



Where Life is Sweet

PUBLIC WORKS
DESIGN STANDARDS, SPECIFICATIONS AND PLANS

CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

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CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

SECTION 1.0000 - GENERAL

1.0010-AUTHORITYANDPURPOSE

The Hermiston Comprehensive Plan addresses land use and development issues within the City. This comprehensive planning document is a single document with references to many Ordinances. The Hermiston Comprehensive Plan and Subdivision Ordinance regulate the divisions of land and the creation of public facilities. The "Design Standards" section of the Subdivision Ordinance, discusses generalized public facility design requirements.

The purpose of these Design Standards is to provide a consistent policy under which certain physical aspects of public facility design will be implemented. Most of the elements contained in this document are Public Works oriented and it is intended that they apply to both public improvements under City contract and public improvements under private contract designated herein.

These Design Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. It is expected that engineers will bring to each project the best of skills from their respective disciplines.

The Design Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Design Standards will be judged, however, on the likelihood that such variances will produce compensating or comparable result, in every way adequate for the user and City residents.

Alternate materials and methods will be considered for approval by the City Engineer as the need arises and conditions warrant modification. This consideration will be on a case-by-case basis and require sufficient justification prior to approval. (See Section 1.0050)

1.0020-ENGINEERINGPOLICY

It shall be the policy of the City of Hermiston to require compliance with Oregon Revised Statute Chapter 672 for professional engineers.

All engineering plans, reports, or documents shall be prepared by a registered professional engineer, or by a subordinate employee under the engineer's direction, and shall be signed by the engineer and stamped with the engineer's seal to indicate the engineer's responsibility for them. It shall be the engineer's responsibility to review any proposed public facility extension, modification or other change with the City, prior to engineering or proposed design work, to determine any special requirements or whether the proposal is permissible. A "Preliminary Review" and/or a "Plans Approved for Construction" stamp of the City, on the plans, etc., for any job, does not in any way relieve the engineer of responsibility to meet all requirements of the City or obligation to protect life, health, and property of the public. The plan for any project shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met.

1.0030-APPLICABILITY

These Design Standards shall govern all construction and upgrading of all public and privately financed public facilities in the City of Hermiston and applicable work within its service areas.

1.0040-STANDARDSPECIFICATIONS

Except as otherwise provided by these Design Standards, all construction, design, craftsmanship, materials, equipment and details, shall be in accordance with the current ODOT / APWA Oregon Standard Specifications for Construction and Standard Drawings.

1.0050-APPROVAL OF ALTERNATE MATERIALS OR METHODS

Any alternate method or material not explicitly approved herein will be considered for approval as set forth in Section 1.0010. Persons seeking such approvals shall make application in writing. Approval of any deviation from these Design Standards shall be in written form. Approval of alternate methods and/or materials will be made in writing.

Alternates must meet or exceed the minimum requirements as set forth in these Design Standards.

The written application is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, calculations, reason, justification, and other pertinent information.

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

1.0060-SPECIAL DESIGN PROBLEMS

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

Applications requiring special review and approval may include, but are not limited to, the following:

Sewer Force Mains	Water Distribution Pump Stations
Relining of Existing Sewers	Relining of Existing Water Mains
Internal Sealing of Existing Sewers	Water Pressure Regulating Devices
Sewer Regulatory Devices	Energy Dissipaters
Sewage Pump Stations	Water Reservoirs
Sewer Siphons	Water Treatment Plants
Sewage Treatment Plants	Water Flow Measurement/Monitoring
Sewer Flow Measurement/Monitoring Devices	

1.0070-REVISIONS TO DESIGN STANDARDS

It is anticipated that revisions to these Design Standards will be made from time to time. The date appearing on the bottom of each page is the date of the latest revision. Users should apply the latest published issue to the work contemplated.

Parenthetical notations at the end of sections indicate the most recent change to those sections. All sections without notations are from the original Design Standards as adopted. Some sections may be changed more than once and it shall be the user's responsibility to maintain his/her copy of these Design Standards with the latest changes.

1.0080-DEFINITIONS

Alley - A public access easement or right-of-way not more than 20 feet and not less than 12 feet in width, which intersects with a public street.

Approved Back Flow Prevention Device - A device that has been investigated and approved by the Oregon State Health Division.

Arterial Street - A street intended to carry large volumes of traffic at steady speeds with minimum interruptions to traffic flow.

As-Built Plans - Plans signed and dated by the project engineer indicating that the plans have been reviewed and revised, if necessary, to accurately show all as-built construction details and changes.

Backflow - The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any sources other than its intended source.

Backflow Preventer - A device or means to prevent back flow into the potable water system.

Back Siphonage - The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a negative pressure in such pipes.

Bike Lanes - A designated travel-way for bicyclists which is located within the roadway directly adjacent to the outside vehicular lane or on the shoulder.

Bike Path - A designated travel-way for bicycling which is completely separated from the vehicular travel lanes and is within independent right-of-ways.

Bike Route - A designated travel-way for bicyclist which is shared with vehicular traffic. The roadway is designated with signs for bicycling (no pavement markings for the bike route or delineation of parking spaces are used).

Building Service Lateral - A public sanitary sewer beginning at the property line or public easement line and extending to the sanitary sewer main.

Building Sewer - A private sanitary sewer beginning 5 feet outside the building and extending to the property line or public easement line, connecting to the building service lateral.

Building Supply - The pipe carrying potable water from the water meter or other source of water supply to a building or other point of use or distribution on the lot. Building supply shall also mean customer line.

City - The City of Hermiston, Oregon.

City Engineer - The individual (a registered professional engineer) designated to have the authority to review and approve all public works design and construction projects.

Collection Systems - Facilities maintained by the City connected thereto for the collecting, pumping, conveying, and controlling of wastewater.

Collector Sewer - The portion of the public sewerage system which is primarily installed to receive waste water directly from individual residences and other individual public or private structures.

Collector Street - Street which forms the boundary of major blocks of land and is intended primarily for inter-neighborhood traffic; can function as a road to service areas from the arterial system.

Core - To cut and remove a circular portion of concrete, pavement, pipe or soil.

Cross Connection - Any connection or arrangement, physical or otherwise, between a potable water supply system and any plumbing fixture or any tank, receptacle, equipment or device, through which it may be possible for non potable, used, unclean, polluted and contaminated water, or other substances, to enter into any part of such potable water system under any condition.

Cul-de-sac - A dead-end street having a turnaround area at the end.

Curb - The line indicating the edge of the vehicular roadway within the overall right-of-way.

Cut Sheets - Sheets of tabulated data, indicating stationing, structures, fittings, angle points, beginning of curve, points on curve, end of curves, storm drain slope, staking offset, various

elevations, offset cuts, and storm drain depths for streets, water lines, sanitary sewers, and storm drains.

Datum - The vertical elevation control for the City of Hermiston is "The National Geodetic Vertical Datum of 1929" which corresponds to the USC&GS 1947 Datum.

Dead-end Street - A street or series of streets which can be accessed from only one point. Dead-end streets can be either temporary (intended for future extension as part of a future street plan) or permanent.

Permanent dead-end streets must provide adequate turnaround capability.

Definition of Words - Whenever the words "directed," "required," "permitted," "ordered," "designated," or words of like importance are used in these Standards, they shall be understood to mean the direction, requirement, permission, or order of designation of the City Engineer. Similarly, the words "approved," "acceptable," or "satisfactory," shall mean approved by, acceptable to, or satisfactory to the City Engineer.

Designated Arterial or Collector Street - A street designated as an arterial or collector in the Comprehensive Plan.

Detention - The holding of runoff for a short period of time and then releasing it to the natural water course where it returns to the hydrologic cycle.

Domestic Sewage - The liquid and waterborne waste derived from the ordinary living processes, free from industrial wastes, and of such character to permit satisfactory disposal, without special treatment into the public sewer or by means of private sewage disposal system.

Double Check Valve Assembly - An assembly composed of two single, independently acting, approved check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test cocks.

Double Check Detector Check Valve Assembly - A line-sized approved double check valve assembly with a parallel meter and meter-sized approved double check valve assembly. The purpose of this assembly is to provide Back flow protection for the distribution system and at the same time provide a metering of the fire system showing any system leakage or unauthorized use of water.

Drainage Facilities - Pipes, ditches, detention basins, creeks, culvert bridges, etc., used singularly or in combination with each other for the purpose of conveying or storing storm water runoff.

Easement - Areas located outside of dedicated rights-of-way which are granted to the City for special uses.

Engineer - The engineer, including the City's engineer, Licensed by the State of Oregon as a Professional Engineer under whose direction plans, profiles, and details for the work are prepared and submitted to the City for review and approval, or who is in charge of and responsible for construction management of the improvement.

Expansion Joint - A joint to control cracking in the concrete surface structure and filled with preformed expansion joint filler.

Fire Hydrant Assembly - The fire hydrant and attached auxiliary valve.

Fire Protection Service - A metered connection to the public water main intended only for the extinguishment of fires and the flushing necessary for its proper maintenance.

French Drain or Leach Line - A covered underground excavated trench filled with washed gravel that surrounds a perforated delivery pipe used to receive storm water, wherein the sides and bottom of the trench are porous, permitting the storm water to seep into the ground.

Grade - The degree of inclination of a road or slope.

Hydrant Lead - The water line connecting the fire hydrant to the auxiliary valve on the City distribution main.

Impervious Areas - Those hard surface areas located upon real property which either prevent or retard saturation of water into the land surface and cause water to run off the land surface in greater quantities or at an increased rate of flow from that present under natural conditions preexisting to development.

Industrial Waste - Solid, liquid, or gaseous waste resulting from any industrial, manufacturing, trade, or business process or from development, recovery, or processing of natural resource.

Interceptor Sewer - The primary public sanitary sewer which conveys waste water directly into the Waste Water Treatment Plant.

Irrigation Service - A metered connection intended for seasonal use and delivering water which are not discharged to the sanitary sewer.

Lateral Sewer - A building service lateral.

Local or Residential Street - A street designated to provide vehicular access to abutting properties and discourage through traffic.

Longitudinal Joint - A joint which follows a course approximately parallel to the centerline of the roadway.

Major Partition - A partition which includes the creation of a road or street.

Major Trees - Trees within the right-of-way are those which have a caliper of 4" or larger. Street improvement plans will identify major trees by location, caliper, and species.

Major tree species are those which contribute to the landscape character of the area to include: Douglas Fir, Cedar, Redwood, Sequoia, Oak, Ash, Birch, Walnut, and Maple. The identification of major trees should distinguish species generally suitably for retention adjacent to streets and those species with growth habits that create nuisances, unusual maintenance problems, or hazards to the public. Major trees exist in clusters, groves or rows within the right-of-way.

Manufacturer's Name - Any manufacturer's name, specification, catalog, number or type used herein is specified by make and order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are comparable with this established standard.

Minor Partition - A partition which does not include the creation of a road or a street.

Natural Grade - The grade of the land in an undisturbed state.

On-Site Detention - The storage of excess runoff on the development site prior to its entry into a public storm drain system and gradual release of the stored runoff after the peak of the runoff has passed.

Owner - The owner of record of real property as shown on the latest tax rolls or deed records of the county, and includes a person who furnishes evidence that he/she is purchasing a parcel of property under a written recorded land sale contract.

Partition - To divide an area or tract of land into two or three parcels within a calendar year when such area or tract of land exists as a unit or contiguous units of land under single ownership at the beginning of such year.

Peak Runoff - The maximum water runoff rate in cubic feet per second (cfs) determined for the design storm.

Person - Individual, firm, corporation, association, agency, or other entity.

Plans - Construction plans, including system plans, sewer plans, and profiles, cross sections, detailed drawings, etc., or reproductions thereof, approved or to be approved by the City Engineer, which Shows the location, character, dimensions, and details for the work to be done, in which constitute a supplement to these standards.

Potable Water - Water which is satisfactory for drinking, culinary, and domestic purposes and meets the requirement of the health authority having jurisdiction.

Private Collection System - A privately owned and maintained sewer system installed to serve multi unit structures on single ownership properties, which cannot legally be further divided.

Private Storm Drain - A storm drain located on private property serving more than one structure on the same premises or parking lot catch basins.

Public Sanitary Sewer - Any sewer located in a public right-of-way or easement and operated and maintained by the City for carrying sewage and industrial wastes.

Public Storm Drain - Any storm sewer located in a public right-of-way or easement and operated and maintained by the City.

Release Rate - The controlled rate of release of drainage, storm, and runoff water from property, storage pond, runoff detention pond, or other facility during and following a storm event.

Right-of-Way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the public for sidewalk, utility, and/or roadway purposes, which the City has sole responsibility to maintain.

Roadway - All of that portion of the right-of-way used or to be used for vehicle movement which exists between the curbs or proposed curb lines.

Sedimentation - Disposition of erosional debris, soil sediment transported by water from a higher elevation to an area of lower gradient where sediments are deposited as a result of slack water.

Sewage - A combination of the water-carried wastes from residences, business buildings, institutions, and industrial establishments, except industrial wastes.

Sidewalk - A walk or path along the side of a road for pedestrians. A right-of-way deeded, dedicated, and designated for the use of non motorized vehicles and pedestrians.

Silt - Fine textured soil particles including clay and sand as differentiated from coarse particles of sand and gravel.

Siltation - Deposition of (silt) waterborne sediments.

Standard Drawings - The drawings of structures or devices commonly used on public improvements and referred to on construction plans.

Streets or Roads - Any public highway, road, street, avenue, alleyway, easement or right-of-way used or to be used for vehicle movement.

Structures - Those structures designated on the standard plans such as catch basins, manholes, etc.

Subdivision - To divide an area or tract of land into four or more lots within a calendar year when such area or tract of land existed as a unit or contiguous units of land under a single ownership at the beginning of such year.

Super elevation - The vertical distance between the heights of the inner and outer edges of a highway pavement.

TransverseJoint - A joint which follows a course approximately perpendicular to the centerline of the roadway.

TraveledWay - That portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.

TurnaroundArea - An area of sufficient size and configuration that a motor vehicle may maneuver so as to travel in the opposite direction.

Trunk Sewer - (Interceptor) A sanitary sewer which is primarily intended to receive waste water from a collector sewer, another trunk sewer, an existing major discharger of raw or inadequately treated wastewater, or water pollution control facility.

Uniform Plumbing Code - The Uniform Plumbing Code adopted by the current edition of the International Association of Plumbing and Mechanical Officials, as revised by the State of Oregon, called the "Oregon State Plumbing Specialty Code."

Waste Water - The total fluid flow in the sanitary sewerage system which includes industrial waste-sewage, or any other waste including that which may be combined with any ground water, surface water, or storm water that may be discharged into the sanitary sewerage system.

Water Distribution System - Water distribution pipelines, pumping stations, valves, and ancillary equipment used to transmit water from the supply source to the service line.

WaterMain - The water-supply pipes for public or community use.

Water Service Line - The pipe connection from the City water main to the users water meter, hydrant, back flow prevention device, or fire sprinkler double check valve.

Wetlands - Those lands adjacent to watercourses or isolated there from which may normally or periodically be inundated by the waters from the watercourse or the drainage waters from the drainage basin in which it is located. These include swamps, bogs, sinks, marshes and lakes, all of which are considered to be part of the watercourse and drainage system of the City and shall include the headwater areas where the watercourse first surfaces. They may be, but are not necessarily, characterized by special vegetation or soils such as peat, muck, and mud.

1.0090-CONSTRUCTIONPLANS

1.0091-GENERALINFORMATION.

Prior to any construction work and plan approval, complete construction plans, specifications and all other necessary submittals shall be submitted to the City Engineer for review.

1.0100-PLANPREPARATION

Construction plans and specifications shall be prepared as specified in Sections 1.0091 - 1.0134 by a professional engineer licensed in the State of Oregon.

1.0101-SHEETSIZE

All construction plans shall be clearly and legibly drawn in ink on Mylar sheets measuring 22 x 34 inches. Sheets shall have 1-1/2 inches of clear margin on the left edge and a 1/2 inch margin on all other edges.

1.0102-SETSOFPANS

When plans are prepared for developer financed projects, the following scale of drawings is suggested.

<u>Plan/Scale</u>	<u>Horizontal</u>	<u>Vertical</u>
Street	1" = 20'	1" = 2'

Sewer	1" = 40'	1" = 4'
Storm	1" = 40' or 20'	1" = 4'
Water	1" = 20' or 40'**	1" = 4'

* Subdivision street plans, when combined with other proposed facilities listed above, may be drawn at 1" = 40' scale.

** When a scale is used which is smaller than 1" = 20' (i.e., 1" = 40') intersection details showing fittings and valving shall be provided at a larger scale.

Architectural scales (i.e., 1/4" = 1'-0") are not permitted unless approved.

1.0130-REQUIRESHEETS

Construction plan submittals shall contain the following minimum sheets: title sheet, plan and profile sheets, and detail sheets.

1.0131-TITLESHEET

All subdivision projects and multiple street improvement projects shall have a title sheet as the first page of the construction plans. This sheet shall contain the following minimum information.

- a. Site plans of the entire project with street right-of-way and/or subdivision layout at a 1" = 100' scale. A 1" = 200' scale may be used if project size is too large. The site plan shall also be a composite utility plan showing all properties served by proposed sewer, water and storm facilities, in addition to the proposed facility and all easements. The site plan shall also include all adjacent public facilities within 100' of the proposed project.
- b. Vicinity map at a 1" = 1000' scale, or greater.
- c. Index of sheets.
- d. Complete legend of symbols used.
- e. General and construction notes pertinent to project.
- f. Temporary and/or permanent bench marks used along with their descriptions, elevations of benchmark and datum.
- g. Engineer's name, address and phone number & seal.
- h. Developer's/owner's name, address and phone number for public improvements with private financing.
- i. Statement referencing City of Hermiston Public Works Design Standards, Standard Drawings and the current ODOT / APWA Oregon Standard Specifications for Construction and Standard Drawings.
- j. Provide contact phone number for all affected utility companies.
- k. Show tax lot numbers or lot and block designations.

