SECTION 100

100. GENERAL DESIGN REQUIREMENTS

110. General Public Improvements Requirements

110.1. General

A. The purpose of this manual is to set standards for the construction of public improvements and all other private improvements which require approval of the City Public Works and/or Water Departments serving new and future developments and for the reconstruction of existing facilities to upgrade existing infrastructure. These standards shall apply to all public 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.

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), *Public Right-of-Way Accessibility Guidelines* (PROWAG), ODOT's *Oregon Standard Specifications for Construction,* Chapter 333 *Oregon Administrative Rules,* 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, reallocated, 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. The City may make the following changes to the provisions of this manual, as needed, when the changes do not alter existing City policy or have significant cost impacts.

1. Implement new products, technical requirements, or construction practices that improve the quality of the improvement and reduce maintenance costs.

2. Revisions that rectify construction and maintenance issues that are resulting from the use of the current requirements in this manual.

3. Mandated changes: 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 approved by the Utilities Commission.

F. Any changes the City proposes to this manual that affect existing City policy or will result in a significant cost increase 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 Transportation Committee. Subject to the Transportation Committee's recommendation, the changes will then be presented to City Council by means of ordinance or resolution for approval. Any changes approved by the City Council will be enforceable on the effective date of the ordinance or resolution.

G. Upon approval of changes to this manual, a technical memorandum explaining the changes will be posted on the City website along with the current edition of the manual for easy access to updates. Periodic reprinting of this manual will incorporate all changes approved prior to the date of the reprinting and the new edition will be approved by City Council with a new edition date and will be enforceable on the effective date of the ordinance resolution.

H. 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 assurances before commencing any work.

110.3. Commencement of Work

A. No work regulated by the City's codes shall commence prior to the approval of construction plans and issuance of the appropriate approval(s). A fully-executed compliance agreement and public improvement permit will be issued at the pre-construction conference only if the following steps have been completed satisfactorily:

1. Submittal of a CWS Service Provider Letter and/or City of Hillsboro Sensitive Area Pre-Screen, and Stormwater Connection Permit Authorization from CWS.
2. Completion of all land use approvals, including appeal periods if applicable.
3. Performance of all applicable Conditions of Approval that must be met prior to issuance of the permit.
4. Approval of the public improvement construction plans by the City and CWS.
5. Submittal of acceptable calculations and other supporting documents to the City when such documents are requested.
6. Approval by the City of the detailed construction cost estimate.
7. Completion and submittal of the signed developer agreement.
8. Provision of certification of liability insurance for general contractor, which shall meet or exceed minimum City requirements for policy limits.
9. Approval of the performance assurance required in the developer agreement by the City.
10. 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.
11. Payment of all fees necessary for the public improvement permits per the current adopted fee schedules.
12. Submittal of copies of permits from all other affected governmental jurisdictions.
13. Issuance of a Grading and Erosion Control Permit.
14. Product submittals for all water related infrastructure.

110.4. Performance and Maintenance Assurance Requirements

A. Performance Assurance standard: 100 percent of the cost to construct all public streets, street lights, traffic signals, sidewalks, signage, street trees, and striping. The Performance Assurance may be in the form of either a cash deposit, letter of credit, or performance bond.

B. Maintenance Assurance standard: Prior to release of Performance Assurance, a 1-year Maintenance Assurance will be required at 10 percent of the cost to construct all public streets, street lights, traffic signals, sidewalks, signage, striping, and released 1 year after acceptance following the correction of any identified defects.

110.5. Precedence of Documents

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

First: City of Hillsboro *Municipal Code*

Second: Building code and issued building permits

Third: CWS *Design and Construction Standards for Sanitary Sewer and Stormwater Management Facilities* for design and construction requirements related to storm sewer, sanitary sewer, stormwater management facilities, and erosion control.

Fourth: City of Hillsboro *Design and Construction Standards*

Fifth: Permits issued by other county, state, or federal agencies, or regional jurisdictions

Sixth: Conditions of any land use approval

Seventh: *Oregon Standard Specifications for Construction*

Eighth: *ODOT Pavement Design Guide*

Ninth: Approved design plans

B. The City of Hillsboro has adopted the Clean Water Services Design and Construction Standards (CWS Standards). All sanitary sewer, closed storm conveyance, treatment, and stormwater management facilities must at a minimum meet the CWS Standards.

C. 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. Violations

A. 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.

120. Permit Application Submittal Requirements

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 350.1. for street lighting plan requirements.

C. All plan review applications must be submitted through the ProjectDox system for electronic plan review. Please visit the City of Hillsboro website for instructions on submitting plans for electronic review.

Upon completion of the initial City plan review, comments will be returned to the applicant through ProjectDox. After all review comments have been addressed, the applicant may resubmit the revised documents and/or drawings through ProjectDox. 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 Stormwater Connection Permit Authorization. The contractor 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 Developer 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 Developer 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 file formats:

1. Portable Document Format (PDF)

2. Design Web Format (DWF)

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. 1 inch = 20 feet, 30 feet, or 40 feet for engineering plans, utility plans, and engineering plan drawings, and 1 inch =50 feet, or 100 feet may be used for exhibits, preliminary plats, ROW retracements, and other drawings determined by the Public Works Department to be acceptable for larger scale prior to submittal.

