

# ***Town of Twisp***

***Public Works***

---

## ***DEVELOPMENT STANDARDS***

MAY 2019

**TOWN OF TWISP**

**TOWN OFFICIALS**

**MAYOR**

**SOO ING-MOODY**

**COUNCIL**

**AARON STUDEN**

**ALAN CASWELL**

**MARK EASTON**

**HANS SMITH**

**HANNAH CORDES**

**PUBLIC WORKS DIRECTOR**

**ANDREW DENHAM**

**Adopted: May 14, 2019**  
**Ordinance #19-642**

## FOREWORD

The Mayor and Council of the Town of Twisp welcome you to work in a community dedicated to maintaining a quality environment.

Twisp's staff will work with you to create first class additions to our Town. It is our intent to provide a practical and uniform approach to the design, construction and maintenance of the Town's public infrastructure.

These standards are meant to establish minimum standards and have been designed to provide consistency and quality control yet provide for flexibility and common sense.

As a fluid document, these Development Standards will require frequent updates to keep up with the pace of technology in the construction industry. The Town encourages our stakeholders to submit suggested revisions of the Development Standards to the Public Works Director for review and consideration

This document, together with the Twisp Municipal Code (TMC), will provide you with our minimum standards. Where specific design standards, construction standards or other items are not specifically addressed in the Town of Twisp Development Standards or Twisp Municipal Code, the most current publications of WSDOT's M41-10, M41-01, M22-01, M46-01, M22-31 Manuals as well as the Washington State Department of Ecology Stormwater Management Manual for Eastern Washington will be complied with by the developer or contractor at the discretion of the Public Works Director.

Andrew Denham  
Public Works Director  
Town of Twisp  
PO Box 278  
Twisp, WA 98856  
Phone (509) 997-1311  
[publicworks@townoftwisp.com](mailto:publicworks@townoftwisp.com)

# PUBLIC WORKS DEVELOPMENT STANDARDS

## TABLE OF CONTENTS

<u>Section</u>	<u>Subject</u>	<u>Page</u>
1.	<a href="#">SECTION 1 - INTRODUCTION</a>	1-1
2.	<a href="#">SECTION 2 - PERMITS</a>	2-1
2.01	PERMIT PROCESS	2-1
2.02	VARIANCES	2-2
2.03	PROJECT COORDINATION	2-3
2.04	CHANGES DURING CONSTRUCTION	2-3
2.05	ATTACHMENT 1	2-4
3.	<a href="#">SECTION 3 - INSURANCE, LIABILITY, AND BOND</a>	3-1
3.01	BONDING	3-1
3.02	INSURANCE & INDEMNITY REQUIREMENTS FOR CONSTRUCTION PROJECTS	3-1
3.03	INSURANCE	3-2
3.04	OTHER INSURANCE PROVISIONS	3-3
3.05	NON-INTERFERENCE	3-4
3.06	WORK SAFETY	3-5
4.	<a href="#">SECTION 4 - INSPECTION, TESTING, WARRANTY, AND ACCEPTANCE</a>	4-1
4.01	GENERAL	4-1
4.02	PROJECT ACCEPTANCE OF COMPLETED CONSTRUCTION	4-1
4.03	AS-BUILT (RECORD) DRAWINGS	4-2
4.04	GIS DATUM	4-2
4.05	WARRANTY	4-2
5.	<a href="#">SECTION 5 - STREETS, SIDEWALKS, AND ALLEYS</a>	5-1
5.01	GENERAL	5-1
5.02	ROADWAY DESIGN	5-1
5.03	STREET LIGHTS	5-2
5.04	VERTICAL DATUM	5-3
5.05	EXISTING MONUMENTS	5-3
5.06	NEW MONUMENTS	5-4
5.07	HOT MIX ASPHALT PLACEMENT	5-4
5.08	CURBS GUTTERS AND SPILLWAYS	5-5
5.09	CEMENT CONCRETE SIDEWALKS	5-5
5.10	ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE	5-6
5.11	INSPECTION	5-11

<u>Section</u>	<u>Subject</u>	<u>Page</u>
6.	<a href="#">SECTION 6 - WATER SYSTEM STANDARDS</a>	6-1

6.01	GENERAL	6-1
6.02	DESIGN STANDARDS	6-1
6.03	GENERAL REQUIREMENTS	6-2
6.04	MATERIALS AND INSPECTIONS	6-4
6.05	WATER PIPE TESTING & DISINFECTING	6-9
6.06	TESTING AND FLUSHING PROCEDURAL ORDER	6-9
6.07	BACKFLOW PREVENTION AND SPRINKLER SYSTEMS	6-12
6.08	STAKING	6-12
6.09	TRENCH EXCAVATION	6-12
6.10	BACKFILLING	6-13
6.11	STREET PATCHING AND RESTORATION	6-11
6.12	EROSION CONTROL	6-11
6.13	FINISHING AND CLEANUP	6-13
<b>7.</b>	<b><u>SECTION 7 - SANITARY SEWER STANDARDS</u></b>	<b>7-1</b>
7.01	GENERAL	7-1
7.02	DESIGN STANDARDS	7-1
7.03	GENERAL REQUIREMENTS	7-3
7.04	MATERIALS AND TESTING	7-4
7.05	CROSSINGS	7-7
7.06	STREET PATCHING AND RESTORATION	7-7
7.07	ADJUSTMENT OF NEW AND EXISTING UTILITY STRUCTURES TO GRADE	7-7
7.08	FINISHING AND CLEAN UP	7-7
7.09	CLEANING AND TESTING	7-8
7.10	GENERAL GUARANTEE AND WARRANTY	7-8
<b>8.</b>	<b><u>SECTION 8 - STORM WATER STANDARDS</u></b>	<b>8-1</b>
8.01	GENERAL	8-1
8.02	DESIGN STANDARDS	8-2
8.03	CONVEYANCE	8-3

<b><u>Section</u></b>	<b><u>Subject</u></b>	<b><u>Page</u></b>
-----------------------	-----------------------	--------------------

## APPENDIX

APPENDIX A:  
SECTION C1-9 "SPECIAL REQUIREMENTS"  
APPENDIX B :  
SAMPLE DOCUMENTS

# SECTION 1

## 1. INTRODUCTION

This document is to guide the developer, utility company, Town contractors, and Public Works crews when performing work that involves public rights-of-way or public.

These standards shall apply to all work within existing or proposed public rights-of-way and/or public easements, and development within the Town. These standards are intended as required guidelines for designers, contractors and developers in preparing their plans and for the Town in reviewing plans. The proponent is cautioned that higher standards and/or additional studies and/or environmental mitigation measures may, and will, in all likelihood, be imposed by the Town when developing on, in, near, adjacent, or tributary to sensitive areas to include, but not be limited to, steep embankments, creeks, ponds, lakes, certain wildlife habitat, unstable soils, high water tables, wet areas, etc.

Except where these standards provide otherwise, design detail, construction workmanship and materials shall be in accordance with the most current edition of the following publications;

- Washington State Department of Transportation Standard Specifications for Road, Bridge & Municipal Construction M41-10, latest edition;
- Washington State Department of Transportation Standard Plans for Road, Bridge & Municipal Construction M22-31, latest edition;
- Washington State Department of Transportation Design Manual M22-01, latest edition;
- Washington State Department of Transportation Materials Manual M46-01, latest edition;
- American Water Works Association Standards, latest edition;
- Washington State Department of Ecology Criteria for Sewage Works Design, latest edition;
- Washington State Department of Health Water System Design Manual, latest edition;
- Manual on Uniform Traffic Control Devices, latest edition;
- Washington Department of Ecology Storm Water Manual for Eastern Washington, latest edition;
- American Association of State Highway and Transportation Officials Standard Specifications for Transportation Materials and Methods of Sampling and Testing, and AASHTO Provisional Standards latest edition

The Public Works Director will make the final determination regarding any and all design standards or construction practices contained in these Development Standards.

Plans for improvements within the public right-of-way or public easements, or within any development as required in these Development Standards shall bear an approval signature from the Public Works Director.

The Owner shall submit calculations and other appropriate materials supporting the design of utilities, pavements, concrete, structures and storm drainage facilities.

Where these Development Standards conflict with any existing Town Ordinances, or discrepancies exist within the body of these Development Standards, the higher "standards" shall be utilized, and as determined by the Public Works Director.

Definitions: As used herein:

- A. "Owner" means the party requesting certain improvements to become a part of the Town's utility and/or roadway system upon completion and acceptance, and/or the owner of the real property upon which the improvements are to occur. The term shall also include the Owner's developer, contractor, engineer and/or agents.
- B. "Plans" mean drawings, including reproductions thereof, of the work to be prepared by a professional engineer licensed in the State of Washington for or on behalf of an Owner, for the performance of the work and for the quantity and quality of materials, as contained or referenced herein.
- C. "Specifications" means the directions, provisions, and requirements designated by a professional engineer licensed in the State of Washington for or on behalf of an Owner, for the performance of the work and for the quantity and quality of materials, as contained or referenced herein.
- D. "Performance Bond" means a bond furnished by the Owner and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the work will be completed in accordance with the plans and specifications, and in a form as approved by the Town.
- E. "Utility" means a public or private utility company occupying the public right-of-way or public easement with physical improvements below or above ground.
- F. "Maintenance Bond" means a bond furnished by the Owner and written by a corporate body qualified to write surety in the State of Washington, guaranteeing that the Owner will repair any defects found in the work within the time period as further identified herein, in a form as approved by the Town.

Owner/Utility to be Informed: It is the Owner's responsibility to be fully informed regarding the nature, quality, and the extent of the Owner's obligation and work to be done, and, if in doubt, to secure specific written clarification from the Town.

Authority of the Public Works Director: The Public Works Director using these Development Standards shall have the authority to determine the amount, quality, acceptability and fitness of the work, material and equipment and to decide all questions relative to the fulfillment of these Development Standards, and to reject all work or material which does not conform to the terms of these Development Standards. The Public Works Director's decision in all matters is the decision of the Town. The Owner's appeal of such decisions shall be to the Twisp Town Council in the manner provided in TMC 18.50.020.

The Town of Twisp and the Public Works Director, or any employee or authorized representative, does not purport to be a safety expert, and has neither the authority nor the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of work for claimed violations thereof. The furnishing by the Town of project representation and/or inspection shall not be construed by the Owner that the Town is responsible for the identification or enforcement of such laws, rules or regulations.

