*Reviewers,*

*These changes are small like sometimes only a sentence, so to streamline the review, we have combined these Design Manual Chapters.*

*Keep in mind that in combining these chapters/sections into one file makes the formatting and numbering of the sections look incorrect. Do not worry about the formatting or the section numbers. We will fix all formatting and section numbers before we publish in September.*

*Please set your MS Word to “Review”, “All Markup” to see all track changes and comments. And do not worry if your changes/comments go into new pages. We will take care of it.*

*Please review the changes below as you would any other Design Manual review using MS Word’s Track Changes and please add a comment about each of your changes to help us understand why you are suggesting your changes.*

*Every chapter starts on a new page.*

***Thank you*** *for helping us improve the Design Manual for users like yourself.*

Chapter 100 Manual Description

# 100.03 Practical Solutions

WSDOT deploys Practical Solutions to enable more flexible and sustainable transportation investment decisions as outlined in [Executive Order (EO) E 1090.01](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1090.pdf). This data-driven approach uses tools, data analytics, performance measures, and stakeholder input to (1) seek lower-cost approaches and efficiencies in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure, (2) identify, evaluate, analyze, and manage risk to WSDOT’s strategic objectives, and (3) identify and implement agency efficiencies. Practical Solutions includes one or a combination of strategies, including, but not limited to, Transportation Systems Management and Operations (TSMO) strategies, off-system solutions, and incremental strategic capital solutions. The goal is to identify and solve needs as quickly and cost-effectively as possible. (See Chapter 1100 for more information.)

Chapter 321 Sustainable Safety Analysis

## 321.05(1) Crash Analysis Report (CAR)

A CAR is developed during the scoping phase for I-2 Crash Reduction projects and is required for funding to be released. A template of the Crash Analysis Report with instructions is available here: <http://wwwi.wsdot.wa.gov/Planning/CPDMO/PlanningProgrammingSafety_I-2.htm>

Projects with an approved CAR may, in some cases, be exempted from the requirement to prepare a Basis of Design (see Chapter 1100.)

Chapter 1100 Practical Design

# 1100.01 General

The Washington State Department of Transportation (WSDOT) is committed to context-appropriate, multimodal, performance-based designs. WSDOT’s goal is to optimize existing system capacity and safety through better interconnectivity of all transportation modes. Community engagement is an essential element.

This chapter provides an overview of the practical design approach that WSDOT uses to make project decisions. The remaining chapters in Division 11 provide specific design policy details for each procedural step. WSDOT’s practical design approach is context-appropriate, multi-modal and performance-based. Practical design uses appropriate performance metrics, stakeholder input, and agency risk management practices to help identify investments that address a given problem in the most efficient manner possible, regardless of the mode, activity, or agency/organization with jurisdiction. As a result, WSDOT’s practical design finds consistency through the procedural process applied rather than pre-determined outcomes for projects.

This chapter provides an overview of practical solutions, practical design, and the different elements that are examined and documented in design decisions.

## 1100.02 Practical Solutions

Practical Solutions is applicable to everything the agency does, including the way we administer, manage, plan, program, design, construct, operate, and maintain all of our services and program. It is a performance-based approach to transportation and organizational decision making, as outlined in [Executive Order (EO) E 1090.01](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1090.pdf).

The Practical Solutions approach prioritizes innovative, timely, and cost-effective decisions with our stakeholders and partners. It considers each situation and encourages incremental, flexible, and sustainable investment decisions by focusing on identified performance needs and engaging stakeholders at the right time.

This data-driven approach uses tools, data analytics, performance measures, and stakeholder input to (1) seek lower-cost approaches and efficiencies in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure, (2) identify, evaluate, analyze, and manage risk to WSDOT’s strategic objectives, and (3) identify and implement agency efficiencies. Practical Solutions includes one or a combination of strategies, including, but not limited to, Transportation Systems Management and Operations (TSMO), off-system solutions, Transportation Demand Management (TDM), and incremental strategic capital solutions. The goal is to identify and solve needs and problems as quickly and cost-effectively as possible.

## 1100.03 Practical Design

Practical design is the design phase component of practical solutions, addressing the transportation-related need that’s identified or evolves during the planning, scoping or design phase of a project. Practical design is data driven, employing performance metrics to seek low-cost approaches and efficiencies in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure that are identified in collaboration with other agencies, communities, and stakeholders. The objective is to identify low-cost solutions that meet the need(s), while considering benefits to the system as a whole and the role of incremental solutions as a way to address uncertainties identified in future scenarios.

