

PUBLIC WORKS DESIGN STANDARDS

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City of North Plains PUBLIC WORKS DESIGN STANDARDS

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APPENDIX

Appendix A: Standard Construction Drawings

CITY OF NORTH PLAINS PUBLIC WORKS DESIGN STANDARDS

GENERAL

Authority and Purpose

The purpose of these Design Standards is to provide a consistent policy under which certain physical aspects of public facility design shall be implemented. 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 and constructed under approved permits.

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, cost savings, or both. However, any alternative must meet or exceed the minimum requirements set forth in these standards.

Unless otherwise specified below, this document is to be used in conjunction with the current editions of the following adopted codes and standards:

- Oregon Revised Statutes
- Oregon Administrative Rules
- City of North Plains Municipal Code
- City of North Plains Development Code
- Clean Water Services Resolutions, Orders, and Construction Standards
- Manual of Uniform Traffic Control Devices
- AASHTO “A Policy of Geometric Design of Highway and Streets”
- American Water Works Association Standards
- American Public Works Association Standards and Specification for Public Works Construction
- If work proposed in Washington County or the Oregon Department of Transportation right of ways, the applicable standards from that agency will govern, including applicable permit requirements.

- Work in or near wetlands, sensitive areas, floodplains, and floodways may require permits and/or approvals from the Army Corps of Engineers and/or the Oregon Division of State Lands (DSL).
- Other permits and standards may be applicable to specific projects. The applicant bears the responsibility to obtain all necessary permits and to apply with all the applicable standards related to any specific project.
- If work is proposed on private property, including grading, excavation and fill, Washington County Building Code requirements apply and may require permits from Washington County, Department of Land Use and Transportation.

Engineering Policy

The City of North Plains requires strict compliance with Oregon Revised Statute 672 for professional engineers.

All engineering plans, reports, documents, calculations and other technical submittals shall be prepared and sealed by a registered professional engineer. 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, and other submittals, 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 by the Public Works Director, the full requirements of the City have not been met.

Applicability

These Design Standards shall govern all construction modifications and upgrading of all public facilities in the City of North Plains and applicable work within its service areas.

Standard Specifications

Except as otherwise provided by these Design Standards, all construction design detail, workmanship and materials shall be in accordance with the current edition of the City of North Plains Standard Specifications and Drawings. If a conflict exists between the Standards and Specifications and Drawings it is the permit holder who must seek clarification from the City Engineer to determine the appropriate design prior to installing improvements.

Approval of Alternate Materials or Methods

Persons seeking approval for alternate materials or methods shall make application in writing to the City Engineer. Approval of any deviation from these Design Standards will be in written form.

Any alternate must meet or exceed the minimum requirements set 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 and justification, and other pertinent information.

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

Special Design Problems

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

Such applications which may occur requiring special review and approval are included, but are not limited to, the following:

- Water Distribution Pump Stations
- Relining of Existing Water Mains
- Water Pressure Regulating Devices
- Energy Dissipaters
- Water Reservoirs
- Water Treatment Plants
- Water Flow Measurement/Monitoring Devices

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. The most current version of the standards should also be posted on the City's website <http://www.northplains.org/index.php/city-departments/public-works/design-standards> Users should apply the latest published issue to the work contemplated.

PERMITEE RESPONSIBILITY

It is the responsibility of persons/firms applying for a permit to conform to all rules and regulations of the City of North Plains, Washington County, Clean Water Services and other public utility providers.

As a general rule, developments must be revenue neutral to the community. This means that a project developer will be responsible for the cost to review, inspect and close permits. The City may charge a deposit in addition to a standard fee for projects that are complex.

All reviewed performed by the contracted City Engineer is on a pass thru basis with a 15% administrative fee.

Permittees will also be required to reimburse the City for the cost of inspections related to public works improvements. This may include the cost of an inspector hired to represent the City.

Plans at Job Site

A complete set of approved plans shall be kept on the job site at all times and made readily accessible to the inspector.

As Built Plans

At the end of a project the permittee must submit to the City a set of as-built drawings for all public improvements.

Coordination

The permitted 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 permitted shall engage consultants, if required, to provide professional inspections on a timely basis. The permitted shall act as a coordinator between the consultants, the contractor and the city inspector. In the event of changed conditions, the permitted shall be responsible for informing the city inspector of such change and shall provide revised plans for approval

PERMITS

A permit shall be obtained before beginning construction, alteration or repairs, using application forms furnished by the City of North Plains.

Application

To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the City of North Plains 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 and street address or similar description that will readily identify and definitely locate the proposed work location.
- C. Indicate the purpose, justification & reason for which the proposed work is intended.
- D. Be accompanied by plans, diagrams, computations, specifications and other data as required.
- E. Be signed by the Permitted, or his authorized agent.
- F. Give such other data and information as may be required by the City.

Permit Fees

Permit fees are established by the Washington County and the City of North Plains. Additional permits and fees may be charged by Clean Water Services.

North Plains [master fee schedule](http://cityofnp.org/index.php/departments/finance/fee-sc/) is available online at <http://cityofnp.org/index.php/departments/finance/fee-sc/>

Expiration

Every permit issued by the City of North Plains 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 12 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 twelve

months.

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

Investigation Fee

An investigation fee, in addition to the permit fee, may 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 the [master fee schedule](#). 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.

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.

CONSTRUCTION PLANS

General Information

Prior to any construction work plan approval, or issuance of permits; complete construction plans, specifications and all other necessary submittals shall be submitted to the City Engineer and the Public Works Director for review together with fees stated in the [Master Fee Schedule](#).

The address for submission is 31360 NW Commercial Street, North Plains, OR 97133. Questions may be directed to City Hall at 503-647-5555 or info@northplains.org.

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

Sets of Plans

All construction plans shall be clearly and legibly drawn in ink on sheets measuring 24 x 36 inches.

All applicants for development permits require submission of electronic .pdf version of the plans suitable for printing on 24 x 36 and 8.5' x 11 sheets, and (3) 24 x 36 copies of the plan.

When plans are prepared for submission to the City, the following scale of drawings shall be as followed:

- Horizontal scales shall be 1" =10', 20', 30', 40', or 50'
- Vertical scales shall be 1" =2', 4', 5' or 10'.

For subdivision plans all plans views and profile views of the plan set should be drawn at a common scale, if more than one scale is necessary, the difference should be large enough to be noticeable (e.g. 1" = 20' & 1" = 50'). When a scale is used which is smaller than 1" = 20' (e.g. 1" = 40'), specify the desired scale, if different for type of work (ie. water, street, sewer, etc.) have a standard for each.

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

Letter size shall not be smaller than 0.10 inch.

Plan Submittal

The City Engineer, City Planner and the Public Works Director will coordinate the plan review and approval of all construction plans which will include review for compliance with all North Plains Design Standard, the North Plains Comprehensive Plan, applicable Master Plans, City Code and other City requirements.

All plan submittals shall include supporting information listed above along with all other information requested by the City Engineer, City Planner and the Public Works Director. This information is to include, but not be limited to:

1. Construction cost estimates
2. Easement documents
3. Right-of-way dedications
4. Executed agreements, and
5. A plan check and inspection fee.

All submittals will be reviewed for completeness and the Design 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.

Upon completion of the detailed review, the City will notify the Design Engineer, in writing, any revisions the City may find necessary. The Design Engineer will revise plans, addressing all items, and return revised plans to the City for review and approval. If the plans must be returned to the design engineer more than once additional fees may be assessed.

Required Sheets

Construction plan submittals shall contain the following minimum sheets:

1. Title sheet
2. Plan and profile sheets,
3. Detail sheets,
4. Erosion control plan sheet,
5. Grading plan sheet with topography

A title block shall appear on each sheet of the plan set and shall be placed on the lower right-hand corner of the sheet, across the bottom edge of the sheet or across the right-hand edge of the sheet. The title block shall include the names of the project, the engineering firm, the owner, the sheet title, and the page number.

The seal and signature of the Design Engineer responsible for the preparation of the plans shall appear on each sheet as well as the Design Engineer's phone number and

email.

The description and date of all revisions shall be shown on each sheet affected, and shall be approved and dated by the Design Engineer as evidenced by signature or initial.