Payment for Town Services: The Owner and/or Utility shall be responsible for promptly reimbursing the Town for all costs and expenses incurred by the Town in the pursuit of project submittal, review, approval, and construction. These costs include, but are not limited to, the utilization of staff and consultants as may be necessitated to adequately review and inspect construction of the project(s). All legal, administrative, and engineering fees for project review, meetings, approvals, site visits, construction inspection, etc., shall be subject to prompt reimbursement. The Owner is cautioned that project approval (Town acceptance) and occupancy permits will be denied until all reimbursement and bills are paid in full. The Owner or Utility's appeal to payment demands is to the Town Council in the manner provided in TMC 18.50.020.

As a condition precedent to the Town accepting the completed improvements, the Owner shall construct the proposed improvements, or additions thereto, in conformance with these Development Standards and its reference documents. Any Owner appeal for rejected work shall be to the Town Council in the manner provided in TMC 18.50.020.

## SECTION 2

### **2. PERMITS**

#### **2.01 Permit Process**

The construction of any infrastructure items or additions thereto, shall not commence until the following conditions have been fulfilled:

1. The Owner shall have the preliminary plat approved in accordance with the Twisp Municipal Code (“TMC”) Chapter 17.
2. The Owner shall submit detailed construction plans of the proposed improvements/utility.
3. The Owner shall submit the plat drawings conforming to the conditions of preliminary plat approval showing all rights-of-way and easements to be dedicated to the Town.
4. Written approval from all regulatory agencies including SEPA mitigation approval shall be submitted.
5. All contractors and subcontractors performing work for the Owner shall have a current Washington State Contractors License and a Town of Twisp Business License on file with the Town.
6. All insurance and bonding is in place as required by the Town.
7. Any financial involvement from the Town or reimbursement to the Town shall be determined and agreed upon.
8. All documents referenced in this Section 2.01 shall require the review and approval by the Town and its Engineer, and the cost of such review shall be at the Owner’s expense.

Should an Owner split any proposed development into more than one phase, the Owner shall submit street and infrastructure plans for all phases of the proposed development to the Town in order to receive approval from the Town to begin work on the first phase of the development.

The Owner’s proposed improvements, or additions thereto, shall not be connected to the Town system until authorized by the Town, and such connection shall be performed only under the supervision and approval of the Town.

In requesting a permit to work in a public right-of-way, the Owner/Utility agrees to indemnify and hold harmless the Town, its officers, elected officials, employees and agents from and against all claims, injuries, damages, losses or suits of any kind by any person or entity , including

reasonable attorney's fees and costs, arising out of or in connection with performance of the Owner's express or implied obligations under these Development Standards, except for injuries and damages caused by the sole negligence of the Town.

In addition to the requirements listed above, no Owner shall commence work on the construction, alteration or repair of any improvement located either in the public right-of-way or a public easement without the necessary permit(s) first having been obtained from the Town.

Any party requesting such permit shall file a written request therefore with the Town at least 20 working days before construction is proposed to start. Such request shall include:

1. The name and address and phone number of the applicant (name and address of Owner if different than applicant); and Owner's contractor;
2. The name and address of the owner of the property abutting the street where the work is proposed if different than the Owner;
3. The street location of the proposed work, giving the street address or legal description of the property involved;
4. A detailed plan showing the dimensions of the abutting properties and the dimensions and location of all existing and/or proposed facilities and other pertinent features to understand the proposed work;
5. The plan shall also show the location of buildings, loading platforms, roof overhangs (if significant) or off-street parking facilities in the vicinity of the new construction;
6. Any other information requested by the Town which is necessary by the Town.
7. Schedule of any closing or rerouting of the public around the construction.

No permit shall be issued until the proposed work has been approved by the Public Works Director.

No plan shall be approved nor a permit issued where it appears that the proposed work, or any part thereof, conflicts with the provisions of these Development Standards or any other ordinance of the Town of Twisp, nor shall issuance of a permit be construed as a waiver of any Development Standards or ordinance requirements concerning the plan. Any permit issued in error shall be null and void.

## **2.02 Variances**

### **A. General**

Design and construction variances to these Development Standards may be granted by the Public Works Director, in the exercise of reasonable judgement, upon evidence that such design variance is in the public's best interest, including satisfying requirements for safety,

function, fire protection, appearance, maintenance, or ordinance compliance in conformance with the intent of these Development Standards.

To gain approval for a variance from these Development Standards, the Owner shall submit a "Request for Design Variance" (Attachment 1) to the Public Works Department. The Request for Design Variance shall state the standard(s) to be varied, including the proposed variance(s) and the reason(s) for the request. Additional supporting information, plans or design data prepared by a professional engineer, licensed in the State of Washington should be included as needed or requested.

If the requested variance is determined by the Public Works Director to significantly change the design, scope or intent of the development or work, the Public Works Director may defer the decision to the Town of Twisp Planning Commission. The Owner will comply with TMC 17.45 when requesting a design variance from the Planning Commission.

### **2.03 Project Coordination**

Prior to the start of construction, the Owner will conduct a pre-construction conference. This conference shall include, but is not limited to the following:

1. Presentation and review of project schedule specifically identifying potential water outages, traffic impacts, connections to existing Town utilities, and any other Town related tasks.
2. Identify a construction contact: the person responsible for managing the day-to-day operations of the project including traffic control, inspection coordination, erosion control, project safety, and the overall coordination.
3. Identification of potential and proposed material variances.
4. Indemnification/hold harmless requirements pursuant to Section 3.02 of these Development Standards.
5. Insurance requirements pursuant to Section 3.03 of these Development Standards.

### **2.04 Changes During Construction**

Changes during construction that potentially affect the scope of the project and/or the accepted individual lot plans must be submitted to the Owner's engineer for review and approval.

When changes to the design are necessary, Owner shall be responsible for coordinating the proposed design changes with the Owner's engineer. The Owner's engineer shall forward the proposed plan change, together with related calculations, to the Public Works Director for review and acceptance prior to construction.



# SECTION 3

## **3. INSURANCE, LIABILITY, BOND, INTERFERENCE AND WORK SAFETY**

### **3.01 Bonding**

Owners/Utilities performing work within the public right-of-way or publicly owned easement(s) shall be prepared to satisfy the following two bonding requirements.

1. Furnishing a Performance Bond, approved as to surety by the Town Clerk and as to form by the Town Attorney, which bond shall be conditioned upon faithful completion of the work to be performed in the manner provided in TMC 17.35.195, as amended. The amount of such bond shall be 150% of the estimated cost of completing all required improvements as determined by the Public Works Director.
2. Furnishing a Maintenance Bond, or alternative security, for 100% of the actual cost of construction as required under these Development Standards in the manner provided in TMC 17.35.195, as amended, and as determined by the Public Works Director.

### **3.02 INSURANCE & INDEMNITY REQUIREMENTS**

#### **1. Independent Status of Owner**

The Owner, in the performance of its requirements under these Development Standards, will be acting in their individual capacities and not as agents, employees, partners, joint ventures, or associates of the Town.

#### **2. Indemnification / Hold Harmless**

The Owner shall defend, indemnify and hold the Town, its officers, elected officials, employees and agents harmless from and against any and all claims, injuries, damages, losses or suits, including attorney fees and costs, of any kind and by any person or entity, arising out of or in connection with Owner's express or implied obligations under these Development Standards, except for injuries and damages caused by the sole negligence of the Town..

### **3.03 Insurance**

Any contractor that the Owner shall hire to complete any work as required under these Development Standards shall procure and maintain for the duration work, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the Owner, their contractor, agents, representatives, employees or subcontractors.

#### **No Limitation**

The maintenance of insurance as required by these Development Standards shall not be construed to limit the liability of the Owner or their contractor to the coverage provided by such insurance, or otherwise limit the Town's recourse to any remedy available at law or in equity.

### **Minimum Amounts of Insurance**

The Owner's contractor shall maintain at least the following insurance limits:

1. Automobile Liability insurance with a minimum Combined Single Limit for bodily injury and property damage of \$1,000,000 per accident.
2. Commercial General Liability insurance shall be written with limits no less than \$1,000,000 each occurrence, \$2,000,000 per project aggregate and \$1,000,000 products- completed operations aggregate limit.
3. Workers Compensation and Employers' Liability \$1,000,000 Employers' Liability each accident, \$1,000,000 Employers' Liability Disease-each employee, \$1,000,000 Employers' Liability Disease-policy limit.
4. Builders Risk insurance shall be written in the amount of the completed value of the work with no coinsurance provisions.
5. Pollution Liability Insurance shall be not less than \$1,000,000 per occurrence, \$2,000,000 per project aggregate.

The Owner is responsible for ensuring that any sub-contractor provide adequate insurance coverage for the activities arising out of subcontracts.

### **3.04 Other Insurance Provisions**

The insurance policies are to contain, or be endorsed to contain, the following provisions for Automobile Liability, Commercial General Liability, Pollution Liability, and Builders Risk insurance:

1. The insurance coverage shall be primary insurance as respect the Town. Any insurance, self-insurance, or insurance pool coverage maintained by the Town shall be excess of the insurance and shall not contribute with it.
2. The insurance shall be endorsed to state that coverage shall not be cancelled except after thirty (30) days prior written notice has been given to the Town.
3. If any coverage is written on a "claims made" basis, then a minimum of a three (3) year extended reporting period shall be included with the claims made policy, and proof of this extended reporting period provided to the Town.

### **Owner's Insurance for Other Losses**

The Owner or their contractor shall assume full responsibility for all loss or damage from any cause whatsoever to any tools, contractor's employee owned tools, machinery, equipment, or motor vehicles owned or rented by the contractor, or the contractor's agents, suppliers or contractors as well as to any temporary structures, scaffolding and protective fences.

### **Waiver of Subrogation**

The Owner, contractor, their subcontractors, sub-subcontractors, agents and employees, waive all rights of subrogation against the Town, for damages caused by any peril to the extend covered by the General Liability and Builders Risk insurance or other property insurance obtained pursuant to this Section or other property insurance applicable to the work.

#### **Acceptability of Insurers**

Insurance is to be placed with insurers with a current A.M. Best rating of not less than A: VII.