1.0132-PLANSHEET

The plan view of each sheet shall be drawn at the appropriate scale showing the following minimum information:

- a. Adjacent street curbs, property lines, right-of-way lines, utility easements referenced to property lines, street centerlines and intersections. Show property corner and curb elevations to determine water service level, serviceability of lot/property and sanitary sewer, points of disposal for building storm drains, and how new curbs will join to existing curbs.

- b. Location of all underground utilities within 100 feet of the project (if they are affected by the project), existing power/telephone poles and guy anchors, valves, manholes, catch basins, fire hydrants, meter boxes and vaults, signs, etc.
- c. Location of all water courses, railroad crossings, culverts, bridges, large water transmission pipes and gravity sewers and/or storm drains within 200 feet of proposed gravity sewer and storm drain extensions if they affect the design of the project. All water courses shall show the 100-year flood plain as indicated on the U.S. Army Corps of Engineers and Federal Emergency Management Agency (F.E.M.A.) maps.
- d. On sewer and storm drain plans, each manhole, catch basin, and clean-out shall be numbered and stationed. Stationing shall tie to existing street monuments, property corners or manholes. Each line shall be stationed continuously upgrade and go from left to right on the plan sheet. Each separate line shall be separately designated (e.g., sewer line 'A', storm line 'A', etc.)
- e. On street plans, horizontal stationing shall show points of tangent and curvature for centerline curve data shall show tangent length, radius distance, centerline curve length, and delta angle. Centerline intersection stationing, in both directions, shall be shown.
- f. Where streets are being widened, edge of pavement elevations shall be shown to determine pavement cross-slope to new curb or pavement edge.
- g. On water plans, all fittings shall be shown and identified by type (i.e., MJ x MJ, FLG X MJ, etc.). Fire hydrants and intersection details for valves and fittings are required when scale of plans is smaller than 1" = 20' (i.e., 1" = 40'). All valves, fittings and pipe conditions shall be indicated.
- h. On erosion control plans, the location of silt fences, inlet barriers, gravel entry ways, temporary ditches and detention ponds and surface preparation shall be shown. The plan shall show the entire development. Details of erosion control devices can be shown on this sheet.

1.0133-PROFILESHEET.

Profiles for construction plans shall be the same horizontal scale as the plan sheet. Where profiles are drawn on the same sheet as the plan view, the profile shall be immediately below the plan view. Stationing shall be continuously upgrade from left to right with lower stations to the left. The following minimum information shall be shown:

- a. For sewers and storm drains, show locations of manholes, catch basins, and clean outs with each numbered and stationed as indicated in Section 1.0132(d).
- b. Existing profile at centerline of proposed utility or street.
- c. Proposed profile grade, as appropriate, for all sewers, storm drains and water lines giving pipe size, length between structures, slope, backfill type, surface restoration type, and pipe materials, sewer inverts, rim elevations, etc.
- d. Existing underground utility that crosses the alignment of the proposed facility.
- e. Beginning of all vertical curves, points of vertical intersection, end of vertical curve, low point of sag curve and length of vertical curve. Profiles of existing centerline grade shall extend a minimum of 250 feet beyond the end of the improvement.
- f. Clearly show all potential utility conflicts with appropriate pipes, conduits, vaults, etc. that affect proposed design.

SPECIAL NOTE: City as-built drawings are only to be used as an aid to the engineer. When a potential conflict may occur, the engineer shall field locate, or cause to be located, and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by the proposed facility.

1.0134-DETAILSHEETS

Detailed drawings shall be included with all construction plans where ODOT / APWA or City Standard Drawings do not exist. If a standard drawing must be modified to fit existing or unique conditions, the modified drawing shall be shown on the plans. When appropriate, due to required detail complexity, a separate detail sheet shall be drawn. When City standard drawing appurtenances or construction installations are to be used, a reference to the specific standard drawing number shall be made on the title sheet.

1.0140-SUPPORTINGINFORMATION

The engineer shall submit sufficient supporting information to justify the proposed design. Such information shall include, but not be limited to, the following:

Design calculations.

Hydrology and hydraulic calculations with basin maps.

Alternate materials specifications including manufacturers' design application recommendations. Plan support information to include as appropriate:

1. Soils engineering report
2. Hydrology report
3. Engineering geology report

1.0141-UTILITYPLAN

When designing sanitary or storm sewer facilities, a utility plan shall be submitted with the construction plans when required by the City. This plan shall be used to identify and analyze the extension of the proposed facilities. The topographic plan shall show all upstream and tributary areas within no less than 200 feet of the proposed development.

The plan shall include existing contours at 1 foot intervals, or as approved by the City. Include location of existing structures and public and private utilities.

1.0150-PLANSUBMITTAL

Construction plans for all privately financed public works facility improvements shall be submitted to the City. The City Engineer will coordinate the plan review and approval of all construction plans which will include review for compliance with all City Codes, Ordinances, Design Standards, Standard Drawings, and utility master plans.

All plan submittals shall include information required in Sections: 1.0140 and 1.0141 of these Design Standards along with all other information requested by the City. This information shall include, but is not limited to, construction cost estimates, easement documents, right-of-way dedications, and executed agreements. All submittals will be reviewed for completeness and the engineer notified if required information is missing. Submittals should be made in a timely manner as lack of information to the City may impede the review process.

1.0151-PUBLICIMPROVEMENTPROCEDURE

All major developments and subdivisions within the City are responsible for installation of public improvements within all newly proposed streets, all existing adjacent unimproved streets and off-site improvements determined by the City to be necessary for the functionality of the development and/or to mitigate development impacts. (HZO §157.161-§157.165) Public improvements shall include but are not limited to:

Street paving
Storm drainage

- Curbs
- Sidewalks
- Gutters
- Public water lines
- Public sewer lines
- Street lights
- Bike paths
- Fire hydrants
- ADA ramps

In addition to the above listed improvements, it may be necessary to construct or contribute to the future construction of traffic signals, water or sewer pump stations, or future infrastructure upgrades such as pipe oversizing. (HZO §157.164)

All applications for development shall attend a pre-application meeting with city development staff. This meeting is intended to familiarize applicants with the development process and the City's standard plans and specifications. All applications for development shall be accompanied by preliminary drawings for installation of public improvements. Drawings shall be prepared by a registered civil engineer and shall be in compliance with the current City Standard Specifications and Drawings. Following approval of the proposed development by planning staff and/or the planning commission, public improvement plans shall be revised and receive final approval from development staff.

In most cases, the applicant will be required to enter into an improvement agreement with the City of Hermiston, agreeing to install all required improvements, specifying time frames for installation, and agreeing to future maintenance of said improvements. The improvement agreement must be completed prior to initiating construction within the development.

In lieu of installation of improvements in new subdivisions, an applicant may provide a letter of credit for 110% of the total cost of all improvements. After receipt of a letter of credit, the city will release the subdivision plat and construction of homes may begin and lots may be sold. However, the applicant must still work towards completion of all improvements and no certificates of occupancy will be released until all improvements are completed. Commercial and multi-family developments may construct buildings and public improvements concurrently, but also may not receive any certificates of occupancy until all public improvements are completed and accepted by the city.

All sidewalks and drainage improvements must be completed at the time any street is constructed.

Following completion of improvement installation, city public works staff will inspect all improvements. The city will generate a punch list of corrections needed and submit said list to the applicant. Following completion of all punch list items, the applicant may request re-inspection. Once the improvements are accepted by the city, the applicant must provide as-built drawings of all public improvements, prepared by the project engineer. The applicant must also provide a one-year maintenance bond for 25% of the cost of the installed improvements.

CHECKLISTFORPLANREVIEWANDSUBMISSION

<u>Action</u>	<u>Date</u>
Attend Pre-Application Meeting	
Obtain Standard Plans and Specifications	
Submit Preliminary Improvement Plans	
Revise Improvement Plans	
Submit Erosion Control Plans	
City Approves Plans	
Sign Improvement Agreement	
Developer Holds Pre-Construction Meeting	
Begin Construction of Improvements	
Submit Letter of Credit (If Desired)	
Complete Construction of Improvements	
Complete Testing of Improvements	
Call for Inspection of Improvements	
City Issues Punch List of Corrections	
Call for Re-Inspection	
City Approves Improvements	
Submit As-Built Drawings	
Submit Maintenance Bond	
City Releases Certificate of Occupancy	

1.0160-AS-BUILTDRAWINGS

For all public works facility improvements, the engineer shall submit certified as-built drawings for all plans which were approved for construction. As-built drawings shall meet the requirements of Sections 1.0100, 1.0130 and 1.0160 - 1.0164 of these Design Standards and shall be of archival quality. At a minimum, the drawings shall be 4 mil Mylar with silver halide emulsion. Original inked Mylars may also be submitted in lieu of photographic Mylars on Mylar sheets. In addition one (1) set of blue line as-builts shall be submitted.

The engineer shall submit, along with the as-built drawings, a statement certifying that all work for which plans were approved has been completed in accordance with the City of Hermiston Public Works Design Standards, Standard Specifications, Standard Drawings and design documents.

The words "As-Built Drawing" shall appear as the last entry in the revision block along with the month, day and year the as-built drawing was prepared.

NOTE: Actual location and depth from finish grade of any other utilities encountered during construction shall be noted on as-built drawings.

1.0161-STREETS

The following minimum information shall be noted on the street as-built drawings

- a. Change in horizontal alignment, curve data and stationing of primary control points (e.g., PC, PI, PT, PRC).
- b. Vertical curve or grade changes; change in location of low point in sag vertical curve.
- c. Change to approved thickness for street pavement section components. Show station limits where changes in structural section have occurred.
- d. Change to driveway locations or widths.
- e. Other change(s) altering the approved plans, including but not limited to; curbs, sidewalks, wheelchair ramps and lighting.

1.0162-STORMDRAINS

The following minimum information shall be noted on storm drain as-built drawings:

- a. Station of drainage structures such as manholes and catch basins. Tie each drainage structure to nearest property corner a right-of-way line, and distance back from the face of curb.
- b. Show alignment changes, grade changes and changes in construction materials. If alignment changes result in station changes, a station equation shall be shown as appropriate at a manhole.
- c. Other change(s) altering the approved plans, including but not limited to; catch basin location, manhole location, pipe size, dry well location, etc.

1.0163-SANITARYSEWERS

The following minimum information shall be noted on sanitary sewer as-built drawings:

- a. Station of manhole, wye or tee into main line. Tie each to nearest property corner at right-of-way line, and distance back from the face of curb.
- b. Depth at the end of service lateral measured from existing ground to invert of pipe. When required by the City Engineer, invert elevations shall be noted.
- c. Length of service lateral measured from centerline of sewer main to end of pipe.
- d. Changes in alignment, grade, pipe size and construction materials. If such changes in alignment and/or grade result in station changes, the stationing and offsets shall be changed for the manholes and other structures which are affected by the changes.
- e. Other change altering the approved plans.
- f. Type of pipe, backfill material and location.

1.0164-WATERMAINS

The following minimum information shall be noted on water main as-built drawings:

- a. Station and/or property line/corner to valves (not at standard location), all fittings, blow-offs and dead-ended lines.

- b. All changes from standard 30-inch depth cover. Limits shall be shown on all plans with annotated reason for change. Actual pipe elevation (top of pipe) will be taken at each fitting.
- c. Changes in alignment, grade, pipe size and construction materials. If such changes in alignment and/or grade result in station changes, the stationing and offsets shall be changed for the valves and other fittings which are affected by the changes.
- d. Provide manufacturer of all valves identify types of fittings (i.e., MJ X MJ, FLG x MJ, etc.); provide information in the form of an inventory list on construction drawings.
- e. Other change altering the approved plans.
- f. Provide photographs of all installed valves and fittings in place before backfill.

CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

SECTION 2.0000 - EXCAVATION AND GRADING

2.0010-PURPOSE

The purpose of this section is to safeguard life, limb, property and the public welfare by regulating grading on private property.

2.0020-SCOPE

This section sets forth rules and regulations to control excavation, grading and earthwork construction, including fills and embankments; establishes the administrative procedure for issuance of permits; and provides for approval of plans and inspection of grading construction.

The standards listed below are guideline standards and as such are not adopted as part of this code.

1. Testing

- A. ASTM D 1557, Moisture-density Relations of Soils and Soil Aggregate Mixtures
- B. ASTM D 1556, In Place Density of Soils by the Sand-Cone Method
- C. ASTM D 2167, In Place Density of Soils by the Rubber-Balloon Method
- D. ASTM D 2937, In Place Density of Soils by the Drive-Cylinder Method
- E. ASTM D 2922 and D 3017, In Place Moisture Content and Density of Soils by Nuclear Methods.

2.0030-PERMITREQUIRED

- a. Permits Required. Except as specified in subsection b of this section, no person shall do any grading without first having obtained a grading permit from the City.
- b. Exempted Work. A grading permit is not required for the following:
 - 1. Grading in an isolated, self-contained area where there is no danger to private or public property, only when approved by the City.
 - 2. An excavation below finished grade for basements and footings of a building, retaining wall or other structure authorized by a valid building permit. This shall not exempt any fill made with the material from such excavation or exempt any excavation having an unsupported height greater than 5 feet after the completion of such structure.
 - 3. Cemetery graves.
 - 4. Refuse disposal sites controlled by other regulations.
 - 5. Excavations for wells or tunnels or utilities.

6. Mining, quarrying, excavating, processing, stockpiling of rock, sand, gravel, aggregate or clay where established and provided for by law, provided such operations do not affect the lateral support or increase the stresses in or pressure upon any adjacent or contiguous property.
7. Exploratory excavations under the direction of soil engineers or engineering geologists.
8. An excavation which: 1) is less than 2 feet in depth, or 2) which does not create a cut slope greater than 5 feet in height and steeper than 2 horizontal to 1 vertical and is less than 50 cubic yards.
9. A fill less than 1 foot in depth and placed on natural terrain with a slope flatter than 5 horizontal to 1 vertical, or less than 3 feet in depth, not intended to support structures, which does not exceed 50 cubic yards on any one lot and does not obstruct a drainage course.

Exemption from the permit requirements of this chapter shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this chapter or any other laws or ordinances of this jurisdiction.

2.0040-HAZARDS

Whenever the City determines that any existing excavation or embankment or fill on private property has become a hazard to life and limb, or endangers property, or adversely affects the safety, use or stability of a public way or drainage channel, the owner of the property upon which the excavation or fill is located, or other person or agent in control of said property, upon receipt of notice in writing from the City, shall within the period specified therein repair or eliminate such excavation or embankment so as to eliminate the hazard and be in conformance with the requirements of this code.

2.0050-DEFINITIONS

For the purpose of this section the definitions listed there under shall be construed as specified in this section.

Approval - shall mean the proposed work or completed work conforms to this chapter in the opinion of the City.

As-Graded - is the extent of the surface conditions on completion of grading.

Bedrock - is in-place solid rock.

Bench - is a relatively level step excavated into earth material on which fill is to be placed.

Borrow - is earth material acquired from an off-site location for use in grading on a site.

Civil Engineering - is a professional engineer registered in the state to practice in the field of civil works.

Compaction - is the densification of a fill by mechanical means.

Earth Material - is any rock, natural soil or fill or any combination thereof.

Engineering Geologist - is a geologist experienced and knowledgeable in engineering geology.

Engineering Geology - is the application of geologic knowledge and principles in the investigation and evaluation of naturally occurring rock and soil for use in the design of civil works.

Erosion - is the wearing away of the ground surface as result of the movement of wind, water or ice

Excavation - is the mechanical removal of earth material.

Existing - grade is the grade prior to grading.

Finish - grade is the final grade of the site which conforms to the approved plan.

Fill - is the deposit of earth material placed by artificial means.

Geotechnical Engineer - See "soils engineer."

Grade - is the vertical location of the ground surface.

Grading - is any excavating or filling or combination thereof.

Key - is a designed compacted fill placed in a trench excavated in earth material beneath the toe of a proposed fill slope.

Professional Inspection - is the inspection required by this code to be performed by the civil engineer, soils engineer or engineering geologist. Such inspections include that performed by persons supervised by such engineers or geologists and shall be sufficient to form an opinion relating to the conduct of the work.

Rough - grade is the stage at which the grade approximately conforms to the approved plan.

Site - is any lot or parcel of land or contiguous combination thereof, under the same ownership, where grading is performed or permitted.

Slope - is an inclined ground surface the inclination of which is expressed as a ratio of horizontal distance to vertical distance.

Soil - is naturally occurring superficial deposits overlying bedrock.

Soils Engineer (Geotechnical Engineer) - is an engineer experienced and knowledgeable in the practice of soils engineering (GEOTECHNICAL).

Soils Engineering (Geotechnical Engineering) - is the application of the principles of soils mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and the inspection or testing of the construction thereof.

Terrace - is a relatively level step constructed in the face of a graded slope surface for drainage and maintenance purposes.

2.0060-GRADINGPERMITREQUIREMENTS

- a. Permits Required. Except as exempted in Section 2.0030(b) of this code, no person shall do any grading without first obtaining a grading permit from the City. A separate permit shall be obtained for each site, and may cover both excavations and fills.
- b. Application. The provisions of Section 2.0030(a) are applicable to grading and in addition the application shall state the estimated quantities of work involved.

