



*“Building A Stronger Community  
TOGETHER”*



# CITY OF SHELTON

## Design and Construction Standards

Ratified and Adopted under  
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Effective April 5, 2006

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## DESIGN & CONSTRUCTION STANDARDS

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**CHAPTER ONE**

**1.0 GENERAL STANDARDS AND SPECIFICATIONS**

**1.1 Purpose**

These Design and Construction Standards are intended to assist, advise, guide and direct all who propose to conduct new development or redevelopment within the City of Shelton, or propose actions that would impact public roads, public rights of way, or existing utility infrastructure. Processing of documents, design details, draft and final engineering documents, surveys, testing and construction shall be in accordance with these Standards, and the regulations and Standards of other agencies referred to herein.

**1.2 Shortened Designation**

These City of Shelton Design and Construction Standards shall be cited routinely in the text as the “Standards”.

**1.3 Applicability**

These Standards are applicable to all new construction, reconstruction, and upgrading of facilities in the right-of-way and on-site for transportation and transportation related facilities, storm drainage facilities, and sewer and water improvements. The following specifications shall be applicable when pertinent, when specifically cited in the Standards, or when required by a higher funding authority. In case of dispute regarding which Standards apply, the Director of Public Works will have the final decision.

- A. The current edition of the Washington State Department of Transportation/American Public Works Association (WSDOT/APWA) Standard Specifications for Road, Bridge and Municipal Construction and the APWA Amendment to Division 1.
- B. Conditions and standards as set forth in the current edition of the City of Shelton Comprehensive Water System Plan.
- C. Conditions and standards as set forth in the current edition of the City of Shelton Comprehensive Sewer Plan Update and 1997 I/I Facility Plan Update.
- D. Conditions and standards as set forth in the current edition of the City of Shelton Comprehensive Plan.

- E. Adopted rules, regulations and ordinances of the Shelton Municipal Code.
- F. Criteria set forth in the Local Agency Guidelines as amended and approved by Washington State Department of Transportation.
- G. City and County Design Standards for the construction of Urban and Rural Arterial and Collector Roads Promulgated by the City Engineers Association of Washington, May 24, 1989, or most current edition.
- H. Conditions and standards as set forth in the Washington State Department of Transportation (WSDOT) Design Manual as amended and approved by WSDOT.
- I. U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD) as amended and approved by WSDOT.
- J. Washington State Department of Transportation (WSDOT) Construction Manual as amended and approved by Washington State Department of Transportation.
- K. Washington State Department of Ecology (DOE) Stormwater Management Manual for the Puget Sound Basin and the Shelton Municipal Code, Title 13.
- L. Rules and regulations of the State Board of Health regarding public water supplies as published by the State Department of Health.
- M. Conditions and standards as set forth in the State of Washington Department of Ecology “Criteria for Sewage Works Design” most current edition.
- N. Conditions and standards as set forth by the State of Washington, Department of Labor and Industries.
- O. Criteria as set forth in the latest American Association of State Highway and Transportation Officials (AASHTO) policy on geometric design of highways and streets.
- P. Design criteria of federal agencies including Department of Housing and Urban Development and the Federal Housing Administration.
- Q. Conditions and standards as set forth in the American Water Works Association (AWWA) design manuals.
- R. Criteria as set forth in Highway Capacity Manual (Special Report 209).
- S. American Water Works Association (AWWA) Cross Connection Control Manual dated December 1995 or current edition.

- T. State of Washington Department of Health Water System Design Manual (current edition).
- U. Federal “Americans with Disabilities” Act (ADA).
- V. Other specifications not listed as may apply when required by the City.

#### **1.4 Definitions and Terms**

“Average Daily Traffic” or ADT = The average number of vehicles passing a specified point during a 24-hour period. Annual average daily traffic (AADT) denotes that daily traffic that is averaged over one calendar year.

“Bicycle Facilities” = That portion of the public right-of-way used exclusively for bicyclists or shared with other transportation modes.

“Building Sewer” = Shall be that portion of the sewer line between the building foundation and extending two feet outside the foundation wall of the structure. Maintenance of building sewers shall be the responsibility of the property owners.

“Controlled Density Fill” or CDF = A lean sand and concrete mixture with a maximum of 188 lbs. of cement per cubic yard (depending on application) and resulting in a material with a compressive strength of 50 to 200 pounds per square inch (depending on cement ratio) as outlined in Section 2-09.3(1)E of the Washington State Department of Transportation Standard Specifications.

“City” = Refers to the City of Shelton.

“City Engineer” = The individual appointed by the City of Shelton as its City Engineer or his or her duly authorized representative.

“Developer” = Any person, firm, partnership, association, joint venture, or corporation or any other entity responsible for a given project.

“Development” = The division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure; any mining, excavation, landfill, or land disturbance; and any use or extension of the use of land.

“Director of Public Works” = The individual appointed by the City of Shelton as its Director of Public Works or his or her duly authorized representative.

"Driveways" = An access from a public right of way or private street easement / tract to one (1) or two (2) parcels maximum, with a length of no more than 50 feet as measured from the edge of the right of way or private street easement /tract to the point where shared access ends for two (2) parcels.

"Dwelling Unit" = A family combination with house-keeping and cooking facilities. Hotel, motel, room and boarding units shall not be considered as dwelling units.

"Easement" = The right to use a defined area of property on a plat or short plat for specific purpose(s) set forth in the easement document.

"Engineer" = Any Washington State licensed professional engineer who represents the developer.

"ERU" = The unit used to calculate sewer consumption. One Equivalent Residential Unit (ERU) for other than residential equals one thousand two hundred (1,200) cubic feet per month of water consumed or wastewater discharged. (Shelton Municipal Code Chapter 14.02, Section 14.02.130 Definitions and, Chapter 14.10, Section 14.10.010 Sewer User Charges).

"Half Street" = Street constructed along an edge of development utilizing half the regular width of the right-of-way and permitted as an interim facility pending construction of the other half of the street by the adjacent owner.

"Inspector" = The authorized representative of the City Engineer who is assigned to the project site or any part thereof during construction.

"Interceptor" = A sewer that receives flow from a number of main trunk sewers, force mains, etc.

"Lateral" = That section of the sewer line extending from the City's main to the right-of-way or easement line. Maintenance of the lateral is the responsibility of the property owner.

"Level of Service (LOS)" = An indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. LOS means an established minimum capacity of capital facilities that must be provided per unit of demand or other appropriate measures of need.

"NPDES" = The 'National Pollutant Discharge Elimination System' permit program administered by the Washington State Department of Ecology.

"Plans" = The plans, profiles, cross sections, elevations, details and supplementary specifications signed by a licensed professional Engineer and approved by the City, which show the location, character, dimensions and details of the work to be performed.

"Pretreatment" = The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutants in wastewater prior to discharge to the City's system.

“Pretreatment Program” = An approved plan that provides for pretreatment, monitoring, sampling, and conditioning of wastewater prior to discharge to the City system.

“Private Pump Station” = A private pump station is a facility connected to a private sewer main, lateral or side sewer which conveys standard strength sewage or effluent by lifting or pumping to a City lateral, trunk, or interceptor sewer line. The design and construction of the private pump station must receive approval of the City prior to use. The private property owner will own, operate and maintain this pump station.

“Private Sewer” = Pertains to a sewer not owned or maintained by the City.

“Private Street” = Privately owned and maintained vehicular access, not including driveways, serving at least two (2) but no more than four (4) lots, extending across a private lot or tract with an access easement that originates from a public right-of-way. The number of lots served by the private street shall include the parcel the private street crosses unless the parcels sole purpose is to provide access. “Project” = General term encompassing all phases of the work to be performed and is synonymous to the term “improvement” or “work”.

"Property" = A lot, parcel, or tract of land together with the building and structures located thereon.

“Public Sewer” = That portion of the system located within public right-of-ways or easements and which are operated and maintained by the City, including interceptors, trunks, mains, and force mains, along with all publicly controlled and maintained manholes, pump stations and other appurtenances.

“Public Street” = Publicly owned and maintained street.

“Redevelopment” = The conversion, structural alteration, relocation, significant alteration or improvement, or enlargement of any structure; and/or the addition or improvement of site features; for the purpose of changing the type of or increasing the intensity of use of a site."

“Right-of-Way” = A general term denoting public land, property, or interest therein acquired for or devoted to a public street, public access or public use.

“Road” = An open general public way for the passage of persons and vehicles. Used interchangeably with street.

“Sanitary Sewage” = Waste water derived from domestic, commercial and industrial pretreated waste to which storm, surface and ground water are not intentionally admitted.

“Sewer Main or Trunk” = A sewer that receives flow from individual services and from one or more mains.

“Side Sewer” = That portion of the system located on private property connecting the building sewer to the lateral. Maintenance of side sewers is the responsibility of the property owner.

“SMC” = Shelton Municipal Code.

“State” = Wherever the Standard Specifications uses the term “State” to define “Owner”, the term “State” shall be construed to mean the City of Shelton.

“Street” = A public thoroughfare used for the passage of persons and vehicles from one place to another, including the sidewalks lining one or both sides. Used interchangeably with roads.

“Street Frontage of Lot” = The distance between the two points where the lot lines intersect the boundary of public street right-of-way.

“Subgrade” = The top surface of the roadbed on which sub-base, base, surfacing, pavement or layers of similar materials are placed.

“Unpaved Street” = An existing street segment within the City that is actively maintained by City crews and which has a gravel or compacted dirt driving surface.

“Utility” = A company providing public service including but not limited to, gas, electric power, street, street lighting, telephone and other communication lines, water, sewer, solid waste, storm drainage, or cable television whether or not such utility is privately owned or owned by a governmental entity.

“Urban Density” = Development of land at a minimum of four dwelling units per acre. Development for commercial or industrial uses that require urban services such as municipal water or sewer is considered to be urban in nature.

## **1.5 Changes to Standards**

From time to time changes may be needed to add, delete, or modify the provisions of these standards. These standards may be changed and upon the approval of the City Commission, such changes shall become effective and shall be incorporated into the existing provisions.

## **1.6 Severability**

If any part of these City of Shelton Standards shall be found invalid, all other parts shall remain in effect.

## **1.7 Design Standards**

Detailed plans for new development or redevelopment within the City of Shelton, or proposed actions that would cause modifications to existing public roads,

public rights of way, or existing utility infrastructure, must be prepared by the Engineer and submitted to the City for plan review and approval prior to the commencement of any construction. The Engineer shall be a licensed professional civil engineer, registered as such in the State of Washington. All proposed and existing facilities must be shown on the plans. Officially designated historical facilities and districts shall be highlighted. All plans must be signed and stamped by the Engineer prior to submittal for plan review. Final plans shall be approved by the City prior to the start of construction. Any alteration(s) to the approved Final Plans shall be submitted by the Engineer and approved by the City prior to construction.

Plan Preparation Standards: The plans prepared by the Engineer shall show all relevant surface features and all subsurface utilities, and shall show both plan and profile views. Separate plan sheets shall highlight the location of individual utilities (water, sewer, storm drainage, etc.) while also showing the other utilities. The plans shall show easements where utilities are on private property, and all utility facilities within those easements must be shown. The plans shall show invert elevations of water, sewer and storm drain mains at the outlet and all inlets of each manhole, slope of the main(s), and surface elevations of all surface structures. In the profile view, the finish ground elevation over the pipe(s) shall be shown. Notes shall be provided on the plans that refer to specific City standards for such things as catch basins, manholes, lampholes, crosswalks, water meter boxes, side sewers, etc. Horizontal and vertical clearances shall be shown between proposed and existing utilities. All cross connection control devices shall be detailed on the plans. If the Engineer is aware of any known or potential conflicts, these shall be highlighted.

Eight (8) sets of plans are required. All drawings shall be on a 24" x 36" sheet size, or as otherwise approved by the City. The minimum allowable scale shall be 1 inch = 40 feet. On small projects, the scale will be enlarged to adequately utilize the full plan sheet. Final plans for construction and As-Built plans shall be good quality reproducible ink on Mylar. The original reproducible copy of the drawings will be returned to the applicant's Engineer after approval by the City. Within 30 days following the completion of construction, the original signed plans on Mylar shall be modified as needed to be "As-Built", and certified by the Engineer. The "As-Built" plans shall be submitted to the City accompanied by a digital file in AutoCAD version 14 or above, with properly executed easement deeds as applicable. "As-Built" plans shall become the property of the City.

Plans and profile drawings, showing all existing and proposed facilities are required for all proposed transportation related improvements, street illumination, traffic signalization, storm drainage, and sewer and water improvements. Specifications shall be required and submitted with the plans if General Notes do not adequately cover the project requirements. If the project is to be done in phases, each phase shall be clearly defined and the entire project shall be designed by an Engineer and approved by the City before any portions of the proposed improvement shall be constructed. Sizing and layout shall take into account the

entire project. On occasion the scope of the project (i.e., relocating one hydrant, installing a new driveway to an existing single-family home) may not require engineering plans and can instead be handled via a Right-of-Way Access Permit. This option will be decided by the City.

## **1.8 Plan Review**

All plans are to be submitted to the City together with any necessary easements or dedications. A preliminary check of the plans and other documents will be made by the City to ensure that the plans meet minimum requirements. If the plans appear to meet minimum requirements as to completeness, they will be then routed to the appropriate City staff for substantive/content review and the plan review process begins. Submittals of plans may include construction drawings, specifications, design calculations, drainage calculations, Maintenance and Operations Manuals, and accompanying deeds, easements and/or other documents pertaining to the project. Additional information may be required from the applicant to ensure that the City's infrastructure needs are met, and that the project is consistent with City of Shelton Comprehensive Plans, and future City needs.

Initial turn-around time for the review of submitted plans is normally two weeks, but may be longer for larger projects. (Note: This is also the review time for any subsequent submittals.) The Engineer is then contacted by City staff, is notified of required revisions, or is requested to submit the original drawings for final approval. Additional review time will be required if revisions are necessary.

Some proposed projects may require other governing agency approval(s), which might require additional time.)

If revisions to the plans require three (3) or more submittals, additional fees will be levied by the City. The fee for third submittal review is established by resolution of the City Commission. Third submittal shall mean the third and any subsequent submittal. Once all corrections have been made, the original reproducible plans shall be submitted for City signature. The originals will be returned and the City shall receive five (5) copies for official records. All prints used for construction shall bear the City approval.

Approved plans will be returned only to the Engineer, and after all plan review fees have been paid.

## **1.9 Construction Control**

Work performed for or impacting the construction of streets and utilities, or private development that falls under these Standards, whether by or for a private developer, by City forces, or by a City contractor, shall be done to the satisfaction of the City and in accordance with approved plans. It is emphasized that no work shall be started until such plans are approved. Any revisions to such plans shall be submitted by the Engineer and approved by the City before being implemented. Failure to receive the City's approval can result in removal or modification of construction not in conformance with approved plans, at the developer's expense. All improvements shall be staked by a licensed professional civil engineer or surveyor and appropriate right of way/easement locations shall be determined.

The Engineer shall include the General Construction Notes in section 1.22 on any plans dealing with construction of alterations, extensions or connections to public facilities, unless otherwise approved by the City.

## **1.10 Inspection**

All work performed within the public rights-of-way, easements, private development that falls under these Standards, or as otherwise described in these Standards, whether by or for a private developer, by City forces, or by a City contractor, shall be done to the satisfaction of the City and in accordance with the approved plans and these Standards. Any revision(s) to the Final Plans must be submitted by the Engineer and approved by the City before being implemented.

It is the responsibility of the developer, the developer's contractor or their agents to notify the City in advance of the commencement of any construction work. The contractor shall contact the City to schedule a preconstruction meeting and/or field review prior to the commencement of work (two business days notice is required). Inspections are to be scheduled through the Department of Public Works office.

It is the responsibility of the developer, the contractor or their agents to have an approved set of plans and any necessary permits on the job site whenever work is being performed. The City shall have authority to enforce construction authorized by the approved plans and these Standards, as well as other referenced or pertinent specifications. The City will assign personnel as necessary to inspect the work being performed. All specific inspections, test measurements or actions required of all work and materials are set forth herein. All tests shall be performed at the developers or contractors expense and witnessed by the City Inspector.

Failure to comply with the provisions of these Standards may result in stop work orders, removal of work accomplished, at the developer's expense, or other penalties as established by Ordinance.

Failure to contact the City for required inspection may result in claims against bonds or other penalties as established by ordinance.

A project is considered final when the City issues a letter of Final Acceptance.

### **1.11 Fees and Charges**

Fees and applicable charges shall be as established by the City Commission by the passage of a Resolution adopting a fee charge schedule except where specifically set forth in the Shelton Municipal Code (SMC). All plan review fees are due prior to the release of approved plans. In addition, there may be various miscellaneous connection, inspection, system development charges and/or impact fees imposed as applicable. The City will not release the approved plans and/or issue a letter of Final Acceptance until all fees and charges have been paid to the City.

### **1.12 Permits**

Some of the work covered under these Standards may require multiple permit reviews and approvals from the responsible authority. Any questions about permits, approvals and agreements should be directed to the City as soon as possible. The following general categories describe some of the permits, approvals and agreements that may be needed along with the issuing permit/code authority identified in parentheses.

#### **A. Environmental Review**

For most projects, an environmental checklist must be completed by the project representative and submitted along with plans, specifications, and other information when approval or permits are being requested for a project. The City will conduct the Environment Review and make the SEPA threshold determinations.

#### **B. Construction Permits**

1. **Business License:** All entities doing business in the City must obtain a City of Shelton Business License (Community Development).
2. **Right of Way Permit:** Because of the need to preserve public safety for vehicular and pedestrian traffic, a Right of Way Permit (Public Works) is required for any work within the public right-of-way. Such work may include utilities, lane closures, parking strips, driveways, curbs, sidewalks, haul routes and/or permission to temporarily close a street or a portion thereof for construction activities. A traffic control plan shall be submitted for approval. In the case of contracted work by the City, the signing of the contract shall constitute the Right of Way Permit. The contractor

shall notify all appropriate agencies of approved closures and/or detours (Fire, Dispatch, Mason County Transit, School Districts, Media (Journal, KMAS Radio)). A separate Right of Way Permit shall be obtained for each separate project before any person, firm or corporation shall commence or permit any other person, firm or corporation to commence any work. Work includes: grading, paving, leveling, altering, constructing, repairing, removing, excavating or the placement of any pavement, sidewalk, crosswalk, curb, driveway, gutter, drain, sewer facility, water facility, conduit, tank, vault, utility pole, mailbox, street banner or any other structure, utility or improvement located over, under, or upon any public right-of way or easement in the City of Shelton, or place any other material or item tending to obstruct, damage, disturb, occupy, or interfere with the free use thereof or any improvement situated therein, or cause a dangerous condition.

3. Building Permit: The project may require a Building Permit (Community Development). A Building Permit is required for most construction work including alteration, repairs and demolition. Demolition of structures greater than 4,000 square feet require the submittal of an environmental checklist.
4. Excavation and Grading Permit: The project may require a Clearing and Grading Permit (Public Works) if the amount of earthen material being moved exceeds 50 cubic yards.
5. State Highway (WSDOT): - Some City streets are also State highways. The contractor shall obtain approval for work upon or temporary closure of State highways from WSDOT as required.
6. County Right of Way Permit: Application to and approval of a Right of Way Permits from Mason County may be required for work on City of Shelton facilities in unincorporated Mason County.
7. Other: There are several other permits or approvals which may be required, and which may be referred to in these Standards; including but not limited to Site Plan Review approval, plat and short plat approval, Certificates of Occupancy issuance, Zoning and other Land Use approvals, Planned Unit Development approval, and Shoreline Substantial Development approval.

### **1.13 Financial Guarantees for Public Projects**

Financial guarantees in the form of bonds or other allowable securities may be required by the City on all projects affecting public facilities to guarantee the performance of or maintenance of required improvements, including improvements constructed within unincorporated areas of Mason County. The type and amount of security shall be per code or, if not specified, be at the discretion of the City. Types of securities include but are not limited to a bond with surety licensed to do bonding business in the State of Washington, a cash deposit, an assigned savings account, a set aside letter or a letter of credit.

- A. Performance Guarantee: No construction permit (see Section 1.12.b above) shall be issued until a performance bond or other allowable security as outlined above, has been posted with the City in an amount equal to one hundred fifty percent (150%) of the cost of the public works improvements. A building permit and/or certificate of occupancy shall be not issued until all public improvements are completed and final acceptance granted, unless otherwise allowed by the City.
- B. Maintenance Guarantee: Prior to the final acceptance of public improvements, a maintenance guarantee for materials and workmanship shall be posted with the City, for a period of 24 months after final acceptance of construction and in an amount equal to 20% of the estimated cost of the public improvements. Release of the maintenance guarantee will occur 18 months from the date of final acceptance of construction, if all maintenance has been performed as required and accepted by the City.

### **1.14 Utility Alignments**

Locations of new or relocated utilities shall conform to City Standards as nearly as practical, be compatible with the existing installations and shall comply with all provisions as set forth in SMC Chapter 12.20 Excavations and Encroachments. Deviations of locations shall be approved by the City. Existing utilities shall be shown on the plans using the best information available. This verification will require exploration/excavation (potholing) if utilities are in conflict with the proposed design. The contractor/developer shall be responsible for utility locates in conjunction with the project.

Utilities converted from overhead to underground on existing roadways will be considered as if they are new utilities.

