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## 1101.01 General

Practical design starts with identification of issues associated with the performance of a transportation facility. First, one or more project needs associated with these issues are identified. These project needs represent the gap in performance between the existing and desired state. Once they are identified, a project need statement is then developed which expresses only the most fundamental causes of these performance gaps.

This chapter provides:

- Instruction on the different types of needs—baseline and contextual.
- A method to diagnose and analyze the contributing factors of the identified need.
- Instruction on how to determine performance metrics and targets for each of the identified needs.
- How to develop project need statements.

## 1101.02 Baseline Needs

A baseline need is the primary reason a project has been proposed at a location. The baseline need usually evolves from a WSDOT planning and/or priority programming process. There can be more than one baseline need such as when an agency partners with WSDOT on a project and the partner's need becomes another baseline need. It is important to consider the needs of all mode users.

**Example:** A local agency desires to fund a revitalization project for a community bordering a state highway. The local agency's baseline need in this case is the local land use's economic vitality. If WSDOT also happens to have a prioritized and funded baseline need at the same location, and the two parties decide to partner in a combined project, that project will have at least two baseline needs. The two parties will work to develop solutions compatible for both baseline needs.

To determine, develop, and refine the project's baseline need(s), examine the conditions surrounding the original project identification, which was completed in the priority programming phase.

After developing and refining the baseline need(s), define the baseline performance metrics. (see [1101.02\(1\)](#)) and determine the baseline need targets (see [1101.02\(2\)](#)).

## 1101.02(1) **Baseline Performance Metrics of the Baseline Need(s)**

Baseline performance metrics are those “measurables” used to check that the project satisfies the need(s). Baseline performance metrics are also used in the development of the project need statement. Project alternatives must address the identified baseline performance metric(s).

Threshold performance metrics are used in the priority programming process to screen the full state network under each performance category (for further information on threshold performance metrics and performance categories, see the guidance document Performance-Based Decisions: [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)). The baseline performance metric for preservation category projects is predetermined, and is the same as the threshold performance metrics determined by Subject Matter Experts (SMEs) and HQ Capital Program Development and Management (CPDM) Office.

The baseline performance metrics for a mobility or economic vitality category project may be different from the threshold performance metrics. However, the baseline metric chosen is to be consistent with the priority programming performance category that identified the location to be evaluated.

**Example:** A routinely congested corridor has been screened to identify locations with a potential mobility performance gap. Screening used a threshold performance metric of estimated operations at 70% of posted speed during the peak hour. After considering the context of the location, and the relevance of the threshold performance metric to the site specific conditions and operations, the advisory team recommends that travel time reliability is a more appropriate metric for the location.

WSDOT’s practical design approach is committed to multimodal safety as identified in Washington State’s Strategic Safety Plan (see [www.targetzero.com/plan.htm](http://www.targetzero.com/plan.htm)). To meet this commitment, projects are required to include a baseline performance metric for evaluating the number of fatal and serious injury crashes in safety, mobility and economic vitality category projects. Other safety metrics to address the specific community or partnering agency needs may be included as contextual needs.

Safety projects are expected to continue project development as directed by the Multimodal Safety Executive Committee (MSEC), and described in the Safety Scoping Flowchart and [Chapter 321](#).

Other projects are to coordinate up front with the HQ Safety Technical Group to determine the scale and scope of crash analyses appropriate for different types and sizes of projects. For additional information see [Chapter 321](#).

## 1101.02(2) **Baseline Performance Target**

Performance targets are the outcome (or desired state) intended for a project. Use baseline performance metrics and targets to compare alternative designs based on how well the alternative meets the selected targets relative to their costs. Targets can be a single value or range of values.

There may be situations where the targets cannot practicably be met by any alternative or where there are unacceptable performance trade-offs in other performance categories. In these situations it may be appropriate to accept performance trade-offs, in one of the other

categories during the alternatives evaluation (see [Chapter 1104](#)), in order to balance competing needs and outcomes. In other situations, it may be appropriate to refine the performance target under consideration.

### 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 (see [Chapter 301](#) for additional information).
- Needs 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 measurable, to the extent feasible. Contextual need metrics can be either quantitative or qualitative.

