LINE (TO BACKFLOW DEVICE) TO BE NFPA & NSF 61 APPROVED.
4. CUSTOMER SHALL INSTALL AN APPROVED BACKFLOW PREVENTION DEVICE ON PRIVATE PROPERTY AT A LOCATION APPROVED BY PUBLIC WORKS.

LAST REVISION DATE: MAY 2023		COPYRIGHT WESTECH ENGINEERING, INC.	
FIRE SERVICE LINE CONNECTION REQUIREMENTS (1-1/2" AND LARGER SERVICE) (NTS)			
DAYTON, OR		DETAIL NO. 550	

4" FEBCO 856 DOUBLE CHECK DETECTOR ASSEMBLY WITH 2 OS&Y GATE VALVES, OR APPROVED EQUAL, W/CITY APPR'D METER ON DETECTOR LOOP (ALSO SEE NOTE 13).

36" WIDE CAST-IN-PLACE CONCRETE THRUST COLLAR WITH RETAINER GLAND CENTERED IN CONCRETE (TYPICAL BOTH ENDS)

PROVIDE BALL DRIP DRAIN VALVE TO DRAIN FDC, EITHER ON CHECK VALVE OR WITH HORIZONTAL TAPPING SADDLE

INSTALL "FORWARD FLOW TEST PORT" PER DTL 559 UNLESS ALT. LOCATION APPROVED.

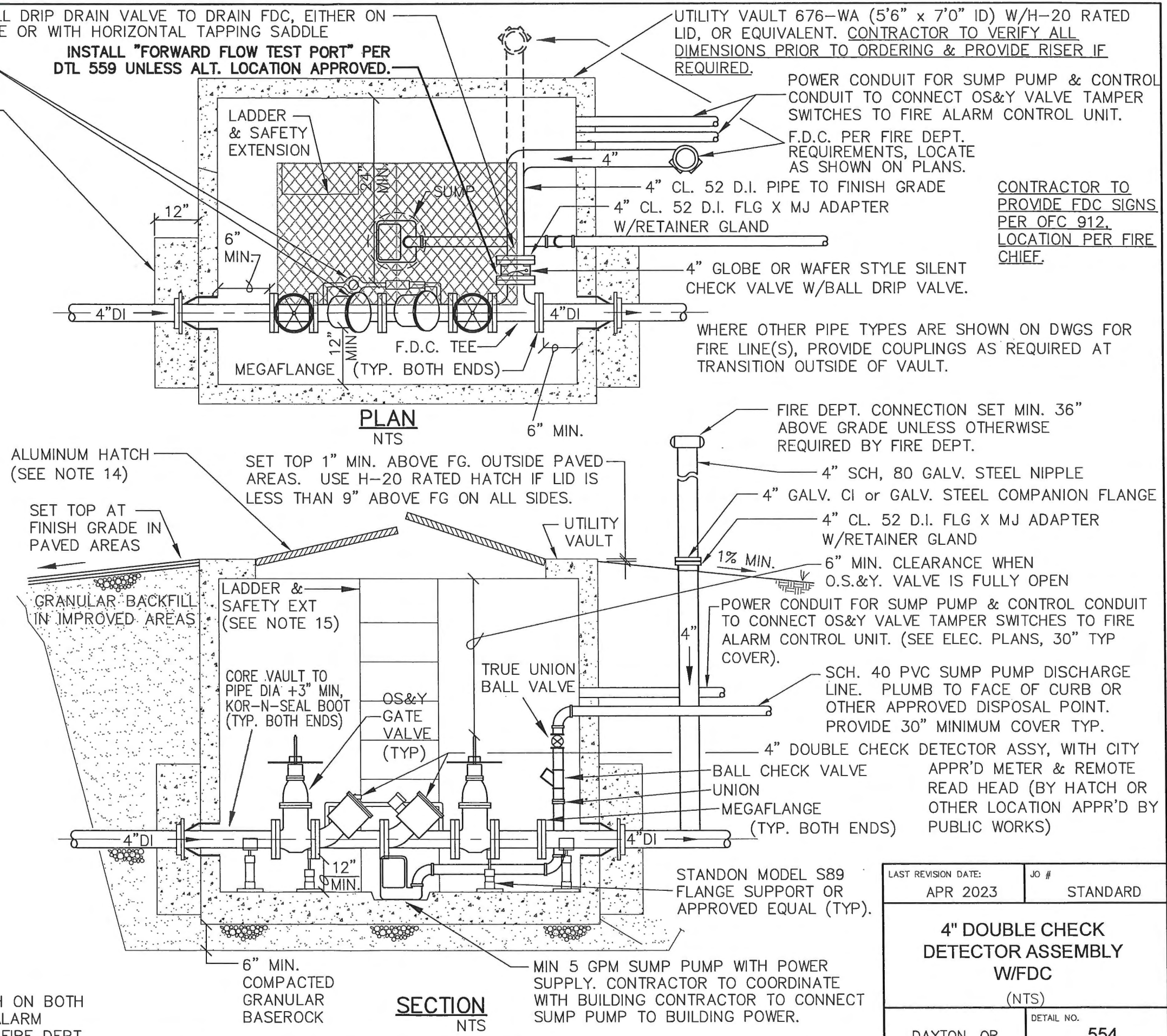
UTILITY VAULT 676-WA (5'6" x 7'0" ID) W/H-20 RATED LID, OR EQUIVALENT. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING & PROVIDE RISER IF REQUIRED.

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT. F.D.C. PER FIRE DEPT. REQUIREMENTS, LOCATE AS SHOWN ON PLANS.

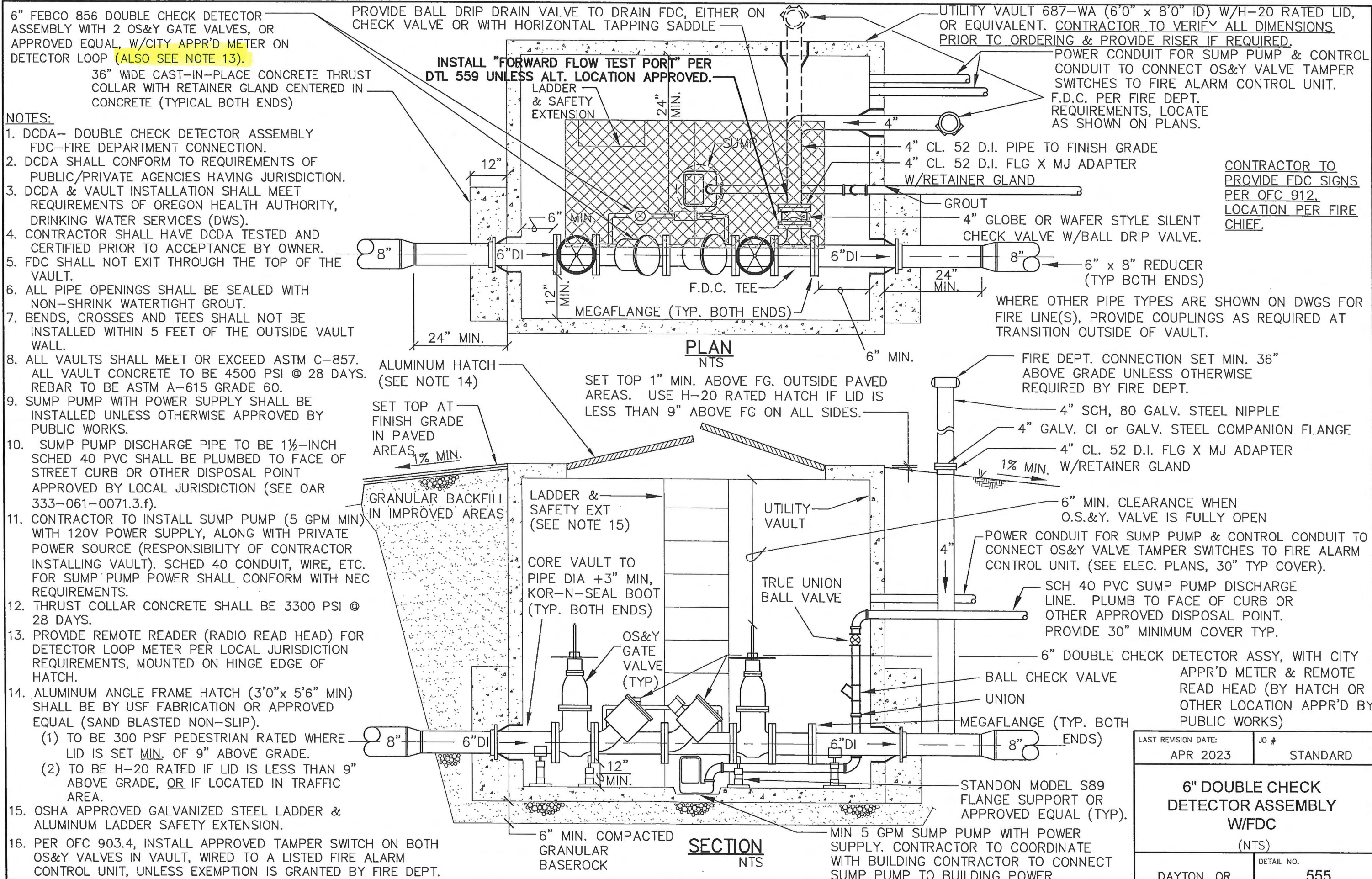
CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912. LOCATION PER FIRE CHIEF.

NOTES:

1. DCDA- DOUBLE CHECK DETECTOR ASSEMBLY FDC-FIRE DEPARTMENT CONNECTION.
2. DCDA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
3. DCDA & VAULT INSTALLATION SHALL MEET REQUIREMENTS OF OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES (DWS).
4. CONTRACTOR SHALL HAVE DCDA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
5. FDC SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.
6. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
7. BENDS, CROSSES AND TEES SHALL NOT BE INSTALLED WITHIN 5 FEET OF THE OUTSIDE VAULT WALL.
8. ALL VAULTS SHALL MEET OR EXCEED ASTM C-857. ALL VAULT CONCRETE TO BE 4500 PSI @ 28 DAYS. REBAR TO BE ASTM A-615 GRADE 60.
9. SUMP PUMP WITH POWER SUPPLY SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS.
10. SUMP PUMP DISCHARGE PIPE TO BE 1½-INCH SCHED 40 PVC SHALL BE PLUMBED TO FACE OF STREET CURB OR OTHER DISPOSAL POINT APPROVED BY LOCAL JURISDICTION (SEE OAR 333-061-0071.3.f).
11. CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
12. THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
13. PROVIDE REMOTE READER (RADIO READ HEAD) FOR DETECTOR LOOP METER PER LOCAL JURISDICTION REQUIREMENTS, MOUNTED ON HINGE EDGE OF HATCH.
14. ALUMINUM ANGLE FRAME HATCH (3'0"x 5'6" MIN) SHALL BE BY USF FABRICATION OR APPROVED EQUAL (SAND BLASTED NON-SLIP).
 - (1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
 - (2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
15. OSHA APPROVED GALVANIZED STEEL LADDER & ALUMINUM LADDER SAFETY EXTENSION.
16. PER OFC 903.4, INSTALL APPROVED TAMPER SWITCH ON BOTH OS&Y VALVES IN VAULT, WIRED TO A LISTED FIRE ALARM CONTROL UNIT, UNLESS EXEMPTION IS GRANTED BY FIRE DEPT.



LAST REVISION DATE: APR 2023	JO # STANDARD
4" DOUBLE CHECK DETECTOR ASSEMBLY W/FDC (NTS)	
DAYTON, OR	DETAIL NO. 554



6" FEBCO 856 DOUBLE CHECK DETECTOR ASSEMBLY WITH 2 OS&Y GATE VALVES, OR APPROVED EQUAL, W/CITY APPR'D METER ON DETECTOR LOOP (ALSO SEE NOTE 13).

36" WIDE CAST-IN-PLACE CONCRETE THRUST COLLAR WITH RETAINER GLAND CENTERED IN CONCRETE (TYPICAL BOTH ENDS)

- NOTES:
1. DCDA- DOUBLE CHECK DETECTOR ASSEMBLY FDC-FIRE DEPARTMENT CONNECTION.
 2. DCDA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
 3. DCDA & VAULT INSTALLATION SHALL MEET REQUIREMENTS OF OREGON HEALTH AUTHORITY, DRINKING WATER SERVICES (DWS).
 4. CONTRACTOR SHALL HAVE DCDA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
 5. FDC SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.
 6. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
 7. BENDS, CROSSES AND TEES SHALL NOT BE INSTALLED WITHIN 5 FEET OF THE OUTSIDE VAULT WALL.
 8. ALL VAULTS SHALL MEET OR EXCEED ASTM C-857. ALL VAULT CONCRETE TO BE 4500 PSI @ 28 DAYS. REBAR TO BE ASTM A-615 GRADE 60.
 9. SUMP PUMP WITH POWER SUPPLY SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS.
 10. SUMP PUMP DISCHARGE PIPE TO BE 1½-INCH SCHED 40 PVC SHALL BE PLUMBED TO FACE OF STREET CURB OR OTHER DISPOSAL POINT APPROVED BY LOCAL JURISDICTION (SEE OAR 333-061-0071.3.f).
 11. CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE (RESPONSIBILITY OF CONTRACTOR INSTALLING VAULT). SCHED 40 CONDUIT, WIRE, ETC. FOR SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS.
 12. THRUST COLLAR CONCRETE SHALL BE 3300 PSI @ 28 DAYS.
 13. PROVIDE REMOTE READER (RADIO READ HEAD) FOR DETECTOR LOOP METER PER LOCAL JURISDICTION REQUIREMENTS, MOUNTED ON HINGE EDGE OF HATCH.
 14. ALUMINUM ANGLE FRAME HATCH (3'0"x 5'6" MIN) SHALL BE BY USF FABRICATION OR APPROVED EQUAL (SAND BLASTED NON-SLIP).
(1) TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
(2) TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
 15. OSHA APPROVED GALVANIZED STEEL LADDER & ALUMINUM LADDER SAFETY EXTENSION.
 16. PER OFC 903.4, INSTALL APPROVED TAMPER SWITCH ON BOTH OS&Y VALVES IN VAULT, WIRED TO A LISTED FIRE ALARM CONTROL UNIT, UNLESS EXEMPTION IS GRANTED BY FIRE DEPT.

PROVIDE BALL DRIP DRAIN VALVE TO DRAIN FDC, EITHER ON CHECK VALVE OR WITH HORIZONTAL TAPPING SADDLE

UTILITY VAULT 687-WA (6'0" x 8'0" ID) W/H-20 RATED LID, OR EQUIVALENT. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING & PROVIDE RISER IF REQUIRED.

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT. F.D.C. PER FIRE DEPT. REQUIREMENTS, LOCATE AS SHOWN ON PLANS.

CONTRACTOR TO PROVIDE FDC SIGNS PER OFC 912. LOCATION PER FIRE CHIEF.

INSTALL "FORWARD FLOW TEST PORT" PER DTL 559 UNLESS ALT. LOCATION APPROVED.

LADDER & SAFETY EXTENSION

24" MIN.

12"

6" DI

6" DI

4" CL. 52 D.I. PIPE TO FINISH GRADE

4" CL. 52 D.I. FLG X MJ ADAPTER W/RETAINER GLAND

GROUT

4" GLOBE OR WAFER STYLE SILENT CHECK VALVE W/BALL DRIP VALVE.

6" x 8" REDUCER (TYP BOTH ENDS)

24" MIN.

6" MIN.

WHERE OTHER PIPE TYPES ARE SHOWN ON DWGS FOR FIRE LINE(S), PROVIDE COUPLINGS AS REQUIRED AT TRANSITION OUTSIDE OF VAULT.

PLAN NTS

SET TOP 1" MIN. ABOVE FG. OUTSIDE PAVED AREAS. USE H-20 RATED HATCH IF LID IS LESS THAN 9" ABOVE FG ON ALL SIDES.

ALUMINUM HATCH (SEE NOTE 14)

SET TOP AT FINISH GRADE IN PAVED AREAS 1% MIN.

GRANULAR BACKFILL IN IMPROVED AREAS

LADDER & SAFETY EXT (SEE NOTE 15)

CORE VAULT TO PIPE DIA +3" MIN, KOR-N-SEAL BOOT (TYP. BOTH ENDS)

UTILITY VAULT

TRUE UNION BALL VALVE

OS&Y GATE VALVE (TYP)

4" SCH, 80 GALV. STEEL NIPPLE

4" GALV. CI or GALV. STEEL COMPANION FLANGE

4" CL. 52 D.I. FLG X MJ ADAPTER W/RETAINER GLAND

1% MIN.

6" MIN. CLEARANCE WHEN O.S.&Y. VALVE IS FULLY OPEN

POWER CONDUIT FOR SUMP PUMP & CONTROL CONDUIT TO CONNECT OS&Y VALVE TAMPER SWITCHES TO FIRE ALARM CONTROL UNIT. (SEE ELEC. PLANS, 30" TYP COVER).

SCH 40 PVC SUMP PUMP DISCHARGE LINE. PLUMB TO FACE OF CURB OR OTHER APPROVED DISPOSAL POINT. PROVIDE 30" MINIMUM COVER TYP.

6" DOUBLE CHECK DETECTOR ASSY, WITH CITY APPR'D METER & REMOTE READ HEAD (BY HATCH OR OTHER LOCATION APPR'D BY PUBLIC WORKS)

BALL CHECK VALVE

UNION

MEGAFLANGE (TYP. BOTH ENDS)

6" DI

6" DI

8"

8"

12" MIN.

6" MIN. COMPACTED GRANULAR BASEROCK

SECTION NTS

STANDON MODEL S89 FLANGE SUPPORT OR APPROVED EQUAL (TYP).

MIN 5 GPM SUMP PUMP WITH POWER SUPPLY. CONTRACTOR TO COORDINATE WITH BUILDING CONTRACTOR TO CONNECT SUMP PUMP TO BUILDING POWER.

LAST REVISION DATE:	JO #
APR 2023	STANDARD
6" DOUBLE CHECK DETECTOR ASSEMBLY W/FDC (NTS)	
DAYTON, OR	555

8" FEBCO 856 DOUBLE CHECK DETECTOR ASSEMBLY WITH 2 OS&Y GATE VALVES, OR APPROVED EQUAL, W/CITY APPR'D METER ON DETECTOR LOOP (ALSO SEE NOTE 13).

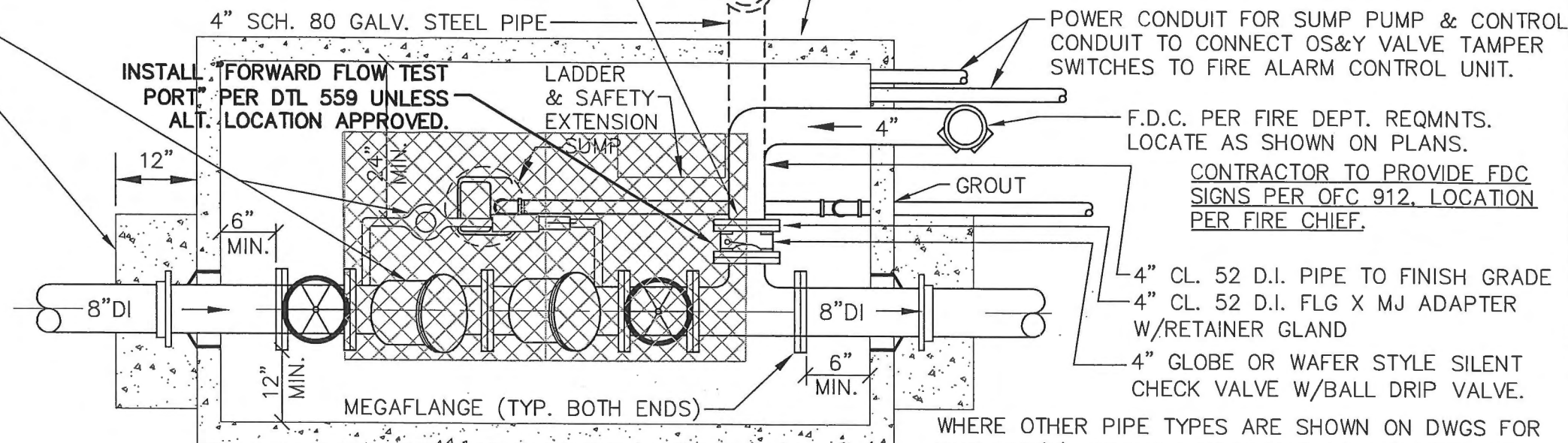
36" WIDE CAST-IN-PLACE CONCRETE THRUST COLLAR WITH RETAINER GLAND CENTERED IN CONCRETE (TYPICAL BOTH ENDS)

NOTES:

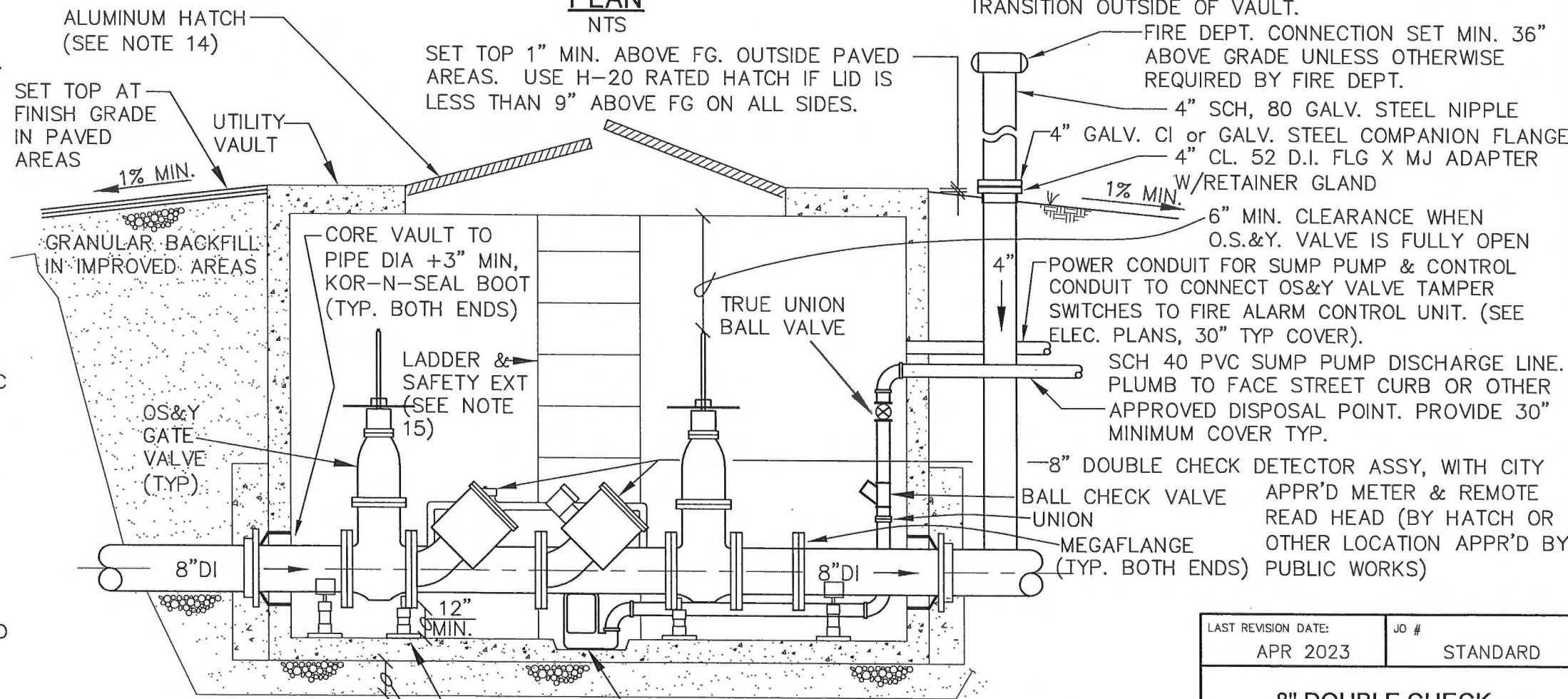
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FDC-FIRE DEPARTMENT CONNECTION.
2. DCDA SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
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4. CONTRACTOR SHALL HAVE DCDA TESTED AND CERTIFIED PRIOR TO ACCEPTANCE BY OWNER.
5. FDC SHALL NOT EXIT THROUGH THE TOP OF THE VAULT.
6. ALL PIPE OPENINGS SHALL BE SEALED WITH NON-SHRINK WATERTIGHT GROUT.
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8. ALL VAULTS SHALL MEET OR EXCEED ASTM C-857. ALL VAULT CONCRETE TO BE 4500 PSI @ 28 DAYS. REBAR TO BE ASTM A-615 GRADE 60.
9. SUMP PUMP WITH POWER SUPPLY SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY PUBLIC WORKS.
10. SUMP PUMP DISCHARGE PIPE TO BE 1½-INCH SCHED 40 PVC SHALL BE PLUMBED TO FACE OF STREET CURB OR OTHER DISPOSAL POINT APPROVED BY LOCAL JURISDICTION (SEE OAR 333-061-0071.3.f).
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16. PER OFC 903.4, INSTALL APPROVED TAMPER SWITCH ON BOTH OS&Y VALVES IN VAULT, WIRED TO A LISTED FIRE ALARM CONTROL UNIT, UNLESS EXEMPTION IS GRANTED BY FIRE DEPT.

