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Section 110 General Requirements for Public Improvements

110.1 General

- A. The purpose of this manual is to set standards for the construction of public and private improvements to serve new and future developments and for the reconstruction of existing facilities to upgrade existing infrastructure. These standards shall apply to all improvements within the existing public rights-of-way, to all improvements from new developments required within the proposed public rights-of-way or public easements, to all improvements intended for maintenance by the City, and to all other improvements which require approval of the City.
- B. The standards contained in this manual are established by the City as rules governing materials and the quality of workmanship to which design engineers, developers, contractors, and others shall adhere in preparing plans and specifications, and in constructing improvements and facilities. These standards also establish the rules to which City staff will adhere in reviewing plans and inspecting construction.
- C. City design and construction standards are primarily based upon AASHTO's *A Policy on Geometric Design of Highways and Streets* and *Roadside Design Guide*, *AWWA Standards*, *CWS's Design and Construction Standards for Sanitary Sewer and Surface Water Management*, *FHWA's Manual on Uniform Traffic Control Devices for Streets and Highways* (with Oregon Supplement), *ODOT's Oregon Standard Specifications for Construction*, *Oregon Administrative Rules*, Chapter 333, and the *Oregon Fire Code*. Where the standards contained in this manual do not address a particular situation, the standards contained in the above referenced documents shall be applied.
- D. The City may make the following changes or corrections to the provisions of this manual periodically, as needed, when the changes or corrections do not alter the sense or meaning of its provision. Changes shall be posted on the City's website with the manual for easy access to the updates:
1. Misspellings: Misspelled words may be corrected.
 2. Histories: Erroneous legislative histories may be corrected.
 3. Cross-references: Cross-references may be changed to agree with newly enacted, amended, reenacted, renumbered, relettered, relocated, or corrected ordinances or resolutions.
 4. Capitalization: Improper capitalization may be corrected.
 5. Headings: Descriptive headings of titles, chapters, sections, or subsections may be edited or added to briefly and clearly indicate the subject matter of the title, chapter, section or subsection.
 6. Renumbering and relettering: The numbering or lettering of sections of ordinances and resolutions, including duplicative numbering or lettering created by conflicting enactments, may be corrected or properly arranged.
 7. Changed job titles and agency names: References in design standards to specific job titles or agency names that are changed without substantial effect on job or agency responsibilities may be changed to refer to the new job title or agency name.
 8. Punctuation: Punctuation, including hyphenation, may be corrected.
 9. Clerical Errors: Typographical or grammatical errors may be corrected.

10. Gender: Gender-specific terms that occur in an ordinance or order may be changed to gender-neutral terms and necessary grammatical changes to properly use the gender-neutral terms may be made.
 11. Reference Documents: Any document referenced in this manual that undergoes a periodic reprinting update may have the reprinting date revised in this manual.
- E. Changes made under this section will be recorded in the online revision log and an updated manual posted to the City website. The City may make the following changes to the provisions of this manual, as needed:
1. Implement new products, technical requirements, or construction practices that improve the quality of the improvement and/or reduce maintenance costs.
 2. Rectify construction and/or maintenance issues that result from the use of the current requirements in this manual.
 3. Mandated additions, deletions, or revisions to City design standards may be made when required for City compliance with mandatory regional, state, or federal regulations.
 4. Any changes that do not alter existing City policy or have significant cost impacts.
- F. Except for changes authorized under 110.1.D and 110.1.E, changes the City proposes to this manual will be posted on the City's website for a 30-day review period. After review of the comments, City staff will revise the proposed changes and present a recommendation to the City Council for adoption. Upon Council approval, the updated revision log and manual will be posted to the City website for easy access to the updates. The updated manual will reflect the date of adoption. Any changes approved by the City Council will be enforceable on the effective date of the ordinance.
- G. Any change or correction made under the authority of this section does not affect the substantive meaning of any enactment of the City. Any erroneous or inadvertent substantive change must be construed as a clerical error and given no effect.

110.2 Required Approvals and Permits

- A. Property owners, developers, and others proposing to construct new public infrastructure, including streets, storm system, sanitary sewer, water, public sidewalks, and/or other frontage improvements within the public right-of-way, or significant changes to any of these public infrastructure types, as defined by the City and CWS, will be required to obtain all applicable land-use approvals, obtain a site development permit and/or right-of-way permit as appropriate, pay all applicable fees, and secure applicable performance securities before commencing any work.

110.3 Commencement of Work

No work regulated by the City's codes shall commence prior to the approval of construction plans and issuance of the appropriate approval(s) by the City. A Site Development Permit (SDP) will be issued at the pre-construction conference only if the following steps have been completed satisfactorily:

1. Submittal of a Service Provider letter and/or system connection permits from Clean Water Services (CWS), if applicable.

2. Completion of the Director, and Planning Commission approval or other appropriate land use approval, including City Council appeal periods, if applicable.
3. Demonstrated performance of all applicable Conditions of Land Use Approval that must be met prior to issuance of the permit.
4. Approval of the construction plans by the City.
5. Submittal of acceptable calculations and other supporting documents to the City Engineer, when such documents are requested, including, but not limited to, stormwater calculations, traffic evaluations and vehicle turning diagrams, retaining wall calculations, geotechnical studies, design exceptions.
6. Approval by the City of the detailed construction cost estimate.
7. Approval of the performance security by the City.
8. Completion and submittal of the signed City Standard Agreement to Construct Required Improvements and Retain a Project Engineer or Coordinating Design Professional Registered in the State of Oregon.
9. Approval of all legal documents, easements, and other documents in addition to showing improvements on construction plans as required by a decision-making authority's conditions of approval.
10. Payment of all fees necessary for the permit per the adopted fee schedules.
11. Submittal of copies of permits from all other affected governmental jurisdictions.
12. Completion of all appeal periods (land use approval and floodplain modification notices)

110.4 Licensed Professionals to Perform Work

Designs shall be stamped by a registered Professional Engineer licensed to practice in the appropriate engineering discipline in the State of Oregon.

Registered Architects licensed to practice in the State of Oregon under, ORS Chapter 671, may stamp construction plans for site grading, erosion control, parking lots, sidewalks, and driveways except in the following cases:

1. A proposed floodway or floodplain modification.
2. Grading of an area that is within a fire access route unless a supporting geotechnical report is supplied.
3. A cut or fill that is greater than 2 feet from original ground level unless a supporting geotechnical report is supplied.

110.5 Precedence of Documents

If there is a conflict between approval documents, the document highest in precedence shall control. The precedence shall be:

- First: Federal, State, and local laws, including, but not limited to, Americans with Disabilities Act (1990)
- Second: Permits from other agencies or jurisdictions, as may be required by law.
- Third: Land use decision-making authority's Conditions of Approval.
- Fourth: City of Beaverton Engineering Design Manual.
- Fifth: City of Beaverton Development Code.
- Sixth: Clean Water Services (CWS) Design and Construction Standards. The City of Beaverton has adopted the Clean Water Services Design and Construction Standards with minor modifications as shown herein.
- Seventh: Oregon Standard Specifications for Construction (current edition) (ODOT, Oregon APWA) including inspection manuals and any reference specifications and standard practices adopted by nationally recognized professional societies such as ASCE, AWWA, APWA, ACI, and ASTM.
- Eighth: ODOT Pavement Design Guide.
- Ninth: Oregon Structural Specialty Code and City-issued building, mechanical, electrical, and plumbing permits.
- Tenth: Approved Plans and details prepared by the design engineer.
- Eleventh: Supplemental written agreements, franchise agreements, and approved revisions to plans and specifications by the appropriate jurisdictions and conforming to local, state, and federal law will take precedence over documents listed above. Detailed plans shall have precedence over general plans.

110.6 Design Life of Improvements

Unless otherwise specified in this manual, the design life of improvements shall follow the direction given as follows. The public water systems shall be designed to meet the minimum design life as defined in AWWA standards. Pavement shall be designed to meet a minimum 40-year design life except as noted herein. It shall be the design engineer's responsibility to ensure that all improvements when built shall meet or exceed the requirements to achieve the above minimum design life or, if not specified in this manual, the industry best management practice minimum design life.

110.7 Performance and Maintenance Security Requirements

- A. Performance Security standard: 100 percent of the cost to construct all public streets, street lights, traffic signals, sidewalks, signage, street trees, and striping and all regulated improvements. The Performance Security may be in the form of a cash deposit, letter of credit, or performance bond.
- B. Maintenance Security standard: Prior to release of Performance Security, a 2-year Maintenance Security will be required at 25 percent of the cost to construct all public streets, street lights, traffic signals, sidewalks, signage, striping, and released 2 years after acceptance following the correction of any identified defects.
- C. Performance Security for Plant Establishment: a 2-year Plant Establishment Security will be required at 100 percent of the cost to install new public plantings and will run concurrently with the Maintenance Security. The Performance Security may be in the form of cash deposit, letter of credit or performance bond.

110.8 Violations

Any act or omission which violates these standards is deemed a civil infraction and a public nuisance and is subject to all the legal provisions and remedies available to the City.

110.9 Appeals

Unless otherwise governed by specific provision of the Beaverton Code, a person aggrieved by any action, decision, or interpretation of the City Engineer may appeal to the City Council in accordance with Beaverton Code 9.05.091.

Section 120 Submittal Requirements for Site Development, ROW, & Facilities Permits

120.1 General

- A. Permit application submittals must include all materials required according to the permit type. Required submittals may include design plans, completed checklists, stormwater drainage calculations, geotechnical reports, or other pertinent information.
- B. Based upon project-specific characteristics, supplementary design analysis exhibits, though not included in the plans, may be required to demonstrate constructability, emergency vehicle accessibility, or compliance with other applicable design standards. Such exhibits may include sight distance diagrams, photometric analyses, vehicle turning simulations, driveway profiles, and the like.

1. The required design vehicle for turning simulations will be determined by the City.
2. See Subsection 450.1. for street lighting plan requirements.

- C. All plan review applications must be submitted for review. The City of Beaverton will accept electronic plans review submittals or hardcopy plans for review. Visit the city's Site Development webpage and click on [Electronic Document Submittal Instructions](#) link for instructions on submitting plans for electronic review.

Upon completion of the initial City plan review, comments will be returned to the applicant. After all review comments have been addressed, the applicant must resubmit the revised documents and/or drawings. If applicable, after the submittals for all related permit types have been approved, the City will forward them to CWS for final approval and issuance of a Storm Water Connection Permit Authorization. The applicant will not be issued permits to begin construction until all plans are approved, stamped, and all fees are paid.

Plan approval does not relieve the Engineer from responsibility for errors, omissions, or deficiencies in the plans.

- D. Projects may be submitted as a whole or in phases. Whole projects will be reviewed in their entirety. Phased projects will be reviewed only for the specific phase submitted and special requirements may be necessary to develop an acceptable utility system. Phased project submittals shall include a master layout showing the connectivity of the entire project.

Projects that have been previously reviewed and approved as a whole project, and then later divided into phases, shall be required to have each phase resubmitted for review and approval. Projects that have been previously reviewed and approved as a phased project, and then later divided into smaller sub-phases, shall be required to have each sub-phase resubmitted for review and approval. Approval of previously submitted plans (whole or phased) does not imply or guarantee the new phases or sub-phases will be approved without comment or alteration.

- E. The City is not responsible for coordination between public and private plans that are submitted for the same project. The Engineer shall be responsible to make revisions and update both sets of plans if improvements or the location of improvements change within the project. All revisions shall be resubmitted for approval.

The Applicant shall be responsible for coordination between Public and Private Plans and designs when more than one Engineer is involved.

120.2 Design Plans Formatting Requirements

- A. All plans must be submitted in one of the following formats:
 - 1. Portable Document Format (PDF), Preferred. PDF documents are to be scaled to print on 22x34-inch.
 - 2. Paper: Paper plans are to be submitted on 22x34-inch sheets (This allows for the printing of 11x17-inch plan sets). Facility Permit plans may be on 11x17-inch paper as the City Engineer deems appropriate for the scope of the project. All plan sheets shall be the same size unless otherwise approved by the City Engineer.
- B. All plans must be drawn to scale. The vertical scale shall be 1-inch = 2-feet, 4-feet, 5-feet, or 10-feet and the horizontal scale shall be 1-inch = 20-feet, 40-feet, or 50-feet for all drawings. Metric or architectural scales shall not be used. Each sheet must have the scale identified with a scalebar or notation adjacent to the north arrow. When more than one scale is used on a sheet, an independent scalebar must accompany each applicable detail. No scale is required if the drawing is schematic, but the City may require it be redrawn to scale if needed for clarity. Schematic drawings shall be labeled "Not to Scale".
- C. All text shall be at least 0.1" high.
- D. Permanent and temporary survey control points, existing survey monuments, vertical benchmarks, and related data shall be shown on the plans in accordance with Subsection 150.
- E. A titleblock shall appear on each sheet 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 titleblock shall include the name of the project, the name and contact information for the engineering firm and owner, the sheet title, the sheet number, and the City of Beaverton land use approval file number and the City of Beaverton Site Development or Right of Way permit number, as applicable.
- F. The seal of the responsible Engineer or Architect shall appear on each sheet. Plans for public improvements shall be stamped by a registered Professional Engineer licensed to practice in the appropriate engineering discipline in the State of Oregon. Plans for landscaping and water quality features shall be stamped by either a registered Architect or Professional Engineer licensed in the State of Oregon.
- G. The description and date of all revisions to the plans shall be shown on each affected sheet and shall be approved and dated by the Engineer as evidenced by original signature(s) or initials.
- H. Indicate the location and direction of view for all sections.
- I. All plan views shall contain the following:
 - 1. Existing and proposed right-of-way, property, tract, and easement lines with labels.
 - 2. Subdivision name, lot numbers, street names, and other identifying labels.
 - 3. Existing aboveground and underground utility facilities and vegetation within the construction limits.

4. All other affected areas and features that are on-site or within a distance of 100 feet outside the site boundary, including but not limited to:
 - a) Features that will be within the zone where grading, excavations, fills trenching, stockpiling, pile driving, blasting, ground shaking from construction vehicles or equipment, structural loading, or invasive construction activities may potentially compromise their structural stability or condition. Such features include, but are not limited to, cultivated vegetation, landscaping and trees, buildings, fences, decks, walks, slabs, and pavements.
 - b) Trees of any type that are 6-inches DBH or more and whose root zones extend into the site (using the trees' dripline as the delineator of the root zone) or are off-site and within 10-feet or less of the site boundary.
 - c) Other areas and features impacting the design and designated by the City for evaluation.
 - d) Tax lot information including Washington County Tax Assessor's Map and Tax Lot Number.
 5. Match lines with stationing and sheet number references.
 6. FEMA designated 100-year flood plains and flood ways, or areas of flooding during a 100-year storm event.
 7. Wetland areas, wetland mitigation areas, and storm water quality undisturbed corridors (Vegetated Corridors), drainage ways, and significant natural resource areas.
 8. Legend showing all symbols and line types used on the drawing.
 9. A north arrow shall be placed adjacent to all plan views.
- J. All profile views shall adhere to the following:
1. Profiles shall designate structures using alpha or numeric labels corresponding to plan view notation. For existing sanitary and storm sewer manholes, designations shall conform to CWS system identification requirements.
 2. All existing and proposed storm, sanitary, water, and other utilities crossing the profile shall be shown, with elevations noted or labeled 'field verify elevation' if elevation is not known.

120.3 Organization of Plans

- A. Plans shall be arranged in specific order. The normal arrangement for development plans is shown in Table 120.1. Not all of these sheet types may be present in a given project. For small or linear (roadway) projects it may be acceptable to combine sheet types. Confer with the assigned plans reviewer for approval of any deviation from the plans arrangement.

120.3.1 Title Sheet

A. All projects shall have a title sheet containing the following elements.

1. Project name in large letters across the top of the page
2. The name, phone number, mailing address of owner, developer, and developer’s engineering firm (including contacts)
3. The City land-use approval file number and the City Site Development file number clearly noted.
4. Vicinity map showing the location of the project in respect to the nearest major street intersection
5. General notes
6. Notice to excavators (one call utility locates)
7. Sheet legend
8. Information on site impervious surface area for both existing and post-developed conditions. This calculation shall be separated into the square footage:
 - a) Within public right-of-way
 - b) Within private property
9. State the basis for horizontal and vertical control. See Subsection 150.
10. A note shall be placed on the title sheet that states: “This design complies with ORS 92.044(7) in that no utility infrastructure is designed to be within 1 foot of a survey monument location shown on a subdivision or partition plat. No design exception or final field location change shall be permitted if it would cause any utility infrastructure to be placed within a prohibited area.”
11. A description that includes township, range, quarter section and tax lot numbers of the areas impacted by the development.
12. Index of sheets.
13. For multi-phase projects, an overall map showing the limits of each phase.
14. USACE and/or DSL permit application number (if permit is required) and the project or permit application number(s) for any other federal, state, or local entity, or wetland delineation. Copies of the permit applications shall be included with the submittal.

Table 120.1 – Sheet Order

Sheet Order	
1.	Title Sheet
2.	Existing Conditions and Demolition
3.	Tree Removal
4.	Preliminary Plat
5.	Typical Sections
6.	Details
7.	Traffic Control
8.	Roadway Plan and Profiles
9.	Utility Plan and Profiles
10.	Water Quality/Quantity
11.	Site Grading and Erosion Control
12.	Landscaping
13.	Retaining Walls
14.	Signing and Striping
15.	Illumination
16.	Traffic Signals

120.3.2 Existing Conditions and Demolition

- A. Identify the location of existing buildings, wells, septic tanks, drain fields, fuel tanks, and any other buried structures. Historical buildings identified on the City's Cultural Resource Inventory shall be identified as such on the drawings. Significant and/or historic trees shall be identified as such on the drawings.
- B. The Engineer shall not rely solely on aerial photography, USGS Quadrangle Maps or other public topographic maps, or any combination thereof, for the topographic information used to prepare the design plans. They shall make an on-site evaluation and survey and shall use the survey data as the primary source of topographic information.
- C. Include existing contours at a maximum interval of 2 feet.

