

# CHAPTER 1 - GENERAL CONSIDERATIONS

## 1-07 REFERENCES

In the event these Standards and other applicable rules adopted by Snohomish County do not provide necessary design information, the following publications may be referenced with said reference(s) applying to the publications as adopted and amended. References followed by an asterisk\* are specifically cited in the EDDS text. All references are hyperlinked when a version is available to the public for free.

### A. WSDOT References

- [WSDOT Bridge Design Manual\\*](#)
- [WSDOT Construction Manual](#)
- [WSDOT Design Manual\\*](#)
- [WSDOT Highway Runoff Manual \(HRM\)\\*](#)
- [WSDOT Hydraulics Manual\\*](#)
- [WSDOT Local Agency Guidelines \(LAG Manual\)\\*](#)
- [WSDOT Roadside Manual](#)
- [WSDOT Standard Plans\\*](#)
- [WSDOT Standard Specifications\\*](#)
- [WSDOT Traffic Manual](#)
- [WSDOT Utilities Manual\\*](#)

### B. State and Local References

- [Criteria for Sewage Works Design \(Orange Book\) \(WA DOE\)](#)
- [Dam Safety Guidelines \(WA DOE\)\\*](#)
- [Low Impact Development: Technical Guidance Manual for Puget Sound\\*](#)
- [Pedestrian Facilities Guidebook](#)
- Washington Administrative Code (WAC)\*
- [Water Crossing Design Guidelines \(WDFW\)](#)
- [Water System Design Manual \(WA DOH\)](#)

### C. Federal References

- [ADA Standards for Accessible Design \(USDOJ\)](#)
- [ADA Standards for Transportation Facilities \(USDOT\)](#)
- Code of Federal Regulations (CFR)\*
- [FHWA Hydraulic Engineering Circular No. 11\\*](#)
- [FHWA Hydraulic Engineering Circular No. 14\\*](#)
- [Guide to the ADA Accessibility Standards \(U.S. Access Board\)](#)

- IESNA Roadway Lighting Handbook RP-8-00 (USDOT)\*
- [2005 Revised Draft Guidelines for Accessible Public Rights-of-Way \(2005 PROWAG\) \(U.S. Access Board\)\\*](#)
- [Manual of Surveying Instructions for the Survey of the Public Lands of the United States \(BLM Manual\)\\*](#)
- [Manual on Uniform Traffic Control Devices \(MUTCD\) \(as amended and approved by WSDOT\)\\*](#)
- [National Bridge Inspection Standard \(NBIS\)\\*](#)

#### **D. American Association of State Highway and Transportation Officials (AASHTO) References**

- Guide for Design of Pavement Structures
- Guide for the Development of Bicycle Facilities
- Guidelines for Geometric Design of Low-Volume Roads
- Guide Specifications for the Design of Pedestrian Bridges\*
- LRFD (Load Resistance Factor Design) Bridge Design Specifications\*
- Manual for Assessing Safety Hardware (MASH)\*
- A Policy on Geometric Design of Highways and Streets (Green Book)\*
- Roadside Design Guide\*
- Standard Specifications for Highway Bridges\*

#### **E. Other References**

- International Building Code (IBC)\*
- International Fire Code (IFC)
- Open Channel Hydraulics, Ven Te Chow, 1959\*

#### **F. Other Federal and State Standards**

The design criteria of other agencies including the Federal Housing Administration (FHA), Department of Housing and Urban Development (HUD), U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Department of Transportation, the Transportation Improvement Board (TIB) or any other federal or Washington State agency may also be applicable even if they are not specifically or generally referenced in the EDDS.

#### **G. Precedence**

In cases where these Standards conflict with the standards or procedures of the Washington State Department of Transportation (WSDOT) or the Federal Highway Administration (FHWA), the state or federal requirements shall take precedence for county road projects with state or federal funding.

