

340.01	General	340.06	Grading and Erosion Control
340.02	References	340.07	Roadway Design and Channelization
340.03	Design Considerations	340.08	Pavement Design
340.04	Project Datum	340.09	Traffic Control
340.05	Site Preparation		

## 340.01 General

This chapter identifies the major civil elements associated with a ferry terminal. Civil elements include: toll plaza, vehicle holding and support areas, parking, HOV and transit, access approaches and exits, bicycle and pedestrian access, site circulation, site utilities, and signage and wayfinding. [Exhibit 340-1](#) is an aerial photo showing the site layout of WSF's Kingston Ferry Terminal. Refer to [Exhibit 340-2](#) for an example terminal layout depicting the civil elements and the chapters covering their design.

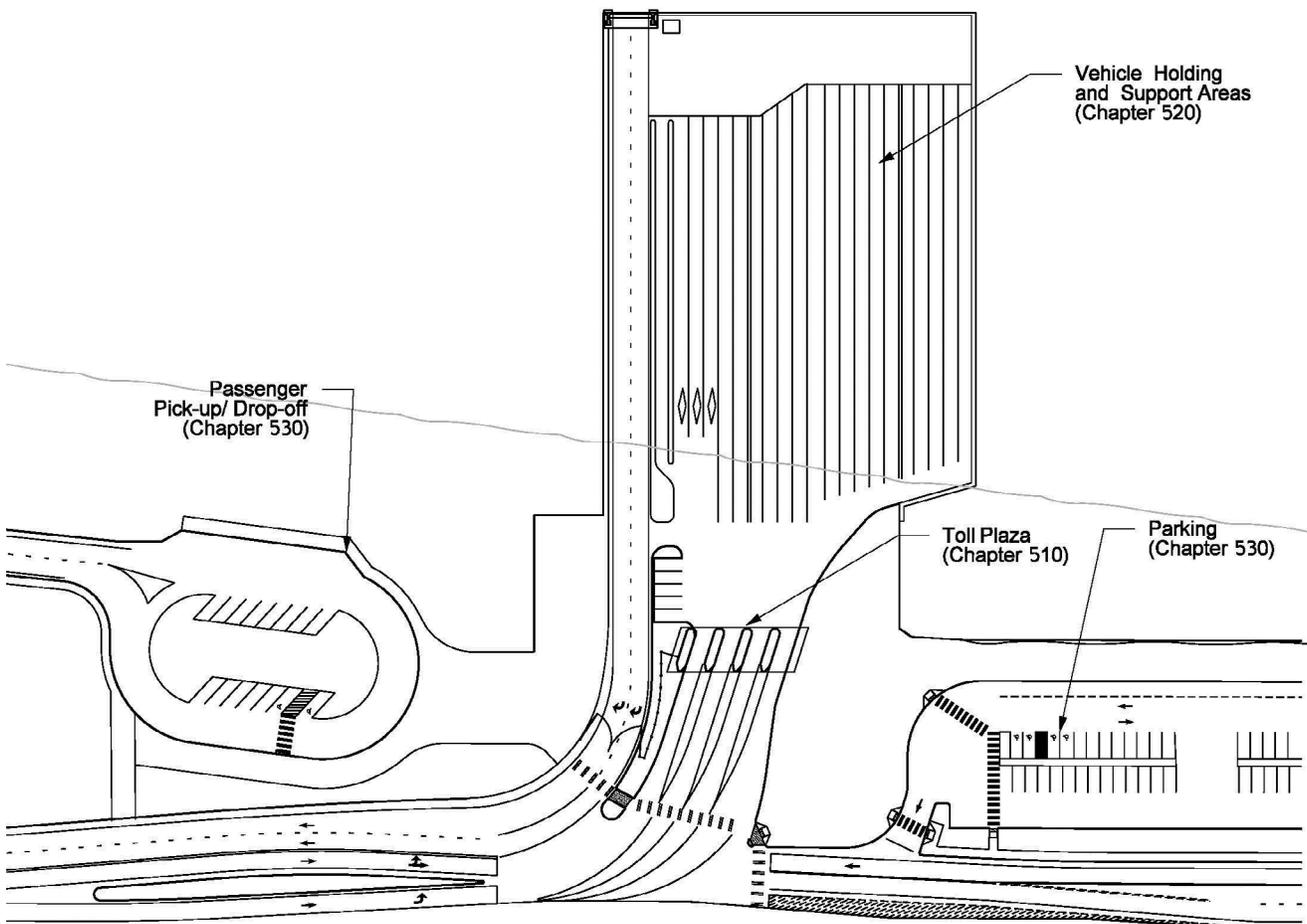


**Kingston Ferry Terminal Layout**  
*Exhibit 340-1*

This chapter also provides guidelines on project datum, site preparation, grading and erosion control, roadway design and channelization, paving, and traffic control.