#### **Verification of Coverage**

Owner or their contractor shall furnish the Town with certificates and the amendatory endorsements, evidencing the Automobile Liability and Commercial General Liability insurance of the Owner's contractor before commencement of the work.

#### **Subcontractors**

Contractor shall ensure that each subcontractor, sub-subcontractors, agents and employees of every tier obtain at a minimum the same insurance coverage and limits as stated herein (with the exception of Builders Risk insurance). Upon request the Town, the Owner or their contractor shall provide evidence of such insurance.

### **3.05 Non-interference**

The Owner shall be responsible for coordination and minimum interference with:

- Traffic routing;
- Emergency vehicle access;
- Transit authority and emergency agency notification;
- Adjoining property;
- Utility facilities natural surface drainage;
- Pedestrian safety.

These items are to be discussed in the pre-construction meeting. Special provisions may be included in any applicable Town Permit(s). A written plan to reduce any or all of the aforementioned interference's may be required of the Owner by the Town.

In the event the Owner's operation damages or disrupts existing improvements, the repairs shall be made at the Owner's expense. In the event they are so damaged or the service disrupted and the Owner fails or is unable to immediately restore the service in a safe and secure manner, then the owners of the improvements may cause the repairs to be made by others and all costs for the same shall be at the Owner's own expense.

Where the construction crosses or is adjacent to existing utilities, the Owner shall exercise extreme care to protect such utilities from damage. If any damage is done to an existing utility, the Owner shall notify the Utility involved.

The Owner/Utility is cautioned that all utilities may not be on record. It shall be the responsibility of the Owner to repair or replace all such systems found during construction which are damaged by the Owner's construction.

Where the Owner is permitted to use or impact private property adjacent to the work, the property so impacted shall be returned to its original or superior condition. The Owner shall make all arrangements in advance with such property owners, to ensure that no conflicts will ensue after the property is restored as described above. The Owner will be required to furnish the Town with a written easement or legal agreement from said private property owners prior to accessing any private property.

### **3.06 Work Safety**

All work performed pursuant to a permit issued shall be done in accordance with job site safety and trench shoring requirements, in accordance with the Washington State Labor and Industries, shall be the full responsibility of the Owner.

# SECTION 4

## **4. INSPECTION, TESTING, WARRANTY, AND ACCEPTANCE**

### **4.01 General**

The Owner/Utility herewith agrees to allow inspections and agrees to cooperate providing reasonable advance notice on his construction schedule during the various construction phases. The Owner/Utility further agrees to reimburse the Town for all engineering fees and inspection expenses incurred by the Town.

The Town shall exercise full right of inspection of all excavating, construction, and other invasions of Town right-of-way or public easements. The Public Works Director, or otherwise directed Town representative, shall be notified 3 working days prior to commencing any work in the Town's right-of-way or public easements.

No work shall take place on weekends or holidays without approval from the Public Works Director. The Town may have an inspector on site for any weekend or holiday work.

The Public Works Director and/or an authorized representative is authorized to issue immediate stop work orders in the event of noncompliance with this chapter or any of the terms and provisions of the permit issued hereunder.

Two-way traffic shall be maintained at all times on existing roadways, unless traffic control plans have been approved in advance.

The Owner shall schedule and control their work so as to comply with all applicable State and Federal and local regulations, ordinances and codes to prevent any hazards to the public or to private property.

The Owner shall keep roadways and pedestrian facilities free of dirt and debris and open at all times.

The Owner shall maintain pedestrian and vehicular access to occupied buildings at all times, except where written approval has been obtained by the Town.

### **4.02 Project Acceptance of Completed Construction**

The Owner shall complete all items required for a complete project before requesting the Town to perform a final inspection. For a complete project, all appurtenances shall be installed; all utilities shall be adjusted; all Portland Cement Concrete and HMA shall be placed; all backfilling shall be completed; and the entire project shall be debris free and washed, swept, or vacuumed as necessary to provide a project that is readily inspectable.

Once the project is prepared for final inspection the Owner shall notify the Town, in writing, of a request for final inspection. Accompanying the request for final inspection shall be a colored copy of the as-built drawings as per these Development Standards. The Public Works Director will make a visual inspection of the job site. Final written approval of construction shall be given

after satisfactory completion of construction, as inspected by the Public Works Director, and the submission of as-built drawings, and applicable material testing documentation. Final acceptance shall not constitute acceptance of any unauthorized or defective work or material.

The Town reserves the right to require the Owner to retain a third-party testing and inspecting agency, of the Town's choice, to verify compliance with all standards listed here-in. Any costs associated with such third-party testing or inspection shall be the responsibility of the Owner.

#### **4.03 As-Built (Record) Drawings**

As-built drawings shall be submitted with a stamp and signature by the engineer and data which verifies the "as-built" condition of the project. These plans shall be provided in an electronic record in TIFF and PDF formats along with two sets of 24"x36" print copies. All data as shown on the drawings shall be "fixed line" or ink. As-builts shall include all verified distances, heights, lengths, depths and all other measurements required by the Public Works Director clearly identified on the as-built drawings. As-built drawings must conform to all requirements of TMC Chapter 17 and are required for all work performed to any utility, roadway system, park, public or private, prior to final acceptance by the Town.

#### **4.04 GIS Datum**

The Owner shall submit GIS data of all structures, manholes, valves, meters and appurtenances of all utilities new and existing, installed or moved as a result of the project. The GIS data shall be collected and prepared by a licensed professional and submitted to the Town in a format designated by the Public Works Director.

#### **4.05 Warranty**

A minimum two-year warranty of the Owner's improvements is required and shall begin when they have been fully inspected and approved, and the following requirements have been met:

1. The final plat has been filed with Okanogan County (if the improvements are pursuant to a plat application).
2. Submit to the Town as-built drawings with all changes from the original design clearly marked to reflect the as-built conditions. The Owner's engineer shall certify the accuracy of the record drawings.
3. Payment of all permit fees, bills, invoices, mitigation payments, equivalent assessment charges, plan check and inspection fees, any other applicable development approval fees required for the project.
4. Payment of all related and/or necessary recording fees.
5. Prepare and furnish the required easements, covenants, contracts, etc. in accordance with Town's requirements, , and furnish the same to the Town for approval by the Town Attorney.
6. Furnish the Town with an affidavit warranting there are no liens against the improvements

constructed on premises by the Owner; this affidavit shall be in the form prescribed by the Town.

7. Furnish the Town with a dedication conveying the water/sanitary/storm or roadway system to the Town at the end of the warranty period.
8. Provide a two-year guarantee (Warranty Bond) that the conveyed systems or improvements or additions thereto shall be free of defects in labor and materials.

In the event any warranty repairs are required, the Town agrees, whenever feasible, to provide the Owner with reasonable notice before directly undertaking such repairs. The Town reserves the right, however, to effect emergency repairs as deemed necessary by the Town. The Town shall be reimbursed by the Owner for all costs thereof.

Upon performing all requirements and conditions of these Development Standards, and any other required Town approvals, the Town shall accept the water/sanitary/storm and/or roadway improvements and dedications, and agree therewith to own, operate, and maintain said system.

# SECTION 5

## 5. STREETS, SIDEWALKS, AND ALLEYS

### 5.01 General

These Development Standards are hereby supplemented with the Washington State Department of Transportation/APWA Standard Specifications for Road, Bridge, and Municipal Construction, current edition (“Standard Specifications). Both standard components apply to all construction within the Town. In the event of conflicting details or specifications, precedence shall be in the following order:

1. Town of Twisp Development Standards
2. Standard Specifications
3. Standards otherwise prescribed under the Twisp Municipal Code
4. Town-approved project plans

All project plans shall have a horizontal scale 20 feet to the inch and a vertical scale of not more than 5 feet to the inch.

### 5.02 Roadway Design

The following roadway design standards correlate to applicable street classifications:

**Table 5.1  
Roadway Design Standards**

Type 1	Type 2	Type 3	Type 4
Right of Way 80’-90’	Right of Way 60’-80’	Right of Way 50’-60’	Right of Way 40’-50’
Maximum Grade 6%	Maximum Grade 6%	Maximum Grade 6%	Maximum Grade 6%
2) 12’ paved lanes	2) 11’ paved lanes	2) 11’ paved lanes	2) 10’ paved lanes
2) 8’ paved parking lanes	2) 8’ parking lanes	2) 8’ parking lanes	1) 8’ parking lane
2) 5’-6’ sidewalks**, curb	1) 5’ sidewalk**, curb	1-2) shared use path	1) shared use path
2) 5’ bike paths	1-2) 5’ bike paths	1) 2’ shoulder gravel	1) 2’ shoulder gravel
63’-73’ improved width	49.5’-69.5’ improved width	43’-48’ improved width	35’ improved width
35’ minimum radius face to curb	30’ minimum radius face to curb	25’ minimum radius face to curb	25’ minimum radius face to curb
4” HMA class ½” PG64-28, 2 lifts	2.5” HMA class ½” PG64-28	2.5” HMA class ½” PG64-28	2.5” HMA class ½” PG64-28
3” CSTC, 9” CSBC	3” CSTC, 6” CSBC	3” CSTC, 6” CSBC	3” CSTC, 4” CSBC

\*All thicknesses are compacted

\*\*C1 zone will be 2) 10’ sidewalks

Minor Arterial	Type 1
Major Collector	Type 1

Minor Collector	Type 1 or 2
Local Major Collector	Type 1 or 2
Local Minor Collector	Type 2 or 3
Local Access	Type 3
Cul-de-sac or dead ends greater than 500'	Type 3
Cul-de-sac or dead ends less than 500'	Type 4

1. All horizontal curve designs must provide at least the minimum stopping sight distance for the design speed at all portions of the road.
2. All roadway designs utilizing super elevation are subject to review of the Public Works Director. Chapter 640 of the WSDOT Design Manual will be consulted.
3. Streets and road intersections shall be laid out so as to intersect as nearly as possible to 90 degrees.
4. All street signs including street names shall be in place prior final acceptance of the project.
5. All street designs will be required to meet minimum sight distance criteria established in Twisp Municipal Code, , Washington state statutes, and guidelines of the American Association of State Highway Transportation Officials. . The sight distance must be located completely within the right of way in order to ensure proper maintenance. The Public Works Director may require additional right of way for conformance of site distance requirements as a condition of development approval.
6. All dead-end streets shall terminate in a cul-de-sac or hammerhead in conformance the requirements and approval of the Public Works Director.
7. Where streets of the development connect to existing roadways, there shall be culvert drains installed in accordance with Standard Specifications.