### **1.15 Easements**

Utilities shall be placed in the public right-of-way unless terrain or other topographic obstacles dictate otherwise, and as otherwise approved by the City. Where the City approves public utilities and/or their conveyance systems across private lands, an easement must be granted to the City. It is the developer's

responsibility to provide the required documentation for the City to process, record and file all easements. If the property is platted, the easement may be conveyed when the short plat or final plat is filed. All easements not shown on a plat must be prepared by a licensed land surveyor.

Easement widths shall be fifteen (15) feet minimum for a single utility and twenty (20) foot minimum for dual utilities, unless a wider width is determined to be necessary by the City. Construction easements shall be thirty (30) foot minimum in total width, including the permanent easement. When trench depths dictate or where pipe diameter or vault widths exceed four (4) feet, a wider easement may be required by the City.

Easements are required to be submitted in draft, unsigned for review and approval. Signed copies are required prior to plan approval. Any change in design which places a public facility, i.e., water main, sewer main, sidewalk, etc., outside of an easement may necessitate the stopping of construction until plans and easements can be resubmitted and approved. Easements will be filed by the City upon satisfactory completion of work.

#### **1.16 Latecomers Agreement**

Any person who constructs a water main or sewer main extension (including pump stations) that will benefit properties abutting the extension, may enter into a contract with the City that is commonly termed a "Latecomers Agreement". As determined by the City at its sole discretion, the Latecomers Agreement may allow the developer to be reimbursed for that portion of the construction cost which benefits adjoining properties. To be considered by the City, the format for a Latecomers Agreement must be submitted for review and approval prior to plan approval. Latecomer Agreements submitted after plan approval will not be accepted.

The developer is responsible for initiating, executing and, submitting the Latecomers Agreement to the City. The Latecomers Agreement shall include a list of those properties which will benefit from the extension, a map outlining and designating these properties, legal descriptions as required by the City, and backup data supporting the costs submitted. The City shall be responsible for filing and recording a covenant on all affected parcels and property and notifying current and future owners of the Latecomers Agreement reimbursement encumbrance. The developer will be responsible for all fees, charges, and expense involved for the City to perform this procedure. The City will collect the latecomer's fee from persons wanting to connect to the extension, and subsequently see that the developer receives the payment. Expiration of this agreement shall be fifteen (15) years from the date of execution.

### **1.17 Traffic Control**

As specified in section 1.12 above, the contractor must obtain a Right of Way Permit before commencing any work in the public right-of-way. The contractor shall also be responsible for interim traffic control during construction on or along traveled roadways. Traffic control shall follow the guidelines of the WSDOT/APWA Standard Specifications. All barricades, signs, and flagging shall conform to the requirements of the MUTCD.

City utilities constructed within Mason County right-of-way shall follow all traffic control requirements as set forth by Mason County Department of Public Works and the MUTCD.

Signs must be legible and visible and shall be removed at the end of each workday if not applicable after construction hours.

When road closures and detours cannot be avoided, the contractor shall notify the City. The City may require a detour plan to be prepared, submitted and approved prior to closing any portion of a City right-of-way.

### **1.18 Call Before You Dig**

All developers/contractors are responsible for timely notification of all utilities in advance of any construction in right-of-way or utility easements. The utilities one-call Underground Location Center Phone Number is 1-800-424-5555.

The City is not responsible for locating private lines or other utilities in the right-of-way. The contractor shall be responsible for field verifying, by pot-holing or other means as needed, all potential public or private utility conflicts.

### **1.19 Utility Extension**

Anyone who wishes to extend any utility should contact the City to see if there are any extension/connection fees or any special extension requirements.

For service to adjacent property and/or future development, as determined by the City, utility mains shall be extended across the face of or to and through the extremes of the property being developed. Extensions shall be to the middle of intersections and through to the end of any pavement. Utility extensions shall be sized per the appropriate utility's Comprehensive Plan or to provide for further extensions, as directed by the City.

### **1.20 Annexation Requirement**

City utilities will not be provided outside of the Urban Growth Area unless utility provides service to a facility designated as having statewide significance or in the case of health threat as determined by the Washington State Department of Health. Owners of property lying outside of but contiguous to City boundaries

must apply for annexation of their property to the City prior to being served by a City owned utility. Owners of property lying outside of but not contiguous to the City must legally commit their property to eventual annexation as well as other conditions specified in the Memorandum of Understanding between the City of Shelton and Mason County, prior to being served by City utility systems. All property must conform to the development requirements of the City as a condition of service.

These annexation requirements will be applied to all extensions of the City's utilities to areas outside the City limits. Anyone who desires to extend the City's utility system into unincorporated areas should contact the City for specific annexation requirements.

### **1.21 Standards in Shelton Urban Growth Area**

City Utilities shall not be extended to properties contiguous with the City boundary except after annexation. On properties within the Shelton Urban Growth Area but not contiguous with the City boundary, utility extensions may be permitted after the following policies are satisfied. The following policies are adopted jointly by both the City and Mason County.

1. City Utilities may be extended to properties within the UGA either upon annexation or through the creation of a Utility Extension Agreement with the owners of properties not annexed. (County policy U-151 B1).
2. No utility extension will be permitted to any unannexed property within the UGA unless a Utility Extension Agreement is signed between the owner of the subject property and the City of Shelton. The agreement shall provide for the following; (County policy U-151 B2).
3. Utility Extension Agreements will be an instrument recorded against the title of the property and the responsibilities therein shall transfer to successors in ownership of all or part of the property. (County policy U-151 B2a).
4. Extension and hook-up must not result in lowering of service delivery below adopted City LOS standards as determined by the City. Hook-ups outside of the City shall not be permitted until such standards are adopted, as determined by the City. (County policy U-151 B2b).
5. Sewer extensions will not be allowed without demonstration that equivalent I&I will be removed from the system or a contribution to a sewer system I&I fund is made, as determined by the City. (County policy U-151 B2c).

6. Water hook-up will not be allowed until a contribution to a source development fund is made by the property owner/developer, as determined by the City (County policy U-151 B2d).
7. Extensions will not be permitted unless agreement is made to pay a system development charge as identified by the City in a rate study (County policy U-151 B2e).
8. All costs for a utility system extension, the steps necessary to maintain level of service (LOS), sewer system I&I fund contributions, water source development fund contributions and system development charges shall be born by the property owner served. (County policy U-151 B2f)
9. All served property must have a commitment to annex when contiguous and requested by the City placed on the property title. (County policy U-151 B2g)
10. All utility users shall be subject to rates and surcharges as established by the City of Shelton. (County policy U-151 B2h)
11. In the event that a Utility Extension Agreement is approved by the City in an area that is served by an existing State Department of Health approved water system, that system may continue to be operated by the present owners or their satellite management agency. Fire flow, service line size, and main size will remain until State DOH requires an upgrade in order to obtain a green operating permit. (County policy U-151 B2i)
12. In addition to all conditions listed in section (1-11) above, the following must be provided in Utility Extension Agreements to extend City services to new development not vested by virtue of a complete development application prior to the adoption of (these standards). (County policy U-151 B3)
  - a. City utilities will only be extended to land uses consistent with the City's Comprehensive Plan, Future Land Use Map as determined by the City. (County policy U-151 B3a)
  - b. City owned utilities will only be extended to development meeting City development standards. (County policy U-151 B3b)
  - c. When extended to residential development, city owned utilities will only be extended that meets the definition of urban densities herein including subdivision to urban densities. (County policy U-151 B3c (amended))

- d. Storm water systems (in the UGA) shall be designed and constructed in compliance with the requirements of the Washington State Department of Ecology Stormwater Manual for the Puget Sound Basin and all adopted storm water master plans or storm water ordinances and basin plans. Those properties designated by these plans as draining to City of Shelton owned and maintained facilities shall be included in the City Storm Water Utility Program.

## **1.22 GENERAL NOTES (FOR ALL PROJECTS)**

1. All workmanship and materials shall be in accordance with the City of Shelton Standards and the most current copy of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction (WSDOT/APWA).
2. All safety standards and requirements shall be complied with as set forth by OSHA, WISHA, and Washington State Department of Labor and Industries.
3. All work in the City right-of-way requires a City of Shelton Business License and right of way permit. All contractors shall be licensed and bonded in the State of Washington. Proponent shall comply with all other permits and other requirements of the governing authority or agency.
4. A pre-construction meeting with the City of Shelton is required. The meeting shall be scheduled a minimum of two (2) days before the start of construction. Contact the City Engineering Department at (360) 426-9731 to schedule.
5. It is the contractor's responsibility to notify the City of his/her schedule. Inspection by City personnel shall be during City work hours. City inspection hours are 8:00 AM to 5:00 PM Monday through Friday, except holidays. The proponent must give the City a minimum of 24-hours notice for inspections. No trenching on public right-of-way after 4:00 PM unless otherwise approved by the City. Other work such as backfilling, cleanup, etc. or as approved by the City is acceptable if 24-hour prior notice is provided to the City.
6. Temporary erosion/water pollution measures shall be required in accordance with section 1-07.15 of the WSDOT/APWA Standard Specifications, the Washington State Department of Ecology Storm Water Management Manual for the Puget Sound Basin, and of the Shelton Municipal Code. At no time will silts and debris be allowed to drain into an existing or newly installed storm water facility or adjacent roads or properties. The contractor shall not release storm water to the sanitary sewer system. All erosion control and water pollution prevention measures shall be regularly inspected and maintained by the contractor.
7. It is the contractor's responsibility to notify all emergency services (Fire, Police, etc.) if streets or other accesses are obstructed. Within the City of Shelton, Dispatch at (360)

426-4441 will notify Police and Ambulance. The contractor shall be responsible for notifying the Shelton Fire Department.

Following are several telephone numbers the contractor may need. These are provided for convenience only, and are subject to change without notice.

City Shop	(360)426-6442
City Engineering	(360)426-9731
Treatment Plant	(360)426-6521
City Hall	(360)426-4491
Fire Department	(360)426-3348
Mason County Transit	(360)427-5033
Shelton School District	(360)426-1687

8. The Contractor shall notify and work with all affected property owners. The Contractor shall provide the City with emergency telephone numbers at the time of the pre-construction meeting and shall supply a foreman on site at all times.
9. The contractor shall be responsible for all traffic control in accordance with The Manual on Uniform Traffic Control Devices and Department of Labor and Industries. Prior to disruption of any traffic, traffic control plans shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic control is in place.
10. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the Underground Locate line at 1-800-424-5555 a minimum of two (2) business days prior to any excavations.
11. Water, sewer or storm service lines broken on private property shall be repaired immediately by the contractor in accordance with Uniform Plumbing Code (UPC) or other appropriate standards. City service lines broken in the City Right-of-way shall be repaired by the City. The Contractor will be billed for the repair work on a time and materials charge for marked utility lines.
12. All utilities shall be staked for grades and alignment by an licensed Engineering or Surveying firm capable of performing such work
13. Signed approved blueprints shall be on site at all times while work is being performed.
14. The Contractor shall restore work area to same or better condition unless otherwise approved or specified.
15. All disturbed areas, other than pavement and rocked surfaces, shall be seeded and mulched, or similarly stabilized to the satisfaction of the City, and in accordance with the Standards. For sites where grass has been planted, the performance and or maintenance guarantees will not be released until the grass has been thoroughly established, unless otherwise approved by the City.

16. If existing native material is determined by the City to be suitable for backfill, the contractor may use the native material.
17. All asphalt restoration shall be as specified in the City of Shelton Design and Construction Standards or to the depth of the existing pavement, whichever is greater. Existing asphalt edges shall be sawcut to a smooth straight edge prior to final patching, unless otherwise approved by the City.
18. All concrete restoration shall be sawcut to a smooth, straight edge prior to final patching, unless otherwise approved by the City. 3000-psi concrete shall be used, and shall be poured to the same depth and alignment as the existing pavement. The City may require doweling.
19. All permanent patching shall be accomplished within seven (7) calendar days unless otherwise approved by the City. Any temporary patch that requires more than seven (7) calendar days shall be hot mix asphalt concrete.

Temporary patching shall be 2" depth Class B asphalt concrete pavement 2" medium-curing (MC-250) liquid asphalt (coldmix), or 2" asphalt treated base.

Contractor shall maintain the patch. If not properly maintained, the City will perform any necessary repair and bill the Contractor.

# DESIGN & CONSTRUCTION STANDARDS

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## CHAPTER TWO

### 2.0 TRANSPORTATION

#### 2.1 Transportation System Alterations, Extensions and Connections

To allow the City to provide timely assistance and advice, anyone who wishes to alter, extend or connect to the City's transportation system should contact the City as soon as possible. Any alteration of, extension of, or connection to the City's transportation system must conform to the Comprehensive Plan, SEPA determinations, Final Plat Approval, Site Plan Approval, Subdivision Approval, Final Planned Unit Development Approval, Binding Site Plan Approval, the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction, the WSDOT Design Manual, the WSDOT Construction Manual, Title 17 of the Shelton Municipal Code, and these Standards.

#### 2.2 Design Standards

#### 2.3 Streets and Alleys

The design of streets and roads shall depend upon type and usage. Street design shall provide for maximum weight loading conditions as determined by the City. The width and grade of the pavement shall provide for safety and uniformity as required by the Standards.

The layout of streets and alleys shall provide for preserving and extending the connectivity of the pedestrian, bicycle, and grid street system. The layout shall also ensure that new development that is bordered or surrounded by areas of undeveloped land provides for future street extensions, connections, rights-of-way, etc., so that undeveloped areas do not become isolated from the transportation network. Existing streets and alleys or their proper projection shall be considered. Streets which primarily serve to provide access to abutting property shall be designed to discourage regular use by cut-through traffic, while maintaining the connectivity of the transportation system. See the table of Minimum Street Design Standards.

- A. Alignment: The alignment of alleys, arterials and collectors shall conform as nearly as possible with the Comprehensive Plan.
- B. Grades: Street grades should conform closely to the natural contour of the land. In some cases, a different grade may be required by the City depending upon the street classification. The minimum allowable profile grade shall be 0.5 percent. The maximum allowable profile grade shall be as specified on Table 2.5, Minimum Street Design Standards.

- C. Width: Street pavement and right-of-way width depend upon the street classification. The table of Minimum Street Design Standards shows the minimum widths allowed. Streets widths shall be measured from face of curb to face of curb on streets with cement concrete curb and gutter, or the edge of the pavement where no curb and gutter exists.
- D. General Notes: Alley widths shall be per the General Notes as detailed below shall be included on any plans dealing with street design, in addition to all applicable requirements in these Standards.

**2.4 Functional Classification**

City streets are divided into principal arterials, minor arterials, major collectors, minor collectors, and local access streets in response to regional transportation needs and the functional use each serves. See the Comprehensive Plan, Transportation Element for a listing of arterials. Function is the controlling element for classification and shall govern right-of-way, road width, and road geometrics. Streets will be classified or reclassified by the City as deemed necessary. See Table 2.5 of Minimum Street Design Standards.

<b><u>Roadway Classification Definitions</u></b>	
Principal Arterial:	Serves regional major activity areas. Carries all inter-urban and significant intra-urban auto and transit trips. Carries the highest traffic and longest trips. Offers most mobility, least land access. Fully or partially controlled access.
Minor Arterial:	Interconnects and augments principal arterials. Distributes travel to areas smaller than those associated with major arterials. Places more emphasis on land access than principal arterials.
Major Collector:	Provides both land access and traffic circulation within residential area. Provides intra-community continuity but doesn't penetrate identifiable neighborhoods. Carries local bus routes.
Minor Collector:	Collects traffic from local system and channels it to arterials. Provides both land access and traffic circulation within residential neighborhoods, commercial areas and industrial areas.
Local:	Provides direct access to abutting land and access to higher classified streets. Offers least mobility. Usually contains no bus routes. Through traffic deliberately discouraged.

## 2.5 Table of Minimum Street Design Standards

### MINIMUM STREET DESIGN STANDARDS

DESIGN STANDARDS <sup>1</sup>	PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL RESIDENTIAL	LOCAL COMMERCIAL	PRIVATE STREET	ALLEY
DESIGN LIMITATIONS	Access should be limited. No on-street parking allowed.	Access should be limited. No on-street parking allowed.	Access should be limited. On-street parking allowed.	Access should be limited. On-street parking allowed.	On-street parking allowed.	On-street parking allowed.		No parking allowed. Loading and unloading allowed
MINIMAL STRUCTURAL DESIGN	See Standard Drawing # _____							
MINIMUM RIGHT-OF-WAY	92' - 96' See Standard Drawing # T-30, T-31 See Note 1	69' - 73' See Standard Drawing # T-30, T-31 See Note 1	61' - 84' See Standard Drawing # T-27, T-28, T-29 See Note 1	61' - 84' See Standard Drawing # T-27, T-28, T-29 See Note 1	60' - 76' See Standard Drawing # T-25, T-26 See Note 1	61' - 65' 75' - 84' See Standard Drawing # T-27, T-28, T-29 See Note 1		20' See Standard Drawing # See Note 1
MINIMUM PAVEMENT WIDTH	48 - 64 feet, with four travel lanes, median, turning pockets and 5' bike lanes on both sides	48 - 60 feet, with 4 travel lanes, one 2-way turning lane and 5' bike lanes on both sides	44 - 48 feet with 4 travel lanes and 5' bike lanes on both sides	24 feet, with 5' bike lanes on both sides	24 feet without on-street parking; 40 feet with on-street parking	40 feet, includes on-street parking	Fire Dept. Standards	20'
PARKING LANE	None allowed.	None allowed.	Allowed; 8 foot minimum	Allowed; 8 foot minimum	Allowed; 8 foot minimum	Allowed; 8 foot minimum		
MINIMUM MAXIMUM GRADE	0.5%-8.0%	0.5%-8.0%	0.5%-8.0%	0.5%-8.0%	0.5%-10.0%	0.5%-10.0%	0.5%-10.0%	0.5%-10.0%
CURB	Cement concrete curb and gutter	Cement concrete curb and gutter	Cement concrete curb and gutter	Cement concrete curb and gutter	Cement concrete curb and gutter	Cement concrete curb and gutter		N/A
SIDEWALKS	Both sides, minimum 8' width, 10' with zero lot setback.	Both sides, minimum 8' width.	Both sides, minimum 8' width.	Both sides, minimum 6' width.	Both sides, minimum 6' in residential zone, 8' in commercial zone.	Both sides, minimum 8' in commercial zone, 10' with zero lot line.		N/A

DESIGN STANDARDS <sup>1</sup>	PRINICIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL RESIDENTIAL	LOCAL COMMERCIAL	PRIVATE STREET	ALLEY
CUL-DE-SAC RADIUS (PAVEMENT WIDTH)	N/A	N/A	N/A	N/A	Fire Dept. Standards, minimum 55' radius	Fire Dept. Standards, minimum 55' radius	Fire Dept. Standards	N/A
INTERSECTION CURB RADIUS	35 feet, 55 feet on Freight Mobility routes	35 feet, 55 feet on Freight Mobility routes	35 feet, 55 feet on Freight Mobility routes	35 feet, 55 feet on Freight Mobility routes	30 feet	30 feet		N/A
DESIGN SPEED (MPH)	40	40	30	30	25	25		N/A
MINIMUM CENTERLINE RADIUS	w/super elevation per AASHTO, with out super elevation 600', maximum superelevation = 6%	w/super elevation per AASHTO, with out super elevation 600', maximum superelevation = 6%	150'	150'	100'	100'		N/A

Note 1: Additional right of way may be required to accommodate street tree corridor and bus turn out.

## **2.6 Signing**

The developer is responsible for providing and installing all necessary traffic control signs (including poles and hardware). Traffic control signing shall comply with the provisions as established by the Manual on Uniform Traffic Control Devices (MUTCD).

## **2.7 Right-of-Way**

Right-of-way width is determined by the functional classification of a street. SEE TABLE 2.5

Right-of-way requirements may be increased if additional lanes, pockets, transit lanes, bus loading zones, operational speed, bike lanes, utilities, schools or other factors are required by the City. Right-of-way shall be conveyed to the City on a recorded plat or by a right-of-way dedication deed.

## **2.8 Private Streets**

- A. Private streets may be approved under the following conditions:
  - 1. Permanently established by tract or easement providing legal access to serve more than one, but no more than four dwelling units or businesses on separate parcels, or unlimited dwelling units or businesses situated on one parcel and sufficient to accommodate required improvements, to include provisions for future use by adjacent property owners when applicable, and
  - 2. Accessible at all times and with sufficient load bearing capacity for emergency and public service vehicle use, and
  - 3. Will not result in landlocking parcels nor obstruct public street circulation nor be inconsistent with surrounding grid system, and
  - 4. Covenants have been approved, recorded, and verified with the City, which provide for maintenance of the private streets and associated parking areas by the owner or homeowners association or other legal entity.
  - 5. Owners may be required to sign an indemnification for any damages.
- B. Private streets will not be approved by the City in an area or location that is identified by the City as a known or potential extension of existing public rights-of-way.
- C. Acceptance as Public Streets. Acceptance of private streets as public streets will be considered only if the street(s) meet all applicable public street standards, including right-of-way widths.

## 2.9 Street and Alley Frontage Improvements

- A. Street frontage improvements, including sidewalks as shown on the City of Shelton's Sidewalk Master Plan, figure 1, will be required along all street frontages adjacent to a development. Corner lots are also responsible for improving adjacent street intersections. All Improvements shall meet the following requirements:
  - a. Existing paved and unpaved streets without sidewalks and NOT proposed for sidewalks on the City of Shelton's Sidewalk Master Plan, figure 1, shall return all adjacent streets to pre-construction condition or better.
  - b. Existing paved streets with sidewalks or proposed for sidewalks on the City of Shelton's Sidewalk Master Plan, figure 1, shall provide curb, gutter, sidewalk, and street improvements to the existing edge of pavement.
  - c. Existing unpaved streets with sidewalks or proposed for sidewalks on the City of Shelton's Sidewalk Master Plan, figure 1, shall provide curb, gutter, and sidewalk.
  
