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1101.01 General

Practical design starts with identification of issues associated with the performance of a transportation facility. A need is defined as a performance gap that is used to guide the development of design alternatives to be considered for the project. The process typically starts in the planning phase or during project scoping, when the needs are identified that must be addressed by the project. These needs are typically associated with larger agency objectives, such as safety, economic vitality, equitable access, state of good repair, etc., and become the baseline need(s) for the project. Other needs related to the project location will emerge in advance or during alternatives development, and these are called contextual needs. Contributing factors analysis can be used to improve the accuracy and precision of need statements that guide the development of performance metrics and targets.

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.

Decisions about project related needs, metrics, targets, and related activities described in this chapter are all performed and documented as a coordinated exercise led by the Project Team in consultation with the Advisory Team (see Section [1100.04\(2\)](#)).

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.

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.

Develop project need statements for each identified baseline need (see Section [1101.05](#)). To determine, develop, and refine the project's baseline need(s) and finalize the associated need statement(s), examine the conditions surrounding the original project identification, which was completed in the priority programming phase, and apply contributing factors analysis (see Section [1101.04](#)).

After developing and refining the baseline need(s), define the baseline performance metrics. See Section [1101.04](#) and determine the baseline need targets (see Section [1101.04\(3\)](#)).

1101.03 Complete Streets Needs

Projects that are required to incorporate Complete Streets, following the screening process described in Section [1104.04\(1\)](#), are assumed to have a “Complete Streets need” in addition to the baseline need and contextual needs.

1101.04 Baseline Performance Metrics

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).

Performance metrics are used in the priority programming process to screen the full state network under each performance category (for further information on performance metrics and performance categories, see the guidance document Performance-Based Decisions: <https://wsdot.wa.gov/engineering-standards/design-topics/design-tools-and-support#Tools>). 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.