The Basis of Design (BOD) is a template for the process WSDOT uses to document the practical design approach, and may be employed in either the project scoping or design phase. The process consists of the following seven steps:

1. Assemble a project advisory team as needed (see 1100.04).
2. Clearly identify the baseline need. Define it in terms of performance, contributing factors, and underlying reasons for the baseline need (see Chapter 1101).
3. Identify the land use and transportation context (which includes environmental use and constraints) for the location (see Chapter 1102).
4. Select design controls compatible with the context (see Chapter 1103).
5. Formulate and evaluate potential alternatives including TSMO strategies that resolve the baseline need for the selected context and design controls (see Chapter 1104).
6. Select design elements that will be included in the alternatives (see Chapter 1105).
7. Determine design element dimensions consistent with performance needs, context, and design controls (see Chapter 1106).

See 1100.10(1) for more information about the Basis of Design.

# 1100.03(1) Community Engagement

WSDOT staff engage the community affected by a project in order to strengthen partnerships, increase credibility, drive priorities, and inform decision-making. Community input informs the project development process from planning to design. Engaging with the community helps us more fully understand:

* Performance issues and gaps
* Context identity
* Local environmental issues
* Modal priorities and needs

Refer to the *[WSDOT Community Engagement Plan](https://wsdot.wa.gov/sites/default/files/2019/05/22/Planning-CommunityEngagementPlan-2016Update.pdf)* for more information, and document the findings of community engagement efforts (see 1100.10(5)).

# 1100.03(2) Advisory Team

Collaborative decisions contribute to successful project delivery. Engage external and internal stakeholders providing consent-based outcomes early in project development.

Convene an advisory team who’s member have the skills, knowledge, and responsibilities needed for design decision-making; including planning, project development, environment, traffic, and active transportation.

Consider recommendations offered by the advisory team that involve decisions documented on the Basis of Design, providing an opportunity for feedback on those decisions that involve those recommendations.

The project manager has discretion in how to engage internal and external stakeholders in documenting decisions. For more information on organizing, managing, and collaborating with advisory teams, see the WSDOT Project Management Guide:  [www.wsdot.wa.gov/projects/projectmgmt/onlineguide/preconstructioninitiatealign](http://www.wsdot.wa.gov/projects/projectmgmt/onlineguide/preconstructioninitiatealign)

# 1100.03(3) Need and Performance Identification

The need for the project is the primary reason the project has been programmed at the location. Determine performance metrics and targets based on an assessment of this project specific need, and other contextual needs developed through community engagement. Perform a contributing factors analysis that refines the identified need so more precise performance gaps and metrics can be identified.

Refer to Chapter 1101 and the Performance Based Design guidance document for more information:  [www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical\_Design.pdf](http://www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf)

# 1100.03(4) Context Determination

Context determination refers to the characteristics, activities, and functions within a geographical area. WSDOT’s context determination process involves two interrelated topics: land use and transportation, referencing both the existing and future conditions. Chapter 1102 provides guidance for determining context.

# 1100.03(5) Design Control Selection

Design controls provide fundamental constraints for highway design. Five design controls are used to help guide design decisions:

1. Design Year
2. Modal Priority
3. Access Control
4. Design Speed
5. Terrain Classification

Chapter 1103 presents guidance related to choosing design controls.

# 1100.03(6) Alternative Formulation and Evaluation

The goal is to develop a solution for the baseline need at the lowest cost. However, it is critical to understand how the solution affects other known or identified needs, termed “contextual needs.” Chapter 1101 provides a discussion on baseline and contextual performance needs, and Chapter 1104 discusses using these needs to develop and evaluate alternatives.

Practical Solutions requires consideration of lower-cost approaches and efficiencies in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure. The intent is to find low-cost solutions before making large capital investments. To support this goal, Transportation Systems Management and Operations (TSMO) provides a broad spectrum of possible operational and demand management strategies that can be assessed before the pursuit of capacity expansion. TSMO is only one of many potential approaches available to meet specific needs and problems identified.

In some cases, the planning phase will have identified a strategy based on practical solutions planning. Focusing on the preferred strategy can help guide the development of alternative solutions. The Alternative Strategies and Solutions subsection of the Guidance Documents discusses primary TSMO strategies and examples of solutions within those strategies.