120.3.3 Tree Removal

- A. Include all plan elements required by the land-use application approval and/or zoning ordinance. Show trees to be removed with an "X" over them. Show tree protection fencing on trees to remain.

120.3.4 Preliminary Plat

- A. Include a scaled copy of the approved preliminary plat. Include all existing and proposed easements, right of way widths and dedications, and tract descriptions.

120.3.5 Typical Sections

- A. Roadway projects shall have at least one typical sections sheet containing the following elements.
 - 1. Typical section(s) of roadway improvements identifying wearing, base, and subbase materials and depths.
 - 2. Labels specifying grade control points, slopes, grades, and longitudinal features such as curbs, sidewalks, and fences.
 - 3. Dimensions of horizontal features such as travel lanes, bike lanes, shoulders, cycle tracks, planters, and sidewalks.

120.3.6 Details

- A. One or more detail sheets shall be provided as part of the plans submittal. The detail sheet(s) shall show all the details necessary for the project. The City reserves the right to require additional details to be submitted as needed to fully convey the design intent.
- B. Standard drawings published by the City, Washington County, ODOT, CWS, AWWA, and other agencies may be used. They shall be reproduced in full and included with the construction plans, not merely referenced. They shall be full size or 95 percent of the original size.
- C. If a standard drawing needs to be modified, remove the standard drawing title block and include it as a project-specific detail.

120.3.7 Traffic Control

- A. Projects with staged construction or temporary traffic control measures require traffic control sheets, broken out by stage, containing the following elements:
1. Plan view identifying areas “under construction” and “under traffic” for the stage shown as well as taper lengths.
 2. Sections at critical areas showing the existing, temporary, and/or finish grades for the stage shown as well as dimensions for travel lane widths, work zone widths, shy distances, and clearances.
 3. Traffic control devices including temporary construction signs, PCMS, barricades, barriers, drums, flaggers, tubular markers, temporary striping, temporary signals, etc. are shown, noted, and dimensioned on both the plan and the relevant section views.
 4. General notes containing information related to closure limitations, local access, and staging areas.
- B. Detour plans may be required for projects including road closures. They include advance warning sign locations and the proposed detour route. They are placed within the traffic control series at the appropriate location based on the construction stage sequencing.

120.3.8 Roadway Plan and Profiles

- A. All roadway projects shall include roadway plan and profile sheets containing the following elements. Some of the required information may be shown as separate details for clarity.
1. Plan View
 - a) Roadway centerline alignment(s) including curve data and stationing at 100-foot intervals and “tic” marks at minimum 50-foot intervals.
 - b) Roadway crown alignment if different than roadway centerline.
 - c) Location and horizontal geometry for all sidewalks, curbs (including curb returns), cycle-tracks, driveways, and all other proposed features.
 - d) Intersection grading information, including spot elevations, contours, and drainage patterns.
 - e) Location of all roadway low points and locations of all catch basins and inlets.
 - f) Sidewalk ramp information including; spot elevations at all break points; all ramp and surrounding sidewalk panel lengths; designed grades between each spot elevation; distance from each landing to pedestrian push button; distance between pedestrian push buttons; and roadway counter slope at each ramp. Please use ODOT standard detail DET1720 as a guide.
 - g) Curb elevations along all cul-de-sacs, eyebrow corners, curb returns, and any other location where the curb location and grade is not typical relative to the roadway alignment and profile grade. Include spot grades at all curb return quarter-deltas, at all low and high points, and as necessary to define the desired vertical geometry along the curbline. Provide such elevations a minimum of 50 feet beyond the point at which the curb again becomes typical relative to the roadway alignment and profile grade.

- h) Location, stationing, and size of all proposed mains and service lines for storm drainage. Stationing shall be located in relationship to the roadway stationing at manholes and at all other key locations.
- i) Location and description of existing survey monuments. See Subsection 150.3.
- j) Location of proposed street intersection monument cases and other required survey monuments. See Subsection 150.3.

2. Profile View

- a) Stationing, elevations, vertical curve data (including curve K values), and slopes for all vertical alignments (design grade profiles).
- b) Existing ground along the alignment and at the edges of the right-of-way if grade differences are significant.
- c) Show profile grades for at least 100 feet beyond the limits of the proposed construction. For stub streets that may be extended in the future, the vertical alignment shall be designed for at least 200 feet beyond the limits of the proposed construction.
- d) All proposed drainage facilities, including invert and top elevations, slopes, materials, bedding, and backfill.
- e) Existing drainage facilities, including off-site facilities, upstream and downstream, that affect the design (i.e., downstream restrictions that back water on to project site). Base flood elevations shall be shown on the profile, if applicable.
- f) Profiles for ditch and creek flow lines shall extend a minimum of 200 feet beyond the project limits, both upstream and downstream. Typical cross sections at 50-foot intervals shall also be submitted.

120.3.9 Utility Plan and Profiles

- A. Include existing public and private utilities, proposed public utility improvements, and existing and proposed public and private easements. All existing easements shall be clearly labeled with easement type and recording information.
- B. Show all piping, structures, and appurtenances.
- C. Provisions for cross-connection control must be clearly shown on the plans, including any retro-fitting of existing water service connections and existing auxiliary water supplies, conversions to the Water Department water services that are required as a condition of development approval, upgrading of existing services connections by replacement of same and any other cross connection control required by state and local rules and codes.
- D. Location, street stationing, and size of all proposed mains and service lines for sanitary sewer and water.
- E. Provide details of all vaults in and impacting work in the ROW. This includes riser sections and vault size.

120.3.10 Water Quality/Quantity

- A. Include a site plan for all existing and proposed public and private water quality facilities showing elevations, grade, connections, structures, easements, and tracts.
- B. Plans shall contain a detail for all headwalls, outfalls, spillways, and by-pass lines.
- C. Plans shall contain a cross section showing the channel, mid-slope, and upland slope of the facility. The cross section shall show the location and depth of all amended soils, drain rock, and underdrains.
- D. A planting plan specific to each water quality/quantity facility shall be included with a separate table for all plantings specific to the treatment, mid-slope, and upland slope areas.

120.3.11 Site Grading and Erosion Control

- A. A site grading plan is required for any development involving excavation or fill in the public right-of-way or on private property.
- B. All soil disturbing construction activity must adhere to the requirements of the most recent approved CWS *Design and Construction Standards*, *CWS Erosion Prevention and Sediment Control Planning and Design Manual*, and all associated land-use approvals. A detailed erosion control plan conforming to the current CWS plan template shall be shown in conjunction with the site grading plan.
- C. All grading plans for areas where the grading will be within 5 feet of the property line, shall include cross sections cut along the property line at 50 foot intervals (a minimum of three are required). The cross sections shall extend a minimum of 50 feet into each property and shall show the existing and proposed grades, structures, and utility facilities.
- D. See Subsection 180 for City policy and guidance concerning environmental protection during construction.
- E. Include existing and proposed contours at a typical interval of 2 feet.
- F. Include retaining walls.
- G. If grading is closer than ten (10) feet from an exterior property line, and it changes the ground surface more than two (2) feet vertically, the Engineer shall obtain an evaluation of the proposed cut and fill slopes and erosion control measures by a geotechnical engineer.

120.3.12 Retaining Walls

- A. Include plan and profile of each retaining wall including stationing at 100-foot intervals and 'tic' marks and a minimum of 20 foot intervals.
- B. Show details of retaining wall, including retaining wall drains and drain connection points.
- C. Refer to subsection 130.B.5 for encroachment requirements.

120.3.13 Landscaping

- A. Include PUE's, other easements, sight vision zones, sidewalks, bikeways, entry monuments or signage, mail boxes, sound walls, landscape retaining walls, irrigation, all underground utilities, street trees, and street lighting in the project and along all existing and proposed street frontage.

120.3.14 Signing and Striping

- A. Projects involving new signing or roadway striping and projects impacting existing signing or roadway striping require signing and striping sheets including the following elements.
 1. Lane dimensions, taper rates for transitions, and radii for striped curves.
 2. Existing and proposed striping and pavement markings.
 3. Existing and proposed signs.
- B. Use ODOT formatting and legends.

120.3.15 Street Lighting

- A. See Subsection 450 for street lighting plans requirements.

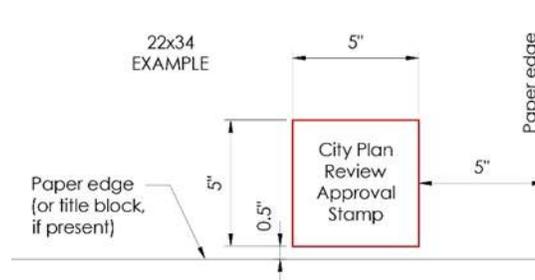
120.3.16 Traffic Signal Plans

- A. See Subsections 440 for traffic signal plans requirements.

120.4 Stamp Requirements

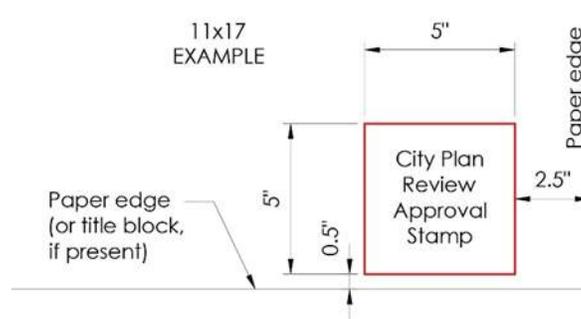
- A. An area located in the bottom right corner of the title sheet shall be reserved for the City plan review approval stamp. The stamp location will allow for a 1/2 inch border.
 1. 22x34 inch plans require a blank (5x5 inch) space 5 inches from the lower right edge of page as shown in the figure below.

Figure 120.1 – D Size Stamp Placement



2. 11x17 inch plans require a blank (5x5 inch) space in the bottom right of each page as shown in Figure 120.2.

Figure 120.2 – B Size Stamp Placement



3. All plan sheets must be stamped and signed per *Oregon Revised Statutes* and *Oregon Administrative Rules*. Architects and Engineers are responsible to meet the specific provisions for wet stamped and signed, and digital signatures within the rules and statutes.

120.5 Record Drawings

- A. Following completion of construction and prior to final acceptance of a completed project, the Engineer shall submit two complete set of record drawings for City review if hardcopy. Electronic submittal is acceptable. There are no additional fees for the record drawing review.
- B. Record drawings shall contain and reflect any and all design exception incorporated into the completed project, and any and all revisions to the previously approved construction plans. Include typical sections, street lights, conduits, everything installed underground, etc. Engineer shall verify all changes and provide a clean record drawing plan set.
- C. Record drawings shall be accompanied by a completion certification letter from the Engineer. The completion certification letter shall include a statement that the site and adjacent properties (as affected by work performed under the City permit) are stable with respect to settlement, subsidence, and sloughing of cut and fills slopes.
- D. If specialists (geotechnical engineer, surveyor, arborist, wetland scientist, engineering hydrologist, etc.) were required in the design of the project, a completion certification from those individuals shall be required related to their specialty.
- E. To receive acceptance by the City, the site must either have all vegetation/landscaping established or all required erosion control measures installed per *CWS Design and Construction Standards*.
- F. Each sheet of the record drawings shall be stamped "Record Drawing" and dated.
- G. Each record drawing shall be signed by the Engineer or Architect. This signature constitutes a certification that the public improvements, grading, and other elements of the engineering drawings have been completed in accordance with the City and CWS approved plans and to the standards of the City and CWS.

-
- H. Every sheet included in the construction plan set showing permanent features shall be included. Record Drawings shall be of archival quality, using black ink on mylar. Additionally, electronic submittal of the scanned and signed record drawings and the record CAD base files are required. Furthermore, the following requirements apply:
1. All public right-of-way, including easements, must be shown. Easement type and recording information shall be noted if applicable.
 2. Distances between utility mainlines in shared trenches must be shown.
 3. Mainline type, size, and material must be shown
 4. Manhole stations and invert elevations must be shown.
 5. All laterals must be shown with descriptions of their lengths, plan stationing, sizes, materials, and invert elevation at the right of way line.
 6. If one or more sidewalks are constructed, the appropriate City standard drawing for each type of public sidewalk must be included.
 7. Clear vision zones shall be shown for each intersection.
 8. Permanent and temporary survey control points and related data must be shown in accordance with Subsection 150.3.
- I. **Residential** building permit release will not be issued until the record drawings have been submitted to and approved by the city. **Commercial** Temporary Occupancy (TCO) will not be issued until the record drawings have been submitted and approved by the city.

Section 130 Easements

A. Public Utility Easement (PUE)

The minimum width for a PUE shall be 8 feet. The PUE shall be located along all property lines adjacent to public rights-of-way. The City may require a larger PUE in commercial and industrial areas and where right-of-way widths are sub-standard. See Subsection 230.11 for easement grading requirements.

B. City-Owned Easements

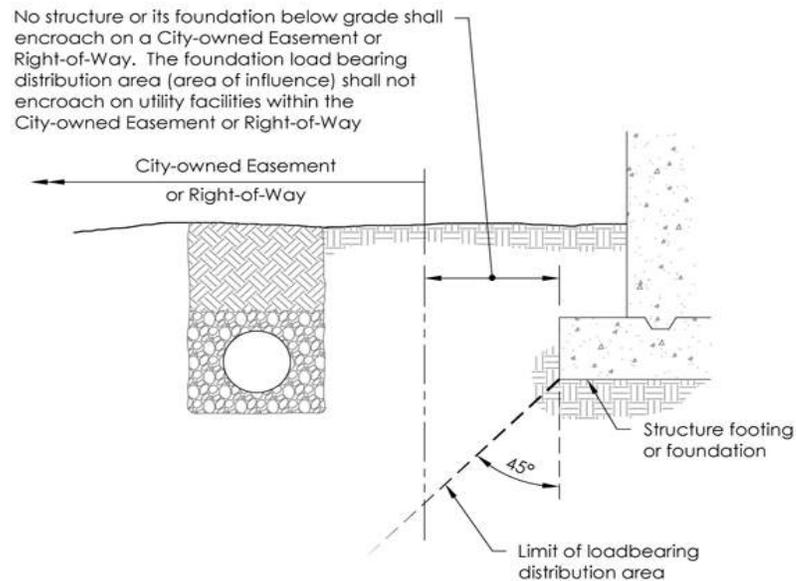
Table 130.1 – Minimum Easement Widths

Easement Type	Width
Public Utility Easement (PUE)	8'
Public Water Easement (paved surface)	15'
Public Water Easement (un-paved surface)	20'
Public Sewer Easement	15'
Shared (Parallel) Public Sewer Easement	25'
Access and Maintenance Easement	20'

1. Public water lines shall be located in the public right-of-way. A public water line may only be located on private property upon approval and at the sole discretion of the Water Department. A public water line on private property shall be centered within a permanent water facilities easement granted to the City. The easement shall have a minimum width of 15 feet along its entire length when placed in a roadway, parking area, or other hardscaped surface. The easement shall have a minimum width of 20 feet in unimproved or landscaped areas where vehicular access is not normally available.
2. Public storm and sanitary sewer located on private property shall be located within a permanent public storm and/or sanitary sewer easement granted to the City, with a minimum width of 15 feet along its entire length. Parallel public storm and sanitary sewer sharing an easement require the easement width to be increased to a minimum of 25 feet. Shared easements require approval of the City.
3. The required width of an easement may be greater than the minimum requirement, based on the surrounding conditions and property line configurations. There may be additional restrictions on the setback of structures near an easement to comply with building codes.
4. A twenty-foot wide permanent access and maintenance easement to benefit the City may be required in instances where City-owned infrastructure is inaccessible by way of the permanent easement. The access and maintenance easement shall be along a route accessible by the City's maintenance vehicles.
5. Encroachments
 - a) There shall be no encroachment within a City-owned easement by a privately owned structure, building, building overhang, retaining wall, monument sign, or any other object, including a structure's loadbearing distribution area as defined in Figure 130.1, which would adversely affect the ability of the City to maintain public utilities.
 - b) There shall be no parallel encroachment within a City-owned right-of-way or easement, including a PUE, by a private utility facility or structure, including a structure's loadbearing distribution area as defined in Figure 130.1, without prior written approval by the City. Private utilities shall cross City-owned easements at right angles. Private utility facilities and structures

shall not be placed within the pipe zone. The City will not approve any encroachment which would adversely affect the ability of the City to maintain public utilities.

Figure 130.1 – Loadbearing Distribution Area



6. The City will not approve any certificate of occupancy or approve any land partition, partition plat, lot line adjustment, or subdivision plat for any development that has not dedicated and/or granted all rights-of-way and easements as required by the land-use conditions of approval.
- C. Easement forms are subject to the approval of the City prior to recording.
- D. All recording costs for easements created by private development shall be borne by the applicant.
- E. All existing and proposed easements shall be shown on the construction plans. Include the easement type and recorded document information on the construction plans. All proposed easements shall have a blank space provided for final recording numbers to be added to the record drawings.

Section 140 Accuracy of City Maps and Plans Not Guaranteed

- A. The City may provide property owners, engineers, contractors, and other members of the public with information from the City's archives. The City makes no guarantee and makes no representation that it has verified the accuracy of the measurements, locations, or other information on such maps and plans.

Section 150 Surveying

- A. All land surveying work performed for the City shall conform to all applicable *Oregon Revised Statutes*, Washington County Surveyors Office requirements, and these standards.

150.1 Requirements Regarding Registered Oregon Land Surveyors

- A. All land surveying work performed for the City shall be done by a Professional Land Surveyor currently registered by the State of Oregon. All maps, surveys, reports, and final documents shall bear the seal of the Registered Land Surveyor responsible for their creation. All actions and work performed by a Registered Professional Land Surveyor shall comply with all applicable *Oregon Revised Statutes*, including but not limited to Chapters 92, 93, 209 and 672. Professional Engineers may provide and stamp survey products as allowed per the governing Oregon Revised Statutes (ORS).
- B. It is the responsibility of the Registered Professional Land Surveyor performing the survey work to acquire the right-of-entry for each required property. Notification shall be made in accordance with ORS 672.047. **All contact with property owners and the public shall be professional, polite, and respectful.**
- C. Surveyor or crew shall maintain a Project daily record of work performed by the survey crew. The daily record shall contain the date, crew names, type and location of work, and work accomplished. Upon request, furnish a copy of diary entries to the Engineer. Furnish a final copy of the diary when the Project is complete. Furnish copies of computations, cut sheets, notes and other records when requested by the City.
- D. All data and original documentation associated with the Project will become the property of the City.