- c. Grading Designation. Grading in excess of 5,000 cubic yards shall be performed in accordance with the approved grading plan prepared by a civil engineer, and shall be designated as "engineered grading." Grading involving less than 5,000 cubic yards shall be designated "regular grading" unless the permittee chooses to have the grading performed as engineered grading, or the City determines that special conditions or unusual hazards exist, in which case grading shall conform to the requirements for engineered grading.
- d. Engineered Grading Requirements. Application for a grading permit shall be accompanied by two sets of plans and specifications, and supporting data consisting of a soils engineering report and engineering geology report. The plans and specifications shall be prepared and signed by an individual licensed by the state to prepare such plans or specifications when required by the building official.

Specifications shall contain information covering construction and material requirements.

Plans shall be prepared in accordance with Section 1.0000 and shall be of sufficient clarity to indicate the nature and extent of the work proposed and shown in detail that they will conform to the provisions of this code and all relevant laws, ordinances, rules and regulations. The first sheet of each set of plans shall give location of the work, the names and addresses of the owner and the person by whom they were prepared.

The plans shall include the following information:

1. General vicinity of the proposed site.
 2. Property limits and accurate contours of existing ground and details of terrain and area drainage.
 3. Limiting dimensions, elevations or finish contours to be achieved by the grading, and proposed drainage channels and related construction.
 4. Detailed plans of all surface and subsurface drainage devices, wall, cribbing, dams and other protective devices to be constructed with, or as a part of, the proposed work together with a map showing the drainage area and the estimated runoff of the area served by any drain.
 5. Locations of any building or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within 15 feet of the property or which may be affected by the proposed grading operations.
 6. Recommendations included in the soils engineering report and the engineering geology report shall be incorporated in the grading plans or specifications. When approved by the City, specific recommendations contained in the soils engineering report and the engineering geology report, which are applicable to grading, may be included by reference.
 7. The dates of the soils engineering and engineering geology reports together with the names, addresses and phone numbers of the firms or individuals who prepared the reports.
- e. Soils Engineering Report. The soils engineering report required by Subsection (d) shall include data regarding the water table, the nature, distribution and strength of existing soils, conclusions and recommendations for grading procedures and design criteria for

corrective measures, including buttress fills, when necessary, and opinion on adequacy for the intended use of sites to be developed by the proposed grading as affected by soils engineering factors, including the stability of slopes.

- f. Engineering Geology Report. The engineering geology report required by Subsection (d) shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and opinion on the adequacy for the intended use of sites to be developed by the proposed grading, as affected by geologic factors.
- g. Regular Grading Requirements. Each application for a grading permit shall be accompanied by a plan in sufficient clarity to indicate the nature and extent of the work. The plans shall give the location of the work, the names of the owner and the name of the person who prepared the plan. The plan shall include the following information:
 - 1. General vicinity of the proposed site.
 - 2. Limiting dimensions and depth of cut and fill.
 - 3. Location of any buildings or structures where work is to be performed, and the location of any buildings or structures within 15 feet of the proposed grading.
 - 4. An engineering soils and geology report may be required by the City depending upon site conditions such as steep slopes, evidence of slippage or slides, high ground water, location of improvements, geologic conditions, etc.
- h. Issuance. The provisions of Section 7.0000 are applicable to grading permits. The City may require that grading operations and project designs be modified if delays occur which incur weather-generated problems not considered at the time the permit was issued.

The Superintendent of Public Works may require professional inspection and testing by the soils engineer. When the Superintendent of Public Works has cause to believe that geologic factors may be involved, the grading shall conform to engineered grading.

2.0070-GRADINGFEES

- a. General. Fees shall be assessed in accordance with the provisions of this section or shall be as set forth in the fee schedule adopted by the jurisdiction.
- b. Plan Review Fee. When a plan or other data are required to be submitted, a plan review fee shall be paid at the time of submitting plans and specifications for review. Said plan review fee shall be as set forth in Table No. 2A. Separate plan review fees shall apply to retaining walls or major drainage structures as required elsewhere in this code. For excavation and fill on the same site, the fee shall be based on the volume of excavation or fill, whichever is greater.
- c. Grading Permit Fees. A fee for each grading permit shall be paid to the City as set forth in Table No. 2B. Separate permits and fees shall apply to retaining walls or major drainage structures as required elsewhere in this code. There shall be no separate charge for standard terrace drains and similar facilities.

TABLE NO. 2A GRADING PLAN REVIEW FEES

50 cubic yards or less	No fees
51 to 100 cubic yards	\$15.00
101 to 1,000 cubic yards	\$22.50
1,001 to 10,000 cubic yards	\$30.00
10,001 to 100,000 cubic yards	\$30.00
	for the first 10,000 cubic yards, plus \$15.00 for each additional 10,000 yards or fraction thereof
100,001 to 200,000 cubic yards	\$165.00
	for the first 100,000 cubic yards, plus \$9.00 for each additional 10,000 cubic yards or fraction thereof.
200,001 cubic yards or more	\$255.00
	for the first 200,000 cubic yards, plus \$4.50 for each additional 10,000 cubic yards or fraction thereof.
Other Fees:	Additional plan review required by changes, additions or revisions to approved plans \$30.00 per hour* (minimum charge-one half hour)

*Or the total hourly cost to the jurisdiction, whichever is the greatest. This cost shall include supervision, overhead, equipment, hourly wages and fringe benefits of the employees involved.

TABLE NO. 2B GRADING PERMIT FEES

50 cubic yards or less	\$15.00
51 to 100 cubic yards	\$22.50
101 to 1,000 cubic yard	\$22.50
	for the first 100 cubic yards plus \$10.50 for each additional 100 cubic yards or fraction thereof.
1,001 to 10,000 cubic yards	\$117.00
	for the first 1,000 cubic yards, plus \$9.00 for each additional 1,000 cubic yards or fraction thereof.
10,001 to 100,000 cubic yards	\$198.00
	for the first 10,000 cubic yards, plus \$40.50 for each additional 10,000 cubic yards or fraction thereof.
100,001 cubic yards or more	\$562.50
	for the first 100,000 cubic yards, plus 22.50 for each additional 10,000 cubic yards or fraction thereof.

The fee for a grading permit authorizing additional work to that under a valid permit shall be the difference between the fee paid for the original permit and the fee shown for the entire project.

Other Inspection and Fees;

- | | |
|---|-------------------------------|
| 1. Inspections outside of normal business hours
(minimum charge - two hours) | \$30.00 per hour ² |
| 2. Reinspection fees assessed under provisions of Section 305 (g) | \$30.00 per hour ² |
| 3. Inspections for which no fee is specifically indicated
(minimum charge one half hour) | \$30.00 per hour ² |

²Or the total hourly cost to the jurisdiction, whichever is greatest. This cost shall include supervision, overhead, equipment, hourly wages and fringe benefits of the employees involved.

2.0080-BONDS

The City may require bonds in such form and amounts as may be deemed necessary to assure that the work, if not completed in accordance with the approved plans and specifications, will be corrected to eliminate hazardous conditions.

In lieu of a surety bond the applicant may file a cash bond or instrument of credit with the City in an amount equal to that which would be required in the surety bond.

2.0090-CUTS

- a. General. Unless otherwise recommended in the approved soils engineering or engineering geology report, cuts shall conform to the provisions of this section.

In the absence of an approved soils engineering report, these provisions may be waived for minor cuts not intended to support structures.

- b. Slope. The slope of cut surfaces shall be no steeper than is safe for the intended use and shall be no steeper than 2 horizontal to 1 vertical unless the permittee furnishes a soils engineering or a engineering geology report, or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.

2.0100-FILLS

- a. General. Unless otherwise recommended in the approved soils engineering report, fills shall conform to the provisions of this section.

In the absence of an approved soils engineering report, these provisions may be waived for minor fills not intended to support structures.

- b. Preparation of Ground. Fill slopes shall not be constructed on natural slopes steeper than 2 horizontal to 1 vertical. The ground surface shall be prepared to receive fill by removing vegetation, noncomplying fill, topsoil and other unsuitable material scarifying to provide a bond with the new fill and, where slopes are steeper than 5 horizontal: to 1 vertical and the height is greater than 5 feet, by benching into sound bedrock or other competent material as determined by the soils engineer. The bench under the toe of a fill on a slope steeper than 5 horizontal: to 1 vertical shall be at least 10 feet wide. The area beyond the toe of fill shall be sloped for sheet overflow or a paved drain shall be provided. When fill is to be placed over a cut, the bench under the toe of fill shall be at least 10 feet wide but the cut shall be made before placing the fill and acceptance by the soils engineer or engineering geologist or both as a suitable foundation for fill.
- c. Fill Material. Organic material shall not be permitted in fills. Except as permitted by the City, no rock or other material with a dimension greater than 12 inches shall be buried or placed in fills.

Exception: The City may permit placement of larger rock when the soils engineer properly devises a method of placement, and continuously inspects its placement and approves the fill stability. The following conditions shall also apply:

1. Prior to issuance of the grading permit, potential rock disposal areas shall be delineated on the grading plan.

2. Rock sizes greater than 12 inches in dimension shall be at least 10 feet below finish grade.
 3. Rocks shall be placed so as to assure filling of all voids with well-graded soil.
- d. **Compaction.** All fills shall be compacted to a minimum of 90% of maximum density per ASTM D-1557, unless the Geotech report suggests a denser compaction.
 - e. **Slope.** The slope of fill surfaces shall be no steeper than is safe for the intended use. Fill slopes shall be no steeper than 2 horizontal to 1 vertical.

2.0110-SETBACKS

- a. **General.** Cut and fill slopes shall be set back from site boundaries in accordance with this section. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary. Setback dimensions shall be as shown in Figure No. 2-1.
- b. **Top of Cut Slope.** The top of cut slope shall not be made nearer to a site boundary line than one fifth of the vertical height of cut with a minimum of 2 feet and a maximum of 20 feet. Where a fill slope is to be located near the site boundary and the adjacent off-site property is developed, special precautions shall be incorporated in the work as the City deems necessary to protect the adjoining property from damage as a result of such grading. These precautions may include but are not limited to:
 1. Additional setbacks.
 2. Provision for retaining or slough walls.
 3. Mechanical or chemical treatment of the fill slope surface to minimize erosion.
 4. Provisions for the control of surface waters.
- d. **Modification of Slope Location.** The City may approve alternate setbacks, The City may require an investigation and recommendation by a qualified engineer or engineering geologist to demonstrate that the intent of this section has been satisfied.

2.0120-DRAINAGEANDTERRACING

- a. **General.** Unless otherwise indicated on the approved grading plan, drainage facilities and terracing shall conform to the provisions of this section for cut or fill slopes steeper than 3 horizontal to 1 vertical.
- b. **Terrace.** Terraces shall be designed and constructed in accordance with the ITC.

Swales or ditches on terraces shall have a minimum gradient of 5% and must be paved with reinforced concrete not less than 3 inches in thickness or an approved equal paving. They shall have a minimum depth at the deepest point of 1 foot and a minimum paved width of 5 feet.

A single run of swale or ditch shall not collect runoff from a tributary area exceeding 13,500 square feet (projected) without discharging into a down drain.

- c. **Subsurface Drainage.** Cut and fill slopes shall be provided with subsurface drainage as necessary for stability.

- d. Disposal. All drainage facilities shall be designed to carry waters to the nearest practicable drainage way approved by the City or other appropriate jurisdiction as a safe place to deposit such water, erosion of ground in the area of discharge shall be prevented by installation of non-corrosive down drains or other devices.

Building pads shall have a drainage gradient of 2% toward approved drainage facilities, unless waived by the City.

Exception: The gradient from the building pad may be reduced to 1% if all of the following conditions exist throughout the permit area:

1. No proposed fills are greater than 10 feet in maximum depth.
 2. No proposed finish cut or fill slope faces have a vertical height in excess of 10 feet.
 3. No existing slope faces, which have a slope face steeper than 10 horizontal to 1 vertical, have a vertical height in excess of 10 feet.
- e. Interceptor Drains. Paved interceptor drains shall be installed along the top of all cut slopes where the tributary drainage area above slopes toward the cut and has a drainage path greater than 40 feet measured horizontally. Interceptor drains shall be paved with a minimum of 3 inches of concrete or gunite and reinforced. They shall have a minimum depth of 12 inches and minimum paved width of 30 inches measured horizontally across the drain. The slope of drain shall be approved by the city official.

2.0130-EROSIONCONTROL

- a. Slopes. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting, matting or covering. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.
- b. Other Devices. Where necessary, check dams, cribbing, rip-rap or other devices or methods shall be employed to control erosion and provide safety.
- c. Construction. Temporary erosion control facilities shall be used to protect against erosion during construction. See Section 3.0050 for requirements.

2.0140-GRADINGINSPECTION

- a. General. Grading operations for which a permit is required shall be subject to inspection by the City. Professional inspection of grading operations shall be provided by the civil engineer, soil engineer and the engineering geologist retained to provide such services in accordance with Section 2.0140 (e) for engineered grading and as required by the City for regular grading.
- b. Civil Engineer. The civil engineer shall provide professional inspection within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of the development area. If revised plans are required during the course of the work they shall be prepared by the civil engineer.
- c. Soils Engineer. The soils engineer shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and

testing for required. compaction. The soils engineer shall provide sufficient observation during the preparation of the natural ground and placement and compaction of the fill to verify that such work is being performed in accordance with the conditions of the approved plan and the appropriate requirements of this chapter. Revised recommendations relating to conditions differing from the approved soils engineering and engineering geology reports shall be submitted to the permittee, the city inspector and the civil engineer.

- d. **Engineering Geologist.** The engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include professional inspection of the bedrock excavation to determine if conditions encountered are in conformance with the approved report, revised recommendations relating to conditions differing from the approved engineering geology report shall be submitted to the soils engineer.
- e. **Permittee.** The permittee shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this code, and the permittee shall engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the city inspector. In the event of changed conditions, the permittee shall be responsible for informing the city inspector of such change and shall provide revised plans for approval.
- f. **City Inspector.** The city inspector shall inspect the project at the various stages of work requiring approval to determine that adequate control is being exercised by the professional consultants.
- g. **Notification of Noncompliance.** If, in the course of fulfilling their respective duties under this chapter. The civil engineer, the soils engineer or the engineering geologist finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the permittee and to the city inspector.
- h. **Transfer of Responsibility.** If the civil engineer, the soils engineer, or the engineering geologist of record is changed during grading, the work shall be stopped until the replacement has agreed in writing to accept their responsibility within the area of technical competence for approval upon completion of the work.

It shall be the duty of the permittee to notify the city inspector in writing of such change prior to the recommencement of such grading.

2.0150-COMPLETIONOFWORK

- a. **Final Reports.** Upon completion of the rough grading work and at the final completion of the work, the following reports and drawings and supplements thereto are required for engineered grading or when professional inspection is performed for regular grading, as applicable.
 - 1. An as-built grading plan prepared by the civil engineer retained to provide such service in accordance with Section 7014 (e) showing original ground surface elevations, as-graded ground surface elevations, lot drainage patterns, and the locations and elevations of surface drainage facilities and of the outlets of subsurface drains. As-constructed locations, elevations and details of subsurface drains shall be shown as reported by the soils engineer.

Civil engineers shall submit a statement that to the best of their knowledge the work within their area of responsibility was done in accordance with the final approved grading plan.

2. A report prepared by the soils engineer retained to provide such services in accordance with Section 7014 (c), including locations and elevations of field density test, summaries of field and laboratory test, other substantiating data, and comments on any changes made during grading and their effect on the recommendations made in the approved soils engineering investigation report. Soils engineers shall submit a statement that, to the best of their knowledge, the work within their area of responsibilities is in accordance with the approved soils engineering report and applicable provisions of this chapter.
 3. A report prepared by the engineering geologist retained to provide such services in accordance with Section 7014 (e), including a final description of the geology of the site and any new information disclosed during the grading and the effect of same on recommendations incorporated in the approved grading plan. Engineering geologists shall submit a statement that, to the best of their knowledge, the work within their area or responsibility is in accordance with the approved engineering geologist report and applicable provisions of this chapter.
 4. The grading contractor shall submit in a form prescribed by the city inspector in a statement of conformance to said as-built plan and the specifications.
- b. Notification of Completion. The permittee shall notify the city inspector when the grading operation is ready for final inspection. Final approval shall not be given until all work, including installation of all drainage facilities and their protective devices, and all erosion-control measures have been completed in accordance with the approved grading plan, and the required reports have been submitted.

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SECTION 3.0000 - STORM DRAINAGE

3.0010-GENERALDESIGNREQUIREMENTS

Performance Standards - Storm drainage design within a development area must include provisions to adequately control runoff from all public and private streets and the roof, footing, and area drains of residential, multi-family, commercial, or industrial buildings. The design must ensure future extension of the drainage system to the entire drainage basin in conformance with these Design Standards. These provisions include:

- a. Surface or subsurface drainage, caused or affected by the changing of the natural grade of the existing ground or removal of natural ground cover or placement of impervious surfaces, shall not be allowed to flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred, but shall be collected and conveyed in an approved manner to an approved point of disposal.
- b. Surface water entering the subject property shall be received at the naturally occurring locations and surface water exiting the subject property shall be discharged at the natural locations with adequate energy dissipaters within the subject property to minimize downstream damage and with no diversion at any of these points.
- c. The approved point of disposal for all storm water may be a storm drain, dry wells, existing open channel, creek, detention, or retention pond approved by the City. Acceptance of suggested systems will depend upon the prevailing site conditions, capacity of existing downstream facilities, and feasibility of the alternate design.
- d. When private property must be crossed in order to reach an approved point of disposal, it shall be the developer's responsibility to acquire a recorded drainage easement (of dimensions in accordance with Section 3.00240. The drainage facility shall be a closed conduit system. Temporary drainage ditch facilities, when approved, shall be engineered to contain the storm water without causing erosion or other adverse effects.
- e. The design peak discharge from the subject property shall not be increased from conditions existing prior to the proposed development except where it can be satisfactorily demonstrated by the applicant that there is no adverse impact.
- f. Retention/detention facilities will be required where necessary to maintain surface water discharge rates at or below the existing design storm peak discharge except where it can be demonstrated that no adverse impact will result from said facilities not being provided.
- g. Minimum width of an access easement from an existing public road to a drainage facility shall be 15 feet.
- h. Vegetation shall be established on areas disturbed by/or on areas of construction as necessary to minimize erosion, in accordance with Section 3.0050.