### 5.03 Street Lights

Guidance documents: IESNA (Illuminating Engineering Society of North America)  
ANSI (American National Standard Institute)  
WSDOT Design Manual  
Twisp Municipal Code

1. Neighborhood Street and Arterial requirements for street lights:
  - a. One light at intersections.
  - b. One light at mid-block if block is longer than 350'.
  - c. One light at school bus stops or transit stops.
  - d. At other locations as deemed necessary by the Public Works Director.
2. Luminaire type: LED adjustable wattage from 35w to 70w. Shields installed.
3. Approved Style: Cobra, Acorn, Shepherds Hook, or other depending on the location and as deemed necessary by the Public Works Director.

4. Poles: 15'-30' feet in height, powder coated aluminum or colored galvanized steel depending on the location and as deemed necessary by the Public Works Director.
5. Some locations may require solar LED Luminaires as deemed necessary by the Public Works Director.
6. All street lighting must comply with applicable "Dark Sky" requirements in the Twisp Municipal Code.

**5.04 Vertical Datum**

The Town has established the USBR elevation datum to be the official vertical datum to be used on all projects within the Town of Twisp municipal limits.

All commercial/industrial projects in the municipal limits are required to have the following statement on the preliminary and final record drawings:

"VERTICAL DATUM."

"The elevations shown on these plans are based on the elevation of the bench mark monument located at the intersection of \_\_\_\_\_ Avenue and \_\_\_\_\_ Street and checked for accuracy by closing to the elevation monument located at \_\_\_\_\_ Avenue and \_\_\_\_\_ Street, according to the Town of Twisp official elevation bench mark list dated \_\_\_\_\_, the records of Twisp, Washington."

If the National Geodesic Vertical Datum of 1929 (NGVD-29) was used, it is converted to the USBR elevation by adding .89 feet to the NGVD-29 elevation. If North American Vertical Datum 1988 (NAVD-99) was used, it is converted to the USBR elevation by subtracting 2.8 feet from the NAVD.

**5.05 Existing Monuments**

The following official benchmarks are hereby established throughout the Town.

DESCRIPTION	LOCATION	ELEVATION

## **5.06 New Monuments**

The materials and method of construction shall conform to the requirements specified herein and as indicated in Section 8-13 of the Standard Specifications. The following procedure shall be followed for the placement of new monuments as well as the replacement of disturbed existing monuments:

1. The Owner's surveyor will reference all monuments that will be removed or destroyed during the course of construction prior to their removal or destruction. The Owner's surveyor will complete and file all documentation required for the temporary removal of said monuments.
2. After the Owner constructs the road, the Owner's surveyor will set two, 2-foot long "straddles" at the monument locations designated on the plans.
3. The Owner shall install the new monument cases, complete with Schedule 40 galvanized steel pipes and 2-inch diameter brass caps. The monument case, cover, pipe, and brass cap will be furnished and set in concrete, and patched with HMA, by the Owner.
4. The Owner's surveyor will stamp the brass caps with "cross hairs," or some other such industry-accepted mark, to indicate the point that was removed is now replaced. The Owner's surveyor will also affix his/her Washington State PLS registration number to the brass caps. The Owner's surveyor will then file all required documentation indicating that the monument has been reestablished.

## **5.07 Hot Mix Asphalt Placement**

The materials and method of construction shall conform to the requirements specified herein and as indicated in the Standard Specifications. Asphalt binder shall be PG 64-28.

A copy of the HMA mix design shall be forwarded to the Town for review and approval a minimum of five business days prior to the start of all paving operations.

A tack coat consisting of CSS-1 emulsified asphalt conforming to Standard Specifications Section 9-02.1(6) shall be applied to the top surface as well as all exposed edges of transverse and longitudinal joints.

All cold joints shall be sealed with poured rubber joint sealer per the Standard Specifications. After sealing, a sand blanket shall be applied on top to help alleviate tracking.

The Owner's material suppliers shall be required to furnish certification from a certified material testing laboratory approved by the Town that the material is in conformance with these Development Standards. The Owner shall be required to test for compaction of HMA to ensure the work is done in conformance with the Standard Specifications. The testing shall be done by a Town approved material testing laboratory, and the Owner shall be responsible for the costs of such testing.

Hot mix asphalt compaction shall meet the requirements of Standard Specifications Section 5.04.3(10). The Owner shall be responsible for the control of the compactive effort.

The level of compaction attained will be determined as the average of not less than four nuclear density gauge readings taken at 90° to each other within any given three-square-foot area. The four readings shall be averaged to result in one “test” which shall be reported to the Town in accordance with the Standard Specifications. Frequency of testing shall be one test per 80 tons of HMA placed. The readings shall be taken in accordance with ASTM Standards for test methods on the day the mix is placed, and after completion of the finish rolling, at randomly selected locations within each lot for each paving course.

## **5.08 Curb, Gutters, and Spillways**

The materials and method of construction shall conform to the requirements specified herein and as indicated in the Standard Specifications Section 8-04.

Any curb and gutter not acceptable, in the opinion of the Town, because of damage or defacement, shall be removed and replaced by the Owner at the Owner’s expense. Sacking or grinding shall not be considered an acceptable means for repairing unacceptable sections.

The alignment of curb and gutter shall conform to the WSDOT Specifications Section 6 02.3(6). Curb and gutter shall not deviate more than 1/4 inch when measured by a 10-foot straightedge held longitudinally on the front face, back face, and top surface.

Concrete shall be tested in accordance with Standard Specifications. All concrete shall meet the specified requirements for 28-day compressive strength. The Owner shall furnish all concrete required for testing. In cases where cylinders are stored at the project site, the Owner shall provide storage and protection for the cylinders.

All concrete testing shall be done by a certified testing laboratory approved by the Town. The frequency of testing shall be one set of cylinders per every 50 cubic yards of concrete placed.

Test reports shall be reported electronically or in writing to the Town within 24 hours of each test. All tests shall identify approximate test location by station and type of concrete placed (sidewalk, curb and gutter, approach, etc.).

## **5.09 Cement Concrete Sidewalks**

Curb ramps shall be provided at all pedestrian crossings and shall meet ADA requirements.

The materials and method of construction shall conform to the requirements specified herein and as indicated in the Standard Specifications Section 8-14. Contraction joints shall be placed at 5’ intervals and placed so they correspond with the placement of expansion joints. Expansion joints shall be placed at 50’ intervals and filled with 3/8” pre-molded joint filler.

In accordance with the Standard Specifications Section 8 04.3, commercial concrete may be used in lieu of Class 3000 concrete subject to the requirements of the Standard Specifications

Section 6-02.3(2) B. Where applicable, Class 4000 concrete shall be used for the full width of all driveway entrances and Class 4000 concrete may be used for sidewalks.

The detectable warning surface shall be constructed with cast-in-place tiles as manufactured by Armor Tile or approved equal. Glue-on style textured mats or paint will not be acceptable.

Any sidewalk not acceptable, in the opinion of the Town, because of damage, defacement or deviation greater than an 1/4" over the width of the sidewalk shall be removed and replaced by the Owner at the Owner's expense. Sacking or grinding shall not be considered an acceptable means for repairing unacceptable sections.

After troweling and before installing the contraction joints or perimeter edging, the walking surfaces of the sidewalk and curb ramps shall be brushed in a transverse direction with a soft bristled broom to produce a fine broom finish. Course broom finishes shall not be acceptable.

Concrete shall be tested in accordance with the Standard Specifications. All concrete shall meet the specified requirements for 28-day compressive strength. The Owner shall furnish all concrete required for testing. In cases where cylinders are stored at the project site, the Owner shall provide storage and protection for the cylinders.

All concrete testing shall be done by a certified testing laboratory approved by the Town. The frequency of testing shall be one set of cylinders per every 50 cubic yards of concrete placed.

Test reports shall be reported electronically or in writing to the Town within 24 hours of each test. All tests shall identify approximate test location by station and type of concrete placed (sidewalk, curb and gutter, approach, etc.).

#### **5.10 Adjustment of new and existing utility structures to grade**

On all asphalt paving projects, the manholes, monuments and valve boxes shall not be adjusted until the pavement is completed and accepted by the Public Works Director. Prior to commencing adjustment, a plywood and plastic cover shall be placed over the manhole base and channel to prevent debris from entering the collection system. The Owner must remove any and all items including debris from the manhole upon completion.

The asphalt concrete pavement shall be cut and removed 14" from the outside diameter of the lid frame. The frame shall be brought up to desired grade which shall allow the top of the cover to be 1/4" below final grade of the asphalt concrete pavement. No dips or rises to the final grade will be allowed within 5' of the center of the manhole cover.

Adjustment to the desired grade shall be made with the use of concrete lift rings. An approved class of mortar shall be placed between manhole sections and adjustment rings, completely filling all voids to create a watertight seal. No rough or uneven surfaces will be permitted. Manhole rings shall be placed so as to provide vertical alignment of the manhole ladder.

Check manhole specifications for minimum and maximum manhole adjustment and step requirements.

Asphalt concrete patching shall not be carried out during wet ground conditions or when the ambient air temperature is below 50 degrees F. Asphalt concrete mix shall be at required temperature when placed. Before making the asphalt concrete repair, the edges of the existing asphalt concrete pavement and the outer edge of the casting shall be tack coated with hot asphalt cement. The remaining four inches shall then be filled with commercial hot mix asphalt and compacted. The completed patch shall match the existing paved surface for texture, density and uniformity of grade.

After pavement is in place, all joints shall be sealed with hot asphalt cement (AR 4000W). A sand blanket shall be applied to the surface of the hot asphalt cement to help alleviate tracking.

Manholes in easement areas shall be adjusted to insure drainage away from the manhole frame and cover. Consideration should be given to the surrounding area such as snow plowing, potential drainage, structures, curbs, paths etc. when adjusting the finished height. The Public Works Director will determine the appropriate finished height.