150.2 Survey Safety

- A. Safety related policy for surveying operations in public rights-of-way within the City shall conform to the *Manual on Uniform Traffic Control Devices* (MUTCD) regarding temporary traffic control. Safety related policy shall conform to the *Oregon Temporary Traffic Control Handbook*.

150.3 Survey Monuments

- A. Existing Monuments
1. All existing Public Land Survey Corners including Section, One-Quarter Section, Donation Land Claim, and other Public Land Survey Corners affected by the project shall be referenced and protected. Additionally, all Washington County Benchmarks, GPS Control Points, or other significant survey control points shall be referenced and protected. If disturbance can't be avoided, the person or agency causing the disturbance shall notify the Washington County Surveyors Office, prior to such disturbance, to coordinate referencing and replacement of the monument. The party responsible for the disturbance shall pay all costs of the replacement.
 2. All existing City Vertical Benchmarks and City Control Points affected by the project shall be referenced and protected. If disturbance can't be avoided, the person or agency causing the disturbance shall notify the City Surveyor, prior to such disturbance, to coordinate referencing and replacement of the monument. The party responsible for the disturbance shall pay all costs of the replacement.

3. Survey Monuments Affected by City-Developed Projects.
 - a) General Construction. All Survey Monuments of Record, including Public Land Survey Corners, City and County Benchmarks, and City and County Control Monuments affected by a City-developed construction project shall be referenced in a pre-construction monument survey. At the conclusion of construction, any monuments of record which were disturbed by construction activities shall be either replaced or referenced. The record of survey showing the monument replacement will be filed with the Washington County Surveyors Office.
 - b) Road Construction Projects. All Survey Monuments of Record, including Public Land Survey Corners, City and County Benchmarks, and City and County Control Monuments affected by a City-developed road construction project shall be referenced in a pre-construction monument survey as required by ORS 209.155. When the construction project is complete, the disturbed monuments shall be either replaced or referenced by the post-construction monument survey as required by ORS 209.155.

B. New Survey Monuments

1. All new centerline and right-of-way monuments shall be installed per City standard drawings, ORS 209.155(2)(a), and Washington County Surveyors Office requirements.
2. All monuments shall be set by a Professional Land Surveyor currently registered by the State of Oregon. A record of survey shall be filed for all monuments set. The record of survey shall conform to ORS 209.250 and any additional requirements set forth by the County or City.

150.4 Units, Datum, and Coordinate Systems

A. Units

1. All coordinates utilized in the Oregon Coordinate System of 1983 and the Oregon Coordinate Reference System of 2011 shall be expressed in International Feet units.
2. All local plane coordinates shall be expressed in Feet units.
3. All elevations shall be expressed in Feet units.

B. Datum

1. All elevations shall be referenced to the City of Beaverton Vertical Datum. Current City Datum, NGVD 29 Datum.

C. Coordinate Systems and Control

1. Primary Horizontal control for City projects shall be referenced to one of the three coordinate systems listed below.
 - a) Oregon Coordinate System of 1983, North Zone, (NAD 83) shown as NAD 83(cors96) epoch 2002.0;
 - b) The Oregon Coordinate Reference System of 2011, Portland Zone (NAD 83) shown as NAD 83(2011) epoch 2010.0 or revisions;

- c) Local Datum Plane. For construction and land surveying projects, it is preferable to utilize a local coordinate system. When a local datum plane is used, a conversion must be specified utilizing a projection point with coordinates in both the Local Datum Plane and at least one of the other coordinate systems listed above, a combined scale factor, and rotation to grid north. Notes shall be submitted containing all information required to transform, rotate, and scale the project to NAD 83 coordinates.
2. Primary Horizontal control Surveys for City projects constrained to the City or Washington County Primary Control Network Points.
3. Project Control shall be durable in nature and able to remain intact for the duration of the project. It shall be located outside the limits of construction to ensure its longevity.

150.5 Base Mapping and Record Drawings

- A. All engineering plans, record drawings, and other mapping submitted in CAD or GIS formats shall be provided using the following control:
 1. Horizontal control shall be referenced to Oregon Coordinate System of 1983, North Zone, (NAD 83) or Oregon Coordinate Reference System of 2011, Portland Zone (NAD 83). All digital maps and data files shall be on the same coordinate system.
 2. If a local datum plane is used for the project, a conversion must be specified utilizing a projection point with coordinates in both the Local Datum Plane and at least one of the other coordinate system listed in Subsection 150.4.C.1, a combined scale factor, and rotation to grid north. Notes shall be submitted containing all information required to transform, rotate, and scale the project to NAD 83 coordinates.

150.6 Types of Surveys and Tolerances

- A. Horizontal Control Survey. Tolerances for newly established Project Control shall meet the Acceptance Tolerances and Standards, based upon survey method, as defined in Chapter 5 of the *Construction Surveying Manual for Contractors*.
- B. Right-of-Way/Property Survey. Includes Monument surveys as detailed in Subsection 150.3. In addition to the requirements in the *Oregon Revised Statutes*, tolerances for right-of-way or property lines shall meet the Acceptance Tolerances and Standards, based upon survey method, as defined in Chapter 5 of the *Construction Surveying Manual for Contractors*.
- C. Construction Staking: Staking Tolerances shall meet the Construction Staking Tolerances as defined in Chapter 4 of the *Construction Surveying Manual for Contractors*.

Section 160 Design Standard Exception

160.1 Design Standard Exception Request

- A. The Engineer may request that the City approve a one-time exception to a City standard by submitting a completed *Engineering Design Exception Request* form available on the City website. If approved, the exception is for project-specific use and shall not constitute a precedent or general modification of the City standard.

Section 170 Construction

170.1 Lane Restrictions, Staging and Stockpiling Areas, and Disposal of Spoils

- A. Lane Restrictions
 - 1. Arterials shall have no lane restrictions from 6:30 am to 9:00 am and from 3:30 pm to 6:30 pm. The City Traffic Engineer has the authority to modify these requirements at their discretion.
 - 2. Collectors and Neighborhood Routes with an Average Daily Traffic (ADT) of over 1,000 shall have no lane restrictions from 7:00 am to 8:30 am and from 4:00 pm to 6:00 pm. The City Traffic Engineer has the authority to modify these requirements at their discretion.
 - 3. No lane restrictions shall occur on weekends or holidays. No lane restrictions are allowed on the Friday prior to Martin Luther King Jr Day, President's Day, Memorial Day Labor Day and, if applicable, Fourth of July holiday weekends, and Thanksgiving Day to the day after New Year's Day.
- B. Staging and Stockpiling Areas: Stockpiling and staging of equipment and materials within the public right-of-way is prohibited without the prior approval of the City. Stockpiling on private property may require that the contractor gain approval through the City Planning Division's land-use process. The land-use process may require significant time to complete.
- C. Disposal of spoils: The contractor shall obtain all necessary land-use approvals and disposal or fill permits for the off-site disposal of spoils from the construction site.

170.2 Inspections

- A. All public improvements shall be inspected by the Engineer.
- B. The City's inspection services do not relieve the owner, applicant, Engineer, or contractor of the responsibility for proper construction and compliance with these standards. City inspection services do not constitute approval of any modification to the approved construction plans.
- C. Privately funded inspection services, required by the City as the primary inspection services on a project, are more comprehensive and intensive than City inspection services and are the responsibility of the owner, applicant, and designated inspecting engineer.

170.2.1 City Inspection Services

- A. Inspection services provided by the City include:
 - 1. Acting as a liaison between the designated inspecting Engineers, their inspectors, and the City.
 - 2. Monitoring both work progress and performance testing results.
 - 3. The performance of administrative and coordination activities as required for supporting the processing and completion of the project.
 - 4. The issuance of a Stop-Work Order by notice to the applicant, contractor and engineer.

170.2.2 Responsibilities of Inspecting Engineer

- A. Obtain and use a copy of City-approved construction plans and specifications and a copy of these standards.
- B. Review and approve all pipe, aggregate, Portland cement concrete, asphaltic concrete, and other materials to ensure compliance with City standards.
- C. Approve all plan or specification changes in writing and obtain City approval (see City Inspection Services above). All changes to the approved plans or specifications must be with the approval of the City prior to the commencement of work affected by the revision.
- D. Monitor construction activities to ensure work meets City specifications.
- E. Perform (or have performed) material, composition, and other tests required to ensure City specifications are met.
- F. For street construction, in coordination with City's inspector, perform the following inspections and record date of each:
 - 1. Curbs, curb-and-gutter, catch basins, street inlets, and sidewalk ramps are built to line and grade and meet all ADA requirements;
 - 2. Subgrade meets grade and compaction specifications;
 - 3. Base course meets depth/thickness, gradation, grade, and compaction specifications;
 - 4. Leveling course meets depth/thickness, gradation, grade, surface condition, and compaction specifications;
 - 5. Wearing course meets material, depth/thickness, gradation, grade, surface condition, compaction, and strength specifications.
- G. Submit daily inspection reports to City's inspector at the end of each week.
- H. Prior to requesting building occupancy on commercial, multi-family, and/or other projects with concurrent site development and building permits, the Engineer shall certify that all necessary public improvements have been installed and accepted in compliance with the City-approved site development permit construction plans. This certification shall also indicate that all items required through the land-use process, including but not limited to payment of all fees, recording of all public utility easements, and obtaining maintenance bonds, have been completed at or before occupancy of the first building.

170.3 Safety Requirements

- A. The contractor is responsible for observing the safety of the work and of all persons and property coming into contact with the work. The contractor shall conduct work in compliance with all the requirements prescribed by OSHA. Traffic control in work zones shall conform to the MUTCD and the ODOT supplements to the MUTCD. A traffic control plan shall be submitted and approved by the City prior to construction.
- B. The City will issue a Stop-Work Order if a serious safety issue is not addressed or corrected.

170.4 Inspection Scheduling

- A. The contractor shall notify the City at least 48 hours (two full working days) prior to any required City inspection. Connections between existing work and new work shall not be made until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the plans and specifications.

170.5 Preservation, Restoration, and Cleanup

- A. All construction projects shall include restoration. Restoration shall return all public infrastructure affected by the construction activities, including haul routes, to original or better condition.
- B. Restoration of surfaces may require extensive rehabilitation, including, but not limited to slurry seal, overlay, grind and inlay, and full depth reconstruction.

170.6 Materials / Approved Product List

- A. To ensure the proper, safe operation and required service life of all public improvements, all construction materials and components used in the construction of public improvements shall be of new manufacture. No rebuilt, reconditioned, refurbished, or used materials and components will be allowed. All new construction materials and components shall be installed as designed by the manufacturer. No alteration of materials and components shall be made.
- B. Whenever these standards reference a specific product, manufacturer's name, or brand, it shall be understood that the words "or approved equal" follow. Determination of quality in reference to the project design requirement will be made by the City. A contractor shall not use an alternative product without prior written approval of the City. A request to designate an alternative product as an "approved equal" shall be processed as if the alternative product were an exception under Subsection 160. The city has a list of approved products on the city website.

Section 180 Environmental Protection During Construction

180.1 General Policy and Requirements

- A. The contractor shall comply with all laws, regulations, and standards of all federal, state, and local authorities, including:
- Clean Water Services
 - US Army Corps of Engineers
 - Oregon Dept. of Fish and Wildlife
 - Environmental Protection Agency
 - Oregon Dept. of Environmental Quality
 - Oregon Dept. of State Lands
 - National Marine Fisheries Service
 - Oregon State Historic Preservation Office
- B. The contractor shall properly install, operate, and maintain both temporary and permanent measures, as shown in the approved plan, to protect the environment during the entire duration of the project.
- C. The City requires construction projects to be scheduled so as to minimize potential erosion or other environmental harm.
- D. All materials delivered to the job site shall be covered and protected from the weather. None of the materials shall be exposed during storage. Waste material, rinsing fluids, and other such material shall be disposed of in such a manner that pollution of groundwater, surface water, or the air does not occur.

180.2 Violations

- A. The contractor is responsible for observing the work and of all persons and property who are associated with the conduct the work. The contractor shall conduct work in compliance with all the requirements of section 180.1.
- B. The city will issue a stop-work order if a serious environmental issue is not addressed or corrected.

Section 190 Fee In Lieu of Improvement Construction

- A. For surface water quality and quantity facilities a fee in lieu may be acceptable. The fee shall be determined by City of Beaverton City Engineer if the project elements are in substantial conformance with what is outlined in the Clean Water Services Rates and Charges Resolution and Order.

Section 191 Permit Requirements

A. General

The installation, maintenance, upgrade, repair, replacement, modification, removal and abandonment of utility facilities (including public and private utility facilities) in public rights-of-way shall be governed by applicable local, regional, state and federal laws, the other chapters of this *Engineering Design Manual* and the Standard Drawings, section 191 (hereafter “this section”), and any conditions of approval issued with the City permit(s) for the work, unless a City franchise or applicable state or federal law expressly supersedes or contains an express exemption from there. All vaults installed in the ROW shall be constructed with riser sections to allow for vertical and horizontal adjustment.

B. Permits

1. All work in the public right of way or public easement requires a permit.
2. Permit Types. In addition to the requirements of the City’s Site Development Ordinance, if applicable, no person shall engage in certain utility construction, maintenance or repair, including certain private utility work and certain public utility work performed by another unit of government, as more specifically defined hereinafter, that disturbs a public right-of-way, easement, or existing improvements therein without obtaining a Site Development Permit, a Right-of-Way Permit, or a Facilities Permit as prescribed below.

Site Development Permit

Application and Expiration. As in section 120, Submittal Requirements, the applicability of each subsection of this section to a Site Development Permit (SD), Right-of-Way Permit (RW), or Facilities Permit (F) is indicated in the left-hand margin beside each paragraph below by a check mark (✓) if the requirement applies and a “∅” if the requirement does not apply. In addition, the applicability of each subsection to work not requiring a permit (N) is indicated in the same manner.

Applicability:			
SD	RW	F	N
✓	∅	∅	∅
∅	✓	∅	∅

- a. A Site Development Permit required by the Site Development Ordinance for construction involving utility work shall be obtained in the manner prescribed in the Site Development Ordinance and this Manual before beginning any work under said permit. A Site Development Permit for utility installation shall expire one (1) year from issuance, or as otherwise required by the permit conditions, whichever is sooner, in accordance with the Site Development Ordinance.
- b. A Right-of-way Permit shall be obtained in the manner prescribed herein for any utility work requiring such a permit and shall expire at the time designated by the City, or one (1) year from issuance, whichever is sooner. A Right-of-Way Permit must be obtained before any work requiring such a permit is begun. In emergency situations as defined herein, the work may begin without a permit; however, the applicant must inform the City Engineer of the nature, location, and expected duration of the emergency work before 12:00 noon of the next business day. Failure to provide the required information may result in suspension of the work until the City receives the required information.

Applicability:			
SD	RW	F	N
∅	∅	✓	∅
✓	∅	∅	∅
✓	∅	∅	∅
✓	∅	∅	∅
∅	✓	∅	∅

- c. A Facilities Permit shall be obtained in the manner prescribed herein for any work requiring such a permit and shall expire at the time designated by the City, or one (1) year from issuance, whichever is sooner. A Facilities Permit must be obtained before any work requiring such a permit is begun.
- 3 Site Development Permit.
- a. In addition to the requirements of the Site Development Ordinance that apply to excavations, fills, grading, and floodplain/floodway encroachments, if applicable, no person shall engage in certain major utility construction work in a public street right-of-way that disturbs the right-of-way, alters or tampers with pavement, sidewalks, curbs, gutter, landscaping, utilities or other public improvements, or is not part of the construction of utility facilities in a new subdivision or other development for which a separate Site Development Permit has already been issued, without first obtaining a permit from the City Engineer.
 - b. A Site Development Permit is required for any of the following:
 - (1) Utility construction work, excluding utility service lines, that is within one or more collector or arterial streets, an intersection thereof, or a combination thereof, and has a total length of ten (10) feet or more that is within the existing pavement.
 - (2) Utility construction work, excluding utility service lines, that is within one or more public streets and has a total length of three hundred (300) feet or more that is in existing pavement, driveways, sidewalks, or other hard-surfaced areas, or any combination thereof.
 - (3) Installation of an aboveground utility facility that is in a public right-of-way, is governed by subsection 191.D.3. and is two (2) feet or more in height (above the ground surface).
 - (4) Any utility construction work that requires closure of a traffic lane in an arterial or collector street.
4. Right-of-Way Permit
- a. In addition to the requirements of the Site Development Ordinance, if applicable, no person shall engage in certain utility maintenance, repair and minor construction work in a public street right-of-way that disturbs the right-of-way, alters or tampers with pavement, sidewalks, curbs, gutter, landscaping, utilities or other public improvements, and is not part of the construction of utility facilities in a new subdivision or other development for which a separate Site Development Permit has already been issued and currently valid, without obtaining a Right-of-way Permit from the City Engineer as provided for herein.
 - b. A Right-of-way Permit is required for utility construction that is not included in the scope of work of an approved Site Development Permit and consists of one or more of the following types of work:

Applicability:			
SD	RW	F	N
∅	∅	✓	∅

- (1) Utility construction work, including but not limited to utility line installation, that is within one or more public streets and the cumulative length of which, within travel lanes, is less ten (10) feet.
- (2) Utility construction work, including but not limited to utility service line installation, that is within one or more public streets and the cumulative length of which, within existing pavement, driveways, sidewalks and other hard-surfaced areas, or any combination thereof, is less than three hundred (300) feet.
- (3) Utility construction work, including but not limited to utility service line installation that is within one or more public streets, is entirely outside pavement, driveways, sidewalks, and other hard-surfaced areas.
- (4) Installation of an underground utility transmission pipe or conduit, or a utility service pipe or conduit that is twenty (20) feet or more in length, by boring, horizontal directional drilling, tunneling, or similar means.
- (5) Installation of an aboveground utility facility that is less than two (2) feet in height (above the ground surface) in a public right-of-way.
- (6) Utility construction work that is within one or more public streets, is entirely outside existing pavement, driveways, sidewalks, and other hard-surfaced areas, and has a total length of more than one hundred (100) feet and less than five hundred (500) feet, or a total area of more than one hundred (100) square feet and less than one thousand (1,000) square feet.
- (7) All pot-holing and those “keyhole” or other circular street cuts that are one (1) foot in diameter and greater and:
 - a) Are in the improved portion of a public street, or
 - b) Are in a public easement that is occupied by an existing public utility facility, or
 - c) Are in a drainage way, jurisdictional wetland, or a water quality sensitive area.