PROVIDE BALL DRIP DRAIN VALVE TO DRAIN FDC, EITHER ON CHECK VALVE OR WITH HORIZONTAL TAPPING SADDLE

UTILITY VAULT 5106-WA (5'0" x 10'6" ID) W/H-20 RATED LID, OR EQUIVALENT. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO ORDERING & PROVIDE RISER IF REQUIRED.



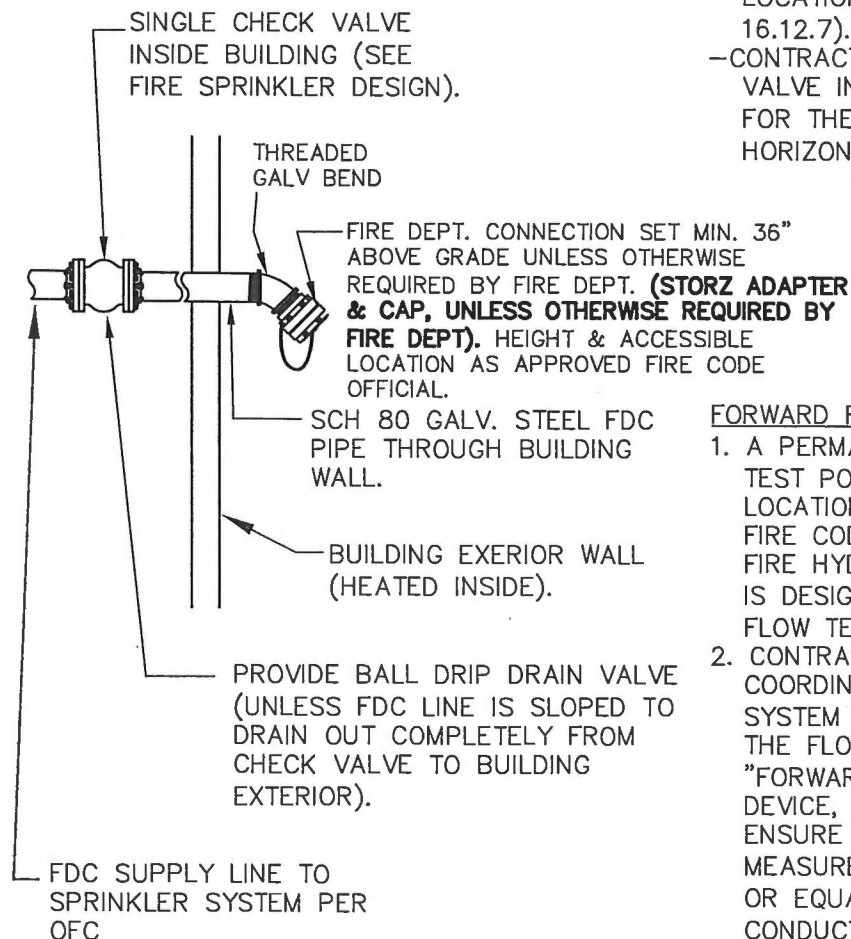
PLAN
NTS



SECTION
NTS

LAST REVISION DATE: APR 2023	JO # STANDARD
8" DOUBLE CHECK DETECTOR ASSEMBLY W/FDC (NTS)	
DAYTON, OR	DETAIL NO. 556

FIRE CONTRACTOR TO PROVIDE FDC SIGNS
PER OFC 912, LOCATION PER FIRE CHIEF.



- FDC LINE CHECK VALVE & BALL DRIP VALVE TO BE INSTALLED IN AN ACCESSIBLE LOCATION (NFPA 13, 16.12.6.1 & NFPA 13, 16.12.7).
- CONTRACTOR TO VERIFY THAT BALL DRIP VALVE INSTALLED IS DESIGNED & LISTED FOR THE ORIENTATION USED (VERTICAL OR HORIZONTAL).

FORWARD FLOW TEST PORT NOTES:

1. A PERMANENT VALVED "FORWARD FLOW TEST PORT" SHALL BE INSTALLED AT A LOCATION AS APPROVED IN WRITING BY THE FIRE CODE OFFICIAL, UNLESS A PRIVATE FIRE HYDRANT DOWNSTREAM OF THE DCDA IS DESIGNATED AS THE REQUIRED "FORWARD FLOW TEST PORT".
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE FIRE SPRINKLER SYSTEM DESIGNER/ INSTALLER TO VERIFY THE FLOWRATE REQUIRED FOR THE "FORWARD FLOW TEST" OF THE BACKFLOW DEVICE, AND SHALL COORDINATE TO ENSURE THAT ALL HOSE & FLOW MEASUREMENT EQUIPMENT (HOSE MONSTER OR EQUAL) IS PROVIDED AS REQUIRED TO CONDUCT THE ACCEPTANCE "FORWARD FLOW TEST" AS REQUIRED BY NFPA 13.10.10.2.5.1.
3. ALL COMPONENTS OF THE FORWARD FLOW TEST PORT (EXCLUDING THE FIRE HOSES & FLOW MEASUREMENT EQUIPMENT) SHALL REMAIN IN PLACE TO ALLOW SUBSEQUENT "FORWARD FLOW TESTS" TO BE CONDUCTED WITHOUT ANY SYSTEM MODIFICATIONS (IE. ANNUAL FLOW TESTS AS REQUIRED PER NFPA 25.13.6.2.1).
4. CONFORM TO ALL OTHER REQUIREMENTS OF APPLICABLE DOUBLE CHECK DETECTOR ASSEMBLY DETAIL(S), NOTES & SPECIFICATIONS (INCLUDING PROVISION OF AN APPROVED WATER METER & READ HEAD ON THE DCDA DETECTOR LOOP).

FORWARD FLOW TEST DRAIN NOTE:

1. IF THE FORWARD FLOW TEST PORT IS INSTALLED INSIDE A BUILDING, DRAINS ADEQUATE TO HANDLE THE FULL TEST FLOWS SHALL BE PROVIDED, UNLESS PROVISIONS ARE INCLUDED TO DIRECT THE TEST FLOWS TO THE EXTERIOR OF THE BUILDING IN A LOCATION WHICH WILL NOT CAUSE DAMAGE TO PUBLIC OR PRIVATE PROPERTY

BALL DRIP NOTES:

1. INSTALL BALL-DRIP DRAIN VALVE AT LOW POINT IN FDC LINE PROFILE (UNLESS FDC LINE IS SLOPED TO DRAIN OUT COMPLETELY FROM CHECK VALVE TO BUILDING EXTERIOR WHEN FDC IS NOT IN USE).
2. THIS DETAIL PROVIDES GUIDANCE ONLY, AND DOES NOT SUPERCEDE REQUIREMENTS UNDER THE OREGON FIRE CODE, NFPA STANDARDS OR DIRECTION FROM FIRE CODE OFFICIAL.

LAST REVISION DATE: APR 2023		JO # STANDARD
FDC ON BUILDING EXTERIOR & FORWARD FLOW TEST PORT, SAMPLE & NOTES (NTS)		
DAYTON, OR		DETAIL NO. 563

CITY OF DAYTON
Public Works Design Standards

Standard Construction Notes

Appendix B

Notes:

- ~~1) The developer's engineers can request the standard construction notes in digital format from the City Engineer.~~
- 12) City Notes Required on Drawings. Per PWDS 1.10.d.1.f, all applicable City standard notes are to be included on construction drawings submitted for City review and approval. Supplemental notes may be added at the discretion of the design engineer.
- 2) The developer's engineers can request the standard construction notes in digital format from the City Engineer.

GENERAL NOTES:

1. Contractor shall procure and conform to all construction permits required by the City of Dayton and Yamhill County, and conform to all conditions and requirements of said permits. Issuance of a City Public Works street/site/utility construction permit does not relieve the contractor from obtaining any and all reviews and permits required under building, plumbing or electrical codes that any portions of the work may be subject to (*including a site plumbing permit if required*), or from any requirements under permits which may be required for the project by other agencies with jurisdiction.
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. A copy of final approved construction drawings and any required permits shall be kept on-site at all times, for review by inspectors upon request.
5. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction.
6. All grading, rocking, paving, utility and related work shall conform to Oregon Standard Specifications for Construction - OSSC (ODOT/APWA), 2021 edition, or local jurisdiction standards, whichever is more stringent.
7. 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 Authority – Drinking Water Services (OHA-DWS) and the Oregon Department of Environmental Quality (DEQ).
8. Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. Saturday.
9. 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.
10. 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.
11. Weekly Construction Schedule. By close of business each week, the Contractor shall submit a weekly work schedule for the following week to the City, summarizing the class of work and areas where work will occur during the following week, and any anticipated inspection

requirements.

12. 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.
13. All traffic control plans & measures shall be approved by the agency with jurisdiction and in place prior to any construction activity. Contractor shall erect and maintain barricades, warning signs, traffic cones *(and all other traffic control devices required)* per City, County and ODOT requirements in accordance with the current MUTCD *(including Oregon amendments)*. Access to driveways shall be maintained at all times.
14. Unless authorized in writing by the City prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days *(timeframe applies independently and separately to each block or intersection where traffic control work is required)*.
15. **Record Drawings.** The Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon will be recorded any approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered *(whether or not existing utilities are shown on the construction drawings)*. These field record drawings shall be kept up to date at all times and shall be available for inspection by the City upon request. Information on the field record drawings shall include reference measurements and materials type.
16. 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 which must be submitted to the City prior to the first final walkthrough inspection.
17. The Contractor shall submit a suitable maintenance bond prior to final payment or final approval where required by public and/or private agencies having jurisdiction.
18. **1200-C Permit.** Contractor shall procure and conform to DEQ stormwater permit No. 1200C for construction activities where 1 acre or more are disturbed.
19. **1200-C Erosion Control Permit & Inspection Responsibilities: For City funded projects where a 1200-C permit is required, the Contractor shall (after contract award and prior to construction) formally transfer (into Contractor's name) the 1200-C permit and the responsibility for erosion control inspection under the permit. The Contractor shall notify the Public Works Director & City Engineer in writing when the transfer is complete. No ground disturbing work shall be performed on the project until the 1200-C permit has been transferred and DEQ has been notified of the change in inspector responsibility.**

19.20. Elevations shown on the drawings are based from _____ (City; OSHD, etc) Bench Mark _____, Elevation _____ (adjusted 19 ____), consisting of a _____ (brass cap; monument, etc.)

Located at _____, which is based on the NAVD 1988 datum corresponding to the FEMA flood map elevations.

~~20.21.~~ Address Numbers. Per OFC 505.1, all new and existing buildings shall have approved address numbers (*4" minimum number height, color to contrast with background*) placed in a position that is plainly legible and visible from the fronting street. For flaglots or other situations where the structure is not visible from the public street, an address sign shall be installed near the entrance to the driveway or private road. Temporary address signs shall be mounted in a visible location prior to and during any construction, and the permanent numbers mounted prior to occupancy, in a position that is plainly legible and visible from the street fronting the property.

~~21.22.~~ Contractor is solely responsible for assuring that any site, street or utility work within the jurisdiction of the City, meets or exceeds any and all legal requirements and any and all industry best practices in the design, construction and/or performance of such site, street or utility work. Contractor is solely responsible for payment of any assessment, fine, penalty, claim, damages or costs that result from Contractor's (1) performing site, street or utility work or (2) failing to perform site, street or utility work that meets or exceeds any and all legal requirements and industry best practices. The City may require and Contractor shall provide the City with confined space entry plans conforming with the requirements of OR-OSHA, traffic control plans, or other plans or performance descriptions necessary or desirable for the Public Works Director to assure that these requirements can be met in performing the work. The City's acceptance, review, or comments on or about the adequacy of any such plan shall not remove or reduce Contractor's sole responsibility to meet any and all legal requirements, administrative requirements, or industry best practices, and Contractor specially assumes, will defend, and will indemnify the City against any claims, liability, damages, fines, fees or assessments related in any manner to Contractor's site, street or utility work.

~~22.23.~~ All construction water must be obtained through an approved hydrant meter or bulk water meter, at a location approved by Public Works Director.

~~23.24.~~ The Contractor shall provide the City and the project engineer with the names and 24 hour telephone numbers of at least two persons associated with the project who can be contacted outside of regular work hours in case of emergencies.

~~24. — Interruption of Sewer or Water Service. In no case shall sewer or water service be interrupted for more than four (4) hours in any one day, without prior written authorization by the City (a minimum of 1 week prior to the work). (moved down)~~

25. Notice to Property Owners, Contractor Responsibility. When work performed by Contractor will impact or interrupt water/sewer/storm drainage utility service or interrupt vehicular or pedestrian access to any public or private property, Contractor shall notify all the affected parties prior to the anticipated impact a minimum of 48 hours in advance. In addition, Contractor shall provide door hangers or equivalent a minimum of 24 hours (*and a maximum of 48 hours*) before such interruption of utility service (*or vehicular/pedestrian access*) to all residences, structures or businesses impacted by the work (*Contractor is responsible to*

coordinate with the City staff a minimum of 1 week prior in order to verify area of impact or interruption). In addition to the written notice, a representative of the Contractor shall knock on the front door of all affected residences or businesses on the morning that the work will commence, and attempt to notify the residents or businesses regarding the start of the work.

26. Fire, Police, Transit, School Bus Notification. Contractor shall provide a minimum of 48 hours (2 work days) notice to police, fire department and Post Office prior to any work that will impact vehicular traffic, and ensure that alternate emergency access is available. Provide a minimum 1 week (5 work days) notice to any transit district or school district of any traffic impacts on streets which are on bus routes (*Contractor to verify routes*), and verify that arrangements are made for alternate routes.
27. Garbage/Recycle Notification. Contractor shall provide a minimum 1 week advance notice for the garbage/recycle collector, and make arrangements for the garbage and/or recycle receptacles at all properties to be placed at a location where they can be collected on the appropriate day(s).
28. Construction Staking. Contractor shall ensure that surveying services are provided necessary to stake the project prior to and during construction, in conformance with City Standards. Construction staking shall be adequate to ensure that all streets, sidewalks, water, sewer, storm drainage and other improvements & utilities are properly installed to design alignments & grades, as well as with respect to easements, right-of-ways and property lines. All construction staking shall be all be clearly marked on lathe in the field for reference by the Contractor, inspectors, etc. during construction. Even when GPS is used during construction, adequate field staking shall be provided to allow verification of locations, alignments, depths, etc. during construction and inspection.
- 28:29. Material/Equipment Submittals from Contractor Required. Per PWDS G-1300, construction submittals shall be provided by the Contractor for review by the City, for all material & equipment which will incorporated into work covered under the PWDS.

EXISTING UTILITIES & FACILITIES:

- 29:30. 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 811*).
- 30:31. 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.
- 31:32. Existing Survey Monuments Location & Marking. The Contractor or developer shall retain a surveyor to research, locate and mark all existing property and street monuments within or adjacent to the work areas prior to construction. Any survey monuments that will be disturbed

during construction of the project shall be referenced (*prior to construction*) and replaced (*following construction*) 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 and/or a survey document recorded as required by ORS 209.140, ORS 209.150 and/or ORS 209.155 as applicable.

32.33. Contractor shall field verify location and depth of all existing utilities where new facilities cross or are closely parallel to the existing facilities. 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 and other conflicts far enough ahead of construction to determine necessary grade, alignment or depth modifications without delaying the work or requiring otherwise unnecessary materials, fittings or structures. If grade, alignment or depth modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer shall obtain approval from the City Engineer prior to construction. -

33.34. 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.

34.35. Except where otherwise shown on the drawings and explicitly approved in writing by the City, existing City utilities crossed, intercepted by or in the vicinity of new utility lines or facilities (*of the same system*) shall be connected to the new City utility system at locations as required by the City Engineer and Public Works Director. Existing City utility lines which are parallel with, or which are replaced or superseded by the new utility lines (*as determined by the City*), shall be abandoned or removed as part of the project (*and existing facilities or structures served by the abandoned lines shall be connected to the new system as applicable*), as required by the City Engineer and Public Works Director.

35.36. Utilities that are abandoned in place, or interfering portions of utilities, 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 (*grout or concrete plugs, if used, shall be installed to fill the full pipe diameter for a distance of two times the pipe diameter back from the pipe end*).

36.37. 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.

37.38. Unless otherwise approved by the City, all springs, field tiles or drain lines intercepted or exposed during construction shall be connected to catch basins or new storm lines, except for field tiles or drain lines which are removed completely during construction, or are located and plugged at 50 foot maximum intervals uphill of the location intercepted (*grout plugs, if used, shall have a length of two times the pipe diameter*). Any abandoned drain tiles downstream of the intercepting trenches shall be plugged with grout for a distance of two times the pipe

diameter back from the pipe end.

38.39. 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.

39.40. Any wells encountered (*which are not specifically designated as being for continued use as approved by the City*) shall be abandoned per the Oregon Water Resources Department (WRD) requirements, and a copy of the notice submitted to WRD shall be provided to the Public Works Director and the City Engineer. Locations and designation of all wells (*abandoned or designed for continued use*) shall be noted and clearly shown on the as-built drawings.

40.41. Any fuel tanks encountered shall be removed and disposed of per State of Oregon DEQ requirements, and notice provided to the Public Works Director and the City Engineer. Locations of abandoned fuel tanks shall be noted and clearly shown on the as-built drawings. Backfill with compacted granular material.

GRADING, PAVING & DRAINAGE:

41.42. Contractor to review soils/geotechnical report prepared by _____ (dated __/20 __), and conform to all recommendations listed in the report or requirements shown on these plans, whichever is more stringent.

42.43. 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.

43.44. Unless otherwise noted, all grading, rock and paving to conform to OSSC (ODOT/APWA) Specifications, 2021 edition.

44.45. 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 on trees which are not scheduled for removal.

45.46. 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. Fills are not to be placed prior to approval of stripping limits and depths and concurrence of such approval by the City.

46.47. Clearing & stripping areas near water bodies or on sloped terrain shall follow best management practices to prevent erosion or runoff at any time.

47.48. 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.

- ~~48.49.~~ Engineered fills shall be constructed and compacted in 6" lifts over approved subgrade. All fills within public right-of-ways and easements shall be engineered, with each lift compacted to 95% of the maximum dry density per AASHTO T-180 test method (*Modified Proctor*).
- ~~49.50.~~ All fills outside of public right-of-ways which are within potential building envelopes shall be engineered and comply with the Oregon Structural Specialty Code, with each lift compacted to 90% of the maximum dry density per AASHTO T-180 test method (*Modified Proctor*). Fills outside of building envelopes which are over 12-inches in depth shall also be engineered and compacted.
- ~~50.51.~~ 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.
- ~~51.52.~~ Contractor is responsible for coordinating with the City for the following proof-rolls (*witnessed by the City, with a fully loaded rock truck*). Performance of proof-rolls summarized below are required for all public street, fire lane or common use driveway improvements. Performance of a proof-roll does not replace the requirement for density testing where specified or where required by City standards.
- Subgrade proof-roll: prior to fabric or baserock placement.
 - Curbline proof-roll: prior to placement of curb & gutter.
 - Finished rock proof-roll: prior to paving.
- If the subgrade is disturbed after the subgrade proofroll, or if inclement weather (*ie. significant rain*) occurs between the time any proof roll is performed and baserock placement, curb placement or paving, another proof roll may be required by the City.
- ~~52.53.~~ Crushed granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve, and shall be approved by the City prior to placement.
- ~~53.54.~~ Granular Baserock Compaction. Compact granular baserock 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 finished rock grade proof-roll (*witnessed by the City*) must be performed.
- ~~54.55.~~ Paving of streets shall not be allowed until after completion of all of the following as a minimum, including submittal of acceptable written test results to the City where applicable:
- all required testing, inspection and proofroll of baserock;
 - installation and testing of new water, sewer and storm drain lines under paved areas (*including trench compaction testing and submittal of test results to the City*);
 - review and approval of the franchise and/or private utility plans by the City Engineer; and
 - installation of all franchise utilities or sleeves located under or crossing paved areas, curbs or sidewalks.

55.56. Pavement Mix Design. AC Pavement shall conform to OSSC (ODOT/APWA) 00744 (hot mixed Asphalt Concrete Pavements (ACP)), and shall be approved by the City prior to placement. Unless otherwise approved in writing by the City (*prior to paving*), base course paving shall be 3/4 inch mix and wearing/leveling course paving shall be 1/2 inch mix (*Level 2 JMF for local streets/parking lots/fires lanes, and Level 3 JMF for collector/arterial streets*).

56.57. Pavement Compaction (*public & private roads & maintenance access routes*). AC Pavement shall be compacted to a minimum of 91% of maximum density (*at all locations*) as determined by the Rice standard method, based on nuclear density testing.

57.58. Pavement Joint Locations & Offsets. Per OSSC 744.44, place ACP in panel widths to minimize the number of transverse and longitudinal joints to a minimum. For multi-lift paving, offset the longitudinal joints and transverse (*end*) joints in one panel by at least 6-inches from the joints in the panel immediately below (OSSC 744.44.a). Longitudinal pavement panel joints/seams shall be at or within 6 inches of the centerline of the street unless otherwise approved by Public Works Director and agency with jurisdiction. Where approved, joints offset from centerline shall be installed at or within 6 inches of lane lines or fog lines. In no case shall longitudinal pavement joints be allowed in travel lanes or adjacent to travel lane wheel paths.

58.59. Where offsets between pavement lifts cannot be provided, ~~OR~~ where new paving abuts existing pavement (*for extension or widening of existing streets*), a bench grind along the joint shall be provided per City standard details, with a strip of pre-tacked paving fabric centered over the joint between the first and second lift.

59.60. Pavement surface shall be a smooth, well-sealed, tight mat without depressions or bird baths. Bony or open graded pavement surfaces shall be repaired to the satisfaction of the City, prior to final acceptance of the work.

60.61. ACP mixtures shall be placed only when the surface is dry and weather conditions are such that proper handling, finishing and compaction can be accomplished. In no case shall ACP mixtures be placed when the surface temperature is below the minimum established under 2021 OSSC (ODOT/APWA) 00744.40 (Season and Temperature Limitations) or the project specifications, whichever is more stringent.

61.62. Contractor shall protect new pavement against traffic as required, until it has cooled sufficiently to avoid tracking.

62.63. All existing or constructed manholes, cleanouts, monuments, gas valves, water valves and similar structures shall be adjusted by the Contractor to match finish grade of the pavement, sidewalk, landscaped area or median strip wherein they lie.

63.64. Street pavement widening cross slope shall be a minimum of 2% and a maximum of 5% except at intersections, where the street cross slopes shall not exceed 2% maximum (*intersection defined from end of curb radius both directions*) to comply with ADA and

PROWAG standards. Prior to placing curbs, Contractor shall field verify pavement widening cross slope and contact City if the design pavement widening cross slope is not within the limits stated above.

- ~~64.65.~~ All street signs, traffic control signs, curb & pavement painting/marketing or striping, and/or reflectors shall be installed (*in conformance with City and MUTCD standards*) prior to requesting final inspection by the City. Signs or barricades at the end of streets, sidewalks or bike lanes shall conform with City standards and be acceptable to the Public Works Director.
- ~~65.66.~~ Pavement Markings. Stop bars shall be provided at all stop signs, located behind the pedestrian crossing at a location acceptable to Public Works Director. All stop bars, crosswalk striping and other roadway marking and emblems shall be 125 mil thick pre-formed skid resistant thermoplastic with intermix glass beads (*Premark BD by Ennis-Flint, or OptaTrac by Geveko Markings*). Installation shall be by methods and by a contractor approved by Public Works Director.
- ~~66.67.~~ Unless otherwise shown on the drawings, no cut or fill slopes shall be constructed steeper than 2H:1V maximum.
- ~~67.68.~~ All planter areas shall be backfilled with approved top soil minimum 8" thick. Stripping materials shall **not** be used for planter backfill.
- ~~68.69.~~ Contractor shall seed and mulch all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. Mulch shall be either hydromulch or finely chopped fescue or rygrass mulch conforming with OSSC (ODOT/APWA) Section 01030.15

As noted in the OSSC, CEREAL GRAIN STRAW (*wheat or similar*) IS NOT AN ACCEPTABLE SUBSTITUTE without specific written approval.

Unless otherwise approved in writing by the City (based on the seeded areas being irrigated), final seeding shall occur between 3/1 and 5/15 or between 9/1 and 11/15, during periods when environmental conditions are conducive to satisfactory growth (see also OSSC (ODOT/APWA) 01030.43 & 01030.60).

- ~~69.70.~~ Grading shown on the drawings is critical to functioning of detention system and shall be strictly followed.
- ~~70.71.~~ Contractor shall coordinate and ensure that detention volumes are inspected and approved by public agencies having jurisdiction prior to paving and landscaping.

• **Curbs, & Sidewalks, Etc.**

- ~~71.72.~~ Unless otherwise shown or indicated on the drawings, 6-inches nominal curb exposure used for design of all parking lot and street grades.