## **5.11 Inspection**

The Owner shall request inspection from the Town a minimum of 3 working days in writing prior to the Owner's scheduled need. Inspection shall be required for the following items of work:

1. Subgrade preparation
2. HMA
3. Concrete

# SECTION 6

## **6. WATER SYSTEM STANDARDS**

### **6.01 General**

The standards established by these Development Standards are intended to represent the minimum standards for the design and construction of water system facilities. Greater or lesser requirements may be mandated by the Town due to localized conditions. Other applicable standards that are referenced within these Development Standards will also be used as design and construction standards. Extensions, connections or modifications to the existing system shall be in compliance with the State Department of Health requirements.

### **6.02 Design Standards**

- A. These design standards apply to any system connected to the Town's system, whether inside of the municipal limits or not.
- B. Detailed plans shall be submitted for the Town's review which provides the locations, size, and type of the proposed water system and points of connection. These plans shall be separate from sewer plans.
- C. Project plans shall have a horizontal scale 20 feet to the inch and a vertical scale of not more than 5 feet to the inch. Plans shall show:
  - 1. Locations of streets, rights-of-way, existing utilities and water system facilities;
  - 2. Ground surface, pipe type and size, and water valves and hydrants stationing;
  - 3. All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly sewer lines, gas mains, storm drains, overhead and underground power and all underground structures, telephone lines and television cables;
  - 4. All utility easements and applicable County recording number.
- D. Computations and other data used for design of the water system shall be submitted to the Town for approval.
- E. Material and installation specifications shall contain appropriate requirements that have been established by the industry in its technical publications, such as ASTM, AWWA, WPCF, and APWA standards. Requirements shall be set forth in the plans for the pipe and methods of bedding and backfilling so as not to damage the pipe or its joints.
- F. The location of the water mains, valves, hydrants, and principal fittings including modifications shall be staked by the Owner. No deviation shall be made from the required line or grade. The Owner shall verify and protect all underground and surface utilities

encountered during the progress of this work.

- I. Prior to final inspection, all pipelines shall be tested and disinfected in conformance with AWWA or Standard Specifications.
- J. Before acceptance of the water system by the Town, all pipes, assemblies, and other appurtenances shall be cleaned of all debris and foreign material. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section.
- K. The Owner shall be required, upon completion of the work and prior to acceptance by the Town, to furnish the Town with a written guarantee (Maintenance Bond) covering all material and workmanship for a period of two years after the date of final acceptance and shall make all necessary repairs during that period at their own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Owner shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required and shall deliver copies to the Town upon completion of the work.

### **6.03 General Requirements**

- A. Prior to construction, the Owner shall notify the Town for a pre-construction meeting.
- B. Work shall be performed only by contractors experienced in laying public water mains.
- C. The Owner shall follow the schedule presented at the pre-construction meeting.
- D. The Owner shall obtain approval of materials to be used from the Public Works Director prior to ordering of materials.
- E. Water mains shall be laid only in dedicated streets or in easements which have been granted to the Town. A street is normally not considered dedicated until the plat which created it has been officially filed with the County Auditor.
- F. All water main distribution pipeline construction shall have a minimum 60-inch cover from finished grade and 60-inch cover over transmission mains. Water mains shall be extended to the far property line(s) of the property being served. Off-site extensions are required to hydraulically loop existing and new systems.
- G. The Town requires minimum pipe sizes of 8-inch in residential zones, 10-inch in commercial zones, and 12-inch in industrial zones unless a larger size is determined to be required by the Town.
- H. Every cross shall have no less than four valves, every tee shall have no less than three valves. An in-line valve shall be installed on runs of pipe every 400 feet.

- I. Unless otherwise approved or required by the Public Works Director, the water main shall be ductile iron pipe or C900/C905 PVC as shown below. The minimum size for all water lines shall be 8 inches, except for pipes connecting hydrants less than 60' long.

<u>Pipe Diameter</u>	<u>Class</u>	
	<u>D.I.</u>	<u>PVC</u>
6" through 14"	Class 52	Class 150
16" and larger	Class 50	Class 150

EXCEPTION: 6-inch hydrant spools and pipelines located beneath rock or retaining walls shall be DI. 53.

- J. Pipes connecting hydrants to mains shall be 6 inch in diameter or larger and not longer than 60'. 60 plus feet requires 8 inch or larger.
- K. Permanent dead-end lines are not permitted. Water mains on cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and have a 2-inch blow off assembly installed at the termination point. All lines shall be capable of being looped upon full development.
- L. All materials shall be new, undamaged and free from any debris.
- M. All fittings shall be cement-lined ductile iron.
- N. Provide bends in field to suit construction and in accordance with pipe manufacturer's recommendations so as not to exceed allowable deflection at pipe joints.
- O. Provide thrust blocking at all fittings and bends as designed by Owner's engineer and approved by the Public Works Director.
- P. Provide anchor blocking at all up-thrust vertical bends as designed by Owner's engineer and approved by the Public Works Director.
- Q. All valve marker posts shall be painted yellow and marked with the distance to valve being referenced.
- R. Residential water service pipe shall be one-inch CTS poly with no joints.
- S. Commercial service lines between the water main and the water meter shall be sized appropriately.
- T. All water services shall end within road rights-of-way or easements, except when otherwise approved by the Public Works Director.
- U. All water services shall be installed by the Town, unless approved by the Public Works Director. All costs associated with this work shall be paid for by the Owner.

- V. One sampling station is required for a development in size of 5 to 20 lots. One additional station is required for each additional 50 lots or portions thereof.
- W. All new service connections shall comply with TMC Chapter 13.07 regarding cross connection control.
- X. Cut in connections shall not be made on Fridays, holidays or weekends. All tapping sleeves and tapping valves shall be pressure tested prior to making connection to existing mains. Taps are to be made by Town personnel (fee is required).
- Y. Owner shall request the Public Works Director approval prior to any water shut-off or turn-on, affecting the water system, a minimum of 3 working days in advance. The Public Works Department shall operate all valves in existing service mains.

#### **6.04 Materials & Inspections**

##### **A. Inspections**

The Owner shall request for inspection a minimum of 3 working days in writing prior to the Contractor's scheduled need. Inspection shall be required for the following items of work:

1. Pipe and bedding installation;
2. Backfill and compaction;
3. Pressure testing.

##### **B. Water Mains & Fittings**

1. Water mains to be installed unless otherwise approved (or required) in writing by the Town Engineer shall be either ductile iron or C900 or C905 PVC pipe.
1. Ductile Iron shall be:
  - a. The ductile iron pipe shall conform to Standard Specifications or ANSI/AWWA C151/A21.51-91 Standards, and current amendments thereto, except the ductile iron pipe shall be thickness Class 52 for 4" through 14" diameter pipe (except for 6-inch hydrant spools which shall be Class 53) and Class 50 for 16" and larger. Grade of iron shall be a minimum of 60-42-10. The pipe shall be cement lined to a minimum thickness of 1/16", and the exterior shall be coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year case, thickness, class of pipe and weight.
2. PVC pipe shall conform to AWWA C900 or C905, Class 150, capable of connecting to ductile iron fittings. All fittings shall be ductile iron.
3. Type of joint shall be mechanical joint or push-on type, employing a single gasket, such as "Tyton", except where otherwise calling for flanged ends. Bolts furnished for mechanical joint pipe and fittings shall be high strength ductile iron, with a minimum tensile strength of 50,000 psi.

4. Restrained joint pipe, where shown on the plans shall be push-on joint pipe with "Fast Tight" gaskets as furnished by U.S. Pipe or equal for 12" diameter and smaller pipe and "TR FLEX" as furnished by U.S. Pipe or equal for 16" and 24" diameter pipes. The restrained joint pipe shall meet all other requirements of the non-restrained pipe.
5. All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.
6. Joints shall be "made up" in accordance with the manufacturer's recommendations, standard joint materials, including rubber ring gaskets, shall be furnished with the pipe. Material shall be suitable for the specified pipe size and pressures.
7. All fittings shall be short-bodied, ductile iron complying with applicable Standard Specifications or ANSI/AWWA C110 or C153 Standards for 350 psi pressure rating for mechanical joint fittings and 250 psi pressure rating for flanged fittings. All fittings shall be cement lined and either mechanical joint or flanged, as indicated on the plans.
8. Fittings in areas shown on the plans for restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be Romac "Grip Ring" (retainer glands) or Town approved equal.
9. All couplings shall be ductile iron mechanical joint sleeves.
10. The pipe and fittings shall be inspected for defects before installation. All lumps, blisters and excess coal tar coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and dry, and free from oil and grease before the pipe is laid. Any damage to the interior lining caused by cutting or other means must be repaired prior to installation.
11. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and pipe forced home and brought to correct line and grade. The pipe shall be secured in place with select backfill tamped under it. Precaution shall be taken to prevent dirt from entering the joint space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. No pipe shall be laid in water or when trench conditions are unsuitable.
13. The cutting of pipe for inserting fittings or closure pieces shall be done in a neat and workmanlike manner, without damage to the pipe or cement lining, and so as

to leave a smooth end at right angles to the axis of the pipe. Pipe shall be laid with bell ends facing in the direction of the laying, unless directed otherwise by the Town. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations.

14. For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing, and shall be jointed according to manufacturer's directions. Bolts shall be tightened alternately at top, bottom and sides, so pressure on gasket is even.
15. For connection of "Tyton" joints, the jointing shall be done according to manufacturer's recommendations, with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be non-toxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.
16. Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner as required. All dead ends on new mains shall be closed with dead end M.J. plugs.
17. Fittings shall be "blocked" with poured-in-place concrete, with a firm minimum bearing against an undisturbed earth wall. Timber blocking and precast concrete blocks shall not be permitted. Thrust blocks shall be poured as soon as possible after setting the fittings in place to allow the concrete to "set" before applying the pressure test. The concrete thrust blocks shall be in place before beginning the pressure test. Anchor blocks shall be allowed to set sufficiently to develop the necessary bond strength between the reinforcing rods and the concrete anchor before beginning the pressure test.
18. All of the new piping, valves and blocking shall have been installed, disinfected and tested up to the point of cutting into existing lines before the crossover is made. The crossover to the existing system shall be in full readiness, including the cut and sized specials. The Town shall be given 3 working days' notice in advance of the planned "cut-ins". All sleeves shall be ductile iron.

## C. Valves

All valves 12" and smaller shall be resilient seat gate valves.

