



# INVEST

ECONOMIC • SOCIAL • ENVIRONMENTAL

Sustainable Highways Self-Evaluation Tool

# **INVEST 1.0**

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## Introduction to the Compendium

INVEST (Infrastructure Voluntary Evaluation Sustainability Tool) was developed by FHWA as a practical, web-based, collection of voluntary best practices, called criteria, designed to help transportation agencies integrate sustainability into their programs (policies, processes, procedures and practices) and projects. This compendium includes all of the criteria in INVEST 1.0 as of October 2012. It includes System Planning (SP), Project Development (PD), and Operations and Maintenance (OM) criteria. It is not intended to be an instructional manual or guidebook; the website, located at [www.sustainablehighways.org](http://www.sustainablehighways.org), provides thorough information and instruction on how to use INVEST.

Short excerpts from the website are featured in this compendium; for more information, visit the INVEST website.

## INVEST 1.0

INVEST 1.0 was developed through research and analysis of sustainability best practices in the transportation field. The original Beta Version criteria, released in the fall of 2010, were written by subject matter experts, and then were reviewed, modified, and vetted through valuable stakeholder feedback. After revising based on this feedback, the Pilot Test Version was released in the spring of 2011 for testing and evaluation across a broad spectrum of agencies, projects, programs and geographies. INVEST 1.0 reflects substantial revisions made to the criteria and web-based tool based on the pilot testing.

### Transportation and Sustainability

Transportation projects and programs serve many different, and sometimes competing, objectives. “Sustainability” is a concept that enables decision-makers to make balanced choices around these objectives. The three principles of the “triple bottom line” upon which sustainability is based—social, economic, and environmental—capture the broad range of transportation goals and objectives. Highway project development (including project planning, design, and construction) should seek to apply these principles. These principles are useful because they begin to define specific results that can be achieved by improving highway sustainability. They begin to provide distinct reasons for highway project development to incorporate such diverse concepts as climate change, environmental protection, judicious use of funds, regional air quality improvement, construction quality incentives, recycling promotion, social equity, and environmental management system use. If done effectively, the result should be more sustainable highways. Using sustainable approaches in transportation infrastructure will help us to continue to enhance quality of life and serve the transportation needs of the present without compromising the ability of future generations to meet their needs.

### What is the Purpose and Intent of this Tool?

FHWA's INVEST is designed to provide information and techniques to help agencies integrate sustainability best practices into their projects and programs. INVEST is intended to provide guidance for practitioners to evaluate the sustainability of their transportation projects and programs and to encourage sustainability progress within the field of transportation. **It is not required and it is not intended to encourage comparisons** between transportation agencies. INVEST was developed with input from state and local transportation agency officials and staff and professional organizations such as AASHTO and ASCE. FHWA will continue to update INVEST as the transportation sustainability field continues to advance. While the use of INVEST is voluntary, it can be used by transportation agencies, such as DOTs, MPOs, Council of Governments, public works departments, and their consultants and partners, to evaluate and aid the integration of sustainability into their programs and projects.

## Modules and Scorecards

INVEST considers the full lifecycle of projects and has three modules to self-evaluate the entire lifecycle of transportation services, including System Planning (SP), Project Development (PD), and Operations and Maintenance (OM). Each of these modules is based on a separate collection of criteria and can be evaluated separately. INVEST 1.0 includes a total of sixty criteria organized into these three modules.

1. **System Planning (SP)** is the first step in the lifecycle of a transportation project. This is where an agency's system-wide network is analyzed and assessed to identify projects that will improve the safety, capacity, access, operations or other key features of the system. The SP module includes sixteen criteria and one bonus criteria (SP-4) that agencies are eligible for based on their scores on the first three criteria. There is one scorecard for the SP module that includes all of the criteria.
2. **Project Development (PD)** is the second step in the lifecycle of a transportation project. This is where specific projects conceptualized and programmed in the System Planning processes are planned, designed and constructed. The PD module includes a total of twenty-nine criteria that are generally organized from planning to design to construction. The criteria are further organized into six scorecards for the evaluation of projects. The scorecards are designed to identify applicable criteria based on the project type and location. Five of these scorecards pre-identify criteria that are most likely to be applicable for the project type and location. The sixth scorecard is a custom scorecard option, which is a dynamic scorecard:
  - *Paving* – for projects that are devoted exclusively to pavement preservation; restoration projects that extend the service life of existing facilities and enhance safety; or pavement restoration projects that restore pavement structure, ride quality, and spot safety. Use this scorecard for paving projects in both rural and urban locations.
  - *Basic Rural* – for small, rural reconstruction or rural bridge replacement projects that do not expand capacity of the roadway.
  - *Basic Urban* – for small urban reconstruction or urban bridge replacement projects that do not expand capacity of the roadway.
  - *Extended Rural* – for rural projects for a new roadway facility; structure projects where nothing of its type currently exists; and major reconstruction projects that add travel lanes to an existing roadway or bridge.
  - *Extended Urban* – for urban projects for a new roadway facility; structure projects where nothing of its type currently exists; and major reconstruction projects that add travel lanes to an existing roadway or bridge.
  - *Custom* - for projects that do not fit any of the pre-defined scorecard options, the Custom Scorecard will allow the user to develop a unique set of criteria that is most appropriate for the project being evaluated. The Custom Scorecard starts with a core set of 19 that must be included as part of the score. There are not achievement levels associated with the custom scorecard.

The following table shows the criteria included in each of the PD scorecards. Each PD scorecard includes a different combination of the twenty-nine PD criteria based on the type project. The custom scorecard includes nineteen core criteria plus user-selected criteria to make a custom self-evaluation for projects that don't fit well into the five defined scorecards.



## Project Development by Criteria Scorecard

	Paving	Urban Basic	Urban Extended	Rural Basic	Rural Extended	Custom Core Criteria <sup>1</sup>
PD-1 Economic Analyses			√		√	
PD-2 Life-Cycle Cost Analyses	√	√	√	√	√	√
PD-3 Context Sensitive Project Development		√	√	√	√	√
PD-4 Highway and Traffic Safety	√	√	√	√	√	√
PD-5 Educational Outreach	√	√	√	√	√	√
PD-6 Tracking Environmental Commitments	√	√	√	√	√	√
PD-7 Habitat Restoration		√	√	√	√	√
PD-8 Stormwater		√	√	√	√	√
PD-9 Ecological Connectivity			√	√	√	
PD-10 Pedestrian Access		√	√			
PD-11 Bicycle Access		√	√			
PD-12 Transit & HOV Access		√	√			
PD-13 Freight Mobility			√		√	
PD-14 ITS for System Operations		√	√		√	
PD-15 Historical, Archaeological, and Cultural Preservation		√	√	√	√	√
PD-16 Scenic, Natural, or Recreational Qualities			√	√	√	
PD-17 Energy Efficiency		√	√	√	√	√
PD-18 Site Vegetation		√	√	√	√	√
PD-19 Reduce and Reuse Materials	√	√	√	√	√	√
PD-20 Recycle Materials	√	√	√	√	√	√
PD-21 Earthwork Balance			√		√	
PD-22 Long Life Pavement Design	√	√	√	√	√	√
PD-23 Reduced Energy and Emissions in Pavement Materials	√	√	√	√	√	√
PD-24 Contractor Warranty	√	√	√	√	√	√
PD-25 Construction Environmental Training		√	√	√	√	√
PD-26 Construction Equipment Emission Reduction	√	√	√	√	√	√
PD-27 Construction Noise Mitigation		√	√			
PD-28 Construction Quality Control Plan	√	√	√	√	√	√
PD-29 Construction Waste Management	√	√	√	√	√	√
<b>Total Number of Criteria in Scorecard</b>	<b>12</b>	<b>24</b>	<b>29</b>	<b>21</b>	<b>25</b>	<b>19</b>

<sup>1</sup> – Indicates the core criteria that must be included in the custom scorecard. The user may choose as many additional criteria as desired.

3. **Operations & Maintenance (OM)** is the third step in the lifecycle of a transportation project. This is where infrastructure planned, designed and constructed in prior steps is operated and maintained and data collected and new project needs identified are passed back to the System Planning step to complete the

lifecycle of projects. The OM module includes fourteen criteria including four aimed at internal operations and ten focused on maintenance and operations of the highway system. There is one scorecard for the OM module that includes all of the criteria.

# System Planning

SP-1: Integrated Planning: Land Use and Economic Development .....	SP-1
SP-2: Integrated Planning: Natural Environment .....	SP-2
SP-3: Integrated Planning: Social .....	SP-3
SP-4: Integrated Planning: Bonus.....	SP-4
SP-5: Access & Affordability.....	SP-5
SP-6: Safety Planning .....	SP-6
SP-7: Multimodal Transportation and Public Health .....	SP-7
SP-8: Freight and Goods Movement.....	SP-8
SP-9: Travel Demand Management.....	SP-9
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# SP-1: Integrated Planning: Economic Development and Land Use

1-15 points

**Goal:** Integrate statewide and metropolitan Long Range Transportation Plans (LRTP) with statewide, regional, and/or local land use plans and economic development forecasts and goals. Proactively encourage and facilitate sustainability through the coordination of transportation, land use, and economic development planning.



## Sustainability Linkage

Integrating transportation planning with economic development and land use supports the economic triple bottom line principle by creating opportunities to improve access and mobility, and increase the social, environmental, and economic returns on both public and private investments in transportation projects and programs.

## Scoring Requirements

### Background

This criterion recognizes that each state and MPO has different land use and economic development regulatory, policy, and institutional frameworks, plans, and goals, and allows for flexibility in the activities and types of plans agencies use to measure integration. The intent of this criterion is to encourage agencies to integrate sustainability into transportation, land use, and economic development planning.

For the purpose of this criterion, it is important to define and further explain the following terms:

- **“Integration”** - In this case, “integration” means developing transportation, land use, and economic development plans consistently and collaboratively.
- **“Sustainable”** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.
- **“Sustainability Principles”** - For the purposes of the INVEST tool, “sustainability principles” refers to the economic, environmental, and social principles of the triple bottom line.
- **“Economic development and land use plans”** - These include policies, plans, maps, regulations, or programs that focus on the use, design, location, density, or related features of land. These include growth strategies, comprehensive plans, zoning plans, downtown revitalization plans, visioning plans, and urban renewal plans, among others.

Agencies are encouraged to work with their stakeholders and the broader community to define what sustainability means for their jurisdiction in the context of land use and economic development. Examples of actions that typically promote sustainability principles include those that result in the efficient use of land near existing transportation infrastructure and/or those that enhance accessibility within and to existing communities. Other examples include policies that enhance the efficiency of goods movement (e.g., dedicated freight corridors or lanes), and policies that encourage economic development near planned transportation improvements.

In addition to many other widely used references and information sources, the following may be useful:

1. FHWA's Planning Tools for Linking Land Use and Transportation [www.fhwa.dot.gov/planning/ppasg.htm](http://www.fhwa.dot.gov/planning/ppasg.htm), and FHWA's Tool Kit for Integrating Land Use and Transportation Decision-Making <http://www.fhwa.dot.gov/planning/landuse/index.htm>
2. The Transportation Planning Process: A Briefing Book for Transportation Decision-makers, Officials, and Staff, FHWA, Sept 2007 <http://www.planning.dot.gov/documents/BriefingBook/BBook.htm>
3. Transportation Impacts of Smart Growth and Comprehensive Planning Initiatives, NCHRP Report 25-25 Task 02, May 2004 [http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25\(2\)\\_FR.pdf](http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(2)_FR.pdf)
4. Travel Model Improvement Program Clearinghouse: Land Use <http://tmiponline.org/Clearinghouse/Subject-Category/Land-use.aspx>
5. AASHTO Center for Environmental Excellence: Land Use [http://environment.transportation.org/environmental\\_issues/land\\_use\\_sg/recent\\_dev.aspx](http://environment.transportation.org/environmental_issues/land_use_sg/recent_dev.aspx)
6. NCHRP Report 582: Best Practices to Enhance the Transportation- Land Use Connection in the Rural United States [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_582.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_582.pdf)

## Scoring

### 2 points. Develop and Adopt Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency has developed goals and objectives for the integration of metropolitan and/or statewide transportation planning with economic development and land use planning above and beyond current requirements. The goals and objectives further the prospects for transportation investments that support sustainability.
- **Additional 1 point.** The goals and objectives are consistent with applicable economic development and land use plans above and beyond current requirements. If existing local, metropolitan, and/or statewide economic development and land use plans cannot be said to further sustainability principles, the agency may earn the point by working with its partner jurisdictions to establish a joint vision for land use and economic development within the planning area that supports sustainability principles.

### 3 points. Engage Partner Agencies

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** The agency regularly engages land use and economic development agencies in its jurisdiction throughout the transportation planning process, to reduce barriers and further the prospects for implementation of its goals and objectives as identified above.
- **1 additional point.** The agency utilizes institutional mechanisms (such as ad hoc or standing technical advisory committees) to facilitate the engagement.

### 2 points. Use Best Practice Quantitative Methods

The agency uses best practice quantitative methods (e.g. integrated land use and transportation models) to analyze and evaluate the performance of alternative land use/transportation scenarios. The agency incorporates the results into the LRTP. Technical assistance and resources are available through [FHWA's Travel Model Improvement Program](#), [FHWA's Toolkit for Integrating Land Use and Transportation Decision-Making](#), and [FHWA's Toolbox for Regional Policy Analysis](#).

## 2 points. Provide Leadership

The agency provides institutional leadership in encouraging transportation planning that is consistent with land use and economic development plans and that supports sustainability principles. Examples include the provision of incentives for partner jurisdictions (such as leveraging funds to provide planning grants, capital grants, model/tool development and/or technical assistance).

## 6 points. Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements. The first two elements must be accomplished to earn the third.

- **1 point.** The LRTP is integrated with land use and economic development plans, and the agency is implementing transportation investments that support sustainability principles.
- **2 points.** The LRTP includes sustainability-related performance measures for the integration of transportation planning with economic development and land use planning. Examples of sustainability-related performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).
- **3 additional points.** The agency monitors progress against the performance measures and can demonstrate the achievement of its goals and objectives.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation plans and supporting documentation that demonstrate how economic development and land use goals and objectives, stakeholder input, quantitative methods, and/or sustainability-related performance measures were integrated into the LRTP.
2. Documentation of regular land use and economic development agency engagement, and the incorporation of their feedback into transportation planning documents. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. Documentation of the use of best practice quantitative tools and analysis methods that enable the evaluation of integrated transportation, land use, and economic development scenarios.
4. The presence of statewide or metropolitan leadership and incentive programs for integrated transportation, land use, and economic development planning (e.g., state legislation, grant programs, and/or technical assistance, etc).
7. Documentation of the agency's monitoring process and progress to date at meeting the agency's goals and objectives for integrating transportation planning with economic development and land use planning and for implementing transportation investments that support sustainability principles.

# SP-2: Integrated Planning: Natural Environment

1-15 points

**Goal:** Integrate ecological considerations into the transportation planning process, including the development of the long range transportation plan (LRTP) and TIP/STIP. Proactively support and enhance long-term ecological function through the coordination of transportation and natural resource planning.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Integrating transportation planning with natural resource planning supports the environmental triple bottom line principle by ensuring the transportation system supports and enhances sustainable ecological function.

## Scoring Requirements

### Background

The agency conducts transportation planning activities in a comprehensive and integrated manner, and incorporates ecological considerations into the transportation planning process. The agency's LRTP is consistent with, and supports, applicable environmental plans, policies, and goals.

For the purpose of this credit it is important to define and explain several terms:

- **“Integrated”** - For the purposes of this criterion, plans and planning are considered “integrated” when their means and ends are consistent, internally and with each other, and when they are developed in a collaborative manner.
- **“Sustainable”** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.
- **“Ecological”** - In this case, it refers to the natural environment—specifically the ecosystems and natural resources on which life depends.
- **“Environmental plans, policies, and goals”** - These include air quality management plans, watershed and/or stormwater management plans, integrated natural resource management plans, climate change and energy plans, and/or habitat conservation or connectivity plans, among others.

### Scoring

An agency can achieve points under this criterion through developing goals and objectives, engaging natural resource agency stakeholders, applying system or landscape-scale evaluation techniques, and demonstrating sustainable outcomes. Both the content of transportation planning documents and the transportation planning process may be considered for points. An agency can achieve points under this criterion according to the following scale:

#### 2 points. Develop and Adopt Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency has developed goals and objectives for the integration of metropolitan and/or statewide transportation planning with applicable environmental plans, policies, and goals. The goals and objectives are incorporated into the LRTP and encourage transportation investments that support and enhance long-term ecological function. Examples of transportation investments that support and enhance ecological function include those that improve surface water quality, maintain or enhance groundwater recharge (e.g., through innovative stormwater design features), or improve habitat connectivity (e.g., by increasing wildlife crossings, etc), among others.
- **1 additional point.** The goals and objectives are consistent with or surpass local, metropolitan, and/or statewide environmental plans, policies, and goals, as applicable.