- ~~72.73.~~ Unless otherwise approved in writing by the City and any other agency with jurisdiction, monolithic curb & sidewalk (*other than pedestrian ramps*) shall not be placed in the public right-of-way (*ie. curb concrete & sidewalk concrete shall be placed separately*). Joint material shall be placed at spacing and locations as noted on the City standard details.
- ~~73.74.~~ Construction of all curbs, & sidewalks, driveways and other concrete structures shall conform to the applicable requirements of OSSC (ODOT/APWA) Section 00759, Miscellaneous Portland Cement Concrete Structures, including placement, curing, finishing and the repairing of minor defects. Major defects (*as determined by the City*) will require removal and replacement of the defective portions as directed.
75. Unless a different thickness is noted on the drawings and approved in writing by the City, all concrete for sidewalks, driveways or other structures shall be placed on a minimum of 4-inches of compacted granular baserock (3/4"-0 granular baserock unless otherwise specified).
- ~~74.76.~~ Where new curbing connects to existing curbing or is installed along existing streets or pavement, the gutter grade shall match the existing street grades so as to allow drainage from the street to the gutter, as well as through any transitions or connections between old & new curbs. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to curb placement. Curbs that are placed too high or too low shall be removed and replaced as directed by the City
- ~~75.77.~~ Finish sidewalk grades at transition to existing sidewalks shall match existing sidewalk grades as required to form a continuous, smooth, free draining surface. The Contractor shall notify the City in writing of any grade discrepancies or problems prior to sidewalk placement.
- ~~76.78.~~ Each lot shall be provided with a minimum two 3-inch diameter weep holes per lot in curbs on each frontage to provide for lot drainage. As a minimum, one weep hole shall be located 5 feet from the property line on the low point in the lot frontage at the time of curb construction. Weep holes shall also be provided as required for existing drainpipes whether or not shown on the drawings, for additional drainpipes shown on the drawings, as well as on both sides of driveway aprons. 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 (*drain pipe under sidewalks shall extend 12-inches behind back of sidewalk and be capped*), and shall connect to existing drain piping where such piping exists within or adjacent to the right-of-way or easement. Where storm drain laterals for lots are constructed to curb weepholes in conjunction with subdivision or development improvements (*ie. where storm drain laterals from storm mainline is not provided*), the Contractor shall install 3" x 4" eccentric reducers just past the back of sidewalk to transition to 4-inch PVC rain drain lines as applicable.
- ~~77.79.~~ Weep holes installed in existing curbs shall be core drilled and sealed as required by Public Works Director.
- ~~78.80.~~ New or replacement 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. Existing curbs crossed by new services shall have letters routed or cut into the concrete, unless otherwise approved in writing by the City.

79.81. Contractor shall construct handicap access ramps at all intersections in accordance with current ADA and PROWAG requirements.

80.82. Concrete. All curbs, sidewalks and driveway approaches shall be constructed using batch plant concrete 3300 psi min @ 28 days, max 5" slump, 4.5% air ($\pm 1.5\%$), and shall be cured with Type 1 or Type 1D clear curing compound. All sidewalks shall fully comply with all ADA and PROWAG standards.

--Standard sidewalks shall be a minimum of 4-inches thick.

--All pedestrian ramps and standard residential driveways shall be a minimum of 6-inches thick.

--Commercial or industrial use driveways and alley approaches shall be minimum 8-inches thick.

--Multi-Use paths shall be a minimum of 6-inches thick (*any pathways used for maintenance vehicle access to utilities shall be reinforced with #4 bar at 12" OC EW, unless 8" concrete thickness is provided*).

81.83. Curb & sidewalk concrete shall be placed only during periods when it will not be damaged by rain (*protect unhardened concrete from precipitation*). Concrete shall not be placed on frozen baserock. Do not begin concrete placement until temperature in the shade is a minimum of 35°F and rising, and stop placement if air temperature falls below 35°F. Protect concrete from freezing for a minimum of 5 days after placement per OSSC (ODOT/APWA) 0000440.40.d & 00756.40 or the project specifications, whichever is more stringent.

82.84. Contraction joints shall be installed directly over any pipes that cross under the sidewalk, to control cracking. In general, cracks in new curbs or sidewalks (*at locations other than contraction joints*) are not acceptable, and cracked panels shall be removed & replaced unless otherwise approved by Public Works Director.

83.85. Contractor shall conduct a flood test of all new or replacement pedestrian ramps after concrete is cured to demonstrate that the ramp does not hold water. After water is poured into the ramp area, the inspector shall check the ramp 15 minutes later to determine if water is ponding in the ramp or gutter area. If water is ponding in the ramp or gutter area and the pond is more than 1-foot in length or 1/4-inch in depth, the Contractor shall be required to make repairs in an approved manner at his/her sole expense.

84.86. Where trench excavation or other work requires removal of (*or causes damage to*) 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. Any sawcut lines shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

85.87. Unless otherwise approved in writing by Public Works Director, areas along curbs and public sidewalks shall be backfilled with approved topsoil, as well as being seeded and

mulched (or hydroseeded).

PIPED UTILITIES:

86.88. Contractor shall coordinate and pay all costs associated with connecting to existing water, sanitary sewer and storm sewer facilities.

87.89. Unless otherwise noted, materials and workmanship for water, sanitary sewer and storm sewer shall conform to OSSC (ODOT/APWA) Specifications, 2021 edition.

88.90. 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.

89.91. Pipe Bedding and Trench Backfill. All pipes shall be bedded with minimum 6-inches of 3/4" minus granular backfill (*crushed rock*) bedding and backfilled with compacted 3/4" minus granular backfill in the pipe zone (*granular backfill shall extend a minimum of 12-inches over the top of the pipe in all cases*). Granular trench backfill shall be used under all improved areas, including sidewalks.

90.92. Granular backfill shall be 3/4"-0 conforming to OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), with no more than 10% passing the #40 sieve and no more than 5% passing the #200 sieve.

91.93. Granular Trench Backfill Compaction. Granular trench bedding and granular backfill in the pipe zone shall be compacted to be firm and unyielding, even though compaction testing is not required in this zone. Granular trench backfill above the pipe zone shall be compacted to 92% of the maximum dry density per AASHTO T-180 test method (*Modified Proctor*), and shall be tested in lifts for deeper trenches.

92.94. Trench Foundation Stabilization. If trenches are over-excavated for any reason, over-excavation shall be filled to the design trench subgrade (*ie. to the bottom of the 6" thick pipe bedding layer*) with compacted, well-graded granular backfill as specified (*the use of open-graded rock for trench foundation stabilization is prohibited unless it is completely encapsulated in geotextile fabric & approved in writing by the City*).

93.95. Temporary thrust restraint on pressure pipelines shall be provided at all locations where necessary due to construction sequencing shown on the drawings, required by City standards or chosen by the Contractor. The adequacy of the temporary thrust restraint shall be the Contractor's sole responsibility, but shall be acceptable to the City and any other agency with jurisdiction. Any movement of the pipe or fittings during pressurization of the pipeline or connection shall be considered evidence that the temporary thrust restraint is not adequate, and the pipeline or connection shall be depressurized and the thrust restraint increased as necessary. Re-pressure testing or re-chlorination, if deemed necessary at the sole discretion of the City, shall be completed at the Contractor's expense.

~~94.96.~~ Contractor shall arrange for and pay all costs to abandon existing sewer and water services not scheduled to remain in service.

~~95.97.~~ 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.

~~96.98.~~ The end of all utility stubs shall be marked with a painted 2-x-4, extending 2 feet minimum above finish grade (*painted white for sanitary sewer, green for storm*), and wired to pipe stub. Tracer wire shall be extended (and attached) to the top of the 2-x-4 post. Type of utility (*ie. sewer, storm, etc.*) and depth below grade to pipe invert shall be clearly & permanently labeled on the marker post.

~~97.99.~~ Contractor shall provide all materials, equipment and facilities required for testing all utility piping in accordance with City construction specifications.

~~98.100.~~ **Tracer (Toning) Wire.** All water, sanitary and storm sewer piping shall have an electrically conductive insulated 12 gauge solid core 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 taped to the top of the pipe at 10 foot maximum intervals and shall be extended up into all valve boxes, and manholes and catch basins and accessible from the surface.

-- All tracer wire splices shall be made with corrosion resistant waterproof wire nuts (*DBR direct bury splice kit by 3M Company, or equal*).

--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 or catch basin.

~~99.101.~~ **6-inch Wide Warning Tape.** All underground water, sanitary and storm sewer piping shall have a 6-inch wide warning tape installed in the upper reaches of the trench as shown on Detail 301 (*color & "Caution: Buried ___ Below" wording as required for water, sewer, storm drain, etc.*). Underground warning tape shall be continuous the entire length of mainlines, and along service laterals installed from the mainline to the back of the PUE as applicable.

~~100.102.~~ 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.

~~101.103.~~ Before mandrel testing, TV inspection or final acceptance of gravity sewer or storm pipelines, all trench compaction shall be completed and all sewers and storm drains flushed & cleaned to remove all mud, debris & foreign material from the pipelines, manholes and/or catch basins.

~~102.104.~~ Where future extensions are shown upstream of new manholes (*sewer or storm*), catch basins or junction boxes, pipe stubs (*with gasketed caps*) shall be installed at design grades to a point 2' minimum outside of the structure.

~~403.105.~~ Timing for Trench Work on Existing Public Streets. Unless authorized in writing by the City 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 completely plated or repaired with cold patch; trenches within each block or intersection shall be permanently repaved within 21 days of the start of excavation (*including completion of all inspections, testing & corrective work required by City standards prior to paving*). These timeframes apply independently and separately to each block or intersection where trenching work occurs.

~~404.106.~~ Interior Debeading. Where butt-fused HDPE is used for gravity flow applications, fusion joint bead projections shall be removed from the interior of all fused pipe as each joint is fused, by means of a mechanical cutting head, for all pipe 18-inches in diameter (IPS) or less. The de-beading cut shall be flush with inside circumference of the pipe.

• Water

~~107.~~ Interruption of Water Service. In no case shall water service be interrupted for more than four (4) hours in any one day, without prior written authorization by the City (*a minimum of 1 week prior to the work*).

~~405.108.~~ City forces to operate all valves on existing public water mains, on the public side of water meters, or at the connection of fire service lines to public water mains.

~~406.109.~~ No person other than Public Works staff shall operate or flow test fire hydrants without first obtaining written authorization from the Public Works Director. This hydrant use restriction shall not apply to fire department/fire district staff in the performance of their regular duties. All hydrant flow tests shall be performed with Public Works staff present unless otherwise approved by the Public Works Director. Opening or operating fire hydrants with any tool other than a standard hydrant wrench designed for that purpose is prohibited.

~~407.110.~~ All water mains shall be C-900 PVC (DR 18) or 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.

~~408.111.~~ 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.

~~409.112.~~ Unless otherwise approved by the City Engineer, all valves shall be flange connected to adjacent tees or crosses (*where such fittings are installed adjacent to valves*). In-line valves shall be MJ x MJ.

~~410.113.~~ All buried valves shall be provided with new valve boxes, including new valves

installed by the Contractor, or existing valves which are excavated around as part of the work, and existing valves which are located within newly paved, newly concreted or newly graveled surfaces. Valve boxes shall conform to City sStandard dDetails. Reuse of existing valve boxes will only be allowed is they fully conform with current City standard details, are accurately centered on the valve nut, are clean of excess rock or debris around the valve nut, and are approved in writing by the City on a case-by-case basis.

~~111.~~114. Permanent thrust restraint (concrete thrust blocks) shall be provided on all bends, tees and other direction changes per local jurisdiction requirements and as specified or shown on the drawings. All concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi min @ 28 days, max 5" slump, 4.5% air ($\pm 1.5\%$). Concrete mix design shall be submitted to the City for review and approval prior to use. If hand mixed sack-crete type concrete is proposed by the Contractor and approved by the Public Works Director, it shall be a 4000 psi minimum mix (*approved by the City prior to use*), mixed with the minimum amount of water necessary for workability (*5" slump or stiffer*). In no case will dry sack-crete mix (*either in bags or as loose mix*) be considered as an acceptable substitute for an approved mixed concrete.

~~112.~~115. It shall be the Contractor's responsibility to coordinate with the City for visual inspection and verification of all thrust restraint and thrust blocking prior to covering or backfilling.

~~113.~~116. Where approved by the City prior to construction, temporary thrust restraint may be used at mainline connections where it is not possible (*prior to pressurization of the connection and placing the waterline in service*) to install permanent concrete thrust blocks, straddle blocks or other permanent thrust restraint as required or shown/noted on the drawings. Trenches at the temporary thrust restraint location shall be left open and not backfilled (*but plated as necessary or required*) until the permanent thrust restraint is installed and approved by the City. Unless otherwise approved in writing by the City, permanent thrust restraint shall be installed by the end of the next working day after installation of the temporary thrust restraint, but in no case later than the third calendar day following installation of the temporary thrust restraint.

~~114.~~117. Unless otherwise approved by the City, water service pipe on the public side of the meter shall be CenCore blue HDPE tubing (*CTS, SDR 9, 200 psi*) conforming to AWWA C901 (ASTM D2239 & D2737) with 2-3/8" long style compression inserts (*AY McDonald 6133T CTS insert stiffener or equal*) and Q style compression fittings.

~~115.~~118. Unless otherwise noted, water service pipe on the private side of the meter shall be Schedule 40 PVC or as approved by the OPSC.

~~116.~~119. **Primer Required.** For all PVC pipe with all solvent cement joints, use of purple primer (*IPS Weld-On P70 Industrial Grade or equal*) is mandatory (*see also OPSC 605.12.2*), with gray medium body PVC cement (*IPS Weld-On 711 Industrial Grade or equal*).

~~117.120.~~ Domestic, irrigation and fire backflow prevention devices and vaults shall conform to requirements of public and/or private agencies having jurisdiction. It is the responsibility of the premise owner and/or water user to provide a thermal expansion tank or other means approved by the Oregon Plumbing Specialty Code (OPSC) to address thermal expansion concerns in the private water system piping downstream of any backflow device or pressure regulator where applicable (*see PWDS 3.22.c & OPSC 608.2&3*). The premise owner and water user is hereby notified of these thermal expansion concerns, and that it is the responsibility of the premise owner and/or water user to address these concerns.

~~118.121.~~ The Contractor shall be responsible for having backflow devices tested and certified prior to final acceptance of the work.

~~119.122.~~ The Contractor shall coordinate with the owner(s) of property being served for permits and installation of conduit(s) and wire as necessary to power required sump pumps in meter vaults and/or in backflow vaults, and any required freeze protection, or as necessary to monitor any tamper switches required in backflow vaults or enclosures. Installation and activation of any such power and/or signal wires is required prior to acceptance by the City.

~~120.123.~~ The Contractor installing each vault or enclosure shall be responsible to install (*or coordinate the installation of*) the conduit and wires required to serve each such vault or enclosure.

~~121.124.~~ 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.

~~122.125.~~ **Water Mainline Couplings.** Where shown on the drawings or required by the City, restrained sleeve couplings shall be Krauz Hymax Grip Couplings or approved equal (Romac Alpha Coupling). Unrestrained mainline couplings shall be long-style epoxy coated DI sleeve couplings, or Hymax Wide Range Coupling (*short body couplings not allowed*).

~~123.126.~~ **Sanitary Sewer & Waterline Crossings.** Where new waterlines cross below or within 18-inches vertical separation above a sewer main or sewer service lateral, center one full length of waterline pipe at point of crossing the sewer line or sewer lateral. Unless otherwise approved in writing by the Public Works Director, existing sewer mains and/or service laterals within this zone shall be replaced with a full 12 foot length of new pipe (*D2241 PVC-DR 32.5, C-900 PVC-DR 18 or CL 50 ductile iron*), centered at the crossing in accordance with OAR 333-061 and local jurisdiction requirements. Connect to existing sewer lines with approved flexible reinforced couplings (*MaxAdaptor Coupling by Gripper Gasket LLC or approved equal*). Example: For an 8-inch waterline with 36-inches cover, 4-inch service lateral inverts within 5.67-feet (*68-inches*) of finish grade must have this pipe centered at the crossing.

~~124.~~127. Contractor shall install temporary chlorination & sample taps, restrained caps/plugs and blowoffs as required on new waterlines for flushing, pressure testing, chlorination and bacteriological testing (*configuration to be acceptable to the City or other agency with jurisdiction*). Chlorination and sample taps shall be located within 18-inches of the end of each mainline segment to be chlorinated & tested, and configured to ensure that all portions of the pipelines are adequately disinfected.

~~125.~~128. Pressure Testing. All waterlines, services and appurtenances shall be pressure tested for leakage. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. The hydrostatic test shall be performed with all service line corporation stops open and meter stops closed, and with all hydrant line valves open. Prior to the start of each pressure test, the position of all mainline valves, hydrant line valves and service line corporation stops in the test segment shall verified.

~~126.~~129. Cleaning & Flushing. After the pressure test and prior to disinfecting, the water lines shall be thoroughly flushed through hydrants, blow offs or by other approved means.

~~127.~~130. Disinfection & Bacteriological Testing. All water mains and service lines shall be chlorine disinfected per local jurisdiction requirements, AWWA C-651 or OAR 333-061 (25 mg/L minimum chlorine solution, 24 hours contact time), whichever is more stringent. Unless otherwise approved by the Public Works Director, a City representative shall witness the application of the chlorine solution and the chlorine testing at the end of the 24 hour contact period. After the 24 hour chlorine contact period, the free chlorine concentration shall be checked, and if it is found to be 10 mg/L or more, the chlorine solution shall be drained (*otherwise the line shall be rechlorinated*), the waterline flushed with potable water, and a minimum of two consecutive samples taken at least 24 hours apart shall be collected from the waterline for microbiological analysis (*ie. one sample immediately after flushing, and another sample a minimum of 16 hours later*). Contractor to pay for laboratory analysis of water samples taken under the supervision of the City. If the results of both analyses indicate that the water is free of coliform organisms, the waterline may be placed in service. Should the initial treatment prove ineffective, the flushing & chlorination shall be repeated until confirmed tests show acceptable results. Contractor shall coordinate with Public Works Director to ensure that both a high level chlorine test kit and a chlorine residual test kit is available at the site during testing.

~~128.~~131. Disinfection of Connections. For connections which cannot be disinfected with the waterline mainlines as noted above, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution (10,000 mg/L) in accordance with the requirements of AWWA C-651 and OAR 333-061.

~~129.~~132. Disposal of Chlorinated Water. The chlorine residual in water from testing, disinfection or flushing activities shall be neutralized in accordance with DEQ standards prior to discharge to the storm system or ditch discharging to surface waters. Care should be exercised to balance the amount of dechlorinating chemical against the chlorine present.

Where required by Public Works Director, the Contractor shall provide a field chlorine residual test kit to verify adequate dechlorination of water being discharged.

~~130.~~133. Capping of Chlorination Taps, Pressure Test Taps, Temporary Sample Taps, etc.

Unless otherwise approved or required by the City, all extra pipe and fittings attached to chlorination, pressure test or temporary sampling taps shall be removed and the corporation stop capped at the mainline tap or saddle after the new waterline is placed in service (*to avoid depressurizing the mainline after disinfection*). Wrap each capped corporation stop in plastic prior to backfilling. The location of all such capped corporation stops shall be shown on the Contractor's record drawings.

~~131.~~134. Unless otherwise shown on the drawings AND explicitly approved in writing by the City, any existing waterlines abandoned in place shall be physically disconnected from valves and other connection points to the existing water system. A blind flange or restrained MJ plug (as applicable) shall be installed on the back side of all valves from which abandoned waterlines are disconnected. Remove valve boxes from abandoned valves prior to repaving or surface restoration.

• **Sewer & Storm Manholes**

~~132.~~135. All precast sanitary sewer manholes shall be provide with integral rubber boots. Lockdown lids shall be used on manholes outside of public right-of-way only where specifically required by Public Works Director.

~~133.~~136. All connections to existing manholes shall be made by core-drilling the existing manhole structure and installing a rubber boot. Connections to manholes shall 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.

~~134.~~137. Grouting & Channels to be Smooth. All interior joints, penetrations & any exposed lifting holes shall be grouted following manhole assembly. The grouting and channels of all manholes shall be smooth and uniform, and shall not retain water or debris. Any grout or concrete splatters (*in channels, on channel benches, on walls or on steps*) shall be removed by the Contractor.

~~135.~~138. Unless otherwise approved in writing by the Public Works Director and the City Engineer, manhole steps shall be installed in any manhole which does not have existing steps, and which is connected to or otherwise altered in any way.

~~136.~~139. Manhole channel depths (*sewer & storm*) shall be to the heights shown on the drawings, but in no case shall be the channel depth be less than 2/3 of the pipe diameter. Flow channels in manholes shall be of such shape (*semi-circular bottoms*) and slope to provide smooth transition between inlet and outlet sewer size/ invert to minimize turbulence and to ensure that the manhole channels are self-cleaning. Channels, as well as shelves between the channels and the manhole walls, shall be sloped to drain per plan details.

~~137.140.~~ For all sanitary sewer manholes, external mastic wrap joint seal (*9-inch minimum width*) shall be installed on all manhole barrel joints & pickholes after assembly, prior to backfilling (*Bidco External Joint Wrap BW-9T by Telleborg, or equal*). The exterior of the manhole barrels adjacent to each joint shall be clean (*under the mastic wrap*) to ensure a good seal (*use wire brush to clean the exterior surface under the mastic wrap to remove all dirt, loose particles or deleterious material*). The mastic wrap shall be held in place with plastic stretch wrap (*ie. pallet wrap plastic, 3 layers minimum*) during backfilling (*ie. to protect the external mastic wrap from displacement during backfill installation &/or compaction*). Plastic wrap shall be installed immediately after the mastic wrap is placed.

~~138.141.~~ MH Rim Elevations. Contractor shall be responsible to verify manhole finish rim elevations match with finish grade or are set above finish grade as required to conform with City standard details. Manhole rim elevations shall be adjusted as required to conform with this requirement.

~~139.142.~~ MH Inflow Inserts. All sanitary sewer manholes in low areas which are subject to flooding or water ponding (*including all lawn, landscape or gravel areas, or low areas of parking lots, or manholes closer than 4 feet clear of parking lot curblines or existing/future street curbs, adjacent to ditches, etc.*) shall be provided with inflow protector lid inserts (*whether or not such MH inserts are specifically noted on each applicable drawings sheet*). Manhole inflow inserts shall be of ABS or HDPE plastic, and shall include integral lifting lugs on each side of the insert allowing removal with a manhole hook (*lift straps are not an acceptable alternate*), a factory installed closed cell neoprene rubber gasket bonded to the underside of the insert rim. Unless waived in writing by Public Works Director (*case by case basis*), a clog-free vent-valve valve (*rubber check by Tideflex*) shall be provided on each unit. Inserts shall be ManPan manhole inserts or approved equal.

143. Sanitary Sewer Manhole Vacuum Testing & Witness. All manhole testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all sanitary sewer manhole testing. Visible groundwater infiltration or leakage constitutes a failed sanitary sewer manhole test, whether or not the vacuum test is successful. Any sewer manholes which exhibit visible leakage after assembly shall be injection grouted by a qualified grouting subcontractor (*retained by the Contractor*) acceptable to the City (*surface plugging of manhole leaks with non-shrink grout is not a permanent repair, and is not acceptable*).

~~140.144.~~ Vacuum Testing (*New SS MHs*). All sanitary sewer manholes shall be vacuum tested following completion of paving or final surface restoration.

~~141.145.~~ Vacuum Testing (*Existing SS MHs*). Existing sanitary sewer manholes to which new pipes are connected (*or where existing pipe connections are modified*) shall be sealed as required and pass a vacuum test prior to final approval.

146. Vacuum Testing (*Resurfacing around Existing SS MHs*). Existing sanitary sewer manholes where pavement or surfacing is replaced around the manhole shall be sealed as required and

pass a vacuum test following completion of paving or final surface restoration.

~~142. Manhole Testing & Witness. All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all manhole testing. Visible groundwater infiltration or leakage constitutes a failed manhole test, whether or not the vacuum test is successful.~~

~~143.~~147. Manhole Cleaning. All manholes shall be thoroughly cleaned prior to being placed in service and/or accepted by the City, including removal of any debris, excess grout in manhole channels or on manhole steps, etc.

• Sewer & Storm Warranty Inspections

~~144.~~148. Re-inspection of the gravity sanitary sewer systems by cleaning & TV inspection shall be performed during the last month of the warranty period, as well as visual inspection of all sanitary sewer manholes during the wet weather season (any visible groundwater infiltration or leakage constitutes a failed manhole test, and will require warranty correction). Based on the results of the TV inspections and/or the City's warranty inspections, additional warranty tests may include mandrel testing or low pressure air testing. The results of these test(s) will be used by Public Works Director to determine if final acceptance of the system is warranted and what corrective work is required prior to final acceptance. The cost of these re-inspections and any corrective work shall be the responsibility of the Developer. The warranty period will not be considered to be complete, and maintenance bonds will not be released until after all warranty inspections are finished and any resulting corrective work is completed.

• Gravity Sanitary Sewer

149. Interruption of Sewer Service. In no case shall sewer service be interrupted for more than four (4) hours in any one day, without prior written authorization by the City (a minimum of 1 week prior to the work).

~~145.~~150. Unless otherwise shown, gravity sanitary sewer pipe shall be PVC in conformance with ASTM D3034, SDR 35. All other appurtenances and installation to conform to the City specifications.

~~146.~~151. Gravity sSanitary sewer laterals for single family residential & each side of duplexes shall be a minimum of 4-inches in diameter (*6-inch minimum for all multi-family, industrial, or commercial or public type laterals*), and shall include toning wire and warning tape per City standard details.

~~147.~~152. Gravity Sewer Couplings. Couplings for new PVC sewer pipe connecting to other PVC or solid wall HDPE pipe shall be gasketed solid sleeve PVC slip couplings. Couplings for connection of PVC to concrete pipe shall be MaxAdaptor Coupling (*by Gripper Gasket LLC*) for sizes up to and including 12-inch diameter.

~~148.153.~~ **Gravity Sewer Cleaning.** After manhole channeling and prior to leakage testing, mandrel testing and/or TV inspection, flush and clean all sewers, and remove all foreign material from 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.