- B. Alley frontage improvements will be required along all adjacent development and shall meet the following requirements:
  - a. Alleys within the residential zones of the City shall be constructed of compacted crushed aggregate for the full width of the alleys.
  - b. Alleys within the Mixed-Use and Non-Residential zones of the City shall be constructed per section 2.17 of these standards for the full width of the alleyway.
  
- C. Undeveloped platted lots with unopened and undeveloped rights-of-way are required to install all street, alley and infrastructure improvements at the time of development. Street and alley frontage improvements shall conform to the City of Shelton's Sidewalk Master Plan, figure 1, table 2.5, and section 2.9 B of these design standards.
  
- D. All unplatted land shall install all street and alley frontage improvements at the time of construction. Such improvements shall include; curb and gutter; sidewalk; storm drainage; street lighting system; traffic signal modification, relocation, or installation; utility relocation; landscaping and irrigation; and street improvements, per Table 2.5; and any other applicable section of these Standards. Plans shall be prepared and signed by a licensed civil engineer registered in the State of Washington.
  
- E. Reconfigured existing lots (re-plats) and short-plats shall install frontage improvements based on the requirements of the City of Shelton's Sidewalk Master Plan, figure 1, and other relevant portions of these standards. All requirements shall be determined based on the location at which the re-plat or short-plat connects to or abuts the City street grid.

- F. All frontage improvements shall be made across the full frontage of the property.
- G. Exceptions: Infill lots are exempt from installing frontage improvements (curb, gutter, sidewalk, street, and alley) if the lot is not on a street with existing sidewalks within the same block and on the same side or designated for sidewalks as shown on the City of Shelton’s Sidewalk Master Plan, figure 1.
- H. Grid System – Street development shall conform to the Comprehensive Plan’s goal of maintaining a grid pattern wherever deemed feasible.

**2.10 Cul-de-sac**

In general, the City discourages the use of cul-de-sacs per Section 2.3 of these Standards. Streets designed to have one end permanently closed shall be no longer than 400 feet. At the closed end, there shall be a widened “bulb” having a minimum paved traveled radius as shown in the Minimum Street Design Standards Table.

**2.11 Temporary Dead Ends**

Where a street is temporarily dead-ended, turn around provisions must be provided where the road serves more than one lot. The turn around may be a hammerhead with a minimum distance on both sides at the centerline intersection of 60 feet to facilitate emergency vehicle turn-around.

**2.12 Half Street**

A half street is an otherwise acceptable roadway section modified to conform to limited right-of-way on the boundary of the property subject to development. A half street may be permitted by the City when:

1. Design of a full street is prepared by a licensed professional civil engineer and submitted for review and approval by the City; and
2. A traffic impact analysis is prepared by a licensed professional traffic engineer and submitted for review and approval by the City, that fulfills City guidelines for a traffic impact analysis, and which demonstrates that the half-street will be safe and of adequate capacity for the use being proposed; and
3. There is written assurance of obtaining the prescribed additional right-of-way from the adjoining property suitable for completion of a full-section roadway; and
4. Such alignment is consistent with or will establish a reasonable circulation pattern; and
5. The right-of-way width of the half street shall equal at least 30 feet; and

6. The traveled way shall be surfaced the same as the designated street classification to a width not less than 24 feet; and
7. The half street shall be graded consistent with locating centerline of the ultimate roadway section on the property line; and
8. Property line edge of street shall be finished with permanent curb and gutter to insure proper drainage, bank stability and traffic safety.

### **2.13 Medians**

A median shall be in addition to, not part of, the specified roadway width. Medians shall be designed so as not to limit the turning radius or the sight distance at intersections. Landscaping and irrigation shall be installed when directed by the City.

### **2.14 Intersections**

Traffic control will be as specified in the Manual on Uniform Traffic Control Devices (MUTCD) or as modified by the City as a result of appropriate traffic engineering studies.

Street intersections shall be laid out so as to intersect as nearly as possible at right angles. For safe design, the following types of intersection features should be avoided:

- a. Intersections with more than four intersecting streets;
- b. “Y” type intersections where streets meet at acute angles;
- c. Intersections adjacent to bridges and other sight obstructions.

Spacing between adjacent intersections, whether crossing or “T”, shall be a minimum of 300 feet measured centerline to centerline, unless otherwise approved by the City. When the roadway is classified as a Principal Arterial, the minimum offset for the centerline involved shall be 350 feet.

On sloping approaches at an intersection, landings shall be provided with grade not to exceed one foot difference in elevation for a distance of 30 feet approaching any arterial or 20 feet approaching a collector or local access street, measured from nearest right-of-way line (extended) of the intersecting street. The City may direct the use of a greater distance when required for public safety.

### **2.15 Driveways**

All driveway approaches crossing sidewalks shall be constructed of Portland Concrete Cement and shall be subject to the same testing and inspection requirements as curb, gutter and sidewalk construction. See standard detail # R-04.

Joint-use driveways serving two adjacent parcels may be built on their common boundary upon formal written agreement by both property owners and approval of the City. The agreement shall be a recorded easement for both parcels of land specifying joint usage.

All abandoned driveways shall be removed and the curbing and sidewalk or shoulder and ditch section shall be properly restored.

Grade breaks, including the tie to the roadway, shall be constructed as smooth vertical curves. The maximum change in driveway grade shall be 8 percent within any 10 feet of distance on a crest and 12 percent within any 10 feet of distance in a sag vertical curve.

No driveway may access an arterial street within 75 feet (measured along the arterial) of any other such arterial street access on either side of the street; provided, that such access may be located directly opposite another access, if approved by the City. No driveway access shall be allowed to an arterial street within 150 feet of the nearest right-of-way line of an intersecting street, unless otherwise approved by the City.

Within the limitations set forth above, access to arterial streets shall be limited to one driveway for each tract of property separately owned. Properties contiguous to each other and owned by the same person are considered to be one tract where practical. Shared access with adjacent properties will be encouraged.

Driveways giving direct access onto arterial streets may be denied if alternate access is available. No commercial driveway shall be approved where backing onto the sidewalk or street right of way will occur. No residential driveway shall be allowed to back out onto a sidewalk or street right of way unless otherwise approved by the Public Works Director, provided the developer can show that adequate sight distance exists and all safety issues are addressed.

The maximum driveway width for two-way access drives onto an arterial or collector shall be 24 feet for residential uses, 30 feet for commercial uses, and 35 feet for industrial uses. Maximum driveway widths for one way access drives onto an arterial or collector shall be 20 feet for residential, 20 feet for commercial, and 25 feet for industrial uses. A wider driveway width maybe approved by the City where a substantial percentage of oversized vehicle traffic exists, where divisional islands are proposed, or where multiple exit or entrance lanes are needed.

Driveways shall be designed and constructed to not restrict surface water flow, and to provide positive drainage at the point of connection to the street.

The maximum driveway width onto a local access street shall be 24 feet for residential uses and 25 feet for commercial uses, unless otherwise approved by

the Director of Public Works. The maximum one way driveway width shall be 14 feet for residential and 22 feet for commercial driveways. Parking lot circulation and signing needs shall be met on site. The public right-of-way shall not be utilized as part of a one way parking lot flow.

Road approaches and/or ingress and egress tapers may be required in industrial and commercially zoned areas as directed by the City. Tapers shall be designed per the current edition of the American Association of State Highway and Transportation Officials (AASHTO) Manual.

Maintenance of sidewalks and driveways is the responsibility of the property owner per Section 12.08.030 of the Shelton Municipal Code.

**2.16 Sight Obstruction**

The following sight clearance requirements take into account the proportional relationship between speed and stopping distance. The sight distance area is a clear-view triangle formed on all intersections by extending two lines of specified length (A) and (B) from the center of the intersecting streets along the centerlines of both streets and connecting those endpoints to form the hypotenuse of the triangle. The area within the sight distance triangle shall be subject to restrictions to maintain a clear view of the intersection approaches. See Detail T-12.

A. Sight Distance Triangle for Stop or Yield Controlled Intersections:  
Sight Distance (Ft.)

<u>Speed Limit</u>	(A)	(B)
	<u>Major Street</u>	<u>Minor Street</u>
20 mph	200	*
25 mph	250	*
30 mph	300	*
35 mph	350	*
40 mph	400	*

B. Sight Distance Triangle for Uncontrolled Intersections:  
Sight Distance (Ft.)

<u>Speed Limit</u>	(A)	(B)
	<u>Major Street</u>	<u>Minor Street</u>
20 mph	90	90
25 mph	110	110
30 mph	130	130
35 mph	155	155
40 mph	180	180

The vertical clearance area within the sight distance triangle shall be free from obstructions to a motor vehicle operator’s view between a height of 3 feet and 10 feet above the existing surface of the street. Sight distance is measured from a point on the minor road 15 feet from the edge (extended) of the major road

pavement, and from a height of eye at 3.50 feet on the minor road to a height of 4.25 feet on the major road.

Where different sight obstruction requirements are set forth in the Shelton Municipal Code than are set forth in these Standards, the most stringent requirement shall apply.

## 2.17 Surfacing Requirements

The following are the surfacing requirements for each application listed. These designs are based on Washington stabilometer subgrade R-value of 5. Alternate structures will be accepted based on soil tests to determine the actual Washington stabilometer R-value. Soil tests and a completed worksheet for each road classification shall accompany plans submitted if other than the structures shown below are used.

Soil tests shall be performed by an Engineer specializing in soils analysis. One soil sample per each 500 LF of centerline with 3 minimum per project representative of the roadway subgrade shall be taken to determine a statistical representation of the existing soil conditions. The soils report, signed and stamped by a soils engineer licensed in the State of Washington, shall be based on actual soils tests and submitted with the plans. All depths indicated are a minimum compacted depth.

### Principal and Minor Arterial Streets

Surfacing: 0.50' Class B Asphalt Concrete  
Top Course: 0.17' Crushed Surfacing Top Course  
Base: 2.08' Ballast

Alternate:  
Surfacing: 0.50' Class B Asphalt Concrete  
Top Course: 0.61' Asphalt Treated Base (ATB)  
Base: 0.17' Crushed Surfacing Top Course

### Major Collector Streets

Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.17' Crushed Surfacing Top Course  
Base: 2.09' Ballast

Alternate:  
Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.62' Asphalt Treated Base (ATB)  
Base: 0.17' Crushed Surfacing Top Course

### Minor Collector Streets

Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.17' Crushed Surfacing Top Course

Base: 1.36' Ballast  
Alternate:  
Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.39' Asphalt Treated Base (ATB)  
Base: 0.17' Crushed Surfacing Top Course

#### Local Streets/Private Streets

Surfacing: 0.25' Class B Asphalt Concrete  
Top Course: 0.17' Crushed Surfacing Top Course  
Base: 0.69' Ballast

Alternate:  
Surfacing: 0.25' Class B Asphalt Concrete  
Top Course: 0.20' Asphalt Treated Base (ATB)  
Base: 0.17' Crushed Surfacing Top Course

#### Alleys

Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.17' Crushed Surfacing Top Course  
Base: 2.09' Ballast

Alternate:  
Surfacing: 0.33' Class B Asphalt Concrete  
Top Course: 0.62' Asphalt Treated Base (ATB)  
Base: 0.17' Crushed Surfacing Top Course

#### Sidewalks

Surfacing: 4" 3000 psi Concrete  
Base: 2" Crushed Surfacing Top Course or well graded sand  
Asphalt sidewalks are not permitted

#### Driveways

Surfacing: 6" 3000 psi Concrete, plus rebar as per detail # R-04  
Base: 1" Crushed Surfacing Top Course or well graded sand

#### Class I Bikeway or Pedestrian Path

Surfacing: 4" 3000 psi Concrete  
Base: 2" Crushed Surfacing Top Course

Alternate:  
Surfacing: 3" Class B Asphalt Concrete  
Base: 2" Crushed Surfacing Top Course  
4" Ballast

## **2.18 Street Pavement Patching**

Temporary restoration of trenches shall be accomplished by using 2” Class B Asphalt Concrete Pavement when available, 2” medium-curing (MC-250) Liquid Asphalt (cold mix), 2” Asphalt Treated Base (ATB), or steel plates. ATB used for temporary restoration may be placed directly into the trench, bladed and rolled. After rolling, the trench must be filled flush with asphalt concrete pavement to provide a smooth riding surface.

All temporary patches shall be maintained in good condition at all times by the contractor, until such time as the permanent pavement patch is in place. The permanent patch shall be accomplished within seven (7) calendar days unless otherwise approved by the City. Any temporary patch that requires more than seven (7) calendar days shall be hot mix asphalt concrete.

If the contractor does not maintain a temporary pavement patch for whatever reason, the City will patch it and bill the contractor for actual costs plus overhead.

## **2.19 Trench and Pavement Cuts, Backfill and Restoration**

All work done in roadways is subject to the requirements of the City Right of Way Permits, which may include Performance and/or Maintenance Bonding.

Trenches shall be excavated to the line and depth designated by the City. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space. Federal, State and Local regulations for safety must be adhered to. Surface water shall be diverted so as not to enter the trench. Where water is encountered in the trench, it shall be removed during pipe laying operations, and shall be so maintained until the ends of the pipe are sealed and provisions are made to prevent floating of the pipe. Unless in the case of unusual circumstances, trench water or other deleterious materials shall not be allowed to enter the pipe at any time. The contractor shall maintain sufficient pumping equipment on the job to ensure that these provisions are carried out.

All initial trench and pavement cuts shall be made by a spade bladed jackhammer or with saw cuts. All final cuts shall be made by saw cuts placed at a minimum of 1-foot outside the trench width.

CDF shall be used for the backfilling of trenches in the pavement area of streets, unless otherwise approved by the City. When public safety concerns exist, the City may require more stringent backfilling standards.

All trenching in a gravel shoulder section outside of the pavement shall be backfilled with ballast conforming to Section 9-039(1) of WSDOT/APWA Standard Specifications unless other material is approved by the City. The trench shall be compacted to 95 percent maximum density, as described in Section 2-03

of the WSDOT/APWA Standard Specifications. Backfill compaction shall be performed in 6-inch lifts.

All surface restoration for gravel surfaces shall be ¾" minus basalt conforming to requirements as set forth in Section 9-03.9(3) of WSDOT/APWA Standard Specifications unless otherwise approved by the City.

If the existing native material is determined by the City to be suitable for backfill, the contractor may use the native material up to the bottom of the surfacing requirements, which shall comply with the specifications listed in Section 2.18 for roadway sections. All trench backfill materials shall be compacted to 95% density (compaction testing may be required).

All asphalt restoration shall be as specified in these Standards, or to the depth of the existing pavement, whichever is greater. Existing asphalt edges shall be sawcut to a smooth straight edge prior to final patching, unless otherwise approved by the City.

All concrete restoration shall be sawcut to a smooth, straight edge prior to final patching, unless otherwise approved by the City. 3000 PSI concrete shall be used, and shall be poured to the same depth and alignment as the existing pavement. Dowling may be required by the City. If the existing concrete is overlaid with asphalt, the asphalt shall be replaced as described below.

Tack coat shall be emulsified asphalt grade CSS-1 as specified in Section 9-02.1(6) of the WSDOT/APWA Standard Specifications. Tack coat shall be applied as specified in Section 5-04.3 (5)A; joint sealing shall comply with Section 5-04.3 (5)C.

Asphalt concrete Class B shall be placed on the prepared surface by an approved paving machine and shall be in accordance with the applicable requirements of Section 5-04 of the WSDOT/APWA Standard Specifications, except that longitudinal joints between successive layers of asphalt concrete shall be displaced laterally a minimum of 12 inches unless otherwise approved by the City. Fine and course aggregate shall be in accordance with Section 9-03.9 of the WSDOT/APWA Standard Specifications. Asphalt concrete shall be placed in equal 2-inch lifts, unless otherwise approved by the City. In no case shall an asphalt lift exceed 3 inches. Tack coat is required between each lift.

All street surfaces, walks or driveways within the street trenching areas affected by the trenching shall be feathered and shimmed to an extent that provides a smooth riding connection and expeditious drainage flow for the newly paved surface. Shimming and feathering shall be accomplished by raking out the oversized aggregates from the Class B mix as appropriate. Surface smoothness shall be in accordance with Section 5-04.3(5)C of the WSDOT/APWA Standard Specifications. All joints shall be sealed using paving asphalt CSS-1.

The final patch shall be completed within seven (7) days unless otherwise approved by the City, but in no case later than 30 days after first opening the trench. The contractor shall re-establish pavement markings in all locations where the existing pavement markings were disturbed by the contractor's operations.

When trenching within the road right of way(s), the right of way shall be restored to its original or better condition. All disturbed areas shall be seeded and mulched or similarly stabilized according to Best Management Practices outlined in the Department of Ecology Stormwater Management Manual for the Puget Sound Basin, within 14 days of disturbance. For sites where grass has been planted, the contractor's performance or maintenance bond will not be released until the grass has been thoroughly established, unless otherwise approved by the City.

## **2.20 Staking**

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a Professional Engineer or Professional Land Surveyor by the State of Washington. A pre-construction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of streets shall be as follows, or as otherwise directed by the City:

- A. Stake centerline every 50 feet in tangent sections and 25 feet in curved sections plus grade breaks, PCs, PTs, high point and low points, with cut and/or fill to subgrade.
- B. Stake top of ballast with red tops and top of crushed surfacing with blue tops, at centerline and edge of pavement at the above-described intervals, and at grade breaks.
- C. Stake top back of curb at the above-described intervals with cut or fill to finished grade.

## **2.21 Testing**

Testing shall be required at the developer's or contractor's expense, and shall be ordered by the developer or contractor. Testing shall be done on all materials and construction as specified in the WSDOT/APWA Standard Specifications with the frequency as specified herein, unless otherwise approved by the City.

In addition, the City shall be notified a minimum of 24-hours before work commences on each phase of street construction (i.e. staking, grading, subgrade, ballast, base, top course, and surfacing).

## **2.22 Sidewalks, Curbs and Gutters, Driveways**

These Standards as specified herein shall be met in the design and construction of sidewalks, curbs and gutters. Because these are minimum standards, the minimum requirements may be modified by the City when circumstances require increased or decreased widths, thickness or strengths.

### Sidewalks

Sidewalks shall be required on both sides of all streets. All properties shall have sidewalks constructed along abutting streets. Sidewalks shall be constructed of 3000psi Portland Cement Concrete at a minimum of 4 inches thick. When the sidewalk, curb and gutter are contiguous, the width of the sidewalk shall be measured from back of curb and gutter to back of sidewalk (per Standard Detail T-02).

The project proponent is responsible for the design and construction of sidewalks on both sides of streets interior to a development, and on the development side of streets abutting the exterior of said development, including cul-de-sacs.

The width of sidewalks shall be shown in the approved design drawings. Those bicycle and pedestrian pathways designated in any adopted City of Shelton comprehensive bicycle and pedestrian plan shall, in addition, meet the minimum requirements established. The City shall require that the design of all sidewalks provide for a gradual rather than an abrupt transition between sidewalks of different widths or alignments. Plans for the construction of sidewalks, curbs and gutters are to be submitted as part of the street plan when applicable.

In the downtown core, a coloring agent such as Webson "Liquid black" or a City approved equal may be required for matching the color of newly constructed cement concrete sidewalks, curbs and gutters to the color of adjacent existing cement concrete sidewalks. The coloring agent shall be added to the concrete during mixing in an amount not to exceed 1/2 gallons per cubic yard of cement concrete mix. For the purposes of this paragraph, the downtown core is defined as from Front Street to 8<sup>th</sup> Street, and from Franklin Street to Grove Street.

Maintenance of sidewalks is the responsibility of the abutting property owner, per Section 12.08.040 of the Shelton Municipal Code.

### Handicap Ramps

All sidewalks must be constructed to provide for handicap ramps in accordance with the standards of state and federal law. Handicap ramps shall be constructed of 3000 psi Portland Cement Concrete. Form and subgrade inspections by the City are required before each handicap ramp is poured. Per Standard Details T-07 through T-11.

### Utility Locations

All above grade utilities shall be located outside of the edge of the sidewalk whenever possible. When it is necessary to place utilities within the limits of the sidewalk, such utilities shall be in compliance with all clear zone requirements and placed so as not to hinder pedestrian traffic.

#### Curb and Gutter

Curbs and gutters shall be required on both sides of all streets. Cement concrete curb and gutter shall be used for all street edges, unless otherwise approved by the City. All curbs and gutters shall be constructed of 3000 psi Portland Concrete Cement. See detail #R-03. Extruded curb and gutter per WSDOT/APWA Standard Specifications may be approved by the City, following submission and approval of the design mix.

#### Materials

Materials shall meet the requirements of the following section 8-14 of the WSDOT/APWA Standard Specifications.

The use of Calcium Chloride as an admixture is prohibited.