### **3 points. Engage Natural Resource and Regulatory Agencies**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** The agency goes above and beyond current consultation requirements by regularly engaging natural resource and regulatory agencies throughout the transportation planning process and incorporates their feedback into the creation of transportation planning documents.
- **1 point.** The agency utilizes institutional mechanisms (such as ad hoc or standing technical advisory committees) to facilitate the engagement.

### **4 points. Apply System or Landscape-Scale Evaluation Techniques**

The agency has applied system or landscape-scale evaluation techniques using natural resource data to (1) assess ecological conditions throughout the system, (2) identify opportunities to avoid and/or minimize potential impacts of planned transportation projects to the natural environment, and (3) identify opportunities to support and enhance long-term ecological function through planned transportation investments. Note that landscape-level natural resource data is collected at a higher resolution than project-level data and may be available through natural resource and regulatory agencies and/or non-profit organizations, such as the Nature Conservancy. An example of a landscape-level evaluation technique includes, but is not limited to, the regional ecosystem framework methodology as described in the [Eco-Logical Ecosystem Approach](#).

Conducting system or landscape-level evaluations during the transportation planning process has many benefits, including potentially identifying major environmental issues before project-level TIP/STIP decisions are made. Additionally, a system or landscape-level analysis can help lay the groundwork for satisfying future project-level federal environmental review requirements (see SP-17 Linking Planning and NEPA). Note that doing project-level NEPA analyses on transportation projects does not meet the intent of this requirement.

One of the following scores applies:

- **0 points.** The agency does not apply system or landscape-scale evaluation techniques using natural resource data during the transportation planning process.
- **2 points.** The agency applies system or landscape-scale evaluation techniques using natural resource data during the transportation planning process and has completed the first two items cited in the paragraph above.
- **4 points.** The agency applies system or landscape-scale evaluation techniques using natural resource data during the transportation planning process and has completed all three of the items cited in the paragraph above.

### **6 points. Demonstrate Sustainable Outcomes**



Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The LRTP is integrated with applicable environmental plans, policies, and goals, and the agency implements transportation investments that support and enhance long-term ecological function.
- **2 points.** The LRTP includes performance measures for long-term ecological function. Examples of sustainability-related ecological performance measures include, but are not limited to, “the number of projects programmed consistent with regional ecosystem framework(s)” and the “the number of projects programmed to maintain or improve water quantity or quality,” among others. Additional examples of sustainability-related performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).
- **3 points.** The agency monitors progress against the performance measures and can demonstrate sustainable outcomes.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation planning documents that demonstrate how ecological considerations were integrated into the transportation planning process, including the development of the LRTP and TIP/STIP.
2. Documentation of regular natural resource and regulatory agency engagement and the incorporation of their feedback into transportation planning documents. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. Evaluation results that document the use of system or landscape-scale natural resource data, and system or landscape-scale evaluation techniques, and how the results of the assessment influenced project-level TIP/STIP decisions.
4. Documentation of the use of ecological criteria for the prioritization and selection of transportation projects included in the LRTP and/or TIP/STIP.
5. Documentation of the agency’s monitoring process and progress to date at meeting the agency’s goals and objectives for long-term ecological function.

# SP-3: Integrated Planning: Social

1-15 points

**Goal:** The agency's Long Range Transportation Plan (LRTP) is consistent with and supportive of the community's vision and goals. When considered in an integrated fashion, these plans, goals and visions support sustainability principles. The agency applies context-sensitive principles to the planning process to achieve solutions that balance multiple objectives to meet stakeholder needs.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Integrating transportation planning with the community's vision and goals for sustainability supports the social triple bottom line principle by ensuring transportation investments reflect the unique vision, goals, and values of the community.

## Scoring Requirements

The agency conducts transportation planning in a comprehensive and integrated manner, and incorporates the community's vision and goals for sustainability and stakeholder input into transportation planning documents. If community visions and goals for sustainability do not already exist, the agency works with stakeholders and the broader community to create visions and goals as they apply to the role of transportation in achieving sustainability outcomes. The agency successfully identifies a diverse range of stakeholders and public participants, engages them regularly throughout the transportation planning process, and demonstrates how their input informed and affected transportation planning decisions. The end result is a context-sensitive LRTP that is consistent with and supports the community's vision and goals for sustainability.

For the purpose of this credit, it is important to define and explain several terms:

- **“Community”** - In this case, the term “community” refers to persons, public agencies, and private or non-profit organizations within the agency's jurisdiction that are affected by changes to the transportation system.
- **“Vision and Goals”** - In this case, “visions and goals” refers to desired outcomes for the future that are determined by the community through an inclusive, comprehensive, and collaborative process.
- **“Sustainability”** - Actions are sustainable when they maintain or enhance our capacity to endure. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future, and the responsible use of natural resources, all while maintaining or improving the well-being of the environment on which life depends.

In addition to many other widely used references, the following may be useful:

1. FHWA's Transportation Planning Process Resource Guide  
[http://www.fhwa.dot.gov/planning/public\\_involvement/resource\\_guide](http://www.fhwa.dot.gov/planning/public_involvement/resource_guide)
2. FHWA's Context Sensitive Solutions Website  
<http://contextsensitivesolutions.org>
3. Transportation Planning Capacity Building: Public Involvement Techniques  
[http://www.planning.dot.gov/PublicInvolvement/pi\\_documents/toc-foreword.asp](http://www.planning.dot.gov/PublicInvolvement/pi_documents/toc-foreword.asp)
4. HUD-EPA-DOT Partnership for Sustainable Communities  
<http://www.sustainablecommunities.gov/index.html>

5. NCHRP Synthesis 407: Effective Public Involvement Using Limited Resources  
[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_407.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_407.pdf)
6. How to Engage Low-Literacy and Limited-English-Proficiency Populations in Transportation Decision-making  
<http://www.fhwa.dot.gov/hep/lowlim/webbook.pdf>
7. International Association for Public Participation  
<http://iap2usa.org>

## Scoring

### 2 points. Work toward a Shared Vision

Metropolitan and/or statewide transportation planning agencies share the community's vision for overall sustainability efforts, and transportation-related goals and objectives are consistent with that vision (as articulated in adopted community vision plans, sustainability plans, and/or community development plans, among others). The agency may also earn the points by working with its stakeholders and the broader community to create visions and goals (if they do not already exist) and to determine the role of transportation in helping to achieve sustainability outcomes.

### 4 points. Engage a Diverse Range of Stakeholders and Public Participants

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency successfully identifies a diverse range of stakeholders and public participants, which include, at a minimum, all **interested parties** (as defined by current regulations), in addition to all other parties potentially affected by changes to the transportation system. The agency regularly engages the identified stakeholders and public participants throughout the transportation planning process.
- **2 points.** The agency gives special consideration and attention to the engagement of low-income, minority, disabled, and linguistically isolated populations, and uses a diverse and innovative range of public involvement techniques to ensure the engagement process is inclusive. Examples include, but are not limited to, conducting outreach in multiple languages, ensuring public meetings are coordinated with transit schedules, and using web-based surveys and/or social media to collect input, among others.
- **1 point.** The agency includes an education component so that stakeholders understand the transportation planning process and are able to better provide informed and meaningful input.

### 3 points. Use a Transparent Process and Demonstrate the Incorporation of Stakeholder Input

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency uses a transparent process to inform stakeholders how their input will be used and then follows through accordingly. An example of a transparent process includes the use of an established hierarchy of public participation (such as the **IAP2 Public Participation Spectrum** or **Arnstein's Ladder of Citizen Participation**).
- **2 points.** The agency demonstrates to stakeholders how their input was used to inform and affect transportation planning decisions.

### 6 points. Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency is implementing transportation investments that support the community's vision and goals and help achieve sustainability outcomes.
- **2 point.** The LRTP includes sustainability-related performance measures to assess the effectiveness of its public involvement process. Examples of sustainability-related performance measures can be found in **NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies**.

- **3 points.** The agency monitors the effectiveness of its public involvement process against the performance measures, makes changes to improve the process as needed, and demonstrates sustainable outcomes.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation planning documents that demonstrate how community vision and goals for sustainability and public input were integrated into the LRTP.
2. Documentation of the regular engagement of a diverse array of stakeholders, including low-income, minority, disabled, and linguistically isolated populations, throughout the transportation planning process. Example documentation sources include committee membership rosters, survey summaries, stakeholder interview summaries, and the times, locations, languages, and attendance of public meetings, among others.
3. Documentation of the use of a transparent public involvement process and the use of public input to inform and affect transportation planning decisions. Example documentation sources include a public involvement plan, project evaluation criteria, project prioritization processes, and comment response summaries that demonstrate how stakeholder input informed and affected the decisions made.
4. Documentation of the agency's monitoring process and the results of its evaluation of the effectiveness of its public involvement process.
5. A commendation for public participation planning in an FHWA/FTA TMA Planning Certification Review.

# SP-4: Integrated Planning: Bonus

0-10 points

**Goal:** The agency has a continuing, cooperative, and comprehensive (3-C) transportation planning process. Planners and professionals from multiple disciplines and agencies (e.g., land use, transportation, economic development, energy, natural resources, community development, equity, housing, and public health) work together to incorporate and apply all three sustainability principles when preparing and evaluating plans.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Long-range, integrated planning at the state and metropolitan levels provides the most robust framework for responding to sustainability goals. This integration supports all of the triple bottom line principles.

## Scoring Requirements

To gain points under this criterion, an agency must have achieved a score of 10 or higher on each of the first three INVEST System Planning criteria (SP-1 through SP-3).

High-performing states and MPOs must move beyond linking each sustainability criterion (economy, environment, and society) separately to transportation. In addition, MPOs and states must incorporate and evaluate the linkages and tradeoffs *between* the sustainability principles. States and MPOs that qualify for points will be able to show how their transportation planning process and its tangible products (transportation planning documents such as the LRTP, S/TIP, or UPWP) support this broader understanding of sustainability.

## Scoring

### 10 points. Transportation Planning Occurs within an Integrated and Collaborative Planning Process

As noted by FHWA (<http://www.fhwa.dot.gov/planning/metro/index.htm>), “since the 1962 Federal-aid Highway Act, federal authorizing legislation for expenditure of surface transportation funds has required metropolitan area transportation plans and programs to be developed through a continuing, cooperative, and comprehensive (3-C) planning process.” While Federal legislation and regulations have required this at the metropolitan level, the 3-C principles support the intent of the INVEST system well. Both state and metropolitan planning for sustainable transportation outcomes are well served by following the 3-C process.

Thus, to achieve points under this criterion, the agency’s transportation planning should occur within a 3-C planning process that is interdisciplinary, and that considers all three sustainability principles at the same time. Agencies will have brought interdisciplinary stakeholders from outside the agency to evaluate its planning process through a sustainability lens and will have developed approaches that integrate the three sustainability principles into the transportation planning document(s) for their state or region. Such work is not easily reduced to a formula. Examples include, but are not limited to:

- **Sacramento’s Blueprint:** Integrating community participation, urban planning and design, and quantitative analysis in the public involvement process.
- **Florida DOT’s ETDM Process:** The development of a process for early and continuous resource agency input, and GIS analysis, into the agency’s planning and decision making process

- Comprehensive Plan Development: The LRTP is part of a “Comprehensive Plan”, as described by the American Planning Association. The American Planning Association describes a comprehensive plan as “establish[ing] a 20-30 year blueprint for the long-range future of the entire community and guides local policy decisions. [The Comprehensive Plan] makes explicit the dependencies and interrelationships that exist between topics such as housing, transportation, land use, economic development and environmental protection. [It may also be] referred to as the general plan or master plan, the comprehensive plan is typically updated every 10-15 years and consists of mandatory elements (as required by state enabling legislation) and voluntary elements (not required by state legislation but important to addressing emerging needs and issues of a community).”
- The active involvement of representatives of multiple agencies, stakeholders, and disciplines in the Agency’s INVEST self-evaluation scoring process.

Scoring for this requirement is based on a scale of 0-10, in proportion to the agency’s estimate of its own progress toward meeting this requirement. The following guidelines apply:

- **0 points.** The agency assembles separate plans produced from different disciplines without interacting or collaborating with each other.
- **5 points.** The agency is making progress toward conducting its transportation planning within an interdisciplinary planning process; however, the three sustainability principles have not yet been fully integrated into the transportation planning document(s) for its jurisdiction.
- **10 points.** The agency’s transportation planning occurs within an interdisciplinary planning process. Interdisciplinary stakeholders from outside the agency have evaluated the agency’s planning process through a sustainability lens and the agency has developed approaches that integrate the three sustainability principles into the transportation planning document(s) for its jurisdiction.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following sources (or equivalent), as appropriate:

1. Documentation that transportation planning occurs within an interdisciplinary, 3-C planning process (e.g., a Comprehensive Plan, Sustainability Plan, or General Plan, among others).
2. Documentation of interdisciplinary collaboration and the evaluation of the agency’s transportation planning process through a sustainability lens (e.g., documentation of input, meeting minutes, or a summary report).

# SP-5: Access and Affordability

1-15 points

**Goal:** Enhance accessibility and affordability of the transportation system to all users and by multiple modes.

## Sustainability Linkage

Improved access and affordability benefit the social and economic sustainability principles by improving employment opportunities and enhancing opportunities to interact with the community. Increasing the modal choices available to the public supports the environmental principle by offering alternatives to motorized travel.



## Scoring Requirements

This criterion is related to SP-8: Freight and Goods Movement. This criterion focuses on access for people, while SP-8 focuses on access for freight and goods movement.

## Background

As explained below, in the context of this self-evaluation tool, accessibility refers to three distinct and complementary issues—physical access, equitable access, and affordable access. To support and inform decision-making, agencies should conduct evaluations and analyses with regard to accessibility and affordability, and should use the results in the programming of transportation improvements.

The following are examples of accessibility issues that might be considered in a transportation planning context.

**Reverse commutes:** A community has high unemployment due in part to an inability to access service and retail jobs which are on the periphery of the metropolitan area. An accessibility analysis is performed to determine what highway or transit investments or improvements are needed to enhance the accessibility of these workers to job sites. The analysis considers the mismatches between the skills of the unemployed and locally available jobs, as well as auto ownership rates.

**Economically depressed/isolated rural communities:** A specific region of a state is economically depressed and isolated and wants additional highway investment to spur economic growth and enhance access to services (e.g., hospitals, airports, grocery stores). The political leadership requests that the State transportation agency evaluate whether a lack of accessibility is contributing to the area's economic woes and isolation. The agency conducts an accessibility analysis to determine the extent to which the area needs additional access and scopes specific projects/programs. These programs address both time and cost barriers to access.

**Access for people with limited mobility or disabilities:** An older metropolitan area has many transportation facilities that are not accessible to users with limited mobility or disabilities. This issue has been raised by the MPO's constituency as a primary concern that should be addressed in the LRTP. In cooperation with the appropriate implementing agencies, the MPO conducts a study of areas where accessible facilities are lacking and needed, and creates a plan for strategically implementing projects/programs to enhance access to the transportation system for these populations. The results of the study are incorporated into its LRTP.

As these examples show, the terms access and accessibility have a number of dimensions. In developing transportation planning documents, agencies should consider the following (the associated details are illustrative only):

### **Physical Access**

- Compliance with the *Americans with Disabilities Act (ADA)*, and more broadly to the principles of universal design, which go above and beyond ADA requirements.
- The ability to reach desired goods, services, activities, and destinations (collectively called opportunities). Providing a broad range of transportation choices increases accessibility.
- Trip connectivity which allows convenient, seamless, and intuitive connections between modes.

### **Access and Equity**

- The availability of road, rail, bus, bike, and pedestrian facilities and transit service for all members of the public and specifically for minority and low-income communities.
- The impacts of transportation on all members of the public and specifically on minority communities and low-income communities.
- The cumulative opportunities afforded by access to jobs, education, food, recreation, health care, social services, places of worship, libraries, retail centers, etc. Good access is especially important for:
  - Rural isolated and/or poor communities
  - Transit-dependent households
  - Other zero-car households
    - Low-income households
    - Persons with disabilities
    - Older adults
    - Children

### **Affordability**

Increase the affordability of the transportation system as a whole through the following transportation planning activities:

- Develop transportation planning documents that specifically address the minimization of transportation costs, particularly for those that are poor or disadvantaged.
- Focus on minimizing the cost of transportation by:
  - Encouraging non-motorized access
  - Encouraging higher density and mixed-use developments in close proximity to existing transportation services or in conjunction with the development of new services
  - Allowing flexibility for non-traditional transportation modes or structures (e.g., jitneys, personal car-sharing, etc.)
- Specific outreach and communication strategies focused on the transportation needs of the disadvantaged.