A Right-of-Way Permit shall expire at the time designated by the City Engineer or one (1) year from issuance, whichever occurs first.

5. FACILITIES PERMIT. A FACILITIES PERMIT IS REQUIRED FOR ANY OF THE FOLLOWING:
 - a. Any work not directly associated with utility and restoration work under an issued Site Development Permit or Right-of-Way Permit.
 - b. Any utility construction work within a public right-of-way or public easement involving a utility service line connection to a City-maintained utility.
 - c. Sidewalk and driveway repairs and replacements.

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	∅	∅	∅
✓	✓	∅	∅
∅	∅	∅	✓
∅	∅	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

- d. Sidewalk ramp installation.
- e. Planting/removal of street trees.

A Facilities Permit shall expire at the time designated by the City Engineer, or one (1) year from issuance, whichever occurs first.

C. Application of Design and Construction Standards

The construction standards in subsection 191 and subsection 192 apply to public and private utility work throughout the City unless specifically exempted by subsections 191.C.1 through 191.C.4 immediately below:

1. All new utility facilities that are to be located in a new public right-of-way that is within the boundaries of a new development or redevelopment or within a new public utility easement that is within the boundaries of a new development or redevelopment are exempt from subsection 191.D.2 and subsection 191.D.3, which only apply to new utility facilities to be located in improved existing public rights-of-way and utility easements.
2. Modifications of existing underground utility facilities that disturb the right-of-way or existing improvements but neither require additional space nor add an at-grade or aboveground component, are exempt from subsections 191.D.1.a, 191.D.1.g, 191.D.1.h, 191.D.2.a, 191.D.2.b, 191.D.2.e through 191.D.2.j, 191.E, 191.F, 191.I, and 191.Q.
3. Maintenance and repair (both routine and emergency repair) of existing utility facilities in existing rights-of-way that disturb the right-of-way or existing improvements are exempt from subsections 191.D.1.a, 191.D.1.g, 191.D.1.h, 191.D.2.a, 191.D.2.b, 191.E, 191.F, 191.H, 191.I, 191.J, and 191.Q.
4. All pot-holing of existing utility facilities and “keyholes” or other circular street cuts performed under a Facilities Permit are exempt from subsections 191.G, 191.H, 191.I, and 191.Q.

D. Location and Design of New Utility Facilities

1. General

- a. All new underground utility facilities to be installed in street rights-of way and public easements shall be installed in conformance with applicable local, regional, state and federal law and in the standard locations within the right-of-way or easement required by this manual.
- b. Except as otherwise required by this Manual or by the City Engineer, new private utility facilities shall be located outside of the paved area of the street to the extent commercially reasonable and practicable so as to avoid future street cuts, except that public utility service lines may be extended across the paved area of the street.

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	∅	∅	∅
✓	✓	✓	✓
✓	✓	✓	∅
✓	✓	✓	✓

- c. On all phased or interim street improvements, public utility facilities shall be stubbed across the interim improvement to ensure that cuts are not necessary when the road is expanded to its full width.
- d. All private utility lines (linear facilities) shall be placed underground, except as expressly allowed otherwise by the City’s Development Code, as amended from time to time, or by applicable state or federal law. (See Development Code section 60 for current exceptions.)
- e. The City does not allow, without the prior express approvals of the City Engineer and the Operations Director, potholing (exploratory excavations), “keyhole” cuts or other circular street cuts that are one (1) foot in diameter or greater, or installation of an underground utility facility requiring a street cut in a paved or resurfaced arterial or collector street that has been paved or resurfaced within the previous five (5) years or other streets that have been paved or resurfaced within the previous three (3) years (sometimes referred to as “moratorium streets.”) See subsection 192.A. for clarification of this policy.
- f. New private underground utility facilities intended to provide direct service to adjacent properties with future connections shall not be located in the full-width paved section of a street to be constructed. If all service connections are existing and extend beyond the full-width section of a partially improved (or interim) street, underground utility facilities can be located in the future paved section of the street, if approved by the City Engineer.
- g. All new underground utility facilities shall be installed with the following minimum depths (i.e., depths of cover, from the proposed finished grade down to the top of the new facility), horizontal separations and vertical separations except when greater minimum depths are required by the National Electric Safety Code:

Applicability:				Minimum Standard Depths and Separations of New Underground Utility Facilities in Public Rights-of-Way			
SD	RW	F	N	Type of Utility Facility	Minimum Depth Required	Minimum Horizontal Separations Required	Minimum Vertical Separations Required
✓	✓	✓	✓	Public	Thirty (30) inches	(a) Minimum horizontal separation from other public utility facilities: As specified in Chapters 4 and 5 of this Design Manual (b) Minimum horizontal separation from parallel private utility facilities: Three (3) feet	(a) Minimum vertical separation from other public utility facilities: As specified in Chapters 4 and 5 of this Design Manual (b) Minimum vertical separation from private utility facilities: One (1) foot
✓	✓	✓	✓	Private	At least equal to the standard depths adopted by the respective utilities consistent with current local, state and federal law ¹	(a) Minimum horizontal separation from public utility facilities: Three (3) feet (b) Minimum horizontal separation from other parallel private utility facilities: At least equal to the minimum standard separations adopted by the respective industries consistent with current local, state and federal law.	(a) Minimum vertical separation from public utility facilities: One (1) foot (b) Minimum vertical separation from other private utility facilities: At least equal to the minimum standard separations adopted by the respective industries consistent with current local, state and federal law
✓	✓	✓	✓	¹ The private utilities' standard depths (of cover) in this area are as follows: [a] Natural gas lines: Mains at 24-inches to 48-inches; services at 18-inches to 30-inches. [b] Power lines: 30-inches (primary and secondary lines), except in joint use trenches with other electric utility lines, primary power lines will be below the other electric utility lines and will have a minimum of 12-inch vertical separation from the other lines. [c] Cable TV lines: Main lines at 30-inches; services at 12-inches. [d] Copper telephone lines: Main lines at 30-inches; services at 18-inches. [e] Other copper telecommunications lines: 30-inches; services at 18-inches. [f] Fiber optic telecommunications lines: 48-inches to 60-inches.			

Applicability:			
SD	RW	F	N
✓	✓	✓	✓

h. Methods of installation that do not cut the pavement or undermine the aggregate base of the street (i.e., "trenchless" methods), such as boring or driving, shall be used as required and as approved by the City Engineer.

For lines six (6) inches in diameter and larger, and for all lines that will cross existing lines, the City Engineer may require that an in-situ subsoil investigation be

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

performed by a qualified professional civil or geotechnical engineer retained by the permittee to properly determine the subsoil conditions and to recommend the most desirable method that will not disrupt the surface grade or integrity of existing utilities in the right-of-way. As alternatives, the City Engineer may accept copies of previous in-situ subsoil investigations in lieu of a new subsoil investigation or may waive the requirement for an in-situ subsoil investigation if documentation is available that other underground construction in the immediate vicinity encountered acceptable subsurface conditions and the documentation is acceptable to the City Engineer. The permittee shall submit a written report on the findings of the subsoil investigation to the City. The City may require other information on the method proposed or on the contractor’s qualifications in order to make final approval. Any and all surface heave or settlement, or related problems caused by the trenchless method shall be corrected by the permittee at its expense, to the satisfaction of the City. The trenchless methods of concern include but are not limited to pushing conduit or reaming and backpulling conduit through pilot bore holes of any size. Any annular region or other cavity remaining after the installation of the conduit, pipe or cable shall be pressure grouted to the satisfaction of the City, prior to backfilling the bore pits. All drilling fluids shall be removed and disposed of properly. All entrance and bore pits and other affected areas shall be cleaned of all objectionable material and properly backfilled and restored. All such areas shall be restored to original contour, shape, appearance and condition.

- i. In difficult underground conditions such as an area of a public right-of-way containing numerous existing utility facilities, the City Engineer may require increased depths and separations for safety, maintenance, or repair purposes.
- j. Underground vaults and other structures, and their access doors, manholes or other access facilities to be constructed within ten (10) feet of a vehicular travel way shall be designed for vehicular traffic loading on paved surfaces. All access doors, manholes, and other access facilities shall be designed and reinforced to a manufacturer’s standard suitable at a minimum for AASHTO HS 20 traffic loadings on off-street locations that are not subjected to high-speed or high-density traffic. The utility will be responsible for repairing such utility structures and their access facilities that are damaged by any commercially available public vehicles, including but not limited to emergency vehicles, with a weight of 80,000 pounds or less.
- k. Utility access facilities that encroach into the sidewalk shall conform to ADA requirements.
- l. At-grade and aboveground utility facilities, including but not limited to transformers, enclosures, cabinets, housings, pedestals, and other utility facilities, shall bear the owner’s name and identification or reference number for that facility, but shall not bear any signs or advertising devices (other than certification, warning, or other required seals or signage). If the City notifies the utility in writing that this information is missing or illegible, the utility shall replace it within 30 calendar days. Emergency repairs and replacements for existing utility facilities are exempt from the requirements of this paragraph for a period of ninety (90) days after they are installed.

Applicability:			
SD	RW	F	N
✓	∅	∅	∅
✓	✓	∅	∅
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

- m. A development or project with two hundred (200) feet or more of frontage on an arterial or collector street within or abutting the development shall provide for future signal interconnects in the public rights-of-way. That is, in each collector and arterial street within or abutting the development or project, the development or project shall furnish and install along its entire frontage on collector and arterial streets a two (2) inch diameter, Schedule 40 or 80 PVC or rigid metal conduit conforming to the requirements of this Manual for street illumination along its entire frontage.
 - n. When new curbing is being placed, a stamp or tag shall be placed to mark where each water, sanitary sewer service, and storm drain service crosses the curb line. The method of marking the curb shall be approved by the City Engineer and noted on the approved construction plans. See section 210.21 last paragraph for detailed requirements.
 - o. All nonmetallic piping shall be installed with copper tracer wire lines per Clean Water Services’ standards and the Oregon State Plumbing Code (OSPC) as follows:
 - (1) Section 718.4 OSPC: sanitary sewer lines require 18-gauge, insulated copper green tracer
 - (2) Section 604.10.1 OSPC: water lines require 18-gauge insulated copper blue tracer
 - (3) Section 1101.6 (7) OSPC: storm sewer lines require 18 gauge insulated copper green tracer
2. Underground Utility Facilities to be Installed in Existing Improved Public Rights-of-way
- In addition to the requirements of subsection 191.D.1, all proposed underground utility facilities to be installed in existing improved rights-of-way shall be installed as follows:
- a. They shall be installed in the standard locations within the right-of-way or easement specified herein and elsewhere in the *Engineering Design Manual*, unless the City Engineer finds that existing conditions prohibit installation in the standard locations and approves alternate locations.
 - b. They shall be installed as near to adjacent existing underground private utility facilities as is commercially reasonable, practicable, and consistent with other requirements herein, but shall be located so as not to interfere with the safety, operation, inspection, maintenance, repair, replacement, or extension of public utility facilities.
 - c. They shall not be located under existing pavement unless permitted by the exceptions below or expressly permitted by the City Engineer:
 - (1) Private underground utility facilities may be constructed in the pavement of an existing street if they are installed by a method that does not cut the pavement

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	∅
✓	✓	✓	✓
✓	✓	✓	✓

or undermine the aggregate base of the street, such as boring, driving, or another acceptable method.

- (2) Existing private underground utility facilities that are already in the pavement of an existing street may be replaced, upgraded, or expanded in the same location, or extended along a projection of their existing alignment unless the facilities would create a safety hazard, would damage another utility facility, or would impair the operation, inspection, maintenance, repair, or extension of public utility facilities in that location. However, if an existing underground utility facility is extended along a projection of its existing alignment in the street pavement, it shall be returned to the City's standard location and alignment outside the pavement at the earliest opportunity to do so that is commercially reasonable and practicable.
- c. They shall be installed in a manner that avoids conflicts with existing public utility facilities. The new utility facilities shall be installed at the depths, horizontal separations and vertical separations specified for utilities in unimproved rights-of-way and easements above, except as may be required otherwise by the City Engineer to prevent conflicts with the operation, inspection, maintenance, repair, and replacement of any existing public utility facilities and any future extensions of said public utility facilities or services that can reasonably be expected by the City to be installed in the future.
- d. If an underground utility facility must cross an existing paved street that is not a residential street serving predominantly single-family residences, the underground facility shall be installed by a method that does not cut the pavement or undermine the aggregate base of the street unless expressly approved by the City Engineer.
- f. A replacement for an existing underground utility facility proposed to be in approximately the same location and at the same depth as the existing facility it is to replace is exempt from these depth requirements and may be installed at the same depth as the existing facility it is replacing, providing the existing depth complies with applicable electrical codes, state and federal laws, and installing the replacement facility at the same depth will not create a safety hazard or impair the operation, inspection, maintenance, repair, or replacement of any existing public utility facilities and any future extensions of said public utility facilities or services that can reasonably be expected by the City to be installed in the future.
- g. With the exception of emergency repairs, no construction of underground utility facilities in an existing right-of-way may begin until all existing utility facilities (including but not limited to all public and private utility main lines and service lines) have been located in the field and marked. Under OAR 952-001-0090, a permittee may not excavate for any work other than emergency repairs until the existing utility facilities have been affirmatively located and marked in the field.) Prior to constructing a utility facility in an improved existing right-of-way, the permittee shall locate all known existing facilities in the public rights-of-way based on the best information available, show the existing utilities on the construction plans in the plan and profile views as clearly and accurately as possible (based on available records), and have the existing facilities marked in the field by the appropriate

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	✓	✓	∅
✓	✓	✓	∅
✓	✓	∅	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	∅

agency. Planning of the proposed utility facilities shall be done jointly with the City Engineer in order to determine the most feasible route and depth. The City Engineer may require additional vertical and horizontal clearance to protect existing utility facilities from damage or for safety or maintenance reasons

- h. A proposed private manhole cluster (i.e., a group of two or more proposed manholes serving the same type of utility that are generally spaced less than fifty (50) feet apart) shall not be located within 300 feet of a signalized intersection, including future intersections planned by the City.
 - i. If a new utility facility must be located within the paved area of the street, to the extent commercially reasonable and practicable, the facility shall be located so that the edge of the pavement cut is not within an existing pavement patch or a wheel path. If, due to site conditions, the edge of a street cut must be in a wheel path, the City Engineer may require removal of additional pavement.
 - j. To the extent commercially reasonable and practicable, new underground utility vaults, manholes, and other structures with at-grade access doors, manhole covers, or other access facilities that encroach into the sidewalk shall be located on the projection of a common property line between two parcels or as far apart as possible.
 - k. After pot-holing (exploratory excavation) or other window cut excavating has been performed in an arterial or collector street that has been paved or resurfaced within the previous five (5) years, or other street that has been paved or resurfaced within the previous three (3) years, pavement restoration shall be performed in accordance with section 212.
3. At-grade and Aboveground Facilities to be Installed in Existing Improved Public Rights-of-way.
- At the option of the applicant and subject to rules promulgated by the Oregon Public Utility Commission (PUC), the requirements of this subsection 191.D.3. apply to surface mounted transformers, surface mounted connection boxes, telephone pedestals, power supplies, surge suppressors, tap/splitters and other similar facilities to be installed by an electric power, telephone, cable television or telecommunications utility company in an existing public right-of-way.
- The requirements of this subsection 191.D.3. do not apply to the following existing or proposed aboveground utility facilities: utility poles, overhead utility lines, guy wires, street light poles and luminaires, traffic signal poles, signal heads and span wires, and their attached overhead appurtenances, meter cabinets, temporary utility service facilities during construction, or high capacity electric lines operating at 50,000 volts or above.
- All proposed at-grade and aboveground utility facilities to be constructed, relocated, or upgraded within a public right-of-way including but not limited to those required for electric power, telephone, cable television, and telecommunications, shall be located and constructed as follows:

Applicability:			
SD	RW	F	N
✓	✓	✓	∅
✓	✓	✓	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅

- a. They shall conform to the provisions of this manual except as expressly provided otherwise herein, as amended from time to time, or by applicable local, State, or federal law.
- b. To the extent commercially reasonable and practicable, they shall be installed in such a manner as to minimize the disturbance of their surroundings, natural and man-made, to the extent consistent with City franchises and applicable local, state, and federal law. In determining the extent of said disturbance for purposes of permitting, the City shall consider public health, safety and welfare, private property rights, and impacts on property amenities and values to be paramount.
- c. To the extent commercially reasonable and practicable, they shall be located within ten (10) feet of a lot corner.
- d. To the extent commercially reasonable and practicable, proposed aboveground utility facilities governed by this Design Manual that are commercially available in equivalent underground models acceptable to the utility shall be installed underground unless placing said equipment underground would create a safety hazard or impair the maintenance or repair of public utility facilities. Electric and gas meter sets, gas regulator stations, cathodic protection test stations, power transformers are exempt from this requirement.