## **1-09 PERMITS**

Other permits, approvals or agreements may be required by the County or other jurisdictions prior to initiating any activities subject to these Standards. It is the project applicant's

responsibility to obtain all necessary permits. Questions regarding such permits, approvals or agreements should be directed to the County Departments of Planning and Development Services or Public Works, as appropriate.

## CHAPTER 4 – ROAD ELEMENTS AND FEATURES

### 4-03 SURVEY MONUMENTS AND CORNERS

#### See Standard Drawing 4-130

#### A. Permit for Removal

In accordance with Chapter [332-120](#) Washington Administrative Code ([WAC](#)), no survey monument as defined therein shall be removed or destroyed without first obtaining a permit from the Department of Natural Resources. Any party causing the removal or destruction of a survey monument shall be responsible for ensuring that the original survey point is perpetuated.

#### B. Responsibility for Replacement

All existing survey control monuments that are disturbed, lost, or destroyed during surveying or construction shall be replaced, at the expense of the responsible party, by a land surveyor registered in the State of Washington.

#### C. New Survey Monuments

New survey monuments shall be installed in accordance with the provisions of this section 4-03. Standard steel reinforcing bars shall be at least 1/2 inch in diameter; steel pipes shall be at least 3/4 inch inside diameter, typical minimum length is 24 inches. Pipe or rebar shall be permanently tagged with the land surveyor's registration number. Specifications for roadway monuments are provided in Standard Drawing 4-130.

#### D. Boundary Establishment

Boundaries of subdivisions and road establishments shall be established with standard steel reinforcing bars, steel pipes, or monuments in accordance with Standard Drawing 4-130 permanently marked with the land surveyor's registration number. The same materials shall be used to mark the corners of lots, tracts, NGPA easement and Critical Area Protection Area/Easement (CAPA/E) boundaries. Monuments that represent section or quarter-section corners shall be marked according to the current Bureau of Land Management ([BLM](#)) [manual](#).

#### E. Offset Monuments

If a property corner is occupied by an obstruction, an offset monument shall be installed along one of the boundary lines. Monuments shall be set and marked according to the current [BLM manual](#) when witnessing section and quarter-section corners.

#### F. Road Monument Setting & Placement

A monument shall be set in accordance with Standard Drawing 4-130 at all points of curvature (PC), points of tangent (PT), center of cul-de-sac, road centerline intersection points, intersections of new road centerlines with the centerline of an existing county road right-of-way, at the end of road stubs, and at such intermediate points as determined by the Engineer.

The point of intersection (PI) will be acceptable in lieu of a PC and PT for road curves, provided the PI falls within the paved roadway and approval is granted by the Engineer prior to installing the monument.

Monuments at intersections with state highways are subject to the requirements and approval of the Washington State Department of Transportation, or as directed by the Engineer.

### **G. Install Monumentation Prior to Recording**

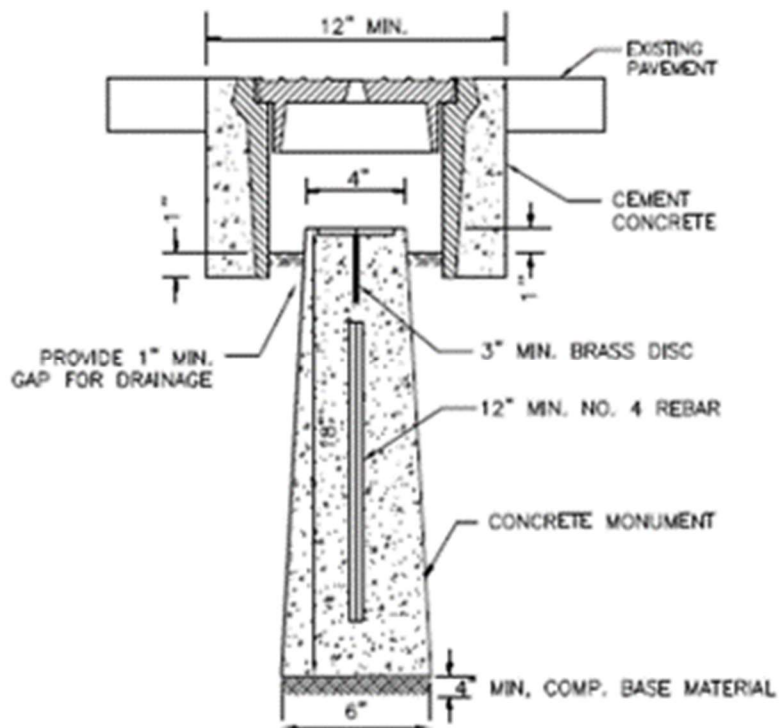
All required monumentation shall be installed prior to the recording of a subdivision, road establishment record of survey, or the final of any right-of-way permit for all other types of development. The delayed installation of required monuments shall not be allowed.