#### Staking for sidewalks, curbs and gutters

The minimum staking of curb, gutter and sidewalk shall be as follows, or as otherwise directed by the City: Stake curb every 50 feet in tangent sections and 25 feet in curved sections plus grade breaks, PCs, PTs, high point and low points, with cut and/or fill to grade. Staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a professional engineer or professional land surveyor by the State of Washington. A pre-construction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

#### Construction

The City shall be notified before each phase of sidewalk, curb and gutter construction begins. Form and subgrade inspections by the City are required before sidewalks, curbs and/or gutters are poured. Monolithic pour of curb, gutter and sidewalk will not be allowed. See standard details #T-02, #T-03 and #T-06

The curb and gutter section shall be placed prior to the placement of the sidewalk section unless otherwise approved by the City. Subgrade shall be approved by the City prior to concrete being placed. Expansion joints shall be placed to match those placed in curbs if new sidewalk is poured adjacent to a curb and gutter. In all other cases, the spacing on expansion joints shall be no greater than 15 feet center to center. Dummy joints shall be 1/4 inch by 1 inch on 5-foot centers. Through joints shall be 1/2 inch, and shall extend to the bottom of the concrete. Per Standard Detail T-06.

A minimum distance of 2 feet is required from the face of curb to any obstruction on or within the sidewalk unless otherwise noted.

It is expected there will be sufficient suitable native material excavated from various portions of the improvement to fill low areas in the sidewalk subgrade and planting strip area when needed. When there is insufficient suitable native material on the project site, the contractor shall furnish, place and compact Gravel Borrow. All sidewalks shall be constructed over a minimum 2 inches of crushed surfacing top course or well graded sand meeting the requirements of Section 9-03.9(3) of the WSDOT/APWA Standard Specifications and compacted to 95% of maximum density.

Steel forms may be used upon approval of the City. Forms shall be staked to a true line and grade. A subgrade template shall then be set upon the forms and the fine grading completed so that the subgrade will be a minimum of 3-5/8 inches below the top of the forms. Post block outs shall be provided for all street name sign and traffic sign posts, unless otherwise approved by the City. Per Standard Detail M-09.

Around utility poles, blockouts shall be constructed around the pole of 3/4 inch expansion joint material and 18" greater in diameter than the pole.

The concrete shall be spread uniformly between the forms and thoroughly compacted. Through joints and dummy joints shall be located and constructed in accordance with these Standards. See detail #T-06. In construction of through joints, the expansion joint material shall be adequately supported until the concrete is placed on both sides of the joint.

Whenever castings are located in the sidewalk area, joints shall be installed at the casting location to control cracking of the sidewalk. If spacing of joints or scoring is such that installation of joint material would be unsuitable, the contractor shall install rebar to strengthen the sidewalk section.

Expansion joints and dummy joints shall be positioned in true alignment at right angles to the line of the sidewalk and be normal to and flush with the surface.

After the concrete has been thoroughly compacted and leveled, it shall be finished with a float. The surface shall be broom finished in a transverse direction except that at driveway and alley crossings it shall be brushed longitudinally. After broom finish, the edges of the sidewalk and all joints shall be lightly edged again with an edging tool to provide a finished appearance.

Curing materials and procedures shall be as specified in Section 5-05.3(13) of the WSDOT/APWA Standard Specifications, except that white pigment curing compounds shall not be used on sidewalks.

The contractor shall have readily available sufficient protective covering, such as waterproof paper or plastic membrane, to cover the pour of an entire day in event of rain or other unsuitable weather. In periods of low humidity, drying winds, or high temperatures, a fog spray shall be applied to concrete in order to prevent to the formation of shrinkage cracks. The spray shall be continued until conditions permit the application of a liquid curing membrane or other curing media.

Specifications for hot and cold weather curing and protection of concrete sidewalks shall be consistent with 6-02.3 of the WSDOT/APWA Standard Specifications.

The sidewalk shall be protected against damage or defacement of any kind until it has been accepted by the City. Sidewalk, which is not acceptable to the City, shall be removed and replaced by the contractor at the contractors expense.

#### Driveways

Driveways shall be constructed consistent with the specifications outlined in this section and with T-04 of the City of Shelton Standard Detail Plans.

#### Testing for sidewalks, curbs and gutters

Testing shall be required at the developer's or contractor's expense on all materials and construction as specified in the Testing and Sampling Frequency Guide. See Table T-1.

**TABLE T-1  
CITY OF SHELTON  
TESTING AND SAMPLING FREQUENCY GUIDE**

<b>ITEM</b>	<b>TYPE OF TESTS</b>	<b>MINIMUM NO.</b>	<b>FREQUENCY</b>
Gravel Borrow	Grading & SE	1 Each	1-4000 Ton
Sand Drainage Blanket	Grading	1 Each	1-4000 Ton
CSTC	Grading, SE & Fracture	1 Each	1-2000 Ton
CSBC	Grading, SE & Fracture	1 Each	1-2000 Ton
Ballast	Grading, SE & Dust Ratio	1 Each	1-2000 Ton
Backfill/Sand Drains	Grading	1 Each	1-2000 Ton
<b>Gravel Backfill For:</b>			
Foundations	Grading, SE & Dust Ratio	1 Each	1-1000 Ton
Walls	Grading, SE & Dust Ratio	1 Each	1-1000 Ton
Pipe Bedding	Grading, SE & Dust Ratio	1 Each	1-1000 Ton
Drains	Grading	1 Each	1-100 Ton
<b>PCC Structures: (Sidewalk, curb and gutter, foundations)</b>			
Coarse Aggregate	Grading	1 Each	1-1000 Ton
Fine Aggregate	Grading	1 Each	1-500 Ton
Consistency	Slump	1 Each	1-100 CY
Air Content	Air	1 Each	1-100 CY
Cylinders (28 Day)	Compressive Strength	2 Each	1-100 CY
<b>Cement:</b>	Chemical & Physical Certification	1	1-JOB
<b>Asphalt Cement Concrete:</b>			
Blend Sand	SE	1 Each	1-1000 Ton
Mineral Filler	S.G. & PI, Certification	1	1-JOB
Completed Mix	Fracture, SE, Grading, Asphalt Content	1 Each	1-1000 Ton
	Compaction	2 Each	5-400 Ton
<b>Asphalt Treated Base:</b>			
Completed Mix	SE, Grading, Asphalt Content	1 Each	1-1000 Ton
	Compaction	1 Each	5-Control Lot*
<b>Asphalt Materials</b>	Certification	1	1-JOB
<b>Compaction Testing:</b>			
Embankment	Compaction	1 Each	1-500 LF
Cut Section	Compaction	1 Each	1-500 LF
CSTC	Compaction	1 Each	1-500 LF
CSBC	Compaction	1 Each	1-500 LF
Ballast	Compaction	1 Each	1-500 LF
Trench Backfill	Compaction	1 Each	1-500 LF

SE=Sand Equivalency

\*A Control lot shall be a normal day's production. For minor quantities 200 tons or less per day, a minimum of two (2) gauge readings shall be taken.

## **2.23 Bikeways**

Normally, bikeways are shared with other transportation modes, although they may be provided exclusively for bicycle use. Bikeway or Urban Trail construction is required in conjunction with any new development or redevelopment, when the need for such a bikeway is indicated in an adopted City of Shelton Bikeway Plan. The design of bicycle paths shall depend upon their type and usage. Bikeway surfacing shall be as outlined in Section 2.18.

## **2.24 Street Illumination Design Standards**

All development in the public right-of-way shall provide street lights, in accordance with Section 840 of the WSDOT Design Manual, Illuminating Engineer Society (IES) and American National Standards Institute (ANSI) approved design recommendations for roadway lighting, National Electrical Safety Code (NESC) requirements as specified by WAC 296-45-045; National Electric Code (NEC) requirements for roadway lighting, the Mason County Public Utility District #3 Standards Book; and these Standards.

A street lighting plan submitted by the applicant and approved by the City of Shelton and Mason County PUD#3 shall be required for all street light installations. All public street light designs shall be prepared by a professional engineer licensed by the State of Washington and capable of performing such work. The street lighting plan shall be submitted on a separate sheet. The type of installation shall be as set forth in the PUD #3 Standards Book and as directed by PUD #3.

After the street light system is completed and approved by the City and Mason County PUD #3, a set of "As Built" plans on Mylar shall be submitted to the City for transmittal to Mason County P.U.D. #3 as a permanent record. Street lights shall be owned and operated by PUD #3

Areas that should be considered for roadway lighting include:

- a. Areas where significant concentrations of pedestrians are crossing roads or any marked crosswalks such as near school.
- b. Curves or other abrupt change in the roadway direction.
- c. Streets with frequent or hidden driveways and crossroads.
- d. Locations with mid street obstacles, such as fountains, raised channelizations or traffic circles.
- e. Locations with measurably higher night to day accident ratios, margin lanes, intersections or any unusual roadway geometry.
- f. A city should use a warrant system to assist its decision making on when and where new street lighting expenditures may be appropriate within available budgeted funds.

## **2.25 Street Illumination Construction (General Notes)**

The General Notes as follows shall be included on any plans dealing with street light design and construction, in addition to all applicable requirements of Mason County Public Utility District #3 and the City.

1. All workmanship, materials and testing shall be in accordance with the standards of Mason County Public Utility District #3, and these Standards.
2. All safety standards and requirements shall be complied with as set forth by the State of Washington, Department of Labor and Industries.
3. A pre-construction meeting shall be held with the City of Shelton and Mason County P.U.D. #3 prior to the start of construction.
4. All approvals and permits required by the City of Shelton and Mason County P.U.D. #3 shall be obtained by the contractor prior to the start of construction.
5. The property owner is responsible for the payment of electrical charges prior to City acceptance of construction.

## **2.26 Traffic Signals**

City of Shelton contracts with the City of Bremerton for maintenance of signal systems. Design review shall be coordinated with the City of Bremerton.

### Traffic Signal Design Standards

Signal systems shall be designed in accordance with the specifications as set forth in the WSDOT Design Manual and the WSDOT/APWA Standard Specifications unless otherwise authorized by the City. All public traffic signal systems shall be prepared by an engineering firm capable of performing such work. The Engineer shall be licensed by the State of Washington. Traffic signals shall be installed per the requirements set forth herein. This work shall consist of furnishing and installing a complete and functional traffic control system of controllers, signals, pedestrian features, emergency preemption devices and appurtenances that meet traffic warrants.

### Induction Loops

Induction loops shall be constructed per WSDOT/APWA Standard Specifications 8-20.3(14)C. Loops shall be preformed in the crushed surfacing top course (CSTC) before paving, or shall be cut in existing asphalt or leveling course to sub-base before the intersection is overlaid.

### Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a professional engineer or professional land surveyor by the

State of Washington. A pre-construction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction. The minimum staking for traffic signals shall be as follows:

- A. Location, with cut or fill to center of all pole bases.
- B. Location of junction box.
- C. Location of all corners of controller base.
- D. Location of service disconnect.

#### Testing

All signals shall be subject to any necessary electrical inspections by the State Department of Labor and Industries, Mason County P.U.D. #3 and the City, as well as requirements as set forth in the WSDOT Design Manual and the WSDOT/APWA Standard Specifications. A signal system shall not be approved or accepted by the City until the signal has performed correctly to the City's satisfaction for a 30 day "check-out" period as outlined below. All parts and workmanship shall be warranted for one year from date of acceptance.

Controller and cabinet testing by WSDOT District 3 laboratory shall be required by the City. All specifications and material samples shall be submitted to the City for review and approval prior to installation.

#### Traffic Signal Check-Out Procedures

The contractor shall call for an intersection check-out after completing the controller cabinet installation, along with all other signal equipment complete with wiring connections. New signals shall operate without any type of failure for a period of 30 days. The contractor shall have a person available to respond to system failures within 24 hours during the 30-day "check-out" period. Failure of any control equipment or hardware within the "check-out" period shall restart the 30-day "check-out" period.

### **2.27 Survey Monuments, Bus Stops, Benches, Mailboxes, Guard Rails, Retaining Walls, Street Trees and Parking Lots**

#### Design Standards

Miscellaneous roadside features included herein shall be designed and constructed to encourage the uniform development and use of roadside features wherever possible. The design and placement of roadside features shall adhere to Section 700, Roadside Safety of the WSDOT Design Manual, the specific requirements as listed for each feature, and the applicable standards set forth in Chapter One.

#### Survey Monuments

All existing survey control monuments and property corners which will be disturbed or destroyed during construction shall be referenced prior to construction and replaced after construction by a Professional Land Surveyor licensed by the State of Washington. All applicable RCWs and WACs will be complied with, including but not limited to, WAC 332-120, WAC 332-130, and

RCW 58.09. The monuments shall be replaced with the proper type as outlined below at the expense of the responsible builder or developer.

A pre-cast monument with cast iron monument case and cover installed per City of Shelton standards is required for all monumentation. See detail #T-15.

Appropriate monumentation shall be placed at all street intersections; at the PC and PTs of all horizontal curves or at the PI if it lies in the traveled roadway; and at all dedicated land claim (DLC) corners, section corners, quarter corners and sixteenth corners that fall within the subdivision. The monument case shall be installed after the final course of surfacing has been placed.

#### Public transit

Different population densities dictate the number and placement of transit bus stops.

1. The spacing, locations and design of specific bus stops shall be coordinated with the Mason County Transportation Authority. See Detail #T-17.
2. Signage shall be placed in accordance with the MUTCD.

#### School Buses

1. The spacing, locations and design of specific bus stops shall be coordinated with the Mason County Transportation Authority. See Detail #T-17.
2. Signage shall be placed in accordance with the MUTCD.

Location of school bus stops shall be designed with safety as a paramount concern. Major arterials with high traffic counts should be avoided where possible, and only used when bus pullouts are available and significant protection provided for children. School bus stops shall also be designed where possible to compliment residential development, and provide convenient location and access for neighborhood children.

#### Benches

Benches are to be fabricated from metal per City of Shelton standards. See detail #M-03 and #M-04. Placement locations shall be approved by the City.

#### Mailboxes

During construction, existing mailboxes shall be accessible for the delivery of mail or, if necessary, moved to a temporary location. Temporary relocation shall be coordinated with the U.S. Postal Service by the contractor. The mailboxes shall be installed at the original location at the completion of construction or, if construction has made it impossible, to a location as outlined below and approved by the U.S. Postal Service and the City. New mailboxes shall be located as approved by the US Postal Service and City of Shelton. Structures set in concrete shall adhere to the requirements of details #M-05 and #M-06.

### Guardrails

For purposes of design and location, all guardrails along roadways shall conform to the criteria of the “Washington State Department of Transportation Design Manual” as may be amended or revised.

### Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a Professional Engineer or Professional Land Surveyor by the State of Washington. A pre-construction meeting shall be held with the City prior to commencing staking. All staking shall be inspected by the City prior to construction.

### Testing

Testing shall be required at the developer’s or contractor’s expense on all materials and construction as specified in the WSDOT/APWA Standard Specifications and with a frequency as specified in the WSDOT Construction Manual.

## **2.28 Retaining Walls**

Retaining walls proposed for development of private property shall be placed only on private property, and not in the public right-of-way, unless otherwise approved by the City. Design and construction shall conform to the Uniform Building Code, and the contractor shall obtain a building permit if required from the City. If the city approves a retaining wall or walls to support the public right of way, such retaining wall(s) may occur in the right of way and shall be designed by an engineer licensed by the State of Washington and capable of performing such work. Retaining walls in the public right of way shall be designed to accommodate traffic loads, as defined by the City. Plans for such retaining walls shall be submitted to the City for review and approval as to location, structural design, loading, and other relevant criteria as determined by the City.

## **2.29 Trees**

Trees shall be required within and along all designated tree corridors as defined by Section 20.60.120 of the Shelton Municipal Code. Designated tree corridors include: Railroad Avenue between Front Street and Seventh Street, Cota Street between First Street and Sixth Street, Fifth Street between Cota Street and Alder Street, Alder Street between First Street and Seventh Street, Olympic Highway North between Thirteenth Street and Wallace Kneeland Boulevard, and Olympic Highway South between Fairmount Street and the City Limits. Trees planted adjacent to streets on private property shall also comply with these specifications.

Unless otherwise approved by the City, street trees shall be installed in the numbers equal to one per forty feet of the sidewalk length to be constructed, excluding the sidewalk within a sight distance area as defined by Chapter 2.15 of these Standards. Street trees shall be planted at the edge of any such sight distance area(s) at intersections and driveways, but sight obstructions shall not be allowed within a sight distance area.

The design for street tree type(s), size and location(s) and planting procedures shall be prepared by a landscape architect licensed by the State of Washington and capable of performing such work. The plans for the installation of street trees, or any other proposed landscaping in the public right-of-way, shall be submitted for review and approval by the City.

Street trees shall be of a type that will minimize the likelihood of future root upheaval or other damage to the sidewalk. In the selection of trees, consideration should be given to overall aesthetic impacts at maturity. The design of tree spacing should consider the tree canopy at maturity, which should be intended to connect and form a continuous tree canopy over the street, while not encroaching into pedestrian headroom or obstruct tall curbside vehicles such as buses. The type selected should be of a variety to reach a minimum of twenty (20) feet in height at maturity, unless such height at maturity would generate conflicts with overhead electrical power lines. A 5-foot minimum clear zone shall be maintained between buildings and tree pits to allow adequate clearance for pedestrians. Design of street tree locations, tree pits and grates shall comply with all relevant Americans with Disabilities Act (ADA) requirements.

Trees shall be a minimum of 1-1/2 inches in trunk diameter at the time of installation. Each tree shall be installed in a tree well or pit with a minimum surface area of 3'x3'. A 3'x3' cast iron grate with frame shall be installed at the top of the tree well or pit to match the surface of the adjacent sidewalk, as specified in the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction. The aesthetic design of the tree grate(s) shall be approved by the City.

The owner shall be responsible for tree maintenance for one year after Final Approval of construction, and shall replace any damaged, diseased or dead trees within that year. The City will assume maintenance responsibility after that first year.

### **2.30 Parking Lots**

All proposed parking lot construction requires a Site Plan Review, whether independent or in conjunction with a project that shall be determined through the Site Plan Review process.

Storm water retention shall be provided and shall follow the criteria as set forth in the Chapter Three of these standards, as required by the Site Plan Review Process. Plans and specifications shall be required for review and approval by the City with respect to storm drainage discharge and on-site retention or detention, matching street and/or sidewalk grades, access locations, parking layout, landscaping, and to check for future street improvement conformity and City zoning regulations.

If required through the Site Plan Review Process and/or Chapter 20.40 of the Zoning Code, parking lot surfacing materials shall satisfy the requirement for a permanent all-weather surface. Asphalt concrete pavement and cement concrete

pavement satisfies this requirement and are approved materials. All other proposed parking lot surface materials require specific approval by the City.

## 2.31 Roadside Safety

### Clear Zone

The clear zone is a primary consideration when analyzing hazards. The intent is to provide as much clear, traversable recovery area as practical. The Design Clear Zone values shown in Figure 700-1 are used to judge the adequacy of the existing clear zone and to provide a minimum target value for highway design. These values are not to be used as justification to compromise or take away from the existing clear zone.

A Design Clear Zone inventory is required for all projects indicating evaluate upgrade (EU) or Full Design Level (F) for the clear zone columns on the design matrices. (See Chapter 325.) Use the Design Clear Zone Inventory form (Figure 700-2) to inventory the roadside for potential hazards. Identify the hazards and propose corrective actions. Eliminating the hazard is the preferred action. Analyze a roadside hazard to determine if further mitigation is necessary even when it is beyond the values in Figure 700-1. When locating a highway appurtenance (such as a sign bridge, bridge pier, or sign post) in an otherwise recoverable area, use the values in Figure 700-1 as guidance in determining the need for mitigation.

The Design Clear Zone is a function of the posted speed, side slope, and traffic volume. There are no distances in the table for 1:3 fill slopes. Although fill slopes between 1:4 and 1:3 are considered traversable if free of fixed objects, these slopes are defined as nonrecoverable slopes. A vehicle may be able to begin recovery on the shoulder, but will be unable to further this recovery until reaching a flatter area (1:4 or flatter) at the toe of the slope. Under these coalitions, the Design Clear Zone distance is called a recovery area. The method used to calculate the recovery area and an example are shown in Figure 700-3.

For ditch sections, the following criteria determine the Design Clear Zone:

(a) For ditch sections with foreslopes 1:4 or flatter (see Figure 700-4, Case 1, for an example) the Design Clear Zone distance is the greater of:

1. The Design Clear Zone distance for a 1:10 cut section based on speed and ADT, or
2. A horizontal distance of 5 ft. beyond the beginning of the back slope.

When a back slope steeper than 1:3 continues for 1.5 m beyond the beginning of the back slope (as is the case with a redirectional land form), it is not necessary to use the 1:10 cut slope criteria.

(b) For ditch sections with foreslopes steeper than 1:4, and back slopes steeper than 1:3 the Design Clear Zone distance is 3 m horizontal beyond the beginning of the back slope. (See Figure 700-4, Case 2, for an example.)

(c) For ditch sections with foreslopes steeper than 1:4 and back slopes 1:3 or flatter, the Design Clear Zone distance is the distance established using the recovery area formula (Figure 700-3). (See Figure 700-4, Case 3, for an example.)