When underground installation of a proposed new utility facility in an existing public right-of-way is not allowed or is not commercially reasonable or practicable, the applicant shall consider alternative aboveground facilities and their locations in the order of preference prescribed by subsection 191.D.11.f. to the extent commercially reasonable, practicable, and consistent with applicable local, regional, state, and federal law. Facility replacements installed in the same location as the facilities they are replacing are exempt from this requirement unless said replacement would perpetuate or create a safety hazard or impair the maintenance or repair of an existing public utility facility. Enclosures to be installed underground shall be manufactured specifically for underground service.

If an applicant believes that it is not commercially reasonable and practicable to install such equipment underground and desires an exemption on that basis, the applicant shall submit to the City Engineer in a form conforming to section 160 Design Exceptions and acceptable to the City Engineer, a written explanation regarding the hardship associated with, or unfeasibility of, underground installation. The City Engineer shall review the explanation, shall consult with qualified utility industry representatives and decide whether the underground installation is commercially reasonable and practicable, and shall inform the applicant of his/her decision within fourteen (14) calendar days. An applicant seeking an exemption from this requirement for all future installations of its equipment shall submit to the City Engineer (1) a letter requesting exemption and (2) a comprehensive manual for its facilities, including descriptive literature and engineering data for all proposed equipment, cabinets, node housings, pedestals, and other enclosures. The letter and manual combined shall contain sufficient information for the City Engineer to determine whether underground installation is commercially reasonable and

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	✓	∅

practicable. Any class of utility facilities for which the City Engineer determines underground installation to be not commercially reasonable and practicable shall be granted an exemption, subject to the City Engineer’s revocation of his/her determination for reasonable cause at any time.

- e. The location of proposed aboveground utility facilities shall be in accordance with the following order of preference to the extent commercially reasonable, practicable, and consistent with applicable state or federal law, and the standards and operating requirements of those power, gas, telephone, cable TV, and telecommunications companies operating within Beaverton on the effective date of this manual.
 - (1) Adjacent to non-residential properties in an area where no modification to the existing right-of-way would be required and existing landscaping is present to screen the facilities from view.
 - (2) Adjacent to side or rear yards of residential properties, preferably on major streets where no modification to the existing right-of-way would be required and existing landscaping is present to screen the facilities from view.
 - (3) As close as possible to the common property line between the front yards of residential properties where no sight distance from driveways would be obstructed.
 - (4) At corner residential lots, aboveground facilities shall not be located at the lot corner nearest the intersection, except with the City's prior approval, and then only if the aboveground unit(s) will not obstruct the sight triangle at the intersection.

- f. To the extent commercially reasonable and practicable, proposed new, relocated, and upgraded at-grade and aboveground private utility facilities of any kind shall be located so as to minimize impairments to the relocation, extension, upgrading, operation, and maintenance of existing public street and utility improvements, adjacent private property and improvements thereto, including driveways, landscaping, trees, shrubs, plants, groundcover, lawn, surfacing and other improvements.

- g. Proposed new, relocated, and upgraded at-grade and aboveground utility facilities shall not:
 - (1) Obstruct the line of sight requirements at intersections or driveways.
 - (2) Obstruct or hinder the opening of a door or a vehicle parked at curbside, in a designated parking space, or adjacent to a residential driveway.
 - (3) Obstruct disabled access along public sidewalks to the extent that a minimum clear passage width of four (4) feet would not be maintained.
 - (4) Interfere with any existing or proposed infrastructure improvement projects.

Applicability:			
SD	RW	F	N
✓	✓	✓	∅
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✓	✓	✓	∅
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	∅

- h. To the extent commercially reasonable and practicable, an applicant proposing the installation, relocation, or upgrade of an aboveground utility facility that is two (2) feet or more in height as measured above the surface of the nearest curb, sidewalk, or driveway, shall locate said facility at a common lot corner between adjacent lots and should locate said facility as far as possible from other existing aboveground utility facilities that are two (2) feet or more in height. In addition, aboveground utility facilities located in the planter strip should be located at the same distance from the curb as other utility facilities along the planter strip to create a uniform setback distance and appearance.
- i. A new at-grade or aboveground utility facility shall not be located in an existing public right-of-way in such a way as to require the removal of an existing tree. Any removal or pruning of a tree is subject to the provisions of sections 40.90 and 60.60 of the *Development Code*.
- j. To the extent commercially reasonable and practicable, a utility proposing to install a new, relocated, or replacement facility shall consider minimizing the number of aboveground utility facilities that would be clustered together and shall consider minimizing over-concentration of at-grade and aboveground utility facilities (including existing and proposed facilities). For purposes of this section, over-concentration is defined as three (3) or more aboveground utility facilities, each of which has an aboveground volume of one and one-half (1-1/2) cubic feet or more that are less than ten (10) feet apart.
- k. The height of a proposed new aboveground cabinet, housing, pedestal, or other aboveground facility, including any facility replacing an existing facility, that is taller than the applicant’s existing units in the immediate area and is to be located in a public right-of-way adjacent to the front, side, or rear property line of a residentially zoned property, may not exceed the permitted height of fencing as determined at the property line.
- l. New at-grade and aboveground utility facilities, including but not limited to transformers, enclosures, cabinets, housings, pedestals, power supplies, surge suppressors, tap/splitters and other utility facilities, shall be constructed of durable, new, or like-new materials, shall be green, tan, or brown colored. Riser sections shall be included to allow horizontal and vertical adjustment.
- m. To the extent commercially reasonable and practicable, all at-grade and aboveground utility facilities are subject to current City ordinance(s) relating to removal of graffiti.
- n. A proposed aboveground utility facility shall not be located immediately in front of a building, structure, or public stairway such that it causes a violation of ADA guidelines for pedestrian passage and shall not obstruct pedestrian passage from private property to the public right-of-way.

Applicability:			
SD	RW	F	N
✓	✓	✓	∅
✓	✓	✓	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅

- o. Private utility services stubbed to the right-of-way line or to a public utility easement and terminated there may be terminated with a riser extended up to the ground surface, provided the top of the riser is cut off and capped flush with the ground surface.
 - p. Prior to constructing an at-grade or aboveground utility facility, a public or private utility shall meet or confer with all persons entitled to notice under subsection 211.H. of this manual and shall make reasonable accommodation of those persons' needs relating to their work schedule, noise, and other emissions, access to those persons' property, and the appearance of that property during and after the utility's construction.
 - q. All new aboveground utility facilities in existing improved public rights-of-way shall be screened from view. To the maximum extent commercially reasonable, practicable, and consistent with the utility's standards and operational requirements, new at-grade and aboveground utility facilities, including new facilities replacing existing facilities, that are three (3) feet or more in height, shall be screened from view through the use of fencing, walls, landscaping, or other means that match the type and color of surrounding features including but not limited to existing fencing, buildings, other structures, and landscaping, and shall comply with the *Development Code*.
- E. Coordination of Trench, Conduit and Enclosure Construction and Joint Occupancy in an Existing Public Rights-of-way
1. When the City or another entity notifies a permittee that two or more utilities are planning to work in the same existing right-of-way, the permittee and the other utilities shall coordinate their work to the extent commercially reasonable and practicable to reduce space requirements, conflicts and the impacts of utility construction activities on the right-of-way and adjacent private property. Underground utility cables and conductors serving the same or different types of utilities shall occupy the same trench where commercially reasonable and practicable. When the City requests utilities to coordinate their proposed work, their failure to do so in accordance with this subsection will be grounds for the City to suspend their permit(s) for the work until they perform such coordination satisfactorily.
 2. In furtherance of the public purpose of reduction of rights-of-way excavation, it is the goal of the City to encourage both the shared occupancy of underground electrical and telecommunications trenches, bored conduits, and casings.
 - a. City Use. In the course of the City's review of plans of a private utility for work that disturbs an existing public right-of-way or public improvements, the City may request installation of facilities at the City's cost for the City's use.
 - b. Use of City Utility Facilities. If the City has constructed underground utility facilities and those facilities have excess capacity, the City may require private utility

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	∅	∅
✓	✓	∅	∅

companies proposing to construct new facilities along approximately the same route to consider use of the City’s excess capacity on mutually agreed terms.

3. Joint Trenching. To the extent commercially reasonable and practicable, multiple private utility facilities to be constructed in the same existing public right-of-way shall be located in a joint trench as illustrated in the *Standards Manual* of the Oregon Utilities Coordinating Council.

F. Utility Facilities Operation and Maintenance

Utility facilities shall be operated and maintained as follows:

1. Except for lawful releases from natural gas facilities, utility facilities shall not emanate noise that exceeds the City's noise standards nor discharge hazardous or toxic liquids or gases to the surrounding environment.
2. The utility shall maintain all facility screens to be in conformance with ADA requirements and other applicable law.
3. To the extent commercially reasonable and practicable, all at-grade and aboveground utility facilities are subject to current City ordinance(s) relating to removal of graffiti.
4. The owners of at-grade enclosures and aboveground cabinets, housings, pedestals, and other aboveground facilities shall keep their facilities in good condition structurally, mechanically, electrically, and aesthetically free of dents, scratches, gouges, rust, peeling paint, loose parts, and in a level, upright (plumb) position.

G. Notification of Adjacent Property Owners and Tenants

Prior to beginning construction under a Site Development Permit or a Right-of-way Permit the utility shall give the City Engineer and the occupants of building(s) within fifty (50) feet of project construction activity adequate written notice by mail or by a "door hanger" notice. Said notification may be addressed to "occupant" and shall be given no less than five (5) days before the work is to begin. Said notification shall clearly identify the location and type of work to be performed, the anticipated date and time that the work is to be performed, and the name and telephone number(s) of the utility company's representative(s) that a property owner should call to contact the utility. In addition, if the proposed construction will extend five hundred (500) feet or more in length or the expected duration of the construction is one (1) month or longer, the utility shall also notify the Neighborhood Association Committee (NAC) contact for the area at the NAC contact’s address currently on file at the City.

H. Consultation with Adjacent Property Owners

A private utility shall meet or confer with any person entitled to notice under subsection "G" above and shall make reasonable accommodation, as determined by the City Engineer, of

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	∅
✓	✓	✓	∅

that person’s needs relating to the work schedule, access to that person’s property, and the appearance of that property during and after the utility’s construction.

I. Project Sign

1. Except as otherwise noted herein, private utility work done under a Site Development Permit or a Right-of-way Permit that is not associated with a city, county, or state project and disturbs the right-of-way or public facilities for a distance of 500 feet or more, or over a project duration of 30 calendar days or more, shall, at least 24 hours before beginning work, be posted for the benefit of pedestrian and vehicular traffic with a post-mounted sign at each end stating the following information:
 - a. The type of work being done,
 - b. The name of the utility company,
 - c. The name of the contractor,
 - d. The name and telephone number of the utility company's responsible project contact person.
2. The sign shall be legible with lettering no smaller than 4 inches in height.
3. The project sign shall be maintained in good condition at all times.

J. Construction Operations

1. Construction facilities, equipment, tools and materials shall be stored at the construction site as inconspicuously as possible and for the shortest period of time possible. If construction operations are suspended due to inclement weather conditions or for other reasons, the permittee shall monitor its construction facilities, equipment, tools and materials at the work site frequently and ensure that they remain stored in a safe, orderly and inconspicuous manner. The permittee shall monitor temporary traffic control at the construction site daily and shall maintain a safe flow of traffic with minimum interruptions and inconvenience to motorists, bicyclists and pedestrians.
2. To minimize the impacts of private utility construction, the total area of public right-of-way disturbed during construction of private utility facilities that are governed by these standards shall be kept to a minimum. In addition to the requirements of section 170, the following requirements apply:
 - a. In the excavation of pot-holes, low impact, non-invasive excavation methods such as "VacX", "SafeX", "Air-spade" or other similar methods shall be used to the maximum extent commercially reasonable and practicable.
 - b. In the excavation of open trenches, bore pits and other excavations, the length of open trench shall be kept to a minimum, and the number of unrestored bore holes

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

and other excavations during construction shall be kept to a minimum. The City Engineer shall be the sole judge of the extent of construction disturbance allowed, the amount of open trench allowed, and the number of unrestored bore hole and excavation sites allowed based on vehicular traffic, pedestrian traffic and other work conditions of the area. In normal cases, the maximum allowed total length of open trench shall not exceed 200 feet; the maximum allowed total length of pavement cut that has not been restored temporarily (i.e., steel plated or temporarily patched with cold-mix asphalt concrete) shall not exceed 400 feet; and the maximum allowed number of bore hole and excavation sites that have not been restored permanently shall not exceed four (4) concurrently. In addition, the maximum allowed total length of trench pavement cut that has not been restored permanently (i.e., patched with hot-mix asphalt concrete or portland cement concrete (PCC) pavement, as required by the permit) shall not exceed 1000 feet.

K. Cleanup and Restoration

1. This section applies to all private utility work in a public right-of-way and to a public utility easement that is already occupied by a public utility facility, whether or not a City permit is required, and supplements the requirements of section 170 of the City's *Engineering Design Manual*. "Cleanup and restoration," as used herein, includes all labor, equipment and materials needed to maintain the work area in an acceptable condition during construction and to restore the work area to its condition prior to start of construction, or better condition as required to meet current construction standards, promptly upon completion of the work. Any utility replacing an existing line or facility or installing a new or upgraded line or facility in an improved public right-of-way or easement shall perform the cleanup of their work area as an ongoing process that is performed on at least a daily basis. Materials and equipment shall be confined to as small an area as possible and maintained in an orderly fashion. Excavated material, backfill and other materials and equipment stockpiled at the work site shall be confined so as not to spill outside of the immediate area of work. Temporary traffic control devices shall be monitored daily and maintained in their proper location and position. Materials and equipment removed from the immediate work site by vandals or others without permission and left nearby shall be returned promptly to the work site by the utility. Garbage and debris from lunches or breaks shall be removed from the work area immediately. Packing cases and wrapping material for materials delivered to the work area shall be removed as soon as they are emptied or unwrapped. Unused or unneeded construction materials, including conduit ends, cable ends and other remnants that are not be used shall be removed from the work area promptly. Sod, shrub and tree trimmings, whole shrubs, trees and other vegetation that are irreparably damaged by the work shall be removed from the work area promptly. The City Engineer may require a work site to be temporarily fenced with construction fencing if, in his/her judgment; the site has been unsightly, unmaintained or unconfined for an excessive period of time, is a nuisance or is hazardous.
2. The utility is responsible for erosion control in accordance with OAR 340-41-455 and must remove all debris such as excess excavated soil, tree limbs and chunks of concrete except any debris that the adjacent property owner and the utility agree is to be left on his/her property. The utility shall obtain written permission from a property owner who

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

allows the utility to leave debris on the property owner's property and shall provide a copy of same to the City on request.

3. Damaged sidewalk shall be repaired promptly to its pre-existing condition or better, in conformance with current ADA standards to the extent commercially reasonable, and in a workmanlike manner, but this section does not require the utility to construct additional, new sidewalk. All sidewalk panels, sidewalk wheelchair ramps, and driveway aprons damaged by utility construction shall be removed completely and the damaged panels replaced, unless otherwise approved by the City Engineer. In the replacement of individual sidewalk panels, the City Engineer may allow the replacement panels to match the width of the original panels where they join the remaining existing sidewalk, even though the original panels did not comply with ADA standards, except that individual panels in wheelchair ramps shall be replaced with new panels that comply in all respects with ADA standards, except the utility will not be required to remove signs, utility poles or other obstructions that were in the existing sidewalk or wheelchair ramp. To the extent commercially reasonable and practicable, the utility shall make accommodations for the City to remove existing obstructions and upgrade adjacent existing sidewalks that are not ADA-compliant, all of which shall be done at the City's cost.

4. The concrete mixture used in sidewalk repairs shall be a 4,000-psi mixture at 28 days. At least 24 hours prior to pouring concrete, the permittee shall request that the City Engineering Inspector inspect the forms, subgrade, thickness and other construction details. Prior to removing any sidewalk, the permittee shall place signs announcing that the sidewalk is closed. Such signs shall be placed at all intersections leading to the sidewalk where work is being performed. All sidewalks removed for construction along collector and arterial streets shall be plated (or patched with a hard durable material such as compacted 3/4"- 0 crushed rock, asphaltic concrete or equivalent material approved by the City) at the end of each workday. All sidewalks removed for construction along residential streets shall have lighted barricades installed at each end of the removed section at the end of each work day or patched with a hard durable material such as compacted 3/4"- 0 crushed rock, asphaltic concrete or equivalent material. No sidewalk may be left in an impassable condition for a period exceeding five (5) workdays without the prior approval of the City Engineer. All sidewalk wheelchair ramps that are disturbed ("disturbed" being defined here as any physical damage or alteration which causes the existing ramp to become either non-functional or in need of repair of over 10 percent of the ramp) shall be reconstructed to current City standards. Existing sidewalks shall be kept free of obstructions except in those cases where, in the City Engineer's judgment, the sidewalk must be obstructed or removed for construction purposes. If a sidewalk must be obstructed or removed, the sidewalk shall be restored as described above or an alternate walkway shall be provided within 4 hours. Concrete cylinders, testing for air entrainment, temperature, and slump shall be performed for sidewalk pours over 100 feet in length.

5. If a permittee cuts, damages or otherwise disturbs a paved or hard-surfaced existing street or sidewalk, said permittee shall do so only if specifically permitted by the City Engineer and shall repair the damage and restore the surface to its original condition, or better condition as required to meet current construction standards, satisfactory to the City and as specified in this section and section 192 of the *Engineering Design Manual*.

Applicability:			
SD	RW	F	N
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

6. If a permittee disturbs a landscaped area, planted area, established grassed or lawn area or surfaced area (with gravel, bark dust, wood chips or other material), the permittee shall repair the damage and restore the area to its original condition in conformance with section 170, or better condition as required to meet current construction standards, and shall maintain the restored area until any new plants are established. The permittee shall replace all damaged established grassed and lawn areas with healthy sod and shall replace other grassed areas with hydro-seeded grass.