All storm drain system designs shall make adequate provisions for collecting all storm water runoff. The system shall accommodate all runoff from upstream tributary areas whether or not

such areas are within the proposed development. The amount of runoff to be accommodated shall be based upon ultimate development of all upstream tributary areas.

Where storm drains are constructed on slopes greater than 20%, in areas designated as hazardous or where there are site conditions that may cause damage to improvements, slippage or slides or determined by the City, a soils and/or geologic report may be required.

For erosion control requirements refer to Section 2.0130.

Where the finished graded surface has a greater than 20% slope, or as required, soil stabilization fabric shall be placed over the entire disturbed area.

Proposed storm drain systems shall not discharge flows into inadequate downstream systems unless approved by the City.

Public storm lines shall be located within the public right-of-way per Section 3.0021.

Standard Drawings relevant to this section may be found in Appendix A.

3.0011-SITEDRAINAGEPLANS

Existing Drainage Plan - Provide a topographical contour map defining existing conditions to include the following minimum information:

- a. Two-foot contour intervals, slopes over 10% may use 5-foot intervals, extend the contours a minimum of 100 feet beyond the property boundary.
- b. All structures, buildings, parking lots and utilities on the property.
- c. Isolation of all existing drainage facilities and water courses, including wetlands and flood plain areas.

Locations of all subsurface water outlets (e.g., - springs.) Show arrows to indicate direction of flow for all drainage information.

Proposed Drainage Plan - Show proposed site grading and drainage facilities on a topographical contour map. Unless the detail for proposed improvements will obscure the conditions shown on the existing drainage plan, proposed site grading and drainage may be shown on the existing drainage plan. The following minimum information shall also be shown.

- a. Finished contours of the property after development shall be at 2-foot contour intervals, slopes over 10% may use 5-foot intervals, extending the contours a minimum of 100 feet beyond the property boundary.
- b. Percent grade, for graded slopes, elevations, dimensions and locations for all graded slopes.
- c. Cut/fill areas, structural fill placement areas, erosion/sedimentation control methods reseeding areas.
- d. All proposed drainage facilities - public and private systems; drainage ditches, culverts.

Drainage Calculations - Furnish such supporting information as required per Section 1.2040.

Detention Requirements - All proposed development will be required to use adequate drainage management practices. Developments located within a master planned drainage basin will follow the recommendations adopted to that plan. Developments not located within master planned drainage basins will minimize the rate and amount of runoff to receiving systems and streams.

3.0012-PIPEMATERIALSANDSIZE

Public storm drains may be constructed of the following materials: Concrete, Ductile Iron, PVC, HDPE.

When pipe has less than minimum cover as defined in Section 3.0023 the pipe material shall be ductile iron.

Public and private storm drain pipe shall meet the appropriate sections of the Uniform Plumbing Code.

All public storm drain lateral lines to catch basins and other inlet structures shall be a minimum of 10 inches in diameter. All public storm drain main lines shall be a minimum of 12 inches in diameter.

3.0013-MINIMUMDESIGNCRITERIA

Storm Frequency - All public storm drain systems shall be designed for the design storm recurrence interval in the following table:

DRAINAGE SYSTEM DESIGN CAPACITY	
Drainage System Element	Design Storm Recurrence Interval (Years)
Minor: Streets, curbs, gutters, inlets catch basin and connector drains	10
Major: Laterals (collectors) < 250 tributary acres	10
Trunk > 250 tributary acres	50*
Arterial Streets and the Drainage System in or under Arterial Streets	50*
Watercourses: without designated floodplain	50
with designated floodplain	100
Bridges	100
Detention Facilities: Storage volume (on site)	25
Storage volume	100
Discharge rate	Function of downstream capacity

* SURCHARGING contained within pipe system will be allowed.

Time of Concentration - Overland flow of runoff to the initial catchment point into the storm drain system shall be a minimum of 5 minutes.

Velocity and Slope - All storm drains shall be on a grade which produces a mean velocity, when flowing full, of at least 3 feet per second.

Manning Equations - When calculating minimum pipe slopes and velocities, the design engineer shall use the Manning pipe friction formula.

Pipe Coefficient - The storm drain pipe roughness coefficient to be used in the Manning formula shall be not less than 0.013.

Storm Water Flows - Several alternative methods are available to design engineers for estimating peak runoff. For areas under 240 acres, the "Rational" formula can be used. Regression equations can only be used as a check on the other methods. For areas over 240 acres, a Hydrographic based formula shall be used.

3.0020-ALIGNMENTANDCOVER

3.0021-RIGHT-OF-WAYLOCATION

Storm drain lines shall generally be located at centerline. All changes in direction of pipe shall be made at an approved structure, except as provided in Section: 3.0022.

3.0022-CURVATURE

Storm drain lines shall not be curved between structures. If unusual circumstances are present, as determined by the City, small diameter storm drains may be curved. Such curves shall conform to the street curvature.

3.0023-MINIMUMCOVER

All storm drains shall be laid at a depth sufficient to protect against damage by traffic and to drain building footings where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the storm drain alignment.

Minimum cover shall be 30 inches above the top of the pipe in paved areas and 36 inches at all other locations. Less than minimum cover shall be allowed only, if unusual circumstances are present, as determined by the City.

The design engineer must show that sufficient depth is provided at the boundary of the development to properly drain the remainder of the upstream basin area tributary to the site.

3.0024-EASEMENTS

- a. When it is necessary to locate storm drains in easements, the storm drain shall be centered in the easement. All storm drain easements shall be exclusive and shall not be used for any purpose which would interfere with the unrestricted use of the storm drain line. Exceptions to this requirement will be reviewed on a case by case basis, (e.g., a utility corridor in a new subdivision).
- b. Easements for storm drain lines 36 inches or less in diameter shall have a minimum width of 15 feet. Easements for storm drain lines greater than 36 inches in diameter, shall have

a minimum width of 20 feet. Wider easement widths may be required for special circumstances.

- c. Open channels shall have easements sufficient in width to cover the 100-year Floodplain Line when a 100-year design storm is required or 15 feet from the waterway centerline or 10 feet from the top of the recognized bank, whichever is greater. A 15 foot wide access easement shall be provided on both sides of the channel for channel widths greater than 14 feet at the top of the recognized bank.
- d. Easement locations for public storm drains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit unobstructed vehicle access for maintenance.
- e. Structures shall not be built over the easements, nor shall trees or large bushes be planted in the easement.
- f. Easements shall be furnished to the City for review and approval prior to recording.

3.0025-RELATIONTOWATERCOURSES

Storm drain lines entering a creek or drainage channel shall be preapproved by DEQ.

3.0030-STRUCTURELOCATION

3.0031-MANHOLES

Manholes shall be included at all changes in slope, alignment, pipe size, and pipe junctions with present or future storm drains. Manhole spacing shall not be greater than 400 feet.

Standard manholes are required when rim to crown of pipe elevations exceed 4 feet at pipe junctions. Flat-top manholes shall be used when rim to crown of pipe elevations are less than 4 feet.

When the downstream pipe size increases, the crown of all upstream pipes shall not be lower than the crown of the larger downstream pipe.

3.0032-CATCHBASINS

Catch basins shall be located in streets at the curb line to receive storm water runoff and convey it to the main storm drain.

Catch basins shall be located at the following locations but in no case be spaced further than 300 feet:

- a. Curb returns on the upstream side of an intersection.
- b. Dead-end streets with a descending grade.
- c. At intermediate locations so that storm flows at the curb line do not exceed 3 feet in width (measured from the curb face) or 3 inches in depth (measured at the curb face,) whichever is less.
- d. At the low points of vertical curves.
- e. For grades greater than 10% the maximum spacing shall be reduced to 150 feet.

- f. For grades less than 1% the maximum spacing shall be reduced to 150 feet.

Catch basins shall be capable of intercepting design storm flows at the curb.

3.0033-DRYWELLS

Where there are no natural or constructed drain ways, or an existing storm water system, dry wells can be used as a discharge point providing they are in accordance with DEQ regulations and are approved by the City.

3.0034-ANCHORBLOCKS

For storm drain pipes greater than four (4) inches in diameter, concrete anchor blocks shall be required if the slopes are greater than twenty (20) percent. Anchor blocks shall key into trench sides. Spacing for anchor blocks is as follows:

SPACING FOR ANCHOR BLOCK FOR ALL SIZE PIPE

SLOPE (%)	MINIMUM SPACING (ft)
0 - 19.99	NO ANCHOR REQUIRED
20 - 34.99	35
35 - 50.99	25
51 - OR MORE	15 OR SPECIAL DESIGN

3.0035-WATERBARS

Where the finished graded surface has a slope greater than or equal to 3 horizontal to 1 vertical or as required, water bars shall be installed. The water bars shall be sloped slightly to drain runoff water away from the pipe line alignment. Water bars shall have a maximum spacing of 40 feet.

3.0040-STORMDETENTION

3.0041-DEVELOPMENTNOTREQUIRINGDETENTION

In general, developments meeting the following criteria will not be required to provide detention:

- a. Land divisions of less than four lots.
- b. Multi-family developments of less than four units.
- c. Commercial and industrial development where the construction of a new or the expansion of an existing facility will not increase the impervious area by more than 5,000 square feet.

3.0042-FLOODPLAININFORMATION

Floodplain information, delineating the 100-year floodplain limits, shall be shown where it occurs within the development. Floodplain limits shall be based on maps prepared by the US Army Corps of Engineers and the Federal Emergency Management Agency (F.E.M.A.) Where better information is available, it shall be used by the Design Engineer.

3.0043-DETENTIONVOLUME

When detention is required, the volume to be detained shall be based on the following:

The rate of runoff from a developed site during a 25-year recurrence interval storm which shall not exceed the pre-development rate of runoff released based on a 10-year recurrence interval storm.

3.0044-EMERGENCYOVERFLOW

The Design Engineer shall assess the impacts of system failure for on-site detention. Overflows may occur due to rainfall intensity which exceeds the design storm, debris blockage of storm drain system, or some other reason.

If a system overflows, it shall not cause inundation of neighboring properties. Potential overflow routes shall be protected from erosion by adequate means.

3.0045-DETENTIONFACILITIES

Detention volume storage methods in order of preference are the following:

- a. Surface storage
- b. Underground storage

3.0050-EROSIONCONTROL

Developments shall provide erosion control methods to limit the removal of soil materials by storm runoff during the construction phases of a project.

3.0051-EROSIONCONTROL-APPLICATION

For subdivision plats temporary erosion control measures also shall be utilized by the applicant during installation of plat improvements and by subsequent builders during construction of dwellings and other lot improvements.

Prior to the initial clearing and grading of any land development, provisions shall be made for the interception of all potential silt-laden runoff that could result from said clearing and grading. Said interception shall preclude any silt-laden runoff from discharging from the proposed land development to downstream properties unless previously approved by the City. Said interception shall cause all silt-laden runoff to be conveyed by open ditch or other means to whatever temporary facility is necessary to remove silt prior to discharge to downstream properties.

Prior to initial clearing and grading of the construction site, an evaluation of the following factors must be carried out:

- a. Soil Erodibility - Soil credibility should be identified using Soil Conservation Service credibility ratings. Erosion control techniques shall be designed accordingly.
- b. Slope and Runoff - Cleared areas will require protection from erosion.
- c. Cover - Erosion protection will be required for all disturbed areas.

Temporary facilities may include silt fences, drain barriers, gravel entries, ditches, surface stabilization or other methods and devices as necessary.

Temporary/permanent hydro-seeding or acceptable seeding and mulching must be provided whenever perennial cover cannot be established on sites which will be exposed after September 1st or prior to June 1st.

3.0060-PRIVATE DRAINAGE SYSTEMS

Private drainage systems shall not enter the public right-of-way and shall be in accordance with DEQ requirements.

3.0061-SUBDIVISIONS

When subdivision lots drain to the rear, it may be necessary to provide a private drainage system in private easements. This system shall be for collection of roof drains, footing drains and surface runoff. This system shall be designed to meet the Uniform Plumbing Code requirements.

3.0062-SUBSURFACE DRAINAGE

Subsurface drains (under drains) shall be provided at the following locations:

- a. For all existing springs and field tile intercepted during construction activity for other facilities, i.e. sewer, water, mains, street excavations, foundations, etc. Subsurface drains are not needed if the tile is removed.
- b. Where high ground water exists or when it is necessary to reduce the piezometric surface to an acceptable level to prevent land slippage or under floor flooding of buildings.
- c. The drainage line installed shall begin at a clean-out and terminate at an approved point of disposal. Open jointed storm drain lines will not be considered as an acceptable solution.

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SECTION 4.0000 - SANITARY SEWERS

4.0010-GENERALDESIGNREQUIREMENTS

Performance Standards - Sanitary sewer system design shall meet the policies and guidelines of the current Oregon Administrative Rules (OAR), and the Oregon Department of Environmental Quality (DEQ) guidelines.

Sanitary sewer systems shall be designed to provide gravity service to all areas of developments. Pump stations are acceptable only if it is not possible to provide gravity service.

Sanitary sewer system capacity shall be designed for ultimate development density of the tributary area. The system shall allow for future system extension and for future development.

Sanitary sewers shall be designed to remove the domestic sewage and industrial wastes from basements of houses, commercial or industrial buildings, and all public and private establishments where practical.

Storm water, including street, roof or footing drainage, shall not be discharged into the sanitary sewer system, but shall be removed by a system of storm drains or by some other method.

Unpolluted or non contact cooling waters shall not be discharged into sanitary sewers. The overflow drains and filter backwash lines of swimming pools and hot tubs shall drain into a sanitary sewer.

As a condition of sewer service, all developments will be required to provide public sewers to adjacent upstream parcels in order to provide for an orderly development of the drainage area. This shall include the extension of sewer mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way. This shall include trunk sewers that are oversized to provide capacity for upstream development.

All sewer service lines shall be extended a minimum of 10 feet beyond the last property served within a subdivision.

All sewer lines shall be located within the public right-of-way as directed by the City Engineer. These lines are placed in the public right-of-way for ease of maintenance, access, control of the facility operation of the facility, and to provide required replacement and/or repair.

Where sewers are constructed on slopes greater than 20%, in areas designated as hazardous or where there are site conditions that may cause damage to improvements, slippage or slides as determined by the City Engineer, a soils and/or geologic report may be required.

Where the finished graded surface is greater than 20%, or as required by the City Engineer, soil stabilization fabric shall be placed over the entire disturbed area.

Notify City's wastewater personnel 72 hours prior to the installation of any sanitary sewer main.

All trench construction shall be Class A conforming to the APWA Oregon Chapter Drawing #301.

Manhole adjustment grade rings shall have a maximum of 12 inches conforming to Oregon Standard Drawing RD 338.

The contractor shall field verify the depth and location of all existing sewer lines to be connected prior to beginning construction. The contractor shall inform the engineer of any discrepancies with the information found in the field compared with that given on the plans.

Where conditions make compliance with these rules impractical, exceptions may be permitted. It will be necessary however, for the design engineer to provide a complete analysis of the need for such exceptions.

The contractor shall not make any connections to new service stubs until after sewer lines have been tested and approved.

4.0011-PIPEMATERIALSANDSIZE

All public sanitary sewers shall be constructed with PVC pipe, conforming to ASTM D 3034 or SDR 35. Where required for added strength, Ductile Iron pipe may be used.

Private sanitary sewers shall meet the appropriate sections of the Uniform Plumbing Code (UPC.)

All sanitary sewer main lines shall be a minimum diameter of 8 inches. 6 inch diameter sewer for non extendible sewers of up to 250 feet in length serving eight (eight) lots or less may be permitted with approval.

4.0012-MINIMUMDESIGNCRITERIA

Velocity - All sanitary sewers shall be designed on a grade which produces a mean velocity, when flowing half-full or full, of no less than 2 feet per second and not to exceed 10 feet per second.

ManningEquation - When calculating minimum pipe slopes and velocities, the engineer shall use the manning pipe friction formula.

PipeCoefficient - The minimum pipe roughness coefficient for sanitary sewers shall be 0.013.

4.0020-ALIGNMENTANDCOVER

4.0021-RIGHTOFWAYLOCATION

Sanitary sewer lines shall be located 5 feet north and west from the right-of-way centerline. All changes in direction of pipe shall be made at a manhole.

Sewers shall be located in the street right-of-way. If streets have curved alignments, the center of the manhole shall not be less than 6 feet from the curb face on the outside of the curve nor the sewer centerline less than 6 feet from the curb face on the inside of the curve.

Curved alignments in sanitary sewers are not permitted.

4.0022-MINIMUMCOVER

Sanitary sewers shall be laid at a depth sufficient to drain building and basement sewers, and to protect against damage by frost or traffic. In new residential hillside subdivisions, main and lateral sewers shall be placed at a depth sufficient to drain structures on the low side of the street.