### 1. Resilient-Seated Gate Valves

All gate valves 12" and smaller shall conform to Standard Specifications or ANSI/AWWA C509-87 Standards for resilient-seated, high strength, bronze stemmed gate valves. The valves shall be iron-bodied, iron disk completely encapsulated with polyurethane rubber and bronze, non-rising stem with "O" ring seals. The polyurethane sealing rubber shall be fusion bonded to the wedge to meet ASTM tests for rubber to metal bond ASTM D429. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts except valves in

vaults shall be furnished with hand wheels. All surfaces, interior and exterior shall be fusion bonded epoxy coated, acceptable for potable water.

The valves shall be set with stems vertical. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable. Valve stem risers shall be installed 12" to 24" of the finished grade of the valve box cap.

Valves shall be Clow, Mueller, M&H, or approved equal by the Public Works Director.

2. Tapping Sleeves & Tapping Valves

The tapping sleeves shall be stainless steel tapping sleeves rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Mechanical joint style sleeves shall be ductile iron and is required for size-on-size connection to cast iron pipe. Mechanical joint sleeves shall be cast by Clow, Dresser, Mueller, Tyler, U.S. Pipe, or approved equal by the Public Works Director.

Tapping valves shall be flanged outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The installation of the tapping sleeves and valves shall be performed by a qualified contractor.

All taps will be made by the Public Works Department. Fees are required.

3. All Valves

All valves with operating nuts located more than 24" below finished grade shall be equipped with extension stems to bring the operating nut to within 12" of the finished grade.

At the top of the extension stem, there shall be a 2-inch standard operating nut, complete with a centering flange that closely fits the 5-inch pipe encasement of the extension stem. The valve box shall be set in a telescoping fashion around the 5-inch pipe cut to the correct length to allow future adjustment up or down.

Each valve shall be provided with an adjustable two-piece cast iron valve box of five inches minimum inside diameter. Valve boxes shall have a top section with a

16-inch minimum length. The valve boxes and covers shall be 6800 with locking lid or approved equal by the Public Works Director.

4. Valve Markers

For each valve outside of asphalt, provide a valve concrete pad 24" x 24" x 6" with reinforcing mesh centered over valve box and set to grade.

D. **Fire Hydrants**

All fire hydrants shall be approved by the National Board of Fire Underwriters and conform to AWWA Specification C502, breakaway type, in which the valve will remain closed if the barrel is broken. The hydrant barrel shall have a diameter of not less than 8-1/2 inches, and the valve diameter shall be not less than 5-1/4 inches. Each hydrant shall be equipped with two 2 1/2-inch hose ports (National Standard Thread), and one 4-1/2-inch pumper connection (National Standard Thread), with permanent 5-inch Storz hydrant adaptor and Storz blind cap which shall be installed on the hydrant prior to installation. Each hydrant shall be equipped with a suitable positive acting drain valve and a 1-1/4-inch counter-clockwise opening pentagonal operating nut. The fire hydrants shall be 6' bury or more to conform to the Standard Detail, M&H model 129.

The holding spools between the gate valve and fire hydrant shall be made from 6-inch Class 53 ductile iron pipe, 0.34-inch wall thickness, or C900 PVC. The hydrant and gate valve shall be anchored in place using holding spools and mechanical joint restraint device. Thrust block at all fittings shall be in accordance with Town standards and conditions. Holding spools with length in excess of 17 feet shall be supplied with an M. J. sleeve and mechanical joint restraint device.

Between the time that the fire hydrant is installed and the completed facility is placed in operation, the fire hydrant shall at all times be wrapped in burlap, or covered in some other suitable manner to clearly indicate that the fire hydrant is not in service.

E. **Blow-offs & Air Relief Assemblies:**

2-inch blow off assemblies shall be installed at the terminus of all dead-end water mains. Blow offs utilized by the Owner for flushing the water main shall be sufficient size to obtain 2.5 feet per second in the main. The system shall be designed to drain the entire assembly to prevent freezing. Temporary blow-offs shall be removed and replaced with a suitably sized watertight brass plug.

2-inch air and vacuum release valves shall be installed at principal high points in the system. The installation of these items shall include connection piping, gate valve, valve box, and all accessories. Valve markers shall be optional with Town.

F. **Water Sampling Station**

One water sampling station shall be furnished and installed for each development in size of 5 to 20 lots. One additional sampling station shall be furnished and installed for each additional 50 lots or portion thereof. The water sampling station(s) shall be furnished and

installed at a location as determined by the Public Works Director and as further shown on any plans.

**G. Bedding for Water Mains and Service Lines**

A. Ductile Iron and PVC Pipe (All Sizes).

Pipe bedding material to be installed and compacted under, around and above all pipe as specified in this section shall be clean, well-graded sand or sand/gravel mixture with a maximum particle size of 5/8 inch, entirely free of clay, silt, organic or deleterious matter and frozen material. Minimum material weight shall be 110 pounds per cubic foot at 95% relative compaction. Bedding shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing*</u>
3/4" Square	100
3/8" Square	95-100
U.S. No. 8	0-10
U.S. No. 200	0-3
Sand Equivalent	35 MIN.

All percentages are by weight. Native material may not be used for bedding

B. Copper, PEX and PVC Less Than 4" Diameter Water Service Pipe

All requirements of 6.04 (G)(A) herein apply, except that bedding material shall be clean sand, free of gravel, with no more than 5% passing the No. 200 Sieve (by weight).

**6.05 Water Pipe Testing & Disinfecting**

All pipelines shall be hydrostatically tested and disinfected per current applicable AWWA and Standard Specifications prior to acceptance of work. A water hydrant meter shall be required and procured from the Town for all water utilized for flushing pipelines. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Owner. Feed for the pump shall be disinfected treated water from a barrel or other container within the actual amount of "makeup" water, so that it can be measured periodically during the test period. Owner shall not transport make up water in trucks.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Owner shall furnish and install temporary blocking.

As soon as pipe is secured against movement under pressure, it may be filled with water after approval from the Public Works Director to do so. Satisfactory performance of air valves shall be checked while the line is filling.

## **6.06 Testing and flushing procedural order**

1. Upon approval from the Public Works Director, fill the pipe line in accordance with these standards.
2. The initial chlorine concentration test is performed by the Public Works Department.
3. Pressure Test in accordance with these standards after acceptable chlorine concentration test.
4. Depressurize after acceptable pressure test, leaving the pipe line full of treated water.
5. 24 hours later, the residual chlorine concentration test is performed by the Public Works Department.
6. Final flushing after acceptable chlorine concentration test until no chlorine is present.
7. Final chlorine concentration is tested by the Public Works Department.
8. Bacterial test sample is taken by the contractor to an accredited laboratory for testing in accordance with these standards.

Other pressure testing and disinfection procedures that conform to AWWA Standards may be approved by the Public Works Director upon of request by the owner.

*TEST WORK SHEET FOR WATER LINES*  
**HYDROSTATIC AND LEAKAGE TEST**

**Project Name** \_\_\_\_\_

**Date** \_\_\_\_\_ **Job No.** \_\_\_\_\_

**Location of Test/Stationing** \_\_\_\_\_

**Contracting Agency** \_\_\_\_\_

**Hydrostatic Test**

**Test Pressure** \_\_\_\_\_

**Time Test Started** \_\_\_\_\_

**Time Test Completed** \_\_\_\_\_

**Total Time** \_\_\_\_\_ **minutes**

Test Passed    Yes   

                  No

## **6.07 Backflow Prevention and Sprinkler Systems**

All water systems (i.e. sprinkler systems, swimming pools, laboratories, fire sprinklers, irrigation systems, car washes, funeral homes, or at direction of the Town Building Inspector and Public Works Department) connected to the public water system shall have backflow prevention as required by WAC 248-54-285 and TMC Chapter 13.07.

## **6.08 Staking**

All surveying and staking shall be performed by an engineering or surveying firm employed by the Owner and capable of performing such work. The engineer or surveyor directing and/or performing such work shall be currently licensed by the State of Washington to perform said tasks.

- A. Provide staking sufficient to satisfy Public Works Director. In new plat development, roadway centerline or edge offset staking must be readily identifiable.
- B. Stake locations of all proposed fire hydrant, blow-off, air-vac, valves, meters, etc.

## **6.09 Trench Excavation**

Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the Town and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the Owner in accordance with the terms of all applicable permits.

Trenches shall be excavated to the line and depth designated by the Town to provide a minimum of 60" inches of cover over the pipe. Except for unusual circumstances where approved by the Town, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths and depths as are necessary for adequate working space as allowed by the governing agency and in compliance with all safety requirements of the prevailing agencies. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The Owner shall maintain sufficient pumping equipment on the job to ensure that these provisions are carried out.

Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the Town, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.

## **6.10 Backfilling**

Native material for backfill: material must be free of wood waste, debris, clods or rocks greater than three inches in any dimension. Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the Town. Selected material shall be placed and compacted around and under the pipe by hand tools. Special precautions should be provided to protect the pipe to a point 12 inches above the crown of the pipe. Due to local conditions, as may be specifically approved by the Town, suitable excavated backfill material, as determined by the Town, may be utilized as backfill, or if such material is not available from trenching operations, the Town may order the placing of gravel base conforming with Standard Specifications Section 9 03.10 for backfilling the trench. All excess material shall be promptly loaded and hauled to waste.

## **6.11 Street Patching and Restoration**

See Section 5 for requirements regarding street patching.

## **6.12 Erosion Control**

Erosion Control shall comply with Standard Specifications M41-10.

## **6.13 Finishing and Cleanup**

After all other work on a project is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, and to the satisfaction of the Public Works Director.

Upon completion of the cleaning and dressing, the project shall appear uniform in all respects.

Drainage facilities such as inlets, catch basins, culverts, and open ditches shall be cleaned of all debris, which is the result of the Owner's operations. All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities, which have been sprayed by the asphalt cement, shall be cleaned to the satisfaction of the Public Works Director.

Castings for monuments, water valves, vaults and other similar installations, which have been covered with the asphalt material, shall be cleaned to the satisfaction of the Public Works Director.

# SECTION 7

## **7. SANITARY SEWER STANDARDS**

### **7.01 General**

The standards established by these Development Standards are intended to represent the minimum standards for the design and construction of sanitary sewer facilities. Greater or lesser requirements may be mandated by the Town due to localized conditions. Washington State Department of Ecology's Criteria for Sewage Works Design, latest edition, and Standard Specifications M41-10 latest edition, shall also be employed by the Town in its review and approval of system connections, extensions, and/or modifications.