For additional information, see the following chapters:

<b>Chapter</b>	<b>Subject</b>
300	Accessibility
310	Security
320	Environmental Considerations
500	Access, Approaches and Exits
510	Toll Plaza
520	Vehicle Holding and Support Areas
530	Parking
540	HOV and Transit
550	Site Circulation
560	Site Utilities
570	Signage and Wayfinding
580	Sustainability/Low Impact Development



**Example Terminal Layout – Site Design**  
*Exhibit 340-2*

## 340.02 References

Unless otherwise noted, any code, standard, or other publication referenced herein refers to the latest edition of said document.

### (1) **Federal/State Laws and Codes**

[49 CFR Part 39](#) *Transportation for Individuals with Disabilities – Passenger Vessels*

[RCW 47.28.035](#) *Cost of project, defined*

[WAC 332-130-060](#) *Local geodetic control survey standards*

### (2) **Design Guidance**

*Design Manual* M 22-01

*Highway Runoff Manual* M 31-16

*Hydraulics Manual* M 23-03

*Pavement Policy*

*Plans Preparation Manual* M 22-31

*Standard Plans for Road, Bridge, and Municipal Construction* M 21-01

### (3) **Supporting Information**

*Guide for Design of Pavement Structures*, AASHTO

*Manual on Uniform Traffic Control Devices (MUTCD)*, FHWA

*A Policy on Geometric Design of Highways and Streets (Green Book)*, AASHTO

*NCHRP Report 659 - Guide for Geometric Design of Driveways Transportation Research Board*

## 340.03 Design Considerations

### (1) **Accessibility**

Wherever pedestrian facilities are intended to be a part of a transportation facility, [28 CFR Part 35](#) requires that those pedestrian facilities meet ADA guidelines. Federal regulations require that all new construction, reconstruction, or alteration of existing transportation facilities be designed and constructed to be accessible and useable by those with disabilities and that existing facilities be retrofitted to be accessible.

Additionally, [49 CFR Part 39](#) prohibits owners and operators of passenger vessels from discriminating against passengers on the basis of disability, requires vessels and related facilities to be accessible, and requires owners and operators of vessels to take steps to accommodate passengers with disabilities.

Design pedestrian facilities to accommodate all types of pedestrians, including children, adults, the elderly, and persons with mobility, sensory, or cognitive disabilities. Refer to [Chapter 300](#) for accessibility requirements.

## (2) Security

[Chapter 310](#) includes a general discussion of the United States Coast Guard (USCG) three-tiered system of Maritime Security (MARSEC) levels, vessel security requirements, and additional information pertaining to civil design. Below are links to relevant sections by topic. Coordinate with the WSF Company Security Officer (CSO) regarding design issues pertaining to security. In addition, coordinate with the USCG and Maritime Security for all terminals, the United States Customs and Border Protection (USCBP) for international terminals, and the Transportation Security Administration (TSA) for TWIC and SSI.

- MARSEC Levels: [310.04](#)
- Vessel Security: [310.05](#)
- Toll Plaza and Vehicle Holding: [310.08](#)
- Access Control/Restricted Areas/TWIC: [310.10](#)
- Panic Buttons: [310.12](#)
- Signage: [310.13](#)
- Sensitive Security Information: [310.14](#)

## (3) Environmental

Refer to [Chapter 320](#) for general environmental requirements and design guidance. Refer to the project NEPA/SEPA documentation for project-specific environmental impacts and mitigation.

## (4) Operations and Maintenance

Involve WSF Operations and Maintenance staff throughout the design process and provide opportunities for review of the project drawings and specifications. Ensure that required maintenance activities can be performed in compliance with OSHA/WISHA guidelines.