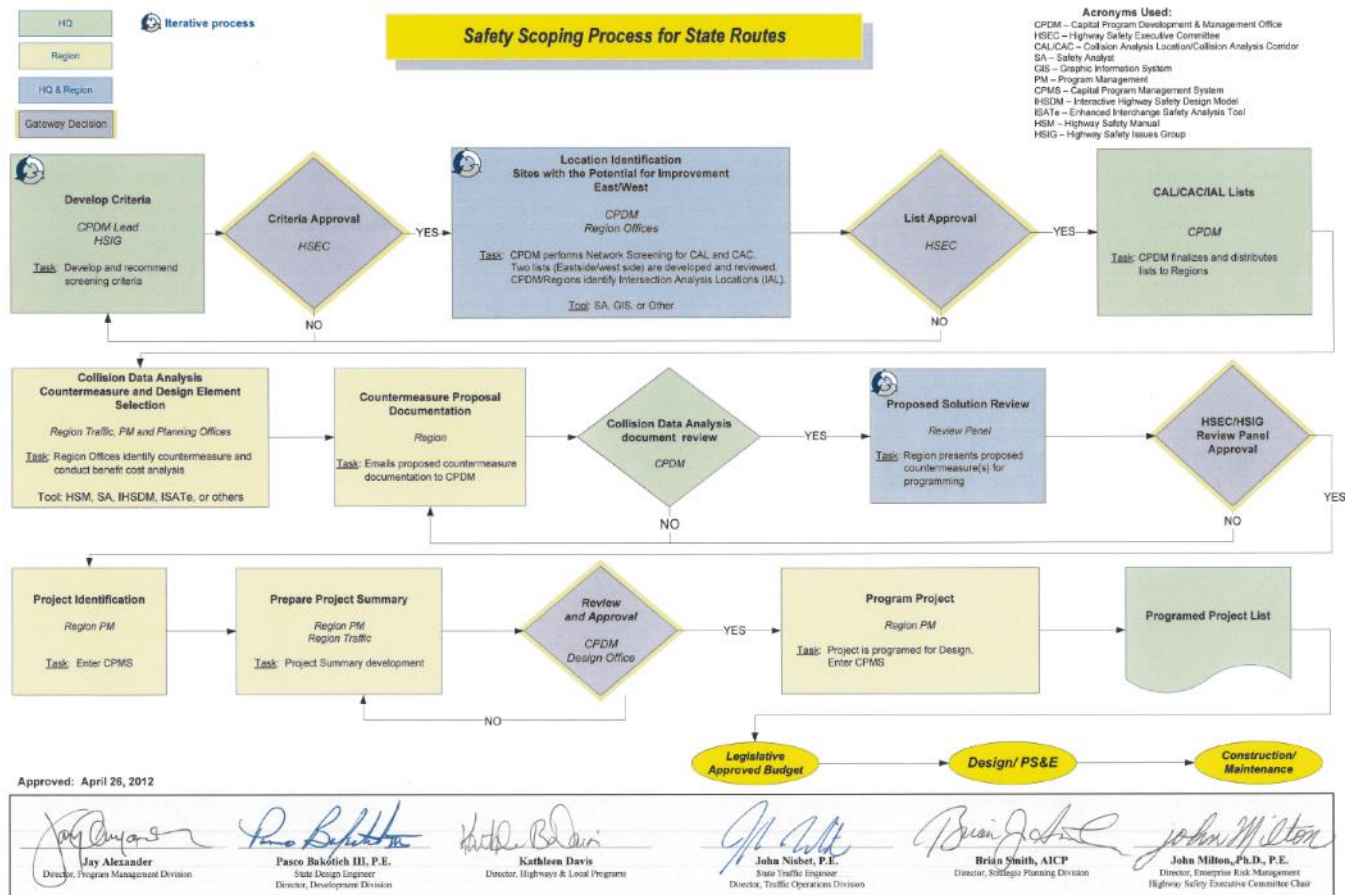
1101.04(1) Safety Performance

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). 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 [Exhibit 1101-1 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](#) and the [safety analysis guide](#).

Exhibit 1101-1 Safety Scoping Process Flowchart



1101.04(2) Complete Streets Performance (New Section 2023)

Projects that have been identified as having a Complete Streets Need (see above) are required to apply five categories of metrics, in addition to any other baseline needs as described above, to help assess design alternative performance with respect to the Complete Streets need.

1101.04(2)(a) Bicycle and Pedestrian Movement (New Section 2023)

Measure the prospective performance of biking, walking and other pedestrian movement through the project using Level of Traffic Stress (LTS) and route directness (RDI). LTS is a metric that is used during planning and design to provide an indication of the relative stress experienced by bicycle riders and pedestrians. LTS is a numeric rating from 1 to 4, where a lower number indicates lower stress for a bicyclist (expressed as BLTS) or for a pedestrian traveler (expressed as PLTS). At a minimum, the numeric LTS rating is based on Average Annual Daily Traffic (more commonly known as AADT), posted speed and the number of travel lanes of the highway segment. Other roadway characteristics can be used to refine an LTS designation. LTS can be used to summarize a highway’s essential characteristics, including design elements, features, dimensions, and configuration. Route directness refers to the amount of out of direction travel pedestrians and bicyclists must engage in to travel between destinations. It is measured in terms of a Route Directness Index (RDI). More information and requirements about LTS and RDI can be found in Sections 1310.03(1), 1510.02(5), and 1520.03(3).

1101.04(2)(b) Concerns of Overburdened Communities (New Section 2023)

An overburdened community is a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts and includes, but is not limited to, highly impacted communities that are designated by the department of health based on cumulative impacts analyses or a community located in census tracts that are fully or partially on "Indian country". Vulnerable populations are groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms (see Glossary).

The identification and evaluation of the needs of vulnerable populations living in overburdened communities is determined by the Project Team in cooperation with the local community during community engagement. The project Advisory Team, in advance of and during community engagement, are tasked with establishing community-centered, measurable outcomes for the project that reflect the needs determined through the engagement process.

1101.04(2)(c) Active Transportation Network Gap(s) (New Section 2023)

Active transportation network gaps are identified in the WSDOT Active Transportation Plan (ATP) become a design issue based on an assessment of how well design solutions address the description of the gap in the plan. This metric is based on work performed by the CS Team, who provide a specific list of identified gaps, based on their review of the ATP, that can be addressed as described above, and coincide with or are immediately adjacent to the project limits such that it is reasonable for the project to address the gap.