### **H. Private to Public Road Conversion**

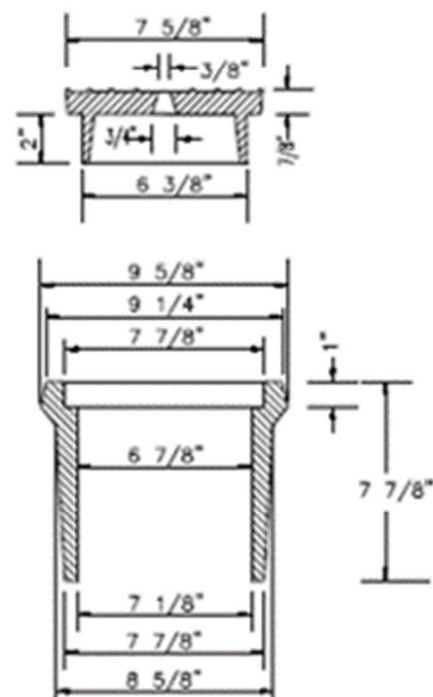
If a private road is constructed with the intent to be converted to a public road or a condition is placed on the development to not protest the conversion of the private road to a public road, monumentation shall be required in accordance with sub sections F & G above.

### **I. Aquatic Boundaries**

If any land in a subdivision is contiguous to an aquatic boundary, reference monuments shall be set along the parcel boundary line(s) which shall be established along the shore at such distance back from the aquatic boundary as to reasonably ensure against damage and destruction by flooding or erosion, bank caving, ice shoving, or wave action. Reference monuments or witness corner monuments will be established as near to the aquatic boundary as practicable. The purpose of the boundary side line reference monuments is to preserve the alignment of and the distance along the parcel boundary. Property lying beyond the reference monuments shall be defined by distance along the side property lines extended to the aquatic boundary.



PLAN



SECTION

NOTES:

1. MONUMENT CASE AND COVER SHALL BE CAST IRON.
2. BRASS DISCS SHALL BEAR THE REGISTRATION NUMBER OF THE LAND SURVEYOR RESPONSIBLE FOR SETTING THE MONUMENT.

SEE TEXT SECTION 4-03



SNOHOMISH COUNTY PUBLIC WORKS

4-130

MONUMENT CASE AND COVER

APPROVED BY:

COUNTY ROAD ENGINEER

DATE

# CHAPTER 6 - BRIDGES AND BURIED STRUCTURES

## 6-01 GENERAL

### A. Standards for New Bridges

Except as modified below, new public and private road bridges and associated structures in Snohomish County shall be designed and constructed to meet the minimum requirements set forth in the latest edition, including all interim addenda, of the AASHTO LRFD (Load Resistance Factor Design) Bridge Design Specifications and the [WSDOT Bridge Design Manual](#).

### B. Standards for Older Bridges

The AASHTO Standard Specifications for Highway Bridges, 17th edition, may be used for the maintenance and rehabilitation design of older, existing public and private road bridges and structures.

### C. Pre-Design for Private Bridges

Designers of private bridges are encouraged to schedule a pre-design meeting with the Departments of Planning and Development Services and Public Works to discuss design proposals.