Title Sheet

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.

1. 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.
2. Vicinity map at a 1" = 1000' scale, or greater.
3. Index of sheets.
4. Complete legend of symbols used.
5. General and construction notes pertinent to project.
6. Temporary and/or permanent bench marks used along with their descriptions, elevations of benchmark and datum.
7. Engineer's name, address, phone number, email & seal.
8. Developer's/owner's name, address, phone number, and email for public improvements with private financing.
9. Statement referencing City of North Plains Design Standards and Specifications.
10. Provide contact phone number for all affected utility companies.
11. Show tax lot numbers or lot and block designations.

Plan Sheet

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

1. Adjacent street curbs, property lines, right-of-way lines, utility easements referenced to property lines, street centerline 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.
2. Location of all underground utilities within 100 ft. 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.
3. 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 UPS. Army Corps of Engineers and Federal Emergency Management Agency (F.E.M.A.) maps.
4. 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.)
5. 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.
6. Where streets are being widened, edge of pavement elevations shall be shown to determine pavement cross-slope to new curb or pavement edge.
7. On water plans, all fittings 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 pipes conditions shall be indicated.
8. 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.
9. On Topographical plans, use 1' or 2' contours at 5' intervals when slope exceeds 15%.

Profile Sheet

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. Unless otherwise approved by the City Engineer, plan and profile views shall be displayed one over the other on the sheet. The following minimum information shall be shown:

1. For sewers and storm drains, show locations of manholes, catch basins, clean outs with each numbered and stationed as indicated in item 4 below.
2. Existing profile at centerline of proposed utility or street.
3. 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.
4. Existing underground utility that crosses the alignment of the proposed facility.
5. Beginning of all vertical curves, points of vertical intersection, end of vertical Curve, low point of sag curve and length of vertical curve. Profiles of existing centerline grade shall extend a minimum of 250 feet beyond the end of the improvement.
6. Clearly show all potential conflicts with existing public and private utilities (i.e. pipes, conduits, vaults, etc.) that impact proposed design.

SPECIAL NOTE: The City of North Plains as-builts 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, inverts, materials and size (horizontal & vertical dimensions) of all existing facilities shown on the plans that will be crossed by the proposed facility.

Detail Sheets

Detailed drawings shall be included with all construction plans where City of North Plains Standard drawings do not exist. If a standard drawing, such as sewer manholes, must be modified to fit existing, or unique conditions, the modified drawing shall be shown on the plans. When 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, plan sheet and profile sheet.

Supporting Information

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

1. Design calculations. (i.e., Street pavement calculations, Street lighting illumination)
2. Hydrology and hydraulic calculations with basin maps.
3. Alternate materials specifications including manufacturers' design application recommendations.
4. Grading plan support information to include as appropriate:
 - a. Soils engineering report
 - b. Hydrology report
 - c. Geotechnical Engineer's report
 - d. Proposed topography
 - e. Existing site topography, min 2' < 15% slope, 5' > 15% slope.
 - f. Adjacent offsite drainage patterns
 - g. Wetlands, 100 year floodplain, drainage hazard area
 - h. Natural drainage features

Franchise Utility Plans

Franchise utility company plans, including, but not limited to; telephone, natural gas, power and cable television shall be submitted to and approved by the City Engineer and Public Works Director prior to any construction of these utilities.

Include location of existing structures and public and private utilities.

As-Built Plan Requirements

For all public works facility improvements, the engineer shall submit certified as-built drawings for all plans which were approved for construction. This includes storm drainage and sanitary sewer drawings as approved by Clean Water Services.

As-built drawings shall be Mylar reproducible and submitted in an electronic format approved by the City Engineer, such as .pdf. As-builts survey notes may be required by the City if any discrepancy is noted.

The Design 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 North Plains Public Works Design Standards and Standard Specifications 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 plans.

Street

The following minimum information shall be noted on the street as-builts:

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

Storm Drains

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

1. Work omitted or added during construction.
2. Surface drainage compounds (inlets, ditches, etc.).
3. Reference Clean Water Services Standards.

Water Mains

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

1. Station and/or property line/corner to valves (not at standard location), all fittings, blow-offs and dead-ended lines.
2. All changes from standard 36-inch depth cover. Limits shall be shown on all plans with annotated reason for change. Actual pipe elevation (top of pipe) will be taken at each fitting. *(This change should be approved prior to acceptance of work.)*
3. Show alignment changes, grade changes, pipe size changes and changes in

construction materials, if changed alignment results in station changes. A station equation shall be shown as appropriate at a valve.

4. Provide types 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.
5. Other change altering the approved plans.
6. Document and provide complete test results to the Public Works Director.
7. Provide photographs of all installed valves and fittings in place before backfill. *(This should be submitted during construction and prior to acceptance of the work.)*

PUBLIC WORKS INSPECTIONS

***North Plains only inspects public works improvements.
It does not provide building inspections.***

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 of North Plains. Inspections presuming to give authority to violate or cancel the provisions of the Codes and/or Ordinances of the City of North Plains 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 Inspector nor the City of North Plains shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

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

Inspection Record Card

An inspection record card shall be kept at the site of the project at all times. The permit holder is required to present this card to the inspector upon demand.

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 requires 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.

Required Inspections

Pipelines, culverts, reinforcing steel or structural framework of any part of any walkway or structure shall not be covered or concealed without first obtaining the approval of the Public Works Inspector and Clean Water Services Field Inspectors.

The City of North Plains, 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 agent wherein the same fails to comply with the code. This action is in addition to inspections by Clean Water Services and Washington County.

Inspections by City of North Plains

The City inspects work in the right-of-way including:

- A. Concrete
- B. Driveways
- C. Sidewalks
- D. Curbs
- E. Aprons
- F. Water Lines
- G. Street Trees
- H. Bike/ Pedestrian Paths
- I. Street/ Grading/ Base/ Pavement. etc.
- J. Culverts
- K. Trench Compaction
- L. Small storm drain lines

Note: *Before any concrete is poured all forms and rebar must be inspected.*

Inspections by Clean Water Services

Clean Water Services inspects all sanitary and storm pipelines over 12 inches in diameter, a CWS field inspector must be present during main tapping.

Inspections by Portland General Electric

All street lights in North Plains are owned by Portland General Electric.

Building Inspections

Washington County provides inspection services for buildings in North Plains.

EXCAVATION AND GRADING

Purpose

The purpose of this section is to safeguard life, limb, property and the public welfare by regulating grading within public right of way and other work under an approved development permit. Separate grading permits may be required for work on private property.

Hazards

Whenever the City Engineer or Public Works Director 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 Engineer or Public Works Director, 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. Coordination with Washington County Building Services are required when work takes place on private property.

Permits Required

No person shall do any work within the right-of-way without first having obtained a right-of-way permit from the City. Grading permits may also be required by Washington County: Land Use & Transportation, Building Services.

Exempted Work

A right-of-way permit may not be required for the following:

1. When approved by the City Engineer and Public Works Director, construction or work in an isolated, self-contained area if there is no danger to private or public property.
2. Excavations for wells, tunnels or utilities, when approved under related permits.
3. Exploratory excavations under the direction of soil engineers or engineering geologists.

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.

Application Requirements

Applications for right of way permits shall include plans 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 plans shall include the following information:

- A. The first sheet of each set of plans shall give location of the work, the names and address of the owner and the person by whom they were prepared.
- B. General vicinity of the proposed site.
- C. Property limits and accurate contours of existing ground and details of terrain and area drainage.
- D. Limiting dimensions, elevations or finish contours to be achieved by the work, and proposed drainage channels and related construction.
- E. Detailed plans of all surface and subsurface devices, walls, piping and other underground utilities to be constructed with, or as a part of, the proposed work together with a map showing the constructed area.
- F. 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 construction.
- G. Topography/Contours shall be 2' < 15% slope or 5' > 15% slope.
- H. 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, bed rock near surface, rock outcroppings, hazardous materials/contamination etc.
- I. Associated land use approvals-copies of permits by others (DSL, COE, Clean Water Services, Washington County, etc.

Right-of-Way Fees

Fees shall be assessed in accordance with the City's [Master Fee Schedule](#).