~~149.154.~~ **Gravity Sewer Pipe Leakage Testing (Air Test).** Sanitary sewer pipe and appurtenances shall be tested for leakage by low pressure air testing, after installation of all mainlines, laterals and cleanout risers for each manhole-to-manhole segment. Leakage tests shall include an air test of all sewer mains and laterals prior to paving. ~~and a~~ separate air test shall be performed on any of all sewer mains and laterals where all utilities which cross sewer laterals were not complete prior to initial air testing (following excavation and backfilling of any franchise utility trenches or other utility work that crosses sanitary sewer laterals). All testing shall conform to requirements as outlined on City testing forms contained in the PWDS. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all sewer leakage testing.

~~150.155.~~ **Gravity Sewer 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 after the trench backfilling and compaction is completed and tested. Unless otherwise approved in writing by the Public Works Director, Public Works staff shall be present for all sewer mandrel testing.

~~151.156.~~ **Gravity Sewer TV Inspection.** Upon completion of all sewer construction, testing and repair (including channeling of sanitary sewer manholes), the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b *(no deviation greater than 1/32-inch per inch of pipe diameter [1/2-inch max for pipes > 16-inch diameter], & no reverse sloping pipe inverts)* and to verify pipelines are adequately cleaned. The TV inspection shall be conducted by an approved technical service, using a track or wheel propelled self-leveling auto-focus pan-head camera which is equipped to make audio-visual recordings of the TV inspections on USB storage device. Unless otherwise required by the agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection *(with the ball in contact with the pipe invert)* 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 USB storage device and written report *(or download link and pdf report)* shall be delivered to the City Engineer.

~~152.157.~~ Prior to or concurrent with connection of a building sewer 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.

~~153.158.~~ Sewer service from upstream and affected properties shall be maintained during

construction unless prior written City approval is granted. Bypass pumping or other methods used to maintain sewer flows shall be the Contractor's design, subject to approval by the City. The bypass system shall be capable of conveying flows when the sewers are flowing full. Normal unrestricted flows shall be restored at the end of each work day. Bypass systems left in place or operated outside normal working hours shall be monitored continuously by the Contractor personnel unless alternate arrangements proposed by the Contractor are acceptable to the City (*ie. high level & pump fail alarm callouts, etc.*). The Contractor shall provide for City review all submittal information required to demonstrate (*to the satisfaction of the City*) compliance with these requirements. Contractor shall be responsible for all costs related to cleanup, damages and fines resulting from any sewerage spill or overflow associated with any methods used to convey sewage flows during construction.

~~154.~~159. Thrust restraint shall be provided on all pressure pipelines meeting the same standards and requirements as for water mainlines.

- **Storm Drain**

~~155.~~160. Storm drain pipe materials shall conform to the construction drawings and City requirements, based on cover depth. 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%).

~~156.~~161. Storm drainage laterals for single family residential properties shall be a minimum of 4-inches in diameter (*6-inch minimum for all multi-family, industrial, ~~or~~ commercial or public type laterals*), and shall include toning wire and warning tape per City standard details.

~~157.~~162. 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.

~~158.~~163. Unless otherwise approved by the City Engineer, all storm drain connections shall be by manufactured tee or wye fittings.

~~159.~~164. Unless otherwise shown on the drawings, all storm pipe inlets & outfalls shall be beveled flush to match the slope wherein they lie.

~~160.~~165. 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.

~~161.~~166. CB Grouting to be Smooth. All joints, penetrations & any exposed lifting holes shall be grouted smooth, so as not to retain debris. Base/sump shall be smooth to facilitate cleaning.

~~162.~~167. Unless otherwise specified or directed, install storm drain pipe in accordance with manufacturer's installation guidelines.

~~163.168.~~ **Gravity Storm Couplings.** Couplings for connection of PVC to concrete or other non-compatible pipe shall be MaxAdaptor Coupling (*by Gripper Gasket LLC*) for sizes up to and including 12-inch diameter.

~~164.169.~~ **Storm Cleaning.** After manhole channeling and prior to mandrel testing or final acceptance, flush and clean all sewers, and remove all foreign material from the mainlines, manholes and catch basins.

~~165.170.~~ **Storm 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.

~~171.~~ **Storm TV Inspection.** Upon completion of all storm drain construction, testing and repair (including channeling of storm manholes), the Contractor shall conduct a color TV acceptance inspection of all mainlines in accordance with OSSC (ODOT/APWA) 445.74 to determine compliance with grade requirements of OSSC (ODOT/APWA) 445.40.b (no deviation greater than 1/32-inch per inch of pipe diameter [1/2-inch max for pipes > 16-inch diameter], & no reverse sloping pipe inverts) and to verify pipelines are adequately cleaned. The TV inspection shall be conducted by an approved technical service which is equipped to make audio-visual recordings of the TV inspections on USB storage device. Unless otherwise required by agency with jurisdiction, a standard 1-inch diameter ball shall be suspended in front of the camera during the inspection. Sufficient water to reveal low areas or reverse grades shall be discharged into the pipe immediately prior to initiation of the TV inspection. The USB storage device and written report shall be delivered to the City.

~~166.~~ **Prior to acceptance, the City will typically lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the City.**

STREET LIGHTS

~~167.172.~~ 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.

~~168.173.~~ Public street light poles, conduit and junction boxes shall conform with the requirements of the City and the power company providing service. Junction boxes shall be H-20 rated and set to finish grade. Direct bury street light poles shall be set to a depth as specified by the manufacturer, but not less than 5 feet.

~~169.174.~~ Street light poles shall be installed within one degree (1°) of plumb.

~~170.~~175. All public street lights shall be energized and fully operational prior to requesting final inspection by the City.

FRANCHISE & PRIVATE UTILITIES

~~171.~~176. Unless otherwise shown on the drawings and approved in writing by all jurisdictions having authority, new and relocated franchise utilities (*power, cable TV, telephone & gas*) shall be installed underground in conjunction with the development.

~~172.~~177. Franchise utility plans shall be submitted to Public Works Director and the City Engineer for review prior to installation. All franchise utility street crossings shall be installed at right angles to the street centerline, and all crossings of water, sewer or storm mainlines or service lines/laterals shall be as close to perpendicular as feasible.

~~173.~~178. Where franchise utilities are installed along new public or private streets, franchise utilities shall either be extended across the entire frontage of the property or to the end of the street improvements (*whichever is further*) or conduit shall be provided for extension of franchise utilities in the future without additional excavation along the new street frontage.

~~174.~~179. Developer and/or Contractor shall coordinate with gas, power, telephone, and cable TV company for installation/location of utilities and/or conduits in common trenches, as well as location of vaults, pedestals, etc., as required to serve all existing homes and new lots within the development. The Contractor shall be responsible for providing franchise utility companies adequate written notice of availability of the open trench (*typically 10 days minimum*), and reasonable access to the open trench for installation of franchise utilities as required to serve each lot within the development or along offsite improvements (*even though how or whether the homes will connect to such franchise utility service lines will be up to the homebuilder or homeowner*).

~~175.~~180. 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. Contractor shall grade street frontage PUEs so that all franchise utility pedestals and vaults can be set to finished grade as measured from the back of the public sidewalk (*whether the sidewalk is installed with street construction or deferred to a later time*).

~~176.~~181. Installation of private utilities (*including either franchise utilities or private water, sewer or storm services*) in a common trench or within 5 feet parallel with public water, sanitary sewer or storm drain mainlines is prohibited. Any parallel utilities shall be installed with a minimum of 5 feet horizontal separation (*ie. clear separation*) from parallel public water, sanitary sewer or storm drains.

~~177.~~182. 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.

~~178.183.~~ Contractor shall notify and coordinate with franchise utilities for relocation of power poles, vaults, etc. to avoid conflict with City utility structures, fire hydrants, meters, sewer or storm laterals, etc.

STREET TREES, LANDSCAPING & IRRIGATION:

~~179.184.~~ Street tree species and spacing shall be approved by the City prior to planting, based on City code provisions (*whether or not street trees are shown on the drawings*).

~~180.185.~~ All street trees shall be provided with root barrier tree wells per City details.

~~181.186.~~ Street trees and landscaping shall not conflict with sight distance standards.

~~182.187.~~ Landscape plantings shall maintain a minimum of three (3) feet clear from all fire hydrants. Maintenance of this clearance is an ongoing obligation of the property owner.

~~183.188.~~ All irrigation systems shall be provided with backflow protection conforming to state and City standards. Backflow testing results shall be submitted to Public Works Director prior to requesting final inspection by the City.

TESTING AND INSPECTION:

~~184.189.~~ The Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.

~~185.190.~~ Unless otherwise specified, the attached "Minimum Required Testing and Frequency" table outlines the minimum testing schedule for the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor. Copies of all test reports shall be submitted to the designated City representative.

Minimum Required Testing and Frequency”, page 1

Minimum Required Testing and Frequency”, page 2

EROSION CONTROL NOTES

The erosion control notes and details contained in these PWDS also apply to work under separate building permits issued without the need for a Public Works Construction Permit. City Code requires that erosion control measures be provided for work under such building permits, to minimize runoff, siltation and pollution both during and after construction (DMC 7.2.304.03 & 7.2.301.02).

General

1. Approval of an 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.*)
2. The implementation of ESC plans and the construction, maintenance, replacement and upgrading of ESC facilities is the responsibility of the applicant/contractor until all construction is completed and approved and vegetation/landscaping is established as provided for on the construction drawings, or until 75% coverage without bare spots (*ie. vegetation well established and not just showing*).
3. The erosion control measures shown on the ESC plan are considered the minimum required for anticipated site conditions, and shall be supplemented and/or upgraded by the applicant/contractor as required to control erosion or sediment within the project boundaries and avoid impacts to adjacent property. Additional measures shall be installed as required to ensure that all paved areas are kept clean for the duration of the project.
4. The boundaries of the clearing limits shown on the plans 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. Sediment fence may be used as the flagging for the clearing limits at the discretion of the Contractor.
5. The ESC facilities must be installed and maintained in conjunction with all clearing, grading and construction 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. The Contractor shall be financially responsible for all costs, violations, fines and/or penalties resulting from failure to adequately control erosion or sediment.
6. Erosion control facilities and sediment fences on active sites shall be inspected by the Contractor at least daily during any period with measurable precipitation. Any required repairs or maintenance shall be completed immediately. The erosion control facilities on inactive sites shall be inspected and maintained by the Contractor a minimum of once a month or within 24 hours following the start of a storm event, or within 24 hours of notification for failure of erosion control devices.
7. Sediment protection (*silt sack inserts with biobags*) for storm drain inlets, catch basin and area drains shall be installed and maintained for the duration of the project, and until permanent

vegetation/landscaping is established.

8. At no time shall sediment accumulation within a trapped catch basin exceed 50% of the sediment capacity. All catch basins and conveyance lines shall be cleaned prior to paving, by the Contractor as their cost. The cleaning operation shall not flush sediment laden water into the downstream system. Contractor shall also verify that all catch basins and conveyance lines are clean, and all trash or sediment deposits are removed, prior to requesting final inspection of the project by the City.
9. In addition to hydroseeding, for slopes 2H:1V or steeper (*or where slope protection matting or erosion control blanket is indicated on the drawings or required by Public Works Director*), the erosion blanket/matting shall be a type that has a extended term functional longevity (*ie. minimum 24 months degradability*) and specifically designed for use of 2:1 or steeper slopes to ensure that the steep slopes are protected until they have adequate vegetation cover established before the matting biodegrades away. Erosion control blanket/matting shall be SC150 Erosion Control Blanket by North American Green, or approved equal (*consisting of a full layer of 70% straw and 30% coconut fiber stitched with degradable thread between a heavyweight UV stabilized polypropylene top net and a lightweight photodegradable polypropylene bottom net*).
10. The Contractor shall provide (*at Contractor's expense*) site watering as necessary to prevent wind erosion of fine-grained soils, and to support vegetation until it is established as specified herein, or as required by an erosion control permit or to comply with City/state/federal erosion control standards.
11. Soil or native fill stockpiles placed or left in place during wet weather periods shall be covered with UV resistant plastic or tarps anchored and weighted in place. Stockpile covering shall also include installation of sediment fences or other sediment barrier around the stockpile on all sides. Inactive stockpiles shall not be left uncovered for more than 7 days during dry weather periods.

Sediment Fences

12. Sediment fences shall consist of standard strength filter fabric fastened securely to stitched post loops, and shall be installed on the upslope side of the posts, with 6 inches of the fabric extended into a trench along the sediment fence alignment. The fabric shall not extend more than 30 inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
13. The sediment fence (*filter fabric barrier*) shall be purchased in a continuous roll cut to the length of the barrier to minimize joints. When joints are necessary, the sediment fence shall be spliced together only at a support post. The support post ends of each sediment fence section shall be twisted together by at least 2 turns and both stakes installed into the ground together.
14. 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, and shall be provided with additional support as required to contain all silt and sediment capture. Filter fabric shall not be stapled to the existing trees.

15. 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.
16. Sediment fences shall be removed by the Contractor when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

Gravel Construction Entrances

17. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures, such as wheel wash basins, may be required to insure that all paved areas are kept clean for the duration of the project. Where provided or required by the City, wheel wash basins shall be periodically (*or as directed by City inspector*) drained, cleaned of sediment and refilled with clean water.
18. 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.
19. The entrance shall be maintained in a condition which will prevent tracking or flow of mud onto public right-of-way.
20. The entrance may require periodic top dressing with additional stone as conditions demand, and repair and/or cleanout of any structures used to trap sediment.
21. The Contractor shall verify that all trucks are well sealed when transporting saturated soils from the site. Water drippage from trucks transporting saturated soils must be reduced to less than 1 gallon per hour prior to leaving the site.
22. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately by the Contractor at their expense and to the satisfaction of the Public Works Director or his/her designee.

CITY OF DAYTON
Public Works Design Standards

Utility Companies & Agencies

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. As noted in the various sections of the PWDS, design and construction of improvements within the City must fully comply with the applicable rules and regulations of all applicable agencies, including but not limited to those listed below. In the event of discrepancies between these PWDS and applicable agency requirements, the more stringent requirements (*as determined by the Public Works Director*) shall apply.

Category	Utility/Agency	Phone #
City Hall	Dayton City Hall	(503) 864-2221
City Utilities	Dayton Public Works	(503) 864-2221
City Engineer	Westech Engineering	(503) 585-2474
Fire Code Official	Dayton Fire District	(503) 864-2221
Gas	NW Natural Gas (currently no gas service in Dayton)	(503) 585-6611 x8142
Power	PGE	(503) 463-6184
Telephone	Verizon	(503) 644-9848
Fiber Optic	Verizon	(503) 644-9848
TV	Comcast	(541) 230-0219
State Highway	ODOT District 3	(503) 986-2874
County Roads	Yamhill County Public Works	(503) 434-7515
Sanitary Sewer	Dept. of Environmental Quality (DEQ) Western Region	(503) 378-8240
Water System	Oregon Health Authority (OHA) Drinking Water Services (DWS)	(971) 673-0405
Schools	Dayton School District, Facilities	971-237-2044

CITY OF DAYTON
Public Works Design Standards

Standard Easement Forms, Etc.

Appendix D

Note: Forms in this appendix are sample model documents only, included for convenience of reference by developers, and may not include all forms. These sample documents are for reference only, and may not have the proper margins and spacing required by the County Clerk for recording.

The documents are subject to modification by the City to address project specific conditions (*as required by the Public Works Director, the City Engineer or the City Attorney*).

Easement Procedure Summary (*use similar procedure for ROW dedications, etc.*).

- For easements from a developer or property owner to the City (*or for private easements required by City standards*), the easement legal description and to-scale exhibit map for the proposed easement shall be submitted to the City for review and approval (*unless the easement is created by the final plat, in which case the City easement form will simply reference the easement as noted on the plat*). Exhibit maps not drawn and plotted to scale, or not containing the information required under PWDS 1.11.b (*or required to accurately and unambiguously identify the easement boundary and/or the subject property*), will be returned for revision.
 - Per ORS 93.600, use of a tax lot number and/or an address as the ONLY means to describe property is not legally adequate as a legal description, for use in a recorded document.
- In conjunction with submittal of the legal descriptions and exhibit maps, the developer shall provide the City with the following information (*if not included as part of the legal description or exhibit map*):
 - Legal name of owner-of-record of property on which the easement is located, and deed reference number for property containing the easement.
 - For easements located on land not owned by the developer, the amount or type of consideration provided by the developer for the easement (*or indicate that consideration is non-monetary*).
- Once approved, the City will attach the legal description and exhibit map to the appropriate City easement form (*modified by the City as applicable based on specific project conditions*), and it will be returned to the developer for execution and recording at the County.
- A photocopy of recorded easements documents must be returned (*hard copy or email*) to the City after recording (*ie. to the City Planner, Public Works Director & City Engineer*).
- All recording costs shall be borne by the Developer.

Note regarding City easements proposed to be created on/by a subdivision or partition plat, or in conjunction with a plat.

- Easements required in conjunction with a plat may be (*at the developer's option*) either (1) created on/by the final plat, or (2) created separately by recorded instrument and referenced on the final plat.
- ORS 92.050.9 prohibits City's from requiring information or notes on a plat which "*is or may be subject to administrative change or variance by the City*" unless authorized by the county surveyor. Under this requirement, terms and conditions of easements to the City typically cannot be included on plats. Therefore, the City requires that a separate easement document be recorded for any easement(s) to the City which is created by a plat, in order to formalize the terms and conditions of said easement(s).
- The developer should be aware that any utility easements to the City which are created on/by the plat (*other than street frontage PUEs*) will also require a separate easement document be recorded (*to formalize the terms of the City easement*), with the easement to be recorded in conjunction with the final plat. In either case (*ie. whether created on/by a plat or created by separate instrument*), a recorded easement document (*in a form acceptable to the City*) must be recorded for any easements to the City.

After recording, return to:

Dayton City Recorder
PO Box 339
Dayton, OR 97114-0339

PUBLIC UTILITY EASEMENT

_____ and _____ (collectively "Grantor"), for good and fair consideration the receipt of which is hereby acknowledged, does hereby grant unto the City of Dayton, ("Grantee" & "City"), a permanent exclusive public utility easement and non-exclusive inspection & maintenance access easement ("Easement") over, across, and through the real property described in EXHIBIT A and depicted in EXHIBIT B (the "Easement Area") for constructing, reconstructing, installing, and maintaining water, sanitary sewer, storm drainage and other associated utilities not deemed incompatible by the Grantee, including the right to utilize routes on and across the Grantor's property as required to access said easement. The easement is in gross for the benefit of the Grantee/City in perpetuity, and subject to the conditions relating to merger and/or vacation/extinguishment as summarized herein.

The Easement Area referenced above is located within the following described properties:

- Lot __, Block __, _____ subdivision plat, Yamhill County Deed Records
 - Tract described in Deed Reference Number _____, Yamhill County Deed Records.
- (collectively the Grantor's Property)

The parties further agree as follows:

1. The true and actual consideration paid for this easement is \$ _____.

The true and actual consideration for this easement consists wholly of value other than money, including the mutual promises and conditions contained herein.

2. Grantor Rights & Obligations. The Grantor agrees not to plant, build, construct or create (or permit others to plant, build, construct, or create) any cuts, fills, flora, buildings or other structures including fences or parallel utilities in the Easement Area that may interfere with Grantee's use of the Easement Area as set forth herein. Prohibited structures in the Easement Area include but are not limited to decks, footings, or overhanging portions of structures which are located outside of the Easement Area. Grantor may use the Easement Area for permitted parking and/or access so long as that use does not interfere with Grantee's use of the Easement Area.

The Grantor agrees not to construct cuts or fills within or on the easement area without express written approval by the Grantee, since this will interfere with the use of the easement for the purposes set forth herein. Any such approval by the Grantee shall be contingent on the Grantor performing all work required to mitigate impacts due to such cuts or fills, including reconstructing or resetting the utilities and appurtenances as directed by the Grantee, at the Grantor's sole expense.

3. Construction, Repair, Inspection and Maintenance. Grantee shall be responsible for the construction, installation, maintenance, and repair of any Grantee utilities in the Easement Area,

except to the extent the need for such maintenance and repair is caused by the gross negligence or willful misconduct of Grantor. The Grantee may remove any obstructions in the Easement Area that interfere with Grantee's use of the Easement Area without any payment to the Grantor including but not limited to trees, undergrowth, buildings, overhangs, fences, shrubbery, cut areas or fill material. Grantee agrees that with the exception of appurtenances which must be at or above grade, all of the utilities will be placed underground. The Grantee shall return the Easement Area to a good condition (i.e. repair/replace soil disturbance; removal of construction debris, rocks/gravel and other materials; etc.) with all damage resulting from or arising out of said use to be repaired by Grantee. The Easement shall include the right of the Grantee, its employees, agents, contractors, consultants and assigns to have ingress and egress to and along the Easement Area for the purposes summarized herein, as well as the right to utilize routes on or across the Grantor's Property as required for inspection or maintenance access, including ingress and egress along any all-weather access lanes required by City standards. In the event Grantor installs cross fences in the Easement Area, Grantor agrees to construct gates allowing Grantee to access the Easement Area.

Grantor shall be responsible for maintenance and repair of any all-weather access lanes which are provided along (or to provide access to) City utilities, in a manner and condition to allow the City, its employees, agents, contractors, consultants and assigns to have vehicular access along said access lane at all times and during all seasons for the purpose of inspecting, maintaining or repairing City utilities.

4. Compliance with Laws. In utilizing the Easement Area, both parties agree to comply with any applicable State, local or Federal laws or regulations for public health or safety, construction or environmental protection.
5. Title Warranty. Grantor represents and warrants that to the best of its knowledge, Grantor owns the entire fee simple interest in the Property, which is free to the best of Grantor's knowledge from all encumbrances (except for easements, conditions and restrictions of record), and has the full power and lawful authority to grant this Easement.
6. Entire Agreement. This Easement is the final and complete agreement between the parties concerning the rights granted herein, and supersedes all prior understandings with respect to it. Except as otherwise set forth in this Easement, this Easement may not be modified or terminated, nor may any obligations under it be waived, except by written instrument signed by all parties to the Easement. The Grantee may vacate or terminate this easement in accordance with state law and local ordinance, subject to the condition that the easement will not be considered abandoned until City Council has declared (in writing) the easement abandoned and no longer in use by (or of benefit to) the City.
7. Further Cooperation. Each of the parties agree to execute such other documents and to perform such other acts as may be reasonably necessary or desirable to further the expressed and intent purpose of this Easement.
8. Covenants Running With the Land. The Easement shall run with the land as to all property benefited and burdened thereby, including any partition or division of such property. The rights,

covenants, and obligations contained in this Easement shall bind, burden, and benefit Grantor and Grantee, and their respective successors, assigns, lessees, mortgagees, and beneficiaries under any deeds of trust.

9. Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a "Covenant Creating an Springing Easement Effective upon Date of Sale", which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

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IN WITNESS WHEREOF, the parties have executed this easement, effective this _____ day of _____, 20__.

GRANTOR:

GRANTEE:

(Signature)

(Signature)

By: _____

By: _____

Title: _____

Title: _____

Date: _____

Date: _____

STATE OF OREGON
County of Yamhill

This instrument was acknowledged before me on _____ 20__, by _____ as _____ of the City of Dayton, an Oregon municipal corporation (Grantee).

Notary Public for Oregon

STATE OF OREGON
County of Yamhill

This instrument was acknowledged before me on _____ 20__, by _____ as _____ of _____, a(n) _____.

Notary Public for Oregon

ACCEPTED on behalf of City of Dayton, Oregon
this _____ day of _____, 20__.

City Engineer (Initial) _____ (if modified)

After recording, return to:

City of Dayton
PO Box 339
Dayton, OR 97114-0339

**COVENANT FOR PERMANENT ACCESS EASEMENT
AND FIRE LANE EASEMENT**

WHEREAS, the owner of record of the Property referenced below is _____, hereinafter called "Owner" and "Grantor", and said Owner (or subsequent owner of the lot or property as noted below) shall be subject to a covenant that creates an easement in perpetuity as outlined herein, which is recorded against the Property referenced below.

The undersigned Owner and Grantor does hereby reserve, create and grant to City of Dayton, Yamhill County, Oregon, a municipal corporation, referred to herein as City, a permanent access easement and fire lane easement for the construction, reconstruction, operation and maintenance of an fire lane (and such other uses not deemed by the City to be incompatible therewith), and all necessary related facilities above, upon and under the following described premises, and subject to the conditions relating to maintenance as summarized herein:

Sample wording

All that portion of the tract of land described in the attached Legal Description labeled "Exhibit A" and map labeled "Exhibit B" (incorporated herein by reference), which is located within the following described parcels:

- Lot __, Block __, _____ subdivision plat
- or- • Tract described in Volume __, page __, Yamhill County Deed Records.

-or-

A portion of Parcel __/Lot __ of Partition Plat 2004-____/____ (subdivision), Deed Records of Yamhill County, incorporated herein by reference, said easement shown as "Easement __" on said _____ plat.

-or-

Easement __ as shown on plat for _____, Yamhill County deed records, incorporated herein by reference.

- () Consideration for this covenant and grant consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.
- () Consideration for this covenant and grant consists of _____ dollars and other valuable consideration to Grantor paid by _____, as well as the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

This covenant and easement is in gross, for the benefit of the City and afford the City (and the Fire Department/Fire District serving the property) all rights to utilize said easements in perpetuity. Except for the uses specifically stated herein, this easement does not grant any rights to the public for access across the referenced property.

The fire lane improvements & any associated turnaround shall be designated and signed for no parking, and the fire lane shall include the right, privilege, and authority of City and/or the Fire Department/Fire District to remove or

cause to have removed any and all obstructions, including vehicles, from the above described premises which may interfere with the full use of the fire lane. No trees, permanent structures or improvements (including overhanging portions of structures which are located outside of the easement), including parallel fences shall be placed or constructed on the easement by the Grantor or the Grantor's heirs, assigns or successors in interest. Access gates acceptable to the City shall be installed in fences which the City allows to be constructed across the easement.