2. Metric or architectural scales shall not be used. Each sheet must have the scale identified with a scale bar or notation adjacent to the north arrow.

3. When more than one scale is used on a sheet, an independent scale bar must accompany each applicable detail.

4. No scale is required if the drawing is schematic, but the City may require it be redrawn to scale if needed for clarity. Schematics drawings shall be labeled “Not to Scale”.

C. All text shall be at least 0.075” 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 title block 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 title block 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 Hillsboro land use approval file number.

F. The seal of the responsible Engineer or Landscape 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 Landscape 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 surface water management facilities 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. See the Capital Improvement Program Project Development Guide for more information on the City-preferred format for linear (roadway) project

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 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 modification or final field location change shall be permitted if it would cause any utility infrastructure to be placed within a prohibited area."

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. Composite Utility Sheet
10. Utility Plan and Profiles
11. Stormwater Management Facilities
12. Site Grading and Erosion Control
13. Landscaping
14. Retaining Walls
15. Signing and Striping
16. Illumination
17. Traffic Signals

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.

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 to fit within the title block.

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 minimum 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) Curb 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 drawing 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 curb line. 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 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.

120.3.10. Stormwater Management Facilities

A. Include a site plan for all existing and proposed public and private stormwater management 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 stormwater management 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 1 or 2 feet.

F. Include retaining walls.

120.3.12. Landscaping

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

120.3.13. 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.

120.3.14. Street Lighting

A. See Subsection 350 for street lighting plans requirements.

120.3.15. Traffic Signal Plans

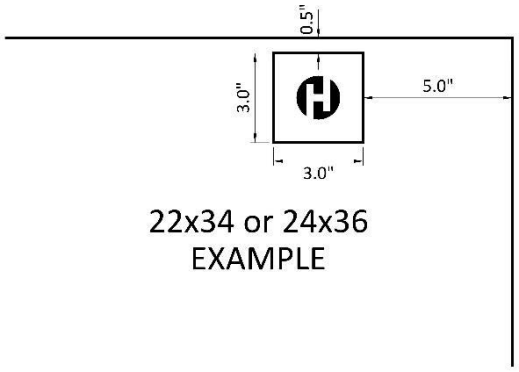
A. See Subsections 340 and 360 for traffic signal and communications plans requirements.

120.4. Electronic Stamp Requirements

A. An area located in the top right corner of all drawings shall be reserved for the City electronic plan review approval stamp. The stamp location will allow for a 1/2 inch border.

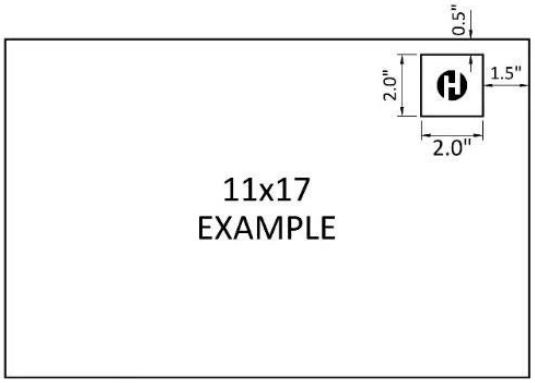
1. 22x34 inch and 24x36 plans require a blank (3x3 inch) space 5 inches from the upper right edge of page as shown in the figure below.

Figure 120.1 – D Size Electronic Stamp Placement



2. 11x17 inch plans require a blank (2x2 inch) space in the upper right of each page as shown in Figure 120.2.

Figure 120.2 – B Size Electronic Stamp Placement



3. All files must be electronically stamped and signed per *Oregon Revised Statutes* and *Oregon Administrative Rules*. Architects and Engineers are responsible to meet the specific provisions for electronic 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 electronically submit one complete set of record drawings for City review through the ProjectDox system. There are no additional fees for the record drawing review.

A residential building permit release will not be issued until the record drawings have been submitted to the City and approved.

B. Record drawings shall contain and reflect any and all design modifications 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. See Subsection 360.4.C.2. for communications record drawing requirements.

E. 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.

F. 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.*

G. Each sheet of the record drawings shall be stamped “Record Drawing” and dated.

H. Each record drawing shall be signed by the Engineer. 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.

I. 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 or polypropylene. Additionally, electronic submittal of the scanned and signed record drawings and the record CAD base files is 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.

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 230.12 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. Public utility easements are not intended or adequately sized for large-scale underground distribution infrastructure. Developer and power service provider shall acquire suitable privately owned pathway for installation when required infrastructure is more than 25% of available easement width.

5. Private utility vaults and/or structures shall not be installed in any public roadway travel lane, including center medians, turn lanes, or bike lanes.