**DESIGN CLEAR ZONE DISTANCES**  
**(In meters from edge of traveled way)**  
**Figure 700-1**

Posted Speed Mph	Average Daily Traffic	Cut Section						Fill Section (Unrounded)					
		1:3	1:4	1:5	1:6	1:8	1:10	1:3	1:4	1:5	1:6	1:8	1:10
35 or Less	The Design Clear Zone distance is established at 3.0 m or 0.5 m beyond the face of curb in urban areas.												
40	Under 250	3.0	3.0	3.0	3.0	3.0	3.0	*	4.0	3.7	3.4	3.4	3.0
	251-800	3.4	3.4	3.4	3.4	3.4	3.4	*	4.3	4.3	4.0	3.7	3.4
	801-2000	3.7	3.7	4.7	4.7	4.7	4.7	*	4.9	4.6	4.3	4.0	3.7
	2001-6000	4.3	4.3	4.3	4.3	4.3	4.3	*	5.2	5.2	4.9	4.6	4.3
	Over 6000	4.6	4.6	4.6	4.6	4.6	4.6	*	5.8	5.5	5.2	4.9	4.6
45	Under 250	3.4	3.4	3.4	3.4	3.4	3.4	*	4.9	4.3	4.0	3.7	3.4
	251-800	3.7	3.7	4.0	4.0	4.0	4.0	*	5.5	4.9	4.3	4.3	4.0
	801-2000	4.0	4.0	4.3	4.3	4.3	4.3	*	6.1	5.2	4.9	4.6	4.3
	2001-6000	4.6	4.6	4.9	4.9	4.9	4.9	*	6.7	5.8	5.2	5.2	4.9
	Over 600	4.9	4.9	5.2	5.2	5.2	5.2	*	7.3	6.4	5.8	5.5	5.2
50	Under 250	3.4	3.7	4.0	4.0	4.0	4.0	*	5.8	4.9	4.6	4.0	4.0
	251-800	4.0	4.3	4.3	4.6	4.6	4.6	*	6.7	5.5	5.2	4.6	4.6
	801-2000	4.3	4.6	4.9	5.2	5.2	5.2	*	7.3	6.1	5.5	5.2	5.2
	2001-6000	4.9	5.2	5.2	5.5	5.5	5.5	*	8.2	6.7	6.1	5.5	5.5
	Over 6000	5.2	5.5	5.8	6.1	6.1	6.1	*	8.8	7.3	6.7	6.1	6.1
55	Under 250	3.7	4.3	4.6	4.9	4.9	5.2	*	7.6	6.4	5.8	5.2	5.2
	251-800	4.3	4.9	5.2	5.5	5.5	5.8	*	8.5	7.0	6.4	6.1	5.8
	801-2000	4.6	5.2	5.8	6.1	6.1	6.4	*	9.4	7.9	7.0	6.7	6.4
	2001-6000	5.2	5.8	6.4	6.7	6.7	7.0	*	10.4	8.8	7.9	7.3	7.0
	Over 6000	5.5	6.4	7.0	7.3	7.3	7.6	*	11.3	9.4	8.5	7.9	7.6
60	Under 250	4.0	4.9	5.2	5.5	5.8	5.8	*	9.1	7.6	7.0	6.4	6.1
	251-800	4.6	5.5	6.1	6.1	6.4	6.7	*	10.4	8.5	7.9	7.0	7.0
	801-2000	5.2	6.1	6.7	6.7	7.0	7.3	*	11.3	9.4	8.5	7.9	7.6
	2001-6000	5.5	6.7	7.3	7.6	7.9	8.2	*	12.5	10.4	9.4	8.8	8.5
	Over 6000	6.1	7.3	7.9	8.2	8.5	8.8	*	13.7	11.3	10.4	9.4	9.1
70	Under 250	4.9	5.8	6.4	6.4	7.0	7.0	*	11.0	8.8	8.2	7.6	7.3
	251-800	5.5	6.7	7.0	7.3	7.9	7.9	*	12.5	10.1	9.4	8.5	8.2
	801-2000	6.1	7.3	7.9	8.2	8.5	8.8	*	13.5	11.3	10.4	9.4	9.1
	2001-6000	6.7	8.2	8.8	8.8	9.4	9.8	*	15.2	12.2	11.6	10.4	10.0
	Over 6000	7.3	8.8	9.4	9.8	10.4	10.7	*	16.5	13.4	12.5	11.3	11.0

\*When the fill section slope is steeper than 1:4 but not steeper than 1:3, the Design Clear Zone distance is modified by the recovery area formula (shown on Figure 700-3) and referred to as a recovery area. The basic philosophy behind the recovery

area formula is that a vehicle can traverse these slopes but cannot recover (control steering) and, therefore, the horizontal distance of these slopes is added to the Design Clear Zone distance to form the recovery area.

**DESIGN CLEAR ZONE INVENTORY FORM**  
**Figure 700-2**

**RECOVERY AREA**  
**Figure 700-3**

**DESIGN CLEAR ZONE FOR DITCH SECTIONS**  
**Figure 700-4**

## **2.32      GENERAL NOTES: STREET CONSTRUCTION**

In addition to the General Construction Notes in Chapter One, the Engineer shall include the following notes on any plans dealing with the construction of alterations, extensions or connections to the transportation system.

1.      Prior to working within the City Right-of-way or on City Property, the Contractor must obtain a City of Shelton Right-of-Way Permit. It is the contractor's responsibility to verify the location of the right-of-way.
2.      All curb and gutter, street grades, sidewalk grades, and any other vertical and/or horizontal alignment shall be staked by a licensed engineering or surveying firm capable of performing such work.
3.      Where new asphalt joins existing, the existing asphalt shall be cut to a neat vertical edge and tacked with asphalt emulsion type CSS-1 in accordance with the WSDOT/APWA Standard Specifications. The new asphalt shall be feathered back over existing to provide for a seal at the saw cut location and the joint sealed with AR-4000W paving asphalt.
4.      Compaction of subgrade, rock and asphalt shall be in accordance with the WSDOT/APWA Standard Specifications.
5.      Form and subgrade inspection by the City is required before placing asphalt or concrete. Twenty-four hours notice is required for form inspection.
6.      Testing and sampling frequencies will be as described in the City of Shelton Design and Construction Standards.
7.      The Contractor/Developer provides and installs street name and regulatory signs at their expense.
8.      All curb and gutter, street grades, sidewalk grades, and any other vertical and/or horizontal alignment shall be staked by a licensed engineering or surveying firm capable of performing such work.
9.      Where new asphalt joins existing asphalt, the existing asphalt shall be cut to a neat vertical edge and tacked with Asphalt Emulsion type CSS-1 per Section 9-02.1(6) of the WSDOT/APWA Standard Specifications. Tack coat shall be applied per Section 5-04.3(5)A. The new asphalt shall be feathered back over existing to provide for a seal at the saw cut location and the joint sealed in accordance with Section 5-04.3(5)C of the WSDOT/APWA Standard Specifications.
10.     Compaction of subgrade, sub-base, base, surfacing, pavement, or layers of similar material shall be in accordance with Section 2-06 and Section 4-04.3(5) of the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction.

Fill shall be provided in 6” maximum lifts unless otherwise approved by the City, and shall be compacted to 95 percent of its maximum relative density.

11. Inspection by the City is required during all phases of construction. It is the contractor’s responsibility to notify the City of his/her schedule. Inspection by City personnel shall be required during City work hours. City work hours are 8:00 AM to 5:00 PM Monday through Friday, except holidays. A minimum of 24-hours notice is required for inspection of any work by the City.

## DESIGN & CONSTRUCTION STANDARDS

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### CHAPTER THREE

#### 3.0 STORM DRAINAGE

##### 3.1 Public Storm Drainage System Alterations, Extensions and Connections

To allow the City to provide timely assistance and advice, anyone who wishes to alter, extend or connect to the City's storm water drainage system should contact the City as soon as possible. Proposed alterations, connections and/or extensions of the public storm water drainage system must conform to the current edition of the Washington State Department of Ecology Storm Water Management Manual, Title 13 of the Shelton Municipal Code, and the Comprehensive Plan. All proposed alterations, extensions or connections to the public storm drainage system must be reviewed and approved by the City of Shelton. The standards established by this Chapter are intended to represent the minimum standards for storm drainage and erosion control facilities.

##### 3.2 Design Standards

The design of storm drainage and/or retention/detention systems shall depend on their type and local site conditions. The design elements of storm drainage systems shall conform to City standards as set forth herein, and follow current design practice. The current edition of the Washington State Department of Ecology Storm Water Management Manual and Chapter 13 of the Shelton Municipal Code are referenced as a part of these Standards.

###### Swales

Swales will only be allowed where approved by the City. If approved, swales shall be protected by curbing and maintained by the abutting property owner(s). Also, in residential developments a homeowners association with covenants shall be formed to ensure enforcement of the maintenance requirements.

Swales designed for transporting, storing and/or infiltrating storm water from public roadways shall not be located on a lot designated for single family occupancy. Easements proposed for such swales will not be allowed. This is necessary due to the complexity of operating and maintaining the integrity of such facilities on private property.

### Catch Basins

Catch basins shall be located on the upstream side of every intersection. Where there are no intersections, maximum catch basin spacing shall be 300 feet on arterials and collectors and 500 feet on local streets. All storm drainage pipes shall be constructed in a straight line between catch basins and other drainage structures.

### Retention/Detention Ponds

The maximum depth of a retention or detention pond shall be 4.5 feet from the pond bottom to the top of the pond slope (not the water elevation), or as otherwise approved by the City. Deeper ponds may be allowed by the City if minimum 6-foot wide benches are provided at no more than 4.5 vertical foot intervals.

### Fencing

Fencing for public safety shall be provided. Surface ponds and infiltration basins with a maximum depth of three feet or less do not require fencing, provided the maximum associated interior side slope of the pond or basin does not exceed 3H:1V (including baffle side slopes). All ponds and basins with a maximum depth of water greater than three feet will require a six-foot high perimeter fence unless the following condition is met:

- A) The facility is designed and constructed with a 10-foot wide safety bench for every three feet of depth, and the interior side slopes are no greater than 3H:1V (including baffle side slopes); or
- B) When fencing is required around a facility to be dedicated to and/or maintained by the City, the fence shall be a chain link fence. The chain link fence fabric shall be galvanized steel core wire and coated with bonded polyvinyl. The polyvinyl coating shall not be subject to fading, cracking, peeling, or shrinkage and shall be brown, black or some shade of natural green (such as pine, forest, or olive). The fence manufacturer shall provide a 10-year (minimum) warranty on the polyvinyl coating. All fence/gate posts and top/brace rails shall be powder-coated the same color as the chain link fence fabric. The chain link fence shall meet all other applicable specifications for Type 1 or Type 3 chain link fence as set forth in the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction, except that the line posts for Type 3 fence shall be set in concrete.

### Driveway Culverts

All driveway culvert pipes shall be corrugated metal pipe (CMP), high density polyethylene (HDPE), concrete or ductile iron with a minimum diameter of 12

inches, and of sufficient length to provide a minimum 3:1 slope from the edge of the driveway to the bottom of the ditch. Culverts shall have beveled end sections to match the side slope.

#### Release to Public System

All on-site storm drainage shall be infiltrated to the highest degree allowed by site conditions. If drainage outlets (stub-outs) are approved by the City to be provided for each individual lot, the stub-outs shall conform to the following:

- A. The receiving drainage system shall have sufficient capacity for the onsite release. The developer shall provide an engineered drainage analysis to verify the capacity.
- B. Each drainage outlet shall be suitably located at the lowest elevation on the lot, so as to service all future roof downspouts and footing drains, driveways, yard drains, and any other surface or subsurface drains necessary to render the lots suitable for their intended use. Each outlet shall have free-flowing, positive drainage to an approved storm conveyance system or to an approved outfall location.
- C. Drainage outlets on each side lot shall be located with a 5-foot long steel reinforcing bar painted florescent green and driven into the ground. The stub-out shall visibly extend above the surface of the ground and be secured to the reinforcing bar.
- D. Drainage easements are required for drainage systems designed to convey flows through individual lots.
- E. The Engineer is responsible for coordinating the locations of all stub-out drainage conveyance lines with respect to utilities (e.g., water, sewer, electrical power, gas, telephone, and television).
- I. All individual stub-outs to the main or catch basin shall be privately owned and maintained by the lot owner.

### **3.3 Storm Water System Rainfall Design Criteria**

The following values are to be used as design criteria for storm water facilities:

100 Year – 24 Hour Design Event	8.50 inches
50 Year – 24 Hour Design Event	7.80 inches
25 Year – 24 Hour Design Event	7.05 inches
10 Year – 24 Hour Design Event	5.50 inches
5 Year – 24 Hour Design Event	4.75 inches
2 Year – 24 Hour Design Event	4.00 inches
6 Month – 24 Hour Design Event	2.56 inches
100 Year - 7 Day Design Event	16.60 inches

The applicable design storm event shall be used in all calculations submitted to the City for review.

All storm water detention, infiltration and conveyance systems shall be sized to accommodate the 100-Year – 24 Hour Design Event, unless otherwise approved by the City. If a smaller design event is proposed by the Engineer and is approved by the City for the sizing of a detention or infiltration system, an overflow system shall be sized to accommodate the 100-Year – 24 Hour Design Event. Additionally, whenever an overflow system is proposed, a complete downstream analysis will be required to ensure that downstream properties or storm water conveyance systems are not compromised. In areas of known groundwater and/or storm water problems, the City reserves the right to require detention facilities to accommodate the 100-Year – 7-Day Design Event.

All storm water treatment systems shall be sized to accommodate the 6-Month – 24 Hour Design Event. However, all storm water conveyance systems must be capable of conveying the 100-Year - 24 Hour Design Event.

All storm water facilities designed with the requirements indicated above shall meet all of the other requirements of the Department of Ecology Stormwater Management Manual, Chapter 13 of the Shelton Municipal Code, and all Best Management Practices.

#### Infiltration Rate Guidelines

Obtaining a design infiltration rate utilizing a soils investigation and infiltration test is highly desirable for all projects utilizing storm water infiltration systems within the City. The largest infiltration rate allowed for design without a soils investigation and infiltration test is six inches per hour (or ten minutes per inch). This rate may be allowed only in locations where the City has sufficient knowledge of existing soils in the vicinity of the project, and where infiltration systems in that location have been performing as designed with this design infiltration rate.

An adequate soils investigation for designing infiltration systems includes a soils exploration and an infiltration test at the depth of the bottom of the proposed infiltration system. The exploration shall be a minimum of three feet below the elevation of the bottom of the proposed infiltration system to determine if high groundwater or impermeable soil layers will impede vertical movement of the storm water unless otherwise approved by the City. The largest infiltration rate allowed for design with a soils investigation and infiltration test is ten inches per hour (or six minutes per inch).

In all cases, an adequate factor of safety shall be utilized when determining a design infiltration rate to compensate for soil clogging and cementation, high groundwater levels, and vertical separation between the bottom of the infiltration system and impermeable soil layers. Additionally, all infiltration rates utilized in

the design shall be reviewed and approved by the City. It is recommended that the infiltration rate proposed for the design of infiltration systems be approved by the City prior to the start of design, to avoid unnecessary revisions that could prove costly for the applicant and cause delays in the progress of the project.

Storm drain pipe within a public right-of-way or easement shall be sized to carry the maximum anticipated runoff for a 25 year, 24 hour storm event from the contributing area. The minimum size for mains and laterals shall be 8 inches in diameter, or as otherwise approved by the City. Nothing shall preclude the City from requiring the installation of a larger sized storm drain if the City determines a larger size is needed to serve adjacent areas or for future service. When the property discharges to the public storm drainage system, installation of appropriately sized storm drains across the face of the property may be required by the City where applicable.

Storm drain pipe shall meet the following requirements:

- A. Concrete pipe conforming to the requirements of AASHTO M 86, Class 2.
- B. Reinforced concrete pipe conforming to the requirements of AASHTO M 170.
- C. PVC pipe conforming to the requirements of ASTM D 3034 SDR 35, ASTM F 794, or ASTM F679 Type 1 with joints and gaskets conforming to the requirements of ASTM D 3212 and ASTM F 477.
- D. Corrugated steel pipe shall conform to the requirements of Section 9-05.10 of the WSDOT Standard Specifications with Treatment 1, 16 gauge minimum; or gasketed helically corrugated lock seam without Treatment 1; or welded seam aluminized steel pipe without Treatment 1.
- E. Corrugated aluminum pipe shall conform to the requirements of Section 9-05.11 with Treatment 1 or gasketed helically corrugated lock seam with Treatment 1, 14 gauge minimum.
- F. Ductile iron pipe conforming to the requirements of AWWA C 151, with thickness class shown on the plans.
- G. High-density polyethylene smooth interior pipe conforming to the requirements of AASHTO M252 Type S or AASHTO M294 Type S. All joints for HDPE storm drain pipe shall be made with a bell/bell or bell and spigot coupling and shall conform to ASTM D 3212 using elastomeric gaskets conforming to ASTM F 477. All gaskets shall be factory installed.

All storm drainage systems are required to be air testable at 4 psi except concrete pipe, which shall be tested per WSDOT/APWA Standards Specifications for concrete storm pipe. All flexible pipe shall be mandrel tested per WSDOT/APWA Standard Specifications. Special structures, oil/water separators and outlet controls shall be installed per the approved plans and manufacturer's recommendations.

The minimum cover for storm drain pipe shall be 2 feet, or as otherwise approved by the City. Where the minimum depth includes the roadway section, structural calculations or manufactures specifications for the appropriate H-loading shall be submitted along with the plans. All drain pipe specified where the cover is less than 2 feet or less shall be HDPE, concrete or ductile iron of a class determined by the structural calculations or manufactures specifications

Where connections require “field verifications”, connection points will be exposed by contractor and fittings verified two (2) business days prior to beginning work.

### **3.4 Staking**

All surveying and staking shall be performed by a licensed engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington as a professional engineer or professional land surveyor. A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of storm sewer systems shall be as follows, unless otherwise directed by the City.

- A. Stake centerline alignment every 50 feet with cut or fill to invert of pipe.
- B. Stake location of all catch basins, manholes and other structures for grade and alignment with cut or fill to rim and invert of all pipes. Two offsets to the centerline of the structures shall be provided.
- C. Grade stake, or slope stake as appropriate, at intervals sufficient to control the location, size and depth of retention/detention facilities.
- D. Stake finished grade of all storm water features, including but not limited to catch basin/manhole rim elevations, overflow structures, weirs and invert elevations of all pipes in catch basins, manholes, and those pipes that daylight.

### **3.5 Trench Excavation**

See Chapter Two, Section 2.19 for requirements regarding trench excavation.

### **3.6 Backfilling**

See Chapter Two, Section 2.19 for requirements regarding backfilling.

### **3.7 Street Patching and Restoration**

See Chapter Two, Section 2.19 for requirements regarding street patching and trench restoration.

### **3.8 Maintenance**

The City shall maintain all stormwater drainage elements such as catch basins, oil water separators, and conveyance systems located within the public rights-of-way.

All private stormwater systems are required to have an Operations and Maintenance Manual per Department of Ecology's requirements. The manual must be submitted to the City for review prior to construction authorization. The development's owner association shall be responsible for maintaining on-site storm water facilities including, but not limited to, on-site retention/detention ponds, catch basins, oil-water separators and conveyance system(s).

### **3.9 Storm Drainage Construction (General Notes)**

In addition to the General Construction Notes in Chapter One, the Engineer shall include the following notes on any plans dealing with the construction, alterations, extensions or connections to the storm drainage system.

All storm mains, structures, conveyance systems and retention/detention areas shall be staked for grade and alignment prior to the start of construction.

All storm drainage systems are required to be air testable at 4 psi except concrete pipe, which shall be tested per WSDOT/APWA standard for concrete storm pipe. All flexible pipe shall be mandrel tested per WSDOT/APWA standards. Special structures, oil/water separators and outlet controls shall be installed per the approved plans and manufacturer's recommendations.

## DESIGN & CONSTRUCTION STANDARDS

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### CHAPTER FOUR

#### 4.0 WATER

##### 4.1 Water System Alterations, Extensions and Connections

To allow the City to provide timely assistance and advice, anyone who wishes to alter, extend or connect to the City's water system should contact the City as soon as possible. Any alteration, connection and/or extension of the public water supply and distribution system must be approved by the City of Shelton. Proposed alterations, connections and/or extensions must conform to Department of Health (DOH) and Comprehensive Water System Plan requirements and City Ordinances.

In the case of development within the corporate City limits on existing lots, or on new lots or sites created by subdivisions desiring a connection to City water or requiring fire flows, where the property abuts a public right-of-way or easement, extension of the water main shall be required. Such extension(s) shall be to and across the full width of the property services with water unless otherwise approved by the City. For corner lots, the extension shall be to the middle of the adjacent roadway intersection.

In planning and designing for any alteration, connection and/or extension, it is the Developer's Engineer's responsibility to see that adequate water for both domestic use and fire protection is attainable. The proposed plans must show how water will be supplied, and whether adequate water pressure will be available in case of fire. An analysis of the water supply and distribution system may be required if it appears that the system might be less than adequate.

Any alteration, extension or connection to the City water system, or any plumbing in a residential or nonresidential facility providing water for human consumption that is connected to the City system, shall be lead-free. With respect to solders and flux, lead-free shall mean no more than 0.2% lead, and no more than 0.8% lead with respect to pipes and pipe fittings.

The design of any water system alteration/extension/connection shall conform to these City Standards and any applicable City Ordinances as set forth herein. The layout of extensions shall provide for the future continuation and/or "looping" of the existing system, as determined by the City. When determined to be applicable by the City due to topography, existing and/or proposed land uses, Comprehensive Plan and other factors, installation of an appropriately sized water main across the full width of the property may be required.

All residential dwelling units, commercial and Industrial complexes shall have at least one water meter installed per separate building. Provided however, additional meters to a multi-family or commercial building may be installed if desired. Master meters may be allowed for properties under one ownership where no onsite fire hydrants are required at the Public Works Directors approval. All appropriate cross connection control devices must be installed.