### D. Buried Structures

Buried Structure is a generic term for a structure built or assembled inside an excavation employing embankment or trench methods, which works with granular backfill to derive its support from both the structure and the surrounding soil through soil-structure interaction. Buried Structure types considered herein consist of metal structural plate pipes, arches, and boxes, along with cast-in-place and precast reinforced concrete arch, box, split box, and three-sided structures.

## 6-02 BRIDGE AND BURIED STRUCTURE INFORMATION

### A. Required Submittals

The following items must be submitted to the Engineer for approval prior to the County accepting a bridge or buried structure that has a span or opening greater than 12 feet. Items 1, 2, and 3 shall be prepared and stamped by a Professional Engineer licensed in the State of Washington.

1. Bridge Load Rating – The load rating shall follow guidance in the current [WSDOT Bridge Design Manual](#).
2. Record Drawings – See EDDS Chapter 10.
3. Hydraulic and Scour Report – At a minimum, the report should include the following items;
  - Basin hydrology evaluation, including the expected range of flows in the waterway.
  - Channel hydraulics evaluation, including 100-year flood elevation relative to the bridge elevation and the corresponding maximum expected water velocity.
  - Scour evaluation, including soil depth calculation, bridge foundation review, and design of mitigation measures if necessary.

- If situated in a floodplain, verification that a “no-rise” condition exists.

## **B. County Inspections & Acceptance**

Bridges and buried structures in right-of-way or carrying a public road shall be inspected by a County bridge inspector prior to acceptance of the structure. After the above items have been submitted and approved, Snohomish County Public Works will schedule a bridge inspection by a county bridge inspector. Any deficiencies identified must be corrected before acceptance of the bridge. Inspections are performed in accordance with the National Bridge Inspection Standards (FHWA) in conformance with [23 CFR 650 Subpart C](#).

## **6-03 PERMITS FROM OTHER AGENCIES**

Construction or reconstruction of bridges may require permits from agencies such as the Coast Guard, Army Corps of Engineers, Department of Ecology, or the Department of Fish and Wildlife, among others. It is the project applicant's responsibility to obtain all necessary permits.

## **6-04 PEDESTRIAN BRIDGES**

Bridges that will carry pedestrian and bicycle traffic shall be designed in accordance with the AASHTO Guide Specifications for Design of Pedestrian Bridges.

## **6-05 BRIDGE DESIGN ELEMENTS**

### **A. Bridge Design Proposals**

Bridge design proposals shall address the elements listed below, as a minimum, for review by the Engineer.

The Engineer may direct that other design criteria, such as the bridge rehabilitation criteria set forth in the [WSDOT Local Agency Guidelines](#), be applied under appropriate circumstances.

### **B. Geometrics**

#### **1. Minimum Bridge Widths for Public and Private Roads**

The bridge shall provide for the full width and configuration specified for the functional classification and future use of the road being served. This may include the traveled way plus curb, sidewalks, walkway, bike lanes, and/or shoulder on one or both sides. The bridge traveled-way width, and shoulders if present, shall be measured between curbs or between faces of rails, whichever is less, but in no case shall it be less than 28 feet for public roads and 20 feet for private roads.

#### **2. Accommodations for Utilities**

Accommodation shall be made for utilities, including likely future improvements.

#### **3. Sidewalk Widths for Urban Area Bridges**

Urban area bridges shall have a minimum 6-foot wide sidewalk on each side of the roadway. Planter strips are not required.

#### **4. Separation for Active Transportation Modes**



Where operating speeds are 35 mph or higher, and significant bike and/or horseback traffic can be expected, the Engineer may require that facilities for these other modes of travel be separated from the traffic lanes by a bridge rail.

5. Vertical Clearance Over Roadways

Overhead vertical clearance for motor vehicles, including overpasses, shall be 16.5 feet minimum.

6. Vertical Clearance Over Active Transportation Facilities

Vertical clearance above a walkway, sidewalk, equestrian trail or bikeway shall be 10 feet minimum.