Design Support Webpage:  <http://www.wsdot.wa.gov/Design/Support.htm>

Direct link to the Guidance Documents:

 [www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical\_Design.pdf](http://www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf)

Direct link to Transportation Systems Management and Operations: <https://tsmowa.org/>

# 1100.03(7) Design Element Selection and Dimensions

The selection of design elements is based entirely on the alternative selected to address the baseline need while balancing performance trade-offs. Chapter 1105 provides instruction for design element selection. Chapter 1106 provides information related to choosing dimensions for design elements.

# 1100.04 Documentation Tools

Basis of Design (BOD), Basis of Estimate (BOE), Design Parameter Sheets, and Alternative Comparison Tables are all documentation tools used to record decisions and analyses needed in development of a solution that is consistent with WSDOT’s practical design approach. The tools can be found at:  <http://www.wsdot.wa.gov/Design/Support.htm>

## 1100.04(1) Basis of Design

The BOD organizes information around the practical design procedural steps (see 1100.02) necessary to support WSDOT’s practical design approach. It provides a template for documenting each step in the process. The BOD includes the following information and sections:

* Planning Document Summary
* General Project Information
* Section 1 – Project Needs
* Section 2 – Context
* Section 3 – Design Controls
* Section 4 – Alternatives Analysis
* Section 5 – Design Element Selection

Exhibit 1100-1 shows the major activities associated with WSDOT’s practical design approach and corresponding Design Manual chapters and Basis of Design sections.

Start compiling the BOD as early as possible. During planning or scoping, a BOD may be only partially completed. Information documented on the BOD provides an opportunity for greater consistency between strategies developed in planning and solutions developed in scoping and design. Information documented in the BOD comes through use of consent-based recommendations (see Section 1100.04).

Contact the region Program Management regarding the need to initiate a BOD during the project-scoping phase. Since the BOD is ultimately a document that supports design decisions, the approval of a BOD, which ideally takes place at 30% design level or earlier, is a part of, and included in, the project Design Approval process (see Chapter 300). Note that if a BOD has been prepared for a project and no design elements were changed, ASDE approval of the BOD is not required.

Basis of Design:  [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)

### 1100.04(1)(a) Basis of Design Exemptions

See 1100.02 for guidance regarding when a BOD is required for scoping projects. For design-phase projects, a BOD supports design decisions and is required on all projects where one or more design elements are changed (see Chapter 1105). Exceptions are listed below.

If the only design elements changed by a project are listed in Exhibit 1105-1, or the changed elements are described and documented in an approved intersection control evaluation (ICE) or collision analysis report (CAR), the need for a Basis of Design (BOD) may be waived with approval of the Assistant State Design Engineer (ASDE). In any request for exemption, describe how the circumstances presented by the project make a BOD unnecessary. Only ICE or CAR documents that describe the project need(s), alternatives considered, and performance tradeoffs used in the alternative selection will be considered documentation suitable to support a BOD exemption. Each request is evaluated on a case-by-case basis.

Note that if the project is a preservation program project, a Basis of Design is not required if the only design elements changed are listed in Chapter 1120, and the criteria/guidance provided in Chapter 1120 is followed. This exemption does not require approval, and is documented in the DDP.

## 1100.04(2) Basis of Estimate

A Basis of Estimate is required for all project estimates, and is updated throughout all phases of project development. Refer to the [*Cost Estimating Manual for WSDOT Projects*](http://www.wsdot.wa.gov/Publications/Manuals/M3034.htm) for additional information on estimating and the Basis of Estimate.

## 1100.04(3) Alternatives Comparison Table

The Alternative Comparison Table (ACT) provides solutions evaluated in accordance with WSDOT’s Practical Solutions approach. This table allows comparison of alternatives to identify the optimum solution. The table enables discussions of performance trade-offs. The Alternative Comparison Table is supplemental documentation for Section 4 of the BOD. Alternative Comparison Table:  [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm).

## 1100.04(4) Design Parameter Sheets

The Design Parameter Sheets document the dimensions selected for the various design elements selected and noted in Section 5 of the Basis of Design. Design Parameter Sheet template:  [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)

## 1100.04(5) Documenting Community Engagement

Community engagement is a fundamental component of WSDOT’s Practical Solutions strategy, and key to practical design implementation. Community engagement will be consistent with the *WSDOT Community Engagement Plan* (see  [www.wsdot.wa.gov/planning/](http://www.wsdot.wa.gov/planning/))

Document community engagement for all projects. There is no strict format for this.