Prior to the installation of any water meters, all public water system improvements must be completed and approved by the City, including granting of right-of-way or easements and the payment of all applicable fees. Issuance of building permits for new construction of single family subdivisions shall not occur until final City approval is given. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A financial security in accordance with Chapter One of these Standards will be required for the remaining water system improvements. The certificate of occupancy will not be issued until final City approval of all improvements.

#### **4.2 Water Main Design Standards**

Water mains shall be sized to provide adequate domestic flow, plus fire flow at the required residual pressure, as required by the current edition of the Washington State Water System Design Manual and the Uniform Fire Code. Fire flow requirements will be determined by the City, however, the quantity of water required will in no case be less than 1000 GPM at 20 psi residual for all other occupancies except UBC Class U. Check with the City for Class U requirements.

The minimum water main size shall be 8 inches diameter. If fire protection requirements are met, the City may approve alternate pipe sizes (i.e. culdesac). Larger size mains are required in specific areas as outlined in the Comprehensive Water System Plan or as necessary to meet fire flow requirements and future service areas. Water supply and fire flow quantities will dictate water main looping requirements. In any case water mains longer than 1,200 lineal feet shall be looped.

All pipe for water mains shall have flexible gasketed joints and shall comply with the following:

- A. 3" diameter and larger water mains shall be ductile Iron Pipe shall conform to AWWA C 151 Class 52 and have a cement mortar lining conforming to AWWA C 104. All pipes shall be joined using rubber gaskets, push on type or mechanical joint, conforming to AWWA C 111, or as otherwise approved by the City.

- B. Water mains two (2) inches in diameter shall be pressure class 200, polyethylene plastic pipe manufactured from all virgin material, category 5, grade P34, Class C high density polyethylene CTS OD ASTM D-2737 SDR 9 PE3408; cell classification 335434C to 355434C from Philips Driscopipe, Superlon Plastics; Type K Copper; or approved equal
- C. All fittings shall be ductile iron compact fittings conforming to AWWA C 153 or Class 250 gray iron conforming to AWWA C 110 and C 111. All shall be cement mortar lined conforming to AWWA C 104. Plain end fittings shall be ductile iron if mechanical joint retainer glands are installed on the plain ends. All fittings shall be connected by flanges or mechanical joints.
- D. The minimum cover for all water mains from top of pipe to finish grade shall be 42 inches unless otherwise approved by the City. If the pipe is offset to the edge of the road, the actual roadway cross grade shall be projected out and used to measure cover to top of pipe. This will require more fill over the pipe in a fill section but allows the pipe adequate cover in the event of future roadway cuts or widening. If the pipe is located under a ditch or on the “downhill” slope of the roadway cross section, the minimum cover over the pipe shall be 42 inches or as otherwise approved by the City. All materials shall also be installed in conformance with the manufacture’s written recommendations.

The maximum cover for all water mains shall be 60 inches at top of pipe unless otherwise approved by the City. See Standard Detail # W-06.

#### **4.3 Hydrant Design Standards**

The pipe from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 52 no less than 6 inches in diameter.

Fire hydrants shall have two 2-1/2 inch outlets, and one 4-1/2 inch pumper port outlet fitted with a 4 inch Stortz adapter. All outport threads shall be Shelton Standard No. 475 thread. The valve opening shall be 5-1/4 inch diameter. The hydrant shall have a positive and automatic barrel drain and shall be of the “safety” or break-away style. Hydrants shall be Mueller Super Centurion or City approved equal. All new hydrants shall be bagged until all new water system construction is approved by the City.

The following guidelines shall apply for hydrant number and location, unless otherwise approved by the City:

- A. A minimum of one hydrant shall be installed at all intersections.
- C. Hydrant spacing of 300 feet shall be required in all residential areas.
- D. Hydrants located in cul-de-sac or dead end areas either by design, topographic or manmade feature which prohibit straight line distance

measurement, shall be located to serve no more than 60,000 square feet of land area or have a maximum travel distance of 300 feet. Where a cul-de-sac or dead end exceeds 300 feet, a hydrant shall be required.

- E. When any portion of a proposed non-residential building is in excess of 150 feet from a water supply on a public street, on-site hydrants may be required by the City. Such hydrants shall be located per the Standards, and easements for such hydrants shall be granted to the City.

A scaled down plan view of the proposed water system shall be included on the plans. The scale shall be appropriate to show the entire proposed system. This plan view shall show the location of all the proposed hydrants plus the location of the appropriate existing hydrants adjoining the project. If the project only includes the addition of one or two new hydrants, the location of at least 2 existing hydrants in the project vicinity need to be shown on the plan view. Fire hydrants shall be set as shown in standard detail #W-08.

For requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve, contact the City Fire Department. Location of the FDC shall be shown on the plans. For private use of City hydrants, see Section 4.10 (E). A Water Usage permit is required for the use of hydrants; contact the City about permit procedures and fees.

Where needed, the City may require hydrants to be protected by two or more posts, six inches in diameter by five feet in height, and made of either reinforced concrete or steel. Posts shall be placed so that they do not interfere with the operation of the hydrant or cause obstruction of the ports. See detail W-09.

#### **4.4 Valve Design Standards**

All valves and fittings shall be ductile iron with ANSI flanges or mechanical joint ends. Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one valve every 1000 feet. Generally, there shall be two valves on each tee and three valves on each cross. Specific requirements for valve spacing will be made during plan review.

- A. Gate Valves: The design, materials and workmanship of all gate valves shall conform to AWA C509-80 latest revision. Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals. Gate valves shall be Mueller, M&H, Kennedy, Clow R/W, Waterous Series 500 or an approved equal. Gate valves shall be used on all water mains 10 inches or smaller, or as otherwise approved by the City.
- B. Butterfly valves shall be used on all lines 12 inches and larger except when a tapping valve is required. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body and O-ring stem

seals. Butterfly valves shall be Mueller, Linseal III, Kennedy, Pratt Ground Hog, Allis Chalmers, or an approved equal.

- C. All valve boxes shall have a standard Inland Foundry #2056 base, #2060 top section and a lug type cover to fit the #2060 top section, or an approved equal. See standard drawing #W-07.
- D. An operating nut extension shall be installed when the ground surface is more than 24 inches above the valve operating nut. The operating nut extension shall extend into the top section of the standard valve box and shall clear the bottom of the valve box lid by a minimum of 10 inches. When an operating nut extension is required, it shall be furnished and installed by the contractor. See standard drawing #W-07.

#### **4.5 Water Service Connections**

For new mains extending across the frontage of existing lots not part of a project, service connections shall be provided as necessary for service to lots. The City will reimburse the contractor for the cost of those service connections. At the time of water main construction, all water service connections required by the approved plans shall be installed by the contractor. All service taps shall be shown on the plans. See Details W-01 through W-05. After the water service lines have been constructed, inspected, tested and approved by the City, the property owner may apply for a water meter. Unless the City approves installation by the contractor, the City will install a water meter after a utility application has been made and all related fees have been paid. All water services are the property of the City.

When water service is desired to a parcel fronting an existing main but not served by an existing meter, a utility application must be made to the City. Upon approval of the application and payment of all related fees, the City will tap the main and install the meter, box, and setter.

Service lines shall be as specified herein. Services lines shall be installed at a 90 degree angle off the water main. No glued joints will be accepted.

All service lines up to and including two (2) inches in diameter shall be pressure class 200, polyethylene plastic pipe manufactured from all virgin material, category 5, grade P34, Class C high density polyethylene CTS OD ASTM D-2737 SDR 9 PE3408; cell classification 335434C to 355434C from Philips Driscopipe, Superlon Plastics; Type K Copper; or approved equal. Stainless steel inserts shall be used with all polyethylene plastic pipe. Service lines larger than two (2) inches in diameter shall be ductile iron pipe. All services shall have a minimum of twenty (20) inches of cover.

Service saddles shall be ductile iron with stainless steel straps. All saddles shall have rubber gasket and iron pipe threaded outlets.

Corporation stops shall be iron pipe or Mueller CC threads conforming to AWWA C 800 or an approved equal.

When connection to the City of Shelton water system is requested by a customer connected to an existing domestic well, the well must be abandoned per Department of Ecology requirements or a cross connection control device must be installed and tested per Section 4.18. This is necessary to assure that an unapproved auxiliary water supply (the customer's well) will not contaminate the City's water supply. The customer's domestic well may be kept serviceable for irrigation purposes, and after all cross connection control have been met. No water meter will be installed for the newly requested service until a cross connection inspection has been completed to the satisfaction of the City.

Development on new lots created by subdivision and each approved site plan shall have a water service connection to a City main installed. In single family subdivisions (including mobile home and manufactured home subdivisions), a service shall be provided to each lot or site. If a separate domestic and an irrigation meter are desired at a particular lot or tract, additional services shall be installed.

#### **4.6 Water Main/Sanitary Sewer Crossings**

When water mains and sanitary sewer mains cross, the water main shall be above the sanitary sewer main. The contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and water mains. The minimum cover of 42 inches for water mains may be reduced to 24 inches, in accordance with the manufacturer's written recommendations, and upon approval by the City to provide for as much vertical separation as possible.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it may be necessary to encase the water pipe and/or sewer service in pipe or concrete per the most current edition of the State Department of Ecology's Criteria for Sewer Works Design, Section 2.414. No concrete shall be installed unless specifically allowed by the City.

#### **4.7 Manholes**

See Chapter 5 for design, construction and testing requirements regarding manholes.

#### **4.8 Sterilization and Flushing**

Sterilization of water mains shall be the responsibility of the contractor, and shall be done in accordance with Section 7-11.3 (11) of the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction and in a manner satisfactory to the City, with a minimum 50mg/1 chlorination in accordance with the requirements of the Washington State Department of Health. At no time shall chlorinated water from the new main be flushed into a body of water. This is to include lakes, rivers, streams, drainage ways, and any and all other waters where fish or other natural water life can be expected.

When a chlorine concentration has been established throughout the line, the valves shall be closed and the line left undisturbed for a minimum of 24 hours. The line shall then be thoroughly flushed and water samples taken by the City at least 24 hours after flushing and disinfecting for testing by an approved laboratory. Should the initial treatment result in an unsatisfactory bacteriological test, the original chlorination procedure shall be repeated by the contractor until satisfactory results are obtained.

#### **4.9 Hydrostatic Tests**

Prior to the acceptance of the work, the installation shall be subject to hydrostatic pressure test(s) of 200 psi or twice the line pressure, whichever is greater, for 15 minutes, in accordance with Section 7-11.3 (11) of the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction. Any leaks or imperfections developing under said pressure shall be remedied by the contractor. No main shall be hydrostatically tested until the lines are flushed of chlorine. The main shall be tested between valves. Whenever possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested.

The contractor shall provide all necessary equipment and shall perform all work required to complete the tests. Tests shall be made on the main prior to any service tap. Service taps will be made after the hydrostatic testing of the main and shall be made when the main is at its working pressure. The contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and the air in the line has been released before requesting the City to witness the test.

#### **4.10 Air and Vacuum Release Valves**

Air and vacuum release valves (ARV) shall be APCO 145C combination air release valve or an approved equal. Installation shall be as shown on standard drawing #W-15. The installation shall be set at the high point of the line when required. Where possible, pipes are to be graded to prevent the need for an air release valve.

#### **4.11 Blowoff Assembly**

If a fire hydrant is not located at the end of a dead end main, a blowoff assembly shall be required. The pressure rating for blowoff assemblies shall be 200 psi. Blowoff assemblies shall be located near the center of cul-de-sacs when appropriate. Installation shall be as shown on standard details #W-11.

#### **4.12 Staking**

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington as a professional engineer or professional land surveyor. All construction staking shall be inspected by the City prior to beginning construction.

The minimum staking of waterlines shall be as directed by the City or as follows:

- A.** Stake centerline alignment every 50 feet with cut or fill to invert of pipe maintaining cover over pipe per Section 4.10. Cuts are normally not required when road grade has been built to subgrade elevation.
- B.** Stake alignment of all fire hydrants, tees, water meters, setters and other appertances and mark cut or fill to hydrant flange finished grade. Any deviations from these minimum staking requirements shall be approved by the City.

#### **4.13 Trench Excavation and Pipe Laying**

Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City. Debris resulting from the clearing and grubbing shall be disposed of by the contractor in accordance with the terms of all applicable permits. Track mounted equipment shall not be allowed on paved City streets and public rights-of-way outside of the approved project boundaries and gravel streets without prior approval by the City.

The contractor shall perform all excavation in whatever substance encountered. Boulders, hardpan, clay, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below water main grade. Where materials are removed from below water main grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.

Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 42 inches of cover over the pipe. The trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space are in compliance with all State and Federal Guidelines. Surface water shall be diverted so as not to enter the trench. Trench water or other deleterious materials shall not be allowed to enter the pipe

at any time. The contractor shall maintain sufficient pumping equipment on the job to ensure that these provisions are carried out. Provisions shall be made to prevent floating of the pipe.

The contractor shall handle all types of pipe in a manner that will prevent damage to the pipe, pipe lining or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall pipe be dropped, skidded, or rolled against another pipe.

If the Inspector determines that the contractor's methods are damaging to the pipe, the contractor shall correct the handling methods. All damaged pipe will be rejected, marked as such, placed apart from undamaged pipe, and shall be removed from the site within 24 hours. Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. For public safety, each size of pipe shall be stacked separately.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and re-laid. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the Engineer, to ensure cleanliness inside the pipe.

The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflecting the joints. The amount of deflection at each pipe joint when pipe is laid on a curve shall not exceed the manufacturer's printed recommended deflections. When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wider on curves for this purpose.

When the contractor is trenching and shoring adjacent to an existing water main or any other underground utilities, no more than two pipe joints shall be exposed at any time. When the support of existing utilities or public safety concerns exist, the City may require more stringent trenching standards. Trenching, shoring and pipe laying shall be in conformance with Washington Industrial Safety and Health Administration (WISHA), Washington Department of Labor and Industries (L&I) and the Office of Safety and Health Administration (OSHA) Safety Standards and any other agency with jurisdiction.

#### **4.14 Casing**

Steel casing pipe shall be schedule 20 steel, ductile iron, or an approved equal. Pipe spacers shall be Cascade style CC5 with 8 inch runners as available from Cascade Waterworks. Casing pipe and spacers shall be sized for pipe being installed. Install minimum of three spacers per section of pipe.

#### **4.15 Irrigation**

All irrigation systems located within the public right-of-way shall be designed by a State of Washington registered professional engineer or licensed landscape architect, and approved by the City. The contractor shall be responsible for all installation, repair, testing, and operation of the irrigation water system until all work is complete and the system has been certified by the engineer or landscape architect who prepared the approved plans. The engineer or landscape architect shall be responsible for inspection of the irrigation system during construction, and testing of system operations following the completion of construction. The engineer or landscape architect shall provide the City with a letter bearing his/her professional registration, and certifying the irrigation system as complete and constructed and all cross connection control requirements per Section 4.18 have been complied with in full accordance with the plans approved by the City.

#### **4.16 Cross Connection Control**

Testing for cross connection control shall be the responsibility of the contractor. A certified backflow assembly tester shall perform all cross connection control tests, and the test results shall be submitted to the City.

The installation of cross connection control devices is required to protect the existing water system and users from possible contamination, and shall comply with the requirements of the most current addition of the AWWA Cross Connection Control Manual. The contractor shall have all cross connection control tests conducted by a certified backflow assembly tester, and the test results shall be submitted to the City. Thereafter, it is the responsibility of the property owner to have the cross connection control device tested annually by a certified backflow assembly tester, and to submit the test results to the City. See Details W-17 through W-26.

#### **4.17 Thrust Blocking**

The locations of thrust blocking shall be shown on the plans. Thrust blocks shall be designed for the test pressures set forth in the Standards. Thrust block concrete shall be commercial concrete (atleast 3000 psi compressive strength) poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type, and size shall be

specified on the plans. See standard details #W-12, #W-13 and #W-14 for examples.

#### **4.18 Backfilling**

Backfilling and surface restoration shall closely follow the installation of pipe, so that not more than 100 feet is left of the trench open at any time during construction without approval of the City. When public safety concerns exist, the City may require more stringent backfilling standards. Selected backfill material shall be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill shall be compacted to 95 percent of the maximum density in the roadway prism, to 90 percent outside the roadway prism, and shall be satisfactorily demonstrated to the City by density tests per the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction. CDF shall be used for the backfilling of trenches in existing streets, unless otherwise approved by the City.

If native material is not suitable for backfill, the City will order the placing of pipe bedding around the water main conforming to the Standard Specifications.

Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction.

#### **4.19 Street Patching and Restoration**

See Chapter 2.20 for requirements regarding trench backfilling, temporary patching, and pavement restoration.

#### **4.20 Watershed and Wellhead Protection Areas**

A protection area is designated for the City's watershed and each of the City's wells as an irregular boundary determined by topography, waterflow patterns both above and below ground, soil types, flow rates and other factors. Please contact the City to determine if the proposed project is situated within a protection area. In order to protect the public water supply, the following criteria shall apply to any project or portion of a project which is partially or completely located within a watershed or wellhead protection area:

- A. A storm and erosion control plan requiring treatment of stormwater is required. Depending on the individual characteristics of the project, more stringent treatment requirements than those required in the Washington State Department of Ecology Storm Water Management Manual for Western Washington and Title 13 of the Shelton Municipal Code may be imposed by the City. All storm water shall be directed away from a well.

- B. If the project is a subdivision, it must be noted on the face of the plat that the project is located within a wellhead protection area or watershed.
- C. All garbage bins and dumpsters shall be lidded or covered in a manner that prevents rainwater from entering the containers and, subsequently, the groundwater.
- D. In projects where a hazard material spill could occur, a spill and containment plan shall be implemented. Depending on the nature of a project, more stringent spill and containment requirements than those in the Washington State Department of Ecology Storm Water Management Manual for Western Washington and Title 13 of the Shelton Municipal Code may be imposed by the City.
- E. No outside storage or sales of hazardous materials will be allowed within a watershed or wellhead protection area. This includes but is not limited to: industrial chemicals, solvents, petroleum products, pesticides, herbicides, animal wastes, fertilizers and other lawn and garden chemicals.

#### **4.21 Water Main Construction Standards (General Notes)**

- A. In addition to the General Construction Notes in Chapter One, the Engineer shall include the following notes on any plans dealing with the construction or alterations, extensions or connections to the water system.
- B. All water mains shall be staked for grades and alignment by an engineering or surveying firm capable of performing such work, in accordance with the Standards.
- C. New and existing valves are to be operated only by City employees.
- D. At any connection to an existing water main where a new valve is not installed, the existing valve must be pressure tested to City Standards prior to connection. If any existing valve fails to pass the test, the contractor shall make the necessary provisions to test the new line prior to connection to the existing system, or install a new valve.
- E. Hydrants shall be bagged until the system is approved after construction. Fire hydrants meeting required fire flows shall be installed, tested, and accepted prior to the issuance of a building permit. A Water Usage permit is required for the use of hydrants; contact the City about permit procedures and fees. A Water Usage permit is valid only at the location specified on the permit. When using the hydrant to fill a vehicle, the vehicle must be equipped with an approved cross connection control device.

- F. All lines shall be chlorinated and tested in conformance with Department of Health (DOH) requirements and City Standards. An approved dechlorination device shall be used when flushing chlorinated water that will discharge to any body of water.
- G. The contractor shall be responsible for determining the scope of work for connections to existing water mains. It shall be the Contractor's responsibility to field verify the location and depth of the existing mains, and to verify the fittings required to make the connections to the existing mains. The contractor shall demonstrate that all necessary fittings are on-site before requesting a shut-down.
- H. The contractor shall give the City a minimum of seventy-two (72) hours notice of any planned shut-down to make a connection to an existing water main. Where connections require "field verification", connection points will be exposed by the contractor and fittings will be verified 48 hours prior to distributing shut-down notices. This includes all cut-ins and live taps. In certain situations, the City may dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers. No tap shall be made to an existing main on a Friday without specific approval from the City.

**CHAPTER FIVE**

**4.0 SANITARY SEWERS**

**5.1 Sewer System Alterations, Extensions and Connections**

To allow the City to provide timely assistance and advice, anyone who wishes to alter, extend or connect to the sanitary sewer system should contact the City as soon as possible. Any alteration of, extension of, or connection to the City of Shelton's sanitary sewer system must conform to the Comprehensive Sewer Plan, State Department of Ecology (DOE) and State Department of Health (DOH) requirements, Section 7 of the WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction, and these Standards.

In the case of development where the property abuts a right-of-way or public easement in which a public sewer is located, or where a service connection is or can be otherwise provided, connection of all structures generating sewage shall be required. Whenever a structure that generates sewage originates within 300 feet of the public sewer the structure shall connect to the public sewer in compliance with these Standards. Sewer main extensions shall be required when the property does not front on a sewer main or when the existing sewer main is not adequate for the increased use that is being proposed. The minimum extension shall be to the far property line or for corner lots, to the middle of the adjacent intersection of the right of way (alley or street).

Development on new lots or sites created by subdivisions or site plans shall have a sewer service installed as required by these Standards. In single family subdivisions and in mobile home/manufactured home parks, a service shall be provided to each lot, site or residential dwelling unit.

Duplex, triplex, multi-family and commercial complexes shall have at least one side sewer or lateral installed per separate building or ownership. Additional side sewers or laterals to a multi-family or commercial building may be installed if desired. Commercial or Industrial properties without a connection to the public water main shall install a meter on the side sewer or sewer lateral to measure the sewage flow from the property, and shall pay the relevant sewer rates as established by Title 14 of the Shelton Municipal Code.