Sanitary sewers in residential areas shall be placed in the street with the following minimum cover:

Building Service Lateral - 6 feet
Trunk and Collector Sewer - 8 feet
In Easements - 8 feet

Where pipes cross under ditches or streams and the cover is less than 3 feet, extra protection is required in accordance with Section 4.0025.

Where existing sewers are shallow (5 feet or less), the cover shall be a minimum of 3 feet.

Deviation from the above standards will be considered on a case-by-case basis when one of the following circumstances exist:

- a. Underlying Rock Strata: Requires a written request to the City Engineer containing a soils report and a plan and profile certifying bed rock exists 3 feet below the undisturbed ground surface at all investigated alignments.
- b. Crossing a Ditch or Stream: Requires a written request to the City Engineer containing a plan and profile with a horizontal scale of 1" = 20' and a vertical scale of 1" = 2'.
- c. Cover Depth Less than 3 feet: Requires a written request to the City Engineer allowing the use of ductile iron pipe, pipe encasement, or other methods be used.

All trench construction shall be type "B" in accordance with the City standard drawings.

4.0023-SEPARATIONWITHWATERLINES

Mains shall be installed in accordance with OAR 52 a minimum clear distance of 10 feet horizontally and 1.5 feet vertically from water lines. Exceptions to these requirements shall be approved by the City Engineer prior to construction.

The minimum spacing between water mains, storm drains, gas lines, and other underground utilities shall be three feet (3') horizontally when the standard utility location cannot be maintained.

4.0024-EASEMENTS

Easements will only be allowed when there is no other alternative for sewer service.

Sewers placed in easements along a property line shall have the easement centered on the property line and the sewer shall be offset 18 inches from the property lines. For sewers placed in an easement located other than along a property line, the sewer shall be placed in the center of the easement. The conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for sewer main purposes. Under no circumstances shall a building or structure be placed over a sanitary sewer easement. This shall include overhanging structures with footings located outside the easement. Further, no trees or large bushes shall be planted in the easement.

Easements for sewers less than 12 inches in diameter shall have a minimum width of 15 feet. Sewers greater than 12 inches in diameter shall have a minimum easement width of 20 feet.

Sewers with more than 8 feet of cover and/or inside diameters 24 inches or greater will require wider easements. A slope of one horizontal to one vertical from the sewer invert to ground surface will be used to determining easement width. Easement widths shall increase from the 15 foot minimum by 5 foot increments; for instance, 15, 20, 25 feet.

Easement locations for public sewer mains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit unobstructed vehicle access for maintenance by City personnel. Full vehicle access shall be provided to all sewer easements, pipelines, cleanouts and manholes outside of public right-of-way.

All easements shall be submitted to the City for review and approval prior to recording.

4.0025-RELATIONTOWATERCOURSES

Generally, the top of all sanitary sewers entering, crossing or adjacent to streams, irrigation ditches or drainage ways shall be at a sufficient depth below the natural bottom of the waterway to protect the sewer line. One foot of cover is required where the sewer is in rock, 3 feet of cover is required in other materials. In paved channels, the top of the sewer line shall be placed at least 6 inches below finish grade of the batten of the channel, except as provided above.

Sewers located along streams shall be located outside of the stream bed and sufficiently removed there from to provide for future possible stream channel widening. All manhole covers shall be watertight, at or below the 100 year flood elevation.

Sewers crossing streams or drainage channels shall be designed to cross the stream as nearly perpendicular to the stream channel as possible and shall be free from change in grade. The minimum cover shall be 36 inches from the bottom of the stream bed or drainage channel.

Pipe material shall be ductile iron with an 18 foot length of pipe centered on the stream or drainage channel centerline. The ductile iron pipe shall extend to a point where a one-to-one slope, which begins at the top of the bank and slopes down from the bank away from the channel centerline, intersects the top of the pipe.

A scour pad centered on the sewer line will be required when the top of the pipe to the bottom of the stream or drainage channel is 30 inches or less. The scour pad shall be concrete, 6 inches thick and 6 feet wide, reinforced with number 4 rebar spaced 12 inches on center both ways and shall extend to a point where a one-to-one slope, that begins at the top of the bank and slopes down from the bank away from channel centerline intersects the top of the pipe. Deviations from the above requirements shall require review and approval on a case-by-case basis.

4.0030-STRUCTURES

4.0031-MANHOLES

Manholes shall conform to ASTM C-478.

Manholes shall be located at changes in slope, alignment, pipe size, and at all pipe junctions with present or future sanitary sewers.

Manhole spacing shall not exceed 400 feet, unless approved by the City Engineer.

The angle between incoming and out going sewer lines shall be greater than 80 degrees.

Manholes are shown in the Standard Drawings. They are suitable for most conditions. New designs or revisions should not be shown on the construction drawings unless the standard designs are not suitable. New or revised designs may be necessary if:

- a. One or more of the sewers to be connected to the manhole is over 36 inches in diameter. Smaller diameters may require a special design if the manhole is at an alignment change.
- b. Several sewers will be connected to the manhole.
- c. There is less than 80 degrees between the incoming and outgoing sewer.

- d. The manhole will be subject to unusual structural loads.
- e. Diversion or other flow control measures are required.

Where one or more of conditions a), b), or c) are encountered, a drawing of the manhole base should be made to determine if it is feasible to use designs shown in the Standard Drawings. It may be necessary to restrict the options to a specific Standard Drawing specified by a note on the construction drawings. If a special design is required for any reason, it will be necessary to show the details on the construction drawings and to provide structural calculations as needed.

Some alternate manhole features are shown in the Standard Drawings. Where these features are required, they must be specified by a note on the construction drawings. Some examples are:

- a. Flat tops must be used in lieu of cones where there will be less than 4 feet between the manhole shelf and the top of the manhole
- b. Watertight manhole frames and covers are to be used if flood waters are expected to cover the manhole top or if the manhole must be located in the street gutter. Such conditions should be avoided wherever feasible.
- c. Tamper-proof manhole frames and covers are required in areas subject to vandalism, such as areas which are not readily visible to the general public or the property occupants.

Standard for elevation differences at manholes have been established to compensate for normal energy losses and to prevent surcharging of a sewer by a larger sewer. For purposes of slope calculation and for establishing elevation differences, the elevations are given at the intersection of the sewer centerline (usually the center of the manhole). The rules for elevation differences at manholes are:

- a. The crowns of incoming sewers shall be at least as high as the crown of the outgoing sewer.
- b. If the incoming and outgoing sewers are of equal size and are passing straight through the manhole, no added elevation change is required.
- c. If sewers intersect or the alignment changes at the manhole, the invert elevation difference shall be at least 0.10 feet for 0 to 45 degrees of horizontal deflection angle, and 0.20 feet for over 45 degrees of horizontal deflection angle.
- d. The slope of a sewer within a manhole shall be no less than the slope of the same sewer outside of the manhole.
- e. Where the difference between the slope of the incoming and out going pipe is greater than 6%, the slope across the manhole shall be the average of the incoming and outgoing pipes.
- f. Drop connections are required when the vertical distance between flow lines exceeds 2 feet. The diameter of the drop connection must be specified on the construction drawings. The diameter of the drop connection shall not be more than one pipe size smaller than the diameter of the incoming sewer. Smooth flow lines with vertical distances of less than 1 foot must be provided wherever feasible. Drop connections shall be outside drops.
- g. All connections must enter the manhole through a channel in the base. This includes drop connections and connections to existing manholes.

Where conditions make compliance with these rules impractical, exceptions will be permitted. It will be necessary, however, for the designer to provide a complete analysis of the need for such designs.

4.0032-CLEANOUTS

Cleanouts will not be approved as substitutes for manholes on public sewer lines. Clean outs are permitted at the upper end of a sewer that will be extended during a future construction phase. When the sewer is extended, the clean out will be removed and a manhole shall be installed in the appropriate location. If future extension requires a change in sewer alignment or grade, a manhole will be required at the cleanout location.

Cleanouts are permitted at the end of a non-extendable sewer line that does not exceed 250 feet in length nor serve more than eight lots.

4.0033-ANCHORBLOCKS

For sewer pipes greater than 4 inches in diameter, concrete anchor blocks shall be required if the slopes are greater than 20%. Anchor blocks shall key into trench sides. Spacing for anchor blocks is as follows:

SPACING FOR ANCHOR BLOCK FOR ALL SIZE PIPE

SLOPE %	MINIMUM SPACING (FT)
0 - 19.99	NO ANCHOR REQUIRED
20 - 34.99	35
35 - 50.99	25
51 - OR MORE	15 OR SPECIAL DESIGN

4.0034-WATERBARS

Where the finished graded surface has a slope greater than or equal to 3 horizontal to 1 vertical or as required, water bars shall be installed. The water bars shall be sloped slightly to drain runoff water away from the pipe line alignment. Water bars shall have a maximum spacing of 40 feet.

4.0040-SERVICELATERAL

Service laterals are those public sewer lines to which a private building sewer connects.

Each individual building site shall be connected by a separate private building sewer service line connected to the public sewer. Combined sewer service lines will be permitted only when the property cannot legally be further divided. Examples of this are a residential lot with a house and an unattached garage or shop with plumbing facilities.

The minimum inside diameter of a sewer service lateral shall be 4 inches and shall be equal to or greater than the building sewer diameter. Service laterals are to be built to the same construction standards and of the same materials as the sewer mainline. Service laterals in general shall be placed at 90 degrees to the main sewer line to avoid excessive exposure to other utilities during excavation for construction or maintenance of the service lines. Angles other than 90 degrees may be approved for special conditions such as cul-de-sac lots. In no case shall the angle between the main and the service be less than 90 degree. Service line connections shall not be made at manholes except at cul-de-sacs.

The minimum slope of sewer service lines shall be 2% except that for unusual conditions, a slope of 1% may be approved. It will be necessary, however, for the designer to provide a complete analysis of the need for any sewer service lateral slope less than 2%. The maximum slope shall be 100% (45 degrees or one foot per foot). Deep connection risers (see the Standard Detail for service lateral to deep sewers) or drop connections to manholes must be used where service line slopes would exceed 100%.

Tees for service laterals shall be installed at 100% slope, and 1/16 or 1/8 bends shall be installed to provide proper grade for service lateral. Service laterals shall be extended to the end at the street right-of-way line or easement line, when a sewer is installed in the easement. A water tight plug shall be installed in the end of the lateral and a 2" x 4" wood marker shall be placed at the lateral end from the pipe invert to 2 feet above the ground. The 2" x 4" top shall be painted green and marked with the depth of the lateral measured from ground to invert of pipe. A green tracer wire shall also be installed on the service line. The curb shall have an "S" stamped on the curb at lateral crossing.

The contractor shall not make any connections to new service stubs until after sewer lines have been tested and approved.

4.0050-CONNECTIONTOEXISTINGSEWERS

Connections to, and extensions of, existing sewers will occur to facilitate new development.

Connections to existing manholes shall be made with the following guidelines:

- a. Where the invert of the connecting pipe is two feet or less above the manhole shelf, a beaver slide will be constructed utilizing Portland Cement concrete. The sewage entering the manhole will follow a smooth concrete channel transitioning evenly from the invert of the inlet pipe into the main channel. Sewage will not be allowed to fall freely to the manhole base.
- b. Where the invert of the connecting pipe is more than two feet above the manhole shelf, the contractor will be required to construct an outside drop with the inlet pipe invert being located at the manhole shelf. The sewage entering the manhole will follow a smooth concrete channel transition from the inlet pipe into the main channel.
- c. Where the invert is required to enter below the shelf of the manhole, the inlet pipe will not enter below a point where the crown of the new inlet pipe is below the crown of the outlet pipe. The base of the manhole will be rebuilt if damaged in this process. The sewage will enter the main flow in a smooth channel transitioning from the inlet pipe to the main channel.
- d. No pipe will enter an existing manhole where the angle between the incoming flow and the outgoing flow is greater than 90 degrees.

When sewers are extended from cleanouts, the entire cleanout assembly, including the wye, shall be removed.

New building service laterals will be made at existing tees where possible.

When tees do not exist on the Public Sanitary Sewer System, the new lateral sewer will enter the collection system through a "cored opening with an approved connector.

4.0060-PRIVATESEWERLINES

Private sewer systems shall be constructed in accordance with the UPC.

4.0070-SYSTEMTESTING

All pipe shall be pressure tested and manholes leak tested per the current ODOT / APWA, Standard Specifications for Construction.

4.0080-SEWAGEPUMPSTATIONDESIGNSTANDARDS

4.0081-GENERAL

The pump station shall be a Duplex submersible pumping system facility as shown in the City's Developer Pump Station.

The station shall be designed by an engineer registered in the State of Oregon and experienced in the design of such facilities. Service area peak flows, pump station cycle and hydrogen sulfide calculations shall be submitted to the City for review and approval.

4.0082-CONSTRUCTION

Station construction will include: wet well, pump enclosure, associated piping and valves, electrical controls, automatic dialer, alarm system compatible with current alarm system, emergency power transfer switch and connection receptacle, lighting, heater, ventilating fan, instrumentation, access road, fencing, landscaping, potable water supply, and shall conform to the Department of Environmental Quality (DEQ) standards and Oregon Administrative Rules (OAR) Chapter 340, Division 52.

4.0083-CAPACITIES

Pump station shall be designed to pump the peak waste water flow from the service area. When the service area is not built out, staging of pump station capacity will be allowed. The wet well shall be sized to allow for a minimum number of starts per hour. Inlet piping will not be used as a portion of the wet well.

4.0084-HYDROGENSULFIDE

Calculations for hydrogen sulfide production shall be performed. Hydrogen sulfide control equipment shall be installed as required. The method used (flow back, air injection, chemical injection) shall be reviewed and approved by the City Engineer.

4.0085-ELECTRICAL

a. ELECTRICAL

Pump station and related facilities will be constructed to Electrical and Building Codes.

Electrical controls shall be located above ground mounted in a waterproof enclosure. Electrical panels shall be listed. The pump station wet well shall be considered a hazardous location. Level controls in the wet well shall be intrinsically safe.

b. CONTROLS

Controls may be mechanical relays or programmable logic-controllers. Pumps shall automatically alternate lead-lag position with each pumping cycle.

Pump level control shall be by multi-trode.

c. POWER

An auxiliary power connector shall be mounted on the exterior of the station with a manual transfer switch mounted in the interior.

Where the flow is substantial or where environmental damage may occur due to power failure, the City Engineer may require permanent standby power.

Alarms include: Power failure
 Telemetry failure
 High water level

4.0086-MATERIALS

a. PUMPS

A minimum of two pumps shall be supplied. Each pump shall be capable of pumping the peak waste water flow. Where more than two pumps are used, the station shall be able to pump peak waste water flow when the largest pump is out of service.

Pumps shall be submersible, manufactured by Hydromatic, Gorman Rupp or equal, explosion-proof suitable for hazardous location when required, and shall be UL or FM listed.

b. PIPING & VALVES

Piping and fittings shall be ductile iron to a point at least 2 feet outside the station. Valves shall be metal, suitable for wastewater use. Valves shall be designed for wastewater service. Provide pressure gages with isolation and purge valves on pump suction and discharge piping.

Steel fabrications shall be hot dipped galvanized. Painting is required on valves, piping, and pipe fittings.

Force main shall be designed for nominal flow velocity in the range of 3 to 5 ft/sec.

Force mains shall not be less than 4 inches in diameter for raw sewage.

c. SPARE PARTS

Supply two sets each of all gaskets, bearings, V-belts, and mechanical seals for rotation equipment.

4.0087-ADDITIONALFEATURES

Provide 1-inch anti-freeze hose bib. Potable water shall be provided by an above ground reduced pressure back flow Preventer.

Provide positive ventilation in the enclosure.

Provide odor control as required.

Landscaping will only be required when the station is visible from the public roadway and then only to blend with the local aesthetics.

A 6 foot high chain link fence shall surround the pump station when required by the City Engineer.

4.0088-OPERATINGANDMAINTENANCEDATA

Compile product data and related information appropriate for City's maintenance and operation of products furnished under the contract.

Prepare operations and maintenance manual.

Instruct City's personnel in the maintenance of products and in the operation of equipment and systems.

4.0090-EROSIONCONTROL

Erosion control will be required for all areas disturbed during construction and following construction until permanent protection is established.

Temporary facilities may include silt fences, drain barriers, gravel entries, ditches, surface stabilization or other devices as necessary.

Temporary/permanent hydro-seeding or acceptable seeding and mulching must be provided whenever perennial cover cannot be established on sites which will be exposed after September 1 or prior to June 1.

CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

SECTION 5.0000 - WATER MAINS

5.0010-GENERALDESIGNREQUIREMENTS

Performance Standards - Water distribution systems shall be designed to meet State Water Administrative Rules and guidelines of the Water System Master Plan and its updates.

Water system design shall provide adequate flow for fire protection and maximum water usage and consumption. Required water system demands shall be met by maintaining the minimum operating pressures required by the City. For single family residential areas the minimum static pressure shall be 50 psi, and the minimum fire flow shall be 1000 gpm. For all other developments, the required fire flow shall be as determined by the Fire Chief.

Water system design shall meet distribution needs for maximum water usage and consumption within a given service area. New water systems shall be extended to the far side of the property to allow for future extensions beyond present development and to be consistent with the Water System Master Plan.

All water lines shall be located within the public right-of-way or as directed by the City Engineer. The City Engineer, under special conditions, may allow a public water line to be located within a public water easement as referenced in Section 5.0024.