### **Scoring**

To achieve points, the agency must demonstrate that it effectively evaluates and monitors the distribution of user benefits and relative accessibility through planned transportation improvements to communities and areas/populations of concern. Points can be earned for increasing levels of activity in the transportation planning process as follows:



#### **4 points. Discussion/Consideration in Transportation Planning Documents**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points:** The LRTP includes an analysis of the three dimensions of accessibility and identifies specific population groups or areas where access is an issue. The analysis includes a discussion of time and cost barriers, as well as their consequences. The TIP/STIP includes specific, planned programs or improvements that address access issues.
- **2 additional points:** The LRTP includes documentation of targeted, enhanced outreach or communications that have been used to engage these population groups or areas in the transportation planning process. The agency goes above and beyond requirements to ensure public meetings are accessible by using innovative methods to involve these groups. Examples of innovative methods include, but are not limited to, taking the meeting to them (so they do not have to make a special trip), and providing materials in multiple languages and formats (e.g., ensuring compatibility with “readers” used by the visually impaired, etc), among others.

#### **5 points. Quantitative Analysis**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** The agency uses travel model, census, geospatial, and other data to quantitatively evaluate the nature and distribution of accessibility and affordability concerns in its jurisdiction.
- **3 points:** The agency analyzes how its transportation planning documents address or improve issues such as:
  - Access to commercial centers, jobs, hospitals, schools, and other civic institutions and social and emergency services,
  - The affordability of travel choices, and
  - The affordability of housing through its relationship to transportation investments.

#### **6 points. Performance Measurement and Regular Monitoring**

Scoring for this requirement is based on the following, cumulative elements.

- **3 points:** The LRTP includes sustainability-related performance measures that can be used to monitor the effects of plan implementation on transportation accessibility and affordability.
- **3 points:** The agency is monitoring progress against the performance measures and adjusts its efforts as necessary to meet its goals.

### **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following sources (or equivalent), as appropriate:

1. LRTP and TIP/STIP include accessibility and affordability content.
2. Supplemental documentation of accessibility and affordability analyses and evaluations.
3. Documentation of targeted and enhanced communication and outreach to “traditionally underserved” populations.
4. Documentation of implemented projects or activities to improve access and affordability in response to discussion/analysis.
5. Documentation of the agency’s performance measures, monitoring process, and progress to date.

# SP-6: Safety Planning

1-15 points

**Goal:** Agency integrates quantitative measures of safety into the transportation planning process, across all modes and jurisdictions.

## Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic triple bottom line principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.



## Requirements

### Background

The nature of this criterion is to recognize the efforts of agencies to reduce fatalities and serious injuries by integrating quantitative measures of safety into the transportation planning process, thereby assuring that consideration of meaningful measures of safety influences program development and implementation.

### Scoring

#### **2 points. Collaborate and Participate in the Development and Implementation of the State Strategic Highway Safety Plan**

One of the following scores applies:

- **0 points.** The agency is not involved in the development of the State Strategic Highway Safety Plan (SHSP).
- **1 point.** The agency actively collaborates in the creation of the SHSP, but is not implementing the SHSP as part of agency-specific planning and programming activities.
- **2 points.** The agency actively collaborates in the creation of the SHSP and is implementing the SHSP in agency-specific planning and programming activities.

#### **1 point. Integrate the Toward Zero Death Vision into the Agency's Vision for Transportation Planning**

The agency or office has incorporated the Toward Zero Death (TZD) vision and is implementing TZD as part of its transportation planning activities (i.e., using multi-disciplinary and integrated approaches to reduce fatal and serious injuries in crashes). The agency vision for transportation planning reflects the intention to cooperate and collaborate across all levels of government.

#### **1 point. Develop a Plan that Incorporates Safety into Short- and Long-Range Transportation Planning**

Develop a plan that incorporates safety into short- and long-range transportation planning that:

- Presents a system-wide approach to reduce the risk of fatal and serious injuries based on data-driven, systematic, and scientific methods and approaches. These methods and approaches account for regression-to-the-mean and incorporate performance thresholds (quantify base performance).
- Includes safety-specific strategies and lead agencies.
- Supports integrated and multidisciplinary approaches to reduce the number of fatal and serious injuries on the entire public highway system in the region.

- Demonstrates a commitment from the agency to include quantitative safety into the programming of projects and activities.

The plan could be a single statewide plan or a combination of Standard Operating Procedures (SOPs) at headquarters and district/regional levels, or a plan for a county, metropolitan area, or regional council area.

One of the following scores applies:

- **0 points.** The agency has not developed a plan that incorporates safety into short- and long-range transportation planning. For MPOs, transportation plans do not align with the State SHSP; for state DOTs, the other safety plans for the state (LRTP, HSP, HSIP, CVSP) do not align with the SHSP.
- **1 point.** The agency has developed a system-wide approach to identify expenditures on programs, projects, and activities that target a reduction in fatal and serious injuries in the region. This could be a single statewide or regional safety plan as part of a collaborative effort across all, or a combination of SOPs at headquarters and district/regional levels of government (federal, state, and local).

### **1 point. Integrate Quantitative Safety Performance Measures into the Transportation Planning Process**

One of the following scores applies:

- **0 points.** The agency has not integrated safety performance measures into the transportation planning process, or the agency uses crash rates as a measure to identify system needs.
- **1 point.** The agency has integrated quantitative safety performance measures into the transportation planning process. The agency uses quantitative safety performance measure(s) to quantify safety performance in terms of the number of crashes or severity. For example, the number of fatal and serious injury crashes, the number of fatal and serious injuries, or the number of fatal and injury crashes involving vulnerable users (pedestrians, bicyclists, motorcyclists, older users, and children). Network screening, as presented in Chapter 4 of the AASHTO Highway Safety Manual, presents advanced measures that account for regression to the mean and offer higher statistical reliability than, for example, crash rate methods.

### **3 points. Integrate Quantitative Safety Considerations in the Selection and Evaluation of Strategies during the Transportation Planning Process**

- **2 points.** The agency has incorporated and integrated quantitative safety considerations into the selection and evaluation of strategies for different user groups (for example, pedestrians, bicyclists, motorcyclists, vehicle occupants).
- **1 points.** The agency has selected strategies that include systemic treatments with proven effectiveness in reducing fatal and serious injuries (may be operational or safety-specific in nature).

### **3 points. Integrate Statistically Sound Approaches to Determine Projected Safety Performance into the Long-Range Transportation Planning Process**

The agency has adopted and integrated advanced, statistically sound, quantitative methods into the long-range transportation planning process to set performance baselines and estimate future safety performance. The agency is using tools that rely on macro-level predictive models to provide a quantitative and statistically reliable forecast of crashes for a given future travel demand (using output from travel demand models), and socio-demographics (if no particular improvements in safety culture, infrastructure, EMS, and other areas occur other than what exists at the base year of the analysis). PlanSafe is an example of such an analysis tool (developed and updated through NCHRP).

#### **4 points. Collect and Maintain Data (Safety and Non-Crash Information) for the Public Roadway System to Incorporate Safety into the Long-Range Transportation Planning Process**

- **1 point.** The agency actively participates and supports the state Traffic Records Coordinating Committee (TRCC) and jointly funds initiatives related to the improvement of data management and linkage initiatives.
- **1 point.** The agency develops, maintains, and uses GIS-based data files for the entire public roadway system, including crash and non-crash information, for use in planning for safety and incorporating safety into the long-range transportation planning process.
- **1 point.** The agency creates, maintains, and uses GIS-based data for safety analysis and for use in the consideration of safety as part of the long-range transportation planning process. NOTE: for MPO or regional agencies, this point does not include the creation of a GIS-based crash data file but includes support to the state in the development of a GIS-based roadway layer for all public roadways in the state.
- **1 point.** The agency routinely joins roadway, operation, asset management, medical, and other datasets spatially with crash data in the analysis to identify potential safety improvements and prioritize planning programs, projects, and activities.

### Sources

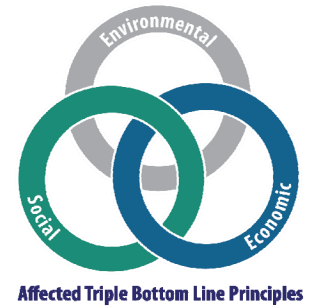
The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency vision statement(s) that document the integration of the Toward Zero Death vision into the agency's vision for transportation planning.
2. Requirements set for safety project funding (e.g., HSIP).
3. Project reports documenting the evaluation of future anticipated safety performance for short-, medium-, and long-range transportation plans.
4. Documentation of the incorporation of safety considerations into the selection, evaluation, and prioritization of projects for inclusion in short-, medium-, and long-range transportation planning documents.
5. Documentation to identify alignment across different state and regional plans (SHSP, STIP, TIP, CVSP, and HSIP), regardless of whether these plans have a safety focus or not.
6. Relevant agency policies or manuals.
7. Documentation of the evaluation of policies, projects, and activities to assess the impact on fatal and serious injury crashes and fatal and serious injury crashes involving vulnerable users.
8. NHTSA State Traffic Records Assessment Report and FHWA State Data Capability Assessment Report for assessments performed within the last 3 years.

# SP-7: Multimodal Transportation and Public Health

1-15 points

**Goal:** Expand travel choices and modal options by enhancing the extent and connectivity of multimodal infrastructure. Support and enhance public health by investing in active transportation modes.



## Sustainability Linkage

A multimodal transportation network supports the social and economic triple bottom line principles by increasing transportation options, reducing traffic congestion and emissions, and encouraging the use of active modes to enhance public health.

## Scoring Requirements

### Background

The agency provides choices and opportunities for multimodal, active transportation networks while meeting access and mobility needs.

For the purpose of this criterion, it is important to define and explain the terms below:

- **“Multimodal”** - Multimodal refers to a transportation system that provides travelers with well-connected and integrated bicycle, pedestrian, and transit networks, in addition to automobile infrastructure. Multimodal can also refer to the provision of travel options for inter-city passenger travel, such as rail, train, bus, or ferry as alternatives to air travel.
- **“Active transportation modes”** - Active transportation modes refer to modes of transportation that increase levels of physical activity and are considered to primarily include biking, walking, and transit (Approximately 30% of transit users receive the CDC recommended amount of daily physical activity. Source: Besser, L. and A. Dannenberg, *Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations*, American Journal of Preventative Medicine, 2005.)

In addition to many other widely used references, the following may be useful:

1. *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, American Association of State Highway and Transportation Officials, Washington, DC, July 2004.
2. *Guide for the Development of Bicycle Facilities*, 3rd Edition, American Association of State Highway and Transportation Officials, Washington, DC, 1999.
3. *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, Institute of Transportation Engineers, Washington, DC, March 2010.
4. *A Resident’s Guide for Creating Safe and Walkable Communities*, Federal Highway Administration, Washington, DC, February 2008.
5. *Center for Disease Control: Transportation Recommendations*  
<http://www.cdc.gov/transportation/recommendation.htm>
6. *The Hidden Health Costs of Transportation*, American Public Health Association, February 10, 2010.

## Scoring

To achieve points, the agency must demonstrate that it produces, monitors, and maintains an integrated multimodal transportation plan that emphasizes active modes. Points are awarded for this criterion based on the following requirements.

### 2 points. Develop Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency has developed goals and objectives for enhancing the extent and connectivity of multimodal infrastructure within its jurisdiction, including transit and non-motorized modes.
- **1 point.** The agency has developed goals and objectives related to active transportation and the improvement of public health.

### 2 points. Engage Stakeholders

The agency regularly engages public health and active mode stakeholders throughout the transportation planning process and incorporates their feedback into the creation of transportation planning documents.

### 5 points. Develop a System-wide Plan

The agency's LRTP includes multimodal and active mode infrastructure needs, projects, and programs. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second. The third element is independent.

- **1 point.** The agency includes and prioritizes active, non-motorized transportation projects and programs as a component of the LRTP. Examples of projects include the expansion of transit, pedestrian, and bicycle infrastructure, facilities, and services. Examples of programs include the implementation of Safe Routes to School.
- **1 additional point:** The agency's LRTP integrates transit, pedestrian, bicycle, and roadway networks so that intermodal connections are safe and convenient.
- **3 points.** The agency has evaluated the health impacts of the LRTP to determine whether the planned transportation investments will help the agency to meet its public health and active transportation goals.

### 6 points. Measure Progress and Demonstrate Sustainable Outcomes

The agency evaluates its progress toward meeting its multimodal and public health goals and makes adjustments as necessary. Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency is implementing transportation investments that expand travel choices and modal options and support and enhance public health.
- **2 points:** The agency has incorporated multimodal and public health-related performance measures into its LRTP and can demonstrate ongoing monitoring of its progress toward meeting its goals.
- **3 points:** The agency can document that it has met its multimodal transportation and public health goals and objectives.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Adopted state or metropolitan transportation planning documents that incorporate multimodal and active mode projects and programs.

2. Documentation of regular public health and active mode stakeholder engagement, and the incorporation of their feedback into transportation planning documents. Documentation may include technical advisory committee membership rosters, meeting agendas and minutes, and interview summaries, among others.
3. A programming and prioritization evaluation framework that demonstrates the prioritization of multimodal and active mode projects and programs.
4. The results of transportation plan evaluations that estimate the public health impacts of the proposed transportation projects and programs.
5. Progress reports and analyses of the agency's progress at meeting its multimodal and public health goals.

# SP-8: Freight and Goods Movement

1-15 points

**Goal:** Implement a transportation system plan that meets freight access and mobility needs while also supporting triple bottom line sustainability principles.



## Sustainability Linkage

Freight and goods movement planning provides multiple sustainability benefits, including economic (supporting economic prosperity through improved freight efficiency and reliability), environmental (reducing fuel consumption and related emissions), and social (reduced adverse impacts of freight on communities, etc).

## Scoring Requirements

This criterion is related to SP-5: Access and Affordability. This criterion focuses on access for freight and goods movement, while SP-5 focuses on access for people.

## Background

A more sustainable freight system provides convenient access to goods and markets, allows for multiple freight modes, reduces congestion on roadways, and reduces freight inefficiencies and adverse impacts on communities (noise, emissions, vibrations, etc.).

Examples of goods movement issues that may be considered in a transportation planning context are described below:

- **Farm to market:** The goals and objectives of a particular state support the increased access of farmers to food/product markets. The current transportation system provides inferior access to markets from specific farming regions in the state. The state DOT collects data and performs sketch planning accessibility analyses. These analyses help the state identify and scope specific improvements to enhance access to these areas.
- **Metropolitan Freight Mobility Study:** The MPO conducts a comprehensive, systems-level mobility study specifically addressing freight movement needs, issues, and potential solutions. The MPO identifies freight bottlenecks, such as truck access to intermodal terminals, and uses data and tools to evaluate alternative solutions. The MPO engages the freight carriers in the conduct of the study.

## Scoring

To achieve points, the agency must demonstrate that it has evaluated or improved freight mobility, reliability, and/or intermodal freight connections. Agencies can earn points according to the following; each of the scoring options is independent and can be achieved without prerequisites:

### 3 points. Engage Stakeholders

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** The agency regularly engages a wide variety of freight service providers, stakeholders, workers, and



representatives in developing transportation planning documents to ensure freight activity supports sustainable economic activity that fits well in the context of the metropolitan area and community.

- **1 additional point.** The agency utilizes institutional mechanisms to facilitate the engagement of freight stakeholders. Examples of institutional mechanisms include decision-making boards or advisory committees that include freight representatives.

#### **4 points. Freight Mobility Needs**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** The agency considers multimodal freight mobility needs (aviation, marine, rail, interstate, pipeline, and intermodal) in the transportation planning process. Freight mobility goals and evaluation criteria are included in transportation planning documents.
- **2 points:** The agency includes and monitors sustainability-related freight mobility performance measures in transportation planning documents. Examples of performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).