Bonds

The City of North Plains requires performance 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.

Inspection

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. Operations for which a permit is required shall be subject to inspection by the City. Professional inspection of operations shall be provided as required by the City for grading:

- **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.
- **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.
- **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.

Responsibility of Permitted

The permitted 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 permitted shall engage consultants, if required, to provide professional inspections on a timely basis. The permitted shall act as a coordinator between the consultants, the contractor and the city inspector. In the event of changed conditions, the permitted shall be responsible for informing the city inspector of such change and shall provide revised plans for approval.

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 permitted and to the city inspector.

Transfer of Responsibility

If the civil engineer, the soils engineer, or the engineering geologist of record is changed during construction, 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 permitted to notify the city inspector in writing of such change prior to the recommencement of such work.

Cost of Inspections

Permitees will be responsible for all costs associated with inspection of their projects. Should a project prove to be problematic, additional fees may be assessed according to the City's [Master Fee Schedule](#).

Completion of Work

The permitted shall notify the city inspector when the 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 designs, and the post construction required reports have been submitted.

Erosion Control

Erosion control shall follow the most current version of the Clean Water Services Standards.

STORM DRAINAGE

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.

The City of North Plains storm system is controlled and maintained by Clean Water Services. All surface run off (storm drainage) issues must meet current Clean Water Services Design and Construction Standards for sanitary sewer and surface water management.

In addition to meeting all Clean Water Services standards and approvals, the following applies:

1. 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.
2. 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 in full compliance with Oregon state water law/OARS.
3. 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 Clean Water Services. Acceptance of proposed systems will depend upon the prevailing site conditions, capacity of existing downstream facilities, and feasibility of the alternate design. Building permits by Washington County may be necessary on private property.
4. 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 those included in Emergency Overflow section). The drainage facility installed must be a closed conduit system. Temporary drainage ditch facilities, when approved, must be engineered to convey and contain the storm water for a 10 yr event without causing erosion or other adverse effects to the private property.
5. The design peak discharge from the subject property may not be increased from conditions existing prior to the proposed development except where it can be

satisfactorily demonstrated by the applicant that there is no adverse impact.

6. 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 by the applicant that no adverse impact will result from not providing said facilities.
7. Minimum width of an access easement from an existing public road to a drainage facility shall be fifteen (15) feet.
8. Drainage from roofs, footings, and downpours may drain directly to a street through the curb under the following circumstances:
 - The building pad ground elevation is at least two (2) feet above the existing street curb, and
 - The existing street is adequately crowned to avoid sheet flow across the street. This requirement will be waived if curb and gutter is existing or installed.
9. Vegetation shall be established on areas disturbed by/or on areas of construction as necessary to minimize erosion, in accordance with Erosion Control section of these standards.
10. 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.
11. 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 Engineer, a soils and/or geologic report may be required. 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.
12. Proposed storm drain systems shall not discharge flows into inadequate downstream systems, a drainage report with down stream analysis shall be reviewed and approved by the Clean Water Services.
13. Public storm lines shall be located within the public right-of-way as directed by the City and approved by Clean Water Services. 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.

Site drainage plans

All site drainage plans must be submitted to and approved by Clean Water Services.

Plans must 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.

1. Finished contours of the property after development shall be at two-foot (2') contour intervals, slopes over 10% may use 5-foot (5') intervals, extend contours a minimum of 100 feet beyond property.
2. Percent grade, for graded slopes, elevations, dimensions and locations for all graded slopes.
3. Cut/fill areas, structural fill placement areas, erosion/sedimentation control methods, receding areas.
4. All proposed drainage facilities - public and private systems; drainage ditches, culverts. All facilities shall be clearly labeled Public or Private

Drainage Calculations

Furnish such supporting information as required per Clean Water Services Design Standards.

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. On-site storm detention may be required in the No-name tributary and may be required in other basins to ensure that new development does not increase flooding downstream.

Pipe materials and size

To be specified by Clean Water Services Design and Construction Standards.

Public storm drain pipe shall meet Clean Water Services Design and Construction Standards for sanitary and surface water management. Private storm drain pipe shall meet the appropriate sections of the Uniform Plumbing Code.

Minimum design criteria

To be specified by Clean Water Services Design and Construction Standards.

Minimum acceptable design criteria are set forth in the current Clean Water Services Design & Construction Standards for sanitary and surface water management.

Alignment and cover

To be specified by Clean Water Services Design and Construction Standards.

Minimum acceptable design criteria are set forth in the current Clean Water Services Design & Construction Standards for sanitary and surface water management.

Right-of-way location

Storm drain lines shall be located within public right of way or as directed by Clean Water Services. All changes in direction of pipe shall be made at an approved structure, except as provided in Section: 3.0022.

Curvature

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

Minimum cover

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.

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.

Easements

1. 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).
2. Easements for storm drain lines thirty-six inches (36") or less in diameter shall have a minimum width of fifteen feet (15'). All pipe lines greater than thirty-six inches (36") in diameter, shall have a minimum width of twenty feet (20'). Larger widths may be required for special circumstances, such as excessively deep pipe or location of structures or other improvements to the easement or as directed by Clean Water Services.
3. Open channels shall have easements sufficient in width to cover the 100-year Floodplain Line when a 100-year design storm is required or fifteen feet (15') from the waterway centerline or ten feet (10') from the top of the recognized bank, whichever is greater. A fifteen-foot (15') wide access easement shall be provided on both sides of the channel for channel widths greater than fourteen feet (14') at the top of the recognized bank.

4. 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.
5. Structures cannot be built over the easements, and trees and large bushes cannot be planted in the easement.
6. All easements must be furnished to the City for review and approval prior to recording platted tract.

Relation to water courses

Storm drain lines shall enter a creek or drainage channel at 90° or Less to the direction of flow. The outlet shall have a head wall and scour pad or rip rap to prevent erosion of the existing bank or channel bottom. The size of pipe or channel being entered will govern which protective measures are required. All protective measures must conform to the requirements of Section 3.0050 of these Design Standards and/or as set forth by Clean Water Services.

Structure location

Manholes

Manholes shall be located at all changes in slope, alignment, pipe size, and at all pipe junctions with present or future storm drains. Manhole spacing shall not be greater than Clean Water Services Standards.

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

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

Design criteria set forth by Clean Water Services current Design and Construction Standards for Sanitary Sewer and Surface Water Management apply.

Catch basins

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:

1. At curb returns on the upstream side of an intersection.

2. At the ends of all dead-end streets with a descending grade.
3. At intermediate locations so that storm flows at the curb line do not exceed three feet (3') in width (measured from the curb face) or three inches (3) in depth (measured at the curb face,) whichever is less.
4. At all low points.
5. On street grades grater than 10 % the maximum spacing shall be 150 feet.
6. On street grades less than 1% the maximum spacing shall be 150 feet.

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

Dry wells

Where there are no natural or constructed drain ways, or an existing storm water system, dry wells can be used as a discharge point with the approval of Clean Water Services. Private systems shall require building permits and approval from Washington County.

Design criteria to be set forth by Clean Water Services.

Anchor blocks

Design criteria to be set forth by Clean Water Services.

Water bars

Design criteria to be set forth by Clean Water Services.

Storm detention

As required by Clean Water Services.

Development not requiring detention

As determined by Clean Water Services.

Floodplain information

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.

Detention volume

When detention is required, the volume to be detained shall be determined by Clean

Water Services calculations.

Emergency overflow

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. The design engineer shall identify the overflow route based on a 100 year event.

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

Detention facilities

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

1. Surface storage
2. Underground

Erosion control

Developments shall provide erosion control methods to limit the removal of soil materials by storm runoff during the construction phases of a project. Erosion control practices must meet Clean Water Services erosion control standards. An Erosion Control Permit is required prior to any construction or grading within the right of way or on private property.

Erosion control - application

1. 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.
2. 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 clearing and grading. Interception shall preclude any silt-laden runoff from discharging from the proposed land development to downstream properties unless previously approved by the City Engineer. 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.
3. Prior to initial clearing and grading of construction site, an evaluation of the following factors must be carried out:
4. In addition a 1200-C permit, as approved by Clean Water Services, is required for a disturbed area of 1 acre or greater.
 - 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, sedimentation ponds, 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.