# 1100.05 References

## 1100.11(1) Federal/State Directives, Laws, and Codes

[Revised Code of Washington (RCW) 47.04.280](http://apps.leg.wa.gov/RCW/default.aspx?cite=47.04.280) – Transportation system policy goals

[Revised Code of Washington (RCW) 47.05.010](http://apps.leg.wa.gov/RCW/default.aspx?cite=47.05.010) – The statement of purpose for priority programming of transportation projects

[Secretary’s Executive Order 1090.01](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1090.pdf) – Advancing Practical Solutions

Chapter 1101 Need Identification

# 1101.03 Contextual Needs

Practical design requires that designers refrain from overdesigning the project by focusing the solution on the baseline need or needs. In doing so, opportunities are provided by projects to address other needs that may be identified through community engagement and/or increased project knowledge and understanding. These other needs are classified as “contextual needs.”
A contextual need is any identified need that is not a baseline need. Potential sources of contextual needs include:

* Performance gaps identified through the priority network screening that did not prioritize under a statewide biennial prioritization and budget exercise, but still exist at the project location.
* Needs identified through community engagement or identified by a partnering agency.
* Needs based on identified environmental regulations and constraints.
* Needs identified through coordination with WSDOT maintenance including life cycle operating and maintenance costs (see Chapter 301 for additional information).
* Needs and agency risks identified through increased knowledge of the project site and context.

Develop metrics for contextual needs to compare alternatives. Interpret and translate each issue into a statement that is measureable, to the extent feasible. Contextual need metrics can be either quantitative or qualitative.

Chapter 1102 Context Determination

# 1102.01 General Overview

***Context*** refers to the environmental, economic, and social features that influence livability and travel characteristics. Context characteristics provide insight into the activities, functions, and performance that can be influenced by investments in the multimodal transportation system including the roadway design. Context also informs designs, including the selection of design controls, such as target speed and modal priority, and other design decisions.

For the purposes of transportation planning and design, WSDOT divides context into two categories: land use and transportation. Each of these contexts is further defined and categorized in this chapter. Note that context categories, and the information pertinent to deriving them, may have been documented in a planning study.

The concepts and method described in this chapter are adapted from National Cooperative Highway Research Program Report 855: “An Expanded Functional Classification System for Highways and Streets” (see <http://www.trb.org/NCHRP/Blurbs/176004.aspx>).

# 1102.05 References

## 1102.05(1) Federal/State Directives, Laws, and Codes

[23 Code of Federal Regulations (CFR) 450, Subpart B](https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=23:1.0.1.5.11#sp23.1.450.b), Statewide Transportation Planning

[23 CFR 450, Subpart C](https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=23:1.0.1.5.11#sp23.1.450.c), Metropolitan Transportation Planning and Programming

[23 United States Code (USC) 134](http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title23-section134&num=0&edition=prelim), Metropolitan Planning

[23 USC 135](https://www.gpo.gov/fdsys/granule/USCODE-1997-title23/USCODE-1997-title23-chap1-sec135), Statewide Planning

[Revised Code of Washington (RCW) 35.58.2795](http://apps.leg.wa.gov/RCW/default.aspx?cite=35.58.2795), Public transportation systems – Six-year transit plans

[RCW 35.77.010(2)](http://apps.leg.wa.gov/RCW/default.aspx?cite=35.77.010) and [RCW 36.81.121(2)](http://apps.leg.wa.gov/RCW/default.aspx?cite=36.81.121), Perpetual advanced six-year plans for coordinated transportation program expenditures – Nonmotorized transportation – Railroad right-of-way

[RCW 36.70A](http://app.leg.wa.gov/RCW/default.aspx?cite=36.70A), Growth management – Planning by selected counties and cities

[RCW 43.21C](http://app.leg.wa.gov/rcw/default.aspx?cite=43.21C), State environmental policy

[RCW 47.05](http://apps.leg.wa.gov/rcw/default.aspx?cite=47.05&full=true), Priority programming for highway development

[RCW 47.06](http://apps.leg.wa.gov/RCW/default.aspx?cite=47.06.040), Statewide transportation planning

[RCW 47.06B](http://apps.leg.wa.gov/RCW/dispo.aspx?cite=47.06B), Coordinating special needs transportation

[Secretary’s Executive Order 1090.01](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1090.pdf) – Advancing Practical Solutions

Chapter 1104 Alternatives Analysis

# 1104.01 General

Washington State Department of Transportation practical design policy requires formulating and evaluating alternatives while considering acceptable performance trade-offs to meet the need(s) of a project at the lowest level of investment. This chapter discusses how:

* Information determined from planning phases and Chapters 1101, 1102, and 1103 is utilized in alternative solution formation.
* To evaluate the alternative solutions developed.

