

1100.01	General
1100.02	Practical Design Procedure
1100.03	Community Engagement
1100.04	Advisory Team
1100.05	Need and Performance Identification
1100.06	Context Identification
1100.07	Design Control Selection
1100.08	Alternative Formulation and Evaluation
1100.09	Design Element Selection and Dimensions
1100.10	Documentation Tools
1100.11	References

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 utilizes a collaborative approach, design flexibility, and a high likelihood of variable solutions. 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 the WSDOT Practical Solutions initiative.
- An overview of the practical design process.
- Information regarding the importance of design control selection.

1100.01(1) *Practical Solutions*

Practical Solutions includes practical solutions planning and practical design, as described in [Executive Order \(EO\) E 1090](#).

Practical Solutions enables more flexible and sustainable transportation investment decisions. It encourages this by: (1) increasing the focus on addressing identified performance needs throughout all phases of development, and (2) engaging local partners and stakeholders at the earliest stages of scope definition to account for their input at the right stage of the development process. Practical Solutions includes one or a combination of strategies, including, but not limited to, operational improvements, off-system solutions, transportation demand management, and incremental strategic capital solutions.

1100.01(1)(a) **Practical Solutions Planning**

Practical Solutions planning is an approach to making planning decisions that considers a variety of conceptual strategies to achieve the desired system performance targets for the lowest cost.

Central to practical solutions planning is a process that identifies regional and corridor performance areas, engages communities to ascertain local contexts and needs, and applies methods to evaluate and implement short- and long-term solutions.

The outcome of practical solutions planning is a recommended set of multimodal strategies that are cost-effective and balance the goals and objectives of state and local needs. WSDOT's corridor sketch initiative and planning studies inform practical solutions through the following:

- Identify performance gaps for a corridor segment, now and in the future.
- Identify potential strategies to address the gaps.
- Integrate inputs from partners that support corridor segment performance.
- Define context and corridor variables.

Identify and rank demand management and operational improvements first, then consider capital solutions. Note that [Executive Order \(EO\) E 1090](#) instructs that the solution may or may not be on a state corridor.

1100.01(1)(b) Practical Design

Practical design focuses on the specific problem or problems identified during the planning and scoping process. This performance-based approach looks for lower-cost solutions that meet outcomes that WSDOT, collaborating agencies, communities, and stakeholders have identified. Practical design is a fundamental component to the Vision, Mission, Values, Goals, and Reforms identified in [Results WSDOT](#), the department's Strategic Plan. The primary objectives of the practical design approach are: (1) focusing on project need(s), and (2) seeking the most reasonable low-cost solution to meet that need(s).

Practical design allows flexibility and encourages innovation. Practical design considers incremental solutions to address uncertainties in future scenarios. Practical design can be applied at all phases of project development; however, it is most effective at the scoping level or earlier, where key decisions are made as to what design controls and elements are affected by alternatives and how they can best be configured to meet the project objectives.

With practical design, decision-making focuses on the maximum benefit to the system, rather than the maximum benefit to the project.

1100.02 Practical Design Procedure

Practical design begins when a location under evaluation moves from a discussion of strategies to one of potential solutions within those strategies. The beginning of the practical design approach occurs when the scoping phase requires a Basis of Design (BOD), or when the preliminary engineering phase for a funded project initiates. In each of these situations, practical design procedures apply whether or not practical solutions planning has occurred.

WSDOT's practical design process consists of seven primary procedural 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 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](#)).

The Basis of Design (BOD) documents the outcomes of applying these procedural steps. It also serves as a management tool throughout the design phase, to keep a project team focused on the baseline performance need and agreed performance trade-offs in order to prevent scope creep. During the design phase, a BOD is required on all projects unless design elements are not changed (see exceptions in 1100.10). During the scoping phase, a BOD is only required as determined by the Capital Program Development and Management (CPDM) Office. See 1100.10(1) for further information about the BOD.

1100.03 Community Engagement

WSDOT has a strategic goal of engaging the community 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

WSDOT encourages recognition of individual community contexts, values, and needs in developing transportation solutions. We do so in order to enhance public trust and develop targeted designs that meet the performance needs of the state, regional, and local transportation systems. – [Executive Order 1096](#)

Use the [WSDOT Community Engagement Plan](#) and document the findings of community engagement efforts (see 1100.10(5)).

1100.04 Advisory Team

Teams deliver projects. Collaborative decisions contribute to successful project delivery. Collaboration emphasizes context sensitive design as part of WSDOT's approach. The practical design approach is a team approach that involves external and internal stakeholders providing consent-based outcomes early in project development. This is consistent with WSDOT [Executive Order 1096 - WSDOT 2015-17: Agency Emphasis and Expectations](#) and [Executive Order 1028 – Context Sensitive Solutions](#). The advisory team is a collaborative body that provides recommendations to the WSDOT project manager and engineer of record, specifically in these areas:

- Need identification (including performance metrics and targets)
- Context identification
- Design control selection
- Alternative formulation

- Performance trade-off decision preferences (including weighing environmental constraints and regulatory issues)
- Alternative evaluation

The Engineer of Record, or project manager, convenes an advisory team that has the skills, knowledge, and responsibilities needed for design decision-making; including planning, project development, environment, active transportation, and context sensitive design. Include WSDOT members on the advisory team who have positional or delegated authority to make decisions associated with the areas outlined in this chapter.