Private drainage systems

Subdivisions

When subdivision lots drain to the rear, it may be necessary to provide an 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. Clean Water Services Standards do not allow private drainage systems with service for multiple lots.

Subsurface drainage

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

1. 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.
2. 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.
3. 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.
4. Public drainage system (pipes) shall be designed to convey subsurface water in addition to surface water.

WATER MAINS

General

Water distribution systems shall be designed to meet Oregon Administrative Rules, AWWA & APWA Standards and guidelines of the City of North Plains Water System Master Plan - 2005 and its updates.

Permitees will fund 100% of public improvements required to develop a project.

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 40 psi, and the minimum fire flow shall be 1,000 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 latest version of the Water System Master Plan.

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

Water mains shall be a minimum of 4' clear of curb in street, no water mains shall be installed behind curbs or sidewalks. The City Engineer, under special conditions, may allow a public water line to be located within a public water easement.

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 twenty percent (20%), or as required by the City Engineer, soil stabilization fabric shall be placed over the entire disturbed area.

Pipe Materials and Size

All public water distribution systems shall be constructed with ductile iron pipe, minimum thickness Class 52.

All such pipes shall be cement mortar-lined pipe with push-on or mechanical type joints.

When a corrosive potential condition is encountered, all ductile iron pipe and fittings will be polyethylene encased with a 8 mil tubing meeting manufacturer and AWWA standards. Polyethylene encasement is required for parallel alignment within 10 feet of steel gas mains, and for 10 feet of either side of steel gas main crossings.

PVC pipe may be considered as an alternate material only on a case-by-case basis.

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 and Public Works Director. Polyvinyl chloride (PVC) pipe may be considered as an alternate to ductile iron pipe where an active cathodic protection system is encountered.

Polyvinyl Chloride (PVC) Pipe and Tracer Wire Installation - PVC pipe 4-12 shall conform to AWWA C900-81. PVC pipe 14" - 36" shall conform to AWWA C905-88 standards. All PVC pipes shall have a dimension ratio no greater than 18, with an outside diameter identical to cast iron. Tracer wire shall be a minimum 12 gauge coated copper wire, colored blue and installed with all PVC water pipes. Warning tape shall also be installed within 24" of surface if PVC pipe is required.

All pipe shall be pressure rated for at least 150 psi, valves shall be of ductile iron, rated at 250 psi and fittings shall be pressure rated at 350 psi for ductile iron.

All fittings shall be factory cement lined.

Service lines 3/4" & 1" shall be type k soft copper.

Service lines 1 1/2" & 2" shall be type K ridged copper.

The tubing shall be cut with square ends, reamed, cleaned and made up tightly. Care shall be taken to prevent the tube from kinking or buckling on short bends. Kinked or buckled sections of copper tube cannot be installed with splices and brass fittings..

Water distribution main sizes shall conform to the following:

Installation of distribution mains smaller than 8 inches will not be permitted.

Non-looped water mains may only be used with approval of the City Engineer in residential zones on dead-end streets less than a distance of 250 feet measured from the center of the intersection street to the radius point of the cul-de-sac of a dead-end street non-looped mains shall provide service to not more than 12 residences and shall

be connected to a looped minimum six-inch main.

All non-looped lines shall terminate with a standard two (2) inch blow off or hydrant assembly.

8-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.

Size	
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" & up	As required for primary feeder lines in subdivisions, industrial and commercial areas.

Water service lines shall conform to the following:

3/4"	Residential services.
1"	Two residential services. Service line shall have a tee with two (2) 3/4-inch lines connected to it such that each lot is served by a separate 3/4 inch line and meter. No more than two (2) residential services can be combined in this manner.
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 five feet (per second). Velocity in service lines (as defined in Section: 3.30.505) shall not exceed ten feet (10') per second.

Grid System

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 permanent dead-end mains greater than 250 feet, upon which fire protection depends and the dependence of relatively large areas on single mains will not be permitted.

Dead-End Mains

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 mechanically restrained. The MJ plug shall be tapped 2" and provided with a Standard Blow-Off assembly (see standard details),

except that the 2" gate valve shall not be installed.

Permanent dead-end mains shall terminate with a Standard Blow-Off Assembly or Hydrant Assembly.

Alignment and Cover

Right-of-Way Location

Water systems shall be located twelve feet (12') south and east from the right-of-way centerline or as directed by the City Engineer. All water lines shall be in the public right-of-way.

All abrupt changes in vertical or horizontal alignment shall be made with a fitting and an approved mechanical joint restraint.

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 not to exceed half of the recommended maximum deflection for reach joint per the manufacturer.

Minimum Cover

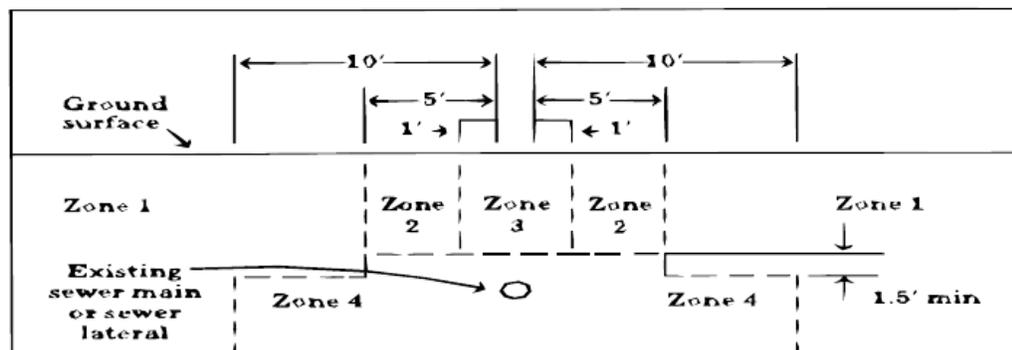
The standard minimum cover over buried water mains within the street right-of-way or easements shall be thirty-six inches (36") from finish grade.

Finish grade shall normally mean the proposed pavement or ground elevation where the main is located.

Separation with Sewer Lines

Sanitary sewer lines and water mains shall be installed in accordance with OAR 333, Division 61.

Figure 1: Water Line-Sewer Line Separation



- Zone 1: Only crossing restrictions apply
- Zone 2: Case-by-case determination
- Zone 3: Parallel water line prohibited
- Zone 4: Parallel water line prohibited

If installed at the same elevation as sewer mains, water mains shall be installed a minimum clear distance of ten feet (10') 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 three feet (3') 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 twelve inches (12") 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 six inches (6").

Easements

Mains shall be offset by a minimum of eighteen inches (18") from the property line and centered in the middle of public utility easements when possible.

For mains placed in easements located other than along a property line, the main shall be placed in the center of the easement.

Easements, when required, shall be exclusive and a minimum of fifteen feet (15') 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.

Any water main placed 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 sign. The City shall provide wording for the sign/monument.

All easements must be furnished to the City for review and approval prior to recording.

Relation to Watercourses

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

1. 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 Engineer.
 - A. Valves shall be provided at each end.
 - B. Air/Vacuum relief valves shall be provided if required.
2. Underwater Crossings
 - A. Mains crossing stream or drainage channels shall be designed to cross as nearly perpendicular to the channel as possible.
 - B. 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 manhole. 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.
 - C. The minimum cover from the bottom of the stream bed or drainage channel to the top of pipe shall be thirty inches (30").
 - D. 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, six inches (6") thick and six feet (6') wide, reinforced with number four bars twelve inches (12") 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. Control density fill may also be used if prescribed by the City Engineer.
3. The following surface water crossings will be reviewed and approved on a case-by-case basis:

- A. Stream or drainage channel crossing.
- B. River or creek crossings requiring special approval from the Oregon Division of State Lands.

Appurtenances

Valves

In general, valves shall be the same size as the mains in which they are installed. Valve types and materials shall conform to the City of North Plains Design Standard Specifications.

Distribution system valves shall be located at all tee or cross fittings. There shall be a sufficient number of valves so located that not more than four (4) and preferably three (3) valves must be operated to effect any one particular shutdown. The spacing of valves shall be such that the length of any one shutdown in commercial or industrial areas shall not exceed 500 feet or 800 feet in other areas.