Below are some operations and maintenance issues to consider:

- Minimize repair and maintenance required during the design life.
- Confirm location of existing utilities within the project limits and take appropriate measures to keep existing utilities operational, as required. Refer to [Chapter 200](#) for some major utilities at various terminals which warrant special note.
- Address traffic control, construction staging, and phasing issues during design to minimize impact on existing operations.

## (5) Materials Specification

Utilize materials that are in accordance with the requirements of the [Standard Specifications](#) M 41-10 and WSF *General Structural Notes* (See Structures Group for a copy and explanation of use) and *Regional General Special Provisions*. Consider the material requirements of federally funded projects including the requirement for American-made steel. Make use of WSF stockpiles of materials where possible.

## **(6) Right of Way and Sundry Site Plans**

Right of Way Plans are the official state documents used as the basis to acquire real estate and other property rights for roadways. It is the responsibility of the region to prepare plans for the acquisition of rights of way (R/W), including easements, permits, and any substantiating documentation necessary for completion of the plans. Verification of ownership of existing R/W is also required.

A Sundry Site Plan is used to map property that cannot be shown on a Right of Way Plan such as ferry terminals, wetlands mitigation sites, park and ride lots, stockpile sites, and stormwater retention or other reclamation sites.

Both Right of Way Plans and Sundry Site Plans convey legal information regarding property boundaries. Right of Way Plans are typically based on roadway alignments whereas Sundry Site Plans are not based on roadway alignments. When the boundaries of an existing ferry terminal are modified, the corresponding Right of Way Plans and Sundry Site Plans must also be modified.

The Sundry Site Plan contains all terminal property information with the exception of property on highway right of way. Refer to the WSDOT [Plans Preparation Manual M 22-31](#) for additional information regarding Right of Way and Sundry Site Plans. To obtain title reports or determine if any acquisition, easements, leases or right of entry agreements may be needed for the project, contact the WSDOT regional or headquarters Real Estate group.

WSDOT has decision authority on state right of way in unincorporated areas and within cities below a specified population as set forth in the [Design Manual M 22-01](#). WSDOT also maintains decision authority in limited access areas. Obtain approval through the local WSDOT district/region for modifications to state right of way in unincorporated areas. Coordinate with both WSDOT and the local jurisdiction for improvements and any associated permit requirements within incorporated areas.

## **(7) DNR Leased Property**

WSF leases offshore state-owned land through the Washington State Department of Natural Resources (DNR) at several existing terminals. A DNR authorization to use state-owned aquatic lands is required if projects will occur on or over state-owned aquatic lands. The use of this land is through a DNR authorization that serves as a legal contract that outlines the terms and conditions of use and conveys certain property rights to the user (WSF) in exchange for rent.

WSF/WSDOT is responsible for contacting the DNR early in the design process to determine any requirements for attaining or altering existing leases. Coordinate with the WSDOT Right of Way Branch on issues regarding DNR leased property.

## 340.04 Project Datum

A datum is a geometrical quantity (or set of quantities) that serves as a reference, forming the basis for computation of horizontal and vertical control surveys in which the curvature of the earth is considered. Adjusted positions of the datum, described in terms of latitude and longitude, may be transformed into State Plane Coordinates.

Establish the Project Datum (horizontal and vertical) to be used for design drawings at the onset of the project. Note that all engineering work (mapping, planning, design, right of way, and construction) for WSDOT projects, excluding WSF projects, is based on a common datum.

### (1) *Horizontal*

[WAC 332-130-060](#) states, “The datum for the horizontal control network in Washington shall be NAD83 (1991) [the North American Datum of 1983] as officially adjusted and published by the National Geodetic Survey of the United States Department of Commerce and as established in accordance with [Chapter 58.20 RCW](#). The datum adjustment shall be identified on all documents prepared; i.e., NAD83 (1991).”

### (2) *Vertical*

The North American Vertical Datum of 1988 (NAVD88) as defined by the National Geodetic Survey (NGS) is the official civilian datum for surveying and mapping activities in the United States. WSDOT has adopted this datum. WSF uses an adjusted vertical datum of Mean Lower Low Water (MLLW) which is based on localized tidal elevations. The MLLW datum is adjusted every 20-25 years based on the current National Tidal Datum Epoch (NTDE). See [Section 330.06](#) Tidal Information for Terminal Tidal Datums, Design Tidal Ranges and a discussion of Sea Level Rise. The Table below provides elevations at the top of a Bridge Seat (Typically Slip 1) from both the NAVD88 and MLLW referenced datum. See [Appendix Z](#) for additional information.