The project manager and project team consider recommendations offered by the advisory team. The project manager decides which recommendations, if any, will be included in the project and informs the advisory team, providing an opportunity for feedback. Document recommendations and their treatment to the Basis of Design prior to its approval.

The project manager has discretion in how to work with 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

1100.05 Need and Performance Identification

The most fundamental function of practical design is to focus on the primary reason a location is under evaluation. Ask why there is a project under consideration at this location, and identify the specific need. If it is a mobility project, why is there a mobility need and what is specifically contributing to that need?

WSDOT's practical design approach requires that the need be translated into specific performance metrics and that targets be selected to be achieved by the design. A contributing factors analysis (see [Chapter 1101](#)) refines focus in order to resolve the specific performance problems and helps define the potential scope of project alternatives.

Chapter 1101 provides guidance for identifying project performance needs. Understanding performance and associated performance terms is critical to the application of Chapter 1101. See the guidance document *Performance Based Design* before proceeding with application of Chapter 1101. Direct link to guidance document:

www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf

1100.06 Context Identification

Context identification refers to understanding the characteristics, activities, and functions within a geographical area. WSDOT is committed to providing context sensitive solutions (see [E 1028](#)), and context identification is key to implementing this goal. WSDOT's context identification process involves two interrelated context facets: land use and transportation. Context identification also considers existing and future contexts. [Chapter 1102](#) provides guidance for determining context.

1100.07 Design Control Selection

Design controls create significant boundaries and have significant influence on design. WSDOT uses five primary design controls:

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

Chapter 1103 presents guidance related to choosing design controls.

1100.08 Alternative Formulation and Evaluation

Under practical design, 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.” This requires consideration of multimodal solutions. 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 operational and demand management strategies prior to implementing a capital strategy. The intent is to find low-cost solutions before making large capital investments.

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 guidance document *Alternative Strategies and Solutions* discusses primary strategies and examples of solutions within those strategies.



Design Support guidance document: <http://www.wsdot.wa.gov/Design/Support.htm>

Direct link to guidance document:

www.wsdot.wa.gov/publications/fulltext/design/ASDE/Practical_Design.pdf

1100.09 Design Element Selection and Dimensions

Design element selection is based entirely on the alternative selected to resolve the baseline need and balance performance trade-offs. Chapter 1105 provides instruction for design element selection. Chapter 1106 provides information related to choosing dimensions for design elements.

1100.10 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>

1100.10(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.

When using a BOD, start 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](#)).

Basis of Design: www.wsdot.wa.gov/Design/Support.htm

1100.10(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.

1100.10(1)(a)(1) **All Projects**

If the only design elements changed by the project are listed in Exhibit 1105-1, a Basis of Design (BOD) may not be required. The Assistant State Design Engineer (ASDE) shall concur with the request to exempt the BOD requirement. Submit a request, by email, for an exemption from the BOD requirement. The request should explain the unique circumstances that make use of the BOD unnecessary. Each request is evaluated on a case-by-case basis. If a BOD has been prepared for the project and no design elements were changed, an ASDE approval of the BOD is not required.

1100.10(1)(a)(2) **Preservation Projects**

A Basis of Design form is not required for Preservation projects if the only design elements changed are listed in [Chapter 1120](#), and the criteria/guidance provided in Chapter 1120 is followed.

1100.10(1)(a)(3) Safety Projects

Safety projects (developed under the I-2 funding program) may not require a BOD even though design elements are changed. The Assistant State Design Engineer (ASDE) shall provide concurrence to exempt the project from the BOD requirement. Submit exemption requests to the ASDE by email explaining why an exemption is applicable. The request should explain the unique circumstances that make use of the BOD unnecessary. Exemption requests are evaluated on a case-by-case basis.

Circumstances that may contribute to a decision to exempt a safety project from the need to prepare a BOD include:

- A programmatic project endorsed by the WSDOT Highway Safety Panel (e.g. Intersection Improvement Program ISIP treatments, Rumble Strips, etc.)
- A Collision Analysis Report (CAR) was approved by the WSDOT Highway Safety Panel AND:
 - The CAR clearly identifies the project need.
 - The CAR compared and rated alternatives.

1100.10(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](#) for additional information on estimating and the Basis of Estimate.

1100.10(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.

1100.10(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

1100.10(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/)

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

1100.11 References

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

[Revised Code of Washington \(RCW\) 47.04.280](#) – Transportation system policy goals

[Revised Code of Washington \(RCW\) 47.05.010](#) – The statement of purpose for priority programming of transportation projects

[Secretary's Executive Order 1090](#) – Moving Washington Forward: Practical Solutions

[Secretary's Executive Order 1096](#) – WSDOT 2015-17: Agency Emphasis and Expectations

[Secretary's Executive Order 1028](#) – Context Sensitive Solution

Exhibit 1100-1 Basis of Design Flowchart