Whereas City standards require that the maintenance of the private fire lane improvements shall be the responsibility of the property Owner, this easement form shall also function as a maintenance agreement for the fire lane improvements within or accessing this easement. The Owner shall be responsible for the maintenance, repair, replacement and upkeep of the fire lane improvements at the Owner's sole expense. Maintenance & repair responsibilities shall include, but are not limited to, maintenance, repair or replacement of surfacing, signs or markings that have been broken, damaged, removed or otherwise are not functioning as designed, etc.

The covenant and permanent access easement and fire lane easement shall include the right of City, its employees, agents, contractors, consultants and assigns (including the Fire Department or Fire District with jurisdiction) to have ingress and egress above, upon and under the easement at all times for the purpose of installing, inspecting, repairing, maintaining an emergency access and fire lane. In the event that the Owner fails to adequately repair or maintain the fire lane upon written notice from the City, the City, its employees, agents, contractors, consultants and assigns, shall have the right to clear and keep clear all obstructions, trees, undergrowth, and other obstructions that may interfere with access, normal operation or maintenance of said emergency access and fire lane, out of and away from the easement. Notwithstanding these rights, the City and assigns shall be under no obligation to perform maintenance or repairs on said easement.

If at any time the City or Fire Code Official determines, in the sole exercise of their discretion, that the fire lane improvements are not properly maintained and/or otherwise kept in good repair so as to provide for emergency vehicle access, the City or Fire Code Official shall give reasonable notice to the Owner that the fire lane needs to be maintained and/or otherwise repaired. The notice shall provide a reasonable description of the problem with the fire lane improvements, and the notice shall provide a reasonable time to correct the problem. Should the responsible parties fail to correct the specified problem, the City may enter upon the property to so correct the specified problem. However, this agreement does not expressly impose on the City a duty to so inspect, clean, repair or maintain the fire lane improvements. The Owner agrees and covenants (for themselves and their respective successors and assigns) that they will reimburse the City for its costs and expenses incurred in the process of maintaining, and/or repairing the fire lane improvements within 30 days of written request by the City.

Legal Effect. This covenant and easement is binding upon and inures to the benefit of all heirs, successors and assigns of Grantor and City and runs with the land.

Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a "Covenant Creating an Springing Easement Effective upon Date of Sale", which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the

extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

Provision Applicable Law. This covenant and easement shall be governed by, and construed in accordance with the laws of the State of Oregon.

Waiver. Failure of either party at any time to require performance of any provision of this covenant and easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this covenant and easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.

Severability. The determination that one or more provisions of this covenant and easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this covenant and easement.

Amendment or Modification. No amendment or modification of this covenant and easement shall be valid unless in writing and signed by all parties hereto. City may vacate this easement in accordance with state law and local ordinance. This easement will not be considered abandoned until City Council (upon consultation with the Fire Department/Fire District) has declared (in writing) the easement abandoned and no longer in use and will not be needed in the future.

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The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this _____ day of _____, 20__.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20__, by _____, as
_____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20__, by _____ as City Manager
of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

COVENANT FOR PERMANENT SIDEWALK EASEMENT

WHEREAS, the owner of record of the Property referenced below is _____, hereinafter called "Owner" and "Grantor", and said Owner (or subsequent owner of the lot or property as noted below) shall be subject to a covenant that creates an easement in perpetuity as outlined herein, which is recorded against the Property referenced below.

The undersigned Owner and Grantor does hereby reserve, create and grant to City of Dayton, Yamhill County, Oregon, a municipal corporation, referred to herein as City, a permanent sidewalk easement for the construction, reconstruction, operation and maintenance of sidewalks and all necessary related facilities (and such other uses not deemed by the City to be incompatible therewith) above, upon or under the following described premises, and subject to the conditions relating to merger as summarized herein:

Sample wording

'The southerly __ feet (adjacent to the __ Street right-of-way) of the following described parcels:

- Lot __, Block __, _____ subdivision plat
- or- • Tract described in Volume __, page __, Yamhill County Deed Records.

- () Consideration for this covenant and grant consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.
- () Consideration for this covenant and grant consists of _____ dollars and other valuable consideration to Grantor paid by _____, as well as the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

The covenant and easements are in gross, for the benefit of the general public and afford the public, by and through the City, all rights to utilize said easements in perpetuity. Grantor shall retain no special rights of use of the easement property beyond those held as member(s) of the general public.

The covenant and sidewalk easement shall include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress above, upon and under the easement at all times for the purpose of excavating, constructing, installing, operating, repairing, maintaining and removing the sidewalk and associated improvements.

The City or its utility franchisees, its employees, agents, contractors, consultants and assigns, shall have the right to clear and keep clear all trees, undergrowth, and other obstructions that may interfere with access, normal operation or maintenance of said sidewalk, out of and away from the easement. The Grantor agrees not to plant, build, construct, or create, nor permit others to plant, build, construct, or create any flora, buildings or other structures, including fences, on the easement that may interfere with the use of the easement for the purposes set forth herein or with the normal operation or maintenance of the sidewalk and associated improvements.

Except as expressly set forth herein, the Grantor reserves the right to utilize the Easement Property for any purpose

which does not interfere with the use of the easement by City for the purposes set forth herein.

Grantor agrees that he shall comply with all obligations in regard to construction, maintenance, repair and other responsibilities in regard to the sidewalk as if the sidewalk were constructed and existing in the public right-of-way adjacent to the property and in accordance with City ordinances.

Legal Effect. This covenant and easement is binding upon and inures to the benefit of all heirs, successors and assigns of Grantor and City and runs with the land.

Doctrine of Merger. In the event of a finding that the easement rights granted under this covenant and easement agreement would otherwise be extinguished or be of no effect under the doctrine of merger (due to current or future common ownership of the dominant estate property and the servient estate property), the covenant and easement agreement entered into herein shall be considered as a "Covenant Creating an Springing Easement Effective upon Date of Sale", which will result in the easement as set forth above taking effect at such time as the dominant or servient estates (or portions thereof containing or affected by the easement) are transferred, sold or conveyed in a manner so as to be under separate ownership (ie. such merger due to common ownership shall not result in the extinguishment of this covenant and easement agreement). This covenant shall automatically create the subject easement upon the recording of a deed conveying either the dominant estate property or the servient estate property (or portions thereof containing or affected by the easement) to another party, whether or not the easement is referenced in the deed. From and after the date that the easement thus becomes effective, the affected properties shall be subject to all terms and conditions contained herein.

Provision Applicable Law. This covenant and easement shall be governed by, and construed in accordance with the laws of the State of Oregon.

Waiver. Failure of either party at any time to require performance of any provision of this covenant and easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this covenant and easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.

Severability. The determination that one or more provisions of this covenant and easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this covenant and easement.

Amendment or Modification. No amendment or modification of this covenant and easement shall be valid unless in writing and signed by all parties hereto. City may vacate this easement in accordance with state law and local ordinance. This easement will not be considered abandoned until City Council has declared (in writing) the easement abandoned and no longer in use by City.

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The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this _____ day of _____, 20____.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20____, by _____, as
_____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20____, by _____ as City Manager
of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____

After recording, return to:

City of Dayton

PO Box 339

Dayton, OR 97114-0339

PERMANENT ACCESS EASEMENT & STORMWATER DETENTION SYSTEM EASEMENT & DETENTION SYSTEM MAINTENANCE AGREEMENT

WHEREAS, the owner of record of the Property is _____, hereinafter called "Owner", and said Owner shall be subject to the maintenance provisions of this agreement;

WHEREAS, _____, hereinafter called "Developer", applied for (with concurrence from the Owner) and was granted approval to develop land in accordance with the City of Dayton Development Code under Dayton Planning File No. _____, hereinafter called "Planning Action," by the City of Dayton, Yamhill County, Oregon, a municipal corporation, hereinafter called "City," for property located as follows, hereinafter called "Property,":

Legal Description of property affected by Planning Action: Tract described in Deed Reference Number _____, Yamhill County Deed Records.

Supplemental description of property location:

Street Address: _____

Tax Lot: _____

WHEREAS, the development & design standards require the Developer to construct a private storm drainage detention system, including detention storage basin, manholes & control structures, storm drain lines, control structures, (also including catch basins and storm inlet structures tributary to the detention basin which collect or otherwise minimize debris or pollutants reaching the detention basin and associated control structures), etc. (and such other uses not deemed by the City to be incompatible therewith), hereinafter called "Detention System";

WHEREAS, the City development & design standards require that the Detention System be located on private property, and be within a public utility and access easement to the City;

WHEREAS, the City development & design standards require that the maintenance of the private Detention System shall be the responsibility of the property Owner, and shall be assured through a recorded maintenance agreement;

NOW, THEREFORE, Owner and the City agree as follows:

SECTION 1. Ownership of Detention System. The Detention System is a private facility owned and maintained by the property Owner noted above. Where there are multiple parties with ownership interest the property on which the Detention System is sited, the provisions of this agreement shall apply to all owner's jointly and severally.

SECTION 2. Description of Easement Area.

2.1 All that portion of the tract of land described under "Easement ____" in the attached Legal Description labeled "Exhibit A" and map labeled "Exhibit B" (incorporated herein by reference), which is located on the property noted above.

SECTION 3. Grant of Easement. The undersigned Owner does hereby grant to City of Dayton, in gross, a permanent and exclusive access & stormwater detention system easement for the access to the Detention System and all necessary related facilities above, upon and under the premises described under Section 2. The easement shall

include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress above, upon and under the easement at all times for the purpose of inspecting said Detention System and related facilities, or for performing any maintenance or repair work determined to be necessary by the City in order to protect public or private property, as outlined under Section 5 below. However, such right to inspect and perform maintenance or repairs does not obligate the City to perform such inspections, maintenance or repairs. Consideration for this grant of easement consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

SECTION 4. Maintenance Responsibilities. The Owner shall be responsible for the maintenance, repair, replacement and upkeep of the Detention System, including the irrigation system serving the Detention System, at the Owner's sole expense. It shall be the Owner's responsibility to demonstrate to the City upon request that the Detention System and related facilities are operating properly. Maintenance responsibilities shall include, but are not limited to, the following:

- 4.1 Inspection. All Detention System components, irrigation system, vegetation, and control structures (outlet structures, control manholes, orifices, as well as catch basins and storm inlet structures tributary to the detention basin, etc.) shall be inspected for proper operations and structural stability, at a minimum, quarterly for the first 2 years from the date of installation, 2 times per year thereafter, and within 48 hours after each major storm event.
- 4.2 Cleaning of Outlet Structures, Outlet Manhole and/or Control Structures. All sediment and/or debris shall be cleaned from the sump of any inlet or outlet structure, outlet manhole and/or flow control structures (as well as catch basins and storm inlet structures tributary to the detention basin) as required to maintain the design function and capacity of the system (water shall be pumped from said sumps as required to accomplish this cleaning). The initial cleaning & maintenance interval shall not exceed 6 months, unless the inspections above reveal a need for more frequent cleaning. After the end of the first year, if approved by Public Works Director based on the sumps in these structures having adequate capacity, the cleaning & maintenance interval can be increased as appropriate, but shall not be cleaned and maintained less frequently than once a year.
- 4.3 Maintenance & Repair. Owner shall be responsible for maintenance, repair or replacement of any component that has been broken, damaged, altered, removed or otherwise is not functioning as designed, including but not limited to inlet & outlet structures, manholes & control structures, storm drain lines, catch basins & storm inlets tributary to the Detention System, etc.
- 4.4 Irrigation, Mowing, Basin Planting & Maintenance Owner shall be responsible for: (a) installation and operation of a permanent underground automatic sprinkler system to maintain the grass and landscaping in a healthy state to maintain the stability of the detention basin slopes; (b) planting of grass to cover the entire interior slopes & base of the detention basin (use of bark dust or similar material on the top of slopes or on interior slopes of the basin is prohibited), (c) planting of grass or other approved landscaping on the exterior slopes of the detention basin. No trees or shrubs which will impair the structural integrity of the detention basin shall be planted or allowed to grow on the detention basin exterior; (d) any work required on the interior or exterior slopes to stabilize and/or replant (including appropriate erosion control measures) when soil is exposed or if erosion is observed; (e) periodic mowing of grass areas not less than once a month during the growing season, or more frequently if required to keep the maximum height less than 5-inches; (f) periodic inspection of the Detention System to ensure that outlet and control pipes are not clogged and remain clear; (g) removal of all debris from catchment and detention basin areas, including litter, leaves, branches and other objects which are unsightly or which may clog storm pipe lines; (h) removal of all non-grass vegetation from the top and interior slopes of the detention basin, and removal of nuisance and invasive vegetation (such as blackberries, ivy, etc) from the exterior slopes when discovered.
- 4.4 Spill Prevention. Measures shall be exercised when handling substances that contaminate stormwater. Releases of pollutants shall be corrected as soon as identified.
- 4.5 Pest Control. Insects & rodents shall not be harbored in the Detention System. Pest control measures shall be taken when insects/rodents are found to be present. If mosquito larvicide is used, it shall be

applied in strict conformance with manufacturer's recommendation and any applicable State regulations. Rodent holes in the ground located in and around the detention basin shall be filled by the Owner.

SECTION 5. Failure to Maintain.

- 5.1 If at any time the City determines, in the sole exercise of its discretion, that the Detention System and related facilities are not properly cleaned, maintained and/or otherwise kept in good repair, the City shall give reasonable notice to the Owner that the Detention System needs to be cleaned, maintained and/or otherwise repaired (in the case of an emergency, the City may enter upon the property without notice to perform emergency maintenance or repairs in cases where the City, at its sole discretion, determines that it is necessary to protect public or private property). The notice shall provide a reasonable description of the problem with the Detention System, and the notice shall provide a reasonable time to correct the problem. Should the responsible parties fail to correct the specified problem, the City may enter upon the property to so correct the specified problem. Notice shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid. However, this agreement does not expressly impose on the City a duty to so inspect, clean, repair or maintain the Detention System. Any surface restoration required due to access, inspection, maintenance or repairs thus performed by the City shall remain the responsibility of the Owner, whether or not the City chooses to complete such restoration in conjunction with the City's access, inspection, maintenance or repairs.
- 5.2 The Owner agrees and covenants (for themselves and their respective successors and assigns) that they will reimburse the City for its costs and expenses incurred in the process of cleaning, maintaining, and/or repairing the Detention System within 30 days of written request by the City. Such written request for payment shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid. The terms actual costs and expenses shall be liberally construed in favor of the City and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless whether the City uses its own personnel, tools, equipment and supplies, etc. to correct the matter. If the City initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the City shall be entitled to its damages and costs, including reasonable attorney's fees, regardless whether the City contracts with outside legal counsel or utilizes in-house legal counsel for the same. In the event that the costs and expenses are not timely paid, such costs and expenses shall be charged against the Property consistent with State and local regulations, and shall constitute a lien upon the Property until paid.

SECTION 6. Indemnification. The Owner agrees to indemnify and defend the City, its officers, agents and employees and hold them harmless against any and all liability, claims, damages or other costs or expenses related to failure of the private Detention System, including any damage or injury incurred during inspection or maintenance of the Detention System, or due to the Owner's failure to maintain the Detention System, or failure to follow proper safety procedures during such inspection or maintenance, or failure to adequately control access to the private Detention System by the public.

SECTION 7. Recording of this agreement by Developer. Developer shall cause this agreement to be recorded in the deed records of Yamhill County, and a photocopy of the recorded document returned to the City.

SECTION 8. Other Provisions.

- 8.1 Legal Effect, Successors and Assigns. This Agreement shall run with the land and be binding on all parties having or acquiring from the Owner, or the Owner's successors, any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of the City.
- 8.2 Provision Applicable Law. This easement shall be governed by, and construed in accordance with the laws of the State of Oregon.
- 8.3 Nonexclusivity of Rights & Remedies. The rights and remedies authorized to the City under this agreement

are cumulative and are in addition to such other remedies as may be provided by law, equity, statute, ordinance or other source.

- 8.4 Waiver. Failure of either party at any time to require performance of any provision of this easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.
- 8.5 Severability. The determination that one or more provisions of this easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this easement.
- 8.6 Modification. No amendment or modification of this easement shall be valid unless in writing and signed by all parties hereto. City may, at their sole discretion, vacate this easement in accordance with state law and local ordinance.

The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this _____ day of _____, 20____.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20____, by _____, as _____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20____, by _____ as City Manager of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

After recording, return to:
City of Dayton
PO Box 339
Dayton, OR 97114-0339

PERMANENT ACCESS EASEMENT & GREASE INTERCEPTOR VAULT MAINTENANCE AGREEMENT

WHEREAS, the owner of record of the Property is _____, hereinafter called "Owner", and said Owner shall be subject to the maintenance provisions of this agreement;

WHEREAS, _____, hereinafter called "Developer", applied for (with concurrence from the Owner) and was granted approval to develop land in accordance with the City of Dayton Development Code under Dayton Planning File No. _____, hereinafter called "Planning Action," by the City of Dayton, Yamhill County, Oregon, a municipal corporation, hereinafter called "City," for property located as follows, hereinafter called "Property,":

Legal Description of property: Tract described in Deed Reference Number _____, Yamhill County Deed Records.

Supplemental description of property location:

Street Address: _____

Tax Lot: _____

WHEREAS, the development & design standards require the Developer to construct a private exterior two-compartment grease interceptor vault, hereinafter called "Grease Interceptor";

WHEREAS, the City design standards require that the maintenance of the Grease Interceptor shall be the responsibility of the property Owner, and shall be assured through a recorded maintenance agreement;

WHEREAS, the City design standards require that the Grease Interceptor be located on private property, and as such needs to be provided with a general access easement to the City;

NOW, THEREFORE, Owner and the City agree as follows:

SECTION 1. Ownership of Grease Interceptor. The Grease Interceptor is a private facility owned and maintained by the property Owner noted above. Where there are multiple parties with ownership interest the property on which the Grease Interceptor is sited, the provisions of this agreement shall apply to all owner's jointly and severally.

SECTION 2. Grant of Access Easement. The undersigned Owner does hereby grant to City of Dayton, in gross, a permanent and non-exclusive right to access the Grease Interceptor location and all necessary related facilities above, upon and under the premises, along driveways, walkways or other areas that must be crossed between the public right-of-way and the Grease Interceptor location. The access rights shall include the right of the City, its employees, agents, contractors, consultants and assigns to have ingress and egress on the property at all times for the purpose of inspecting said Grease Interceptor, or for performing any maintenance or repair work determined to be necessary by the City in order to protect public or private property, as outlined under Section 4 below. However, such right to inspect and perform maintenance or repairs does not obligate the City to perform such inspections, maintenance or repairs. Consideration for this grant of easement consists wholly of value other than money, including the mutual promises and conditions contained herein, the receipt and sufficiency of which are hereby acknowledged.

SECTION 3. Cleaning & Maintenance Responsibilities. The Owner shall be responsible for the cleaning, maintenance, repair, replacement and upkeep of the Grease Interceptor, at the Owner's sole expense. It shall be the Owner's responsibility to demonstrate to the City upon request that the system is operating properly.

Maintenance responsibilities shall include, but are not limited to, the following:

- 3.1 Inspection. All Grease Interceptor components (vault segments, inlets, outlets, control orifices, etc.) shall be inspected for proper operations and structural stability, at a minimum, annually.
- 3.2 Cleaning of Grease Interceptor. All grease and/or debris shall be removed from both compartments of the Grease Interceptor vault, as well as cleaned from inlet or outlet piping as required, to maintain the design function and capacity of the system (water shall be pumped from vault as required to accomplish this cleaning). The initial cleaning & maintenance interval shall not exceed every 3 months while the building is in use (including at the end of each school year), unless the inspections above reveal a need for more frequent cleaning. After the end of the first year, if approved by the Public Works Director based on the vault having adequate capacity, the cleaning & maintenance interval can be increased as appropriate, but shall not be cleaned and maintained less frequently than twice a year (including at the end of each school year). If subsequent inspections reveal capacity problems, the Owner shall revert to the more frequent cleaning intervals.
- 3.3 Maintenance & Repair. Owner shall be responsible for maintenance, repair or replacement of any component that has been broken, damaged, altered, removed or otherwise is not functioning as designed, including but not limited to the vault, divider walls, inlet & outlet structures, access lids, etc. All access lids and risers shall be extended to finish grade and maintained in a watertight condition, and exclude any infiltration of groundwater or inflow of surface water.
- 3.4 Spill Prevention. Measures shall be exercised when cleaning the Grease Interceptor to avoid spillage of pumped grease, solids or liquids. Any spillage shall be completely cleaned up prior to the cleaning or maintenance crew leaving the site.
- 3.5 Prohibited Substances. No chemical, enzyme or bacterial agent shall be added to the Grease Interceptor which will cause the release of grease into the sewer system. Unless otherwise specifically required in writing by the Plumbing Official, no garbage grinders, food pulpers or toilets shall discharge to the Grease Interceptor.
- 3.4 Records and Reporting. The Owner shall maintain a record (in the form of a log book) of steps taken to abide by the obligation under this section. The log book shall be available for inspection by the City upon request. The log book shall catalog the action taken (cleaning, inspection and/or maintenance), who took it, date and time it was done, how it was done, and any problems encountered or follow-up action recommended. Copies of all receipts for cleaning and pumping of the Grease Interceptor must be retained by the Owner with the log book. The Owner shall send a letter to the City prior to December 15 of each year that provides proof of cleaning, inspection and maintenance, including copies of pumping contracts and/or receipts of work conducted by a hired service.

SECTION 4. Failure to Maintain.

- 4.1 If at any time the City determines, in the sole exercise of its discretion, that the Grease Interceptor is not properly cleaned, maintained and/or otherwise kept in good repair, the City shall give reasonable notice to the Owner that the Grease Interceptor needs to be cleaned, maintained and/or otherwise repaired (in the case of an emergency, the City may enter upon the property without notice to perform emergency maintenance or repairs in cases where the City, at its sole discretion, determines that it is necessary to protect public or private property). The notice shall provide a reasonable description of the problem with the Grease Interceptor, and the notice shall provide a reasonable time to correct the problem. Should the responsible parties fail to correct the specified problem, the City may enter upon the property to so correct the specified problem. Notice shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid, or delivery to the Owner's local place of business. However, this agreement does not expressly impose on the City a duty to so inspect, clean, repair or maintain the Grease Interceptor. Any surface restoration required due to access, inspection, maintenance or repairs thus performed by the City shall remain the responsibility of the Owner, whether or not the City chooses to complete such restoration in

conjunction with the City's access, inspection, maintenance or repairs.

- 4.2 The Owner agrees and covenants (for themselves and their respective successors and assigns) that they will reimburse the City for its costs and expenses incurred in the process of cleaning, maintaining, and/or repairing the Grease Interceptor (including cleaning of downstream sewer system resulting from failure of the Grease Interceptor) within 30 days of written request by the City. Such written request for payment shall be effective to the Owner by the City's deposit of the notice into the regular United States mail, postage pre-paid, or delivery to the Owner's local place of business. The terms actual costs and expenses shall be liberally construed in favor of the City and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless whether the City uses its own personnel, tools, equipment and supplies, etc. to correct the matter. If the City initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the City shall be entitled to its damages and costs, including reasonable attorney's fees, regardless whether the City contracts with outside legal counsel or utilizes in-house legal counsel for the same. In the event that the costs and expenses are not timely paid, such costs and expenses shall be charged against the Property consistent with State and local regulations, and shall constitute a lien upon the Property until paid.

SECTION 5. Indemnification. The Owner agrees to indemnify and defend the City, its officers, agents and employees and hold them harmless against any and all liability, claims, damages or other costs or expenses related to failure of the Grease Interceptor, including any damage or injury incurred during inspection or maintenance of the Grease Interceptor, or due to the Owner's failure to maintain the Grease Interceptor, or failure to follow proper safety procedures during such inspection or maintenance.

SECTION 6. Recording of this agreement by Developer. Developer shall cause this agreement to be recorded in the deed records of Yamhill County, and a photocopy of the recorded document returned to the City.

SECTION 7. Other Provisions.

- 7.1 Legal Effect, Successors and Assigns. This Agreement shall run with the land and be binding on all parties having or acquiring from the Owner, or the Owner's successors, any right, title, or interest in the property or any part thereof, as well as their title, or interest in the property or any part thereof, as well as their heirs, successors, and assigns. They shall inure to the benefit of each present or future successor in interest of said property or any part thereof, or interest therein, and to the benefit of the City.
- 7.2 Provision Applicable Law. This easement shall be governed by, and construed in accordance with the laws of the State of Oregon.
- 7.3 Nonexclusivity of Rights & Remedies. The rights and remedies authorized to the City under this agreement are cumulative and are in addition to such other remedies as may be provided by law, equity, statute, ordinance or other source.
- 7.4 Waiver. Failure of either party at any time to require performance of any provision of this easement shall not limit the parties' right to enforce the provision, nor shall any waiver of any breach of any provision of this easement be a waiver of any succeeding breach of the provision or a waiver of the provision itself or any other provision.
- 7.5 Severability. The determination that one or more provisions of this easement is invalid, void or illegal or unenforceable shall not effect or invalidate the remainder of this easement.
- 7.6 Modification. No amendment or modification of this easement shall be valid unless in writing and signed by all parties hereto. City may, at their sole discretion, vacate this easement in accordance with state law and local ordinance.

The individuals executing this Agreement warrant that they have full authority to execute this Agreement on behalf of the entity for whom they are acting herein.