#### **4 points. Freight Reliability**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** The agency includes in the LRTP, or other appropriate transportation planning document (for example, a freight rail plan), specific provisions for maintaining and improving freight reliability and interconnectedness between freight modes for both inter- and intra-city freight, in ways that enhance sustainability (e.g., improve safety and fuel economy and/or reduce noise and emissions). Examples of provisions include information exchange, infrastructure investments, technology, and other best practices.
- **2 points:** The agency includes and monitors sustainability-related freight reliability performance measures in the appropriate transportation planning document(s).

#### **4 points. Intermodal Freight Connectors**

Intermodal freight connectors are the public roads leading to major intermodal terminals. Although they account for less than one percent of National Highway System mileage, they are key conduits for the timely and reliable delivery of goods. Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** The agency provides for planning, evaluating, maintaining, and improving intermodal freight connectors at all levels (federal, state, and local). Measures and criteria to encourage coordination among the freight modes (e.g., rail, port, airport, and other) in ways that enhance sustainability are included.
- **2 points:** The agency includes and monitors sustainability-related performance measures for intermodal freight connectors in the appropriate transportation planning document(s).

## **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A stakeholder involvement/public involvement plan or a similar description of the efforts used to engage the freight community in creating transportation planning documents.
2. Documentation of freight mobility goals, objectives, and policies.
3. A freight section in the appropriate transportation planning document(s) that includes freight performance measures and implementation strategies/actions.
4. Recommendations in the appropriate transportation planning document(s) that address sustainable freight and goods movement best practices.

# SP-9: Travel Demand Management

1-15 points

**Goal:** Reduce vehicle travel demand throughout the system.

## Sustainability Linkage

Transportation Demand Management (TDM) provides multiple sustainability benefits, including environmental (reduced energy consumption and related emissions), social (improved awareness of available travel choices), and economic (reduced costs of travel and congestion to the economy).



## Scoring Requirements

This criterion relates to SP-14: Transportation Systems Management & Operations; while both can help to mitigate congestion, SP-9 focuses primarily on reducing travel demand and SP-14 focuses on optimizing the efficiency of the transportation system. Accordingly, the spatial or temporal shifting of travel demand to off-peak periods and less congested facilities is covered in SP-14.

## Background

TDM is a tool that seeks to reduce vehicle travel by making it easier for travelers to elect travel options other than driving alone (such as transit, bicycle, walking, ridesharing, and teleworking). Common types of TDM strategies include, but are not limited to:

1. Travel option education and outreach programs
2. Challenge/incentive programs for non-auto modes
3. Rideshare and car-sharing programs
4. Parking pricing and policies
5. Road/vehicle pricing policies
6. Land use policies (that promote a mixed-use, pedestrian-friendly built environment)
7. Employer trip reduction programs (e.g., transit benefits, trip end facilities, parking cash-out programs, teleworking, etc)
8. Transportation Management Organizations (TMO), among others

These strategies represent a range of approaches to TDM, including those that are more appropriate for implementation at the state level (e.g., road/vehicle pricing policies, etc.) and those that are more appropriate for implementation at the MPO and/or local government level (e.g., rideshare programs, parking policies, etc.). Additionally, some of these strategies may work best in urban contexts (e.g., TMOs), while others are well suited to either urban or rural settings (e.g., rideshare programs). Additional TDM guidance and reference materials are available on the [FHWA website](#).

The requirements for earning points under this criterion are described below. To achieve the most points, TDM performance measures and a means of quantifiably assessing outcomes is required. It should be noted that for all the scoring requirements below, an agency may earn the points for implementing the requirements themselves or for providing support/funding (such as grants or technical assistance) to other agencies within its jurisdiction (e.g., transit agencies, MPOs, councils of governments (COG), and/or non-profit agencies, etc.) for achieving the requirements. This may often be the case for state DOTs.

## Scoring

### 2 points. Set TDM Goals and Objectives

- **1 point.** The agency has developed quantifiable TDM goals and objectives for reducing travel demand for the transportation network within its jurisdiction. Examples of TDM goals and objectives include vehicle miles of travel (VMT) reduction goals and/or mode split targets.
- **Additional 1 point.** The TDM goals and objectives are also consistent with relevant state and/or metropolitan goals and objectives for reducing travel demand.

### 4 points. Implement a TDM Program

The agency is implementing a comprehensive TDM program that includes several of the various types of TDM strategies described in the Background paragraph above. One of the following scores applies:

- **0 points.** The agency is implementing less than two of the TDM strategies described in the Background paragraph above.
- **2 points.** The agency is implementing a TDM program that includes two or three of the TDM strategies described in the Background paragraph above.
- **4 points.** The agency is implementing a comprehensive TDM program that includes several (four or more) of the TDM strategies described in the Background paragraph above.

### 4 points. Develop TDM Performance Measures & Monitor Progress

The agency has quantifiable TDM performance measures and can demonstrate ongoing monitoring of its TDM program. Examples of common TDM performance measures include non-SOV mode share, VMT reduced, and vehicle trips reduced. Additionally, TDM performance measures may assess the success of TDM education and outreach programs by tracking the number of participants in various TDM programs or surveys. Additional examples of performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#). One of the following scores applies:

- **0 points.** The agency does not have TDM performance measures and is not conducting ongoing monitoring of its TDM program.
- **2 points.** The agency has quantifiable TDM performance measures, but is not conducting ongoing monitoring of its TDM program.
- **4 points.** The agency has quantifiable TDM performance measures and can demonstrate ongoing monitoring of its TDM program.

### 5 points. Demonstrate Sustainable Outcomes

This requirement may be scored on a scale of 0-5, in proportion to the agency's estimate of its progress toward meeting this requirement. The following guidelines apply:

- **0 points.** The agency cannot document that they have met or are making measurable progress toward meeting its TDM goals and objectives.
- **3 points.** The agency can document that they have made measurable progress toward meeting its TDM goals and objectives.
- **5 points.** The agency can document that it has met its TDM goals and objectives and that its TDM program has contributed to those outcomes. For example, the agency can show that VMT has been reduced or that non-SOV mode-share has increased for its jurisdiction (in accordance with its TDM goals and objectives), and can reasonably attribute a proportion of that to its TDM program.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency transportation planning documents (long range, corridor, CMP, non-motorized, project-selection criteria, etc.) that include a TDM component.
2. A published document, website, brochure, and/or administrative report (or equivalent) that provides evidence of the agency's TDM goals and objectives.
3. Documentation of the implementation of the TDM strategies described in the Background section above.
4. An annual or periodically updated report of TDM program progress, which includes the TDM performance measures, baseline data collection, and the results from ongoing monitoring of the TDM program over time. This can be done independently or as part of an existing regular reporting cycle.
5. An independent review or TDM program evaluation.

# SP-10: Air Quality

1-15 points

**Goal:** To plan, implement, and monitor multimodal strategies to reduce emissions and to establish a process to document emissions reductions.

## Sustainability Linkage

Reducing emissions and improving air quality provides multiple sustainability benefits, including environmental (reducing emissions) and social (improving human health).



## Scoring Requirements

This criterion is related to SP-6: Multi-Modal Transportation and Public Health, SP-9: Travel Demand Management, SP-11: Energy and Fuels, and SP-14: Transportation Systems Management and Operations. While the strategies in this criterion help serve multiple goals, this criterion is focused primarily on the reduction of criteria air pollutants.

Air quality issues are expected to be addressed based on the implementation of emissions reducing transportation strategies. To obtain credit for this criterion, the agency should perform the following process steps:

- Through interagency consultation, discuss the emissions reduction strategies or programs that are to be included in transportation planning documents and implemented.
- Establish a process to design, test, evaluate, and deploy the selected strategies or programs.
- Develop measures for the prioritization of transportation projects or programs in the LRTP and/or TIP, based on their emission reduction potential.
- Use EPA, or another approved emissions model, to estimate and quantify emissions reductions.
- Communicate findings and emissions reduction results to stakeholders and other areas with similar air quality challenges.

### 10 points. Implement Strategies to Reduce Emissions

The agency is implementing multimodal strategies as part of a transportation plan to reduce emissions. The agency receives 2 points for implementing strategies from each of the categories listed below, for a total of 10 points. A report published in 2010: *NCHRP 25-25 (Task 59): Evaluate the Interactions between Transportation-Related Particulate Matter, Ozone, Air Toxics, Climate Change, and Other Air Pollutant Control Strategies*, provides good background information on these strategies.

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** The agency is implementing transportation demand management strategies, including land use strategies and strategies that reduce vehicle miles travelled, increase transit services, and promote non-motorized modes of transportation.
- **2 points.** The agency is implementing transportation system management strategies, including congestion relief and traffic management strategies such as pricing or idling restrictions.

- **2 points.** The agency is implementing vehicle technologies including diesel emissions reduction strategies, such as truck stop electrification, funding school bus retrofits, retrofits of state or local maintenance and construction equipment, and clean vehicle strategies such as replacing diesel buses with CNG or hybrid buses.
- **2 points.** The agency is implementing fuel technologies including renewable energy measures (which reduce emissions from power plants or fuel consumption) such as: solar lighting, solar or wind energy at rest areas, renewable electricity generation or biofuel crops in ROW, and mandates for the use of biofuels in fleet or construction vehicles, etc.
- **2 points.** The agency is implementing dust controls, including paving unpaved roads, and strategies to control construction-related dust.

#### **5 points. Conduct Emissions Analysis**

Conduct emissions analysis to document emissions reductions from the transportation strategies implemented.

One of the following scores applies:

- **0 points.** No emissions analysis is performed.
- **2 points.** The agency conducts a qualitative assessment of the emissions reduction potential of all the strategies implemented.
- **5 points.** The agency conducts a quantitative emissions analysis to document emissions reduction for all the strategies implemented.

### Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Plan and policy review that demonstrates emissions reduction transportation strategies or programs are included in transportation planning documents.
2. Documentation of the transportation strategies or programs implemented.
3. Methodology documentation for estimating emissions.
4. Calculations and/or documentation showing that the transportation strategies reduced the emissions of at least one criteria pollutant.

# SP-11: Energy and Fuels

1-15 points

**Goal:** Reduce the energy and fossil fuel consumption from the transportation sector and document it in the transportation planning process.

## Sustainability Linkage

Reducing energy and fossil fuel consumption from the transportation sector provides multiple sustainability benefits and supports all of the triple bottom line principles by reducing fuel spending, greenhouse gas emissions, and energy dependence.



## Scoring Requirements

### Background

There are many ways an agency can reduce the energy and fossil fuel consumption of the transportation system within its jurisdiction. Types of strategies include improving the fuel efficiency of vehicles (for autos, transit, trucks, etc), as well as encouraging the switch to alternative fuels. Examples of the types of strategies that are implementable by states and/or MPOs include, but are not limited to:

- Providing incentives for the purchase and/or use of high fuel efficiency or alternatively fueled vehicles (e.g., accelerated vehicle retirement programs, allowing hybrids to drive solo in HOV lanes, etc.)
- Implementing public eco-driving and anti-idling campaigns
- Providing alternative fueling infrastructure (e.g., electric vehicle charging corridors, Truck-Stop Electrification (TSE) programs, etc.)

Additional strategies include shifting travel to less energy-intensive modes, reducing travel demand, and optimizing travel speeds for fuel-efficiency. Examples of these types of strategies are described in more detail in SP-7: Multimodal Transportation and Public Health, SP-9: Travel Demand Management, and OM-13: Transportation Management and Operations, respectively. Additionally, while this criterion is primarily focused on reducing on-road energy and fossil-fuel consumption, the use of renewable energy for system-wide operations (solar variable message signs, solar highways, etc.) also reduces transportation energy use.

Additional examples of strategies and guidance for reducing energy and fossil fuel use from transportation are available at the following resources:

1. State and Local Energy Programs Resource Center; AASHTO Transportation and Climate Change Resource Center <http://climatechange.transportation.org/energy>
2. TRB Special Report 307: Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation <http://www.trb.org/Publications/Blurbs/165535.aspx>
3. State/Local Actions & Policies, Integration of Climate Considerations into Transportation Decision-Making, US DOT <http://climate.dot.gov/state-local/integration/index.html>
4. USDOT Transportation and Climate Change Clearinghouse <http://climate.dot.gov/index.html>

5. Transportation's Role in Reducing U.S. Greenhouse Gas Emissions, prepared for FHWA by Cambridge Systematics Inc., April 2010 [http://ntl.bts.gov/lib/32000/32700/32779/DOT\\_Climate\\_Change\\_Report\\_-\\_April\\_2010\\_-\\_Volume\\_1\\_and\\_2.pdf](http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf) and <http://www.dot.gov/affairs/2010/dot7510.htm>
6. Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions, Urban Land Institute (ULI) report prepared by Cambridge Systematics Inc., July 2009 <http://movingcooler.info>
7. Integrating Climate Change into the Transportation Planning Process, prepared for FHWA by ICF International, July 2008 <http://www.fhwa.dot.gov/hep/climatechange/index.htm>

## Scoring

Toward the goal of including and integrating energy and fossil fuel considerations into its transportation planning documents, an agency can achieve points under this criterion through data collection and analysis, performance measurement, and quantifiably assessing outcomes. Agencies can earn points according to the following; each of the scoring options is independent and can be achieved without prerequisites:

### 2 points. Set Goals and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency has developed energy and/or fossil fuel reduction goals and objectives for the transportation system within its jurisdiction.
- **1 additional point.** The goals and objectives are consistent with relevant state and/or metropolitan goals and objectives for reducing energy and fossil fuel consumption.

### 4 points. System-Level Data Collection and Forecasting

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** The agency (or cooperating agencies) has developed and maintains a baseline inventory of current energy and/or fossil-fuel consumption (for all fuel types and modes) from transportation.
- **2 additional points.** The agency uses an appropriate model or method to forecast energy and fuel consumption associated with its LRTP, including business-as-usual and alternative scenarios (as appropriate). The agency uses this information to inform transportation decision-making and the development of the LRTP. Resources related to conducting transportation energy data, inventories, and forecasts can be found on the USDOT website here: <http://climate.dot.gov/ghg-inventories-forcasts/index.html>.

### 4 points. Develop a Plan and Implement Strategies to Reduce Transportation-related Energy and/or Fossil Fuel Usage

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Energy and fossil fuel reduction strategies are included in the LRTP, and the LRTP includes a discussion of the impacts of including these strategies.
- **2 points.** The agency (or cooperating agencies) implements transportation strategies to reduce transportation-related energy and fossil fuel consumption and related emissions (such as those described in the Background section above). These may include strategies implemented primarily to reduce energy use, as well as strategies implemented primarily for other purposes (e.g., congestion relief, air quality, vehicle travel demand reduction, etc).

### 5 points. Measure Progress and Demonstrate Sustainable Outcomes

Scoring for this requirement is based on the following, cumulative elements.



- **1 point.** The agency has incorporated energy and fossil fuel reduction performance measures into its LRTP. Examples of performance measures include fuel expenditure reductions, gallons of fuel consumed, and greenhouse gases reduced, among others. Additional examples of performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).
- **2 points.** The agency demonstrates ongoing monitoring of its progress toward reducing energy and fossil-fuel consumption.
- **2 points.** The agency can document that they have met its energy and fossil-fuel consumption goals.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following types of documentation (or equal where not available):

1. A published document, website, brochure, and/or administrative report (or equivalent) that provides evidence of the agency's energy goals and objectives.
2. Transportation-related energy and fossil fuel inventories, forecasts, and/or methodology reports that quantify energy and fossil fuel consumption.
3. Transportation planning documents that include projects and programs for reducing energy and fossil fuel use.
4. Documentation of the implementation of the strategies described in the Background section of this criterion.
5. An annual or periodically updated report of progress, which includes the results from ongoing monitoring over time.

# SP-12: Financial Sustainability

1-15 points

**Goal:** Evaluate and document that financial commitments made in transportation planning documents are reasonable and affordable.

## Sustainability Linkage

Financial sustainability supports the economic triple bottom line principle by improving economic prosperity for current and future generations, and ensuring that there are sufficient financial resources to advance the projects and program goals of the community.



## Scoring Requirements

The intent of this criterion is to encourage the use of advanced best practices in cost estimating and revenue forecasting.

## Background

In 1991, Congress enacted “fiscal constraint” provisions as part of the *Intermodal Surface Transportation Efficiency Act*. Fiscal constraint in the context of sustainability goes beyond formulaically meeting regulatory requirements; it should ensure that the estimated capital costs and operating expenditures of the transportation system are reliable, and that they are in line with anticipated revenues. In addition, subsequent plan implementation should adhere to the constraints imposed by anticipated revenues and costs. This ensures that future generations are able to continue to benefit affordably from future transportation investments.