A common point has been selected at each terminal for the purpose of establishing horizontal and vertical datums. This point is located at the intersection of the Slip 1 centerline and the shoreward edge of the steel cover plate at the bridge seat. See [Exhibit 340-3](#) for the horizontal and vertical datums for this point at each terminal. See also [Appendix Z](#) for photos of the surveyed points.

Terminal	Northing (Feet)	Easting (Feet)	Latitude	Longitude	NAVD88 (Feet)	MLLW (Feet)
Anacortes	555118.59	1193345.95	48 30 25.590 N	122 40 39.900 W	16.33	16.88
Bainbridge Island	231594.00	1227009.97	47 37 21.210 N	122 30 35.433 W	15.85	18.36
Bremerton	210152.60	1198069.99	47 33 43.215 N	122 37 30.497 W	14.89	17.39
Clinton	359334.35	1269055.96	47 58 30.246 N	122 20 58.503 W	15.50	17.55
Coupeville	428258.52	1191534.48	48 09 27.400 N	122 40 21.769 W	13.07	14.19
Edmonds	300486.63	1259178.33	47 48 47.641 N	122 23 06.212 W	14.71	16.76
Fauntleroy	194761.33	1254308.36	47 31 23.446 N	122 23 46.095 W	13.22	15.65
Friday Harbor	567584.98	1112106.53	48 32 07.602 N	123 00 51.109 W	16.44	16.93
Kingston	294447.80	1232044.95	47 47 42.465 N	122 29 41.759 W	16.00	18.05
Lopez	579546.06	1144138.17	48 34 14.275 N	122 53 00.063 W	18.15	18.67
Mukilteo	349711.97	1279904.40	47 56 57.378 N	122 18 16.383 W	15.33	17.39
Orcas	589759.04	1129781.00	48 35 51.188 N	122 56 37.623 W	18.36	18.94
Point Defiance	116178.98	1223430.66	47 18 21.642 N	122 30 50.876 W	16.18	18.67
Port Townsend	411277.07	1169980.50	48 06 40.875 N	122 45 33.326 W	15.45	16.56
Seattle	223419.72	1268887.33	47 36 09.098 N	122 20 21.889 W	16.32	18.65
Shaw	584895.60	1133024.81	48 35 04.089 N	122 55 47.412 W	12.34	12.86
Southworth	191480.18	1229538.68	47 30 45.947 N	122 29 45.876 W	16.14	18.65
Tahlequah	125719.27	1225240.57	47 19 56.164 N	122 30 27.632 W	15.24	17.73
Vashon	190530.46	1237485.87	47 30 38.255 N	122 27 49.840 W	16.58	19.11

**Terminal Horizontal and Vertical Datums**  
**Exhibit 340-3**

### (3) Datum Conversion

Many reference drawings used for design purposes, such as as-built drawings for utilities prepared by local municipalities, are prepared using different datums. The datum of all reference drawings should be verified and converted to the Project Datum prior to use. When using existing WSF drawings, make note of the tidal epoch and convert elevations to the Project Datum as required.

## 340.05 Site Preparation

Specify site preparation activities including but not limited to clearing, grubbing, cut, fill, demolition, and existing utility protection, demarcation and/or relocation in order to create favorable site conditions which facilitate construction activities. If necessary, remove existing roadway to accommodate new roadway sections. Roadway sections are determined by surfacing reports produced by the region materials lab (NW Region for East Sound and Olympic Region for West Sound). Refer to the WSDOT *Plans Preparation Manual* M 22-31 for Site Preparation Plans.

Consider the following with regard to site preparation activities:

- Specify clearing and grubbing activities that minimize disturbance to existing vegetation, especially trees. Consider protecting trees and other vegetation to be removed with construction fencing or other means.

- To the extent feasible, select grades that balance the overall quantity of cut and fill for the project.
- Minimize excavation in soils where contamination is known or expected to exist.
- Minimize excavation in areas with known archaeological issues, such as the Mukilteo Ferry Terminal. During the early stages of design, consult with WSDOT Cultural Resources staff whenever planning work in such a location.
- The extent of removal of existing structures may depend on environmental mitigation, with consideration to current over-water coverage and contaminated materials such as creosote coated timber piles.
- Consider in-water work window limitations for any necessary in-water demolition work.
- Specify means and methods to be incorporated such that on-street transportation relating to site demolition is minimized.
- Adhere to all project permit conditions.