**5.2 Sewer Design Standards**

The design of any sewer extension/connection shall conform to the State Department of Ecology's "Criteria of Sewage Works Design", and any applicable Standards as set forth herein. The layout of extensions shall provide for the future

continuation of the existing system as determined by the City. All sewers shall be designed as a gravity sewer whenever physically feasible.

Gravity sewers shall be designed with a straight alignment between manholes, or as otherwise approved by the City. New gravity sewer systems shall be designed on the basis of an average daily per capita flow of sewage of not less than 100 gallons per day. See the following DOE table on Design Basis for Sewage. This figure is assumed to cover normal infiltration, but an additional allowance may be required by the City where conditions are unfavorable. Generally, laterals and submain sewers should be designed to carry, when running full, not less than 400 gallons daily per capita contributions of sewage. When deviations from the per capita rates are used, a description of the procedure used for sewer design shall be submitted to the City for approval.

Sewer mains shall be sized for the ultimate development of the tributary area, as determined by the City. The minimum size for submains and mains shall be 8 inch inside diameter. The minimum size for a lateral shall be 4 inches. Nothing shall preclude the City from requiring the installation of a larger sized main or a greater installation depth if the City determines a larger size or a greater installation depth is needed to meet requirements for future service.

Gravity sewer mains shall be Class 52 ductile iron pipe or solid wall PVC and shall conform to the requirements of ASTM D 3034 SDR 35 for pipe up to 15" diameter and ASTM F 679 type 1 only for pipe sizes 18 to 27 inch diameter with joints and rubber gaskets conforming to ASTM D 3212 and ASTM F 477.

Gravity sewers will typically have a minimum depth of 7 feet to provide gravity service to adjoining parcels, adequate head room within manholes for maintenance personnel, and vertical clearance between water and sewer lines. Actual depth will be determined by slope, flow, velocity and elevation of the existing system. Additional depth may be required by the City.

All new mains connecting to the existing system, shall connect either to an existing manhole or to a main of the same size and 180° to the lay of the main provided the manhole placement per Section 5.4 is met. See Section 5.9 and details #SS-5 and #SS-6 for requirements for building or side sewer connections.

Septic Tank Effluent Pump (STEP) systems are not allowed by the City.

### **5.3 Connection to Existing System**

Before connection to the existing system, all new sewers shall be physically plugged until all tests have been completed and the City approves the removal of the plug. Connection of new sewer pipe lines to existing manholes shall be accomplished by core drilling and inserting a "Kor-N-Seal" boot, or as otherwise

approved by the City. The transition of connecting channels shall be constructed so as not to interrupt existing flow patterns.

Connection of a sewer pipe line to a sewer system where a manhole is not available shall be accomplished by installing an approved precast base or pouring a concrete base and setting manhole sections. The existing sewer pipe shall not be cut into until approval is received from the City. At connections where an existing stub out is not available, or where a new building sewer is the same size as the existing main, a replacement manhole shall be installed, unless otherwise approved by the City. All sewer main installations shall be per Section 5.4.

When sewer service is needed to a parcel fronting an existing sewer main, a Utility Application must be made to the City. Following approval of the application and payment of all related fees, the contractor may tap the existing sewer main and install all building side sewers or laterals required by the approved plans shall be installed by the contractor. All connections to the sewer main shall be shown on the plans. The City shall inspect the contractors work and testing.

Taps shall not be allowed to protrude more than one inch into the existing main. The City shall be notified 48 hours prior to any tap of a City sewer and a City Inspector shall be present to witness the tap. The mainline at the tap location shall be televised after tapping and prior to approval to ensure compliance upon City direction.

When it is necessary to break out or repair an existing sewer during construction, only new pipe having the same inside diameter will be used in reconnecting the sewer. Where joints must be made between pipes with a mismatched wall thickness, the contractor shall use a flexible gasketed coupling, adapter, or coupling-adapter to make a water-tight joint. Couplings shall be those manufactured by Romac or Smith-Blair for reinforced pipe and Fernco for non-reinforced pipe, or a City approved equal.

***Taps on PVC sewer mains shall be made with a PVC Gasketed Sewer Main Saddle Wye conforming to ASTM D 3034 SDR 35, or City approved equal. Taps on a ductile iron sewer main shall be made with a Romac style CB sewer saddle with Ductile+Plus saddle, stainless steel strap and rubber gasket meeting ASTM D-2000 3 BA715, or City approved equal. See detail SS-14. The manufactured bevel on the pipe to be inserted into the saddle shall be cut off to avoid pushing the new sewer pipe too far into the main.***

#### **5.4 Sewer Services and Laterals**

Building side sewers and lateral sewers shall be minimum 4-inch inside diameter. Maintenance of building side sewers and laterals is the responsibility of the property owner. Prior to connection of a building side sewer or a lateral to the

public sewer, an approved Utility Application must be obtained. Materials and design criteria for a building side sewer and for lateral sewers are covered by the Uniform Plumbing Code (UPC) and these Standards. See detail # SS-5, SS-5A, SS-6A.

Each separate building shall have its own separate side sewer (per SMC chapter 14.06.010), and each property shall have its own lateral connection to the system. Laterals for single family residential properties shall not be connected to the system at a manhole, unless otherwise approved by the City. Multi-family and commercial complexes may connect directly to a manhole if the lateral sewer is six (6) inches in diameter or larger, and the manhole is channeled to accommodate the lateral. Manhole sizing where laterals are connected shall be the same as designated in section 5.4 of these Standards.

Lateral sewers shall be PVC ASTM D3034 SDR35 with flexible gasketed joints. Ductile iron pipe may be required where there is insufficient cover. Lateral connections shall be made by a tap to an existing sewer main by a licensed and bonded contractor upon approval of the right of way permit, or by a Y branch from a new main connected above the spring line of the pipe. PVC sewer T-Y fittings shall be GPK Products Part Numbers 113-0044 to 113-0278 depending on application size, or 114-0044 to 114-0278 depending on application size, manufactured in accordance with ASTM D-3033-79 SDR 35, SDR 41, or ASTM D-3034-78 SDR 42 or SDR 35, or City approved equal. A cleanout is required on the lateral at the right-of way-line or easement line, unless otherwise approved by the City. Cleanout ring and cover shall be Inland Foundry #247 (WSDOT) Standard Plan B-18b), or City approved equal. See detail # SS-10. A backwater valve is required on the side sewer in an accessible location near the building, unless otherwise approved by the City. See detail # SS-7.

If the property abuts an existing sewer main, an application for sewer service shall be made by the owner of the property on which the work is to be performed or by a properly licensed and bonded contractor representing the owner. All fees required by the City shall accompany the completed application. The charge for connection to the City's sewer system is established by the City Commission and may be amended by the Commission from time to time as necessary. All charges incurred in establishing a connection to the City's sewer system shall be at the sole expense of the applicant.

No person other than authorized personnel of the City, or a properly permitted, licensed and bonded contractor who is approved by the City, shall make any connection to or opening into, use, alter, or disturb any part of the City sewer system or appurtenance thereto without the express consent of the City.

Taps shall not be allowed to protrude into the existing main. The City shall be notified 48 hours prior to any tap of a City sewer and a City Inspector shall be

present to witness the tap. The mainline at the tap location shall be televised after tapping and prior to approval to ensure compliance upon City direction.

Sewer main extensions shall be required when the property does not front on a sewer main or when the existing sewer main is not adequate for the increased use that is being proposed. The minimum extension shall be to a point at least 5 feet inside the prolongation of the property line.

## **5.5 Pressure Sewer (Force Main) Design Standards**

Force mains may be considered for situations where topography makes a gravity sewer impractical. Force mains shall be ductile iron AWWA C151 Class 52, or a City approved equal. A restraint-joint pipe may be required where unlimited trench widths occur. All ductile iron pipe and fittings shall be Protecto 401 epoxy coated or PE lined pipe or City approved equal, and designed for use with corrosive materials.

Force mains over 2" shall have a minimum 68 inches of cover to top of pipe. This minimum assumes 42 inches cover to an 8-inch diameter water pipe and 18 inches separation from the bottom of water pipe to the top of the sewer line. See Chapter 4.20 for sanitary sewer/water main crossing requirements.

The minimum velocity allowed is 2 feet per second (fps) at average dry weather flow. 2 fps is required to maintain solids in suspension although 3 fps is desired to scour settled solids. Maximum velocity allowed shall be 8 fps.

Sewer force main valves shall be ductile iron and epoxy coated, or PE lined and designed for use with corrosive materials. 4" to 12" valves shall be Waterous Series 500 plug valves or an approved equal. Three valves shall be installed at each cross and two valves shall be installed at every tee. At every lift station, a force main isolation valve is required within ten feet of the station. Valves shall be installed at all locations where the size of the pipe changes. Valves shall also be installed "in-line" between nodes at sufficient intervals to facilitate system repair, but shall not exceed the following:

- every 6,000' for 4" diameter pipe
- every 3,000' for 6" diameter pipe
- every 1,500' for 8" diameter pipe
- every 1,000' for 10" diameter pipe
- every 700' for 12" diameter pipe
- every 500' for 14" diameter pipe

Air/Vacuum Valves: Air release valves and air/vacuum valves shall be located at the high points of the force main line within a standard 48 inch manhole or a comparable sized, approved vault. Air release valves shall be fitted with an activated carbon canister to absorb compounds with disagreeable odors prior to releasing the air to the surrounding area. Grades shall be designed to minimize the

need for air/vacuum valves when practical. Vehicular access to each air release/vacuum valve is required for maintenance.

Force Main Drain: Provisions to drain a force main to facilitate repairs or to temporarily remove the force main from service shall be provided. This shall be accomplished through the use of a valved tee connected to a drain line at the low point of the line. A manhole shall be set over the force main at the valved tee.

Thrust Blocking: Locations of thrust blocking shall be shown on the plans. Thrust blocks shall be designed for the test pressures set forth in section 4.13 of these Standards. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. Designed and approved restraining joint systems may be allowed in lieu of thrust blocking. Restraining joint brand, type, and size shall be specified on the plans. See standard details #W-12, #W-13 and #W-14 for examples.

Force Main Termination: Hydrogen sulfide odors (H<sub>2</sub>S) and the buildup of sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) occur in the operation of a force main. To mitigate these conditions, some type of control method(s) shall be used. This may include chemical addition at the pump station and/or the re-aeration of the waste water at or near the terminus. Re-aeration may include the following:

1. Construction of a vault housing and aspiration assembly.
2. The use of a hydraulic fall (vertical siphon) within the terminal manhole.
3. High velocity discharge with smooth transition so as to not cause splashing of force main into the down stream gravity sewer.

These methods all require an adequate source of fresh air at the vault or manhole. At a minimum, the manhole at the terminus and the first manhole downstream of the terminus shall be coated with Tnemec 120 vinyl ester, Quantum polymorphic resin or approved equal, under the direction of the product representative. If new gravity manholes are to be installed, two PVC lined manholes shall be installed downstream of the force main terminus. Aerators shall be contained within an appropriately sized manhole or suitably constructed building.

## **5.6 Sanitary Sewer/Water Main Crossings**

See Chapter 4.6 for requirements regarding sewer main and water main separation at crossings.

## **5.7 Manholes**

Manholes shall be provided at a maximum of 300 foot intervals, at all intersections, at changes in direction, at changes in grade, or where the pipe size changes. Mastic is required between risers and between risers and castings. A shim will be required under the frame to prevent settling. Minimum slope through

the manhole shall be 1/10th of one foot from invert in to invert out. An eccentric manhole cone shall be offset to be located out of the tire track of a traveled lane.

Precast manholes shall meet the requirements of ASTM C 478 with either a pre-cast base or a cast-in-place base made from 3000 psi structural concrete. Manholes shall be Type 1, 48-inch diameter minimum. The minimum clear opening in the manhole frame shall be 24 inches. Where a drop manhole is used, a larger opening may be required. Joints shall be rubber gasketed conforming to ASTM C 443 and shall be grouted from the inside and outside with All-Crete and Mascobond SBR (moose milk) or an approved equal per the manufacturer's recommendations. Lift holes shall be filled entirely with grout. Acceptance of pre-cast manholes, inlets and catch basins will be based on the presence of a "WSDOT Inspected" stamp or tag provided in the field, as specified in Section 9-4.41 of WSDOT Construction Manual and Section 9-12 of the State of Washington's Standard Specifications. See details #SS-01 and #SS-02.

Manhole rings and covers shall be Inland Foundry #817 (APWA Plan #42) conforming to Section 9-05.15 of the State of Washington's Standard Specifications, or City approved equal. See detail # SS-11. Manhole rings and covers shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects which would impair serviceability. Repairs of defects by welding or by the use of smooth-on or similar material will not be permitted. Manhole rings and covers shall be machine-finished or ground-on seating surfaces so as to assure a non-rocking, self seating (easily removed and replaced without the use of a sledge hammer) fit in any position, and be interchangeable in other standard manhole frames. All castings shall be coated with a bituminous coating prior to delivery to the job site.

Lock-type covers shall be required in all multi-family complexes, on school grounds, on manholes containing odor control devices and as otherwise determined by the City. Where lock-type castings are required, the casting device shall be such that the cover may be readily released from the ring and all movable parts shall be made of non-corrosive materials and otherwise arranged to avoid possible binding. See Detail #SS-11.

Safety steps shall be fabricated of polypropylene conforming to an ASTM D-4101 specification, injection molded around a 1/2 inch ASTM A-615 grade 60 steel reinforcing bar with anti-slip tread, per Section 7 of WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction. Steps shall project uniformly from the inside wall of the manhole. Steps shall be installed to form a continuous vertical ladder with rungs equally spaced on 12-inch centers.

Manhole Sizing shall be determined by the following criteria:

- A. 48" Manhole
  - 1. 2 connecting pipes, 8 inch to 12 inch diameter
  - 2. 3 connecting pipes, 8 inch to 10 inch diameter, perpendicular

3. 4 connecting pipes, 8 inch diameter, perpendicular
- B. 54" Manhole
  1. 2 connecting pipes, 8 inch to 12 inch with less than 45<sup>o</sup> deflection. Deflection = angle between any two pipe channels in the manhole.
  2. 3 connecting pipes, 10 inch to 12 inch diameter, perpendicular
  3. 4 connecting pipes, 10 inch to 12 inch diameter, perpendicular
- C. 72" Manhole
  1. 2 connecting pipes, 15 inch to 18 inch diameter with less than 45<sup>o</sup> deflection.
  2. 3 connecting pipes, 15 inch diameter, perpendicular
  3. 4 connecting pipes, 15 inch diameter, perpendicular

The above configurations shall provide adequate shelves and room for maintenance and performing TV inspections. For other sewer pipe configurations, the size of the manhole shall be approved by the City.

## 5.8 Slope

All sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second based on Manning's formula using an "n" value of 0.013. Use of other practical "n" values may be permitted by the City if justifiable on the basis of field data submitted. The following minimum slopes should be provided; however, slopes greater than these are desirable.

Sewer Size (Inches)	Minimum % Slope % (Feet per 100')
6	1.00 (0.0100 Ft/Ft)
8	0.40 (0.0040 Ft/Ft)
10	0.28 (0.0028 Ft/Ft)
12	0.22 (0.0022 Ft/Ft)
14	0.17 (0.0017 Ft/Ft)
15	0.15 (0.0015 Ft/Ft)
16	0.14 (0.0014 Ft/Ft)
18	0.12 (0.0012 Ft/Ft)
21	0.10 (0.0010 Ft/Ft)
24	0.08 (0.0008 Ft/Ft)
27	0.07 (0.0007 Ft/Ft)
30	0.06 (0.0006 Ft/Ft)
36	0.05 (0.0005 Ft/Ft)

Sewers shall be laid with uniform slope between manholes. Under special conditions, slopes slightly less than those required for the 2.0 feet per second velocity may be permitted by the City. Such decreased slopes will only be considered where the depth of flow will be 0.3 of the diameter or greater for design average flow. Whenever such decreased slopes are proposed, the engineer shall furnish computations of the depths of flow in such pipes at minimum, average, and daily or hourly rates of flow. Larger pipe size shall not be allowed to achieve lesser slopes unless otherwise approved by the City.

The maximum tolerance from true line and grade shall be as follows:

- A. Maximum deviation from established line and grade shall not exceed 1/32 inch per inch of pipe diameter, and not exceed 1/2 inch per pipe length.
- B. No adverse grade in any pipe length will be permitted.
- C. The difference in deviation from established line and grade between two successive joints shall not exceed 1/3 of the amounts specified above.

## **5.9 High Velocity Protection**

Where velocities greater than 15 feet per second are expected, special provisions shall be applied such as thrust blocking, abrasion resistant manhole and pipe materials, and anti-abrasive coatings, as required by the City to protect against displacement by erosion and shock. Anti-abrasive coatings shall be Tnemec 120-5002 Vinester (vinyl ester) for prime coat, and Tnemec Series 120-5001 Vinester (vinyl ester) for the finish coat, applied in a neat and workmanlike manner in accordance with the manufacturer's recommendations, or City approved equal.

## **5.10 Drops**

Straight grades between inverts of manholes are preferred over drops. Care must be taken when designing steep grades so as not to create a situation of excessive velocity or excavation. Drops may be allowed as approved by the City.

An inside drop connection shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the invert shall be filleted to prevent solids deposition. An outside drop connection will not be allowed unless specifically approved by the City. Drop structures shall be constructed per details # SS-8 and #SS-9.

## **5.11 Lampholes**

Lampholes are not an acceptable substitute for manholes. However, lampholes may be used in lieu of manholes at the end of 6 or 8 inch diameter lines, when approved by the City. This does not include a 6 inch building or side sewer to serve one or two single family dwellings. Location of the cleanout for a building sewer is governed by the Uniform Plumbing Code.

All lampholes in City right-of-way shall be extended to grade. A cast iron ring and cover shall be installed around all lampholes. See detail SS-12.

## **5.12 Staking**

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a professional engineer or professional land surveyor by the State of Washington. All construction staking shall be inspected by the City prior to construction. The minimum staking of sewer lines shall be as follows, or as otherwise directed by the City:

8. Stake the location of mainline pipe every 50 feet with cut to invert of pipe.
9. Stake the location of all manholes for alignment and grade with cut or fill to rim and invert of pipes with a minimum of two offsets.
10. Stake the location of all laterals and cleanouts at the property line.

Any deviations from these minimum staking requirements shall be approved by the City.

## **5.13 Trench Excavation and Pipelaying**

Clearing and grubbing shall be performed within the easement where required, or within the public right-of-way as permitted by the City. Debris resulting from the clearing and grubbing shall be disposed of by the contractor in accordance with the terms of all applicable permits and regulations. Track mounted equipment shall not be allowed on City streets and public rights-of-way outside of the approved project boundaries.

The contractor shall perform all excavation of every description. Where native materials are unsuitable for pipe bedding (i.e. boulders, hardpan, clay, rocks, roots and other obstructions) the materials shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below sewer main grade. Where materials are removed from below sewer main grade, the trench shall be backfilled to grade with material meeting pipe bedding specs and thoroughly compacted.

Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 7 feet of cover over the pipe (see Section 5.2). Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space. When the support of existing utilities or public safety concerns exist, the City may require more stringent trenching standards. Trenching, shoring and pipe laying shall be in conformance with Washington Industrial Safety and Health Administration (WISHA), Washington Department of Labor and Industries (L&I) and the Office of Safety and Health Administration (OSHA) Safety Standards. Surface water shall be diverted so as not to enter the trench. Where water is encountered in the trench, it shall be removed during pipe laying operations, and shall be so maintained until

the ends of the pipe are sealed and provisions are made to prevent floating of the pipe. Trench water or other deleterious materials shall not be allowed to enter the pipe at any time. The contractor shall maintain sufficient pumping equipment on the job to ensure that these provisions are carried out. Disposal of all trench water shall meet all local, state and federal guidelines.

The contractor shall handle all types of pipe in a manner that will prevent damage to the pipe. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall pipe be dropped, skidded, or rolled against another pipe. If the Inspector determines that the contractor's methods are damaging to the pipe, the contractor shall correct the handling methods. Damaged pipe will be rejected, and the contractor shall immediately place all damaged pipe apart from undamaged pipe, and shall remove damaged pipe from the site within 24 hours. Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and re-laid. A clean whisk broom shall be used for this purpose, and for brushing to remove foreign matter prior to joining of pipe ends. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the Engineer, to ensure cleanliness inside the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails or other similar supports. Pipe on succeeding tiers shall be alternated by bell and plain end. Timbers 4-inches by 4-inches in size shall be placed between tiers, and chocks shall be placed at each end to prevent movement. For public safety, each size of pipe shall be stacked separately.

The trench bottom shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

Pea gravel backfill will be allowed only to the spring line of the sewer main pipe. For additional requirements regarding trench backfilling, temporary patching and pavement restoration, see Section 1 of these Standards.

#### **5.14 Testing**

Gravity Sewer Main (includes both main and lateral): Immediately following pipe cleaning, the gravity sewer pipe installation shall be tested with low-pressure air. The contractor shall make an air test for his own purposes prior to notifying the City to witness the test. The acceptance air test shall be made after the trench is backfilled and compacted and the roadway section is completed to subgrade. All wyes, tees, and end of building or side sewer stubs shall be plugged with

flexible joint caps or acceptable alternates, and securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable and their removal shall provide a socket suitable for making a flexible jointed lateral connection or extension.

Prior to approval and acceptance of gravity sewer construction, gravity sewer pipes shall be subject to a low pressure air test and meet a 4 psi for 15 minutes standard. A mandrel test or equivalent shall be required on all sewers except laterals. The contractor shall furnish all equipment and personnel for conducting the tests.