In general, a tee-intersection shall be valved in two branches and a cross-intersection shall be valved in three branches. Transmission water mains shall have valves at not more than 1,000 foot spacing unless designated by City Engineer. Hazardous crossings, such as creek, railroad, and freeway crossings, shall be valved on each side.

Distribution tees and crosses for future branch lines on transmission mains may be required at the direction of the City Engineer and Public Works Director.

Valves shall be ductile iron resilient wedge (AWWA C-515) rated for 250 psi cold water working pressure. Valve body and all other ferrous material shall be ductile iron, the wedge shall be encapsulated with EPDM rubber (2"-larger sizes).

Butterfly valves shall only be used if and when designated by City Engineer and Public Works Director.

Fire Hydrants

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 1000 GPM.

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 subdivisions or as approved by the Fire Chief and City Engineer. Residential hydrants shall be located as near as possible to the corner of street intersections and not more than 500 feet from any cul-de-sac radius point.

In addition, sufficient hydrants shall be available within 500 feet of a building in commercial/industrial areas to provide its required fire flow.

No fire hydrant shall be installed on a main of less than eight inches (8") inside diameter unless it is in a looped system of six-inch (6") mains. The hydrant lead shall be minimum six-inch (6") inside diameter.

All fire hydrants will be located behind the existing or proposed sidewalk. If any public hydrant encroaches on private property an easement will be provided as directed by the City Engineer.

No hydrant shall be installed within five feet (5') of any existing aboveground utility nor shall any utility install facilities closer than five feet (5') from an existing hydrant.

Full-depth hydrants will be required in all installations. Installation of hydrant extensions will require approval from the Public Works Director.

Each fire hydrant shall have an auxiliary valve and valve box, which will permit repair of the hydrant without shutting down the main supplying the hydrant. Such auxiliary valves shall be resilient seat gate valves (AWWA C-515). The auxiliary valve shall have MJX flange ends. The valve shall be connected directly to the water main using a MJX flange joint tee with mechanical joint restraints.

Hydrants shall meet or exceed AWWA C-502, latest revision. Rated working pressure shall be 250 psi test pressure shall be 500 psi, and hydrants shall include the following specific design criteria:

- The nozzle section, upper and lower stand pipes and hydrant base shall be ductile iron.
- The main valve closure shall be of the compression type, opening against pressure and closing with the pressure.
- Nozzle section to be designed for easy 360 degree rotation by loosening of no more than four bolts.
- The draining system of the hydrant shall be bronze and be positively activated by the main operating rod.
- Hydrant to be furnished with a sliding bronze drain valve. Sliding drain valves made of rubber, plastic or leather will not be allowed.

- Hydrant must have an internal travel stop nut located in the top housing of the hydrant.
- HYDRANT SHALL BE WATEROUS PACER (Model number WB-67-250 with integral 5" storz nozzle).

Hydrants shall not be located within twenty feet (20') of any building, nor will they be blocked by parking.

The large hydrant port should face the road or travel way.

Guard posts a minimum of three feet (3') high shall be required for protection from vehicles when necessary. Such protection shall consist of four-inch (4") diameter steel pipes, six feet (6') long filled with concrete and buried a minimum of three (3') feet deep in concrete, and located at the corners of a six (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 and Public Works Director.

Pressure-Reducing and Air Release Valves

The specific design and location for such valves will be reviewed and approved by the City Engineer and Public Works Director.

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

Ductile Iron Fittings

All fittings shall conform to ANSI/AWWA Specification C110/A21.10 or ANSI/AWWA Specification C153/A21.53. All ductile iron fittings shall be rated at 350 psi working pressure. Fittings shall be factory lined with cement mortar or cement lined to factory standards. Fittings are to be cement lined and seal coated in accordance with ANSI/AWWA C 104/A21.4. All coated fittings must meet requirements of NSF-61. No field coating with cement will be approved, other than minor repairs. Fittings shall be new and free of defects in coating, body, and lining. During installation, fittings shall be properly aligned, and bolted securely to provide watertight joints.

Mechanical Joint Restraint

The Contractor shall provide restrained joints at all tees, crosses, caps and bends.

Mechanical joint restraints should not be used on plain end fittings. Mechanical Joint restraints shall be:

- MEGALUG brand, as manufactured by Ebaa Iron Sales Inc or

- Romogrip, as manufactured by Romac or approved equal.

Service Brass

All underground service line valves and fittings shall meet ANSI/AWWA C-800-89 Standards or latest version.

Fittings shall be compression type with stainless steel gripping restraint. Fittings with spilt clamps will not be allowed. Corporation stops will be plug valve type in sizes 3/4" & 1" and ball valve type corporation stops in 1 1/2" & 2" sizes. Angle meter valves (3/4" & 1" SIZE) shall be full or reduced port angle ball valves rated at 300 psi with copper tube size compression x swivel meter nut configuration. Flanged angle valves 1 1/2" & 2" shall be ball style rated at 300 psi with lockwing.

Valve Boxes

Cast iron valve boxes shall be furnished with all valves 2" and larger and shall conform to the "Vancouver" style 910 valve box@ style with 3034 PVC bottom extensions. Valve lids shall be marked "WATER".

Backflow Devices

Devices shall be listed on latest edition of the University of Southern California (USC) Cross Connection Control list of approved backflow devices. The application must meet the Oregon Administration Rule on Cross Connection Control Requirements- Oregon Administrative Rules, Chapter 333.

OAR 333-61-070. Services larger than 1" shall have a premise isolation at the meter, services of this size are usually used for other than residential use. The degree of hazard shall be determined by the City of North Plains Cross Connection Inspector, thus determining the type of device needed.

Railroad or Highway Crossings

All such crossings defined above, or as determined by the City to be of a hazardous nature, 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. It shall be the applicant's responsibility to obtain such permits prior to city approval of plans.

Water Service Lines

The sizes of water service lines which may be used are 3/4", 1", 1-1/2", 2", 4", 6", 8", 10", and 12". Water service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

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

Domestic service lines 3/4" through 2" shall normally extend from the main to behind the curb with an angle meter stop and meter box located at the termination of the service connection. Meter will be provided and installed by City. Meter boxes are specified by the City of North Plains and provided by the developer.

In general, individual service connections shall terminate in front of the property to be served and shall be located approx. two (2) feet on each side of a common property line.

When the service line is 1" or less, Mid-States Plastics model MSBCF1118-12 with ductile iron reader lid, Amorcast 10x15 part no P600192x12 with reader lid part no A6001922R or a Christy FL12BOX meter box with a FL12F hinged lid cover shall be provided.

Private plumbing permits from Washington County are required on private property.

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. An approved back flow prevention device shall be required of the property being served.

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

System Testing

All new water systems (lines, valves, hydrants, & services) shall be individually pressure tested, chlorinated and tested for bacteria. All testing shall be performed in accordance with the AWWA Standards, North Plains Standard Specifications, OAR's and in the presence of a City inspector. Sample will be taken by inspector and tester at a location approved by Public works.

STREETS

General

All street designs shall provide for the safe and efficient travel to the motoring public, bicyclists and pedestrians.

No road or utility construction shall commence prior to City approval of all of the following:

- Construction plans
- Payment of all applicable fees
- Issuance of all applicable permits

Designs submitted shall be stamped by a Registered Professional Engineer licensed to practice in the State of Oregon.

Streets shall be designed to meet or exceed minimum guidelines. These guidelines are set forth in the "AASHTO Policy on Geometric Design of Highways and Streets" (latest edition). Traffic Control Devices shall conform to the "Manual on Uniform Traffic Control Devices for Streets and Highways," Federal Highway Administration, with Oregon Supplements, Oregon Dept. of Transportation's (latest edition) and the Washington County Uniform Road Improvement. All vertical and horizontal curves shall meet the guidelines of the AASHTO Policy and the design speed for each 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 given be permitted.

All streets must be built to City of North Plains standards. Private streets shall only be allowed in PUD or Master Planned neighborhoods with established home owners associations.

All development shall be provided public street access as well as pedestrian access.

Street System Classifications

All streets are classified into one of the following categories:

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.

No arterial streets exist within North Plains city limits as of 2014.