### **7.02 Design Standards**

The design of sanitary sewer systems shall be dependent on local site conditions. The design elements of sanitary sewer systems shall conform to minimum standards set forth herein. Department of Ecology approval of sewer extensions may be required. It shall be the responsibility of the Owner's engineer to obtain Ecology approval, if needed.

- A. If future extensions of the system are deemed probable by the Town, the proposed systems shall be extended to "far" property line(s) at the maximum depth available as may be necessary to provide access to future development. At a minimum, access and/or easements to all systems from adjacent areas will be required.
- B. Detailed plans shall be submitted for the Town's review which provides the location, size, type and direction of flow of the proposed sewers and the connection with existing sewers. All elevation information shall be to the Town datum.
- C. Project plans shall have a horizontal scale 20 feet to the inch and a vertical scale of not more than 5 feet to the inch. Plans and profiles shall show:
  - Locations of streets, rights-of-way, existing utilities and sewers.
  - All associated right-of-way, easement and/or property lines.
  - Site topography at a minimum of 5-foot intervals, to include a minimum of 20-foot within adjacent areas.
  - Vicinity and site location map.
  - Ground surface elevation.
  - Pipe type, class, and size.
  - Manhole stationing.

- Invert and surface elevation at each manhole, and grade of sewer between adjacent manholes. All manholes shall be numbered on the plans and correspondingly numbered on the profile.
  - Where there is any question of the sewer being sufficiently deep to serve any residence, the Owner shall indicate building and basement floor elevations in the profile.
  - All known existing structures, both above and below ground, which might interfere with the proposed construction, particularly water mains, gas mains, storm drains, overhead and underground power lines, telephones lines, irrigation systems and television cables.
  - All utility easements, including County recording numbers.
  - Details in scale drawings which clearly show special sewer joints and cross-sections, and sewer appurtenances such as manholes and related items and all other items as required by the Town to clearly identify construction items, materials, and/or methods.
- D. Construction of new sewer systems or extensions of existing systems will be allowed only if the existing receiving system is capable of supporting the added hydraulic load.
- E. Collection and interceptor sewers shall be designed and constructed for the ultimate development of the tributary areas and as established in the Town's General Sewer Plan.
- F. Sewer systems shall be designed and constructed to achieve total containment of sanitary wastes and maximum exclusion of infiltration and inflow. Sewers installed below water table may require special design and inspections.
- G. Computations and other data used for design of the sewer system may be required to be submitted to the Town for approval.
- H. All pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from established line and grade shall not be greater than 1/2-inch, provided that such variation does not result in a level or reverse sloping invert. Any corrections required in line and grade shall be reviewed with the Public Works Director and shall be made at the expense of the Owner.
- I. Deflection tests shall be performed on all PVC sewer mains and the deflection test limit shall be 5.0 percent of the base inside diameter of the pipe.
- J. After all other work is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections for a new roadway consistent with the original section to the satisfaction of the Public Works Director
- K. The Owner shall be required, upon completion of the work and prior to acceptance by the Town, to furnish the Town with a written guarantee (Maintenance Bond) covering all material and workmanship for a period of two years after the date of final acceptance and the Owner shall make all necessary repairs during that period at their own expense, if such

repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Owner shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the Town upon completion of the work.

### **7.03 General Requirements**

- A. Prior to construction, the sewer plans shall be reviewed and approved by the Public Works Director, DOE and the Town's engineer when applicable.
- B. Prior to construction, the Owner shall notify the Town for a pre-construction meeting.
- C. Work shall be performed only by a Washington State licensed and bonded contractor, with a Town business license, if required, and with demonstrated experience in laying public sewer mains of the type being proposed for construction.
- D. Minimum horizontal and vertical separation shall be maintained between water and sewer utilities as required by the DOE manual entitled "Criteria for Sewage Works Design", latest edition.
- E. The maximum distance between manholes shall be 300 feet unless specifically approved otherwise by the Public Works Director.
- F. PVC pipe shall be a minimum Class S.D.R. 35 and be manufactured in accordance with ASTM D3034.
- G. The allowable cover (finished grade) for main line collection piping is 5' to 15'.
- H. The minimum slope for 4-inch side sewer laterals shall be 2.0% 6-inch side sewer laterals shall be 1.0% The minimum slope for 8-inch gravity mains shall be 0.5%. The minimum slope for 10-inch gravity mains shall be 0.4%. The minimum slope for 12-inch gravity mains shall be 0.3%.
- I. Each side sewer lateral shall have an approved water-tight cap at the termination of the stub, and it shall be adequately "blocked" to satisfactorily resist the air pressure testing (5 lbs. for 5 minutes).
- J. Each side sewer lateral shall have a treated 4" x 4" wood "marker" at the termination of the stub. The "marker" shall extend from the bottom of the trench to 12 inches above finished grade. Above the ground surface, it shall be painted "white" with "S/S" and the depth, in feet, stenciled in black letters 2-inches high.
- K. Front lot corners shall be staked prior to construction for side sewer tee location.
- L. All side sewers shall be extended a minimum of five feet past the street right-of-way line (or property line).
- M. Side sewer connections if allowed directly into manholes shall be constructed according to the drop manhole detail within these specifications.

- N. Manholes, where sewer extension may occur, shall be provided with knock-outs and channeled accordingly.
- O. Manholes shall be provided with a 0.10-foot drop across the channel.
- P. Locking covers shall be provided for all manholes and shall have the word “sewer” cast integrally onto its surface.
- Q. Concrete collars shall be placed around all frames for manholes located in gravel drive areas.
- R. Pipe connections to manholes shall be as follows: Core the manhole and connect sewer pipe with a water-tight flexible rubber boot grouted into manhole wall, Kor-N-Seal boot or equal.
- S. Pipe trenches shall not be backfilled until pipe and bedding installation has been inspected and approved by the Public Works Director.
- T. Final air testing shall not be accepted until after the asphalt treated base or finished paving is accomplished, all other underground utilities have been installed, and the lines have been flushed, cleaned, deflection tested and television inspected.
- U. Manhole rim and invert elevations shall be field verified after construction by the Owner’s engineer(s) and the “as built” drawings individually stamped by a professional engineer licensed in the State of Washington which shall attest to the fact that the information is correct. As-built drawings shall be to Town datum, and must be submitted and approved by the Town prior to project acceptance.

Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the Town, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) safety standard.

#### **7.04 Materials and Testing**

##### **A. Inspection**

The Owner shall request for inspection a minimum of 3 working days in writing prior to the Owner’s scheduled need. Inspection shall be required for the following items of work:

- 1. Pipe and bedding installation;
- 2. Backfill and compaction.

Upon completion of the project all sewer install shall be inspected with television inspection equipment. The Owner shall provide the Town with a copy of the inspection and shall have the Town present during the television inspection.

##### **B. Sewer Mains, Laterals and Force Mains**

Gravity sewer mains and laterals shall be designed and constructed in conformance with Standard Specifications M41-10 current edition.

Pressure sewers and force mains shall be designed and approved by DOE. They shall conform with DOE Criteria for Sewage Works Design, latest edition.

All pipe shall be jointed by the manufacturer's standard coupling, be all of one manufacturer, be carefully installed in complete compliance with the manufacturer's recommendations.

The sewer pipe, unless otherwise approved by the Public Works Director, shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug.

All extensions, additions and revisions to the sewer system, unless otherwise indicated, shall be made with sewer pipe jointed by means of a flexible gasket which shall be fabricated and installed in accordance with the manufacturer's specifications and approved by the Public Works Director.

Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed, cleaned, re-lubricated if required, and replaced before the rejoining is attempted.

Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket until the gasket is properly positioned

For the joining of dissimilar pipes, suitable adapter couplings shall be used which have been approved by the Public Works Director.

All gravity sewer pipe shall be bedded with pea gravel or other material approved by the Public Works Director. The PVC pipe shall be bedded from a depth of four inches below the pipe to eight inches above the pipe.

### **C. Manholes**

Manhole material, size, type, construction, testing, adjustments and appurtenances must conform to Standard Specifications M41-10 current edition.

The Owner shall be responsible for any existing defects in the existing manhole unless these defects are witnessed by the Public Works Director prior to any work being performed to make the connection. The Owner shall be required to remove any and all debris in the existing manhole and downstream reaches as a result of his/her work.

#### **1. Manhole Sections**

Manhole sections shall be placed and aligned so as to provide vertical sides and vertical alignment of the ladder steps. The completed manhole shall be rigid, true to dimension, and be water tight. Rough, uneven surfaces will not be permitted. The mortar used between the joints in the pre-cast sections and for laying manhole

adjusting bricks shall be composed of one-part cement to two parts of plaster sand. All joints shall be thoroughly wetted and completely filled with mortar, smoothed both inside and outside to insure water tightness. The outside and inside of pre-cast concrete manhole sections shall be plastered and troweled smooth with 1/2-inch (minimum) of mortar in order to attain a watertight surface.

2. Drop Manholes

Drop manholes shall, in all respects, be constructed as a standard manhole with the exception of the drop connection as further detailed herein.

**D. Oil/Water Separation, Grease Interceptor**

1. Industrial or commercial businesses that regularly wash vehicles or engage in engine cleaning and other cleaning operations that use acids, caustics, or other metal brighteners as part of their integral maintenance operations, must use closed loop water recycling systems that have zero discharge to the Town's sanitary sewer system. These systems will be reviewed by the Town and DOE for proper design, construction and maintenance.
2. Industrial or commercial businesses that generate mineral/petroleum oils exceeding 100 milligrams per liter to be discharged to the Town's sanitary sewer system, pre-treatment is required. An oil/water separation device shall be installed by the Owner, selection and sizing of an oil/water separator shall be subject to the approval of the Public Works Director.
3. Commercial food preparation operations that generate fats, oils and grease waste must have a properly sized grease interceptor installed by the Owner in conformance with the Uniform Plumbing Code, Appendix H standards and Twisp Municipal Code. Selection and sizing of an interceptor shall be subject to the approval of the Public Works Director.