### 340.06 Grading and Erosion Control

Site grading and erosion control are interrelated. Proper grading can reduce the extent of erosion control measures required during and after construction.

#### (1) Grading

Grade the site in such a manner that surface water does not accumulate in areas other than designated sediment traps. Provide smooth transitions to buildings and other structures. Grade the site such that pedestrian paths of travel are accessible. Avoid, wherever possible, the use of walls or other earth retaining structures to prevent abrupt changes in elevation and provide smooth transitions between site elements.

#### (2) Erosion Control

The *Highway Runoff Manual* (HRM) M 31-16 defines the thresholds that require projects to develop temporary erosion and sediment control (TESC) and spill, prevention, control, and countermeasure (SPCC) plans. TESC and SPCC plans are required to identify and minimize project risks associated with sediment and pollutants impacting soil, air, and water quality. Project parameters such as soil type, precipitation, topography, drainage patterns, groundwater, sensitive areas, vegetation preservation, and schedule all affect the TESC and SPCC plans.

During construction, protect known wetlands with high visibility (orange construction) fencing.

All paving projects shall include the cleaning of existing drainage structures as part of the work.

Employ available Best Management Practices (BMPs) as appropriate to construction activities. Design site drainage to prevent erosion of soils and to prevent flooding up to the design storm event. Consider utilizing areas of existing vegetation to remove sediment from runoff before it flows into the receiving water body. Refer to the *HRM* and *Standard Plans* M 21-01 for more information regarding erosion control BMPs.

Erosion control measures may include, but are not limited to the following:

- Matting
- Construction road stabilization
- Dewatering structures and holding tanks
- Erosion Control Blankets
- Sediment traps
- Silt fencing, wattles
- Storm drain inlet protection, storm drain outlet protection

Stabilize embankments and prevent movement of soil stockpiles with soil covering measures where necessary. Protect adjacent properties by retaining sediment onsite through use of structural and source control measures as necessary (in essence, prevent the transport of soil and debris onto adjacent streets).

Sensitive areas, such as wetlands, shall be protected from intrusion by installing high visibility orange temporary construction fencing.

### (3) **Material Selection**

Utilize materials for grading and erosion control that conform to *Standard Specifications* M 41-10. Where feasible, specify that onsite soil be used or reused. Where significant concrete demolition is required, consider reusing crushed concrete.

## 340.07 Roadway Design and Channelization

### (1) **General**

Design roadways approaching terminals to accommodate both local and ferry traffic, maintaining local access to the waterfront. Signing and striping is to delineate terminal traffic. Consider designing the roadway to provide overflow queuing of ferry traffic, thereby reducing traffic backups onto adjacent roadways (refer to *Design Manual* for design width of ferry holding lanes on roadway shoulder). Consider use of controlled intersections and strategic timing of signalized intersections, where appropriate, to further improve traffic flow.

Safely segregate vehicles, pedestrians, and bicyclists. Be aware of vertical clearance and clear zone requirements when sizing and laying out elements within the adjacent roadways and terminal area. Bicyclists may be combined with vehicular traffic outside the terminal boundaries, but a separate bicycle lane is recommended where significant bicycle traffic is anticipated.

Consider whether bicycle volumes warrant adding a separate bicycle gate at the terminal entrance.

Identify the agency with jurisdiction over each segment of roadway being designed. Roadway design and channelization requirements vary between roadways within the terminal limits (WSF jurisdiction) and roadways outside the terminal limits which may be governed by either WSDOT or a local municipality. WSDOT has decision authority in unincorporated areas and within cities below a specified population as set forth in the *Design Manual* M 22-01.

**(a) WSF**

Design terminal roadways in accordance with the *Design Manual* M 22-01, as supplemented by the *WSF Terminal Design Manual* guidelines. Where any discrepancy exists, the *WSF Terminal Design Manual* takes precedence.

Refer to [Chapter 500](#)), [Chapter 510](#), and [Chapter 750](#) for additional information on roadways within the ferry terminal.