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 transit vehicles. Collector streets generally have a traffic volume rate of 1,000 to 4,000 vehicles/day. Abutting land uses are generally residential.

2014 List of Collector Streets

Street	Class	Jurisdiction
Glencoe Road	Collector	Washington County
Gordon Road	Collector	Washington County
North Avenue	Collector	Washington County
West Union Road	Collector	Washington County
Commercial	Collector	North Plains
Hillcrest Street	Collector (minor)	North Plains
Wascoe Street (319 th -Gordon)	Collector (minor)	North Plains
Pacific Street	Collector (minor)	North Plains
307 th	Collector (minor)	North Plains
Highland Court	Collector (minor)	North Plains
313 th	Collector (minor)	North Plains

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.

Most streets in North Plains are local streets. There are a couple subclasses of 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 600' in length and shall not serve more than 20 dwelling units.

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. Minimum radius for cul-de-sacs shall be no less than 45 feet from center of turn around to face of

curb.

An existing dead-end street system which is more than 600 feet long or which serves more than 20 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.

Types of Streets

The following designations will be utilized in the assignment of new street names:

- A. Road: major north/south street providing through traffic movement across the community;
- B. Boulevard: major east/west street providing through traffic movement across the community;
- C. Avenue: continuous, north/south thoroughfare or extension thereof;
- D. Street: continuous east/west thoroughfare or extension thereof;
- E. Lane: short east/west street under one thousand feet in length;
- F. Terrace: short north/south street under one thousand feet in length;
- G. Drive: curvilinear thoroughfare (less than one hundred eighty degrees) at least one thousand feet in length;
- H. Court: east/west cul-de-sac;
- I. Place: north/south cul-de-sac;
- J. Way: loop street (exceeding one hundred eighty degrees);
- K. Parkway: a broad landscaped thoroughfare.

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The City Council may grant an exception to the street name standards specified under on a case-by-case basis and subsequent to accepting public comment.

Right-of-Way and Pavement Width

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

Arterial:

Right-of-way = 80'-100'
Pavement width = 50'
Sidewalk minimum 5= width

Collector:

Right-of-way = 60'-80'
Pavement width = 50'
Sidewalk minimum 5' width

Local Residential:

Parking both sides of street

Right-of -way = 52'-60'
Minimum Pavement width = 34'
Sidewalk minimum 5' width

Cul-de-sac

Right-of-way = 52'
Pavement width = 34'
Sidewalk minimum 5' width
Min. 45' radius to curb

See Figure 5-2E

For street designated collector and below, the City Engineer may consider design modifications to conserve major trees in the public right-of-way. In no instance shall the paved width of a new street be less than 28”.

Pavement Design

In general, all streets shall be constructed with asphaltic concrete type "C"; however, Portland Cement Concrete (PCC) streets are permitted as approved by the City Engineer. Local streets are required to have a minimum asphalt concrete thickness of 3” over a compacted 8” based.

The Engineer will provide a street structural design section for all roadways classified Neighborhood Collector and higher, and local streets in industrial zones. A structural design section will also be required when the soils report indicates poor soil.

Intersections

Connecting street intersections shall be located to provide for traffic flow, safety, and

turning movements, as conditions warrant.

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°). Angles of less than 75° 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 centerline is not offset, except as provided below. Where existing streets adjacent to a proposed development do not align properly, conditions may be required of the development to provide for proper alignment.

For intersections which are not directly aligned with street centerline, the centerline spacing must meet the following minimum separation distance:

Street Class	Intersection Spacing (ft)
Arterial	500*
Collector	400*
Local	300*
Cul-de-sac	150

* *The City Engineer may permit a minimum spacing of not less than 300 feet (Arterial), 200 feet (Collector), 200 feet (Local), when findings are made to establish that:*

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

Design Speed

Design speeds for classified streets shall be as follows:

Street Class	Design Speed
Arterial	35-45 mph
Collector	25-40 mph
Local	25 mph
Cul-de-sac	25 mph

Horizontal/Vertical Curves, and Grades

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:

Street Class	Curve Radius
Arterial	415-600'
Collector	165-275'
Local	100'
Cul-de-sac	100'

Vertical Curves

Vertical curve length shall be based on the 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.

Grades

Maximum grades for each street classification shall be as follows:

Street Class	Maximum Grade
Arterial	0.060 ft/ft
Collector	0.080 ft/ft
Local	0.100 ft/ft
Cul-de-sac	0.120 ft/ft

Local and cul-de-sac streets may exceed 12%, but in no case permitted to exceed 16%. The City Engineer 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 a 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 0.0050 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 0.0060 feet per foot (0.60%).

Street cross-slopes shall be two (2) percent. Where there are site constraints the cross slope can vary from one (1) to three (3) percent.

Concrete Curb

All development projects will be required to construct street improvements with concrete curbs.

Standard Curb shall only be used on streets classified Collector and lower when the longitudinal street grade is 0.10 feet per foot (1.0%) or greater. Curb exposure for Standard Curb is seven (7) inches, and nine (9) inches at catch inlets.

All others curb and sidewalks shall be separated by a planter strip.

Monolithic Curb and Gutter shall be used on streets classified Collector and higher and when the longitudinal street grades less than 1.0%. Curb exposure for monolithic curb and gutter shall be six (6) inches, and eight (8) inches at catch insets.

Joint spacing in curbs shall be 15-foot maximum for contraction joints and 45-foot maximum for expansion joints. In addition, expansion joints shall be located at all curb return points and at driveway curb drop transition points.

A minimum of two drainage block-outs to accommodate 3" drain pipe shall be provided for each lot. Typically, these block-outs are located five feet (5') from each side property line.

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:

Intersection	Radius
Local/Cul-de-sac with Local/Cul-de-sac	20'
Local/Cul-de-sac with Collector	20'
Local/Cul-de-sac with Collector or Arterial	30'
Collector with Collector or Arterial	30'
Collector/Arterial with Collector/Arterial	30'

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

Parking

Parking spaces are required on most streets.

Street Class	Parking Lanes	Parking Required
Arterial	None	May be allowed in some areas
Collector	2	Variable (1)(2)
Local	2	Yes (3)
Cul-de-sac	1	Yes (3)

- 1) *Where bike lanes exist on collectors, parking may be prohibited.*
- 2) *Collector - No parking within 45' of curb return.*
- 3) *Local - No parking within 15' of curb return.*

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

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

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.

1. 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.

2. 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.
3. 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.
4. All required handicapped parking space shall conform to ORS 447.210 and shall be a minimum of 14 feet in width.
5. 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 a 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	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")

Sidewalks

In general, new sidewalks are required for all development requiring a development permit. The width of sidewalk must be a minimum of 5'. In Commercially zoned areas wider sidewalks are encouraged.

Minimum Sidewalk Width

Street Class/Location	Not including 6" curb
Arterial	5'-15'
Collector	5'-20'

Local	5'
Cul-de-sac	5'

Sidewalks do not include a six inch curb as a portion of the minimum width. Sidewalks may be required to meander within the dedicated right-of-way or outside of the right-of-way within an easement with the approval of the City Engineer.

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

Wheelchair Ramps

Each corner at all intersections shall contain wheelchair ramps for handicapped access located within the curb return. Ramps shall also be located wherever an accessible route crosses a curb.

In residential areas the ramp will be located at the midpoint of the curb return. On streets classified above local or cul-de-sac, ramps may be required at different locations within the curb return. It may also be required to construct two (2) ramps at a curb return when a different location is required.

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.

Pedestrian Paths

Pedestrian paths are distinguished from sidewalks in that they are not adjacent to streets, and may be located in open space areas, landscaped areas or other areas not accessible to motor vehicles.

Pedestrian paths can be constructed from variety of materials ranging from cement, asphalt concrete, decomposed granite, rock, bark chips, or boardwalk. The appropriate material will be determined by the Planning Commission, after evaluating the site conditions and any related reports regarding significant natural resources or flood plains.

Pedestrian paths shall be a minimum of 4' in width, and have no maximum width.

The City of North Plains is committed to trail construction and maintenance that minimizes environmental impacts and improves environmental conditions. As best management practices evolve, the city will alter trail and natural area management practices as necessary. Some basic guidelines for sound trail construction include:

- When possible, use recycled and/or local materials.