Testing of the gravity sewer main shall include a television inspection by the contractor. The camera must be equipped with a rotating head to allow televising of the building or side sewers as mainline inspection is occurring. Any tap to an existing sewer system also needs to be inspected by television. Television inspection shall be done after the air test has been approved and before the roadway is paved. Immediately prior to a television inspection, enough water shall be run down the line so it comes out the lower manhole. Two copies of the video tape and any accompanying written report shall be submitted to the City. Acceptance of the gravity sewer line will be made after the tape has been reviewed by the City.

Manholes: A water or a negative air pressure (vacuum) test of all manholes on the gravity sewer line is also required. The water test shall be made by the contractor by filling the manhole up with water and letting it sit for 24 hours to allow the water to saturate the concrete. After 24 hours the manhole shall be filled to the top of the cone. The water cannot drop more than 0.05 gallons in 15 minutes per foot of head above invert to pass.

The negative air pressure (vacuum) test may be used for testing concrete manholes. After backfilling, plug all inverts and lift holes with plugs suitably rated for the test pressures. Plugs shall be placed a minimum of 6-inches beyond the manhole wall. Once the vacuum tester head assembly is suitably attached to the tip of the manhole, the manhole shall be evacuated to 10 inches Hg (0.3 bar). Once a vacuum of 10 inches HG (0.3 bar) is attained, the contractor and City Inspector will monitor to ensure that the vacuum does not drop in excess of 1-inch Hg over the time specified on the table below. If the manhole fails the test, the contractor will identify and seal the leak and retest until satisfactory. This procedure shall be repeated after backfilling for final acceptance.

## VACUUM TEST TIMETABLE

Depth	Diameter - Inches		
	48-inch	60-inch	72-inch
4 feet	10 sec.	13 sec.	16 sec.
8 feet	20 sec.	26 sec.	32 sec.
12 feet	30 sec.	39 sec.	48 sec.
16 feet	40 sec.	52 sec.	64 sec.
20 feet	50 sec.	65 sec.	80 sec.
24 feet	60 sec.	78 sec.	96 sec.
*	05 sec.	6.5 sec.	8.0 sec.

\*Add "T" times for each additional 2-foot depth. (The values listed above have been extrapolated from ASTM designation C924-85).

**Force Mains:** Prior to acceptance of force main construction, force main and service lines shall be subjected to a hydrostatic pressure test of 200 pounds for 4 hours, and any leaks or imperfections developing under said pressure shall be remedied by the contractor. No air will be allowed in the line. The force main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections shown on the plans have been made. The contractor shall perform all tests to ensure that the equipment to be used for the test is adequate and in good operating condition, and the air in the line has been released before requesting the City to witness the test.

A water test for all wet wells in accordance with the manhole water test for gravity sewers shall be required.

### 5.15 Sewer Lift Station Design Standards

The design of any public sewer lift station shall conform to the Department of Ecology's "Criteria of Sewage Works Design" and these Standards as applicable. Public lift stations shall be of a submersible style unless otherwise approved by the City. Private lift stations shall conform to the Uniform Plumbing Code and these Standards as applicable. The City may require some lift station applications to be customized, depending on the size of service area, introduction flow to the station, and the pumping requirements of the station.

Five (5) copies of a design report with engineering plans shall be submitted with each lift station (custom designed or packaged), demonstrating its conformance with the Standards. The design report and plans shall provide:

1. Overall site drawing(s) of the lift station showing the location of all

- components including elevations;
2. List(s) of specific materials and components used including quantity, description, manufacturer and area representative;
  3. Schematic and line diagrams of the service, motor control center and lift station. Terminology and abbreviations shall be per industry standards. A legend shall be provided on all schematics and line diagrams, which shall show applicable telemetry points. A common termination point shall be provided in the lift station to interface between the lift station and the Remote Telemetry Unit (RTU). Telemetry points shall consist of:
    - High Wet Well
    - 1 Pump Run
    - Power Fail
    - Intrusion
    - Low Wet Well
    - 2 Pump Run
    - Pump Fail for each pump
    - Spare
  4. An electrical system designed to meet NEC, State and City Standards. A 460/277 three phase system with 100 amp outlet and cover shall be provided, equipped with an Appleton reverse service receptacle, model ADR1044-RS for connection to an emergency generator in the event of a power failure, or a City approved equal. The receptacle outlet cover shall be painted red.
  5. All pumps shall have rail guides to facilitate removal and replacement.
  6. Pump Data
    - size and type
    - pump curves
    - head capacity
    - velocity
    - manufacturer/distributor
  7. Motor Data
    - size and type
    - horsepower
    - service factor
    - motor insulation
    - cycle length
    - full load amps
    - voltage
    - frame and type of mount
    - manufacturer/distributor
  8. Controls
    - timers and relay mounting
    - motor starter size
    - phase monitor
    - NEMA type enclosure
    - thermal magnetic circuit breakers
    - alternator
    - GFI outlet
    - indicating lights
    - level controls
    - telemetry failure points

- elapse time meters
- component manufacturer/distributor
- 9. Telemetry - alarm system (compatible with City system)
- 10. Housing
  - size and type
  - ventilation
  - access
  - insulation
  - locking mechanism
  - hold open device
  - safety chain
- 11. Testing
  - factory test
  - operational test
  - pressure test
  - personnel at test
- 12. Piping and Valves
  - size and type
  - bypass
  - manufacturer/distributor
- 13. Spare Parts
  - spare motor
  - one complete mechanical seal unit
  - two intrinsically safe relays
  - one set of replacement O-rings for all components
  - spare gaskets for all components
- 14. Miscellaneous: Water hose bib service (unmetered) connected to a double check valve assembly mounted to the side of the lift station.
- 15. A lift station emergency by-pass connection shall be installed.

### **5.16 Packaged Lift Stations**

In addition to the provisions of section 5.10, the following are minimum requirements for packaged lift stations.

- Three mercury float switches to control pump down levels in the wet well. Each float shall function as follows: two pump run; one pumps run and pumps off.
- One mercury float switch in the wet well to signal low wet well conditions.
- One mercury float switch in the wet well to signal high wet well conditions.
- Auxiliary Power: Provision for connection required of all lift stations. The developer may also be required to furnish or participate in the cost of an auxiliary generator. at the discretion of the City.
- Well Sizing
  - type
  - size
  - storage capacity
  - access
  - access to locking mechanism

- welding
- safety entry equipment
- Maintenance
  - warranty
  - staff training upon completion
  - tools and equipment required
- Electrical Service
  - specifications (service size, voltage, motor size, enclosure type, etc.)
  - source of power
  - calculations
  - single line diagram
  - primary distribution equipment
  - service entrance
  - branch circuiting
  - mechanical equipment power requirements
  - control diagrams & schematics
  - schedules of fixtures, panel boards & switch gear
  - shop drawings
- Corrosion Protection
  - type of materials
  - primer and finish coatings
  - total thickness in mils, dry
  - linings
  - maintenance
- The control pump down mercury float switches in the wet well must be powered through intrinsically safe devices.
- Mercury float switches in the wet well shall be separated from each other by means of a wooden board and spacers to prevent tangling.
- Wet well ladder rungs shall not extend beyond the specified inlet pipe invert elevation into the wet well.
- Inlet pipes into the wet well shall be baffled to reduce turbulence in the wet well.
- Lift station motors and pumps shall be close coupled and mounted vertically.
- A manual toggle switch to allow selection of lead and lag pump is required.
- A five-digit hour meter to 1/10 hour increments is required for each pump so that run time can be accounted for.
- The heater shall be controlled by an adjustable thermostat.
- Lift stations shall have a blower capable of a minimum 300 cfm.
- Pump motors shall have sealed bearings requiring no lubrication.

A complete operation and maintenance manual from the lift station manufacturer shall be supplied. Two copies shall be submitted for the initial review. Upon completion of construction, 5 copies are to be submitted to the City. Specific components and model numbers shall be in the manual.

### **5.17 Interim Sewerage Facilities – Urban Growth Area**

When annexation and/or extension of the city sewer system is feasible and appropriate, as determined by the City, such annexation and/or extension will be required. In those areas located within the City of Shelton’s Urban Growth Area where annexation or connection to a permanent public sewerage system is not feasible, an interim community on-site sewer system may be constructed to serve residential and light commercial locations, when approved by the City prior to design and construction. In certain cases, a value engineering study or approved equivalent may be required by the City prior to granting approval for an interim sewerage facility. Maintenance and pumping of Interim Sewerage Facilities shall be the responsibility of the property owner(s).

### **5.18 Design Standards for Interim Community On-Site Sewer Systems**

The design of any interim community on-site sewer system shall conform to conform to the criteria as set forth in the City of Shelton Comprehensive Plan, and these Standards. All collection lines, dry lines, pumping stations and all other sewer appurtenances and sizing shall be installed at the time of initial construction. The layout of the dry line main extension shall provide for the future continuation of the existing public sewer system as determined by the City. In addition, the dry line main extension shall be installed within a plat or property prior to new roadway construction, and extended to and through the side of the affected property fronting the main to the existing roadway and sewer main.

The interim community on-site sewer system shall be designed in such a way that each residence will discharge into their own on-site septic tank, which will then discharge by gravity into a community wet well. The community wet well will pump the effluent into a pressurized community drain field. Upon approval of the City of Shelton and Mason County, a community system may be designed utilizing an appropriately sized community solids tank and subsequent settling tanks before discharge into a community wet well. Tank design standards shall meet the applicable standards as set forth below for septic tanks.

Plans for the proposed interim community on-site sewer system shall be prepared by a licensed professional engineer registered in the State of Washington, and shall be submitted to the City for review and approval. The City will coordinate the review by the State and County Health Departments, whose approval is also required.

#### Pumping Chamber:

The pumping chamber leading to the pressurized drainfield shall be designed and constructed as set forth in Section 5.10 and 5.11 for Lift Stations. The dry line installed for future connection to the public sewer system shall terminate in the pumping chamber. A valve shall be installed outside the wet well connected to the dry line for future use.

Grinder Pump:

All private pumps on service lines shall be grinder pumps. Grinder pump must meet all Uniform Plumbing Code requirements and shall connect to a gravity sewer lateral at the property or easement line.

Septic Tank:

Each residence shall have it's own septic tank. Only sanitary wastewater shall be discharged into the tank. Roof drains and other stormwater sources shall be strictly excluded. The tank shall be watertight, and shall be equipped with twin risers as specified, with the exception that the 24-inch solids riser may be covered a maximum of 12 inches. It is the homeowner's responsibility to locate and uncover the solids riser when pumping of the septic tank is required. The 30 inch pump chamber riser may not be covered. It is the property owner's responsibility to pump the tanks.

The effluent shall be discharged by gravity to the community pumping chamber. In the event that topography prohibits a specific lot from achieving a gravity discharge, an approved STEP system shall be installed.

Pipe:

- a) Pressurized Drain Field: All pipe used in construction of the pressurized drain field shall be as specified by these Standards, and shall be shown on the approved plans.
- b) Gravity Lines: All pipe installed from the septic tanks to the pumping chamber, and all dry lines installed for future extension, shall meet the criteria set forth in Chapter 5.2 of the Standards for gravity sewer lines.
- c) Side Sewer or Lateral: The gravity side sewer or lateral between the building and the tank shall be designed and installed in accordance with the Uniform Plumbing Code. Maintenance of this line is the property owner's responsibility.
- d) Connection: When the dry line is activated by the City, each property owner shall be required to connect to the public sewer system, and decommission the septic tank on their property per the applicable Standards. This requirement shall be placed on the property title prior to the initial sale of the property.

**5.19 Sanitary Sewer Main Construction (General Notes)**

In addition to the General Construction Notes in Chapter One, the Engineer shall include the following notes on any plans dealing with the construction of alterations, extensions or connections to the sanitary sewer system.

- A. The City shall be notified at least 48 hours in advance of a tap connection to an existing sewer main. The City's inspector shall be present at the time of the tap.

- B. All sewer mains shall be field staked for grades and alignment by a registered land surveyor or licensed engineer.
- C. Precast manholes shall meet the requirements of ASTM C 478. Manholes shall be Type 1-48" manhole unless otherwise specified on the plans. Joints shall be rubber gasketed conforming to ASTM C 443 and shall be grouted from the inside. Lift holes shall be grouted from the outside and inside of the manhole with All-Crete and Mascobond SBR (moose milk) or an approved equal per the manufacturer's recommendations..
- D. Side sewer services shall be PVC, ASTM D 3034 SDR 35 with flexible gasketed joints. Side sewer connections shall be made by a tap to an existing main, or a wye branch from a new main connected above the spring line of the pipe.
- E. All lines shall be high velocity cleaned and pressure tested prior to paving in conformance with these Standards. Hydrant flushing of lines is not an acceptable cleaning method. Testing of the sanitary sewer main shall include TVing of the main by the contractor. Immediately prior to TVing, enough water shall be run down the line so it comes out the lower manhole. The video tape shall show the distance from the manhole that the camera enters to all connections and to the next manhole. A copy of the video tape shall be submitted to the City. Acceptance of the line will be made after the tape has been reviewed and approved by the City. The contractor shall be responsible for cleanup of any debris in new or existing manholes and mains associated with the project after the new lines are cleaned. A vacuum test of all manholes in accordance with these Standards is also required. Testing shall take place after all underground utilities are installed and compaction of the roadway subgrade is completed.
- F. All discharges from the sewerage collection system and spills of any type that may affect human health or the environment must be immediately reported by the contractor to the City.
- G. Pea gravel shall be allowed for pipe bedding up to the spring line of pipe.

## LIFT STATION INSPECTION CHECKLIST

(This checklist is provided to help the contractor prepare for the final inspection. It will be used by the City during a final inspection of a lift station. Additional items may be added depending on the type of station construction.)

Inspectors: \_\_\_\_\_ Date: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name of Lift Station: \_\_\_\_\_

Location: \_\_\_\_\_

Address: \_\_\_\_\_

Assigned Lift Station Number: \_\_\_\_\_

AMP reading recorded at startup: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

Motor Data: HP \_\_\_\_\_ RPM \_\_\_\_\_ Phase \_\_\_\_\_ Cycle \_\_\_\_\_ Volt \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

Pump Design in gallons per minute: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

#1, #2 and #3 \_\_\_\_\_ TDH \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

Pump performance during startup in gallons per minute: #1 \_\_\_\_\_ #2 \_\_\_\_\_

#3 \_\_\_\_\_ #1, #2 and 3 \_\_\_\_\_ TDH \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

Hour Meter Readings: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

Pump #1 Running Amps: L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

Pump #2 Running Amps: L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

Pump #3 Running Amps: L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

Note: Check that motors are not exceeding their nameplate amperage multiplied by the motor service factor, (i.e., with FLA = 10 and SF = 1.15, the amperage recorded should not exceed 11.5 amps). The motor will operate satisfactorily under the following conditions of voltage and frequency variation, but not necessarily in accordance with the Standards established for operation under rated conditions.

- The voltage variation may not exceed 10% above or below the rating specified on the motor nameplate.

- The frequency variation may not exceed 5% above or below motor nameplate.
- The sum of the voltage and frequency variations may not exceed 10% above or below motor nameplate rating, provided the frequency variation does not exceed 5%.

Motor Nameplate Amps: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

Motor Nameplate SF Amps: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

Voltage Taken @ Terminal Block: L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_

	OPERATION OKAY?	
	Yes	No
Unusual Noise #1 Pump or Motor: Comments: _____ _____	_____	_____
Unusual Noise #2 Pump or Motor: Comments: _____ _____	_____	_____
Unusual Noise #3 Pump or Motor: Comments: _____ _____	_____	_____
Sealed Bearings: Comments: _____ _____	_____	_____
Pump Alternator Operation: Comments: _____ _____	_____	_____
Control Panel components: Pump Run Lights: _____	_____	_____
Hour Meters: _____	_____	_____
H.O.A.: _____	_____	_____
Limit Switches: _____	_____	_____
Comments: _____		

	OPERATION OKAY?	
	Yes	No
Alarm Functions: Power Fail: _____	_____	_____

High Wet Well: \_\_\_\_\_  
Low Wet Well: \_\_\_\_\_

OPERATION OKAY?  
Yes No

Pump #1 Fail: \_\_\_\_\_  
Pump #2 Fail: \_\_\_\_\_  
Dry Well Flood: \_\_\_\_\_  
Smoke and Fire: \_\_\_\_\_  
Intrusion: \_\_\_\_\_  
Pump #1 Run: \_\_\_\_\_  
Pump #2 Run: \_\_\_\_\_  
Comments: \_\_\_\_\_  
\_\_\_\_\_

Actual Wet Well Pump down and fill levels:  
High Water: \_\_\_\_\_  
Fill Level: \_\_\_\_\_  
Pump Down: \_\_\_\_\_  
Low Level: \_\_\_\_\_

Wet Well blower Operation: \_\_\_\_\_  
Comments: \_\_\_\_\_  
\_\_\_\_\_

Wet Well Ladder: \_\_\_\_\_  
Comments: \_\_\_\_\_

Spare Parts Furnished: \_\_\_\_\_  
Comments: \_\_\_\_\_

O & M Manuals (5 copies): \_\_\_\_\_  
Comments: \_\_\_\_\_

Telemetry Function at Maintenance Shop:  
Power Fail: \_\_\_\_\_  
High Wet Well: \_\_\_\_\_  
Low Wet Well: \_\_\_\_\_  
Pump #1 Fail: \_\_\_\_\_  
Pump #2 Fail: \_\_\_\_\_  
Dry Well Flood: \_\_\_\_\_  
Smoke and Fire: \_\_\_\_\_  
Intrusion: \_\_\_\_\_

OPERATION OKAY?

		Yes	No
	Pump #1 Run:	_____	_____
	Pump #2 Run:	_____	_____
Comments:	_____		
	_____		
	_____		

		OPERATION OKAY?	
		Yes	No
Locks:			
	Wet Well:	_____	_____
	Electrical:	_____	_____
	Fenced Area:	_____	_____
Heater Operation:		_____	_____
Comments:	_____		

Disconnect Operation:		_____	_____
Comments:	_____		

Auxiliary Generator:			
	Plug-in:	_____	_____
	Plug-in face plate (red if 480\277/green if 208\120)	_____	_____
	Transfer Switch:	_____	_____
	Operation:	_____	_____
Comments:	_____		

Isolation Valve Operation:			
	Dry Well:	_____	_____
	Outside:	_____	_____
Comments:	_____		

Check Valve Operation:		_____	_____
Comments:	_____		

Corrosion Resistant (epoxy coating):			
	Dry Well:	_____	_____
	Wet Well:	_____	_____
	Force Main Outfall:	_____	_____
	Down Stream Manhole:	_____	_____
Comments:	_____		

		OPERATION OKAY?	
		Yes	No
Emergency Bypass:			
Components:		_____	_____
Operation:		_____	_____
Comments:	_____		

All nuts and Bolts in Place:			
Dry Well:		_____	_____
Wet Well:		_____	_____
Comments:	_____		

All Mechanical Components Installed:			
Dry Well:		_____	_____
Wet Well:		_____	_____
Comments:	_____		

		OPERATION OKAY?	
		Yes	No
Wet Well Piping for Proper Size:		_____	_____

Heavy Ribbed Neoprene Mat Dry Well Floor:		_____	_____
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Control Panel Enclosures with Appropriate UL Labels:		_____	_____
Comments:	_____		

Wiring Schematics for Correlation:		_____	_____
Comments:	_____		
	_____		
	_____		

Wire Gauge (usually 18):		_____	_____
Comments:	_____		
	_____		

Electrical Conduit for Defects:		_____	_____
Comments:	_____		
	_____		
	_____		

Terminal Block:		_____	_____
Comments:	_____		
	_____		
	_____		

		OPERATION OKAY?	
		Yes	No
Proper Sized Circuit Breakers & Fuses:		_____	_____
Comments:	_____		
	_____		
	_____		
Electrical Control Devices Sized for Motor Horse Power:		_____	_____
Comments:	_____		
	_____		
	_____		
Overload Devices, Trip Test & Manual Reset:		_____	_____
Comments:	_____		
	_____		
	_____		
All Wires Connected:		_____	_____
Comments:	_____		
	_____		
	_____		
Air Release Valve on Discharge:		_____	_____
Comments:	_____		

		OPERATION OKAY?	
		Yes	No
Warranty:		_____	_____
Comments:	_____		
	_____		
Debris in Wet Well:		_____	_____
Comments:	_____		
	_____		
	_____		
Infiltration Points:		_____	_____
Comments:	_____		
	_____		
	_____		
Cleanliness:		_____	_____
Comments:	_____		
	_____		
	_____		

Proper Pump Rotation (shaft moves in direction of arrows):  
Comments: \_\_\_\_\_

OPERATION OKAY?

Yes                  No  
\_\_\_\_\_                  \_\_\_\_\_

PSI Gauges Prime Chamber:  
Comments: \_\_\_\_\_

\_\_\_\_\_                  \_\_\_\_\_

Operation of Latch:  
Comments: \_\_\_\_\_

OPERATION OKAY?

Yes                  No  
\_\_\_\_\_                  \_\_\_\_\_

Operation of Entrance Cover:  
Comments: \_\_\_\_\_

\_\_\_\_\_                  \_\_\_\_\_

Operation of Cover Safety Latch:  
Comments: \_\_\_\_\_

\_\_\_\_\_                  \_\_\_\_\_

Hose bib and DCVA:  
Comments: \_\_\_\_\_

\_\_\_\_\_                  \_\_\_\_\_