The following are three sources of additional information related to financial sustainability:

1. The FHWA/FTA Final Rule on statewide and metropolitan transportation planning and programming and congestion management processes/systems was published in the Federal Register on February 14, 2007 and became effective on March 16, 2007. This Final Rule can be accessed at: <http://edocket.access.gpo.gov/2007/07-493.htm> (HTML version) or <http://edocket.access.gpo.gov/2007/pdf/07-493.pdf> (PDF version).
2. *Best Practices in Managing STIPs, TIPs, and Metropolitan Transportation Plans in Response to Fiscal Constraints*. February 2010. The report was prepared as part of National Cooperative Highway Research Program Project 20-68A U.S. Domestic Scan. Further information on the NCHRP 20-68A U.S. Domestic Scan program is available at <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>. Best practices cited in this report are summarized below.
3. *Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction*. 2007. This report was prepared as part of the National Cooperative Highway Research Program Project 8-49 to help address problems of cost escalation and support the development of consistent and accurate project estimates through all phases of the development process. The report is available at: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_574.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_574.pdf)

## Scoring

Agencies can earn points according to the following; each of the scoring options is independent and can be achieved without prerequisites:

### **7 points. Advanced Revenue Forecasting**

Use an inter-agency, cooperative approach for advanced revenue forecasting practices to develop a reasonable finance plan that considers risk and includes contingencies. Advanced revenue forecasting is a dynamic process that considers a wide range of sources, “nontraditional” financing mechanisms, risk management techniques, and forecasts that are updated on a regular basis. Include cost estimations and actual costs of ongoing operations and maintenance of systems in LRTPs and TIPS/STIPs. Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** The agency engages in regular and comprehensive coordination and information sharing among affected agencies (including State DOTs, MPOs, and transit operators) during the development of revenue forecasts.
- **3 points:** The agency undertakes systematic forecast updates. Significant changes in forecast revenues are addressed in the transportation planning process to prevent unsustainable deficits or funding gaps.
- **2 points:** The agency has an established process for engaging stakeholders in a dialogue about the implications of any changes in revenue forecasts.

Evidence of the use of advanced revenue forecasting practices could include:

- Evidence of leadership emphasis on rigorous fiscal discipline;
- Incorporation of risk management techniques into revenue forecasts;
- Inclusion of local and state sources as part of the revenue forecast and coordination with other potential funding sources;
- Involvement of appropriately qualified revenue estimating organizations for the state or local unit of government responsible to elected officials for overall revenue estimates;
- Coordination of STIP and Metropolitan LRTP development with state budget development to mirror respective fiscal constraints;
- Involvement of a professional economist in revenue forecasting;
- Use of committees to establish consensus regarding the revenue forecast;
- Evidence of policies or guidelines for monitoring and updating forecasts, especially at major decision points for projects and plans;
- Objective analysis of “nontraditional”, innovative financing mechanisms and the expected revenues from those approaches; and
- Evaluation of past revenue forecasts and understanding why they did or did not turn out as expected.

### **8 points. Advanced Cost Estimating**

Use an inter-agency, cooperative approach for advanced project cost estimating practices that considers both capital and lifecycle costs (which would include maintenance and operations), risks, and contingencies. An example of advanced cost estimating includes factoring in a variety of land use/transportation growth scenarios and associated future infrastructure construction and maintenance costs. Scoring for this requirement is based on the following, cumulative elements.

- **2 points:** As projects progress through the transportation planning process and ultimately construction, the agency keeps accurate records of all changes to the project scope and documents their impact on costs.

- **3 points:** As the project development process progresses, the agency avoids formula-driven cost estimating procedures in favor of project-specific methods.
- **3 points:** The agency completes systematic cost updates regularly, including cost estimates for ongoing system operations, and maintenance and changes to costs as projects develop. Cumulative or major changes in project costs are reflected in updated financial plans and the fiscal constraint determinations of subsequent transportation planning documents, including the TIP/STIP.

Evidence of the use of advanced cost estimating practices could include:

- Evidence of leadership emphasis on fiscal discipline;
- Coordination between preconstruction and construction personnel in preparation of cost estimates;
- Feedback loops from lessons learned during construction for future cost estimating practices; and
- Practices for tracking changes in project scopes and the subsequent relationship to cost estimating and revenue forecasting procedures.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation in the TIP/STIP
2. State or metropolitan revenue forecasts or studies
3. Meeting minutes of policy making or governing Boards, Committees, or Commissions
4. Major project-level financial plans and cost estimating reports
5. Independent reviews of agency construction or revenue estimates or procedures
6. Financial plan section of the LRTP or other transportation planning documents

# SP-13: Analysis Methods

1-15 points

**Goal:** Agencies adopt and incentivize best practices in land use, socioeconomic, and transportation systems analysis methods.

## Sustainability Linkage

The use of analysis methods can help an agency measure progress toward meeting its sustainability goals by providing the means to estimate, evaluate, and communicate the expected social, environmental, and economic outcomes of changes in transportation policies, services, and the built environment.



## Scoring Requirements

### Background

Transportation planning includes numerous tools and practices within the profession to inform decisions regarding transportation infrastructure, policy, plans, management of the systems, or project implementation. The analytical framework for transportation planning and policy along with the relationship to comprehensive planning drives the development of the analytical tools and practices. Understanding the interplay between land use, socioeconomic systems, transport systems, and the environment is central to developing more sustainable transportation systems and communities. To assist in accomplishing this, tools and practices need to reflect these dynamics at the appropriate scale (national, state, metropolitan, local, etc.) and provide relevant performance measures as part of the decision-making process.

### Scoring

#### 3 points. Quality of Data

The transportation data resources used as the basis for the analysis and the development of tools such as travel demand models are of a sufficient quality and coverage to support the conclusions. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency demonstrates that the analysis has a strong foundation in observed data suitable for developing tools which model the land use, socio-economic, transport, and environmental systems.
- **2 additional points.** The agency demonstrates that the data used in planning analysis are evaluated and updated on a regular basis.

#### 2 points. Technical Committee

The agency's organizational structure includes a technical committee to review data collection/quality, planning assumptions, and forecasting methods. This committee may be comprised of state and local transportation planning professionals, private consultants, and other individuals having interest in the forecasting process. The technical committee's role is to provide review and feedback on the analytical methods and tools utilized by the agency.

#### 4 points. Program Support

The agency has a plan (or equivalent) which includes a specific, multi-year development program for maintaining transportation data resources and improving analysis methods. The specifications for the data resources and methods explicitly address sustainability principles. The plan identifies an adequate level of funding required to implement the data collection and modeling tasks, and this is reflected in the Unified Planning Work Program (UPWP) or equivalent. Those resources include support for experienced technical management and a mix of technical staff and/or contract staff. One of the following scores applies:

- **0 points:** Agency does not have a current strategic plan, program, or equivalent.
- **2 points:** A strategic plan, program, or equivalent exists and some of the areas described in the above paragraph are addressed.
- **4 points:** A strategic plan, program, or equivalent is in place and it addresses all of the areas described in the paragraph above.

#### 6 points. Peer Review

The agency has convened a peer review of its analysis methods (e.g., the peer review program offered by the Travel Model Improvement Program (TMIP): [http://www.fhwa.dot.gov/planning/tmip/resources/peer\\_review/](http://www.fhwa.dot.gov/planning/tmip/resources/peer_review/)). The review included an assessment of the primary data used to develop the analytical tools and an assessment of the calibration and validation results of the tools, methods, and practices. In addition, the review has demonstrated that the methods are sensitive to the actions being tested, such as the expected and desired changes in transportation policies, supply, services, and the built environment. Results of the peer review are used as inputs to the plan and describe improvements to the analytical methods. One of the following scores applies:

- **0 points:** A peer review of the agency's analytical methods, tools, and practices has not been conducted.
- **3 points:** A peer review of at least one of the agency's major analytical tools, such as the travel demand model, has been conducted.
- **6 points:** All of the agency's analysis methods, tools, and practices have been peer reviewed.

### Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following transportation documentation sources (or equal where not available):

1. Forecasting tools and methods documentation, including calibration, validation, and sensitivity results.
2. A technical committee charter, meeting schedules, and/or proceedings.
3. A forecasting methods or analysis tools strategic plan, program, or equivalent which provides reference to the level of funding for analysis methods and data.
4. Documentation of the most recent peer review, including the stated purpose, a list of participants, recommendations arising from the review, and the agency's plan and/or schedule to address the peer review recommendations.

# SP-14: Transportation Systems Management and Operations

1-15 points

**Goal:** Optimize the efficiency of the existing transportation system.

## Sustainability Linkage

Improving the efficiency of the existing transportation system provides multiple sustainability benefits, including economic (reduced funding needs), social (improved mobility and reduced congestion), and environmental (reduced resource consumption).



## Scoring Requirements

This criterion relates to SP-9 Travel Demand Management; while both can help to mitigate congestion, SP-9 focuses primarily on reducing travel demand and SP-14 focuses on optimizing the use of the existing transportation system.

## Background

The intent of the Transportation Systems Management and Operations (TSM&O) criterion is to encourage active management of the transportation system and to implement these strategies in lieu of, or strategically in conjunction with, capacity expansion. Common types of TSM&O strategies include, but are not limited to:

1. Intelligent Transportation Systems (traveler information, transit signal priority, ramp metering)
2. Active Traffic Management (variable speed displays, dynamic lane assignment)
3. Incident Management (emergency service patrols)
4. Event Management

These strategies can help to increase the efficiency of the system by shifting travel demand to off-peak periods and less congested facilities, optimizing travel speeds for fuel efficiency, and utilizing existing capacity to the greatest extent possible. Additional TSM&O strategies can be found in OM-13: Transportation Management and Operations and PD-14: ITS for System Operations.

## Scoring

### 2 points. Set TSM&O Policies, Goals, and Objectives

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency has developed clearly defined TSM&O policies, goals, and objectives for improving the efficiency of the transportation system within its jurisdiction.
- **Additional 1 point.** The TSM&O policies, goals, and objectives are also consistent with relevant state and/or metropolitan goals and objectives for improving transportation system efficiency.

### 4 points. Develop a Plan for TSM&O Strategies

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second and/or third.

- **1 point.** TSM&O strategies are included in the LRTP, or other transportation planning documents, as appropriate.
- **1 additional point.** The LRTP, or equivalent, includes a discussion of the impacts of including TSM&O strategies.
- **2 additional points.** The TSM&O strategies are considered and prioritized in the LRTP, or other transportation planning documents. Where appropriate, these strategies are considered in lieu of, or strategically in conjunction with, capacity expansion.

#### **4 points. Support or Implement TSM&O Strategies**

One of the following scores applies:

- **0 points.** TSM&O strategies are not being implemented or financially supported by the agency.
- **2 point.** Some, but not all, TSM&O strategies identified as priorities are being implemented by the agency or financially supported through inclusion in the TIP/STIP for which the agency has responsibility.
- **4 points.** All of the TSM&O strategies identified as priorities are being implemented by the agency or financially supported through inclusion in the TIP/STIP for which the agency has responsibility.

#### **5 points. Establish Performance Goals and Monitor Progress**

This requirement may be scored on a scale of 0-5, in proportion to the agency's estimate of its progress toward meeting this requirement. The following guidelines apply:

- **0 points.** The agency has not developed TSM&O performance measures.
- **3 points.** The agency has developed TSM&O performance measures and can demonstrate steady progress towards meeting its TSM&O goals and objectives. Examples of performance measures can be found in [NCHRP Report 708: A Guidebook for Sustainability Performance Measurement for Transportation Agencies](#).
- **5 points.** The agency has developed TSM&O performance measures, and can document that it has met its TSM&O goals and objectives and that the implementation of its TSM&O strategies contributed to this outcome.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

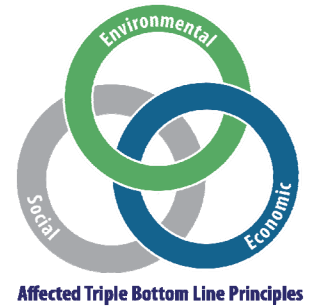
1. Agency transportation planning documents that include a TSM&O component (either integrated throughout or called out separately).
2. A TIP/STIP that includes a list of implementable TSM&O strategies and technologies that are applicable to the system.
3. Transportation planning documents that show early consideration of operational strategies and projects, such as the congestion management process for MPOs with populations over 200,000.
4. An annual or periodically updated report of progress, which includes the results from ongoing monitoring of the agency's progress towards meeting its TSM&O goals and objectives over time.



# SP-15: Linking Asset Management and Planning

2-15 points

**Goal:** Leverage transportation asset management data and methods within the transportation planning process to make informed, cost-effective program decisions and better use existing transportation assets.



## Sustainability Linkage

Incorporating transportation asset management data and economic analysis methods throughout system planning supports the environmental and economic triple bottom line principles by improving the cost effectiveness of decisions, extending the life of assets, and reducing the demand for raw materials.

## Scoring Requirements

### Background

As defined by the American Association of State Highway and Transportation Officials' Subcommittee on Asset Management, "Transportation Asset Management is a strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively through their life cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision-making based upon quality information and well defined objectives."

In addition to many other references, the following may be useful:

- FHWA's *Asset Management Position Paper* further describes the relationship between planning and asset management and can be found at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/amppplan.cfm>.
- TRB publication 1924, *Linking Asset Management to Strategic Planning Processes: Best Practices from State Departments of Transportation*, which can be ordered at <http://pubsindex.trb.org/view.aspx?id=775715>.
- FHWA's Publication 806, *Beyond the Short Term Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*, which can be found at [http://www.fhwa.dot.gov/asset/10009/tam\\_topr806.pdf](http://www.fhwa.dot.gov/asset/10009/tam_topr806.pdf).
- NCHRP Report 551, *Performance Measures and Targets for Transportation Asset Management*, which can be found at: [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_551.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_551.pdf).
- FHWA peer exchange summary notes, *Integrating Asset Management into the Metropolitan Planning Process: A Peer Exchange*, <http://www.fhwa.dot.gov/planning/statewide/intassetmgmt.htm>.
- Midwest Transportation Knowledge Network, *Data and synthesis report*, <http://members.mtkn.org/measures>.
- FTA's *Transit Asset Management Practices: A National and International Review*, explores State of Good Repair best practices and case studies of State DOTs and transit agencies and can be found at: [http://www.fta.dot.gov/documents/TAM\\_A\\_National\\_and\\_International\\_Review\\_-\\_6.10\\_FINAL.pdf](http://www.fta.dot.gov/documents/TAM_A_National_and_International_Review_-_6.10_FINAL.pdf).
- TCRP Synthesis publication 92: *Transit Asset Condition Reporting: A Synthesis of Transit Practice*, available at: [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_syn\\_92.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_syn_92.pdf).

## Scoring

Points are awarded based on a set of best practices to be incorporated within the transportation planning process.

### **3 points: Incorporate Asset Management Based Performance Measures**

Leverage performance-based planning and programming components of asset management to analyze and evaluate tradeoffs in the long-range transportation planning process. An agency has identified at least one performance measure for each asset management goal and objective in order to track progress over time. These performance measures should help evaluate and communicate the impacts and implications of different plan alternatives, and provide criteria for analyzing and evaluating tradeoffs. Examples of asset management related performance measures include, but are not limited to: pavement condition; bridge condition; remaining service life; percentage of total planned maintenance complete; cost-effectiveness; route continuity; corridor completion; state of good repair for transit rolling stock, signal systems, guideways, and facilities; and sidewalk and bicycle inventories.

### **8 points: Incorporate Asset Management Data and Economic Analysis to Prioritize Investments**

Incorporate asset management data and leverage economic analyses, including Life-Cycle Cost Analyses (LCCA) and Benefit-Cost Analysis (BCA) to apply basic cost and performance data to screen a large number of potential project alternatives, assisting in the development of program budgets and areas of program emphasis. Scoring for this requirement is based on the following, cumulative elements.

- **4 points.** Leverage LCCA to evaluate project alternatives and prioritize investments. LCCA is used to compare the life-cycle costs of two or more alternatives to accomplish a given project or objective, enabling the least cost alternative to be identified. LCCA is an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project. LCCA can be used to study either new construction projects or to examine preservation strategies for existing transportation assets. For more information, refer to FHWA's website on Asset Management Life-Cycle Cost Analysis at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>.
- **4 points.** Leverage BCA to compare projects and prioritize investments. BCA attempts to capture all benefits and costs accruing to society from a project or course of action, regardless of which particular party realizes the benefits or costs, or the form these benefits and costs take. Used properly, BCA reveals the economically efficient investment alternative (i.e., the one that maximizes the net benefits to the public from an allocation of resources). For more information, refer to FHWA's website on Asset Management Benefit-Cost Analysis at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer05.cfm>.