WITNESS our hands and seals this ____ day of _____, 20__.

(Printed Name of Grantors)

(Signature of Grantors)

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on _____, 20 __, by _____, as
_____ of _____.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

APPROVED:

Dayton City Manager

Date

This instrument was acknowledged before me on _____, 20 __, by _____ as City Manager
of the City of Dayton, Oregon.

(Notary Signature)
Notary Public for Oregon
My Commission Expires: _____

City Engineer (Initial) _____ (if modified)

This memo is considered to be sent to all land developers within the City of Dayton, at or near completion of their project.

Memo

Date:

To:

_____ address

cc:

Dayton land use file (_____)
Dayton Building Official
Dayton Public Works

From: Dayton City Engineer

Subject: Lot Grading & Drainage During and After Construction of Structures

This memo is to reiterate grading requirements relative to the layout and building of homes and structures on this property, and the need to take extra care in the grading during and after building to facilitate good drainage on the lots and the surrounding area.

As you are no doubt aware, good grading around a house and on a lot can make all of the difference in how homes are effected by the rain (and resultant drainage concerns) in Oregon. It is important to ensure that the houses and structures are not set too low on the lots. To avoid drainage problems, it is important that the homes are kept high enough so that you can grade around the structures and the lots in a manner that will direct the surface runoff away from the homes and off the lots into the streets and drainage systems without ponding. This is particularly critical where there is drainage coming onto any lot from adjacent property, either within or outside the development. In addition, it is critical that existing drainage patterns from adjacent properties must be maintained when grading on lots, around houses or other structures so as to not pond water or block drainage.

The City design standards for new developments include provisions intended to ensure that the streets are low enough so that the lots can drain to the streets, or that drainage stubs are provided at an elevation that will provide a good positive outlet. However, in spite of this, poor grading around homes during house construction and landscaping is a common cause of problems. Depending on building location, landscaping and lot grading, in some cases it may be necessary to construct perimeter drains to collect water and direct it to another point. It may also be necessary to install area drains to prevent water from collecting and being trapped in areas around homes, particularly in the rear of the homes or on the high side of the lots. It is a good idea to ensure that the landscape contractor considers these elements when the lots are finished following house construction.

In the event that you sell all or any portion of this property to another builder or developer, please make sure that they are aware of the need for proper grading and drainage on the lots. Please be aware that under City standards, the builder is responsible for ensuring that these drainage issues are addressed, and the builder is also responsible for installing and maintaining erosion control measures during and after building construction (*LUDC 7.2.304.03.A & 7.2.306.01.C*).

CITY OF DAYTON
Public Works Design Standards

Sample Insurance Certificates
Appendix E

Note: Sample form in this appendix is provided for convenience of reference by developers and contractors.

Insurance Certificate Requirements.

- Certificates of insurance required from the contractor contracted to complete the site/street/utility work. Insurance certificates shall include notations or language noting the coverage limits listed on the sample certificate included herein.
- Evidence of insurance coverage submitted on current “ACORD” forms (*or other insurance certificate containing the same information*) shall EITHER include a statement that “30 days cancellation notice will be provided”; OR the Contractor’s insurance agent shall provide a written letter (*to be submitted with the insurance certificates*) stating that copies of insurance certificates will be sent to the City a minimum of every 30 days, throughout the term of the required insurance under the contract.
- The City and Westech Engineering (*as City Engineer*) shall be covered as additional insured.
 - The insurance certificate and/or separate Accord schedule(s) may include language certifying that “any and all entities required by written contract or by required permits are additional insureds”, OR all of the required “additional insured” entities may be listed individually on the insurance certificate.
- The City is to be named as a certificate holder.
- Where work is to be performed in an ODOT or County right-of-way, these agencies shall be covered as additional insured and certificate holders per agency permit requirements.
- Insurance certificates shall include notations, language or additional schedule(s) specifically noting job site pollution coverage, and specifically noting that there are no XCU exclusions.
- Coverage shall be primary and non-contributory with any other insurance and self-insurance. Policies shall be written on an occurrence basis, and include coverage for respective officers, directors, members, partners, employees, agents, consultants and subconsultants of each additional insured.
- Evidence of Worker’s Compensation coverage from the contractor or subcontractor performing the site/street/utility work.
 - Any contractor indicating that they are exempt from worker’s compensation coverage requirements shall provide detailed documentation substantiating that they meet all of the criteria established by the Workers’ Compensation Division, as well as providing information on who will be providing Workers’ Compensation coverage for any leased employees planned to be used on the project.

**City of Dayton, Oregon
PO Box 339
Dayton, OR 97114-0339**

**City of Dayton, Oregon
PO Box 339
Dayton, OR 97114-0339**

**Westech Engineering, Inc.
Dayton City Engineer
3841 Fairview Industrial Drive SE, Suite 100
Salem, OR 97302**

CITY OF DAYTON
Public Works Design Standards

Adopting Ordinance & Resolutions
Selected DOJ/DOT Federal ADA Curb Ramp Technical Assistance Publications
Oregon Transportation Commission Standards for Accessible Parking Places, Aug 2018

Appendix F

CITY OF DAYTON
Construction Drawing Review, Public Works Permit, Construction Requirements & Procedures

PWDS Appendix G
Construction Drawing Review, Public Works Permit,
Construction Requirements & Procedures

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PWDS APPENDIX G
CONSTRUCTION DRAWING REVIEW, PUBLIC WORKS
PERMIT, CONSTRUCTION REQUIREMENTS & PROCEDURES

G.1 GENERAL

- a. These Public Works Construction Requirements and Procedures will be cited routinely in the text as the “Standards.”
- b. Wherever specific supplementary standards are indicated (ie. AWWA C-150, ASTM C-857), it shall be understood to mean the latest revision thereof.
- c. Pronouns & Captions. In interpreting these Standards, it is understood that: (1) if the context so requires: (a) the singular pronoun shall be taken to mean and include the plural pronoun; (b) the masculine pronoun shall be taken to mean the feminine and the gender neutral pronoun as may be applicable; and (2) all captions used therein are intended solely for the convenience of reference and shall in no way limit any of the provisions of these Standards.
- d. These Standards shall apply to all improvements within existing and proposed public right-of-way and City/public utility easements, to all improvements to be maintained by the City, and to all improvements for which the Development Code requires approval by the City, or which must be designed to meet the provisions of the Public Works Design Standards (PWDS). The provisions of these Standards are binding on contractors and developers in the performance of any work covered under the categories outlined above. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.
- e. Requests for variances to these Standards shall be based on the criteria and procedures outlined in Section 1.12 of the Public Works Design Standards (PWDS).
- f. In the case of conflicts between the text of these construction standards and the standard details in the PWDS, or between the provisions of these construction standards and the PWDS, the more stringent as determined by the Public Works Director shall apply.
- g. All other utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as City standards.
- h. Traffic Control Devices shall meet the standards of the current Manual on Uniform Traffic Control Devices, including Oregon amendments.
- i. All other work not covered by the above standards shall conform to the Oregon Standard Specifications for Construction (OSSC/ODOT/APWA), most recent edition.

G.2 PURPOSE

- a. The purpose of these Standards is to provide a consistent policy under which certain physical aspects of public utility construction will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to the development or platting process. However, it is intended that they apply to both public and private work designated herein.
- b. These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by experienced contractors. The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.
- c. The objective is to develop Standards which will:
 - 1) be consistent with current City Ordinances and the PWDS.
 - 2) set forth uniform material and workmanship standards under which all public works facilities shall be constructed within the City.
 - 3) supplement and complete the requirements of the City's development ordinances, PWDS, and other prevailing ordinances as they relate to the physical construction of public works facilities within the City.
 - 4) clarify and streamline the administration and construction of public works facilities within the City.
 - 5) provide public and private utility improvements constructed in a manner to allow economical future maintenance.
- d. These Standards shall relate only to public works construction in the City and are not to be intended to replace building codes, development or zoning ordinances and other regulations for which procedures and standards have been established.
- e. Planning, zoning and related matters shall be satisfied prior to submitting an application for a public works construction permit *(ie. where land use approval is required, drawings are typically not to be submitted for detailed permit review by Public Works until after issuance of the land use approval by the City or other applicable agency body, unless there are exceptional extenuating circumstances as determined by the City).*

G.3 CONTRACTING POLICY

- 1) The policy of the City for construction or reconstruction of public infrastructure or public improvements covered under these standards or owned/maintained by the City requires that the contractor be registered with the Oregon Construction Contractors Board.

G.4 DEFINITIONS AND TERMS

- a. Unless otherwise defined in these Standards, the following definitions, terms and abbreviations shall apply whenever used.

- 1) City: The City of Dayton, Oregon.
- 2) 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.
- 3) 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.
- 4) Cut Sheets: Construction submittals as required by Section G-01300 of these standards.
- 5) Definition of Words: Wherever, in these Standards, the words directed, required, permitted, ordered, designated or words of like importance are used, they shall be understood to mean the direction, requirement, permission, order or designation of the Public Works Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or satisfaction to the Public Works Director.
- 6) Design Engineer: The engineer licensed by the State of Oregon as a Civil Engineer under whose direction plans (*construction drawing*), profiles and details for work are prepared and submitted to the City for review and approval.
- 7) Developer. The individual, organization, business, partnership or joint venture who is responsible for submitting construction drawings for review and obtaining a Type A or Type B site/street/utility construction permit as required by these standards, or the applicant for such construction drawing review and construction permits.
- 8) Easement: Areas along the line of public utilities that are outside of dedicated

right-of-way. Easements shall be prepared on City forms granting rights along the public utility line to the City.

- 9) Improvement: General term encompassing all phases of the work to be performed under the construction permit and is synonymous to the term project.
- 10) 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 therefor.
- 11) Owner: The City of Dayton for projects initiated and contracted by, and paid for by the City. For any other project, the owner is the individual, firm, co-partnership, corporation or any combination thereof who has hired a Contractor to complete any public works project subject to these standards.
- 12) Plans: See Construction Drawings.
- 13) PWDS: Dayton Public Works Design Standards.
- 14) Right-of-Way: 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.
- 15) Standard Details: The drawings of structures or devices commonly used on City work and referred to on the construction drawings. Also called Standard Plans. The Standard Details in these standards and in the PWDS shall apply to all public works construction within the City.
- 16) Director: The Director /supervisor of the Public Works Department of the City of Dayton or his/her authorized representative (*Public Works Director*).
- 17) 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.
- 18) 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.

G.5 PERMITS REQUIRED, TYPES OF PERMITS

- a. The following requirements and procedures apply to City Public Works construction permits (*see also PWDS G.2.e regarding sequencing of land use approval where required*).
- 1) Any reviews and/or permits required by the County, ODOT or railroads (*where applicable*) are the sole responsibility of the design engineer and/or the development team, including payment for any associated permit fees, bonds or insurance. The City does not coordinate with (*or submit construction drawings to*) the County, ODOT or the railroads on the developer's behalf (*for public works related permits*).
 - 2) The development team is responsible to comply with any requirements imposed by the County, ODOT or the railroads. Where County, ODOT or railroad requirements conflict with City requirements, the more stringent shall apply.
- b. No developer, person or organization (*other than the City of Dayton*) shall begin to construct, reconstruct, cut, excavate, repair, modify, alter, or grade any sidewalks, curb, curb-cut, driveway, 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 or City/public utility easement within the jurisdiction of the City without first obtaining approvals from the Public Works Director and the City Engineer as required by these standards, paying any required plan review and construction permit fees, depositing any required performance security, and obtaining a street/utility construction permit therefor as provided herein.
- c. Work for which a street/utility construction permit is required shall include, but not be limited to, the following. This list is not all inclusive. The intent is that any work covered under the Public Works Design Standards (PWDS) will require either a Type A or Type B Site/Utility/Street Construction Permit prior to construction.
- 1) 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.
 - 2) Storm Sewer. A permit shall be required for any work to lay and install any storm sewer and storm sewer appurtenances, detention systems, storm drainage improvements involving drywells or stormwater infiltration systems which require approval or permitting by DEQ, or storm drainage service lateral(s), or within any existing or proposed City/public utility easement.
 - 3) 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 City/public utility easement.

- 4) 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, fire service lines or appurtenances, within any public right-of-way or within any existing or proposed City/public utility easement, or any other improvements attached to the City water system.
- 5) Parking Lots, Private Streets, Common Use Driveways, Fire Lanes: A permit shall be required for any work on a parking lot, private street or common use driveway 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, or for fire lanes required by the Fire District. 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 City/public utility easements.
- 6) Site Grading and Filling. A permit shall be required for any site grading, filling or fill stockpiling operations as follows.
 - a) Projects that require site grading, filling or fill stockpiling operations associated with development of the property other than those operations directly associated with the construction of and under a structure for which a valid building permit has been issued by the City.
 - b) 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 City/public utility easements.
- 7) 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.
- 8) Franchise Utilities. A permit covering any work on underground franchise utilities within any improved area of any public street, including sidewalks, or within any existing or proposed City/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 (*although traffic control plans shall be provided to and approved by Public Works to the extent required for mitigation of traffic impacts due to the work*).

d. Type A Public Works Permit.

- 1) Work for which a Type A Street/Utility Construction Permit is required shall include the following.
 - a) Any sidewalk, driveway approach or utility service improvements to serve a single residence, duplex or business for which public street or mainline utility improvements are not required, ~~AND which and that~~ do not include construction or reconstruction of parking lots, private streets, fire lanes or common use driveways other than for duplexes.
 - b) Utility work by franchise utility companies that does NOT require pavement cuts or boring longitudinally along a public right-of-way or City utility easement shall require a Type A permit *(including installation by boring along or across a public right-of-way or City utility easement, unless the Public Works Director determines that the scope of the proposed installation requires review by the City Engineer, in which case a Type B permit will be required)*. Such work shall be exempt from permit fees to the extent provided by Section G.9(e) herein.
- 2) An improvements agreement and performance security shall be executed as specified in Section G.10 herein.

e. Type B Public Works Permit.

- 1) Work for which a Type B Site/Street/Utility Construction Permit is required shall include the following.
 - a) Any site, street, sidewalk or utility improvement project which: to
 - (1) serves more than a single residence, duplex or business, or for which public street or mainline utility improvements are required *(including fire hydrants or fire service lines serving fire sprinkler systems and/or private fire hydrants, per PWDS 5.19.d.2)*, or
 - (2) that includes parking lots, private streets, fire lanes or common use driveways other than for duplexes, or
 - (3) which includes public storm drainage improvements, or storm drainage improvements involving drywells or stormwater infiltration systems ~~which require approval or permitting by DEQ,~~ or
 - (4) which serves more than a single residence, or
 - a)(5) which serves commercial / industrial / public developments.

~~(6)~~ includes installation of service laterals for multiple properties within a common trench, or

~~b)(7)~~ includes installation of service lateral(s) across property other than that being served.

e) ~~Site Grading & Fills.~~

~~(1)(8)~~ Projects that requires site grading, filling or fill stockpiling operations associated with development of the property other than those operations directly associated with the construction of and under a structure for which a valid building permit has been issued by the City.

~~(9)~~ requires Site grading, filling or fill stockpiling operations over existing public sanitary sewer, storm drain or water distribution lines, or

~~(2)(10)~~ requires site grading, filling or fill stockpiling such operations within existing or proposed City or public utility easements.

~~d)b)~~ Utility work by franchise utility companies that requires pavement cuts or boring longitudinally along a public right-of-way or City utility easement (*ie. parallel with & within the R/W or easement*) shall require a Type B permit (*for subdivisions or other development which obtains a Type B permit for the overall project, a separate permit will not be required for franchise utility work directly associated with the issued Type B permit for the development*).

Work by franchise utility companies which is not associated with such a development project shall be exempt from permit fees to the extent provided by Section G.9(e) herein.

- f. If there are classes of work not specifically covered herein but that are included under the scope of the Public Works Design Standards, the determination of the type of permit required shall be made by the City Manager after consultation with the Public Works Director and the City Engineer.
- g. Approval of Construction Drawings is required prior to obtaining a permit or beginning construction.
- h. Approval of construction drawing (*plans*) by the City Engineer or City Public Works for issuance of a City Public Works street/site/utility construction permit does not relieve the developer, contractor or engineer from obtaining any and all reviews and permits required under the building, plumbing or electrical codes that any portions of the work may be subject to, or from any requirements under County, ODOT or other agency permits or approvals required for the project.

- i. Any permit issued by the City is considered to be a “written contract” for purposes of triggering “additional insured” coverage of the City under the Contractor’s required insurance policy(s).

G.6 PW APPROVAL OF CONSTRUCTION DRAWINGS REQUIRED

- a. ~~Site/street/utility/access/parking/fill/grading c~~Construction drawings (*plans*) ~~and other engineering documents~~ shall be submitted for review ~~and be approved~~ by Public Works and/or the City Engineer prior to issuance of ~~Public Works~~ permits required by these Standards, ~~and prior to issuance of building permits for structures served by such required infrastructure improvements.~~

Type A Permits shall have the written approval of the Public Works Director or his/her designated representative prior to issuance of the permit.

In addition to written approval by the Public Works Director, Type B Permits shall have the written approval of the City Engineer.

- a.b. For subdivisions and other developments requiring improvements to public streets and/or ~~multiple~~ public utility systems, construction drawings for ~~streets, sewer, water, storm drainage and franchise utilities streets, and storm drains(as applicable)~~ shall be submitted simultaneously to facilitate checking for conflicts.

- b.c. Construction drawings ~~submitted for approval~~ shall be subject to the standards, specifications, policies and procedures, construction drawing review and permit fees of the Public Works Department in effect at the time ~~the construction drawings are approved, subject to the update requirements in the following paragraphs if work is not commenced within the required timeframe of application or reapplication for construction drawing review.~~

- e.d. Except as provided in Subsection (d) of this section, such construction drawing approval shall be void upon expiration of six months from the date of said written approval in Subsection (a) of this section if a Type A or Type B permit is not obtained and work commenced on the project. Resubmittal of construction drawings, ~~or a request for an extension of the construction drawing approval,~~ will require that they be updated to reflect current City standards ~~(including but not limited to updating all standard details included on or required by the construction drawings).~~

- d.e. If a Public Works permit is not issued and/or substantial construction ~~has not~~ commenced ~~(as determined by the Public Works Director, at his sole discretion)~~ within 6 months from the ~~construction drawing plan~~ approval date, a new review of the drawings will be required except as follows.

- 1) Upon a written verification that the facts upon which the ~~construction drawing plan~~ approval was based have not changed to an extent sufficient to warrant a new review of construction drawings, ~~and a finding by the Public Works Director and the City Engineer that there have been no updates to City design~~

standards or standard details which would apply to the project, then the construction drawing-plan approval may be extended for a period not to exceed 6 additional months.

- 2) Written verification for Type A permits shall be provided by the Public Works Director t, while verification for Type B permits shall be by both the Public Works Director and the City Engineer.
- 3) No more than two such six month extensions (*ie. new period during which substantial construction must be commenced*) shall be granted for any one development or project, resulting in a maximum time extension of one year.

e.f. Reapplication for construction drawing review must be made with the Public Works Director or his/her designated representative upon expiration of said six month period in Subsection (c) of this section, or extension periods provided herein, if the permit is not issued within said approval or extension period.

f.g. All construction drawingsplans, reports, or documents for public utility improvements required by these 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.

G.7 CONSTRUCTION DRAWING REVIEW PROCESS AND REVIEW FEES

- a. All construction drawings (*plans*) for Type A or Type B permits shall be reviewed in general conformance with the procedures outlined in PWDS Section 1.9, including providing preliminary drawings and scheduling a pre-design meeting (*per PWDS 1.9.a*) between the developer's engineer and Public Works (& City Engineer as applicable) to receive input regarding design issues related to required improvements.

The submittal for construction drawing review shall be filed by the responsible party (*ie. the design engineer for public improvements*) with the Public Works Director for any permit or permits required by these standards.

In addition to requirements, documents and information listed under PWDS 1.10.b (*full list is not reproduced here*), such submittal for construction drawing review shall include the following as applicable.

- 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 public improvements*);
- 4) Description of the work area location, including addresses as applicable;
- 5) Preliminary construction drawingsplans (*3 sets for single family residential*

developments, and 4 sets for commercial, industrial and multifamily developments) showing a vicinity map and details of the proposed project, including street widths and property lines, existing and proposed utility locations. In the case of public improvements, preliminary construction drawingsplans shall include all applicable information outlined under PWDS 1.10.

- 6) Estimated construction cost of the proposed project, or estimates based on the construction cost estimate schedule established by the Public Works Director or the City Engineer.
- 7) Construction drawing (plan)Plan review fees as prescribed by resolution of the City Council *(for franchise utilities, see Section G.9e)*.
- 8) Review fees required in Subsection (7) of this section are nonrefundable, and are required to support permit plan review.
 - a) A plan review fee payment based on a percentage *(to be set by resolution of the City Council)* of the initial engineer's estimate of all construction work related to the project *(ie. all work covered under the PWDS)* is due at submission of the engineered construction drawings for review *(see also PWDS 1.10.b.13 for costs to be included in the estimate)*.
 - b) Monthly billings of any City costs exceeding the plan review fee payment, payable within 30 days.
 - c) Final reconciliation of project review and inspection costs, including City Engineer review & inspection costs and Public Works staff expenses, will be determined at project completion. Any final balance due the City must be paid before City approval and/or acceptance of the project.
- 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) A current title report(s) covering all property where utility construction will occur *(which includes a list of all existing easements, restrictions, and other encumbrances, including copies of deeds, easements or other restrictive documents referenced in that report)* [a pdf copy of each title report with embedded hyperlinks to the referenced documents may be provided in lieu of a hard copy].
- 11) Such other information as the Public Works Director shall find reasonably necessary for the determination of whether construction drawingsplans should be approved for permit.

- b. Grant of Access to Development Property. Submittal of construction drawings for review and/or application for a construction permit shall be evidence that the developer and property owner grants to the City, its employees, agents, contractors, consultants and assigns the right to access the property at any and all times, including access along driveways, walkways or other areas that must be crossed between the public right-of-way and the location of the proposed improvements, in order to examine conditions and evaluate the feasibility of the proposed design, as well as access during construction for purposes of observation and inspection as applicable.

G.8 CONSTRUCTION PERMIT APPLICATION

- a. Application Form. Following review and approval of the construction drawingsplans by the City, an application for a construction permit as required by these standards shall be filed with the Public Works Director. Such applications shall be in the form prescribed by the City and shall include the following information as a minimum:

- 1) Name and address of the owner or owners of the property.
- 2) Name and address of the developer of the property.
- 3) Name and address of the designer (*design engineer for public improvements*).
- 4) Name and address of the party doing the work, including subcontractors.
- 5) Location of the work area, including addresses as applicable.

- b. Number of Drawing Sets Required, Supplemental Information Required. Prior to issuance of the public utility construction permits, the Developer shall provide the City with the following after review & approval of the construction drawings (*see also PWDS 1.9(h)*):

- 1) Copies of the final revised (*approved*) construction drawingsplans for approval stamping by the City as follows:
 - Type B permit, ~~10~~5 sets
 - Type A permit or franchise utility improvements, 4 sets

For Type B permits, the City will keep three (3) ~~four (4)~~ sets of approved construction drawings and return the remainder to the development team. Additional sets may be submitted for approval stamping at the Developer's request.

The development team may make additional copies of the stamped approved construction drawingsplans for dispersal to their team members as applicable.

- 2) **Other information & documentation as summarized under PWDS 1.9.i.**
- 3) Such other information specific to the project as the Public Works Director or

the City Engineer shall find necessary for the determination of whether a permit should be issued therefor, including evidence that all applicable City, County, state and/or federal laws and regulations have been or will be complied with.

G.9 CONSTRUCTION PERMIT FEES

- a. Accompanying the application required by these standards shall be a construction permit fee as prescribed by resolution of the City Council.
- b. Permit fees required by these standards are nonrefundable, and are required to support permit issuance, testing, and inspection.
- c. In computing the construction permit fees, the estimated value of proposed construction shall be comparable with current bid prices for City contract projects, and shall approved by the City prior to issuing the permit.
- d. Work being done under contract with the City shall be exempt from permit fees.
- e. Work being done by franchise utilities shall be exempt from permit fees to the extent provided by the franchise agreements with the City.
- f. Work without Permits. Where work for which a permit is required by these standards is commenced or proceeded with prior to obtaining said permit *(or after said permit has expired or been suspended)*, the construction permit fees specified in Subsection (a) of this section shall be doubled, but the payment of such double fee shall not relieve any person from fully complying with the requirements of these standards and other applicable City codes, standards and ordinances in the execution of the work nor from any other penalties prescribed herein, nor shall it obligate the City to accept any work so performed without a valid permit.
- g. Permits required by these 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 construction drawingplan approval, reapplication for construction drawingplan review shall be made.

If previous construction drawingplan review payment 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 Manager, cover the estimated cost for the new review.

G.10 CONSTRUCTION AGREEMENT & PERFORMANCE GUARANTEE

- a. Except as otherwise provided below, a performance guarantee shall be provided for all work for which a Type A or Type B 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.