1101.04(2)(d) Access to Transit (New Section 2023)

Designing for access to transit involves establishing the need for new or improved facilities and features that provide convenient access to transit, rail, ferries, or aviation by active travel modes. When people are able to make efficient intermodal connections using active transportation for part of their trips, they are less likely to rely solely on a personal motor vehicle.

Consider the following steps to determine the presence and incorporation of access to transit facilities:

- Determine the presence of modal routes, stations, and stops within the project limits.
- Identify routes that active transportation users will use to access these locations.
- Identify facilities needed to accommodate active transportation users, based on an assessment of local context, and LTS, as applicable.
- Incorporate those facilities into design alternatives for evaluation and selection ([Chapter 1104](#)).

Provide specific improvements when projects lie within High-Capacity Transit areas (refer to the WSDOT HCT improvements guide for more information).

1101.04(2)(e) Comfortable Roadside Environment (Street Trees) (New Section 2023)

Complete Streets are intended to provide for a comfortable environment for pedestrians and bicycles. Street trees are a common treatment associated with Complete Streets used to accomplish this urban environment goal. Street trees provide shade and help indicate an appropriately-scaled urban context to travelers. Consult with the CS Team to determine the need for trees in order to establish the desired urban environment. Also consult with subject matter expert(s) to determine the appropriate locations, types, and applications, with the limitation that trees may only be placed where 6" curbing is installed between the traveled way and the trees so not to incumber traveled ways. Work in collaboration with the local jurisdiction to establish the responsible party for maintaining street trees. Note that the project documentation required for approving installation of trees that lie within the design clear zone varies depending on whether the project lies inside or outside an incorporated city (see Section [1600.02](#)).

1101.04(3) Baseline Performance Target (Section Rewritten 2023)

Develop custom performance targets that represent the outcome (or desired state) intended for the project with respect to each baseline need. The extent to which alternative designs meet these targets provides the primary basis for alternative development – alternatives do not move forward for evaluation unless they meet each of the specified baseline or complete streets performance targets (see [Chapter 1104](#)). Targets can be a single value, a range of values, or a performance outcome as defined by the Project Team in consultation with the Advisory Team.

There may be situations where the targets cannot practicably be met by any alternative or where it's been determined and documented that there would be unacceptable performance trade-offs in other performance categories. In these situations, it may be appropriate to identify trade-offs among the project's baseline performance metrics to balance competing needs and outcomes. In these situations, determine and document a refined performance target to be carried forward into alternatives evaluation (see [Chapter 1104](#)).

1101.05 Contextual Needs

During project development, opportunities often arise to address other needs that may be identified. These other needs are classified as “contextual needs,” as they reflect the context within which the project will take place. 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.

Contextual needs serve a different role than baseline needs. Baseline needs primarily shape the alternatives developed, while contextual needs contribute to the analysis of performance trade-offs and comparison of alternatives (see [Chapter 1104](#)).

Although metrics associated with contextual needs can be either quantitative or qualitative, use an objective statement to describe the need in a way that the outcome is measurable. By definition, there is no requirement that contextual needs be addressed by a project.

Contextual needs are not expected to add significant project cost. ASDE and CPDM approval is required when a preferred alternative incorporates contextual needs that increase the project cost beyond addressing the baseline need(s) and Complete Streets needs where applicable.

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.

1101.06 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: [Design guidance & support | WSDOT \(wa.gov\)](#)).

1101.07 Project Need Statement

A project need statement (or statement of need) uses the baseline needs (see Section [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 Writing Effective Needs Statement chapter in the Guidance Document: [Design guidance & support | WSDOT \(wa.gov\)](#)

1101.08 Documentation

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

Download The BOD here: <https://wsdot.wa.gov/engineering-standards/design-topics/design-tools-and-support#Tools>

1101.09 References

Contributing Factors Analysis, WSDOT Guidance Document: [Design guidance & support | WSDOT \(wa.gov\)](#)

Performance-Based Design, WSDOT Guidance Document: [Design guidance & support | WSDOT \(wa.gov\)](#)

Writing Effective Needs Statement, WSDOT Guidance Document: [Design guidance & support | WSDOT \(wa.gov\)](#)

Washington State's Strategic Safety Plan: [Strategic Highway Safety Plan: Target Zero | WSDOT](#)

WSDOT Safety Scoping Flowchart [Exhibit 1101-1](#)