### **4 points: Prioritize Maintenance and Preservation**

The agency prioritizes transportation decisions that support the maintenance and good repair of existing transportation assets. Documentation includes the extent to which maintenance, preservation, and repair projects are included in the STIP/TIPs, UPWPs, and other similar annual work plans are the direct result of the identification, prioritization, and selection of projects in the LRTP process and/or the extent to which those projects are completed.

In order to demonstrate this, monitor performance and demonstrate attainment of the agency's maintenance and preservation goals over at least a one-year period. These goals may be linked to infrastructure condition and should also be focused on the need and investment in maintenance and preservation activities. Examples of metrics that would accomplish this include:

- The percent completion of annual maintenance and preservation plan;
- Pavement maintenance and/or preservation funding;

- Funds for a preservation program—cash flow planned vs. actual expenditures; or
- The dollar value of deferred maintenance needs.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency policy on incorporating asset management goals and objectives into the transportation planning process and documentation of those goals and objectives in transportation planning documents.
2. Performance measures for each goal and objective.
3. Documentation of the process used to incorporate asset management data in making strategic resource allocation decisions.
4. Documentation that demonstrates monitoring and attainment of performance measures.

# SP-16: Infrastructure Resiliency

1-15 points

**Goal:** Anticipate, assess, and plan to respond to vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure multi-modal transportation system reliability and resiliency.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Planning for infrastructure resiliency in the face of potential hazards supports all of the triple bottom line principles by reducing spending from infrastructure replacement, improving the safety and security of multimodal transportation system users, and providing energy savings from long-lasting investments, among others.

## Scoring Requirements

This criterion complements and expands on the requirements discussed in SP-15: Linking Asset Management and Planning.

## Background

For the purposes of this criterion, the key terms below are defined as follows:

- “Hazards” are conditions or circumstances that may result in undesirable outcomes. Natural hazards may include seismic and extreme weather events, and/or the effects of climate variability and change. Man-made hazards may include security threats from terrorism.
- “Extreme weather events” refers to flooding, hurricanes, fires, tsunamis, droughts, and winter storms, for example.
- “Climate variability and change” refers to long-term variations in climate, such as changes in sea level, temperature, precipitation intensity, and coastal storms, among others. While sea level rise primarily affects coastal regions, changes in the frequency and intensity of warm/cold weather days, precipitation events (flooding/droughts), and storms can affect infrastructure throughout the United States.
- “Vulnerability” in this context refers to the degree to which transportation infrastructure can be adversely affected by various hazards.
- “Vulnerability Assessment” is an assessment of the potential consequences of hazards on the durability and performance of specific transportation infrastructure (e.g., inundation of roads and enhanced scour of structures).
- “Risk” is the potential for an unwanted outcome resulting from an event—in this case, a climate stressor or other hazard. It is determined by the product of (a) the likelihood of the impact, and (b) the consequence of the impact.
- “Risk Assessment” is an assessment of the likelihood and potential consequences of exposure to a hazard.

## Scoring

### 2 points. Hazard Identification

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** The agency has conducted a GIS-based system-level assessment of potential hazards such as seismic events, relative sea level rise, storm activity/intensity, temperature and heat waves, precipitation events, lake levels, stream flow, etc.
- **1 additional point.** The agency has identified locations potentially vulnerable and/or at risk as a result of current and future hazards, and includes a discussion of the potential implications on the transportation system in the LRTP, or other appropriate transportation planning document.

### 4 points. Vulnerability Assessment

A vulnerability assessment focuses on how existing or planned transportation facilities may fare given current and future hazards. A vulnerability assessment should cover transportation assets in the planning area or a substantial subset of that area, as appropriate. Asset data on key existing and planned assets should be used. This could include elevations of the assets (not just the land), drainage capabilities, types of pavements and their ability to withstand excessive heat, more intense freeze-thaw cycles, and a variety of stress factors through time.

Investigating past events and resulting impacts can inform the assessment of vulnerabilities to seismic and storm events, and the impacts of long-term climate change effects. By comparing historical events with historical maintenance and repair needs, agencies can estimate how well specific assets might withstand certain stressors. For example, agencies could consider effects of past weather events on emergency response and evacuations required or on the services provided by an asset (e.g., changes in VMT and/or the value of goods transported). One of the following scores applies:

- **0 points.** The agency has not conducted a vulnerability assessment of its assets.
- **2 points.** The agency has conducted a vulnerability assessment and considered hazard consequences for some of its planned, programmed, and existing facilities throughout the transportation system.
- **4 points.** The agency has conducted a vulnerability assessment and considered hazard consequences on all planned, programmed, and existing facilities throughout the transportation system.

### 4 points. Risk Assessment

A risk assessment is a method for estimating the likelihood of a particular impact resulting from a defined set of stressors, including climate change related impacts, and also assesses the consequences of the impact in terms of how it affects the surrounding community, metropolitan area, or state. One of the following scores applies:

- **0 points.** The agency has not conducted a risk assessment of its assets.
- **2 points.** The agency has conducted a risk assessment for some of its planned, programmed, and existing facilities throughout the transportation system.
- **4 points.** The agency has conducted a risk assessment and considered the consequences on all planned, programmed, and existing facilities throughout the transportation system.

### 5 points. Develop and Implement Adaptation Strategies

Adaptation strategies are actions taken to respond to the vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure transportation system reliability and resiliency. Examples of strategies include, but are not limited to, the relocation of critical infrastructure, evacuation

route planning, and disaster preparedness programs, among others. Additional examples are available on the [USDOT website](#) and in [TRB Transportation Research E-Circular E-C152](#).

This requirement may be scored on a scale of 0-5, in proportion to the agency's estimate of its progress toward meeting this requirement. One of the following scores applies:

- **0 points.** The agency has not developed adaptation strategies.
- **2 points.** The agency has developed, but not yet implemented, adaptation strategies to manage the impacts the agency can reasonably expect to occur.
- **5 points.** The agency has developed and is implementing adaptation strategies to manage all of the impacts the agency can reasonably expect to occur based on its completed vulnerability and risk assessments.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Transportation planning document(s) that contain evidence of the consideration of hazard identification, vulnerability assessment, risk assessment, and/or adaptation strategies.
2. Hazard Mitigation Plan(s).
3. Documentation of a vulnerability assessment of critical transportation infrastructure. This could include studies on the vulnerability of specific areas.
4. Documentation of a risk assessment of critical infrastructure. This should address the process used, an assessment of likelihood, and the resulting assessment of risk.

# SP-17: Linking Planning and NEPA

2-15 points

**Goal:** Integrate transportation system planning process information, analysis, and decisions with the project-level environmental review process, and reference it in NEPA documentation.



Affected Triple Bottom Line Principles

## Sustainability Linkage

The NEPA process encompasses sustainability principles typically at the project level. This criterion ensures that information and decisions made in the system planning process generate useful information regarding sustainability impacts, and that data and sources are consistent between system-level and project-level planning.

## Scoring Requirements

### Background

The intent of this criterion is to ensure that transportation planning conducted at the system and programmatic level informs project-level implementation, specifically during the environmental review process. Because transportation system-level planning leads to the programming of various projects, systems-level information should be consistent with the needs of project-level NEPA analysis and integrate without rework or with minimal updating.

The agency should have tools and processes in place to ensure analysis, decisions, and documents that are completed during the transportation system planning process, such as corridor, subarea, or metropolitan plans, inform the environmental analysis conducted to meet NEPA requirements during project development. This prevents duplication of work, unnecessary expense, delays, and confusion for the public and policymakers. To successfully link planning to NEPA, it is vital to involve a wide range of partners, including resource and regulatory agencies, NEPA practitioners, planning and development partners, legal counsel, and the public.

Three sources of additional information on these best practices include:

1. The FHWA Guidance on Using Corridor and Subarea Planning to Inform NEPA, published April 5, 2011. This guidance can be accessed at [http://www.environment.fhwa.dot.gov/integ/corridor\\_nepa\\_guidance.pdf](http://www.environment.fhwa.dot.gov/integ/corridor_nepa_guidance.pdf).
2. The FHWA Planning and Environmental Linkage (PEL) tool kit. <http://environment.fhwa.dot.gov/integ/edctools.asp>.
3. Appendix A to 23 CFR Part 450—Linking the Transportation Planning and NEPA processes. The FHWA/FTA Final Rule on statewide and metropolitan transportation planning and programming and congestion management processes / systems was published in the Federal Register on February 14, 2007 and became effective on March 16, 2007. The guidance in Appendix A is located at <http://edocket.access.gpo.gov/2007/07-493.htm> (HTML version) and <http://edocket.access.gpo.gov/2007/pdf/07-493.pdf> (PDF version).
4. The U.S. Department of Transportation's Strategic Sustainability Performance Plan (SSPP), published June 2011, provides high-level guidance to all USDOT agencies pursuant to Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. The SSPP establishes USDOT's sustainability implementation framework and requires USDOT agencies to integrate sustainability principles both between

policy and planning, as well as between planning and the NEPA process. This guidance can be accessed at: [http://www.dot.gov/sustainability/sspp\\_2011.pdf](http://www.dot.gov/sustainability/sspp_2011.pdf).

## Scoring

Points are awarded for this criterion based on the following requirements:

### **5 points. Document Linkages between Transportation System Planning and NEPA**

The agency has documented the following procedures that link system-level planning analyses to project-level NEPA analysis:

- The agency has formal agreements or procedures in place to consult with and involve resource/environmental agencies (including state, local, tribal, and federal agencies, including FHWA) during system-level transportation planning.
- The agency provides public review of system-level transportation planning studies. Both the public and agencies have a reasonable opportunity to comment during the system-level transportation planning process.
- The agency utilizes data sources for transportation system planning that are as consistent as possible with the needs of project-level NEPA analyses (e.g., GIS software, census year, etc.).
- The agency produces documentation of transportation system planning decisions that assist in meeting NEPA documentation requirements. For example, purpose and need statements are developed for major projects recommended in the LRTP, or examination and elimination of alternatives are adequately assessed and documented at the system-level to meet NEPA needs in later phases.

Documented procedures could include official documentation (such as policy and procedures manuals or similar guidance documents), or unofficial documentation (such as flowcharts, best practices, or other similar documents).

One of the following scores applies:

- **0 points.** No documented procedures exist, or undocumented procedures exist that do not cover all four of the bullets above.
- **3 points.** Undocumented procedures exist that cover all four of the bullets above, or documented procedures exist that cover one or two of the bullets above.
- **5 points.** Documented procedures exist that cover all four of the bullets above.

### **4 points. Consult NEPA Practitioners**

The agency consults with NEPA practitioners throughout the transportation system planning process to ensure the material produced is consistent with the needs of downstream use (e.g., project-level NEPA) so that it:

- Can be incorporated into subsequent NEPA documents in accordance with CEQ regulations, and FHWA and FTA guidelines;
- Will aid in establishing or evaluating the purpose and need of the projects, reasonable alternatives, impacts on the built and natural environment, or mitigation measures; and
- Is in a form that is accessible during the NEPA scoping process and can be appended or referenced in the NEPA document.

One of the following scores applies:

- **0 points.** NEPA practitioners are not consulted during the transportation system planning process.
- **2 points.** NEPA practitioners are consulted occasionally but not systematically to help ensure materials are consistent with downstream needs as noted above.



- **4 points.** NEPA practitioners are fully integrated in the transportation system planning process to help ensure materials are consistent with downstream needs as noted above.

#### **6 points. Apply System Planning Results to NEPA Projects**

The agency successfully incorporates information (e.g., analyses, decisions, and documents from the transportation system planning process) into project-level NEPA documents. In addition, clear documentation of conversations, meetings, and decisions is passed from the system-level planning phase to the project manager of specific projects.

The information for FHWA & FTA review and consideration can be used in several ways, including the following:

- The foundation for projects' purpose and need statements;
- Inputs to the preliminary screening of alternatives and the elimination of unreasonable alternatives;
- Inputs to the projects' potential impacts on the environment;
- Methods to mitigate the projects' environmental impacts;
- Evaluations of indirect and cumulative effects;
- Linkages with housing, development, economic, and environmental goals.

One of the following scores applies:

- **0 points.** System-level transportation planning information is not included in project-level NEPA documents.
- **3 points.** System-level transportation planning information and documentation are occasionally, but not systematically, included or referenced in project-level NEPA documents.
- **6 points.** System-level transportation planning information and documentation are fully integrated in project-level NEPA documents.

### Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Agency program that specifies the consultation of a NEPA practitioner throughout the transportation system planning process.
2. Documentation of how the transportation system planning process supports subsequent project development and NEPA work.
3. Written agency procedures for linking the transportation system planning process with NEPA.
4. Current case studies showing how transportation system planning results, designed to inform NEPA, were successfully incorporated into the NEPA process and included in a NEPA document, including how the agency can continue to improve that process.

# Project Development

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# PD-1: Economic Analyses

2-5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Using the principles of benefit-cost analysis (BCA) or economic impact analysis (EIA), provide evidence that the user benefits, including environmental, economic, and social benefits, and justify the full life-cycle costs.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Conducting an economic analysis supports all of the triple bottom line sustainability principles by ensuring that user benefits exceed the investment costs for the project through analysis of impacts to local businesses, emissions, safety, and others.

## Scoring Requirements

### 2 points. Benefit-Cost Analysis

A BCA assesses the user and agency benefits of projects and programs in comparison to their costs. It normally includes all direct user and agency costs and benefits that the agency is able to estimate, including operating costs, travel time costs, and often other impacts such as crash and pollution costs, but broader economic impacts are excluded in traditional BCA. Benefit-cost analysis is typically applied in transportation studies to identify the NPV of the societal benefits that can be associated with a project or program, net of the investment costs. This includes benefits that are not reflected in any monetary transaction. As a requirement for receiving points, a BCA for the project must be completed using minimum acceptable industry practices. If using the analysis to compare alternatives, one alternative that may be included is a no-build option. U.S. DOT provides guidance on developing a BCA under the TIGER Grant Federal Register notices (see <http://www.dot.gov/tiger>). In addition, FHWA has developed two project-level BCA tools including: (1) BCA.Net, which is a web-based BCA tool designed to support the highway project decision-making process; and (2) STEAM, which is a corridor and system-wide analysis tool that computes the net value of mobility and safety benefits attributable to regionally important transportation projects. Performing a BCA for a project facilitates justification that the environmental, economic, and social benefits expected justify the investment costs for the project. It should not be confused with life-cycle cost analyses, which are leveraged to compare different alternatives (see PD-2) and are the starting point for a BCA.

### Additional 3 Points. Economic Impact Analysis

An EIA is concerned with the monetary transactions that affect the generation of income in an area's economy due to the investment in the program or project. It does not include the travel time or other costs or benefits for which money is not exchanged; however, it includes indirect and induced impacts on business growth that are not included in benefit-cost analysis. However, it does include much broader estimates of impacts than direct impacts. It asks the question: "What does the economy of interest look like with or without a project or program?" as measured by the quantity of and the types of transactions that are forecasted to occur under each scenario. Impacts are shown by the change in jobs, in worker income, and in GDP or gross state product (GSP) that results in future years as a consequence of the transportation programs or projects. FHWA has a primer on EIAs at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/primer08.cfm>. To obtain credit for this requirement, the EIA should include the following:

- Forecasting and quantification of revenues and costs of the project;
- Quantification of benefits, including social, environmental, and economic factors; and
- Quantification of impacts to regions, land values, and businesses.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Results from a Benefit-Cost and/or Economic Impact Analysis that include documentation of techniques and underlying assumptions for any economic model(s) used to generate results.

# PD-2: Life-Cycle Cost Analyses

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce life-cycle costs and resource consumption through the informed use of life-cycle cost analyses of key project features during the decision-making process for the project.



## Sustainability Linkage

Conducting a life-cycle cost analysis supports the environmental and economic principles by promoting efficient use of materials and resources.

## Requirements

Life-Cycle Cost Analysis (LCCA) is an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project. LCCA can be used to study either new construction projects or to examine preservation strategies for existing transportation assets. LCCA considers all agency expenditures (including planning, engineering, design, construction, maintenance, operations, and administration costs) and user costs (including time, safety, fuel, and other vehicle operating costs associated with normal operations and work zone delays) throughout the life of an alternative, not only initial investments. More than a simple cost comparison, LCCA offers sophisticated methods to determine and demonstrate the economic merits of the selected alternative in an analytical and fact-based manner.