- b. 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.
- c. Type A permit. The performance guarantee may consist of one of the following, and shall be in a form as required by the City.
 - 1) An agreement with the City whereby building permits will not be issued until all improvements within the public right-of-way or utility easements are completed and approved by the City.
 - 2) 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(4) 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.
- d. Type B permit. Before the issuance of a Type B construction permit, the applicant shall execute the City's standard Developer-City Construction Agreement that certifies that all improvements will be constructed in conformance with all City standards and ordinances and all conditions of construction permit approval will be satisfied (*ie. plan approval required prior to execution of the construction agreement*). In addition to the construction agreement, the developer shall provide a performance guarantee consisting of one of the following in a form as required by the City.
 - 1) Work Within Existing Improved Rights-of-Way, or Work on Existing Public Utilities. Except for work being performed under public contract for the City of Dayton or Yamhill County, a financial security shall be provided to the City as outlined under Subsection d(4) below for all work within existing developed rights-of-way, unless otherwise approved by the City. The financial security shall specify a timeframe, acceptable to the City, by which the work shall be completed and the existing streets, facilities and improvements are restored to pre-existing or better conditions.
 - 2) Work Outside Existing Improved Rights-of-Way (*except Work on Existing Public Utilities*).
 - a) Subdivisions. An agreement with the City that the final plat for the subdivision will not be approved nor recorded until all improvements have been completed and accepted by the City, or all improvements

have been substantially completed and a financial security has been provided as outlined in Subsection d(4) below.

- b) Partitions. An agreement with the City that no building permits for any structures within the partition will be issued until all improvements have been completed and accepted by the City, or all improvements have been substantially completed and a financial security has been provided as outlined in Subsection d(4) below.
 - c) Other than Subdivisions and Partitions. An agreement with the City whereby occupancy of structures and permanent connection to City water and sewer service will not be allowed until all permitted improvements are completed and approved by the City.
- 3) Upon provision of a performance guarantee as outlined herein, building permits for on-site private work can be obtained for commercial, industrial & multi-family projects. Permanent connection to City water and sewer service will not be allowed until all public improvements are completed, and all on-site improvements are completed or bonded to guarantee all improvements will be completed in accordance with the approved drawings, City Standards and specifications.
- 4) Financial Security. The financial guarantee for a Type B permit may consist of one of the following, and shall be in a form as required by the City. The amount of the security guarantee shall not be less than \$500 or the amounts specified below, whichever is greater.
- a) A surety bond executed by a surety company authorized to transact business in the State of Oregon, in a form approved by the City Attorney. The amount of the performance surety bond shall be as established by the Public Works Director, but shall not be less than 125% of the estimated construction cost of required improvements, as verified by the City. The performance surety bond shall insure the full and faithful performance of all proposed work and shall guarantee that the applicant will conform to all provisions of the construction agreement, if any, and immediately upon the completion of work, remove all surplus earth, rubbish or other material, replace or restore all existing streets, utilities and landscaping to a condition as good as or better than existed prior to the work.
 - b) An irrevocable letter of credit assigned to the City of Dayton in an amount equal to 125% the estimated construction cost of required improvements, as verified by the City. The letter of credit shall be subject to the same conditions as set forth above in the case of surety bonds.
- 5) 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 Public Works Director.

G.11 CONDUCT AND PROGRESS OF THE WORK

- a. All work under said permits shall be completed in conformity with the provisions of these standards, the terms of the applications and construction permits, and under the supervision and subject to the approval of the Public Works Director. 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.
- b. Timeframe for Restoration of Existing Street Surfaces.
 - 1) Unless authorized in writing by the City Manager prior to the start of the work, no work within any existing public roadway shall disrupt traffic flow for more than 14 consecutive days.
 - 2) Unless authorized in writing by the City Manager 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 plated or repaired with cold patch. In addition, trenching within existing major streets (*arterial, collector or commercial-industrial streets*) shall be plated or repaired with cold patch at the end of each work day. This requirement shall apply to work within existing paved streets that are will later be reconstructed as part of the project. 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 working days of written notice by the City.
 - 3) Unless authorized in writing by the City Manager 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.
- c. The contractor is responsible for the coordination with the various utilities and agencies during construction.

- d. Weekly Construction Schedule. By close of business each week, the Contractor shall also submit a weekly work schedule for the following week to the City, summarizing the class of work and areas where work will occur during the following week, and any anticipated inspection requirements.

G.12 ADHERENCE TO AND EXHIBITION OF PERMITS

- a. No work shall be undertaken other than that specified in the application and permit for the particular cut or excavation. Upon demand of the Public Works Director or his/her 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 obtained.

G.13 EXPIRATION OR SUSPENSION OF PERMIT; STOP WORK ORDER; APPEAL

a. Expiration of Permit

- 1) A Type A or Type B site/street/utility construction permit shall lapse if construction for which the permit was issued has not commenced within ninety (90) days of the date of issuance. All construction under a Type A or Type B site/street/utility construction permit shall be completed within 12 (twelve) months of issuance of the permit or execution of the Developer-City Construction Permit, whichever is earlier.
- 2) To reinstate the permit, the applicant shall submit a written request for reinstatement to the Public Works Director giving the reasons for failure to begin construction, pay a reinstatement fee and provide a date when construction will be commenced.
- 3) In reinstating the permit, the Public Works Director and/or the City Engineer may impose additional requirements or conditions deemed necessary for the project to conform to current City standards.

b. Suspension of Permit (Stop Work Order)

- 1) At any time after the issuance of a construction permit required by these standards, the Public Works Director may suspend the permit upon a finding that any of the following grounds exist:
 - a) False, misleading, or erroneous data or information submitted by the applicant in connection with securing the permit.
 - b) Materials or workmanship do not meet specification for the construction or installation of the permitted improvement; or construction or installation varies from the approved plan or design of the improvements without written authorization by the City.

- c) Violation of any of the provisions of the City development ordinances governing the work being done under the permit.
 - d) Failure by the Contractor and his personnel to at all times be civil and courteous around private citizens and property owners, as well to the City staff and inspectors. Foul or abusive language, obscene gestures, use of obscenities, or rudeness directed to private citizens *(or to the City staff or inspectors)* will not be tolerated.
 - e) Failure by the Contractor notify the City prior to performing testing which is required to be witnessed by City staff, or failure by the Contractor to provide copies of all test reports to the City in a timely manner.
- 2) Upon verbally notifying the Contractor of suspension of a construction permit as provided above, the Director 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.
 - 3) 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 standards when a "stop work order" has been issued as provided by this section. The City will not accept any work performed after verbal notification of the "stop work order" to the person in charge of work in progress at the project site, or after subsequent delivery of the written stop work order.
 - 4) An applicant whose permit has been suspended may appeal such action to the City Manager through the City's established appeal process. Notwithstanding the provisions for appeal to the City Manager, the filing of an appeal shall not stay the effect of a "stop work order" issued under this section.
 - 5) In reinstating the permit *(upon adequate assurances that subsequent work and/or conduct will be in accordance with City standards)*, the Public Works Director and/or the City Engineer may impose additional requirements or conditions deemed necessary for the project to conform to current City standards.

G.14 NOTICE OF COMPLETION OF WORK, FINAL INSPECTIONS

- a. Within 3 business days of completion of the work for which a permit was required under these 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 cause to be submitted a written notice to the Public Works Director *(Type A permits)* or the City Engineer *(Type B permits)* 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 (also see requirements relating to notice from the engineer-of-record under PWDS 1.14.c.3.p).

- b. As a minimum, the following must be submitted to the Public Works Director or the City Engineer as applicable prior to the preliminary final inspection.
 - 1) All exterior property pins and street monumentation set (*partitions & subdivisions*).
 - 2) All set property pins exposed and all property corners marked with lath (*partitions & subdivisions*).
 - 3) All easement limits (*except PUEs parallel with r/w*) marked with labeled lath.
 - 4) 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.
 - 5) Written copies of all required utility test reports (*compaction, mandrel, pressure, vacuum, etc*), as well as video tapes of any required pipeline TV inspections.
 - 6) 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, baserock and AC pavement tests for streets and trench patching, as well as soil compaction results for all lots with fills.
 - 7) Certification that the areas within the building envelopes of all lots conform to compaction requirements of the applicable Oregon Building Code.
- c. Any corrective work items identified during the preliminary final inspection (*ie. punchlist 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 punchlist 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.
- d. Upon completion of all corrective work to the satisfaction of the Public Works Director 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.
 - 1) Full-size mylar or vellum as-built drawings (*based from an as-built survey as applicable*) for Type B permitted improvements, full-size blackline paper as-built drawings for Type A permitted improvements.

- 2) Acceptable Maintenance Bond (*or other security acceptable to the City*) valued at a minimum of 40 percent of the estimated construction costs for the public portion of the improvements completed under the Public Works permit, as well as portions of the private improvements as noted under G.15.
 - a) Bond periods shall conform with the minimums noted under G.15.d, unless longer periods are required by the City as noted under G.15.d.5.
 - b) The warranty period shall not commence prior to provisional acceptance of the public improvements by the City.
 - 3) 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.
 - 4) Other items required as conditions of the land use planning approval, where applicable.
- e. 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.

G.15 CITY POLICY FOR ACCEPTING NEW OR RECONSTRUCTED STREETS AND PUBLIC UTILITIES

- a. The City will accept developer-built public street, sanitary sewer, storm sewer and water distribution improvements constructed in conformance with the City Public Works Construction Standards subject to the following procedures.
- b. After construction of the total project has been completed (*including completion of all roadways & access lanes as required by City standards in order to provide maintenance access to water, sewer & storm system improvements*), and after all final inspections have been completed, and after all required maintenance bonds and as-builts have been submitted and accepted by the City and any outstanding plan review or permit fees have been paid (*and after other items under G.14 have been provided*), the Public Works Director or the City Engineer will provide a memo to the City Manager 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.
- c. 40% Maintenance/Warranty Bonds.
 - 1) Maintenance Bonds (*or other security acceptable to the City*) shall be provided by the Contractor or the Developer for the public portion of the improvements constructed under the Public Works permit, as well as portions of the private improvements as noted below, valued at a minimum of forty

percent (40%) of the applicable construction costs.

d. Warranty & Maintenance Bond Scope/Periods/Coverage.

- 1) Warranty and Maintenance Bond periods shall commence upon the date of the notice of provisional acceptance by the City, with final acceptance to occur at the end of the warranty period. The warranty and maintenance bond periods and scope of work covered shall be as summarized below.
- 2) One (1) year from provisional acceptance by the City of the applicable public sanitary sewer, storm drainage and/or water improvements including water meters (as well as detention systems, water quality facilities & structures, private fire hydrants, portion of fire service lines located within the public right-of-way or City utility easements or serving private fire hydrants, fire service backflow assemblies, FDCs, etc.), but excluding any other improvements which are listed by the PWDS as “special items” for design (see PWDS 2.3, 3.3, 4.3 & 5.3) which required a longer warranty period.
- 3) Two (2) years from provisional acceptance by the City of the applicable public street/public sidewalk/street light improvements (excluding street lights owned/maintained by the power company), as well as box culverts, trench paving, driveway approaches, designated fire lanes, common use driveways, common use private streets, private common sewers & private manholes, private sewer pump stations, metering/monitoring manholes, etc., and also including other improvements which are listed by the PWDS as “special items” for design (see PWDS 2.3, 3.3, 4.3 & 5.3).
- 4) Any damage to the covered improvements during the warranty period shall be corrected prior to final acceptance by the City and release of the warranty and/or bonds, regardless of the cause of the damage.
- 5) The required warranty and bond period may be extended at the discretion of the City Manager if the Public Works Director or the City Engineer identify construction materials or methods that differ from City standards, but which the City does not require to be removed and replaced.
 - a) This authority granted to the City Manager shall in no way obligate the City to accept any work that is not constructed in full conformance with the approved plans and these standards, nor shall it be construed as establishing a precedent.

e. Prior to the end of the warranty and bond period, Public Works 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.

- 1) All required corrective work shall be completed by no later than 21 days from

the date of such written notification.

- 2) Any delay in correcting the identified deficiencies will result in a delay in final acceptance by the City, and release of any warranty or bonds.

G.16 PENALTY; CONTINUING VIOLATIONS

- a. Failure to comply with any provision of these 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 standards to civil penalties as prescribed herein.
- b. Offenses defined in these standards shall be punishable by a fine not to exceed \$250 per violation. Each and every day a violation is permitted to exist shall constitute a separate offense.
- c. A violation of the provisions of these standards is declared to be an offense, but not a crime. It is intended to be an offense which can be disposed of in all respects as a civil proceeding and not governed by procedural, evidentiary, substantive, and constitutional rules applicable to criminal charges and proceedings. A person adjudged responsible for an infraction shall not be deemed "guilty" of the infraction and a judgment of responsibility shall not be deemed a "conviction" for any purpose.
- d. Notwithstanding anything in this section or any other ordinance to the contrary, no greater penalty shall be imposed for any violation of city ordinance than the maximum penalty prescribed under Oregon statute for the same act or omission.

G.17 PRECONSTRUCTION CONFERENCE

- a. Requirements relating to the Preconstruction Conference are outlined in Section 1.13 of the Public Works Design Standards (PWDS).

G.18 VARIANCES TO CONSTRUCTION STANDARDS

- a. Requests for variances to these Standards shall be based on the criteria and procedures outlined in Section 1.12 of the Public Works Design Standards (PWDS).

G.19 CONSTRUCTION INSPECTION & ENGINEER-OF-RECORD RESPONSIBILITIES

- a. Construction inspection and responsibilities of the Engineer-of-Record shall generally conform to the procedures outlined in Section 1.14 of the Public Works Design Standards (PWDS).
- b. Design or Drawing Revisions or Modifications. During construction, any revisions, modifications or changes proposed to the approved drawings and/or design must be

requested in writing by the engineer-of-record, as summarized in PWDS 1.14.c.3.p.

G.20 CONSTRUCTION SUBMITTALS BY CONTRACTOR

- a. Construction submittals for materials & equipment incorporated into the work shall be submitted by the Contractor, and shall generally conform to the requirements outlined in Section G-01300 attached hereto.

SECTION G-01300
CONTRACTOR CONSTRUCTION SUBMITTALS

PART 1: GENERAL

1.1 SCOPE

- a. Construction submittals for review by the City are required for all material & equipment which is incorporated into work covered under the PWDS or which will be turned over to the City for operation and maintenance, including but not limited to streets/sidewalks, water/sewer/storm drainage improvements, pump stations, treatment facilities (water, sewer or storm), storage reservoirs, bridges, etc.
- b. 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.
- c. Construction Submittal Format & Number of Copies.
 - 1) Contractor will be allowed to provide electronic/pdf copies of highlighted/marked-up submittals and associated submittal cover sheet, conditional upon submittals being complete and configured in accordance with the requirements of this section.
 - 2) If the Contractor fails to provide submittals in full conformance with this section, the Public Works Director and/or City Engineer may require all subsequent submittals to be submitted in hard copy format (three copies minimum).

1.2 GENERAL SUBMITTAL REQUIREMENTS

- a. Review by Engineer-of-Record Required.
 - 1) Unless otherwise approved in writing by the Public Works Director, all submittals to the City (*with the exception of the laboratory and test reports*) shall be first reviewed by the Engineer-of-Record, who is responsible to verify that the submittals conform with the approved design and with PWDS requirements before they are forwarded to the City for review. Direct submittals from contractors, subcontractors or suppliers will not be accepted by the City unless otherwise noted herein.
 - 2) Prior to submitting to the Engineer-of-Record, the Contractor shall carefully review the correctness and thoroughness of the material, verify all field measurements, and coordinate all aspects of each item being submitted.
 - 3) The 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, and ensure that the submittal is otherwise organized and marked as required herein or in the individual specification sections as applicable.
 - 4) **The Contractor shall verify his/her review by affixing his/her stamp of approval and signature to the front page of each submittal package.**

- b. Direct Supplier/Subcontractor Submittals Not Accepted. All submittals to the City, with the exception of the laboratory test certificates, shall be made only after review by the Engineer-of-Record. Submittals from subcontractor or suppliers will not be accepted.
- c. Sequential Numbering. All submittal reports shall be numbered sequentially. Resubmittals shall be designated with the same number as the original submittal followed by a designation letter (ie. Submittal "5A" for the first resubmittal of submittal 5, Submittal "5B" for second, etc.).
- d. Specified Cover Sheet. All submittals shall be accompanied by a completed copy of the submittal report cover sheet included under Part 4 of this section.
- 1) A separate submittal report cover sheet shall be prepared for each submittal. Generally, items under a single PWDS division can be included on the same submittal report. Each submittal report shall clearly designate the PWDS division & section(s) that apply to the material or equipment being submitted on.
 - 2) A single submittal report shall not be used for items under different PWDS divisions.
 - 3) All submittal report cover sheets shall reference the item(s) that it covers, the applicable PWDS division & section(s), the Contractor's name, the Project title and location, and the date of submission. Submittal shall also indicate whether the information is for review and approval by the City, for record purposes or for the fulfillment of the operation and maintenance requirements.
- e. The Contractor shall provide copies of each submittal as follows unless otherwise directed by the City:
- 1) Material and Equipment Construction Submittals – Four (4) copies provided to City if pdf submittals are dis-allowed as noted above.
 - 2) Quality Control Submittals – The Contractor or the laboratory shall submit one copy of all test certificates, and calibration certificates directly to the following; Public Works Director and City Engineer.
 - 3) Informational Submittals – The Contractor shall submit one copy of all licenses and permits directly to the following; Public Works Director and City Engineer.
- f. Substitutions. 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, or as specified below. Provision of such information or acceptance for review shall not be construed as approval of such substitute.
- g. Highlighting and/or Marking. All submittals shall be tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information (*as well as being marked, labeled or identified with where the product will be used, as applicable*). All options and equipment furnished shall be so indicated.
- h. Complete Submittals Required. Failure to provide complete submittals, or failure to follow the instructions outlined in this section (*including but not limited to highlighting applicable information and/or crossing out non-applicable information*), will result in the incomplete submittal being returned to the Contractor without review, at the discretion of the City Engineer or the Public Works Director.

1.3 MATERIAL AND EQUIPMENT SUBMITTALS:

a. All Variances, Exceptions and/or Substitutions Shall be Noted.

- 1) If the proposed material or equipment includes modifications from standard requirements, features or options in the PWDS or on the drawings, these shall be clearly noted on the submittal.
- a) Failure to note variances from the PWDS or drawing requirements may result in the submittal being returned to the Contractor without review, if the discrepancy is discovered by the City.
- 2) Required Summary. At the front of each submittal package, the Contractor shall clearly indicate and list all exceptions, variances or substitutions from the requirements in the PWDS or on the Drawings (*any proposed changes, substitutions or differences of any kind*), as well as marking these on the applicable submittal page(s).
- a) Contractor Responsibility. If the Contractor fails to clearly indicate all exceptions or variances from the requirements in the PWDS or on the Drawings as noted above, and these differences, exceptions or variances are not discovered by the City during submittal review, the Contractor shall remain fully and completely responsible for correcting such discrepancies, regardless of when they are ultimately discovered, at no cost to the City.

~~a. Variances Shall be Noted.~~

- ~~1) The Contractor and/or Engineer of Record shall indicate on the submittals all variances from the requirements in the PWDS or on the Drawings. Failure to note variances from the specification requirements may result in the submittal being returned to the Contractor without review.~~
- ~~2) 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.~~

b. Material & Equipment Submittals. Submittals for all materials and equipment used by the Contractor in the performance of the work shall include the following as applicable.

- 1) Manufacturers' 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:
 - a) Manufacturer's catalog data
 - b) Materials of construction
 - c) Manufacturer's name and model number
 - d) 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 design and the PWDS. 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 by this section or if noted on the drawings. 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.
- 5) Shop Drawings: Shop drawings shall include the following as applicable to the equipment or system along with any special requirements listed in the PWDS, approved drawings or directive from the Public Works Director:
 - a) Scaled details
 - b) Scaled dimensional drawings
 - c) Sectional assembly drawings
 - d) Fabrication information
 - e) Wiring schematics with termination point identification if applicable.
 - f) Motor information if applicable.
 - g) Piping schematics if applicable.

1.4 SUBSTITUTIONS

- a. Substitute items of material or equipment are those items which are determined by the Public Works Director NOT to qualify as an "or equal", or which require any level of redesign work to incorporate into the project.
- b. Submittals for substitute materials or equipment shall include but not be limited to manufacturer's literature, design criteria, dimensions and installation instruction.
- c. 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.
- d. If the substitution requires a change in the design (*including dimensional changes to any structure or other component*), the submittal shall include all pertinent design information and details for the required design change, with supporting documentation.

1.5 QUALITY CONTROL SUBMITTALS

- a. Quality Control submittals are defined as those required by the PWDS to present documentary evidence to the City that the Contractor has satisfied certain requirements of the approved drawings or the PWDS. Such submittals may include but are not limited to:
 - 1) 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.
 - 2) 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.

1.6 INFORMATIONAL SUBMITTALS & SUBMITTALS FOR RECORD

- a. Informational submittals formalize the flow of information between the Contractor and the City. Such submittals may include but are not limited to:
 - 1) Construction Schedules: Unless otherwise specified, the Contractor shall submit construction schedules as required in the PWDS.
 - 2) 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, including but not limited to the following.
 - a) Copies of all construction permits and licenses required by all approving agencies, including as applicable cities, counties, state agencies, utility service districts, etc.
 - b) Copies of all structural, electrical, mechanical, and plumbing permits (as appropriate) required by all approving agencies.
 - c) Copies of County, ODOT and/or railroad right of entry permits (as applicable), including copies of permit conditions.

1.7 CITY REVIEW OF SUBMITTALS

- a. Except as may otherwise be indicated, the City will review the submittals with reasonable promptness for their compliance with the design concept and the PWDS and return each submittal to the Contractor with comments noted thereon. The City's maximum review period for each submittal or resubmittal will be 21 days.
- b. If the review indicates that the material or equipment is in general conformance with the design concept and complies with the Drawings and Specifications, submittal copies will be marked "REVIEWED". In this event the Contractor may begin to incorporate the material or equipment covered by the submittal.
- c. If the review indicates that limited corrections are required, the submittal will be marked "FURNISH AS CORRECTED". The Contractor may begin incorporating the material and equipment covered by the submittal in accordance with the noted corrections.
 - 1) Unless otherwise approved in writing by the City, the Contractor shall provide a written summary (*letter, memo or email*) confirming how each such "FURNISH AS CORRECTED" review comments will be addressed. A separate letter/memo/email shall be provided for each submittal (*subject line referencing the submittal number and title*), with confirmation of each applicable submittal review comment from the submittal review by the City, with numbering to match the applicable submittal review comment.
 - 2) If the requirement for written confirmation of "FURNISH AS CORRECTED" review comments is waived in writing by the City, no further action is required by the Contractor.
- d. If a submittal is returned marked "REVISE AND RESUBMIT", the Contractor shall revise it and shall resubmit the required number of copies to the City for review.
 - 1) Resubmittal of only portions of multi-page or multi-drawing submittals will not be allowed unless specifically requested or allowed by the City (in the submittal review). For example, if a Shop Drawing submittal consisting of 10 drawings contains one drawing noted as "REVISE AND RESUBMIT", the submittal as a

whole is deemed "REVISE AND RESUBMIT", and 10 drawings are required to be resubmitted.

- 2) However, if a submittal includes numerous different items, each of which was reviewed and commented on separately, only those noted as "REVISE AND RESUBMIT" need to be resubmitted.
- e. If a submittal is returned marked "REJECTED", it shall mean either that the proposed material or product does not satisfy the specification or the submittal is so incomplete that it cannot be reviewed. In such cases, copies will be returned to the Contractor for correction. The Contractor shall then resubmit the required number of copies of the corrected submittal.
 - 1) Any material or equipment on-site which is rejected by the City shall be removed from the job site by the Contractor within two (2) working days of notification of rejection of the submittal.
- f. Except at its own risk, the Contractor shall not undertake work covered by submittals marked as "REVISE AND RESUBMIT" or "REJECTED" until a new submittal is made and returned without exceptions.
- g. The City's review of submittals is only for general conformance with the design concept of the project and general compliance with the information given in the approved design and the PWDS. Corrections or comments made on the submittals or shop drawings during this review (or absence of such corrections or comments) do not relieve the Contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her work with that of all other trades; and for performing all work in a safe and satisfactory manner.
- h. In the event that multiple reviews are performed on the same submittal (*or portions of the same submittal*) due to revisions, clarifications, duplicate submittals or other reasons, all submittal review comments are complementary and what is noted by any submittal review iteration shall be as binding as if noted on all.

PART 2: PRODUCTS

None.

PART 3: EXECUTION

None.

PART 4: SPECIAL PROVISIONS

4.1 SUBMITTAL REPORT FORM

- a. See following pages:

WESTECH ENGINEERING INC. SUBMITTAL REPORT

PROJECT: _____

FROM (Contractor): _____

TO: Public Works Director

COPIES: 1 for pdf submittals, or three (3) if hard copies are required by Public Works Director

SUBMITTAL NUMBER _____ (to be numbered sequentially by Contractor)

Category of Information being Submitted:

- ☐ EQUIPMENT/MATERIAL SUBMITTALS/SHOP DWGS ☐ MANUFACTURER'S DATA
☐ REPORTS ☐ METHOD STATEMENT ☐ INFORMATION FOR RECORD
☐ SAMPLES ☐ OTHER ☐ OPERATIONS&MAINTENANCE INFO

DESCRIPTION: _____

PWDS Division & Section: _____

CONTRACTOR:

I hereby certify that the material submitted has been checked for compliance with the approved drawings and any exceptions have been clearly noted.

Signed (Contractor's authorized representative)

Date

Printed Name

Title

ENGINEER-OF-RECORD:

I hereby certify that I have reviewed this submittal, and it is in compliance with the design concept, the approved drawings and PWDS requirements, except as clearly noted.