Where water lines are constructed on slopes greater than 20%, in areas designated as hazardous or where there are site conditions that may cause damage to improvements, slippage or slides as determined by the City Engineer, a soils and/or geologic report may be required.

Where the finished graded surface is greater than 20%, or as required by the City Engineer, soil stabilization fabric shall be placed over the entire disturbed area.

5.0011-PIPEMATERIALSANDSIZE

All public water distribution systems shall be constructed with ductile iron pipe of the class shown in the following table.

Pipe size (inches)	D.I. Class
8 and smaller	52
10	51
12	50

Pipes shall be cement mortar-lined pipe with tyton push-on or mechanical type joints. When a corrosive potential condition is encountered, all ductile iron pipe and fittings will be polyethylene encased with an 8 mil tubing meeting manufacturer and AWWA standards. Where an active cathodic protection system is encountered as a result of other utilities, a deviation from the normal pipe design material/installation practice may be required by the City Engineer.

All pipe shall be pressure rated for 150 psi and all valves and fittings shall be pressure rated at 350 psi for ductile iron. All fittings shall be factory cement lined and coated. Pipe constructed per Section 5.0025 will require the use of restrained pipe joints or ball and socket river pipe.

Service lines shall be as shown in the following table.

Service Pipe Size (inches)	Pipe Material
1 1/2 and Smaller	Type K Copper Tubing
2	Polyethylene
3 and Larger	Ductile Iron

Water distribution main sizes shall conform to the following:

- 4-inch A looped water main utilized in residential streets on dead-end streets (cul-de-sac) with less than 450 feet measured from the center of the street intersection and the radius point of the cul-de-sac with no more than 12, ¾ inch residential services. The actual number of services will be based on actual flow and pressure available. Fire hydrants are not permitted on 4 inch lines.
- 4-inch Non-looped water mains may only be used with approval of the City Engineer residential zones on dead-end streets less than 250 feet measured from the center of the intersection street to the radius point of the cul-de-sac with service to not more than 12 residences and shall be connected to a looped minimum six-inch main. Fire hydrants are not permitted on four-inch lines. Dead end 4 inch lines shall terminate with a standard 2 inch blow off.
- 6-inch Minimum size residential subdivision distribution water main for the grid (looped) system and for fire protection, not to exceed an unsupported length of 600 feet and shall not be permanently dead-ended. Looping of the distribution grid shall be at least every 600 feet.
- 8-inch Minimum size for permanently dead-ended mains supplying fire hydrants with a fire flow less than 1,500 gpm and for primary feeder mains in residential subdivisions.
- 10-inch As required for primary feeder lines in subdivisions, industrial and commercial areas.

Water service lines shall conform to the following:

- ¾" Residential services.
- 1" and up Public, Commercial, Industrial and other non-residential uses shall be sized per actual usage.

Velocity in distribution mains shall be designed not to exceed 5 feet per second. Velocity in service lines shall not exceed 10 feet per second in accordance with Section 5.0050..

5.0012-GRIDSYSTEM

The distribution system mains shall be looped at all possible locations. All developments will be required to extend mains across existing or proposed streets for future extensions by the City or other developments. All terminations shall be planned and located such that new or existing pavement will not have to be cut in the future when the main is extended. The installation of

dead-end water mains with a length greater than 250 feet upon which fire protection is dependant and the dependence of relatively large areas on single mains shall not permitted.

5.0013-DEAD-ENDMAINS

Dead-end mains which will be extended in the future shall be provided with a line-size gate valve and MJ plug at the end and tie rodded. The valve plug shall be tapped 2 inch and provided with a standard blow-off, except that the 2 inch gate valve shall not be installed.

Permanent dead-end mains shall terminate with a standard blow-off assembly.

5.0020-ALIGNMENTANDCOVER

5.0021-RIGHT-OF-WAYLOCATION

Water systems shall be located 12 feet south and east from the right-of-way centerline except as provided in Section 5.0024 or as directed by the City Engineer. All abrupt changes in vertical or horizontal alignment shall be made with a concrete thrust block, a megalug, MJ grip ring or as required by the City Engineer. Curved alignment for water lines or mains is permitted and shall follow the street centerline when practical. The minimum allowed radius shall be based on allowable pipe deflection for the pipe diameter and the pipe laying length, but shall not to exceed 3 degree joint deflection.

5.0022-MINIMUMCOVER

The minimum cover over buried water mains within the street right-of-way or easements shall be 36 inches from finish grade.

Deviation from the above standards will be considered on a case-by-case basis when the following exists:

- a. When there is underlying rock strata that prohibits placement of the water main 36 inches below finish grade, a written request must be submitted to the City Engineer together with submission of a soils report with a plan and profile certifying that bed rock exists less than 3 feet below the undisturbed ground surface.

5.0023-SEPARATIONWITHSEWERLINES

Water mains shall be installed a minimum clear distance of 10 feet horizontally from sanitary sewers and shall be installed to go over the top of such sewers with a minimum of 18 inches of clearance at intersections of these pipes. Exceptions shall first be approved by the City Engineer. In all instances, the distances shall be measured edge to edge. The minimum spacing between water mains and storm drains, gas lines, and other underground utilities, excepting sanitary sewers, shall be 3 feet horizontally when the standard utility location cannot be maintained.

Where water lines are being designed for installation parallel with the other water mains, utility pipe, or conduit lines, the vertical separation shall be 12 inches below or in such a manner which will permit future side connections of mains, hydrants, or services and avoid conflicts with parallel utilities without abrupt changes in vertical grade of the above mentioned main, hydrant, or service. Where crossing of utilities are required, the minimum vertical clearance shall be 6 inches.

5.0024-EASEMENTS

Mains placed in easements along a property line shall have easements centered on the property line and shall be offset 18 inches from the property line. For mains placed in easements located other than along a property line, the main shall be placed in the center of the easement. Easements, shall be exclusive and a minimum of 15 feet in width. The conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for water main purposes. Under no circumstances shall a

building or structure be placed over a water main or water main easement. This includes overhanging structures with footings located outside the easement. Further, no trees or large bushes shall be planted in the easement.

Easement locations for public mains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit unobstructed vehicle access for maintenance by City personnel.

Water mains located within a water main easement will be permanently marked with steel posts and metal signs at all angle points and no less than every 100 feet. In addition, such posts and signs shall be placed where the water line intersects the public right-of-way at the easement location. A monument cap set in the pavement of parking lots shall be an acceptable alternative to the post and sign. The City shall provide wording for the sign/monument.

Easements shall be furnished to the City for review and approval prior to recording.

5.0025-RELATIONTOWATERCOURSES

New water mains may cross over or under existing streams, ponds, rivers, or other bodies of water.

- a. Above Water Crossings - The pipe shall be engineered to provide support, anchorage, and protection from freezing and damage, yet shall remain accessible for repair and maintenance. All above water crossings will require review and approval by the City.
 1. Valves shall be provided at each end.
 2. Air/Vacuum relief valves shall be provided.
- b. Underwater Crossings
 1. Mains which cross stream or drainage channels shall be designed to cross as nearly perpendicular to the channel as possible.
 2. Valves shall be provided at both ends of the water crossing so that the section can be isolated for testing or repair. The valves shall be easily accessible and not subject to flooding. The valve nearest to the supply source shall be in a valve box. Permanent taps shall be made on each side of the valve within the manhole to allow insertion of a small meter for testing to determine leakage and for sampling.
 3. The minimum cover from the bottom of the stream bed or drainage channel to the top of pipe shall be 36 inches.
 4. A scour pad centered on the water line will be required for the top of the pipe to the bottom of the stream bed or-drainage channel is thirty inches (30") or less. The scour pad shall be concrete, 6 inches thick and 6 feet wide, reinforced with number 4 bars on 12 inch centers in both directions and shall extend to a point where a one-to-one slope, that begins at the top of the bank and slopes down from the bank away from channel centerline intersects the top of the pipe.

- c. The following surface water crossings will be treated on a case-by-case basis:
1. Stream or drainage channel crossing for pipes 12 inches inside diameter and greater.
 2. River or creek crossings requiring special approval from the Division of State Lands.

5.0030-APPURTENANCES

5.0031-VALVES

Valves shall be the same size as the water main. Main line valves shall be resilient seated gate valves meeting the requirements of AWWA C509. Valves 16 inches and larger shall be butterfly valves.

Distribution system valves shall be located at tee or cross fittings. There shall be a sufficient number of valves so located that not more than 4 and preferably 3 valves must be operated to affect any particular shutdown. Spacing of valves shall not exceed 500 feet in commercial or industrial areas and shall not exceed 800 feet in other areas.

Tees and crosses shall have valves on all branches. Transmission water mains shall have valves at not more than 1,000 foot spacing. Hazardous crossings, such as creek, railroad and highway crossings, shall be valved on each side.

Distribution tees and crosses with valves for future branch lines on transmission mains may be required as directed by the City Engineer.

5.0032-VALVEBOXES

Valve Boxes shall be Olympic Foundry, Inc. VB 910 (10 or 18 inch) or approved equal with "W" or "WATER" on the lid. Valve box extensions shall be 6 inch Schedule 40 PVC pipe extending 6 to 8 inches into the valve box.

5.0033-BLOWOFFASSEMBLIES

Blow off assemblies shall include at the lower elbow a 3/16 inch drain hole surrounded by drain rock. Assemblies which are outside of surfaced areas shall include a concrete pad no less than 2 feet square with a 2" X 4" wooden marker painted blue extending a minimum of 3 feet above the ground.

5.0034-FIREHYDRANTS

Hydrant shall be Clow Medallion, Waterous Pacer WB 67-250, M&H 929, or Kennedy Guardian K81D or approved equal meeting the following requirements:

- Hydrants shall be manufactured in accordance with AWWA Standard 0502, be listed by Underwriters Laboratories, Inc. and have Factory Mutual Research Approval.
- Hydrants shall be designed for 200 psi working pressure and tested to 400 psi Hydrostatic pressure.
- Hydrants shall be backed by manufactures 5-year limited warranty.
- Hydrants shall be dry-top center stem construction having an O-Ring sealed lubrication reservoir.
- Hydrants shall be manufactured with the operating and thrust nuts made of bronze, with bearings located both above and below the thrust collar and with the operating nut protected by a cast-iron weather shield.

- Hydrants shall be manufactured with nozzles mechanically locked into the barrel and having O-Ring pressure seals.
- Hydrants shall be a "Traffic Model", complete with safety flanges and steel stem coupling. Nozzle section must rotate 360 degrees.
- Hydrants shall be manufactured with a main valve seat ring of bronze threaded into a bronze drain ring. A 360 degree drain channel shall have a minimum of two drain outlets.
- Hydrants shall have a bronze upper valve plate and two urethane rubber facings that activate the drain ports.

Hydrants shall be painted with two coats of Benjamin Moore, Industrial Urethane Alkyd Gloss Enamel, M22-21 Safety Red, M22-41 Safety Green, M22-82 Safety Black. The hydrant body shall be red. The caps and bonnet color are dependant upon the water main at the tee to hydrant, 6 inch main shall be black and 8 inch main and larger shall be green in accordance with the water department painting code.

Hydrants shall be installed on minimum 8 inch diameter water mains. If the water system is a looped system hydrants may be installed on minimum 6 inch diameter water mains. The hydrant lead pipe shall be minimum 6 inch diameter.

All fire hydrants will be located 6 inches behind sidewalks and behind the existing or proposed curb. Hydrants which encroach on private property shall require an easement as directed by the City Engineer.

Hydrants shall not be installed within 5 feet of any existing aboveground utility nor shall any utility install facilities closer than 5 feet from an existing hydrant.

Full-depth hydrants will be required in all installations. Hydrant extensions require prior approval of the City Engineer.

Hydrants shall not be located within 20 feet of any building, nor will they be blocked by parking. The large hydrant port should face the road or travel way.

Hydrant guard posts a minimum of 3 feet high shall be required for protection from vehicles when necessary. Such protection shall consist of 4 inch diameter steel pipes 6 feet long filled with concrete and buried a minimum of 3 feet deep in concrete and located at the corners of a 6 foot square with the hydrant located in the center. Use of posts other than at the four corners may be approved by the City Engineer.

Residential hydrants shall be located as nearly as possible to the corner of street intersections and not more than 500 feet from cul-de-sac radius points.

The distribution of hydrants shall be based upon the required average fire flow for the area served. Design coverage shall result in hydrant spacing of approximately 500 feet in residential areas, approximately 300 feet in commercial or industrial areas or as approved by the Fire Chief and City Engineer. In addition, sufficient hydrants shall be available within 1000 feet of a building in commercial/industrial areas to provide its required fire flow.

The public fire hydrant system shall be designed to provide up to a maximum of 3,500 GPM. The distribution system shall be designed in commercial/industrial areas to accommodate fire flows up to 4,500 GPM or as required by the Fire Chief. Minimum fire flow in single family residential areas shall be 1500 GPM.

5.0035-PRESSURE-REDUCINGANDAIRRELEASEVALVES

The City's water distribution system is divided into several pressure zones. Where water systems cross these zone lines, a pressure-reducing valve station will be required. The specific design and location for such valves shall require review and approval by the City Engineer.

When required by the City Engineer, air release valves shall be installed. Such valves are required on large diameter lines at all high points in grade.

5.0036-RAILROADORHIGHWAYCROSSINGS

Such crossings defined above, or as determined by the City, shall be valved on both sides of the crossing. Casing of railroad or highway crossings, if required, shall be as noted in the permit from the respective agency.

5.0037 – ANCHOR BLOCKS

For water pipes greater than 4 inches in diameter, concrete anchor blocks shall be required if the slopes are greater than 20%. Anchor blocks shall key into trench sides. Spacing for anchor blocks is as follows:

SPACING OF ANCHOR BLOCKS FOR ALL PIPE SIZES

SLOPE %	MINIMUM SPACING(ft)
0 - 19.99	NO ANCHOR REQUIRED
20 - 34.99	35
35 - 50.99	25
51 - OR MORE	15 OR SPECIAL DESIGN

5.0038-WATERBARS

Where the finished graded surface has a slope greater than or equal to 3 units horizontal to 1 unit vertical or as required, water bars shall be installed. The water bars shall be sloped slightly to drain runoff water away from the pipe line alignment. Water bars shall have a maximum spacing of 40 feet.

5.0040-BACKFLOW PREVENTION

Back flow prevention devices shall be required on all 1½ inch and larger water services as provided for in Oregon Administrative Rules, Chapter 333.

5.0050-WATERSERVICELINES

The sizes of water service lines which may be used are ¾, 1, 2, 4, 6, 8, 10, and 12 inch. Water service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

For 2 inch and greater services, a design drawing must be submitted showing the vault and fitting requirements with the expected flow (normal and maximum daily flow) requirements and proposed usage.

Domestic service lines ¾ inch through 2 inch shall normally extend from the main to behind the curb with a meter setter and meter box located at the termination of the service connection. Meters shall be provided and installed by the City at the cost of the developer. Meter boxes shall be provided by the developer. Individual service connections shall terminate in front of the property to be served and shall be located 2 feet on each side of a common property line.

Meters shall be provided by the City for individual services.

Meter boxes shall be made of molded plastic with a minimum traffic rating of 25k having a white interior and flip-up reader lid. Meter boxes for ¾ inch services shall be Mid States Plastics model MSBCF1324-12, using 1-12 inch bottom section and 2-12 inch body sections or .1-18 inch bottom section and 1-18 inch body section.

Meter setters for ¾ inch services shall be Ford model VBH 73-15W(44-33G) with tie bar or AY McDonald model 21-315WD22-33 with tie bar and full ¾ inch copper tubing.

Hot Taps shall be permitted with prior authorization of the City. The City shall inspect the hot tap and the coupon shall be relinquished to the inspector.

A 2" x 4" marker post painted blue extending 3 feet above grade shall be installed for each service line.

When the service line is 1 inch or smaller, a Brooks meter box Series 38-S (C.I.) shall be provided. For other water service details refer to the City water department.

Fire Service - There are three categories of private fire services: 1) hydrants, 2) fire sprinkler lines, and 3) combination hydrant and fire sprinkler lines.

The water fire service line shall normally extend from the main to the property line and end with a vault, metering device and valves. A double detector check back flow prevention device installed in a vault shall be required at each property being served.

Fire Vaults - A vault will be required when a development provides fire sprinklers. The vault drawing will be included on construction drawings submitted to the City. The vault shall contain all valves, fittings, meters, and appurtenances required for fire service to the development.

5.0060-SYSTEMTESTING

All new water systems (lines, valves, hydrants, & services) shall be individually pressure tested, chlorinated and tested for bacteria. The required tests shall be performed in accordance with the current ODOT / APWA Oregon Standard Specifications for Construction, and OAR's. Tests shall be performed in the presence of a City representative. The City requires notification for scheduling of water main testing a minimum of 72 hours prior to the start of testing.

5.0070-EROSIONCONTROL

Erosion control will be required for all areas disturbed during construction and following construction until permanent protection is established.

Temporary facilities may include silt fences, drain barriers, gravel entries, ditches, surface stabilization or other devices as necessary.

Temporary/permanent hydro-seeding or acceptable seeding and mulching must be provided whenever perennial cover cannot be established on sites which will be exposed after September 1st or prior to June 1st.

CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

SECTION 6.0000 - STREETS

6.0010-GENERALDESIGNREQUIREMENTS

Performance Standards - All street design shall provide for the safe and efficient travel of the motoring public. Streets shall be designed to carry the recommended traffic volumes identified for each street classification. Street classifications shall be in accordance with Section 6.0110, STREET SYSTEM DESCRIPTION AND FUNCTION.