**3 points.** Complete calculations for LCCA of key project features in accordance with generally accepted engineering economics practices. Comparing multiple design alternatives is encouraged but not required. Points are awarded cumulatively, up to a maximum of 3 points, for each LCCA as follows:

**1 point.** Perform an LCCA of all pavement structure alternatives in accordance with the method described in the FHWA's Technical bulletin for Life-Cycle Cost Analysis. This may be completed manually, or by using the FHWA's free [RealCost software](#), or any equivalent software. This requirement may also be accomplished by using pre-determined pavement designs based on context-specific best practices that are part of a formal Pavement Management System if the pavement design was established based on LCCA analyses (e.g., if within a specific region it has been determined through LCCA analyses that a specific pavement type/mix is most appropriate for bus lanes).

**1 point.** Perform an LCCA of all stormwater infrastructure alternatives considered. This analysis should include costs for planning, design, initial construction, maintenance (including appropriate BMP maintenance), and operations. With respect to BMPs, careful consideration should be given to factors such as frequency of scheduled maintenance, chronic maintenance problems (e.g., clogging), and failure rates that add to the overall cost of BMP implementation.

**1 point.** Perform an LCCA of the project's major feature (bridges, tunnels, retaining walls, or other items not listed in the preceding options) for each of the alternatives considered. For bridges, perform an LCCA in accordance with the guidance in the National Cooperative Highway Research Program (NCHRP) Report 483 (Hawk, 2003). The report provides standard input values for a wide range of potential bridge projects and referenced sources for

other input data. LCCA software may be used, including RealCost, with some minor adjustments to the spreadsheet or a bridge LCCA may also be completed by hand.

## Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Calculations for the LCCA, including a summary of inputs and outputs.
2. A copy of the owner-agency policy on LCCA if one exists.
3. Calculations for the LCCA performed as part of a Pavement Management System process to set best practice pavement designs.

# PD-3: Context Sensitive Project Development

1-5 points

SCORECARDS:

Paving

Rural Basic

Rural Extended

Urban Basic

Urban Extended

**Goal:** Deliver projects that harmonize transportation requirements and community values through effective decision-making and thoughtful design.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Implementing Context Sensitive Solutions (CSS) supports all of the triple bottom line sustainability principles by ensuring that environmental resources, community values, and economic context of a project are all considered during project development.

## Scoring Requirements

Context Sensitive Solutions (CSS) is defined as a collaborative, interdisciplinary approach that involves all stakeholders to provide a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions.

Evidence should exist that the following principles of CSS were applied in the project development process through a formal CSS program or equivalent process that accomplishes the same principles. A public involvement process does not necessarily meet this criterion unless the public and other stakeholders are engaged in two-way communications that ultimately influence the vision and design of the project. For smaller projects that typically do not require involvement of many people, or direct management by stakeholders, this credit's review and documentation process should be scaled accordingly.

### 2 points: Six Step Framework for CSS-based Project Development

Did the project development process generally follow the six-step CSS framework described in NCHRP report 480 and NCHRP report 642, or an equivalent process? NCHRP report 480 describes a general process for incorporating CSS at a project level:

1. Develop a decision-making process and management structure;
2. Define the problem;
3. Develop the project and the evaluation framework for the project;
4. Determine alternatives;
5. Screen the alternatives; and
6. Evaluate and select an alternative.

### 1 point: Deployment of a Multi-disciplinary Team

Did the project development process feature a "cradle-to-grave," project team that included planners, traffic engineers, public involvement specialists, design engineers, environmental experts, safety specialists, landscape architects, right-of-way staff, freight experts, construction engineers, and others to work on projects who worked together to achieve the desired CSS-based vision for the project?

**1 point: Creation of Public “Champions”**

As a result of CSS-influenced project development process, were external “champions” for the project created in the affected community who were engaged and proactive in supporting it?

**1 point: Acceptance of Project-level “Problems, Opportunities, and Needs”**

Was acceptance achieved among project stakeholders on the problems, opportunities, and needs that the project should address and the resulting vision or goals for addressing them?

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the CSS or equivalent process applied on the project.

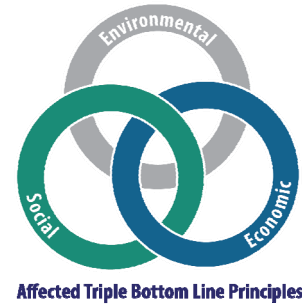


# PD-4: Highway and Traffic Safety

1-10 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Safeguard human health and reduce social and economic impacts from crashes by incorporating science-based quantitative safety analysis processes within project development that will reduce serious injuries and fatalities within the project footprint.



## Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.

## Scoring Requirements

*Nominal safety* refers to the extent to which a site (corridor, intersection, segment, or area) meets currently applicable design standards and guidelines. *Substantive safety* refers to actual or anticipated safety performance as defined by crash frequency and crash severity. Substantive safety reflects the science of safety: objective knowledge built on science-based discoveries of data-driven assessments of the safety impacts of road design, road user actions or behaviors, and vehicle attributes

### 2 points. Incorporate Human Factors Considerations

One of the following scores applies:

- **0 points.** Rely solely on published design and operational performance standards during the project development process.
- **2 points.** Evaluate, document, and incorporate interactions between road users and the roadway using fundamentals captured in Chapter 2 of the *Highway Safety Manual* and the *Human Factors Guideline for Road Systems* (NCHRP Report 600 series). Road Safety Audits (RSA)/Assessments are completed in accordance with FHWA's *Road Safety Audit Guidelines* and include human factors principles (from Chapter 2 of the *Highway Safety Manual* and the *Human Factors Guideline for Road Systems*).

An RSA is the formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team (NOTE: some agencies refer to these as Road Safety Assessments). RSAs *qualitatively* report on potential road safety issues and identify opportunities for improvements in safety for all road users based on input from designers, traffic engineers, maintenance experts, law enforcement, and human factors experts (<http://safety.fhwa.dot.gov/rsa>). RSAs are particularly beneficial at the planning and design stages of project development.

### 1 point. Build Awareness among the Public Regarding Contributing Factors to Crashes

Use media, for example the agency website or flyers, to raise awareness among the public about contributing factors to crashes on the existing facility or similar facilities on the network in a manner that is easy to understand. The purpose of these awareness efforts would be to support an improved understanding of road users about their personal responsibility in preventing crashes and to improve overall safety culture.

## **6 points. Explicit Consideration of Safety using Quantitative, Scientifically Proven Methods**

Best practices for using quantitative safety methods and measures to identify and evaluate, for example, safety improvements or actions, are presented in the advanced approaches in the HSM that account for regression to the mean (RTM), the impact of countermeasures presented in Part D of the HSM, and highly rated CMFs in the FHWA CMF Clearinghouse. Predictive methods for evaluation of quantitative safety refers to analytical approaches that result in a calculation of the predicted and/or expected frequency and/or severity of crashes for a given site or set of conditions. Such methods are described in the *AASHTO Highway Safety Manual* (see <http://www.highwaysafetymanual.org>). They incorporate the use of safety performance functions, crash modification factors that meet the HSM inclusion rules, and local or state-specific calibration.

Tools that can be used in this process include AASHTO SafetyAnalyst, the Interactive Highway Safety Design Model (IHSDM), spreadsheet tools developed to apply the predictive methods in the HSM, and analytical tools that use substantive safety as the basis of the analysis. While crash rates have been in use for many years, these and other methods that do not account for the characteristics of crash data and the impact of, for example, RTM, and therefore do not represent state of the practice.

The *Integrating the HSM into the Highway Project Development Process* guide (FHWA 2012) describes examples of the application of the HSM in the project development process.

Incorporate substantive safety performance into project development decision-making through the use of scientifically proven and statistically reliable predictive methods for evaluation of quantitative safety. Significant project decisions include establishment of project type and design criteria, selection of project design alternatives, and development of preliminary and final design details, including the use of design exceptions as necessary.

No credit is given for using design and operational performance standards and guidelines to assess nominal safety of the project throughout the project development process; or using less reliable quantitative safety methods such as crash rates to forecast future anticipated safety performance; or conducting RSAs that only assess nominal safety performance to describe safety (for example, assessing and documenting whether design standards and guidelines are met).

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** Establish the project type during scoping of project alternatives through a quantitative and statistically reliable process. This process includes consideration of historic safety performance of the existing facility or similar facilities.
- **2 points.** Develop and evaluate project design and/or operational alternatives using explicit consideration of substantive safety through quantitative, statistically reliable methods.
- **3 points.** Use quantitative and statistically reliable methods and knowledge to assess substantive safety performance in the development of preliminary and final design details. Where a project includes design exceptions, evaluate the safety impact of the design exception(s) with these methods, and identify potential mitigating actions to improve safety performance. Note: if the project has no design exceptions, the agency can earn 3 points by documenting that their policies and processes for evaluation and documentation of design exceptions incorporate substantive safety principles described above.

## 1 point. Evaluate Safety Performance of the Project after Implementation

One of the following scores applies:

- **0 points.** Perform no post-evaluation of the project, or use only less reliable methods such as crash rates to evaluate the safety performance of the project after implementation.
- **1 point.** Use a statistically reliable, science-based method to evaluate the safety effectiveness of the implemented project.

Given the relative rarity of crashes, a statistically reliable post-evaluation period may take several years. As agencies may wish to complete a sustainability assessment sooner than that, earning one credit for this step is possible by documenting that agencies (a) have formal safety project evaluation policy and process in place that are statistically reliable, and (b) indicating that the agency intends to apply such process to this project.

A statistically reliable evaluation process includes at least the following elements:

- Collection and recording of the traffic volumes, roadway, and crash data for the three years prior to implementation for use after implementation.
- Keeping record of the implementation date (i.e., actual start of construction work and completion date of construction (last day before official opening) is recorded for use after implementation).
- The agency is able to retrieve the abovementioned information for a post-implementation safety performance review.
- The method used in the evaluation process is advanced enough to account for regression to the mean (RTM).

The Empirical Bayes (EB) before-after study (with or without comparison sites) method is considered the most appropriate means assessing the safety effectiveness of a treatment. The EB method accounts for regression to the mean (RTM) effects which are common to highway and traffic safety studies and applications. The HSM provides details on how to conduct post-implementation evaluations to demonstrate statistically valid safety effects. The evaluation shall assess three to five years of before and after data in determining the effect of the project on crashes and crash severity. The EB methods rely on predictive methods, for example, the use of safety performance functions, crash modification factors that meet the HSM inclusion rules, and local or state-specific calibration. If such models do not exist or calibrations of the HSM models have not been completed, the naive before-after study approach is acceptable.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. Documentation of examples where human factors were considered in the project development process; or, if an RSA took place, documentation of the RSA, which may include resumes or biographies of RSA team members demonstrating their experience and qualifications to conduct RSAs. The documentation needs to include evidence that the fundamentals of human factors were applied (reflect knowledge and application of Chapter 2 of the HSM and the *Human Factors Guideline for Road Systems* (NCHRP 600 series).
2. Documentation of public awareness or information presented to the public to support a change in safety culture. These will include information (quantitative) on contributing factors, for example, speeding, drinking and driving, and distracted driving based on historic crash performance.
3. Documentation of the project scoping process, including data and analysis describing how the existing facility's safety performance was used to make decisions on scope of project improvements.
4. Project reports, technical memos, or other supporting documentation that demonstrate application of HSM-quality evaluations of the project and alternatives considered. These include documentation of the existing

safety performance (frequency, crash type, severity) and comparison with an appropriate benchmark. Include analysis of the expected safety performance of alternatives considered (with specific reference to SPFs and CMFs used), as well as how quantitative safety was considered as part of overall project decision-making.

5. Design exception review and evaluation reports approved by the appropriate agency authority that include quantitative estimates of the expected safety performance of the design exception, specific mitigation measures, and estimates of the quantitative safety performance of the proposed mitigation measures. Where no design exceptions were required, documentation of the agency's processes and procedures for design exceptions that cite reference to and use of substantive, science-based crash analyses and methods.
6. Documentation of the post-implementation effectiveness evaluation of the project, including a collection of crash data before and after implementation, and shall follow the Empirical Bayes process or advanced methods that account for RTM. Where post-evaluation requires a lengthy period beyond project implementation, documentation of the agency's formal process for evaluation with a statement of intent or policy regarding post-evaluation can be submitted.

# PD-5: Educational Outreach

2 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Increase public, agency, and stakeholder awareness of the integration of the principles of sustainability into roadway planning, design, and construction.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Educational outreach supports all of the triple bottom line principles by communicating to the public how social, environmental, and economic issues relate to roadway projects.

## Scoring Requirements

Incorporate public educational outreach that promotes and educates the public about sustainability including social, environmental, and economic principles. Communicate how the principles are being integrated into the planning, design, construction, and operational phases of the roadway project. Leverage public involvement processes where possible.

Note that performing a routine public involvement process does not accomplish this criterion unless it includes specific efforts to educate the audience about the sustainability of the project. Also note that the word “sustainability” does not have to be used specifically, and that terminology should be appropriate to the audience.

**2 points.** Install or perform a minimum of two different educational elements from the following table:

Educational Element	Recommended Requirements
Include sustainability in a Project Development Process	Specifically include sustainability as a consideration in a project development process that harmonizes transportation requirements and community values through effective decision-making and thoughtful design. Examples of this type of development process include complete streets, context sensitive solutions, neighborhood-aware design, and similar.
Include sustainability in Public Involvement	Specifically include sustainability education and promotion of sustainability as a project element throughout the public involvement process for the project.
Install point-of-interest	Install and maintain off-road point-of-interest kiosk(s) that display(s) information about the project and its sustainability features, as appropriate.
Project website	Provide a publicly available and maintained informational project website with capacity for submitting feedback and comments.
Stakeholder guide	Include sustainability and how it is being applied to the project in agency and/or stakeholder guide, specification, or policies, as appropriate.

Educational Element	Recommended Requirements
School presentations	Perform presentation(s) about the project and its sustainability features for primary and secondary schools.
Professional presentations	Perform professional technical presentation(s) about the project and its sustainability features.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Public Involvement and Outreach materials showing sustainability was specifically included.
2. Text or printed copy of the information offered at the kiosk (i.e., brochure or static installation).
3. Website address and/or screen captures.
4. An agency guide, specification, or policy.
5. A copy of school or professional presentations and the date of the presentation.

# PD-6: Tracking Environmental Commitments

2-5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Ensure that environmental commitments made by the project are completed and documented in accordance with all applicable laws, regulations, and issued permits.



## Sustainability Linkage

Tracking commitments supports the environmental and social principles by ensuring that adherence to commitments made to stakeholders and the environment are consistently met throughout project development.

## Scoring Requirements

**2-3 Points.** Agencies are responsible for meeting commitments made throughout the project to regulatory agencies, property owners, tenants, the community, and other stakeholders. This criterion requires the project owner to facilitate the tracking and compliance of commitments through a formal environmental compliance tracking system. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 Points.** Beginning in project development, use a comprehensive environmental compliance tracking system for the project and related facilities to identify how environmental commitments will be identified, tracked, fulfilled, and verified throughout design and construction. The environmental tracking system should include all regulatory and non-regulatory commitments that apply to the development work and additional properties, including surveys, borings, batch plants, staging, equipment storage, employee parking, and field offices, as well as land that is purchased, leased, occupied, or used for the work.

At a minimum, the system should: identify commitments in a single list; identify an environmental compliance manager; ensure that environmental commitments are communicated from one phase of a project to another; leverage tracking mechanisms (such as databases, forms, or lists); identify training needed for necessary design and construction staff; and provide periodic reports verifying the commitments have been fulfilled. The tracking system should be updated and maintained throughout the project development and any monitoring period.

For more information on environmental tracking systems, see [AASHTO's Center for Environmental Excellence](#).

- **Additional 1 Point.** The environmental tracking system has a formal mechanism to communicate commitments from transportation planning through design, construction and maintenance.

**2 Points.** The Owner shall require that the principal project constructor assigns an independent environmental compliance monitor who will provide quality assurance services and report directly to and make recommendations to the regulatory and lead agencies. The Independent Environmental Monitor should be a recognized expert or persons knowledgeable about natural resources protection and construction, and should report directly to

regulatory agencies about problems observed during design review and construction phases, including, but not limited to, erosion and sediment control problems.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Documentation of environmental tracking system, including instructions on what is to be included and how the chain of documentation flows throughout the phases of projects.
2. Contract documents requiring the construction contractor to assign an independent environmental compliance manager.



# PD-7: Habitat Restoration

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Avoid, minimize, and compensate the loss and alteration of natural (stream and terrestrial) habitat caused by project construction and/or restore, preserve, and protect natural habitat beyond regulatory requirements.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Minimizing or avoiding impacts to habitat and restoring habitat beyond required regulations enhances the ecosystem and therefore supports the environmental principle of the triple bottom line.