# 1104.02 Environmental Documentation Considerations

This chapter presents methods for developing alternatives. For projects requiring an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), a final proposed alternative may only be determined through the National Environmental Policy Act (NEPA) process and/or the State Environmental Policy Act (SEPA) process (see Chapter 400 of the Environmental Manual for more information). If an EA or EIS has not been initiated under NEPA/SEPA, follow the procedures in this chapter. To help advance the project, consider and use appropriate NEPA/SEPA terminology. Perform public and agency outreach and document all information regarding alternatives development for use later in the NEPA/SEPA process, according to 23 CFR 168(d). Terminology used in this chapter assumes that NEPA/SEPA have not been initiated. In the event that the NEPA/SEPA process has been initiated and an EA or EIS will be required, coordinate with the region Environmental Office staff to make sure that this alternative formulation and evaluation is performed in accordance with NEPA/SEPA guidance.

# 1104.03 Alternative Solution Formulation

Identify alternatives that address the baseline need while balancing the performance trade-offs identified in the process. This performance-based, data-driven approach can include analysis of multimodal trade-offs and the formulation of multimodal/intermodal solutions, potentially reducing travel demand. Reference need identification and contributing factor analysis (CFA) in the alternative solution formulation (see Chapter 1101 and Contributing Factors subsection of the *[Guidance Document](http://www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf)* for more information).

Conduct alternative solutions formulation according to the following principles:

* Formulate alternatives compatible that are with context and design controls.
* Seek lower-cost approaches and efficiencies, such as Transportation Systems Management and Operations strategies, in expanding and operating the multimodal transportation system to reduce travel demand and the need for building costly new infrastructure.
* Consider incremental, phased solutions.
* Formulate alternatives that address, but do not exceed, the specific needs and problems.
* Form solutions around contributing factors or the underlying root reason(s) identified from CFA. Address the underlying root reason(s) determined from CFA in at least one alternative.
* Evaluate the relative benefit between each alternative against the baseline and contextual performance metrics to determine the optimally performing solution for the least cost. (See 1104.03(3) for information on calculating the benefit/cost of alternatives.)

Planning phase corridor sketches or studies may be used to identify WSDOT’s strategy for the corridor. If occurred planning phase has occurred, develop at least one alternative based on the strategy identified in the planning report See the Alternative Strategies and Solutions subsection of the *[Guidance Document](http://www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf)* for more information regarding different strategies that may be considered.

If a planning study has developed specific alternatives, and those alternatives are still relevant,carry those alternatives into the alternative evaluation process.

# 1104.04 Alternative Solution Evaluation

Alternative solution evaluation involves analyzing the design year performance benefits provided by a solutions with respect to the amortized cost. It is the intent of the alternative solution evaluation process to:

* Compare solutions that resolve the baseline need(s) in consideration with the benefits or impacts associated with the contextual needs.
* Analyze the relative value of each alternative, including associated performance
trade-offs. Considerations should also include agency risks, resource constraints, and life cycle operating and maintenance costs. .
* Mitigate unacceptable performance trade-offs with proven countermeasures.
* Refine targets if mitigation measures applied yield unacceptable performance
trade-offs.