Streets shall be designed to meet or exceed minimum guidelines in accordance with the current AASHTO, "Policy on Geometric Design of Highways and Streets". Traffic Control and Traffic Control Devices shall conform with the current Federal Highway Administration "Manual on Uniform Traffic Control Devices for Streets and Highways". and ODOT / APWA Supplements.

All vertical and horizontal curves shall meet the guidelines of the AASHTO Policy, the design speed and street classification. Where practical, the Design Engineer shall provide the desirable stopping sight distance set forth in the AASHTO Policy, but in no case shall it be less than the minimum stopping sight distance.

Standard Drawings relevant to this section may be found in Appendix A.

6.0011 - RIGHT-OF-WAY AND PAVEMENT WIDTH

Right-of-Way and minimum pavement widths for each street classification shall be as follows:

Classification	<u>Right-of-Way (feet)</u>	<u>Pavement Width (feet)</u>
Arterial (Major)	90	70
Arterial (Minor)	80	48
Collector	54	36 (b, d)
Local (Residential)	54	34 (a, c)
Cul-de-sac Turnaround	54	45 (a)

- a. In special conditions, right-of-way width may be reduced to 40 feet and the pavement width may be reduced to 28 feet, with approval of the City.
- b. In Commercial/Industrial areas the minimum pavement width shall be 44 feet, with approval of the City.
- c. In Commercial/Industrial areas the minimum pavement width shall be 40 feet, with approval of the City.
- d. In special conditions the pavement width may be reduced to 32 feet, with approval of the City.

On streets with raised island medians the minimum pavement width shall be 20 feet.

For street designated collector and below, the City may consider design modifications to conserve major trees in the public right-of-way.

6.0012 - ACCESS

All developments shall be provided public street access. Access roads - public and/or private, approaches, and easements shall be as set forth in other sections of these Design Standards.

6.0013 - TRAFFIC ANALYSIS

The City will require a traffic analysis report as determined by the type of development and its potential impact to existing street systems. A traffic analysis report may be required for a development when: 1) it will generate 1,000 vehicle trips per weekday or more, or 2) it's location, proposed site plan, traffic characteristics could affect traffic safety, access management, street capacity, or known traffic problems or deficiencies in a development's study area.

The report will be prepared by a licensed traffic engineer in the State of Oregon. At a minimum, the report shall contain the following:

1. Purpose of Report and Study Objectives

A discussion of key traffic issues to be addressed and the transportation system and development objectives related to a specific development.

General transportation system objectives are:

to maintain safe and efficient traffic flow on surrounding street system,

to provide safe and effective transfer of vehicular traffic between the site and the street system providing a convenient, safe and efficient on-site and off-site movement of private, service and delivery vehicles, pedestrians, transit and bicycles,

to effectively mitigate adverse site-generated traffic impacts on affected streets and intersections. Site-specific objectives may be established by the City for each study and report.

2. Executive Summary

A concise summary of the study purpose/objectives, site location and study area, development description, key assumptions, findings, conclusions and recommendations.

3. Description of Site and Study Area Roadways

A description of the site, study area, existing traffic conditions in the study area, anticipated nearby development and committed roadway improvements which would affect future traffic in the study area.

The study area will be defined by:

All roads, ramps and intersections through which peak hour site traffic composes at least 5% of the existing capacity of an intersection approach, or roadway sections on which accident character or residential traffic character is expected to be significantly impacted.

On-site Traffic Evaluation

An evaluation of the proposed (and alternative) site access locations, the adequacy of access depth, number of lanes, queuing storage, safety and efficiency of proposed vehicular circulation, parking layout, pedestrians, service vehicle routes/facilities, together with recommendations for on-site traffic markings and controls.

1. Technical Appendix

A technical appendix including work sheets, charts, traffic count, and drawings to support findings as described in the body of the report.

2. Recommendations for Public Improvements

Recommendations should be made for external roadway improvements, such as additional through and turn lanes, and traffic control devices necessitated as a result of the development. Recommended improvements to transit facilities, pedestrian and bicycle circulation should also be reported.

The recommendations should specify the time period within which improvements should be made, particularly if improvements are associated with a phased development, the estimated cost of improvements, and any monitoring of operating conditions and improvements that may be needed. If needed street improvements, unrelated to the development, are identified during the analysis, such improvements shall be reported.

3. Access Management

On sites with arterial and collector street frontages, the report shall evaluate and recommend the use of access management plans or techniques:

To separate basic conflict areas. Reduce number of approaches or increase spacing between approaches and intersections.

To remove turning vehicles or queues from the through lanes. (Reduce both the frequency and severity of conflicts by providing separate paths and storage areas for turning vehicles and queues.) These techniques may include turn restrictions, striping, medians, frontage roads, channelizing of lanes or approaches, shared approaches, access between similar uses, access consolidation, lanes for left or right turns, and other transportation system management (TSM) actions.

4. A review of alternative access points for site access to highways, city streets, and county roads.

5. The analysis of alternate access proposals should include:

- a. Existing daily and P. M. peak hour counts, by traffic movements, at intersections effected by generated traffic from the development. (Use traffic flow diagrams).
- b. Projected daily and P.M. peak hour volumes for the same intersections and proposed access points when the development is in full service. (Use traffic flow diagrams.)
- c. A determination of the existing levels of service and projected levels of service at each intersection and access points studied.
- d. A discussion of the need for traffic signals. This should include a traffic warrant computation based on the National Manual on Uniform Traffic Control Devices.

1. The recommendations made in the report should be specific, and should be based on a minimum level of service when the development is in full service. As an example, if a traffic signal is recommended, the recommendation should include the type of traffic signal control and what movements should be signalized. If a storage lane for right turn or left turn is needed, the recommendation should include the amount of storage needed. If several intersections are involved for signalization, and an interconnect system is considered, specific analysis should be made concerning progression of traffic between intersections.
2. The report should include a discussion of bicycle and pedestrian usage and the facilities provided along with the availability of mass transit to serve the development, if appropriate.

6.0014 - INTERSECTIONS

Connecting Street Intersections: shall be located to provide for traffic flow, safety, and turning movements, as conditions warrant.

Arterial Intersections: Exclusive left and right turn lanes will be provided, bus turnouts will be provided if traffic flow and safety conditions warrant and designated crosswalks will be provided at controlled locations and street alignments across intersections shall be continuous.

Collector and Local Street Intersections: Street and intersection alignments should facilitate local circulation but avoid alignments that encourage non-local through traffic.

Streets shall be aligned so as to intersect at right angles, 90 degrees. Angles of less than 75 degrees will not be permitted. Intersection of more than two streets at one point will not be permitted.

New streets shall intersect with existing street intersections so that centerlines are not offset, except as provided below. Where existing streets adjacent to a proposed developments do not align properly, conditions may warrant the development to provide the proper alignment.

For intersections which are not directly aligned, the minimum separation distance shall be as follows:

<u>Street Class</u>	<u>Intersection Spacing (feet)</u>
Arterial	500*
Collector	400*
Local	300*
Cul-de-sac	150

* The City may permit a minimum intersection spacing of not less than 300 feet for Arterial, and 200 feet for Collector/Local, when findings establish that:

- a. Without the change, there could be no public street access from the parcel(s) to the existing street, and
- b. All other provisions of the street design requirements can be met.

6.0015 - HALF-STREET CONSTRUCTION

Half-street construction is generally not acceptable. Where such a Street is justified, the right-of-way and pavement width shall be approved by the City. In no case shall the pavement

width required be less than that required to provide two lanes of traffic to pass at a safe distance. For a 32 foot local street the half-street pavement width will be 20 feet. Half-streets will only be approved when the abutting or opposite frontage property is undeveloped and the full improvement will be provided with development of the abutting or opposite (upon right-of-way dedication) frontage property.

Half-street improvements shall include curb, sidewalk and storm drainage on one side of the street. When a half-street improvement is required, the entire street shall be designed.

A development on an unimproved street shall be responsible for constructing a continuous City standard street to a connection with the nearest standard (publicly-maintained) street.

6.0016 - STREET CLASSIFICATION

All streets within the City shall be classified in accordance with Section 6.0110, STREET SYSTEM DESCRIPTION AND FUNCTION. The classification for any street not listed in Section 6.0110 shall be as determined by the City.

6.0017 - DESIGN SPEED

Design speeds for classified streets shall be as follows:

<u>Classification</u>	<u>MPH</u>
Arterial	35 to 45
Collector	30 to 40
Local	25
Cul-de-sac	25

6.0020-HORIZONTAL/VERTICAL CURVES.ANDGRADES

6.0021 - HORIZONTAL CURVES

Horizontal curve radius (on centerline) for each street classification shall be designed according to the roadway design speed. The radius shall not be less than the following:

<u>Classification</u>	<u>FT</u>
Arterial	415 to 830
Collector	275 to 600
Local	165
Cul-de-sac	165

6.0022 - VERTICAL CURVES

Vertical curve lengths shall be based on design criteria which includes: 1) design speed, 2) crest vertical curve, and 3) sag vertical curve. Stopping sight distance for crest and sag vertical curves shall be based on sight distance and headlight sight distance, respectively.

All vertical curves shall be parabolic and the length shall be computed for each location.

6.0023 - GRADES

Maximum grades for each street classification shall be as follows:

<u>Classification</u>	<u>FT/FT</u>
-----------------------	--------------

Arterial	0.06
Collector	0.08
Local	0.10
Cul-de-sac	0.12

Local and cul-de-sac streets may exceed 12%, but in no case shall exceed 16%. The City may approve a grade greater than 12% when all of the following conditions exist:

1. Topographic constraints do not allow the development to be served by a street with a maximum grade of 12% without causing de-stabilization of soils by excessive cuts and fills.
2. There is no access to the property being developed through adjacent properties at a maximum 12% grade.
3. The section of local street will not exceed a combination of length, horizontal alignment, and/or grades exceeding 12% which will create hazardous traffic conditions.
4. In no case shall the maximum street grade exceed 16%.

Minimum grade for all streets shall be 0.005 feet per foot (0.50%) however, in all cases, street grades shall allow for proper and adequate drainage. Cul-de-sac "bulbs" shall have a minimum slope of 0.006 feet per foot (0.60%).

Street cross-slopes shall be 2%. Where there are site constraints the cross slope can vary from 1% to 3%.

6.0030-PAVEMENTDESIGN

In general, all streets shall be constructed with Hot Mix Asphalt Concrete, HMAC unless otherwise approved by the City.

Typical flexible pavement sections shall be as shown on the standard drawings per street classification.

The Engineer will provide a street structural design section for all roadways classified Neighborhood Collector and higher, and local streets in industrial zones. A pavement section structural number shall be provided to confirm or revise the pavement section when the soils report indicates poor soil.

6.0040-CONCRETECURB

All development projects are required to construct street improvements with concrete curbs. Mountable Curb and Gutter shall be used on streets classified Arterial and Collector. Curb exposure for mountable curb and gutter shall be six (6) inches, and eight (8) inches at catch insets. Joint spacing in curbs shall be in accordance with the standard drawing. Flat concrete curb shall be used on all streets classified as local.

6.0041 - CURB RETURN RADIUS

Curb return radius at street intersections shall be designed to accommodate all expected traffic. Minimum curb radius required shall be as follows:

<u>Intersection</u>	<u>Radius (ft)</u>
Local/Cul-de-sac with Local/Cul-de-sac	25
Local/Cul-de-sac with Collector /Arterial	35
Collector/Arterial with Collector/Arterial	35

Streets serving commercial/industrial properties may be required to install larger curb radius as required for vehicle movements when required.

6.0050-PARKING

<u>Street Classification</u>	<u>Parking Lanes</u>	<u>Parking Required</u>
Arterial	None	May be allowed in some areas
Collector	2	Variable (a)(b)
Local	2	Yes (c)(d)
Cul-de-sac	2	Yes (c)(d)

- a. Where bike lanes exist on collectors, parking may be prohibited.
- b. Collector - No parking within 45' of curb return.
- c. Local - No parking within 30' of curb return.
- d. Local Streets and Cul-de-sacs which are approved for reduced 40 feet right-of-way and 28 feet pavement will be required to have one parking lane to assure that on-street parking is adequate for adjacent uses; a reduced street design will consider clustered parking bays adjacent to the street, if needed. Parking will not be allowed in a reduced radius cul-de-sac bulb.

For streets designated collector and below, the City may consider design modifications to conserve major trees in the public right-of way. Parking lanes may be removed on one or on both sides of a street subject to approval by the City.

Design standards - parking and loading.

a. Scope.

1. These design standards shall apply to all parking, loading and maneuvering areas.
2. All parking and loading areas shall provide for the turning, maneuvering and parking of all vehicles in the lot.

b. Access.

1. Where a parking or loading area does not abut directly on a public street there shall be provided an unobstructed drive and not less than 20 feet in width for two-way traffic, leading to a public street, and traffic directions shall be plainly marked.

Parking area improvements. All public or private parking areas which contain three or more parking spaces and outdoor vehicle areas shall be improved according to the following.

- a. All parking areas shall have durable, dust free surfacing of asphaltic concrete, Portland cement concrete or other approved materials. The design section shall conform to the use and the soils report. All parking areas, including those in conjunction with a single family or two-family dwelling, shall be graded so as not to drain excess storm water over the public sidewalk or onto any abutting public or private property.
- b. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas, which abut a residential district, shall conform to the screening requirements as set forth in the city's site design ordinance.
- c. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas may contain a maximum of 25% of the parking spaces sized for compact vehicles.
- d. All required handicapped parking space shall conform to ORS 447.210 and shall be a minimum of 14 feet in width.
- e. All parking areas, except those required with single family or two family dwellings or vehicle sales areas, shall have physically marked individual parking spaces such as painted lines, lettering, curbs and landscaping.

Table of Standards. The following table provides the minimum dimensions of parking stall's, length and width, aisle width and maneuvering space, of public or private parking areas. All parking facilities shall meet these minimum standards. The width of each parking space includes a four inch (4") wide stripe which separates each space. Compact spaces are noted in parenthesis:

Angel from Curb (Degrees)	Stall Width "A"	Channel Width "B"	Aisle Width "C"	Curb Length per stall "D"
Parallel	9' 0" (8'6")	9' 0" (8' 6")	12' 0" (12' 0")	23' 0" (20' 0")
30	9' 0" (8'6")	16' 10" (14' 10")	12' 0" (12' 0")	18' 0" (17' 0")
45	9' 0" (8'6")	19' 1" (16' 7")	14' 0" (14' 0")	12' 9" (12' 0")
60	9' 0" (8'6")	20' 1" (17' 3")	18' 0" (18' 0")	10' 5" (10' 3")
90	9' 0" (8'6")	18' 0" (15' 0")	24' 0" (24' 0")	9' 0" (8' 6")

6.0060-SIDEWALKS

In general, new sidewalks are required for all development requiring a development permit.

New sidewalks which abut the back of curb shall have a minimum width of 5 feet not including the curb width. Sidewalks which do not abut the back of curb shall have a minimum width of 4 feet. Sidewalks may be required to meander within the dedicated right-of-way and/or outside of the right-of-way within an easement.

For streets designated collector and below, the City may consider design modifications to conserve major trees in the public right-of-way. Sidewalks may be deleted on one side of a street subject to approval by the City.

6.0061 - ADA RAMPS

At intersections each corner radius shall include ADA ramps. ADA ramps shall also be included at marked crossings. ADA ramps shall be in accordance with the standard drawings.

Locations of sidewalk ramps shall be designed with regard to storm water flows, street grades, and pole locations. Other factors may also dictate sidewalk ramp location.

6.0070-BIKEWAYS

This summarizes the City's policy and implementation strategies for bike ways within the City and for connection with metropolitan bike ways. The City's plan has adopted both AASHTO and ODOT / APWA standards and criteria as the minimum guidelines for bike way design and construction.

The City's adopted guidelines for bike ways consist of the following:

1. Guide for Development of New Bicycle Facilities 1981.
2. AASHTO, Oregon Supplements and Exceptions to AASHTO Guide.
3. Manual on Uniform Traffic Control Devices with Oregon supplements by the Oregon Transportation Commission.

6.0071 - BIKEWAY LOCATION, WIDTH

<u>Bikeway Location</u>	<u>Minimum Width (ft)</u>	<u>Comments</u>
Public Street (designated bike lane)	8 **	Each direction of travel at
Public Street (no designated bike lane)	0	One way pavement width greater than 12 feet, desirable width 14 feet or greater
Off-Street Bicycle Path	5 *	One-Way Travel
Off-Street Bicycle Path	8-10 *	Two-Way Travel
Off-Street Bicycle Path Shared with Pedestrians)	12 *	Two-Way Travel
Off-Street Bicycle Path Shared with Pedestrians)	7 *	One-Way Travel

* Paths are constructed with 2 foot gravel shoulders on both sides.

** An 8 foot section is required unless this width is not practical because of physical or economic constraints. A minimum width of four feet may be designated as a bicycle lane.

6.0072 - DESIGN CRITERIA

In general, bikeway design shall meet the adopted standards referred to in Section 6.0060.

All bike ways shall have a minimum cross slope 2% and a maximum cross-slope of 5%. On curved alignments, the cross-slope shall be to the inside of the curve.

Bikeway curvature will be based on a minimum design speed of 20 mph. Bikeway grades shall be limited to a maximum of 5%. Where topography dictates, grades over 5% are acceptable when a higher design speed is used and additional width is provided.

6.0073 - CONSTRUCTION

Off-street bike ways shall be constructed for two situations: 1) Where limited City maintenance vehicle use will occur, and where heavy City maintenance vehicle use will occur. In both cases, sub grade preparation will require removal of existing organic material and compaction.