Signed (Engineer of Record)

Date

RESPONSE TO SUBMITTAL (by City):

- ☐ REVIEWED ☐ FURNISH AS CORRECTED ☐ REJECTED
☐ REVISE AND RESUBMIT ☐ SEE ATTACHED LETTER, ____/____

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the approved design and the PWDS. Corrections or comments made on the submittals or shop drawings during this review (or absence of such corrections or comments) do not relieve the contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her work with that of all other trades; and for performing all work in a safe and satisfactory manner.

Signed

Date

Printed Name

CITY OF DAYTON
Public Works Design Standards

Dayton Small Wireless Facilities Design & Construction Standards

Appendix H

CITY OF DAYTON
Public Works Design Standards

Stormwater Detention Systems, Purpose & Example Summary

Appendix I

*NEW INFORMATIONAL
SECTION*

NEW

Stormwater Detention

The primary purpose of stormwater detention is to mitigate the impacts of new development on downstream drainage systems and downstream properties. As property develops, the increased impervious area generates increased stormwater runoff due to a couple of factors. First, a larger portion of the rainfall is discharged from the site, since pervious surfaces (*bare or vegetated ground*) allow more of the water to soak into the ground and not leave the site than do impervious surfaces (*ie. pavement, roofs, sidewalks, compacted gravel, etc. associated with development*). Second, impervious surfaces allow the stormwater to travel across the site more quickly, resulting in a greater concentration of water in a shorter time period, thus producing higher peak runoff rates. By capturing the runoff from developed areas in a detention facility, the opportunity is created to release the resultant runoff at a controlled rate, with the discharge rate. Allowable runoff is typically permitted to be no more than the estimated flow from the site under pre-developed conditions, of the capacity of the downstream conveyance system, whichever is less.

The City's current detention standard is outlined in Division 3 of the Public Works Design Standards (PWDS). City standards require a development to control the flowrate of stormwater run-off to the flowrate that was generated by a defined storm under pre-development conditions (*unless there are downstream capacity issues which would require an even lower discharge flowrate*). The stormwater detention storage facility must be sized to contain the difference between the defined post-development storm (*ie. runoff under post-development conditions*) and the defined predevelopment storm (*ie. runoff under pre-development conditions*).

Figures 5-4 and 5-5 show the runoff from a hypothetical 5-acre site. It is a grassy field in its undeveloped condition, and developed as a commercial site. Figure 5-4 provides a comparison of undeveloped run-off and developed runoff for a 10-year storm event on the same property. This gives a picture of pre-developed and post-developed runoff based on the same storm event. For example, where City standards require calculations based on a 5-year pre-developed storm and a 25-year post-developed storm, Figure 5-5 presents runoff for those events and also shows the discharge from a detention basin where the release is restricted to the peak flow of the 5-year storm event.

There are several benefits provided by stormwater detention systems. The first relates to the local system immediately downstream of the site. As shown by Figure 5-5, the peak release rate from the detention facility is limited to the peak flow rate from a 5-year storm in the predeveloped condition. The resulting 2.2 cfs discharge is much more easily handled by the downstream stormwater system than would be the case if the 5.8 cfs discharge occurred from a development without a stormwater detention system (*in this case, the peak flowrate would be more than doubled without detention*).

Another potential benefit of detention relates to controlling the demand placed on the downstream trunk storm systems and drainage channels. The impact of runoff and detention is cumulative. As multiple sub-basins discharge into the main stormwater conveyance system, the impact of undetained runoff increases. This issue is particularly important for the

City, since the time of concentration is relatively short for many of the drainage basins, resulting in comparatively large percentage increases in basin run-off that all occur close to simultaneously. The timing consideration for the cumulative runoff is important. For larger basins where the upper end of the basin is a long distance from the middle or lower end of the basin, the peak flows become offset in time and do not fully add together to produce the same percentage increase in the combined peak flows as experienced in smaller basins.

In addition to the reduced capacity impacts on the downstream storm conveyance system, detention provides benefits by reducing the erosion and silt impacts caused by the stormwater runoff. Detention systems typically capture some sediment either in the flow control structure or in the detention storage area itself, reducing the amount of sediment flowing to the downstream system. Downstream of detention, reduced flows in open channels also cause less erosion than would typically be experienced under the higher undetained flows. Finally, where drainage basins discharge to major drainageways, the reduced flows cause less erosion potential due to combined basin flow discharges into the creek or river.

While stormwater detention has potential benefits when properly implemented, it is not without costs. One potential cost is loss of developable land. Some of the simplest and least expensive detention facilities are open storage ponds created on a site. A second method of creating detention capacity is to do so with underground vaults, pipes or chambers. While this method is more expensive to construct, it typically allows the development of a greater percentage of the site. Whether constructed above or below ground, detention facilities also result in long-term maintenance requirements for the responsible party, which incurs additional cost over time.

To protect the local system adjacent to potential development sites, and also to protect the major storm drainage trunk system, the City have implemented stormwater detention requirements in the PWDS.

As described above, the basic principle of detention is to capture the runoff before it leaves a site, hold it in some form of storage system, and release it at a metered rate to the downstream stormwater conveyance system, in order to avoid increases in flow that the downstream system may not be able to handle. As noted above, detention can be accomplished a number of different ways. Options used for storage include open storage basins, storage in landscape areas, ponding in parking lot areas, underground storage pipes or storage chambers. Different forms of storage can be combined at one facility, such as a ponding in a parking lot and an underground pipe. Several examples are shown in Figures 5-6 through 5-9.

The most common method of controlling the discharge rate is a flow control structure with an orifice that restricts the ability of the water to flow into the discharge pipe. Flow control orifices are typically installed in manholes or stormwater inlets. An standard example of a flow control manhole is shown by PWDS Detail 320, whereas flow control Type III inlet as shown by Figure 5-11 may be used where there is not enough depth for a standard flow control manhole (*these are illustrative samples only, and any flow control structure must meet current City standards*).

Figure 5-4 | Pre & Post Development Runoff

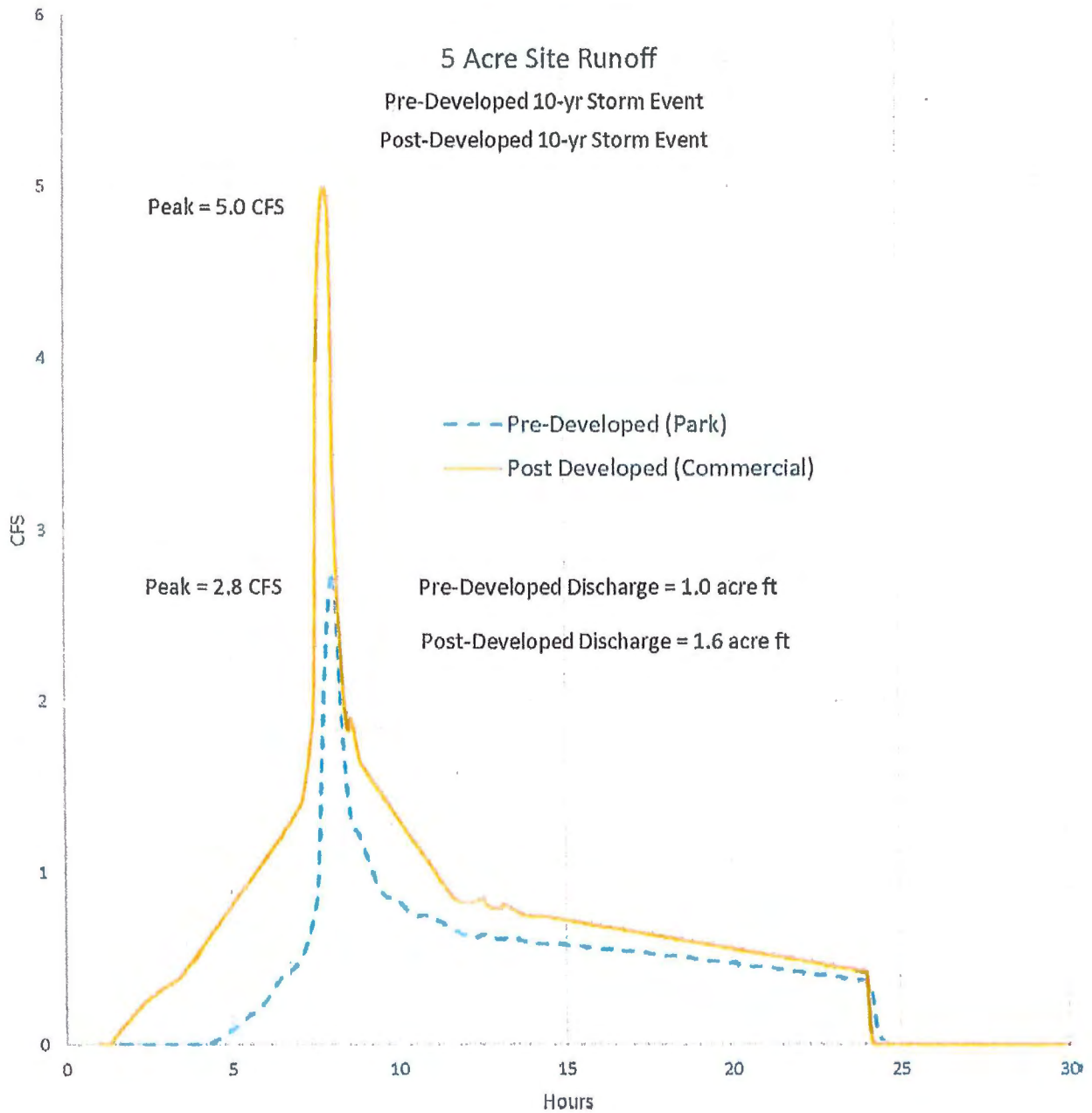


Figure 5-5 | Site Runoff With Detention

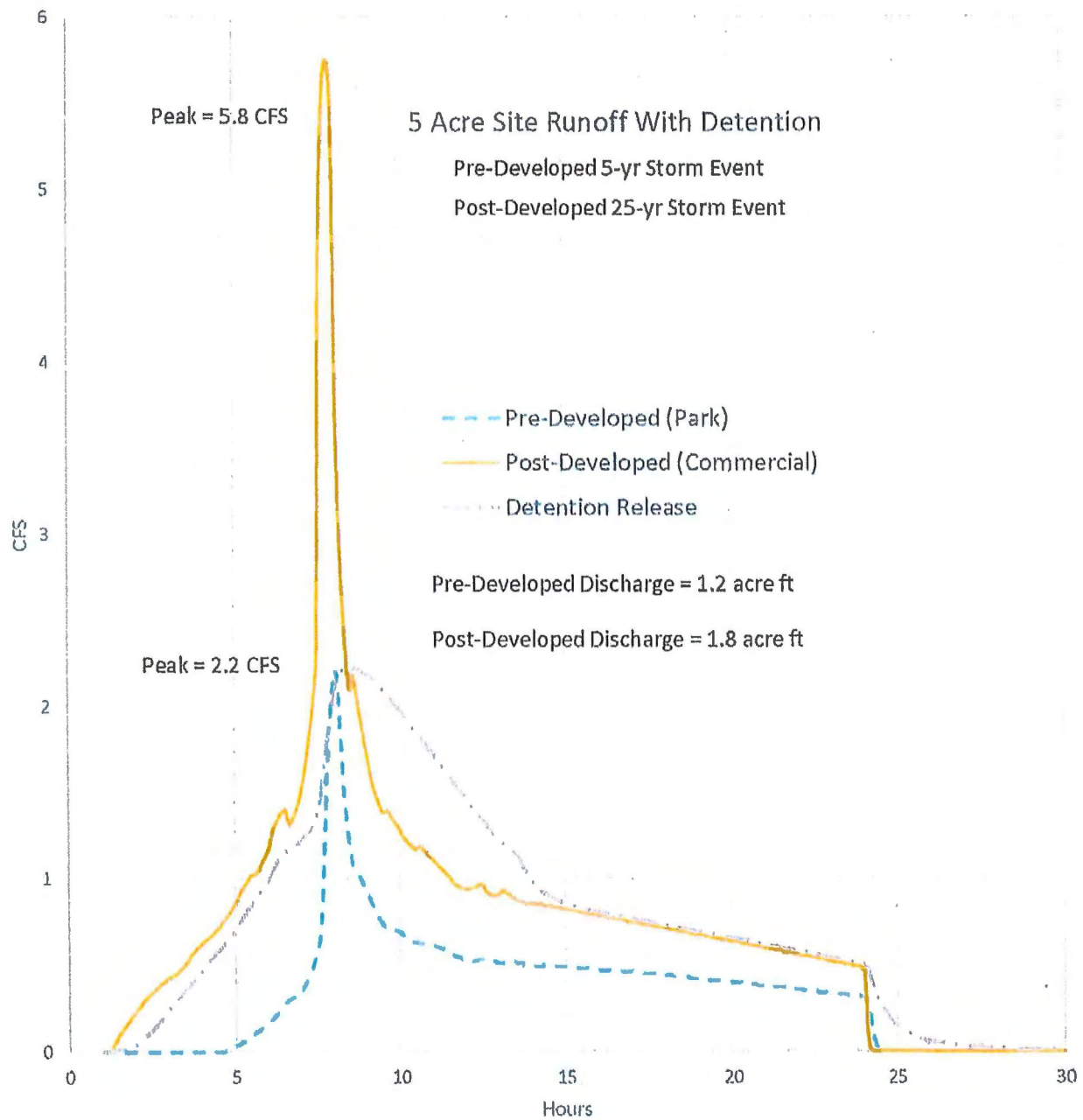
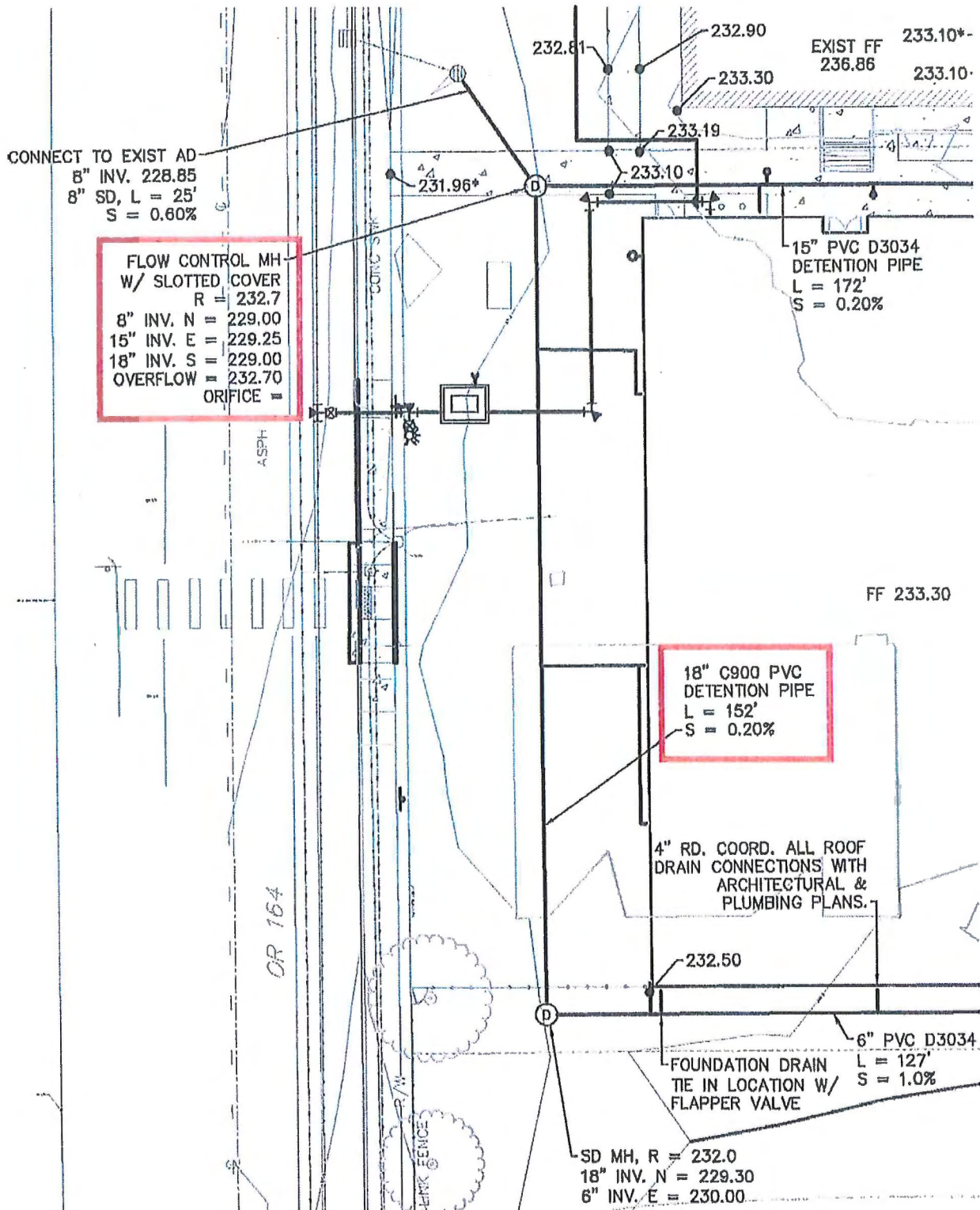
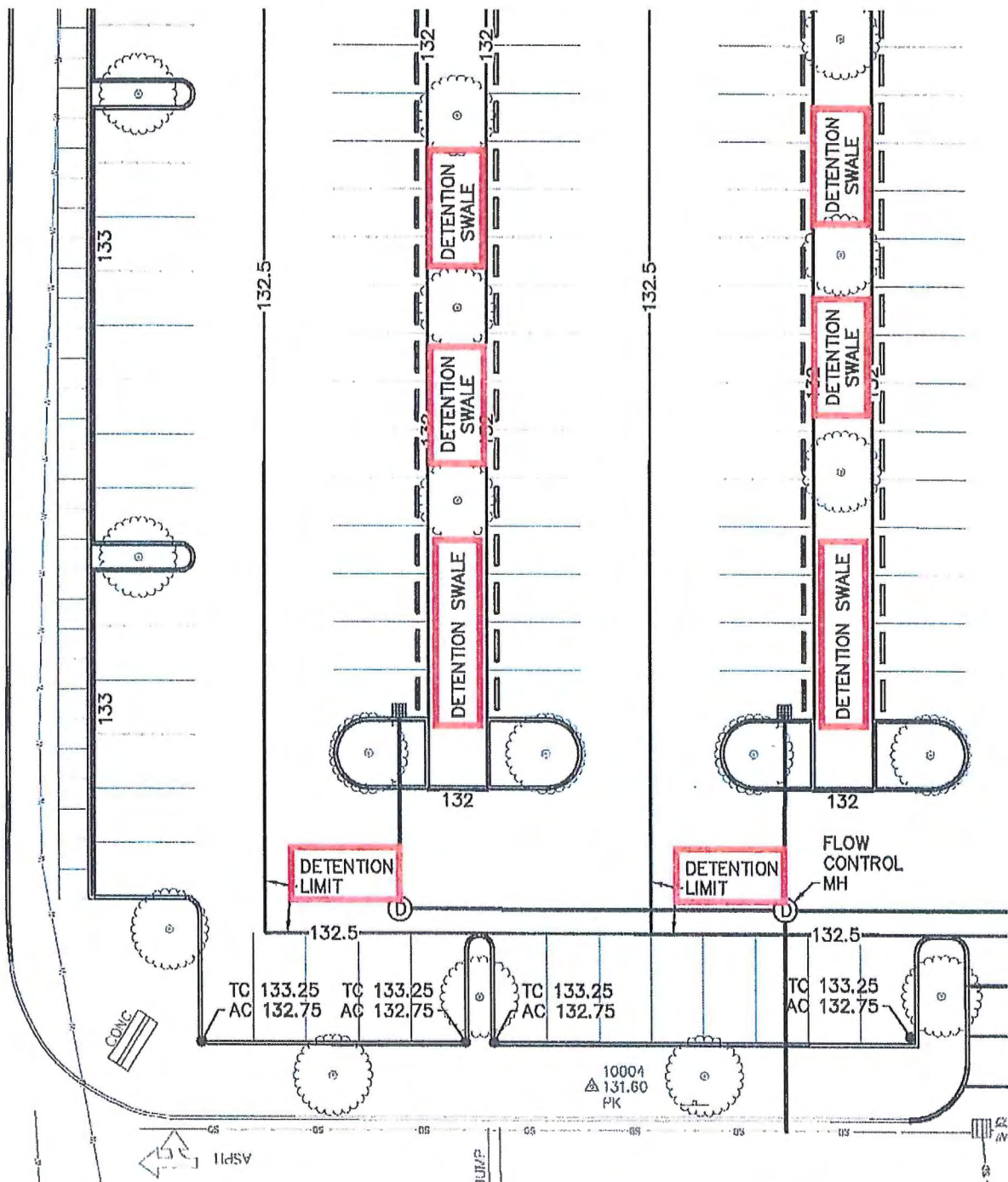


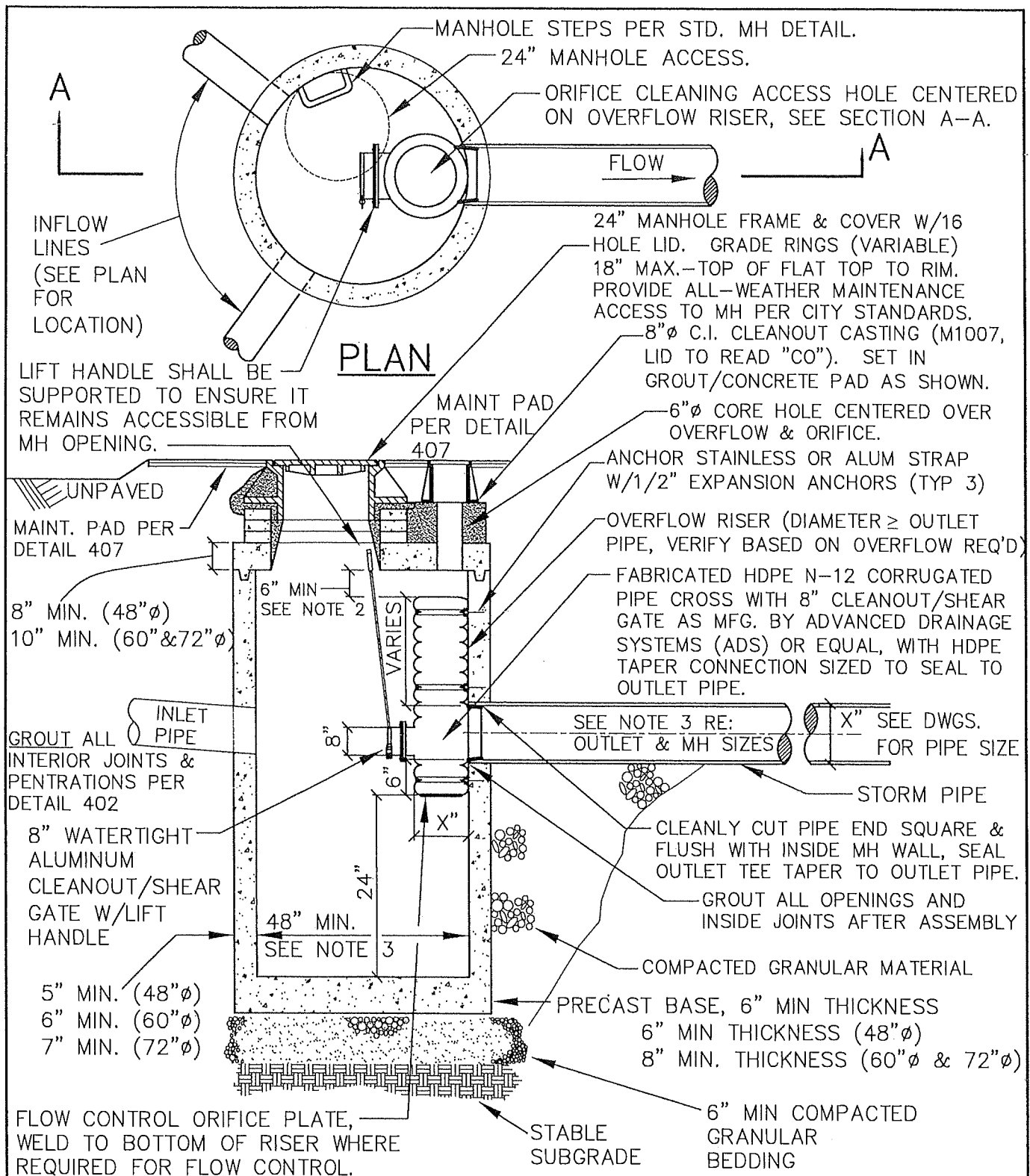
Figure 5-7 | Pipe Detention



[illegible]

Figure 5-9 | Parking Lot Swale Detention





NOTES:

1. PRECAST SECTIONS SHALL CONFORM TO ASTM C-478.
2. DISTANCE FROM TOP OF OVERFLOW TO MH RIM SHALL BE BASED ON OVERFLOW CAPACITY CALC'S BY DESIGN ENGINEER (ASSUME ORIFICE CONTROL).
3. 60" MINIMUM DIA. MANHOLE REQUIRED FOR OUTLET PIPE LARGER THAN 15" OR INLET > 21".
4. ORIFICE CLEANING ACCESS TO BE 6" CORE HOLE THROUGH FLAT-TOP (CENTERED ON OVERFLOW) WITH CI CLEANOUT BOX GROUTED TO SLAB.

LAST REVISION DATE:

AUG 2020

**POLLUTION/FLOW CONTROL
MANHOLE W/OVERFLOW**

(NTS)

DETAIL NO.

DAYTON, OR

320

Figure 5-11 | Flow Control Type III Inlet