### **C. Water Crossing Structures**

When a bridge crosses water it shall comply with [WAC 220-660-190](#) (Water Crossing Structures). Deviation from the WAC 220-660-190 will require the approval of the Engineer. The following criteria are part of the WAC 220-660-190:

1. Bridge Height

The design must have at least three feet of clearance between the bottom of the bridge structure and the water surface at the 100-year peak flow unless engineering justification shows a lower clearance will allow the free passage of anticipated debris.

2. Bridge Abutments

The waterward face of all bridge elements that may come in contact with waters of the state including abutments, piers, pilings, sill, foundations, aprons, wing walls, and approach fill must be landward of the ordinary high-water line.

### **D. Approach Profile**

1. Sag Vertical Curves

A bridge shall not be located at the low point of a sag vertical curve to prevent accumulation of stormwater runoff on the bridge.

2. Width & Superelevation

The width and superelevation of the bridge shall match the approach roadway.

### **E. Load Requirements**

1. Live Loads – Vehicular Bridges

All vehicular bridges shall be designed to carry a live load of HL-93 (AASHTO Load Resistance Factor Design method, LRFD).

2. Live Loads – Active Transportation Bridges

Bridges for pedestrian and/or bicycle traffic shall be designed for a live load of 90 pounds per square foot.

3. Dead Loads

All new bridges shall be designed for actual dead load and superimposed dead loads, such as utilities, pavement and bridge railings.

4. Superimposed Dead Loads - Utilities

The minimum superimposed dead load for utilities is 120 pounds per linear foot, per utility line.

5. Superimposed Dead Loads – Asphalt Overlay

The minimum superimposed dead loads for 2-inch asphalt overlays is 25 pounds per square foot.

6. All Other Loads

All other loads not mentioned shall be per AASHTO LRFD (Load Resistance Factor Design) Bridge Design Specifications and the [WSDOT Bridge Design Manual](#).

## **F. Approach Slabs**

1. Requirements

Approach slabs are required for all bridges. Approach slab design shall be per AASHTO LRFD (Load Resistance Factor Design) Bridge Design Specifications and the [WSDOT Bridge Design Manual](#). The requirement for approach slabs may be waived only by deviation approved by the Engineer based on a geotechnical analysis.

2. Pavement Seats

All new bridge plans shall provide pavement seats for approach slabs, unless otherwise approved by the Engineer.

3. Length & Width

Approach slabs shall match the bridge width as required in 6-05.B.1, above

## **G. Substructures**

1. Scour Protection

All bridge foundations shall be protected from scour regardless of bridge type, location, and usage.

2. Scour Analysis

A scour analysis is required for new bridges.

3. Piers

Foundations for new bridges shall be located landward from the ordinary high water line and shall be founded on piles or drilled shafts unless it can be demonstrated that there will be no structural failure from expected scour for the life of the bridge.

4. Utility Openings

Bridge piers and diaphragms shall have openings for existing and future utilities.

## **H. Decks**

1. Threaded Inserts for Utilities

Bridge decks shall have threaded inserts for existing and future utility installations.

2. Concrete & Reinforcing Steel

Bridge decks shall be concrete and all reinforcing steel shall be hot-dip galvanized steel.

## **6-06 GUARDRAILS AND RAILINGS**

### **A. Approach Guardrails**

Bridge approach guardrails are generally required at all four corners of each bridge.

### **B. MASH Compliant**

All new bridge railing, rail transitions, and approach guardrail shall be MASH (Manual for Assessing Safety Hardware) compliant.

### **C. Standards and Specifications**

Bridge railing, rail transitions and approach guardrail shall be designed in accordance with the AASHTO LRFD Bridge Design Specifications, the [WSDOT Bridge Design Manual](#) and [WSDOT Standard Plans](#).

### **D. Hot-Dip Galvanized Steel**

All exposed structural steel in bridge railings shall be hot-dip galvanized steel.

### **E. Pedestrian Railing Height**

Pedestrian railing shall be a minimum height of 42 inches measured from the top of the walkway or future overlay.