**(b) WSDOT**

Design WSDOT roadways outside the ferry terminal limits in accordance with the *Design Manual* M 22-01. Submit separate WSDOT Channelization Plans for WSDOT approval. Work with the WSDOT regional office for Channelization Plan submittal and approval requirements during the 30 percent Design stage.

Intersection modifications may require modifications to the Right of Way and/or Sundry Site Plan which can be a long lead time item.

Coordinate with WSDOT for design information including but not limited to:

- Design vehicle
- Highway classification
- Highway design speeds
- Lane widths and other geometrics

**(c) Local Municipalities**

Coordinate with local municipality for standards pertaining to their roadways. Design of these roadways is subject to approval by the local municipality. Note that WSDOT has decision authority in unincorporated areas and within cities below a specified population as set forth in the *Design Manual* M 22-01.

**(2) ADA Accessibility**

Design routes of travel to comply with ADA requirements and accommodate both abled and disabled persons. Refer to [Chapter 300](#) for further information.

**(3) HOV Access**

If specified in the scoping process, design terminals to promote the use of HOV travel options which may include HOV lanes, motorcycle and bicycle lanes, carpool parking, transit facilities/bus circulation, and access to commuter rail.

**(4) Emergency Access**

Provide access for emergency vehicles including fire and medical aid to the terminal facilities and for preferential loading to the vessel. Coordinate with the local Fire Chief for emergency access requirements. Accommodate fire truck turning requirements in design of terminal roadways.

### (5) Vertical Clearance Requirements

When crossing the vehicle holding and exit lanes, the minimum clearance under the OHL system is 16.0 feet with 16.5 feet being desirable. All ferry vessels serving WSF terminals have a tunnel height of 16 feet or less. If any OHL structure is proposed to cross a state route outside the terminal facility per the terminal sundry site plan or a city street, the minimum clearance must meet highway standards (WSDOT and AASHTO). Refer to the *Design Manual* M 22-01 for vertical clearance requirements for bridges.

### (6) Design Vehicles

The design vehicle within WSF terminal facilities (beginning at the toll plaza) is a WB-62 (a semitrailer truck with an overall wheelbase of 62 feet) tractor trailer. For parking lots and loading dock areas use the largest design vehicle appropriate to the largest vehicle that is anticipated to use the facility.

Design adjoining roadways using the design vehicle per the *Design Manual* M 22-01.

### (7) Vehicle Turning Analyses

Coordinate with WSF Operations staff to determine critical operational maneuvers to be analyzed using turn simulation software (such as AutoTURN®) to verify the design. At a minimum, confirm the following:

- Passenger vehicles are able to enter any of the toll lanes and pass through to any of the holding lanes.
- Two lanes of passenger vehicles are able to load and unload from each vehicle transfer span at once.
- Design vehicle (WB-62) is able to enter any of the toll lanes and pass through to a more limited number of “truck” holding lanes (to be specified by WSF Operations). A smaller design vehicle, the use of which is to be documented, for parking and loading dock areas is acceptable.
- Design vehicle is able to load and unload from each vehicle transfer span (only one lane of traffic required to load at a time).
- Largest anticipated vehicle (typically a WB-67) is able to make required movements with some encroachment outside designated lanes.
- Emergency vehicles are able to access all critical locations of the site as identified by the local Fire Chief.
- BUS (single unit bus) is able to make all necessary movements.

**Note:** A deviation is required for terminals designed to use the exit lanes for the loading of larger vehicles. Service vehicles are exempt from this deviation requirement, but a separate service vehicle entrance lane should be considered at new terminals.

### (8) **Controlled Intersections**

A signal warrant must be satisfied for each proposed signalized intersection prior to its installation. MUTCD, Part 4, defines a signal warrant as a threshold condition that, if found to be satisfied as part of an engineering study, shall result in analysis of other traffic conditions or factors to determine whether a traffic control signal or other improvement is justified.

Refer to *Design Manual* M 22-01 for additional controlled intersection requirements.

### (9) **Approvals**

Below is a list of potential approvals required for roadway design and channelization.