#### 1101.03(1) Use in Alternative Formulation and Evaluation

Contextual needs serve a different role than baseline needs. Baseline needs primarily shape the alternatives developed, while contextual needs are important to the performance trade-offs discussion (see [Chapter 1104](#)). Not all contextual needs identified need to be addressed by a project. Contextual needs present opportunities for optimizing the design, provide for partnerships and modes, and ultimately determine the most optimal project alternative (in conjunction with SEPA/NEPA processes as discussed in [Chapter 1104](#)).

Whether a design alternative achieves a particular contextual performance target is a consideration during the tradeoffs analysis. When no alternative adequately balances performance, lower-cost countermeasures can be employed to help mitigate performance issues and improve the viability of alternatives. Modifications to one or more design controls are another approach that can be used to achieve performance targets (see [Chapter 1103](#)), without significantly burdening the alternative with additional cost. If all alternatives fail to find an acceptable performance balance targets may be refined. Performance targets are documented and approved as part of the Basis of Design approval process.

### 1101.04 Contributing Factors Analysis

Contributing factors analysis (CFA) is a process by which subject matter experts on the advisory team evaluate the contributing factors associated with performance gaps in order to identify the root reasons for each gap. In the transportation field, contributing factors are any geometric,

operational, context-based, or human factor that can reasonably be attributed to a performance need through data analysis and engineering judgment.

Practical design relies on CFA to find the root reason(s) a need exists, rather than focusing on a symptom that may only temporarily or partially resolve the need.

Note: It is recognized that completely solving a problem may not be possible by a single corrective action due to the number of contributing factors or because of constraints.

The CFA method will:

- Organize and identify multiple contributing factors and underlying root reasons.
- Formulate a number of potential countermeasures to solve the need as thoroughly and efficiently as possible.

Diagnosis of contributing factors yields the best results when data is available for the analysis. Comprehensive crash data, organized by travel mode, is important when considering safety performance. In other performance categories, where quantitative data is not available, qualitative analysis may be used to reveal the underlying contributing factor(s).

Contributing factor analysis is only required for evaluation of baseline performance needs. However, it may be relevant to perform CFA for contextual performance metrics.

Diagnosing contributing factors using CFA is not necessarily a simple linear process. It's possible to find that a contributing factor identified by one discipline is the root cause of another discipline's contributing factor. In some cases, mapping the contributing factors in a network or fishbone diagram can help identify these relationships more clearly (see the guidance document Contributing Factors Analysis: [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)).

## 1101.05 Project Need Statement

A project need statement (or statement of need) uses the baseline needs (see [1101.02](#)) and results of contributing factors analysis to succinctly describe the real root project need(s). The objective is to provide a clear, accurate plain talk description of the root needs that will facilitate the development of efficient, focused project alternatives. A need statement should:

- Identify the objective, in simple, direct terms.
- Identify the performance metric(s) involved.
- Include one or more quantifiable statements.
- Exclude any description or discussion of potential solutions.

Consider other processes applicable to their projects that may require need statements such as: value engineering, NEPA/SEPA, and [Access Revision Reports](#). Consider timing of these processes as well as integration and alignment of the need statements with the processes required for the project.

For more information and examples of need statements, see the guidance document Writing Effective Needs Statement: [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)

## 1101.06 Documentation

Use the Basis of Design, Section 1, to document decision-making and conclusions associated with project need identification.

Download The BOD here: [www.wsdot.wa.gov/Design/Support.htm](http://www.wsdot.wa.gov/Design/Support.htm)

## 1101.07 References

Contributing Factors Analysis, WSDOT Guidance Document:

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

Performance-Based Design, WSDOT Guidance Document:

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

Writing Effective Needs Statement, WSDOT Guidance Document:

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

Washington State's Strategic Safety Plan: [www.targetzero.com/plan.htm](http://www.targetzero.com/plan.htm)

WSDOT Safety Scoping Flowchart:

<http://wwwi.wsdot.wa.gov/ppsc/pgmmgt/wwwi/PlanProg/Scoping/SafetyScopingProcessFlowChart.pdf>