- Align the trail above the ordinary high water mark and in a manner that has the least impact on the natural surroundings, minimizes grading/limits erosion, protects water quality, and maintains wildlife habitat
- Avoiding trail construction and maintenance between April 1-July 15 to avoid disturbing nesting birds and other breeding wildlife
- Surrounding the trail with denser vegetation to encourage users to stay on trail and minimize site disturbance, especially in wetter areas
- All best management grade and outslope designs should be followed, including the incorporation of rolling dips and grade reversals to reduce erosion and sedimentation
- Large brush/dead and standing wood should be retained on the site to provide wildlife habitat, restore nutrients, and minimize site disturbance
- Using trail material/trail break methods that minimize erosion and are ADA compliant
- Keeping all motorized maintenance equipment on trail to reduce site disturbance

Recycling containers and trash cans must be installed at the entrance/egress points of trails longer than 1,250 feet.

Benches or other seating facility shall be placed at a minimum of every 1,250 feet along pedestrian paths.

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 standards and criteria as the minimum guidelines for bike way design, construction and control.

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 Oregon Transportation Commission

Bikeway Location

Bikeway Location	Minimum Width	Comments
Public Street (designated bike lane)	4"	Each direction of travel
Public Street (non designated bike lane)		One way pavement width greater than 12" – desirable one way pavement width is 14' or greater

Design criteria

In general, bikeway design shall meet the adopted standards referred to above.

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

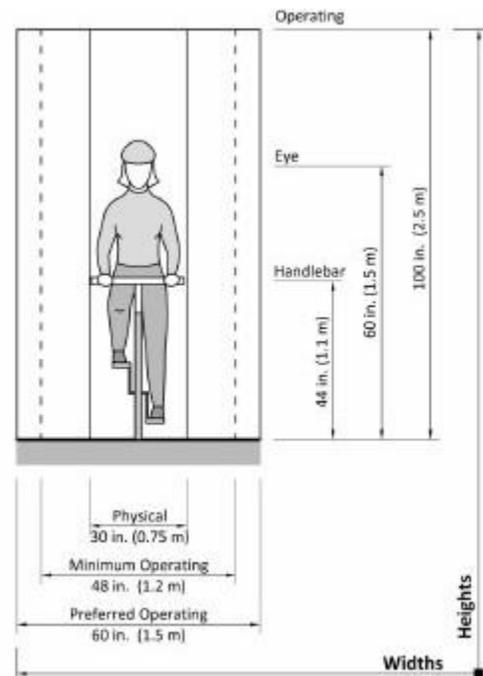
Bikeway curvature will be based on a minimum design speed of 20 mph. Bikeway grades shall be limited to a maximum of five percent (5%). Where topography dictates, grades over five percent (5%) are acceptable when a higher design speed is used and additional width is provided.

Construction

Off-street bike ways shall be constructed for two different situations:

- A. Where limited maintenance vehicle (City-owned) use will occur, and
- B. Where heavy maintenance vehicle use will occur.

In both cases, sub grade preparation will require removal of existing organic material and compaction.



Bikeway Thickness

Use	Asphalt	Aggregate
Low	2"	6"
Heavy	3"	8"

When drainage, such as side ditches, is required parallel with the bike way, the ditch centerline shall be at least five feet (5') from the edge of the pavement. Ditch side slope

adjacent to the bike way shall be no steeper than 2:1 when measuring the horizontal distance to the vertical distance.

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

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.

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 (1) post is required, the spacing shall not exceed a separation of more than five (5) feet.

An alternative to deterring the motor vehicles is to design two (2) five (5) foot wide lanes separated by low landscaping at the intersection.

Driveways

Access to private property shall be permitted with the use of driveway 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 driveway 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 driveways on a frontage are approved by the City Engineer, 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 driveways, such as limited turn movements, shared access between uses, closure of existing driveways, or other access management actions.

Driveway approach types, Residential Driveway, Commercial/Industrial Driveways, must be approved by the City Engineer.

Should the length of a driveway be greater than fifty (50) feet in length and the driveway has only one (1) access to the street or does not loop to the street, a turnaround shall

be provided. The minimum inside radius of the turn around shall be fifteen (15) feet with a width at the turnaround point of thirty (30) feet for maneuvering.

Driveway Widths (Min-Max)

Street Class.	Residential	Commercial/Industrial	Number Allowed
Arterial	12/24(1)	15/40	1/250' of frontage
Collector	12/24(1)	15/40	1/frontage (2)
Local	12/24(1)	15/40	1/frontage
Cul-de-sac	12/24(1)	15/40	1/frontage

Notes:

- 1) *Certain businesses may warrant one additional curb cut for service driveways*
- 2) *24=width up to 50 > of lot frontage. (Wider than 50 feet of frontage 24 = + 1 foot/foot of lot frontage driveway not to exceed 35 feet in width)*

Frontage greater than 130' may permitted one additional curb cut.

Special conditions may warrant additional driveway access, and will be reviewed on a case by case basis.

Driveway Locations (minimum distance to curb return)

Street Classification	Residential	Commercial	Industrial
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, driveways 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, a driveway with restricted turn movements may be allowed.

Within commercial, industrial and multifamily areas shared driveways 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 driveways or internal access between uses will be established by means of common access easements at the time of development.

Driveway grades shall not exceed twelve percent (12%) from the curb line to the property line.

Alleyways and Private Residential Access ways

Alleyways

Alleyways may be provided in commercial and industrial developments with approval by the City Engineer. When approved, alleyways shall be dedicated to the city. The minimum width shall be 20 feet with a 12 foot pavement width.

Generally, alleyways shall be designed for one-way operations.

Alleyways are private drives and solely the responsibility of the private property owner.

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 the following standards:

- A. Dead-end access ways shall not exceed 600 feet in length nor serve more than 25 dwellings units.
- B. Dead-end access ways which exceed 150 feet in length shall be provided with an approved turnaround.
- C. "Private Street" Signage and driveway approach shall be placed at the intersection with the public street to clearly identify the private access way.
- D. Private maintenance of the private streets/access ways shall be provided by a Homeowner's Association or property owner. Maintenance shall insure continual emergency access at all times.
- E. Location of private access ways shall meet the Uniform Fire Code and meet the minimum pavement section of local residential streets.
- F. Private residential access ways shall not be allowed in Manufactured Home Parks or Subdivisions.
- G. Private residential access ways require Washington County building permits.

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.

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 six (6") inches in depth, thirty six inches (36") wide and shall be 3/4-inch minus crushed.

Culverts

Streets without curbs and gutters are designed to carry run-off to adjacent ditch lines. When ditch lines are filled and culverts installed the run-off water is conveyed and velocities and hydraulics increase to adjacent ditch lines, thus causing erosion and flooding problems.

If a property has an open ditch line in the right of way area the maximum culvert crossing shall be set forth by the width of the driveway approach.

All pipes and culverts shall be a minimum of twelve(12) inches in diameter. For pipes and culverts not of circular cross-section the minimum clear dimension that crosses the centroid shall be twelve (12) inches.

Washington County Uniform Road Improvement Design Standards and Clean Water Services Drainage Standards, minimum pipe size is 12" in diameter.

Pipe and culverts may be constructed of the following materials:

- concrete
- asphalt coated corrugated steel
- polymer coated corrugated steel
- corrugated aluminum
- polyvinyl chloride
- corrugated polyethylene
- cast iron
- ductile iron

The material used shall be adequate to carry anticipated dead and live loads within deflection limits specified by the manufacture. All pipe and culverts shall have a minimum design service life of seventy five (75) years based on manufacture recommendations and be per applicable ASTM (American Society of Testing Material) standards. All pipes and culverts shall be strong enough to withstand stresses created by cleaning equipment. Installation techniques shall be documented and follow

manufacturers recommendation.

Minimum cover for plastic pipes shall be three (3) feet to finish grade.

Signs

The developer of subdivision 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 and installed by the developer in new developments.

A full inventory of signs installed by the developer must be submitted to the City together with GPS location information and date of installation with as-built plans.

Street Names

Streets that are north/south are required to be numbered in accordance with the Washington County grid system. East/west streets shall be named after a family on the approved street name list.