- WSDOT Channelization Plans
- Design Approval
- Project Development Approval
- WSDOT Signal Warrant
- WSDOT Sundry Site Plan modifications
- WSDOT Right of Way modifications

## 340.08 Pavement Design

### (1) **General**

Pavement design is determined by different limiting factors including traffic loading, soils characteristics, weather, performance records, and cost/benefit analysis. Refer to the WSDOT *Pavement Policy* for additional information regarding paving. For the civil design criteria, paving is typically divided into the following categories:

#### (a) **Roadway**

The roadway portion of the paving includes exit lanes and the toll plaza, vehicle access lanes, and roadways and intersections outside the terminal boundary.

#### (b) **Parking**

The parking portion of the paving includes such areas as passenger drop-off, short-term and ADA parking, commuter parking, and WSF employee parking.

#### (c) **Transit Facilities**

The transit facility portion of the paving includes transit centers and other areas with high transit use.

#### (d) **Toll Booths**

Toll booth paving refers to a short swath of Portland Cement Concrete Pavement (PCCP) adjacent to the toll booth windows, which is subject to added wear due to the continuous starting and stopping of vehicles. Refer to [Chapter 510](#) for toll booth pavement limits.

**(e) Holding Lanes**

The holding lanes portion of the paving includes the entrance lanes to the toll booths from the adjacent roadway as well as the service lane, holding lanes, and all other areas of the trestle.

**(f) Hardscape**

Hardscape paving includes all paved portions of the site designed for pedestrian traffic, except overhead walkways and standard crosswalks. It is inclusive of all sidewalks and promenades.

**(2) Material Selection**

For pavement areas within the terminal, pavement sections and materials will be used as described below. For areas outside the terminal facility, the project designer will contact the WSDOT region materials laboratory for surfacing recommendations. The boundary is defined by the sundry site plan.

For projects with work outside the facility, consult project geotechnical, paving and traffic reports for data and recommendations that may influence pavement design. A WSDOT resurfacing and/or pavement design report specifying paving requirements for the roadways outside WSF facilities is typically prepared for terminal projects by the WSDOT region materials lab. WSDOT HQ approves the pavement design. Refer to [Design Manual Chapter 620](#) Design of Pavement Structure for additional information.

Ferry terminals have low (less than 5000) Average Daily Traffic (ADT) counts with a small (less than 5 percent) truck traffic percentage. For this reason, at ferry terminals the designer is instructed to use the pavement sections given below.

In an effort to reduce stormwater collection and treatment systems, consider incorporating permeable pavement in select areas of terminal pavement design. Since the suitability of permeable cement concrete pavements is dependent upon the percolation rate of the subgrade material, this type of pavement should not be used without concurrence from the WSDOT region materials laboratory. Refer to [Chapter 580](#) for a discussion of low impact pavement design options.

Following are some general paving recommendations for areas within the facility. For all hot mix paving applications, specify Hot Mix Asphalt (HMA) Class ½", Performance Grade (PG) 64-22, and an Equivalent Single Axle Load (ESAL) of 0.5 million in the project contract documents.

Material lift thickness and material property requirements are per the requirements of the [Standard Specifications](#) M 41-10. In areas with moderate to severe alligator cracking as described in the [WSDOT Pavement Surface Condition Rating Manual](#), repair subgrade as needed.

**(a) Roadway**

For work inside WSF right of way, use 0.50' thick compacted sub-grade (generally Method B per *Standard Specifications* Section 2-04.3(14)B) topped with a 0.50' deep crushed rock base course and overlain by 0.50' thick HMA, or pervious cement concrete pavement per WSDOT Materials Lab recommended design section(s). Pervious cement concrete pavement sections will also need to be sized according to hydraulic design considerations. Native embankment may need to be recompacted as well. If there is a history of rutting or shoving a bump in binder grade to PG 70-22 should be considered.

Use HMA over trestles to pave trestle roadway lanes. Match existing pavement section depth. New concrete trestle pavement requirements will be per the recommendations of the structures group supervisor.

For work outside WSF right of way, use pavement per WSDOT Materials Laboratory recommended design section(s).

**(b) Parking**

For reconstruction or pavement repair, use 0.50' thick compacted sub-grade (generally Method B per *Standard Specifications* Section 2-04.3(14)B) topped with a 0.35' deep crushed rock base course and overlain by 0.25' thick HMA. Consider the use of pervious pavement in onsite parking areas. Native embankment may need to be recompacted as well.

For resurfacing work, use a WSDOT recommended bituminous surface treatment.