## 1104.04(3) Benefit/Cost Analysis

Inherent with understanding the performance trade-offs being considered, is the overall benefit/cost for the alternatives proposed. Although a factor for all potential alternatives, in some cases, decisions will be based on life cycle operating and maintenance costs, as discussed in Chapter 301. In other cases, perceived benefits are a challenge to quantify and will need analysis such as that discussed in *NCHRP Report 642:* *Quantifying the Benefits of Context Sensitive Solutions*: 🖰 [www.trb.org/Publications/Blurbs/162282.aspx](http://www.trb.org/Publications/Blurbs/162282.aspx)

# 1104.06 References

## 1104.06(1) Federal/State Directives, Laws, and Codes

[42 United States Code (USC) 4321](http://uscode.house.gov/view.xhtml?req=(title:42%20section:4321%20edition:prelim)%20OR%20(granuleid:USC-prelim-title42-section4321)&f=treesort&edition=prelim&num=0&jumpTo=true), National Environmental Policy Act of 1969 (NEPA)

[Chapter 43.21C Revised Code of Washington](http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21C) (RCW), State Environmental Policy Act (SEPA)

[Chapter 468-12 Washington Administrative Code](http://apps.leg.wa.gov/wac/default.aspx?cite=468-12) (WAC), WSDOT SEPA Rules

[Secretary’s Executive Order 1090.01](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1090.pdf) – Advancing Practical Solutions

[Secretary’s Executive Order 1018](http://wwwi.wsdot.wa.gov/publications/policies/fulltext/1018.pdf) – Environmental Policy Statement

## 1104.06(2) Guidance and Resources

[*Environmental Manual*](http://www.wsdot.wa.gov/Publications/Manuals/M31-11.htm), M 31-11, WSDOT

[*Standard Plans for Road, Bridge, and Municipal Construction*](http://www.wsdot.wa.gov/Publications/Manuals/M21-01.htm) (Standard Plans), M 21-01, WSDOT

*Understanding Flexibility in Transportation Design – Washington*, WA-RD 638.1, Washington State Department of Transportation, 2005

🖰 [www.wsdot.wa.gov/research/reports/fullreports/638.1.pdf](http://www.wsdot.wa.gov/research/reports/fullreports/638.1.pdf)

Direct link to the Guidance Documents:

🖰 [www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical\_Design.pdf](http://www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf)

Direct link to Transportation Systems Management and Operations:

<https://tsmowa.org/>

Chapter 1105 Design Element Selection

We are updating this Design Manual Exhibit 1105-1. As a reminder, this (below) is what it looks like right now.

Please drop down to page 2 and review/edit, with tracked changes for your particular expertise.

The version on page 2 has been further divided into more rows and columns because we found that overtime some of these have become incorrect and others should not be combined. The final may like rows and columns combined.

Exhibit 1105-1 Required Design Elements

|  |  |
| --- | --- |
| **Program or** **Sub-Program** | **Design** **Elements** |
| **ADA** | **Clear Zone [1]** | **Roadside Safety Hardware [3]** | **Signing & Delineation [4]** | **Illumination [7]** | **ITS [8]** | **Signal Hardware** |
| **I-1 Mobility** **I-3 Economic Initiative - Trunk System****I-6 Sound Transit** | Apply the content in [Chapter 1510](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1510.pdf) (1510.05) | Apply the content in [Chapter 1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf) | Apply the content in Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf) and [1620](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf) | Apply the content in [Chapter 1020](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1020.pdf) for signing and [Chapter 1030](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1030.pdf) for delineation | Apply the content in [Chapter 1040](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1040.pdf) | Apply the content in [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf) | [5] |
| **All Preservation (P-1, P-2, P-3)** | Apply the content in [Chapter 1120](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1120.pdf) (1120.03(2)) | [2] | Apply the content in [Chapter 1120](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1120.pdf)  | [2] [6] | [2] | [2] | [5] |
| **I-2 Safety** **I-4 Environmental Retrofit****I-3 All Other** | Apply the content in [Chapter 1510](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1510.pdf) (1510.05) | [2] | [2] | [2] [6] | [2] | [2] | [5] |

Notes:

[1] See [Chapter 1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf)

[2] Only include when changed as described in [1105.02](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1105.pdf).

[3] Includes all roadside safety design elements in Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf), and [1620.](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf)

[4] See [Chapter 1020](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1020.pdf) for signing and [Chapter 1030](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1030.pdf) for delineation

[5] Consult the Assistant State Design Engineer (ASDE), HQ Traffic Office, and Capital Program Development and Management Office (CPDM) to determine policy requirements.

[6] Consult the ASDE for policy requirements if the roadway channelization is changed.