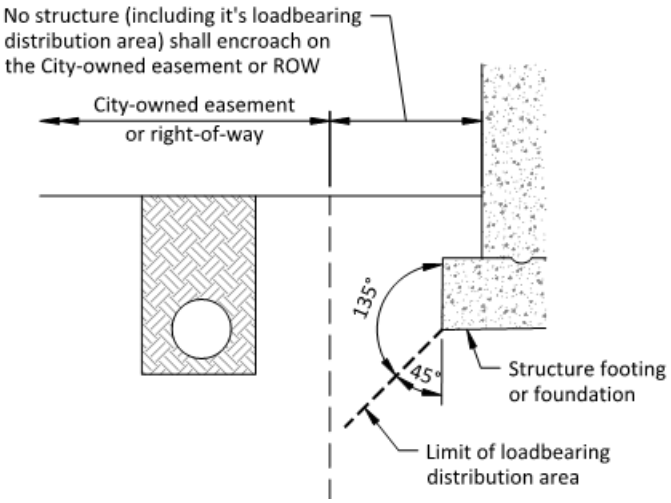
6. A 20-foot wide permanent access and maintenance easement to benefit the City may be required in instances where City-owned infrastructure is inaccessible by way of the permanent easement. The access and maintenance easement shall be along a route accessible by the City's maintenance vehicles.

7. 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



8. 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 developer.

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.

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 can't guarantee and makes no representation that it has verified the accuracy of the measurements, locations, or other information on such maps and plans.

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.

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.**

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 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. A record of survey showing the monument replacement shall 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 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 Hillsboro Vertical Datum. City Datum is based on sea level and is roughly equivalent to 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);

b) The Oregon Coordinate Reference System of 2011, Portland Zone (NAD 83);

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 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.

1. See Subsection 510.4.5 for Water Department staking requirements.

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 *Design Standard 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.

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.

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.

3. No lane restrictions shall occur on weekends or holidays.

B. Staging and Stockpiling Areas: Stockpiling and staging of equipment and materials within the public right-of-way is prohibited without the approval of the City. Stockpiling on private property may require that the contractor gain approval through the City Planning Department'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, developer, 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, developer, and designated inspecting engineer.

D. All public water line improvements shall be inspected by the City of Hillsboro Water Department.

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 designated inspecting Engineer, or that Engineer's inspector.

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 curb 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 his work in compliance with all the requirements prescribed by OSHA.

B. Traffic control in work zones shall conform to the *Oregon Temporary Traffic Control Handbook*, MUTCD and the ODOT supplements to the MUTCD. A traffic control plan shall be submitted and approved by the City prior to construction.

1. When existing pedestrian facilities are disrupted, closed, or relocated in a construction zone, the traffic control plan shall accommodate temporary pedestrian facilities. The temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. The alternate pedestrian access routes shall conform to section 1.6 of the Oregon Temporary Traffic Control Handbook and applicable sections of the MUTCD.

2. When an existing bicycle lane or path is disrupted or closed in a construction zone, the traffic control plan shall accommodate temporary bike facilities. The temporary bicycle facility should include the features and characteristics present in the existing facility. For example, if a bike lane will be closed, a temporary bike lane should be created to guide bikes past the work zone, rather than closing the bike lane. Bicycles should be separated from automobile traffic whenever possible except for shared bus/bike lanes. In situations where it is not feasible to provide an exclusive bicycle facility, bicycles should be directed to either a shared path (such as a sidewalk) before being directed to share a travel lane with automobile traffic.

    a) Incorporate appropriate signage for temporary bike routing in accordance with MUTCD standards.

C. 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

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.

170.6.1. Concrete Embodied Carbon Threshold

A. Concrete Embodied Carbon Thresholds are measured by global warming potential (GWP). GWP shall be calculated in units of kilograms of carbon dioxide-equivalent (kg CO2e). The GWP of a specific concrete mix shall be verified` by a product-specific Type III Environmental Product Declaration (EPD) that is 3rd party verified and within its 5-year period of validity. The Concrete Embodied Carbon Threshold is a performance requirement for concrete mixes in addition to applicable City concrete specifications (per the City's standard construction specifications or project specific specifications).

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, stormwater, or the air does not occur.

190. Fee In Lieu of Improvement Construction

A. A developer or property owner may be allowed or required to pay a fee in lieu of construction for a conditioned development improvement.

B. The fee, for all types of improvements except potable water systems and stormwater management facilities, shall be determined as follows:

1. The applicant shall submit an itemized construction cost estimate to the City for approval. The estimate shall include all items necessary for the construction of the improvement in accordance with the development condition, these standards, and the City of Hillsboro *Community Development Code*. The construction cost estimate should not include additional costs for permitting, surveying, engineering, and the like. If the applicant is not able to prepare the construction cost estimate, City staff will prepare it on their behalf.

2. If applicable, the City will subtract from the estimate any items that would otherwise be eligible for SDC credits.

3. The fee will be 150% of the approved construction cost estimate before the SDC credit eligible components are removed.

4. The applicant shall send the fee to the appropriate City department prior to obtaining City permits.

C. For stormwater management facilities, the fee shall be determined by Clean Water Services.

D. The Water Department only allows fee-in-lieu in unique circumstances for potable water improvements. A fee-in-lieu waiver must be approved by the Water Department Engineering Manager and Director. Contact the Water Department for further information. The Water Department does not allow SDC credits.