7. A person who disturbs a public right-of-way shall schedule the work to ensure that the period of time the work site is disturbed (during mobilization, construction, restoration and cleanup) is kept to a minimum. Disturbed areas of the right-of-way and, where applicable, public utility easements shall be restored reasonably promptly. Permit applicants are cautioned that the expiration time specified in the Site Development Permit is not necessarily the minimum time in which the portion of the work that is within existing public right(s)-of-way and, where applicable, public utility easement(s), is to be completed, and that the City expects the permittee to complete that work earlier than other work, if possible. Notwithstanding the repair of sidewalks as specified above, in no case may any disturbed area of the right-of-way or applicable public utility easements go un-restored for more than 30 calendar days, nor may any area of a public utility easement, where applicable, go unrestored for more than seven (7) calendar days, unless the permittee obtains written permission from the City for a longer period of time when justified by inclement weather, unusual delays in the delivery of materials, or other conditions not under the permittee’s control. If a permittee is delinquent in cleaning up or restoring a disturbed area, allowing for such extensions of time as may be granted by the City, and the City notifies said permittee of the delinquency, said permittee shall complete the restoration within 14 calendar days of receiving notice from the City. If the permittee fails to restore the right-of-way or public utility easement, the City shall cause such restoration to be made at the permittee’s expense. The City Engineer may grant the permittee an extension of time for completion of permanent restoration if there are extenuating circumstances that justify the extension, if the permittee requests an extension of time in writing and the permittee agrees to implement such temporary restoration measures as may be required by the City Engineer, including temporary walkway surfacing, paving or other improvements.

L. Damaged and Disassembled Utility Facilities

Utilities shall take reasonable care to ensure that damaged, disassembled or partially disassembled cabinets, node housings, pedestals and other aboveground utility facilities that pose a safety hazard, have been substantially damaged or disassembled or are unsightly are restored satisfactorily by the utility reasonably promptly. If the City or another entity notifies the owner of a facility that said facility has been damaged materially, and repair or replacement of the facility is commercially reasonable and practicable, the owner shall restore, repair or replace the damaged facility to satisfactory condition within thirty (30) calendar days from the date the owner was notified, providing the repair is commercially reasonable. This requirement applies to all such facilities, whether disassembled for a utility construction project or damaged by accident or vandalism. The owner and the City shall determine jointly whether the damage is material and repair are practicable.

Applicability:				
SD	RW	F	N	
				M. Relocation of Utility Facilities
✓	✓	✓	✓	1. Upon the City’s determination that an existing utility facility in a public right-of-way must be relocated (to the extent consistent with current franchise agreements) to allow construction or maintenance of public improvements or that it must be modified when the public interest requires, the City shall give said facility’s owner 90-days notice before the facility must be relocated. Upon discovery that a utility facility in a public right-of-way appears to be abandoned and the City determines that said facility shall be abandoned formally or relocated, the City shall give the facility’s owner (at the owner’s address on file at the City) 90-days notice that the facility be relocated or formally abandoned in accordance with all City requirements.
✓	✓	✓	✓	2. If a utility does not respond within ninety (90) calendar days to a City notice as per subsection N.1 above, the City may declare the facility to be a nuisance obstructing public right-of-way pursuant to <i>Beaverton Code</i> section 5.05.115 and may abate the nuisance pursuant to <i>Beaverton Code</i> section 5.05.140.
				N. Security for Performance and Maintenance
✓	✓	∅	∅	1. Performance and maintenance securities are required for all utility work performed under a City Site Development Permit or Right-of-way Permit. The performance security shall be for the full amount of the work to be performed within the right-of-way, as estimated by the utility and approved by the City Engineer for general accuracy. The maintenance security shall protect against defects in the permitted work, and shall be for 25 percent of the value of the work as built and shall be in effect for at least two (2) years following the City’s written approval of the work. The City Engineer may require that the maintenance security remain in effect for a longer period, if the completed work is not in conformance with all City requirements.
✓	✓	∅	∅	2. If allowed by the permittee’s franchise agreement with the City, the City Engineer may accept a combination performance and maintenance “blanket bond” or other type of “blanket” security for all utility work to be done by a single permittee at one or more locations or times in a calendar year (e.g., utility work that the permittee anticipates may be done under more than one permit). Said blanket security shall be in conformance with the requirements of the Site Development Ordinance, shall be for a period of up to one (1) year, and shall be in a form approved by the City Attorney. The blanket security shall be for the full amount of the work to be performed within the right-of-way, as estimated by the utility and approved by the City Engineer for general accuracy. If at any time during the effective period of a blanket security the total estimated cost of the permittee’s uncompleted work is expected to exceed the original amount of the security, the City Engineer may require the permittee to increase the amount of the security accordingly. In addition, the City Engineer may review each blanket security upon its expiration, may determine whether a new security is required, whether the amount of the security is sufficient, and may require that the amount of the security be increased accordingly (e.g., if the scope or cost of the project has increased materially).
✓	∅	∅	∅	O. Additional Submittal Requirements

Applicability:			
SD	RW	F	N
∅	✓	∅	∅
∅	∅	✓	∅
✓	✓	∅	∅
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✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅

1. Organization and Content of Submittals for Utility Facilities.
 - a. For private utility work that is to be a part of a new subdivision or other development, the permit submittals shall be in conformance with section 120 and subsection 191.O.2 of this manual.
 - b. For utility work that requires a Right-of-way Permit, the permit submittals shall be in conformance with section 120 and subsection 191.O.2 of this Manual. The construction plans shall be separate plan sheet(s) conforming to subsection 120 of this manual and subsection 191.O.2 below or as otherwise required by the City Engineer.
 - c. For utility work that requires a Facilities Permit, the permit submittals shall be in conformance with section 120 and subsection 191.O.2 of this Manual, with the exceptions listed in subsection 191.O.3 below, or as otherwise required by the City Engineer. The work shall be shown on separate plan sheet(s) in the permit submittals.

2. In addition to the minimum requirements set forth in section 120 of this manual for plan submittals, the following items shall be additional minimum requirements for approval of engineering plans for utility construction work requiring a Site Development Permit or a Right-of-way Permit. Plans shall contain at least the following information (the City Engineer may request additional information):
 - a. The business name of the utility that is constructing the proposed facilities and the name, address and telephone number of the utility’s contact person, including an after-hours telephone number;
 - b. The name, address and telephone number of the utility contractor and the name and telephone numbers (office and mobile) of the contractor’s contact person, including an after-hours telephone number;
 - c. The name, address and telephone number of the design firm that prepared the plans and the name and telephone numbers (office and mobile) of the design firm’s contact person, including an after-hours telephone number;
 - d. The business name(s) of the utility or utilities that will use the proposed facilities and the names, addresses and telephone numbers of the utility’s or utilities’ contact person(s), unless ORS 757.270 et seq. applies;
 - e. In the Plan view, the locations and descriptions of proposed underground and aboveground conduits, conductors, and cables (for direct-bury cable);

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
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∅	∅	✓	∅
∅	∅	✓	∅
∅	∅	✓	∅
∅	∅	✓	∅
∅	∅	✓	∅

- f. In the Plan view, the locations and descriptions of proposed underground structures, including vaults and other enclosures, including any drainage piping and power supply cabinets and conductors;
 - g. In the Plan view, the locations and descriptions of proposed aboveground utility improvements, including cabinets, housings, pedestals and other enclosures, with their locations shown to scale;
 - h. In the Plan view, the locations and descriptions of proposed utility poles;
 - i. For those proposed underground utility facilities that will be installed in existing streets and will cross existing or planned future public utility facilities and private sewer service lines, a profile view showing the location, depth, size, type and number of proposed underground utility facilities, and to the extent the information is available or given to the utility by the City, the existing and planned future utility facilities (public and private) that are parallel with and within a three (3) foot radius of the proposed facilities, and showing in cross-section all existing and planned future utility facilities to be crossed by the proposed underground facilities based on the best as-built information available, regardless of the method of construction to be used for installing the proposed underground facilities (i.e., trench or trenchless construction);
 - j. If multiple underground conduits are being proposed, typical cross-sectional views showing the location, depth, size, type and number of proposed underground and aboveground private utility facilities, regardless of the method of construction to be used for installing the proposed underground facilities (i.e., trench or trenchless construction);
 - k. The method(s) of construction to be used for installing each run of underground utility lines (i.e., trench or trenchless [directional drilling] construction); and,
 - l. Application fee as set forth in *Beaverton Code* section 9.05.032 and Resolution No. 3223 or subsequent resolution, unless otherwise prescribed in the applicant's franchise agreement with the City.
3. For a Facilities Permit, plan sheet(s), if required by the City Engineer, shall be in conformance with section 120, with the following exceptions:
- a. Subsections 120.2.B. (preferred but not required), 120.2.D, 120.2.E, 120.2.H, 120.2.I.2, 120.2.I.4 through 120.2.I.6, and 120.2.J are waived.
 - b. Subsections 120.2.B. is waived. (No Title sheet or composite utility plan is required.)
 - c. Subsections 120.3.3 through 120.3.6, and 120.3.8 through 120.3.15 are waived.
 - d. Subsections 120.3.8 is waived. (Profile views are not required.)

Applicability:			
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∅	∅	✓	∅
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅

- e. Subsection 120.3.11 is waived. (A site grading plan is not required.) However, 120.3.11.B and D, erosion control is required.
 - f. Subsection 120.1.4 is waived. (Drainage calculations are not required.)
 - g. Subsection 120.3.6 is waived. (Details are not required.)
4. If the method of construction identified in subsection 191.O.2.k. above must be changed, or any other aspect of a proposed utility facility governed by these standards must be changed materially during construction, the permittee shall inform the City of the change(s). The permittee shall make a reasonable effort to inform the City of the change(s) in writing before proceeding with that aspect of the construction, but a revision of the Site Development Permit shall not be required unless the proposed facility is to be located in a newly paved or resurfaced street (an arterial or collector street that has been paved within the previous five (5) years or other street that has been paved within the previous three (3) years) and the proposed change will require a street cut, in which case section 192 will apply.
 5. The proposed locations of the utility lines and other utility facilities shown in Site Development Permit or Right-of-way Permit submittals shall be dimensioned in sufficient detail to allow the City to determine their proposed locations accurately in the field. Where the proposed utility facility is planned to be located five feet or less from an existing or planned future public utility facility, and upon completion of the proposed utility facility its actual location deviates from its planned location more than two (2) feet in the horizontal or more than one-half (0.5) foot in the vertical, and the deviation will cause a safety hazard, substantial maintenance difficulties, or substantial additional future construction costs for the City, the City may require the utility company to re-install the facility in its correct location or make other adjustments approved by the City, unless prior approval of said deviation was granted by the City in writing. Upon completion of construction, the utility shall provide the City as-built construction plans in accordance with subsection 191.P. below. The City's receipt of as-built construction plans containing deviations from the City-approved plans shall not constitute the City's approval of those deviations.
 6. The requirements of subsection 120.1.E of this manual shall apply to any revisions of the City-approved construction plans for private utility facilities governed by Site Development Permits and Right-of-way Permits, including, but not limited to, descriptions of aboveground enclosures and the method of construction to be used for installing underground utility lines (i.e., trench or trenchless construction), except that if an unforeseen condition is encountered during construction and requires a revision of the approved Site Development Permit or Right-of-way Permit plans, as applicable, and to obtain the City's prior approval of the appropriate Permit revision would create a traffic disruption, a safety hazard or an unreasonable financial burden for the permittee due to a construction delay or other factors, the permittee may proceed with the work, but shall inform the City of the revision as soon as possible and shall promptly seek City approval of the Permit revision. However, nothing in this subsection constitutes a waiver of the requirements of the preceding subsection. Further, failure to comply with the Engineering Design Manual will be grounds for the penalty imposed under *Beaverton*

Applicability:			
SD	RW	F	N
✓	✓	∅	∅
✓	✓	✓	✓
✓	✓	∅	∅
✓	✓	∅	∅
✓	✓	∅	∅

Code section 9.05.032 for each incident of unapproved revision(s) in the approved permit plans.

P. Record Drawings

1. In addition to meeting the requirements of subsection 120.5 regarding record drawings, record drawings for utility work governed by the Site Development Ordinance and these standards shall:
 - a. Be submitted in a generally recognized format;
 - b. Show all material deviations from the original approved plans,
 - c. Indicate the location and depth of the completed facilities, and
 - d. To the extent practicable, be accurate to within plus or minus one (1) foot in the horizontal and plus or minus one-half (0.5) foot in the vertical for underground utility facilities, and to within plus or minus two (2) feet in the horizontal and plus or minus one (1) foot in the vertical for aboveground utility facilities.
2. Upon request, the City will provide a person any pertinent as-built information on existing utility facilities that the City has on file and is approved for public distribution.
3. When the City, from any information available to it, discovers errors in as-built information provided by a utility, the City may require the utility to correct the record drawings for said facilities and to provide the City copies of the corrected drawings within a reasonable time after the City notifies the owner of the inaccuracies.
4. Record drawings for projects designed on a CAD system shall be submitted to the City in hard copy form (on Silver Halide Contact Mylar) and, with matching detail, in electronic form (on CD ROM disks). Record drawings in electronic form shall be in AutoCAD (latest version) format (.dxf or .dwg) and shall be compatible with the City's Windows software. If GPS (Global Positioning System) measurements are used in the preparation of the as-builts, the locations of GPS-surveyed improvements shall be reflected in the as-builts as State Plane Coordinates corrected to the coordinates of the City's base station on Griffith Drive.
5. Upon request by a private utility, the City may prepare the record drawings for the utility's facilities constructed under a City permit. In such cases, the City will prepare the record drawings from the utility's construction records within a reasonable time after completion of the construction of the utility facilities and receipt of said construction records from the utility. The requesting utility shall reimburse the City for the cost of preparing said record drawings on a time and materials basis separate from any franchise or permit fees.

Applicability:			
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✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

6. As City staff time and resources allow, the City may create and maintain as-built overall system maps for the private utilities that request such maps and reimburse the City for their preparation and maintenance thereafter. The City may deem such product proprietary and may recover its costs incurred in developing and reproducing the product as allowed by Oregon law. The City will include in the maps only the facilities of those private utilities that provide the City copies of their maps of their existing systems and provide financial support for the City's mapping program. The details of the City's private utility system mapping program shall be defined in interagency agreements between the City and the utilities.

Q. Requests for Exemptions

1. Requests for exemptions from the requirements of this section 191 require approval by the City Engineer. The procedures for processing such requests shall be the same as specified in section 160 Design Standard Exception. In order for the City Engineer to grant an exemption, the following criteria must be met:
 - a. The specification or standard does not apply in the particular application, or
 - b. Topography, right-of-way, or other geographic conditions impose an economic hardship on the applicant and make compliance with the standard impractical, and an equivalent alternative that can accomplish the same design purpose is available and does not compromise public safety or accessibility for the disabled, or
 - c. A change to a specification or standard is required to address a specific design or construction problem which, if not enacted, will result in an undue hardship, or
 - d. The requested exemption is minor and, if granted, will not materially compromise public safety, accessibility for the disabled, community esthetics, the stability of adjacent property values, land use compatibility between proposed aboveground utility facilities and neighboring land uses, the capacity of the City's infrastructure, the cost-effective use of public rights-of-way, or the cost-effective construction, operation, maintenance and repair of the City's infrastructure, or
 - e. In cases where the applicant is claiming an economic hardship relative to a proposed aboveground facility and is proposing an equivalent alternative for the proposed aboveground facility, and the proposed alternative can accomplish the same design objectives and will not compromise community esthetics, the stability of adjacent property values, land use compatibility between proposed aboveground utility facilities and neighboring land uses, the capacity of the City's infrastructure, the cost-effective use of public rights-of-way, or the cost-effective construction, operation, maintenance and repair of the City's infrastructure.
2. The City Engineer shall notify the applicant of the decision within fourteen (14) calendar days of receiving the applicant's request. The applicant may appeal the City Engineer's decision to the City Council.

Section 192 Trenching and Street Cuts

This subsection applies to all trenching and street cuts performed within the City of Beaverton.

A. Prohibited Street Cuts

The City will not allow, without prior approval from the City Engineer and the Operations Director, any street cuts in newly paved or resurfaced streets (i.e., arterials paved within the previous five (5) years and other streets paved within the previous three (3) years (sometimes referred to as “moratorium streets”). The following is a list of exceptions to this policy. These exceptions require the City Engineer’s approval and the appropriate documents must be submitted with the application for any street cut permit:

1. An arborist determines that boring would pose greater risk to a significant or protected tree than a conventional open street cut, and the applicant provides the City Engineer a letter documenting that determination; or
2. The engineer of record determines that the only possible vertical location of the line would be within the structural section (i.e., the existing required aggregate base course) of the street and the applicant provides the City Engineer a letter documenting that determination; or
3. The street cut is in AC pavement and will be restored by a 2-inch deep grind and 2-inch thick (minimum) AC inlay. A transverse street cut shall also include a minimum of a 2-inch deep grind and 2-inch thick (minimum) AC inlay that extends for a distance equal to the street width from both sides of the trench, or an inlay with an alternative distance from both sides of the trench as required by the City Engineer to ensure that no settling or loss in pavement life is expected. A longitudinal street cut shall also include a minimum of a 2-inch deep grind and new AC inlay that extends over the entire width of the street and over the entire length of the trench plus the street width beyond both ends of the trench, or an inlay with a 2-inch thickness (minimum) with larger dimensions as required by the City Engineer, to ensure that no settling or loss in pavement life is expected. On street cuts for excavations over ten (10) feet deep, and on street cuts for excavations over five (5) feet deep that are in weak pavement sections, severely deteriorated pavement, poor soils, saturated soils, or high groundwater, the City Engineer may require the owner or developer to retain the services of an engineer specializing in pavement design to analyze the inlay requirements, recommend inlay dimensions that will ensure that no settling or loss in pavement life is to be expected, document the analysis with supporting data in a written report bearing the engineer’s seal, and submit the report to the City Engineer for approval.

A permittee may apply for additional exceptions by submitting a formal request for a Design Exception to the City Engineer in accordance with section 160 Design Standard Exception.