[7] See [Chapter 1040](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1040.pdf)

[8] See [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf)

Exhibit 1105-1 Required Design Elements

|  |  |
| --- | --- |
| **Program or** **Sub-Program** | **Design** **Elements** |
| **ADA** | **Clear Zone**  | **Roadside Safety Hardware [3]**  | **Signing**  | **Delineation** | **Illumination**  | **Intelligent Transportation System (ITS)**  | **Signal Hardware** |
| **I-1 Mobility**  | See Section (1510.05) | [1] | See Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf) and [1620](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf) | See [Chapter 1020](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1020.pdf)  | See [Chapter 1030](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1030.pdf)  | See [Chapter 1040](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1040.pdf) | See [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf) | [5] |
| **I-2 Safety**  | See Section (1510.05) | [2] [1] | [2] | [2]  | [6] | [5] | [2] | [5] |
| **I-3 Economic Initiative - Trunk System** | See Section (1510.05) | [1] | See Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf) and [1620](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf) | See [Chapter 1020](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1020.pdf)  | See [Chapter 1030](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1030.pdf)  | See [Chapter 1040](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1040.pdf) | See [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf) | [5] |
| **I-3 All Other**  | See Section (1510.05) | [2] [1] | [2] | [2] | [6] | [5] | [2] | [5] |
| **I-4 Environmental Retrofit** | See Section (1510.05) | [2] [1] | [2] | [2] | [6] | [5] | [2] | [5] |
| **I-6 Sound Transit** | See Section (1510.05) | [1] | See Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf) and [1620](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf) | See [Chapter 1020](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1020.pdf)  | See [Chapter 1030](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1030.pdf)  | See [Chapter 1040](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1040.pdf) | See [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf) | [5] |
| **Roadway Preservation (P-1)****See Section 1120.03** | See Section(1120.03(2)) | [2] [1] | See Section 1120.03(7) | [2] | See Sections 1120.03(6) & 1231.06[6] | [5] | [2] | [5] |
| **Structures Preservation (P-2)** | [9] | [9] [1] | [9] | [9] | [9] | [9] | [9] | [9] |
| **Other Facilities Preservation (P-3)**  | [9] | [9] [1] | [9] | [9] | [9] | [9] | [9] | [9] |

Notes:

[1] See [Chapter 1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf)

[2] Only include when changed as described in [1105.02](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1105.pdf).

[3] Includes all roadside safety design elements in Chapters [1600](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1600.pdf), [1610](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1610.pdf), and [1620.](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1620.pdf)

[5] Consult HQ Traffic Office, the Assistant State Design Engineer (ASDE), and Capital Program Development and Management Office (CPDM) to determine policy requirements.

[6] Consult the ASDE for policy requirements if the roadway channelization is changed.

[9] See Section 1120.02 and include this element when this element is changed as described in 1105.02.

Chapter 1410 High-Occupancy Vehicle Facilities

# 1410.01 General

High-occupancy vehicle (HOV) facilities is a Transportation Systems Management and Operations (TSMO) strategy that includes separate HOV roadways, HOV lanes, transit lanes, HOV direct access ramps, and flyer stops. The objectives for the HOV facilities are:

* Improve the capability of corridors to move more people by increasing the number of people per vehicle.
* Provide travel time savings and a more reliable trip time to HOV lane users.
* Provide travel options for HOVs without adversely affecting the general-purpose lanes.

Plan, design, and construct HOV facilities that provide intermodal linkages. Give consideration to future highway system capacity needs. Whenever possible, design HOV lanes so that the level of service for the general-purpose lanes is not degraded.

In urban corridors that do not currently have planned or existing HOV lanes, complete an analysis of the need for HOV lanes before proceeding with any projects for additional general-purpose lanes. In corridors where both HOV and general-purpose facilities are planned, construct the HOV lane before or simultaneously with the construction of new general-purpose lanes.

For additional information, see the following chapters:

**Chapter Subject**

[1230](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1230.pdf) Geometric cross section

[1240](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1240.pdf) General-purpose turning roadway widths

[1420](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1420.pdf) HOV direct access

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# 1410.03 Operations

## 1410.03(3) Intelligent Transportation Systems

The objective of Intelligent Transportation Systems (ITS), which is a subcategory of Transportation Systems Management and Operations (TSMO) strategy, is to make more efficient use of our transportation network. This is done by collecting data, managing traffic, and relaying information to the motoring public.

It is important that an ITS system be incorporated into the HOV project and that the HOV facility fully utilize the ITS features available. This includes providing a strategy of incident management since vehicle breakdowns and crashes have a significant impact on the efficient operation of the HOV facilities. (For more information on ITS, see [Chapter 1050](http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-01/1050.pdf).)