**(c) Transit Facilities**

Due to heavier loading conditions, use 0.75' thick Portland cement concrete pavement (PCCP), including dowel bars, instead of HMA where busses stop or wait. PCCP shall be placed over 0.50' deep crushed rock base course over 0.50' thick compacted sub-grade (generally Method B per *Standard Specifications* Section 2-04.3(14)B). Native embankment may need to be recompacted as well.

**(d) Toll Booths**

Use PCCP between the toll booths due to added wear caused by the frequent starting and stopping of vehicles at the toll booth windows. Use the same pavement section as described above for Transit Facilities. Refer to [Chapter 510](#) for additional toll booth requirements.

**(e) Holding Lanes**

Use HMA over trestles to pave trestle holding lanes. Match existing pavement section depth. New concrete trestle pavement requirements will be per the recommendations of the structures group supervisor.

For upland holding lanes, in general, use the same pavement section as described above for Roadways.

**(f) Hardscape**

Design hardscape portions of the paved areas to support pedestrian traffic in addition to maintenance and emergency vehicles, as required. As is the case for sidewalk sections at the Anacortes and Coupeville terminals, there may be potential to incorporate pervious pavement in some hardscape areas. Design sidewalks with consideration to [Standard Plans M 21-01](#) and [Standard Specifications M 41-10](#). Design sidewalks to be ADA compliant. Refer to [Chapter 300](#) for additional information.

**(3) Approvals**

Below is a list of approvals that may be necessary for paving activities.

- Building Permit, as administered by the local municipality
- Highway paving (outside WSF right of way) requires pavement approval by WSDOT HQ Materials Lab.
- Bituminous surface treatment requires pavement approval by WSDOT HQ Materials Lab.

**340.09 Traffic Control**

Traffic Control is intended to promote safety and efficiency by providing the orderly movement of all road users on streets, highways, bikeways, and private roads open to public travel. Traffic control is accomplished through the implementation of traffic control devices. Traffic control devices notify users of regulations and provide warning and guidance needed for the uniform and efficient operation of all elements of the traffic stream. Traffic control devices include signs, barricades, gates, markings, and traffic signals.

Refer to [Chapter 570](#) and the MUTCD for further design information.

**(1) Temporary Traffic Control**

The Work Zone Traffic Control Plan (WZTCP) is prepared by WSF and approved by WSDOT and the local municipality as appropriate. The WZTCP is viewed as a working document that may change with operational requirements and permit conditions. It can be modified by the contractor with WSDOT approval. Consult WSF Operations both in preparation of traffic control plan and when making modifications during construction. Coordinate with local municipality and refer to [Design Manual Chapter 1010](#) for additional guidance on temporary traffic control.

In addition to the aforementioned guidelines, consider the following guidance specific to WSF terminals:

- Spotters, equipped with 2-way radio communications equipment, shall be used for all operations involving the backing of trucks.
- Traffic pylons and or cones are commonly used at WSF terminals in place of traffic barrels due to the low speeds and limited space available. Refer to [Standard Plans M 21-01](#) and [Standard Specifications M 41-10](#) for addition guidelines.

**(2) State Force Provided Traffic Control**

- Accommodating pedestrians within the work zone may be needed, such as busloads of children at the Vashon Island Ferry Terminal.
- The dollar value of State Force work for a given project, which includes State provided traffic control, is limited by the requirements of [RCW 47.28.035](#). Refer to [Chapter 200](#) and WSDOT *Plans Preparation Manual* Division 7, Other Contract Considerations for more guidance on this topic.

**(3) Permanent Traffic Control**

Design traffic control devices so that features such as size, shape, color, composition, lighting, and contrast are combined to draw attention to the devices; that size, shape, color, and simplicity of message combine to produce a clear meaning; that legibility and size combine with placement to permit adequate time for response; and that uniformity, size, legibility, and reasonableness of the message combine to command respect.

Design placement of traffic control devices to be within the road user's view so that adequate visibility is provided. To aid in conveying the proper meaning, position traffic control devices appropriately with respect to the location, object, or situation to which it applies. Locate traffic control device such that a road user has adequate time to make the proper response in both day and night conditions. Place traffic control devices in a uniform and consistent manner. Avoid use of devices that are not necessary to the control of traffic as they can create confusion and clutter. Refer to [Standard Plans](#) M 21-01 and [Standard Specifications](#) M 41-10 for addition guidelines.