B. Requirements for Street Cuts and Pavement Restoration

1. General.
 - a. Street cuts and pavement restoration (repair and resurfacing/replacement) shall be in conformance with this section, the Standard Drawings for street cuts, the conditions of the permit and the current requirements of other agencies.
 - b. The final cut of existing pavement shall be a "T-cut" (also known as a T-section or cutback), in which the existing pavement is cut back a specified distance away from the edge of the excavation as shown on the Standard Drawings for street cuts except that circular street cuts 8-inches or less in diameter do not require T-cuts. If existing pavement is over 6"

thickness, the city reserves the right to require stepped 2" ground offsets in the existing pavement.

- c. The minimum dimensions of any initial street window cut for an exploratory excavation shall be two (2) feet by two (2) feet, except that the minimum size for street cuts for potholes using non-destructive vacuum excavation shall be 8-inches in diameter.
- d. If a street cut is parallel with, and less than three (3) feet from an existing curb or curb-and-gutter, the permittee shall remove the existing pavement within the street cut and the intervening existing pavement between the street cut and the curb or curb-and-gutter using a T-cut that encompasses the entire area of pavement that has been removed, and shall replace the removed pavement in accordance with this manual and the Standard Drawings.
- e. If a street cut is parallel with, and less than five (5) feet from another street cut made by the permittee or a visible, pre-existing street cut that shows signs of distress determined by the City Engineer to be unacceptable, the permittee shall remove the existing pavement in the two street cuts and the existing pavement between the two street cuts using a T-cut that encompasses the entire area of pavement that has been removed, and shall replace the removed pavement in accordance with this manual and the Standard Drawings.
- f. All street cuts shall be in a straight line and to a vertical plane. The cut lines shall be parallel to the centerline of the trench and shall be neat, straight and vertical.
- g. Irregularly shaped (non-rectangular or non-circular) street cuts and street cuts with more than four (4) sides will be allowed only with the express approval of the City Engineer.
- h. A street cut that will be partially or wholly within an existing pavement patch will not be allowed unless the street cut is widened to include the entire width of the existing patch.
- i. A street cut within five (5) feet of two or more valve box covers, manholes covers, grates or other castings, or combinations thereof, in the street shall encompass all of those castings that are within five (5) feet or less of another casting.
- j. Angles in T-cut Lines. The number of angles in a final pavement cut shall be kept to a minimum. At intersecting pavement cut lines, no angle shall be less than 75 degrees, unless expressly approved or required by the City Engineer.
- k. Marking T-cuts and Approval by City Inspector. Before the final pavement cuts for the permanent resurfacing are made, the boundaries of the T-cuts shall be marked with white spray paint and must receive the approval of the City inspector.
- l. Structural Integrity of Street Cut Restoration. To ensure the structural integrity and durability of the pavement, where a permittee has made an irregularly shaped street cut, or two (2) or more street cuts, or a combination thereof, for a trench or other excavation, the City, based on sound engineering principles, may require final pavement cuts and restoration in a larger rectangular area to compensate for disturbance of the existing subgrade under the existing pavement on both sides of the street cut in accordance with the Standard Drawings for street resurfacing and pavement restoration.

- m. T-cut Widths. T-cut lines for trenches shall be a minimum of one (1) foot outside the trench walls, except that the City may require T-cuts to be further outside the trench walls if the trench walls are widened after the initial cut due to sloughing, additional excavation or other causes, in which case the City may require the T-cuts to be widened to more than one (1) foot outside the trench walls as required to reach undisturbed, stable subgrade. In such cases, the permittee shall remove the additional pavement and replace the entire area of removed pavement in accordance with this manual and the Standard Drawings entirely at the permittee's expense. (Please refer to Section 191 for additional requirements pertaining to street cuts in A.C. pavement.)
2. AC Pavement Street Cuts.
- a. Street cuts in AC pavement shall be in accordance with sections 192.A and 192.B.1, the following requirements and the Standard Drawings for street cuts in PCC streets, unless otherwise directed by the City Engineer.
 - b. The minimum dimensions of the final street cut for a trench in AC pavement will be greater than the size of its initial cut because the City requires that all final cuts be T-cuts, which are outside the initial street cut.
 - c. Cutting Methods. In AC pavement, all initial pavement cuts (cuts prior to excavation) shall be made by jackhammering, sawcutting or grinding. Final cuts (T-cuts) shall be by grinding or sawcutting, except that for AC overlays and inlays, the final cutting shall be done only by milling or grinding with a drum grinder.
 - d. Structural Integrity of Street Cut Restoration in AC Pavement. To ensure the structural integrity of the restored pavement and the existing pavement on both sides of the restored pavement, the City may require the contractor to remove and restore the street cut and adjacent existing pavement in a single rectangular area that encompasses a larger area than the standard T-cut. If, based on sound engineering principles, the City has reason to believe that the pavement or subgrade outside the minimum T-cut area has been disturbed by the contractor's operations, or if the existing pavement, base course, or subgrade outside the minimum T-cut area is determined by the City via visual observation, density testing, proof-rolling performed by the contractor at the City's direction, or other means to be damaged, structurally compromised, contaminated, saturated or unstable, the City may require the T-cuts to be widened in accordance with the Standard Drawings for street resurfacing and pavement restoration.
3. PCC Concrete Pavement, Sidewalks, Curbs and Curb-and-Gutter Cuts.
- a. Street cuts in PCC pavement, driveways and sidewalks shall be in accordance with sections 192.A and 192.B.1, the following requirements and the Standard Drawings for street cuts in PCC streets, unless otherwise directed by the City Engineer.
 - b. On PCC-paved Arterial streets and non-Arterial streets that are bus routes or truck routes, the minimum pavement restoration shall be full panel replacements of all cut panels and all damaged panels.
 - c. On PCC-paved non-Arterial streets that are neither bus routes nor truck routes, a minimum pavement restoration area that is less than full panel (partial panel)

replacement may be approved by the City Engineer unless one or more of the following conditions exists:

- i. Unstable subgrade conditions. The street cut is in an area of pavement with subgrade that is known to be unstable or frequently saturated from subsurface drainage and the City Engineer requires full panel replacement to compensate for such subgrade conditions.
 - ii. Removal of more than fifty percent (50%) of a panel: In any panel where the cut removes (or requires removal of) more than 50% of the panel.
 - iii. Cuts in the Central Business District (CBD): Where a street cut or multiple street cuts in the same panel in a street in the Central Business District remove an area of pavement or multiple areas of pavement the cumulative area of which is more than twenty-five percent (25%) of the panel's area.
 - iv. Diagonal Cuts: Any diagonal cut that is not parallel to a diagonal panel joint will require full panel replacement.
 - v. Cuts leaving a panel in three (3) pieces: Where a proposed cut will leave a panel in three or more pieces, the entire panel shall be removed and replaced.
- d. Less than Full Panel (Partial Panel) Replacement. Partial panel replacement will be allowed if the cut is not in an Arterial street, bus route or truck route or if the cut is entirely within the median lane or center turn lane of an Arterial street, bus route or truck route, and if none of the conditions listed in section 192.B.3.c. above exist. Except for window cuts for exploratory excavations that are two (2) feet or less in length and width, if the cut is entirely within the median lane or center turn lane of an Arterial street, bus route or truck route, in order for the cut to be allowed, it must first meet the following criteria:
- i. The cut must be a longitudinal cut that is at least 100-feet long and at least six (6) feet wide, and
 - ii. One edge of the cut must be on one of the lane lines along its entire length, and
 - iii. The cut must remove less than 50 percent (50%) of the panel width at all points, and
 - iv. Both ends of the cut must be at least 200-feet from the nearest intersections on each end (as measured from the intersecting centerlines of the intersection.), and
 - v. The cut must be three (3) feet or more from an existing longitudinal joint or five (5) feet or more from an existing transverse joint, any other patches (new or existing) or any existing cracks in the panel being cut that are determined by the City Engineer to require removal and replacement.

Initial street cuts in other roadways, except window cuts for exploratory excavations, shall be six (6) feet by six (6) feet, minimum.

- e. Additional Panel Removal. If the initial cut is less than three (3) feet from a longitudinal joint or five (5) feet from a transverse joint or other patches (new or existing) or cracks, the intervening portion of the panel must be removed.
- f. Pavement Panels with Curbs. If the edge of the initial cut is less than thirty-six (36) inches from the face of a curb, the intervening portion of the panel and curb must be removed and replaced.
- g. Pavement Replacement on Edges of Panels without Curbs: Pavement replacement on the longitudinal (outside) edge of panel without a curb shall be a minimum of three (3) feet in width.
- h. Additional Responsibility. If any pavement between the cut and the nearest joint, crack, or another cut, as described above, becomes disturbed or unserviceable before the time of restoration, it must be removed and replaced entirely at the permittee's expense.
- i. Saw cutting. The minimum depth of any saw cut on PCC pavement or on asphalt over PCC pavement shall be in accordance with the Standard Drawings for street cuts. Subsequent removal shall be accomplished by using a jackhammer. The use of a machine utilizing a falling or swinging weight (a "head-ache ball") will not be permitted. No cutting wheel runout will be permitted beyond the limit of the opening of the cut or on adjacent panels on arterials, bus routes and truck routes. The slurry resulting from the cutting operation shall be contained, collected and disposed at an appropriate disposal site. No such material shall be disposed of in any storm drain system.
- j. Jackhammers and Line Drilling. Use of Jackhammers and line drilling is authorized (for initial cuts only) providing the holes shall be one and one-half (1-1/2) inches in diameter, and the maximum spacing between holes shall be six (6) inches, center to center. The holes shall be drilled perpendicular to the base and completely through the pavement.
- k. Direction of Cuts. Cuts shall be made parallel and/or perpendicular to longitudinal and transverse joints.
- l. Cut Enlarged by City. If the cut conforms to the above rules and the Department removes additional pavement, the replacement of the additional portion of the panel shall be at the expense of the City. Note: The application of these rules may sometimes require the replacement of more than fifty percent (50%) of a pavement panel requiring full panel replacement, even though the initial cut itself covered less than fifty percent (50%).
- m. Damage to Adjacent Panels. If an existing PCC pavement panel adjacent to a street cut is spalled, chipped, cracked, uplifted, tilted, undermined, depressed or otherwise damaged during construction, it shall be replaced in its entirety by the permittee entirely at the permittee's expense.
- n. Sidewalk cuts. The minimum cut in a concrete sidewalk shall be one full sidewalk panel.
- o. Structural Failure of and Damage to Restored PCC Pavement. Restored PCC pavement, whether full panel or partial panel, that fails structurally or is damaged prior to the end of the maintenance period shall be replaced completely. See section 210.7 Structural Rehabilitation Design.

- p. Cutting Methods. In streets other than arterials, collector streets, bus routes and truck routes, the final cut of PCC concrete pavement, curbs, curb-and-gutter and sidewalks shall be sawcut to a minimum depth of four (4) inches or half the concrete thickness, whichever is greater. Subsequent removal may be accomplished by using a jackhammer. The final pavement cut shall be ground or sawcut, as applicable, consistent with these standards. The pavement shall be cut in a straight line and to a vertical plane, regardless of the shape or condition of the initial cut. The cut lines shall be parallel to the centerline of the trench and shall be neat, straight and vertical. Full-depth sawcutting and doweling may be done at the permittee's option, per the Standard Drawings, at the permittee's expense. The use of a machine utilizing a falling or swinging weight (a "head-ache ball") will not be permitted. If an existing PCC pavement panel adjacent to a street cut is spalled, chipped, cracked, uplifted, undermined, depressed or otherwise damaged during construction, it shall be replaced in its entirety by the permittee entirely at the permittee's expense.
 - q. Re-cutting Unsatisfactory Cut Edges. Prior to resurfacing (patching), if the ground or sawcut face of a final cut is spalled, jagged, frayed, cracked, uplifted, undermined, depressed or otherwise unsatisfactory, the City may require the cut to be re-done by sawcutting in sound pavement up to twelve (12) inches from the edge, in continuous straight cuts, which shall be done by the permittee entirely at the permittee's expense, unless otherwise agreed to by the City and the permittee in accordance with subsection 192.B.10 below.
4. Temporary Pavement Patching and Steel Plating. Pavement restoration shall be as required by this section and the approved plans. After the trench has been backfilled, the pavement may be patched temporarily by using cold mix AC or bridged over by steel plates. (Exception: Circular cuts in AC pavement shall be patched temporarily only with hot mix asphalt concrete. Cold patches are not allowed.)
- a. Pavement repairs made to emergency excavations will be considered temporary and must be inspected and restored in accordance with the requirements for final pavement cuts and permanent pavement restoration hereinafter.
 - b. Permanent replacement of pavement, curb, curb-and-gutter, sidewalk and driveway cuts shall be completed within thirty (30) calendar days from the date the pavement is initially cut, unless an extension is granted by the City Engineer for inclement weather or other adverse conditions.
 - c. If cold mix asphalt is used as a temporary patch, the compacted thickness of the cold mix shall be at least two (2) inches. The contractor shall monitor the patch and maintain a smooth driving surface by promptly correcting any irregularities in the pavement surface that deviate from the proper street grade or cross-section by plus or minus one-quarter (1/4) inch or more. All temporary patches shall be replaced with a permanent resurfacing no more than thirty (30) calendar days after the pavement is cut, provided the applicant makes daily inspections and makes any necessary repairs on a timely basis. If the temporary patch is not monitored and maintained, or if the temporary patch creates uncomfortable driving conditions, the City Engineer may shorten the thirty (30) day time limit to as few as fourteen (14) calendar days. If the temporary patch creates unsafe driving conditions, the City reserves the right to shorten the time limit as conditions warrant.
 - d. If steel plates are used, they shall be secured firmly to the pavement with cold mix around their perimeter so that they do not move horizontally, rattle, bounce or make

unnecessary noise. If a steel plate becomes detached from the pavement or makes unacceptable noise, the Contractor shall take remedial action promptly, and if notified by the City of same, shall take remedial action promptly. Failure of the contractor to remedy the situation promptly may necessitate the City to make repairs. If the City makes repairs, the contractor will be responsible for all costs associated with the repairs. If a steel plate becomes detached from the pavement repeatedly, the City may require the Contractor to secure said steel plate to the pavement with anchors and/or bolts. Steel plates may be used for a maximum of fourteen (14) calendar days, at the end of which the contractor shall complete permanent restoration of the pavement. If requested by the permittee, the City Engineer may grant an extension of this time frame for inclement weather or other adverse conditions.

5. Restoration of Damaged Adjacent Pavement.
 - a. Before paving, the City Engineer may require the permittee to expand the pavement restoration area and T-cut beyond one (1) foot from the initial cut lines, at no additional expense to the City, and require the permittee to repair subsidence, rutting, cracks, gouges, punctures, contamination and other damage to the adjacent pavement that occurred after the permittee's initial pavement cut.
 - b. If any pavement between the cut and the nearest joint, crack or other cut becomes disturbed or unserviceable before the time of restoration, and prior to the end of the performance period, it shall be removed and replaced by the permittee entirely at the permittee's expense.
6. Backfilling. All backfilling shall be in conformance with this and other sections of this manual and the Standard Drawings.
 - a. All approved rectangular street cuts that are twelve (12) inches wide or less and in streets of a higher functional classification than "local" shall be backfilled with approved Controlled Low-Strength Material (CLSM).
 - b. All approved rectangular street cuts that are twelve (12) inches wide or less and in streets classified as residential or local streets may be backfilled with compacted clean sand, compacted crushed rock aggregate backfill material or approved CLSM. A permittee desiring to use CLSM must submit a written request to the City and obtain the City's prior approval in writing.
 - c. All other approved street cuts shall be backfilled with compacted crushed rock aggregate backfill material except as may be approved or required otherwise by the City Engineer, except that circular or "keyhole" cuts shall be backfilled with compacted clean sand, CLSM, or approved lean concrete for the entire depth of the core below subgrade.
 - d. In narrow trenches that are wider than twelve (12) inches, the permittee may substitute CLSM for crushed aggregate backfill with the express approval of the City Engineer.
7. Approval of Final Pavement Cuts/T-cuts. The City inspector must approve the edges and corners of final pavement cuts/T-cuts before permanent pavement reconstruction may proceed. If the edge or corner of the final pavement cut, or the face, edge, or surface of the pavement immediately adjacent to the final pavement cut/T-cut, becomes deteriorated, deformed, rolled (rounded), depressed, undermined, dirty, contaminated, raveled, cracked, unsound or damaged in any way that, in the City inspector's opinion, might interfere with the proper bonding of the new

asphalt to the existing asphalt, interfere with proper sand sealing of the joint, or create an irregular pavement surface at the joint, the City inspector may require re-sawcutting of the existing pavement along a new cut line that is further from the initial street cut, at no expense to the City. If required by the City inspector, irregular edges of pavement cuts shall be prepared by the permittee for permanent resurfacing by either grinding the edges smooth or sawcutting a new, smooth edge before resurfacing.