All streets named or renamed will comply with the following criteria:

- Collector streets, local roads and highways (arterials) shall maintain a common name or number for the entire contiguous alignment inside the corporate limits of North Plains.
- Whenever practicable, historical family names, names of former Mayors, and parade grand marshal will be utilized or retained and be subject to the considerations as outlined below. Priority shall be given to names listed in the Street Name Pool.
- Hyphenated, multiple words, or other exceptionally long names requiring more than 25 characters will be avoided.
- No street will be given a name that is the same as, similar to, or pronounced the same as, any other street within the jurisdiction of the City of North Plains unless that street is an extension of an already-named street.
- Consideration will be given to the continuation of the name of a street in another jurisdiction when it is extended into the City of North Plains.
- Names that are difficult to pronounce or spell will be avoided.
- Abbreviated street names will not be allowed.

All proposed street names will be reviewed, prior to use, by the City staff to determine whether the proposed street names comply with the standards and classifications set forth in this policy.

Street Lights

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.

All street lighting shall be designed using the illuminating Engineering Society guidelines. All street light poles should be located near property lines and at least 25 feet from any trees, unless otherwise preapproved in writing by the Public Works Director.

All street light plans shall include: pole locations, conduit locations, junction box locations, transformer/controller cabinet locations, photometrics (or P.E. Certification)

The contractor shall be responsible to provide all required traffic controls associated with lighting.

The contractor shall be responsible for making arrangements with PGE to obtain light fixtures and equipment to connect the street lighting system and local distribution system.

After January 1, 2015, only LED street lights may be installed in North Plains.

New street light installation shall follow PGE option C.

Traffic Analysis

The City Engineer and City Planner will require a traffic analysis report as determined by the type of development and its potential impact to existing street systems. A traffic analysis may be required for a development:

- A. When it will generate 1,000 vehicle trips per weekday or more, or
- B. When a development'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 easy and safe traffic flow on surrounding street system.
- To provide effective and safe transfer of vehicle traffic between the site and the street system.
- To provide convenient, safe and efficient on-site and off-site movement of vehicles, pedestrians, transit, service and delivery vehicles, 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.

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 and study area, existing traffic conditions in the study area, and 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.

4. On-site Traffic Evaluation

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

5. Technical Appendix

A technical appendix including work sheets, charts, traffic count, drawings to

support findings as described in the body of the report.

6. Recommendations for Public Improvements

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

7. 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 driveways or increase spacing between driveways 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 area for turning vehicles and queues.) These techniques may include turn restrictions, striping, medians, frontage roads, channeling of lanes or driveways, shared driveways and access between similar uses, access consolidation, lanes for left or right turns, and other transportation system management (TSM) actions.

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

The analysis of alternate access proposals should include:

1. Existing daily and P. M. peak hour counts, by traffic movements, at intersections effected by generated traffic from the development. (Use traffic flow diagrams).
2. Projected daily and P.M. peak hour volumes for these same intersections and proposed access points when the development is in full service. (Use traffic flow diagrams.)

3. A determination of the existing levels of service and projected levels of service at each intersection and access points studied.
4. 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.
 - a. 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.
 - b. The report should include a discussion of bike and pedestrian usage and the facilities provided along with the availability of mass transit to serve the development, if appropriate.

Temporary Dead Ends

Temporary dead-end streets more than one-hundred-fifty (150) feet in length shall be provided with an approved turn-around for emergency vehicles.

Temporary dead ends will only be permitted where there is a reasonable expectation that a street will be completed within five years of construction of the temporary dead end.

Appropriate signage and Type III barriers must be installed when a temporary dead is created.

Half-Street Construction

Half-street construction is not acceptable for new developments. 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.

Mailboxes

Mailboxes located within the right-of-way shall be either gang box style. Location of each type shall be set by the North Plains Postmaster and the Public Works Director.

DEFINITIONS

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

Approval - shall mean the proposed work or completed work conforms to this chapter in the opinion of the City Engineer and Public Works Director.

Approved Back flow Prevention Device - A device that has been researched, tested and approved by the USC Hydraulic Research Dept. and adopted by the Oregon State Health Division.

Arterial Street - A major facility for moving intra-area traffic and for moving traffic to and from the highway/expressway system.

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.

As-graded – This is the extent of the surface conditions on completion of grading.

Back flow - 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.

Bedrock - In-place solid rock.

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

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

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 bicyclists 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).

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

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 Lateral - A private sanitary sewer beginning five (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 North Plains, Oregon.

Civil engineer - An 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.

Collection Systems - Facilities maintained and operated by Clean Water Services 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 - A facility that allows traffic within an area or neighborhood to connect to the arterial system.

Compaction - The densification of a fill by mechanical means.

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 North Plains 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 - That, whenever, in these Standards, the words "directed," "required," "permitted," "ordered," "designated," or words of like importance are used, they shall be understood to mean the direction, requirement, permission, 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 and Public Works Director.

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.

Development- All human-induced changes to improved or unimproved real property, including;

- 1) Construction of structures requiring a building permit.
- 2) Land division, including subdivisions, partitions, and lot line adjustments.
- 3) Grading.
- 4) Excavation.
- 5) Clearing.
- 6) Drilling.
- 7) Construction of utility infrastructure.
- 8) Public works improvement.
- 9) Redevelopment.

Domestic Sewage - The liquid and water borne waste derived from the ordinary living processes, free from industrial wastes, and of such character to permit satisfactory disposal, without special treatment into the public 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.

Earth material - Any rock, natural soil or fill or any combination thereof.

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

Engineer - The 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.

Engineering geologist - A geologist experienced and knowledgeable in engineering geology.

Engineering geology - 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 - the wearing away of the ground surface as result of the movement of wind, water or ice.

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

Excavation - the mechanical removal of earth material.

Existing grade- Grade prior to disturbing ground.

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

Fill - The deposit of earth material placed by artificial means.

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.

Geotechnical engineer - See "soils engineer."

Grade - The vertical location of the ground surface.

Grading - Any excavating or filling or combination thereof.

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, as existed under natural conditions preexisting to development, 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 is not discharged to the sanitary sewer.

Key - A designed compacted fill placed in a trench excavated in earth material beneath

the toe of a proposed fill slope.

Lateral Sewer - A Building Service Lateral.

Local or Residential Street - A facility designated to serve primarily direct access to abutting land and offers the lowest level of traffic mobility. Through-traffic movement is deliberately discouraged.

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

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

Major Trees - "Major 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 specie.

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, Maple. The identification of major trees should distinguish species generally suitable 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 may be considered for approval, providing they are comparable with this established standard and are approved by the City Engineer and Public Works Director.

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.

Or Equal, Or Approved Equal, Or Equivalent - These terms indicate that the "equal" product is the same or better than the product or standard named or prescribed in function, performance, reliability, quality, and general configuration. Determination of the quality in reference to the project design requirements will be made by the Public Works Director. Contractor shall not use such "equal" products without prior written approval of the Public Works Director.

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 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 show 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.

Professional inspection - 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.

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

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 in public right-of-way or easement operated and maintained by Clean Water Services for carrying sewage and industrial wastes.

Public Storm Drain - Any storm sewer in public right-of-way or easement operated and maintained by Clean Water Services and or the City of North Plains.

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.

Redevelopment- Any activity that alters existing improved area on a subject property, including:

- 1) Expansion of or change to an existing structure or building footprint.
- 2) Reconfiguration of existing roadways, driveways, or parking lots.
- 3) Land disturbing activities related to structural or impervious area modifications.

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

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

Sedimentation - Disposition of erosion 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.

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

Siltation - Deposition of (silt) water borne sediments - fine textured sedimentation - terms used to describe the smoothing or cementing effect of a blanket of silt deposited over sand and gravel areas used by migratory fish for spawning (includes colloidal material when the transporting water evaporates).

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

Soil - Naturally occurring superficial deposits overlying bedrock.

Soils engineer (geotechnical engineer) - An engineer experienced and knowledgeable in the practice of soils engineering (geotechnical) engineering.

Soils engineering (geotechnical engineering) - 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.

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.

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

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

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

Turnaround Area - 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 discharge 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.

Water Main - 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 therefrom 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.