**E. Side Sewer Lateral**

Side sewer lateral material, size, type, construction and testing must conform to Standard Specifications M41-10 current edition.

A side sewer lateral is considered to be that portion of a sewer line that will be constructed between a main sewer line and the final connection point to the building. All applicable specifications given herein for sewer construction shall be held to apply to side sewer laterals. Side sewers shall be for a single connection only and be a minimum four-inch diameter pipe. Side sewers shall be connected to the tee, provided in the sewer main where such is available, utilizing approved fittings or adapters. The side sewer shall rise at a maximum of 45° and a minimum slope of two percent, from the sewer main to provide each lot with the deepest sewer possible.

The Owner shall provide for each side sewer service a 4-inch x 4-inch treated wooden post which extends from the invert of the end of the 6-inch pipe to above the existing ground. The exposed area of this post shall be painted white and shall have selected thereon in two-inch letters (black paint) "S/S" and shall also indicate the depth of the sewer service stub from finished grade.

Where no tee or wye is provided or available, connection of 4-inch and 6-inch side sewer shall be made by machine-made tap and saddle, only by the Twisp Public Works Department. The Public Works Director shall review the exact location and material list. Saddles shall be placed between 45° and 80° off vertical. The maximum bend permissible at any one fitting shall not exceed 45°. The Owner will provide a safe excavated access to the sewer connection for the Twisp Public Works Department to perform the tap.

The maximum bend of any combination of two adjacent fittings shall not exceed 45° (one-eighth bend) unless straight pipe of not less than three feet in length is installed between such adjacent fittings.

Provide grease trap or grease interceptor in accordance with DOE Criteria for Sewage Works Design latest edition, or as approved by the Town.

### **7.05 Crossings**

All state highway, railroad, and stream crossings shall be encased with a steel casing or ductile iron or PVC sleeve, as approved by the Town and prevailing regulatory agencies. The welded steel casing or sleeve shall be of sufficient diameter, size and strength to enclose the sewer pipe and to withstand maximum highway or railroad loading. Sizing and wall thickness of casing is subject to approval by the Public Works Director. Link seal, foam or grout fill between the casing and the sewer pipe shall be required to hold the sleeve and pipe apart and seal the ends.

### **7.06 Street Patching and Restoration**

See Section 5 for requirements regarding street patching.

### **7.07 Adjustment of New and Existing Utility Structures to Grade**

See Section 5 for requirements regarding street patching.

### **7.08 Finishing and Cleanup**

Before acceptance of sewer system construction, all pipes, manholes, catch basins, and other appurtenances shall be cleaned of all debris and foreign material. After all other work on this project is completed and before final acceptance, the entire roadway, including the roadbed, planting, sidewalk areas, shoulders, driveways, alley and side street approaches, slopes, ditches, utility trenches, and construction areas shall be neatly finished to the lines, grades and cross sections of a new roadway consistent with the original section, to the satisfaction of the Public Works Director.

Drainage facilities such as inlets, catch basins, culverts, and open ditches shall be cleaned of all debris which is the result of the Owner's operations.

All pavements and oil mat surfaces, whether new or old, shall be thoroughly cleaned. Existing improvements such as Portland cement concrete curbs, curb and gutters, walls, sidewalks, and other facilities which have been sprayed by the asphalt cement shall be cleaned to the satisfaction of the Public Works Director.

Castings for manholes, valves, lamp holes, vaults and other similar installations which have been covered with the asphalt material shall be cleaned to the satisfaction of the Town.

#### **7.09 Cleaning and Testing**

Prior to the completion of work, the constructed sanitary sewer system shall be cleaned and tested in accordance with Standard Specifications Section 7-17.

#### **7.10 General Guarantee and Warranty**

The Owner shall be required, upon completion of the work, and prior to acceptance by the Town, to furnish the Town a written guarantee (Maintenance Bond) covering all material and workmanship for a period of two years after the date of final acceptance and shall make all necessary repairs during that period at their own expense, if such repairs are necessitated as the result of furnishing poor materials and/or workmanship. The Owner shall obtain warranties from the contractors, subcontractors and suppliers of material or equipment where such warranties are required, and shall deliver copies to the Town upon completion of the work.

Easement documents, if applicable, shall be filed and recorded with the Okanogan County Auditor's office and the documents reviewed by the Town's Attorney prior to project acceptance.

# SECTION 8

## **8. STORM WATER STANDARDS**

### **8.01 General**

Storm drainage revisions, additions, modification, or changes shall be made in compliance with these Development Standards, Twisp Municipal Code, and “Best Management Practices” as identified in the Washington State Department of Ecology Stormwater Management Manual for Eastern Washington, current edition. Adequate provisions shall be made for storm drainage, storm sewers, and associated appurtenances sufficient to transmit maximum seasonal flows and one hundred-year floodwaters characterized in the area. All storm drains and facilities shall be designed by a professional engineer licensed in the State of Washington.

Storm sewer systems shall be designed and constructed in accordance with all applicable portions of Section 7 (Sanitary Sewer Standards) of these Development Standards.

Unless otherwise approved by the Town, pipes shall not be located underneath sidewalks, driveways, walls, or landscaped areas except for where drain pipes cross perpendicular to these areas.

Where frontage improvements are required by the Town, the Owner shall include in the detention calculations, the right-of-way improvements and provide detention and treatment for those improvements.

Where allowed, underground vaults or tanks shall not be located underneath public roads or recreation facilities.

Underground vaults or tanks shall not protrude above the ground surface more than 4-feet in any location. All portions protruding above the ground surface shall have an architectural facing approved by the Town and landscaping provided for screening.

Where allowed, underground vaults shall be equipped with a hatch as described in the Department of Ecology Eastern Washington Storm Water Management Manual for Eastern Washington, latest edition, rather than a standard manhole cover.

Where allowed, underground vaults and tanks shall be accommodated with easements or setbacks large enough to provide for the complete replacement (without encroaching on any other structures or roads) of the structure should

replacement be required in the future.

Open vaults or bioswales with vertical side(s) shall be prohibited.

Bioswales shall only be constructed where approved by the Town. Specifically, bioswales shall not be constructed between single family residences or commercial buildings.

Bioswales shall not be designed with a longitudinal slope less than 1.5 percent.

All ponds shall be constructed with interior and exterior side slopes no steeper than 3 horizontal to 1 vertical. Ponds shall not be constructed with vertical side(s) unless approved by the Town.

All pond access roads shall be connected to the public street in at least one location (or connected via a public access tract). No portion of the access road shall exceed a 10 percent grade. Bollards shall be installed approximately 25 feet from the edge of traveled way (or curb) in order to provide a safe parking area for maintenance personnel when accessing the pond.

For privately owned and operated storm drainage systems, the Owner shall execute and record a Declaration of Covenant that identifies the storm drainage system by legal description, allows access to the Town to inspect and maintain, if necessary, and identifies the private owner as the party responsible for operation and maintenance. Such Declaration of Covenant shall be recorded with the Okanogan County Auditor prior to final approval of the project.

All stormwater drainage systems serving more than one single parcel not located within the public right-of-way or dedicated drainage tract shall be located within a drainage easement granted to a specific party. All easements shall be of sufficient width to allow complete replacement of the identified storm system component without encroaching into the foundation support of nearby buildings, walls, roads, steep slopes, driveways, sidewalks, or other structures.

All easements shall be provided in a form acceptable to the Town and recorded at the Okanogan County Auditor's Office prior to allowing the construction of a building on the property, or prior to recording of a plat. For land subdivisions, the easements may be shown on the plat map so long as the plat map identifies the specific party to which the easement is granted, the restrictions for the grantee and grantor, and clearly identifies the dimensions of the easement(s).

No public storm drainage easement shall be less than 15 feet in width. Where the easement is provided to gain access to a structure (catch basin, manhole, inlets) the easement width shall not be less than 15 feet.

## **8.02 Design Standards**

Project plans shall have a horizontal scale 20 feet to the inch and a vertical scale of not more than 5 feet to the inch.

The design of storm drainage and detention systems shall depend on their type and local site conditions. The design elements of storm drainage systems shall conform to the Twisp Municipal Code and the Development Standards as set forth herein. The following design considerations shall apply:

The use of commercial parking lots for detention of stormwater will be reviewed by the Town and approved or denied based on the design, location and general parameters of the project. The detention area shall be situated away from areas of pedestrian movement. The maximum depth of water in parking lot storage shall be limited to six inches. Curbs cannot be used for storage.

Maximum catch basin spacing shall be 200 feet on road grades up to three percent, 300 feet when the road grade is three percent or greater, and 500 feet maximum on main storm drains between access structures, whether catch basins or manholes. No surface water (unless otherwise approved in writing by the Town) shall cross any roadway.

Where storm systems are located outside an existing public right-of-way, permanent easements will be required for public or private maintenance of the system. Such easement shall be a minimum of 15 feet in width or twice the bury depth of the utility whichever is greater.

## **8.03 Conveyance**

Storm drain pipe within a public right-of-way or easement shall be sized to carry the maximum anticipated runoff (25-year design storm) from the possible contributing tributary area.

The minimum pipe size shall be 12 inches in diameter. Runoff shall be computed and, if the flow requires it, a larger pipe shall be used. Nothing shall preclude the Town from requiring the installation of a larger sized main if the Town determines a larger size is needed to serve adjacent areas or for future service.

All pipe for storm mains shall be "preapproved" by the Public Works Director based on localized conditions and comply with the following types:

Polyvinyl Chloride: PVC pipe shall conform to ASTM D3034, SDR 35 or ASTM F789 with joints and rubber gaskets conforming to ASTM D3212 and ASTM F477.

Polyethylene: PE smooth wall pipe per Advanced Drainage Systems

(ADS) N-12 (bell and spigot), or Town approved equal, constructed per Standard Specifications 7-04.

High Density Polyethylene Pipe (HDPE): HDPE pipe shall be SDR 25 butt-fused welded pipe high density, black, PE 3408. Pipe shall be made from premium high-density polyethylene resin, qualified as Type III, Category 5, Class C, Grade P34 in ASTM D1248-81.

Rim (ground) and invert elevations for individual storm drainage stubs shall be shown on the final record drawings. In the field, individual storm drainage stubs shall be marked by use of a white 2-inch x 4-inch post stamped "STORM." Post shall be placed at the stub invert and shall protrude from ground at a minimum of three feet.