8. Pavement Restoration after T-cuts. The restoration of pavement after T-cutting shall be in accordance with the Standard Drawings for street cuts, as applicable, and the additional requirements below:
 - a. AC Surfacing on Flexible Base: The compacted thickness of the permanent AC pavement resurfacing shall be at least 3 ½ inches or existing thickness plus two (2) inches thicker than the original AC, whichever is greater. AC shall be Level 2, ½ inch ACP for local streets and Level 3, ½-inch ACP for collectors and arterials. Compact AC in 2-inch to 3-inch lifts to 92 percent of maximum density (Rice). Base course shall be ¾-inch -0 aggregate base compacted to 95 percent of maximum density per AASHTO T-99 and ODOT/APWA spec 00641. Minimum thickness of aggregate base shall be 8 inches or match existing, whichever is greater.
 - b. AC Surfacing on Cement Treated Base (CTB). CTB base course shall be replaced with new CTB conforming to section 210.5. The thickness of the PCC base replacing the original base shall be at least two (2) inches thicker than the original base. The AC wearing course shall conform to the requirements in the preceding subsection.
 - c. AC Surfacing over portland cement concrete (PCC). PCC courses shall be replaced with new PCC pavement conforming to section 210.5. The thickness of the PCC replacing the original base shall be at least two (2) inches thicker than the original base. The AC wearing course shall conform to the requirements for AC in the preceding subsection and be equal to the existing AC thickness.
9. Full-depth PCC Pavement. The permanent resurfacing for full-depth portland cement concrete pavement shall be new full-depth PCC pavement that is two (2) inches thicker than the original pavement it is replacing, but not less than eight (8) inches thick in any case. The permanent PCC resurfacing shall be high early strength 5,000 psi. concrete and shall be constructed in accordance with subsection 210.5.
10. Replacement to Proper Grade and Cross-section. When existing pavement abutting a curb or curb-and-gutter is removed and restored, the gutter's existing/original grade and cross-section shall be maintained (matched) except that when the existing/original pavement did not drain properly and exhibited areas of localized ponding (i.e., a "bird bath"), such areas of ponding shall be eliminated when the pavement is restored. The City Engineer shall provide documentation of said ponding upon request from the permittee. Elsewhere, the surface of the final resurfacing shall match the existing/original pavement's grade and cross-section, except that a patch or inlay may increase the height of the street's crown and the street's cross-slope if expressly approved by the City Engineer. When existing structures such as manholes, catch basins, concrete curb-and-gutter, and valve boxes are within the area to be resurfaced and are to be preserved, the resurfacing shall match the top of the existing finished grade of these facilities unless otherwise required or approved by the City Engineer.

11. City Request for Additional Resurfacing. If the existing pavement adjacent to a street cut has failed or is defective with respect to surface quality, structural condition, grade, cross-section or any other aspect before the work begins, by no fault of the permittee, or is damaged during the work by no fault of the permittee, the City Engineer may request the permittee to expand the pavement restoration area, at the City's expense, to correct high or low spots in the pavement surface or to repair deteriorated or damaged pavement, and to replace pavement markings and stripes removed from the expanded restoration area. The permittee may decline such request without penalty.
12. Replacement of Existing Driveways, Sidewalks, Curb, Curb-and-Gutter, Castings and Structures. Existing driveways, sidewalks, curb, curb-and-gutter, castings and structures that are to be preserved but have been removed by the permittee or its excavator shall be replaced with the same material or better as required to meet current construction standards, and to the same section, width, depth, surface texture, color and finish, line and grade as that removed unless current standards require otherwise. If high early strength concrete is being used in restoring pavement that is adjacent to other PCC concrete improvements that must be restored, the same concrete mix shall be used in reconstructing the other PCC concrete improvements, if all of the concrete can be poured successively without additional expense other than the additional cost of the high early strength concrete. Damaged sidewalk ramps shall be reconstructed in accordance with current ADA requirements. Broken or jagged ends of existing concrete shall be sawcut on a straight line and to a vertical plane. Prior to replacing the concrete sections, the subgrade shall be backfilled to proper grade and cross-section and compacted to 95 percent (95%) AASHTO T-99 to prevent subsequent settlement. All concrete replacement work shall be completed prior to the placement of adjacent AC resurfacing.
13. Joints in Permanent AC Resurfacing. Shall be emulsified asphalt tack coat according to ODOT/APWA 00730. Tack coat shall be applied to the existing pavement, existing curb or gutter, and edges of saw cuts and grinds. After the resurfacing and inlay areas are permanently paved and rolled, the joints shall be sand sealed the same day with paving asphalt cement or emulsified asphalt, and dry paving sand, which shall be applied before the asphalt cement solidifies. If the joints are not sand sealed the same day, the Contractor shall seal the joints with crack sealing compound, cold or hot pour type, conforming to ASTM D 6690. All sand sealed joint surfaces and crack-sealed joint surfaces shall be smooth and flush with the adjacent pre-existing pavement surface. There shall be no bumps, dips or noticeable roughness in the riding quality of the completed resurfacing.
14. Surface Smoothness. The surface smoothness of pavement, driveways, sidewalks, monolithic curb-and-gutter, and barrier curbs restored by the contractor (i.e., the permanent resurfacing) shall conform to the *Oregon Standard Specifications for Construction*. Resurfaced pavement shall provide motorists a smooth, quiet ride equal to or better than the original pavement. Resurfacing that does not meet these requirements shall be corrected only by removing the resurfacing by sawcutting and re-paving the unacceptable area.
15. Correction of Defective Work.
 - a. General. If a street cut is repaired and the replacement pavement fails to meet the pavement mix requirements, compaction requirements, surface smoothness requirements or any other pavement requirements of this manual or permit conditions upon completion of the pavement repair, or anytime within a period of two (2) years thereafter, the defective pavement shall be replaced by the permittee entirely at the permittee's expense.

- b. Defective Restored AC Pavement. In addition to removal of the area of defective pavement, a new, wider "corrective" T-cut and removal of the entire original restoration area in which the defect exists and for a minimum distance of twenty-five (25) feet beyond the defective restoration area longitudinally in both directions and three (3) feet transversely outside the original T-cut area in both directions or nine (9) feet in width, whichever is greater, will be required, unless expressly approved or required otherwise by the City Engineer.
 - c. Defective Restored PCC Pavement. Replaced PCC pavement shall be deemed "defective" if it does not meet the above requirements, does not drain properly, does not meet or exceed the required compressive strength or other material specifications, or if it exhibits temperature cracks, excessive shrinkage cracks, structural failure (breakage), spalling, gouging, differential settlement, edge chipping at joints, defective joints or unsightly damage due to external causes. Replacement of a defective area of a PCC pavement panel shall be no smaller than the entire original restoration area of the panel in which the defect exists, up to the full panel, as determined by the City Engineer. Defective PCC in more than one panel of an Arterial street, bus route or truck route will require full panel replacement of all those panels containing defective pavement. The minimum dimensions of T-cuts in PCC pavement, driveways and sidewalks shall be in accordance with sub-section the Standard Drawings for PCC street cuts, unless otherwise directed by the City Engineer. The PCC concrete used in replacing defective concrete shall have the same color, same finish, same joint pattern, same panel size, shall match the existing concrete that was replaced in all other respects, and shall meet the City's standards that are current when the defective concrete is replaced, except as may be allowed or required otherwise by the City Engineer.
15. Corrective AC Pavement Inlays. In addition to subsection 14. immediately above, in existing AC pavement that is more than one year old, certain types of street cuts, if not restored properly, can shorten the service life of the existing pavement excessively. Therefore, if the AC pavement restored by the permittee fails upon completion of the pavement restoration or anytime within a period of two (2) years thereafter, the City Engineer may require the permittee to reconstruct the pavement as required in subsection 192.B.14. and, in addition, construct a pavement inlay over the failed area, and for a distance of twenty-five (25) feet beyond the defective restored pavement in both directions longitudinally, to ensure the structural integrity of the pavement in the restoration area and the adjacent existing pavement.
- a. If AC replacement pavement does not continue to meet the AC pavement requirements of this manual for a period of two (2) years after completion of the pavement repair, and the street cut falls into any of the categories listed under the heading "Description of Street Cut" in the table below, then in addition to a wider, corrective T-cut in the failed restoration area and replacement of the failed pavement section as specified in subsection 192.B.14., the City Engineer may require the permittee to grind the pavement and construct a pavement inlay throughout the area of defective pavement restoration.
 - b. If the City Engineer requires a corrective inlay, the permittee shall, in accordance with the T-cut and reconstruction requirements above, remove the top two (2) inches of the existing pavement by grinding and construct an AC inlay following the material requirements listed in 210.4 and in areas specified in the table below:

Table 192.1 – Corrective Inlay Requirements

TYPE OF STREET CUT	AREA OF CORRECTIVE T-CUT AND PAVEMENT RECONSTRUCTION REQUIRED	AREA OF TWO (2) INCH DEEP (NOMINAL) GRINDING AND PAVEMENT INLAY REQUIRED
<p>(1) Street cut is three (3) feet or less from existing curb or edge of pavement</p>	<ul style="list-style-type: none"> a. The area of existing pavement that is within the new street cut, plus b. The area of existing pavement that is between the street cut and the curb or edge of pavement, plus c. The area of existing pavement that is outside and adjacent to the street cut and is at least three (3) feet from it in all directions. d. Per Standard Drawings. 	<ul style="list-style-type: none"> a. The area of existing pavement that is outside, adjacent to, and within at least one (1) foot of the corrective "T" cut area. b. Per Standard Drawings.
<p>(2) Street cut is five (5) feet or less from another street cut (includes another new street cut and a visible pre-existing street cut)</p>	<ul style="list-style-type: none"> a. The area of existing pavement that is within the new street cut, plus b. The area of existing pavement that is between the two street cuts, plus c. The area of existing pavement that is outside the street cuts and is at least three (3) feet from them in all directions. d. Per Standard Drawings. 	<ul style="list-style-type: none"> a. The area of existing pavement that is outside, adjacent to, and within at least one (1) foot of the corrective "T" cut area. b. Per Standard Drawings.
<p>(3) Series of two or more longitudinal street cuts along the same axis of which two or more are less than fifteen (15) feet apart</p>	<ul style="list-style-type: none"> a. The area of existing pavement that is within the new street cut, plus b. The area of existing pavement that is between the street cuts, plus c. The area of existing pavement that is outside all of the street cuts and is at least three (3) feet from them in all directions. 	<ul style="list-style-type: none"> a. The area of existing pavement that is outside, adjacent to, and within at least one (1) foot of the corrective "T" cut areas, plus b. The area of existing pavement that is fifteen (15) feet longitudinally beyond the ends of the end street cuts.
<p>(4) Two (2) or more parallel or transverse street cuts, or two (2) or more small street cuts in succession along the same axis, any two or more of which are less than fifteen (15) feet apart longitudinally or transversely.</p>	<ul style="list-style-type: none"> a. The area of existing pavement that is within the new street cuts, plus b. The area of existing pavement that is between the street cuts that are less than fifteen (15) feet apart, plus c. The area of existing pavement that is outside the all of the street cuts and is at least three (3) feet from all of them in all directions. 	<ul style="list-style-type: none"> a. The area of existing pavement that is outside, adjacent to, and within at least one (1) foot of the corrective "T" cut areas of the street cuts that are less than fifteen (15) feet apart, plus b. The area of existing pavement that is between the street cuts that are less than fifteen (15) feet apart, plus c. The area of existing pavement that is fifteen

TYPE OF STREET CUT	AREA OF CORRECTIVE T-CUT AND PAVEMENT RECONSTRUCTION REQUIRED	AREA OF TWO (2) INCH DEEP (NOMINAL) GRINDING AND PAVEMENT INLAY REQUIRED
		(15) feet longitudinally beyond the transverse edges of the end street cuts.
(5) Intersecting street cuts, including new street cuts intersecting other new street cuts and new street cuts intersecting visible, pre-existing street cuts, window cuts or pot-holes that are larger than 20 square feet in area	<ul style="list-style-type: none"> a. The area of existing pavement that is within the new street cuts, plus b. The area of existing pavement that is outside and adjacent to the new street cuts and is at least three (3) feet from all of them in all directions, plus c. The area of additional existing pavement that is necessary to form a single rectangular inlay shape that encompasses the intersecting street cuts at their longest and widest parts. 	<ul style="list-style-type: none"> a. The area of adjacent existing pavement that is outside, adjacent to and within at least one (1) foot of the corrective "T" cut, plus b. The area of existing pavement that is within the full width of any travel lanes that have been encroached upon by a new street cut area covering fifty (50) percent or more of their width.

- c. Pavement grinding shall be the minimum width necessary for a paving machine to be used for repaving, but shall be limited in maximum width to keep the impacts and cost of pavement restoration reasonable. Unless expressly permitted otherwise by the City Engineer, pavement grinding and inlays shall not be less than nine (9) feet wide nor more than thirteen (13) feet wide, except that where two or more adjacent travel lanes are affected, the City Engineer may require the grinding and inlay to exceed thirteen (13) feet in width.
- d. Inlays shall fill the entire area of the grind and shall have a compacted thickness of at least two (2) inches. The surface of the compacted inlay shall match the surface of the existing pavement at its edges, and the thickness of the inlay shall exceed the depth of the grind where required to produce a smooth, properly graded driving surface, up to a maximum thickness of three (3) inches, which shall be entirely at the permittee's expense. If a smooth, properly graded driving surface cannot be achieved, the City Engineer may request additional thickness as provided in subsection 192.B.8. The additional cost of additional AC that is in excess of two (2) percent of the total cost of the AC used in the inlay shall be borne by the City, providing such additional AC is not required as a result of defective work by the permittee.
- e. If a corrective inlay is required, the permittee is responsible for all grinding, inlays, adjusting the height of all affected existing structures and castings, and replacing pavement markings and stripes removed for the street cut, all of which shall be done by the permittee entirely at the permittee's expense unless the work is being performed under a City contract and the pavement cuts are required by the construction plans and specifications.
- f. If an inlay is required, the permittee may elect as an alternative, entirely at the permittee's expense, to sawcut the full depth of the pavement section for the full length and width specified above, rather than grinding only the top two (2) inches of the existing pavement.

If the permittee so elects, the thickness of the permanent resurfacing shall be at least as the minimum thickness specified in subsection 192.B.8.

16. Conformance with Other City Standards.
17. Replacement of damaged pavement, driveways, sidewalks, sidewalk ramps, curb, curb-and-gutter, and other damaged improvements shall be in accordance with all other applicable City standards, including without limitation those standards for materials, construction procedures, weather conditions, ground temperature, air temperature, asphalt mix temperature and all others. Material testing is required for backfill, aggregate base, AC pavement, PCC concrete pavement, concrete driveways, sidewalks, curb, and curb-and gutter. Compaction shall be as specified elsewhere in the City's standards. If pipe, conduit, backfill, aggregate base, compaction, pavement, sidewalk or driveway replacement, or any other work does not meet City standards and the defective work is expressly, conditionally allowed to remain, or if the defect is minor and immediate correction is not required by the City Engineer, the City Engineer may require an Extended-period Maintenance Warranty for a period of up to five (5) years and in the amount of 100 percent of the City Engineer's estimate of the cost of correcting the defective work by competitive bid contracting, including without limitation construction, engineering, administration, inflationary costs, permits and other appropriate costs.

C. Controlled Low-Strength Material (CLSM)

1. The use of approved CLSM as trench backfill is an approved method of backfill that the City Engineer may require or allow in lieu of aggregate or native materials as specified elsewhere in this document.
2. Approved street cuts to be backfilled with CLSM shall be backfilled with CLSM conforming to ODOT/APWA Section 00442 as modified herein. Only CLSM approved by the City Engineer shall be used for backfilling.
3. CLSM shall not be used for lengths greater than 100 feet. Should the required trench exceed 100 feet, then the City will determine where CLSM will be required on a case-by-case basis. When CLSM is used, at a minimum, pipe and conduit bedding and pipe/conduit zone material shall be ¾-inch minus aggregate. In addition, the top 12 inches of the trench backfill (below the pavement) shall also be ¾-inch minus aggregate to allow subgrade drainage.
4. The Engineer of record (or designee) shall be on site while the CLSM is being placed in order to ensure that the proper mix is supplied and to ensure that the above minimum drainage requirements are met and, if subsurface drainage is excessive, to instruct the contractor to increase the depth of the ¾-inch minus aggregate to ensure adequate subgrade drainage, especially in conditions where cross drainage occurs (at the low point of sag vertical curves, for example).
5. CLSM shall be field tested by an independent laboratory per ASTM D 4832, D 5971, and D 6023 standards (the field technician shall be ACI Certified or equivalent). The Engineer of Record and the independent laboratory shall record: the name of the supplier (the engineer of record shall include with the daily report a copy of all batch tickets), the temperature of the air, ground, and mix (at time of placement), the weather conditions, ground water conditions, other utilities encountered, and any other information which may affect the material. At a minimum four cylinders shall be taken for each trench and other separate excavation and for each one hundred (100) linear feet of trench for trenches that are in excess of one hundred (100) feet long, and for

each different mix used. These cylinders shall be broken one at 7 days, one at 28 days, and one at 90 days with one reserve cylinder.

6. All test reports shall be sent to the City Inspector, the engineer of record, and the supplier. If the test results do not meet the requirements of this subsection, the City shall reject the unacceptable CLSM. If the City rejects the CLSM, the permittee shall remove the rejected CLSM and replace the rejected CLSM and the pavement above it with approved material and pavement entirely at the permittee's expense.

D. Repair of Circular Exploratory Excavations (Potholes)

This section applies to potholing of the type defined in subsection 1. below and to the restoration of the existing street subgrade and pavement section as specified in subsections 2. through 6. below.

1. Potholing – any exploratory excavation within the pavement of the curb to curb section of the public right-of-way for the purpose of geotechnical explorations or determining location and depth of existing public or private utilities and resulting in a hole with a diameter 8-inches or less and of varying depth.
2. Excavated Material – All excavated material shall be removed from the site and shall **not** be used for backfill.
3. Backfill Material – The pothole shall be backfilled with clean sand, crushed $\frac{3}{4}$ -inch aggregate, or controlled low strength material for the entire depth of the excavation below subgrade in accordance with section 192.B.6.c of this manual. See Section 192.C. of this manual for specifications concerning controlled low strength material.
4. Backfill Compaction – The top three (3) feet of sand and crushed aggregate shall be compacted with a rammer type compactor in a manner satisfactory to the City Inspector.
5. Pavement Restoration – The thickness of pavement restoration shall match the thickness of the surrounding pavement or as directed by the City Engineer. The pavement restoration material shall also match the surrounding material. Pavement restoration for AC surfaced streets shall be either non-shrink grout or compacted polymer modified pavement patch (EZ Street or approved equal), or Level 2, $\frac{1}{2}$ -inch dense ACP. Pavement restoration for PCC streets shall be 5,000 psi non-shrink patch. The interior surface of the core shall be cleaned before the new pavement is placed in the pothole. In all cases, the surface restoration shall be flush with the surrounding pavement surface.
6. Pothole Maintenance – The pothole excavator shall be responsible for maintaining the pothole restoration in good condition, free from settlement greater than one-half inch ($\frac{1}{2}$ "), raveling, cracking and other deterioration for a period of six (6) months from the date of excavation.