<u>Use</u>	<u>HMAC</u>	<u>Aggregate</u>
Limited	2 inches	6 inches
Heavy	3 inches	8 inches

When drainage, such as side ditches, is required parallel with the bike way, the ditch centerline shall be at least 5 feet from the edge of the pavement. Ditch side slope adjacent to the bike way shall be no steeper than 2 horizontal and 1 vertical when measuring the horizontal distance to the vertical distance.

When culverts cross bike ways, the ends of the pipe shall be no closer than 5 feet from the edge of the bike way.

6.0074 - LIGHTING

Lighting should be included in the bikeway design when nighttime security could be a problem and a high nighttime use is expected (i.e., paths serving students, commuters). The horizontal illumination levels shall be .05 foot candle (5 lux) to 2 foot candles (22 lux) except when security problems exist. Higher illumination levels should be considered in these locations. The placement of the light standards (poles) shall meet all vertical and horizontal clearances.

6.0075 - DETERRING MOTOR VEHICLE USE

Bike paths intersecting with roadways require physical barriers to deter use by unauthorized motor vehicles. A lockable, removable post(s) may be used to discourage such use and still permit authorized vehicles to access the paths. The post shall be brilliantly colored and permanently reflectorized. If more than one post is required, the spacing shall not exceed a separation of more than 5 feet.

An alternative to deterring the motor vehicles is to design two, 5 foot wide lanes separated by low landscaping at the intersection.

6.0080-DRIVEWAYS

Access to private property shall be permitted with the use of approach curb cuts. The access points with the street shall be the minimum necessary to provide access while not inhibiting the safe circulation and carrying capacity of the street.

On Collector streets and above, one approach per site frontage will be the normal maximum number. Double frontage lots and corner lots on these streets may be limited to access from a single street, usually the lower classification street. If additional approaches on a frontage are approved by the City, a finding shall be made that no eminent traffic hazard would result and impacts on through traffic would be minimal, Restrictions may be imposed on additional approaches, such as limited turn movements, shared access between uses, closure of existing approaches, or other access management actions.

Approach types shall be, Residential or Commercial/Industrial.

Should the length of an approach be greater than 50 feet and have only one access to the street, a turnaround shall be provided. The minimum inside radius of the turn around shall be 15 feet with a width at the turnaround point of 30 feet for maneuvering.

TABLE 6 - 1

Approach Widths, Min-Max (ft)

<u>Street Classification</u>	<u>Residential</u>	<u>Commercial</u>	<u>Industrial</u>	<u>No. Allowed</u>
Arterial	12-24(2)	12-36	12-36	Res.-1 / 250' frontage Com.-1 / 250' frontage
Collector	12-24(2)	12-36	12-36	Res.-1 / frontage Com.-1 / frontage(5)
Local	12-24(2)	12-36	(4)	Res.-1 / frontage(3) Com.-1 / frontage
Cul-de-sac	12-24(2)	12-36	12-36	Res.-1 / frontage(3) Com.-1 / frontage

Res. = Residential Zone Com.= Commercial Zone Ind.= Industrial Zone

- Notes: (1) Special conditions may warrant access.
 (2) 28' maximum with 3 car garage.
 (3) Frontage greater than 130' permitted one additional curb cut.
 (4) Build to Collector standard.
 (5) Certain businesses may warrant one additional curb cut for service approaches.

TABLE 6 – 2

Minimum Distance from Approach to Radius Curb Return (ft)

<u>Street Classification</u>	<u>Residential</u>	<u>Commercial</u>	<u>Industrial</u>
Arterial	100 (1,3)	100	100
Collector	45 (3)	100	100
Local	45 (2)	45	45
Cul-de-sac	45 (2)	45	45

- Notes: (1) Minimum distance from curb return unless this prohibits access to the site.
 (2) 25 feet will be allowed for corner lots with limited frontage where distance requirements cannot be met.
 (3) Direct access to this street will not be allowed, if an alternative exists or is planned.

For classification of Collector and above, approaches adjacent to street intersections shall be located beyond the required queue length for traffic movements at the intersection. If this requirement prohibits access to the site, an approach with restricted turn movements may be allowed.

Within commercial, industrial and multi-family areas shared approaches and internal access between similar uses are encouraged to reduce the access points to the higher classified

roadways, to improve internal site circulation, and to reduce local trips or movements on the street system. Shared approaches or internal access between uses will be established by means of common access easements at the time of development.

Approach grades shall not exceed 12% from the curb line to the property line.

6.0090-STREETLIGHTING,NAMESANDSIGNAGE

6.0091 - STREET LIGHTING

A complete street lighting system shall be the responsibility of the development. All streets fronting the property shall be provided with adequate lighting. Developer is required to provide lighting for public convenience and safety. For lighting requirements, all developments will be required to submit 3 copies of the final plat (residential and major land partitions) to the City. Commercial and industrial developments, in addition to the above requirement, shall submit 3 copies of the site plan to the City.

Street lighting shall be provided as part of the street design process. Design illumination levels shall be in accordance with the recommendations of the "Illuminating Engineering Society" and are summarized in the following table.

RECOMMENDATIONS FOR ROADWAY AVERAGE
MAINTAINED HORIZONTAL ILLUMINATION (Foot
Candles)

Street Classification	Commercial	Urban Intermediate	Residential
Highway	1.4	1.2	1.0
Arterial	2.0	1.4	1.0
Collector	1.2	.9	.6
Local/Cul de sac	-	.9	.6

The average-to-minimum uniformity ratios for roadways in commercial and intermediate areas shall be 4 horizontal to 1 vertical or better. In residential areas this uniformity ratio shall be 6 horizontal to 1 vertical or better.

The street lighting system shall be provided using high pressure sodium vapor luminaries. The design average horizontal illumination and uniformity ratio shall be obtained by considering together the factors of lamp wattage, pole support spacing, mounting height and luminaire of the street lights to locate poles at lot line extensions and not in the middle of a lot, and to locate poles at corners.

6.0092 - STREET NAMES AND TRAFFIC CONTROL

Street names for all new developments will be approved by the City prior to recording of any maps or plats. The developments shall pay for all street name and traffic control signage prior to the signing of the final plat or map by the City. All new signage will be provided by the developer and installed by the City.

Street names shall conform with the established grid system(s) in the City and its UGB. No new street name shall be used which will duplicate or be confused with the name of existing streets in the UGB area.

Building numbering will be issued by the City.

6.0100-MAILBOXES

Joint mailbox facilities shall be provided in all residential developments, with each joint mailbox serving at least 2 dwelling units.

1. Joint mailbox structures shall be placed adjacent to roadway curbs.
2. Proposed locations of joint mailboxes shall be designated as part of the development plan, and shall be approved by the City.
3. Plans for the joint mailbox structure to be used shall be submitted as part of the development plan for approval by the City.

6.0110-STREETSYSTEMDESCRIPTIONANDFUNCTION

6.0111 - GENERAL GUIDELINES

The urban boundary map, policies and access requirements for various land uses, as adopted by the Comprehensive Plan and Zoning Ordinance, shall serve as guidelines for the functional classifications, definitions and standards requirements and rules adopted under this chapter.

6.0112 - FUNCTIONAL CLASSIFICATIONS

Functional classification categorizes roads and streets by their operational purpose. Some of the key factors considered when adopting the functional classifications were the following:

- a. Relation between street traffic and land use of the abutting properties;
- b. Volume and kinds of traffic;
- c. Relative origins and destinations of traffic and lengths of trips.

The basic hierarchy of functional classification are Arterial, Collector and Local/Cul-de-sac streets. These categories are defined as follows:

Arterial streets: Arterial streets carry higher volumes of traffic, usually over 4,000 vehicles/day and are generally consist of three or more lanes, with the third lane being a common turn lane. Their function is to serve intra-county trips; that is, trips which have at least one end trip within the county.

Collector streets: Collector streets gather area traffic from local streets within a one-half mile radius and connect it to the arterial system. They are not intended to serve through traffic, and they are the lowest order of streets designed to carry transient vehicles. Collector streets generally have a traffic volume rate of 1,000 to 4,000 vehicles/day. Abutting land uses are generally residential.

Local streets: Local streets provide access to abutting property and do not serve to move through traffic. Local streets standards will be further categorized by adjacent land use into residential, commercial and industrial local streets.

Local streets - (Commercial/Industrial): Within the local street classification, there may be considerable difference between the kind of improvement specified where commercial or industrial land uses access a local street, as compared to the kind of improvement specified for residential access. Generally, a local street classification in commercial or industrial areas will require an improvement equal to that specified for a collector classification.

Cul-de-sac streets: Cul-de-sac streets provide access to abutting property only and will be as short as possible, in no event shall a Cul-de-sac be more than 400 feet in length.

The length of a Cul-de-sac shall be measured along the centerline of the roadway from the near side of the intersecting street to the farthest point of the Cul-de-sac.
All Cul-de-sac streets shall terminate in a circular turnaround.

6.0120-PERMANENTDEAD-ENDSTREETS

A standard cul-de-sac turnaround shall be provided at the end of a permanent dead-end street that does not provide looped circulation. Permanent dead-end streets shall be limited to serving no more than 25 dwellings and shall not exceed 600 feet in length from the point of the nearest intersection centerline.

A permanent dead-end street is measured from the right-of-way line at the nearest intersecting street, which has at least two points of access, to the right of way line at the furthest end of the dead-end street.

An existing dead-end street system which is more than 600 feet long or which serves more than 25 dwelling units may be terminated in a cul-de-sac if no Future Street Plan has been adopted and the following criteria are met:

- a. Alternative emergency vehicle access or fire protection is provided satisfactory to the local Fire Authority and,
- b. Neighborhood traffic circulation needs are not adversely impacted by the proposed cul-de-sac termination of the street.

Temporary dead-end streets more than 150 feet in length shall be provided with an approved turnaround for emergency vehicles.

6.0130-ALLEYWAYSANDPRIVATERESIDENTIALSTREETS/ACCESSWAYS

6.0131 - ALLEYWAYS

Alleyways may be provided in commercial and industrial developments with approval by the City. When approved, alleyways shall be dedicated to the city. The right of way width shall be 20 feet with a 20 foot surfacing width.

Design for alleyways shall meet the same criteria as other public streets. The exceptions to those criteria may be centerline radius and design speed. Generally, alleyways shall be designed for one-way operations.

6.0132 - PRIVATE RESIDENTIAL ACCESS WAYS

In general, private residential streets and access ways shall be provided for multi-family developments such as condominiums and apartments. Interior design for private access ways in a manufactured home park shall meet standards for private residential access ways include:

1. Dead-end access ways shall not exceed 600 feet in length nor serve more than 25 dwellings units. Dead-end access ways which exceed 150 feet in length shall be provided with an approved turnaround.
2. "Private Street" signage and approaches shall be placed at the intersection with the public street to clearly identify the private access way.

3. Private maintenance of the private streets/access ways shall be provided by a Homeowner's Association or other appropriate entity. Maintenance shall insure continual emergency access at all times.
4. Location of private access ways shall meet the Uniform Fire Code and meet the minimum pavement section of local residential streets.
5. Private residential access ways shall not be allowed in Manufactured Home Parks or Subdivisions.

6.0133 - PAVEMENT CUTS

Where pavement is installed next to existing pavement and at all trench cuts, the existing pavement shall be saw cut. The face of the joint between the new and existing pavement shall be coated with asphalt emulsion and the surface of the joint shall be sand sealed.

6.0134 - SHOULDERS

Where sidewalks and pavement end or where there is no curb and sidewalk (such as half-street improvements) shoulder rock shall be provided to grade with the pavement. Shoulder rock shall be a minimum of 6 inches in depth, 36 inches wide and shall be $\frac{3}{4}$ inch minus crushed aggregate base.

CITY OF HERMISTON PUBLIC WORKS DESIGN STANDARDS AND SPECIFICATIONS

SECTION 7.0000 - PERMIT

A permit shall be obtained before beginning construction, alteration or repairs, other than ordinary repairs, using application forms furnished by the City.

7.0010 - APPLICATION FOR PERMIT

7.0011 - APPLICATION

To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the City for that purpose. Every such applicant shall:

- a. Identify and describe the work to be covered by the permit for which application is made.
- b. Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building.
- c. Indicate the use or occupancy for which the proposed work is intended.
- d. Be accompanied by plans, diagrams, computations, specifications and other data as required.
- e. State the valuation of any new building or structure or any addition, remodeling or alteration to an existing building.
- f. Be signed by the permittee, or his/her authorized agent.
- g. Give such other data and information as may be required by the building official.

7.0012 - PERMIT FEES

Permit fees are established by the State of Oregon and the City.

7.0013 - EXPIRATION

Every permit issued by the City under the provisions of the Codes and/or Ordinances of the City shall expire by limitation and become null and void if the building or work authorized by such permit is not commenced within six months from the issue date of the permit, or if the building or work authorized by such permit is suspended or abandoned at any time after work is commenced for a period of six months. Before work can be resumed, a new permit shall be obtained to do so, and the fee therefore shall be one-half the amount required for a new permit for such work, provided no changes have been made in the original plans and specifications for such work; and provided further that such suspensions or abandonment has not exceeded six months.

A permittee holding an unexpired permit may apply for a one-time extension, provided he/she can show good and satisfactory reasons, and beyond his/her control the work cannot be commenced within the six-month period from the issue date. In order to renew work on a permit after it has expired, the permittee shall pay a new full permit fee.

7.0014 - INVESTIGATION FEE

An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this code. The minimum investigation fee shall be the same as the minimum fee set forth in Table No. 1. The payment of such fee shall not exempt any person from compliance with all other provisions of this code nor from any penalty prescribed by law.

7.0015 - PENALTY

Any person, firm or corporation violating any of the provisions of the Codes and/or Ordinances of the City, shall be guilty of a misdemeanor and each such person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of the codes and/or City Ordinances is committed, continued or permitted, and upon conviction of any such violation such person shall be punishable by a fine, or by imprisonment, or by both such fine and imprisonment as established by local applicable laws.

7.0016 - RIGHT OF APPEAL

All persons shall have the right to appeal the building official's decision through a body appointed by the City and qualified by the experience and training to pass upon matters pertaining to building construction.

7.0017 - PLANS

When required by the City, plans shall be drawn to scale and shall be of sufficient clarity to indicate the nature and extent of the work proposed and shall show in detail that it will conform to the provisions of this code and all relevant laws, ordinances, rules and regulations. Plans shall include a plot plan drawn to scale showing the locations of all easements, drainage facilities, adjacent grades, property lines, the proposed building and of every existing building on the property. Two sets of plans required. One additional complete set of plans shall be kept on the job site at all times and made readily accessible to the inspector.

7.0020 - INSPECTIONS

7.0021 - GENERAL

All construction or work for which a permit is required shall be subject to inspection by the City and all such construction or work shall remain accessible and exposed for inspection purposes until approved by the City Inspector. In addition, certain types of construction shall have continuous inspection.

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of the Codes and/or Ordinances of the City. Inspections presuming to give authority to violate or cancel the provisions of the Codes and/or Ordinances of the City shall not be valid.

It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection purposes. Neither the Building Inspector nor the City shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

A survey of the lot may be required by the City to verify that the structure is located in accordance with the approved plans.

7.0022 - INSPECTIONS FOR RIGHT-OF-WAY IMPROVEMENTS

If the construction of a sidewalk, curb and gutter or A/C improvements, is not included in a performance bond of an approved subdivision or the performance bond has lapsed, then every person, firm or corporation desiring to construct sidewalks as provided by this Section, before commencing the work or improvement, shall comply with the following:

- a. An occupancy permit shall not be issued for a development until provisions of this section are satisfied.
- b. The City may allow temporary noncompliance with the provisions of this section to the owner, builder or contractor when, in the engineer's opinion, the construction of the sidewalk is impractical for one or more of the following reasons:
 1. Sidewalk grades have not and cannot be established for the property in question within a reasonable length of time;
 2. Forthcoming installation of public utilities or street paving would be likely to cause severe damage to the new sidewalk;
 3. Street right-of-way is insufficient to accommodate a sidewalk on one or both sides of the street; or
 4. Topography or elevation of the sidewalk base area makes construction of a sidewalk impractical or economically feasible.

7.0022 - INSPECTION RECORD CARD

Work requiring a permit shall not be commenced until the permit holder or his/her agent shall have posted or otherwise made available an inspection record card such as to allow the Building Inspector conveniently to make the required entries thereon regarding inspection of the work. This card shall be maintained available by the permit holder until final approval has been granted by the Building Inspector.

7.0023 - INSPECTION REQUESTS

It shall be the duty of the person doing the work authorized by a permit to notify the City that such work is ready for inspection. The City may require that every request for inspection be filed at least one working day before such inspection is desired. Such request may be in writing or by telephone at the option of the City.

It shall be the duty of the person requesting any inspections required to provide access to and means for inspection of such work.

7.0025 - REQUIRED INSPECTIONS

Reinforcing steel or structural framework of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the Building Inspector.

The City, upon notification, shall make the following inspections and shall either approve that portion of the construction as completed or shall notify the permit holder or his/her agent wherein the same fails to comply with the code.

7.0030 - INSPECTIONS

7.0031(a) - INSPECTIONS BY BUILDING INSPECTOR

1. Site
2. Concrete
 - A. Approaches
 - B. Sidewalks
 - C. Curbs
 - D. Aprons

NOTE: BEFORE ANY CONCRETE IS POURED ALL FORMS AND REBAR MUST BE INSPECTED.

3. Streets
4. Street Lights
5. Water Lines
6. Sewer Lines

NOTE: ALL PLANNING REQUIREMENTS MUST BE MET BEFORE ANY PERMITS WILL BE ISSUED