## Scoring Requirements

Credit for enhancement can be obtained for this criterion through project-specific mitigation or through the use of mitigation banking.

**3 points.** Points shall be achieved per the following table. Points are **not** cumulative; rather the highest point value should be used.

No. Points	Method
1	<b>Minimize Impacts.</b> Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize impacts to habitat as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 50% or more as compared to the original proposal.
2	<b>Avoid Impacts.</b> Show that an effort has been made to modify the alignment and/or project cross-sections to significantly avoid impacts to habitat as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 75% or more as compared to the original proposal.
3	<b>Enhance features.</b> For projects required to mitigate habitat impacts through restorative practices, implement a restoration/preservation approach that restores and/or preserves an upland buffer area surrounding the required stream or wetland mitigation site. The amount of buffer must be an appropriate amount so it improves the habitat quality of the wetland or stream it is protecting.
3	<b>Enhance features.</b> For projects not required to mitigate habitat impacts, implement a habitat restoration effort that mitigates for the habitat of non-listed species under the Federal Endangered Species Act (see Recovery Crediting Guidance, 73 Fed Reg. 44761, July 31, 2008, which can be found at: <a href="http://www.gpo.gov/fdsys/pkg/FR-2008-07-31/pdf/E8-17579.pdf">http://www.gpo.gov/fdsys/pkg/FR-2008-07-31/pdf/E8-17579.pdf</a> ).

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Contract documents showing the baseline conditions of the site (including existing habitat quality) and improvements to be constructed and planted.
2. Technical reports or permitting documentation that describes the species which are intended to benefit from the site and the value of the habitat lift (above and beyond requirements) that is satisfying this criterion.
3. Technical report that describes minimization that occurred throughout the project development process.

# PD-8: Stormwater

1-9 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Improve stormwater quality from the impacts of the project and control flow to minimize their erosive effects on receiving water bodies and related water resources, using management methods and practices that reduce the impacts associated with development and redevelopment.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Implementing more sustainable stormwater management practices supports the environmental principle by improving water quality, managing runoff, and using technology that mimics natural hydrology.

## Scoring Requirements

To calculate the total number of points achieved for this criterion, follow the directions in each of the scoring sections below for Water Quality, Flow Control, and Low-Impact Development (LID), and add the points achieved in each of the three areas up to a maximum of nine points total.

**1-3 Points. Water Quality** requires treating pollutants from at least 80 percent of the total annual runoff volume. Use Table 1 to calculate the number of points achieved for water quality based on the amount of runoff volume treated, pollutants treated, and the target impervious surface area treated. For retrofit projects, first use Table 2 to determine an equivalent value to use for Target Impervious Surface Area in Table 1, column 3.

**TABLE 1. WATER QUALITY – REDEVELOPED ROADWAYS**

(1) Amount of Runoff Treated (% of Annual Volume)	(2) Target Pollutant	(3) Target Imp. Surface Area (% of Added) <sup>1</sup>	(4) Points
80–89%	Sediment	101%–125%	0
		>125%	1
	Sediment, and Metals or Other <sup>2</sup>	101%–125%	1
		>125%	2
90% +	Sediment	101%–125%	1
		>125%	2
	Sediment, and Metals or Other <sup>2</sup>	101%–125%	2
		>125%	3

Column 3 – For retrofit projects, see Table 2 for equivalent percentages to use.

1 – % of Added = Treated Impervious Surface Area ÷ Added Impervious Surface Area

2 – Other basin-specific pollutant of concern is targeted

**TABLE 2. RETROFIT PROJECTS – CALCULATING EQUIVALENT TARGET IMPERVIOUS SURFACE AREA**

(1) Existing Impervious on Project (acres)	(2) % of Existing Impervious Area Treated	(3) Equivalent (% of Added) <sup>1</sup>
0–1.0	0–50%	101%–125%
	50.1%–100%	>125%
1.1–5.0	0–40%	101%–125%
	40.1%–100%	>125%
5.1–10.0	0–30%	101%–125%
	30.1%–100%	>125%
>10.0	0–20%	101%–125%
	20.1%–100%	>125%

Column 3 – Percentage to use in Table 1, column 3; Table 3, column 3; and Table 5, column 2

**1-3 Points. Flow Control** requires managing the flow from at least 80 percent of the total runoff volume, and is based on controlling peak flows or durations from the project site. Use Table 3 to calculate the number of points achieved for flow control based on the amount of runoff treated, what was treated, and the target impervious surface area treated. For retrofit projects, first use Table 2 (above) to calculate the equivalent value to use for Target Impervious Surface Area in column 3 of Table 3.

**TABLE 3. FLOW CONTROL**

(1) Amount of Runoff Managed (% of Total Volume)	(2) Flow Control Standard Used	(3) Target Imp. Surface Area (% of Added) <sup>1</sup>	(4) Points
80–89%	Peak Rate	101%–125%	0
		>125%	1
	Flow Durations	101%–125%	1
		>125%	2
90% +	Peak Rate	101%–125%	1
		>125%	2
	Flow Durations	101%–125%	2
		>125%	3

Column 3 – For retrofit projects, use Table 2 for equivalent percentages.

**1-3 Points. Effective BMPs.** LID requires using effective BMPs or stormwater management techniques that mimic natural hydrology to treat pollutants. Table 4 identifies BMPs considered most effective for specific target pollutants. If the project uses one, proceed to Table 5 to calculate the number of points achieved for Effectiveness/LID based on the target impervious surface area treated. For retrofit projects, first use Table 2 (above) to calculate the equivalent value to use for Target Impervious Surface Area in Table 5, column 2.

**TABLE 4. EFFECTIVE BMPS AND INFILTRATION/VOLUME REDUCTION**

Target Pollutant	BMP					
	Detention Pond	Wet Pond	Wetland	Biofilter	Media Filter	Infiltration /LID <sup>1</sup>
Suspended Solids	X	X	X	X	X	X
Total Copper	X			X		X
Dissolved Copper		X		X		X
Total Lead		X		X	X	X
Dissolved Lead		X				X
Total Zinc		X	X		X	X
Dissolved Zinc				X		X
Total Phosphorus <sup>2</sup>		X	X	-		X

1 – Provide 100% infiltration for the water quality storm/volume using a pond, LID techniques, or a combination.

2 – Phosphorus or other additional basin-specific pollutant

**TABLE 5. EFFECTIVE BMPS AND INFILTRATION/VOLUME REDUCTION**

(1)	(2)	(3)	(4)
Effective BMP/Infiltration/LID Used?	Target Imp. Surface Area (% of Added) <sup>1</sup>	Points for Rural Projects	Points for Urban Projects
Yes	101%–125%	1	2
	125% +	2	3

Column 1 – See Table 4 for Effective BMPs, Infiltration and LID practices.

Column 2 – For retrofit projects, see Table 2 for equivalent percentages.

Column 3 – Project location is outside growth area/higher densities established by MPO.

Column 4 – Project location is inside growth area/higher densities established by MPO.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Project Drainage Report or other relevant calculations and studies.
2. Project Contract Documents.

# PD-9: Ecological Connectivity

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Avoid, minimize, or enhance wildlife, amphibian, and aquatic species passage access, and mobility, and reduce vehicle-wildlife collisions and related accidents.



## Sustainability Linkage

Improving ecological connectivity supports all of the triple bottom line sustainability principles by improving habitat for species while reducing accidents, therefore preventing the impacts associated with personal and public property damage, injury, and the loss of life.

## Scoring Requirements

In order to achieve points for this criterion, the following prerequisite must apply:

**Prerequisite:** Conduct a site-specific ecological assessment of the roadway project using GIS data or regional expertise. Report the resulting impacts that the roadway has on the major ecosystems, according to the best scientific knowledge available. A project or resource agency biologist should be involved with the assessment. The ecological assessment should be consistent with the State-approved wildlife action plans, if available.

**1-3 Points.** Points shall be achieved per the following table. Points are **not** cumulative; rather the highest point value should be used. Note that more points are available for enhancing features on new alignments than existing alignments because more opportunity typically exist to improve ecological connectivity on new alignments.

**TABLE 1. POINTS AND METHODS TO MINIMIZE IMPACTS TO ECOLOGICAL CONNECTIVITY (CONTINUED ON NEXT PAGE)**

No. Points <sup>1</sup>	Method
1	<b>Minimize Impacts.</b> Show that an effort has been made to modify the alignment and/or project cross-sections to significantly minimize impacts to ecological connectivity as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 50% or more as compared to the original proposal.
2	<b>Avoid Impacts.</b> Show that an effort has been made to modify the alignment and/or project cross-sections to significantly avoid impacts to ecological connectivity as compared to a traditional alternative and above and beyond what was required by regulations. To qualify, the area of impact must be reduced by 75% or more as compared to the original proposal.
2	<b>Enhance features.</b> For existing alignments only. Replace in-kind, retrofit, or upgrade any and all existing culverts and wildlife fencing structures or planting deemed structurally deficient, damaged, obsolete, insufficiently sized, or otherwise inadequate. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.

No. Points <sup>1</sup>	Method
3	<b>Enhance features.</b> For new alignments only. Install new dedicated or multi-use wildlife crossing structures and protective fencing (if needed) or planting as recommended by the wildlife assessment. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.
3	<b>Restore features.</b> Re-establish past habitats, infrastructure, or add connectivity to re-establish corridors and habitats. Actions must be approved by the project ecologist, resource/regulatory biologist, or other appropriate staff.

<sup>1</sup> Refer to text below for the exceptions to this table.

Dedicated wildlife crossings are structural features of the roadway that are not used by motorized vehicles. Where deemed appropriate by an ecologist, crossings may be shared by non-motorized modes of transport. No points will be awarded in the following conditions:

1. For projects that maintain or rehabilitate existing ecological connections to out-of-date or current standards (i.e., routine maintenance of drainage culverts does not qualify).
2. Pre-existing ecological connectivity features: all new features or upgrades must be due to and completed as part of the roadway project.
3. Projects that add wildlife connectivity features where such features are clearly outside of the project context.
4. Projects located in a network that is systematically inadequate. However, points could be awarded for such projects where it is demonstrated that a program is in place at the owner agency for systematic improvements on that network, and that this project fits this program.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one of the following documentation sources (or equal where not available):

1. Ecological study performed for the project provided in NEPA documentation. State permitting documentation that includes an ecological connectivity element.
2. Contract documents showing wildlife crossing improvements.
3. Technical report that describes minimization that occurred throughout the project development process.

# PD-10: Pedestrian Access

1-2 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Improve the safety and convenience of pedestrian networks for people of all ages and abilities by providing or enhancing facilities within the project footprint.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Promoting pedestrian access supports all of the triple bottom line sustainability principles by improving safety, access, and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

## Scoring Requirements

To receive credit for this criterion, the project must accommodate pedestrians of all ages. As always, context is important. The criterion is not applicable to projects in areas where pedestrians are specifically (and appropriately) prohibited. To receive full credit, these facilities should go beyond minimum standards and requirements and strive to create safe, comfortable, attractive, and convenient pedestrian networks.

Project features that qualify for this criterion must enhance or help achieve at least the first three of the following factors:

- **Safety:** Improved safety for pedestrians of all ages and abilities through well-designed facilities that promote safe behaviors.
- **Comfort:** Pedestrian facilities that are comfortable will have adequate width to permit greater volumes of walkers; provide space for passing slower pedestrians; and will be well maintained.
- **Connectivity:** Improved connectivity through development of convenient pedestrian infrastructure that connects homes to places of employment, schools, shopping, services, transit, and recreation areas. This can be achieved through the well thought-out use of sidewalks, crosswalks, shared use paths, bridges, tunnels, and signage.
- **Aesthetics and Environment:** Creating a pleasing, safe, and enjoyable pedestrian facility with features such as landscaping, art, furniture, lighting, and social amenities (such as benches and gathering spaces) as appropriate to promote the use of the facilities.

**1 point.** Implement new or improve existing features (such as those factors mentioned above) for existing pedestrian facilities that address safety, comfort, and connectivity. Current facilities do not qualify for this criterion without additional effort, such as upgrades, improvements, or construction of new facilities such as road diets, median refuges, or installing pedestrian hybrid beacons. The attempt to enhance the pedestrian transportation experience should be deliberate and a direct result of the project. No credit is given for improvements and retrofits to bring existing facilities into ADA compliance.

OR

**2 points.** Implement features in the design and construction of new pedestrian facilities that address all four of the factors listed above. New facilities include physical or constructed changes to the roadway structure, dimensions,



or form that enhance safe, comfortable, convenient, and attractive pedestrian access within the right-of-way or roadway corridor.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need or other planning documents addressing pedestrian access on the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans.
2. Results of public input on proposed pedestrian facilities, if any.
3. Contract documents showing enhanced pedestrian facilities incorporated.

# PD-11: Bicycle Access

1-2 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Promote bicycling in communities by providing or enhancing safe and convenient bicycling facilities within the project footprint.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Promoting bicycle access supports all of the triple bottom line sustainability principles by improving safety, access, and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

## Scoring Requirements

To receive credit for this criterion, the project must include bicycle facilities that foster use by bicyclists. As always, context is important. This criterion is not applicable to projects in areas where bicyclists are specifically (and appropriately) prohibited. These facilities should go beyond minimum standards and requirements and strive to create safe, comfortable, attractive, and convenient bicycling networks.

Project features that qualify for this criterion must enhance or help achieve at least the first two of the following factors:

- **Safety:** Improved bicyclist safety through well-designed facilities that promote safe behaviors.
- **Connectivity:** Improved connectivity through development of convenient bicycle infrastructure that connects homes to places of employment, schools, shopping, services, transit, and recreation areas. This can be achieved through the well thought-out use of bicycle lanes, shared use paths, wide shoulders, bicycle parking, bridges, tunnels, and signage.
- **Aesthetics, Comfort, and Environment:** Creating a pleasing, safe, and enjoyable bicycle facility with features such as landscaping, lighting, and parking (including bicycle share parking) as appropriate to promote the use of the facilities.

**1 point.** Implement new (or improve existing) features (such as those mentioned above) for existing bicycle facilities that improve safety and connectivity. Current facilities do not qualify for this criterion without additional effort, such as upgrades, improvements, or construction of new facilities such as: added signage or minor access improvements for bicycles, installing bicycle detectors in driving lanes or granting signal priority, adding bicycle-friendly stormwater drains, code-required dimension upgrades, resurfacing existing bicycle lanes, or adding new streetside bicycle storage facilities (lockers, racks, etc.). The attempt to enhance bicycle transportation experience should be deliberate and a direct result of the project. No credit is given for improvements and retrofits to bring existing facilities up to required standards.

OR

**2 points.** Implement features (such as those mentioned above) in the design and construction of new bicycle facilities that enhance safety, connectivity, aesthetics, comfort, and environment. New facilities include physical or constructed changes to the roadway structure, dimensions, or form that provide safe, convenient, and attractive bicycle access within the right-of-way (ROW) or roadway corridor. To be eligible for this credit, the bicycle facilities

must be Class I (separated) or Class II (bike lanes); lanes shared with motorized vehicles and shoulders do not meet this requirement, except under certain circumstances.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and Need addressing bicycle access within the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans, project analysis, or a Bicycle Master planning process.
2. Results of public input on proposed bicycle facilities, if any.
3. Copy of the contract specification and plans for proposed bicycle facilities.
4. Total cost associated with new or improved bicycle facilities.

# PD-12: Transit and HOV Access

1-5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Promote use of public transit and carpools in communities by providing new transit and high occupancy vehicle (HOV) facilities, or by upgrading existing facilities within the project footprint.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Promoting transit and HOV access supports all of the triple bottom line sustainability principles by improving access and mobility for the public while also increasing the modal choices available to travelers, reducing traffic congestion and emissions.

## Scoring Requirements

Transit and HOV facilities installed for this requirement shall be consistent with the need, purpose, and appropriateness for transit and HOV access within the project footprint. To receive credit for this criterion, the project must include contextually appropriate transit and/or HOV facilities that go beyond minimum design standards and requirements, and strive to create safe, versatile, attractive, and convenient transit and HOV networks that are integrated with pedestrian and bicycling networks.

**1–5 Points.** Achieve the requirements within the project footprint listed in Table 1, which is roughly based on the Federal Transit Authority (FTA) criteria from *Characteristics of Bus Rapid Transit for Decision-Making (CBRT)* and *TCRP 90, Bus Rapid Transit* by Diaz and Hinebaugh (2009), and *Guide for High-Occupancy Vehicle (HOV) Facilities, 3<sup>rd</sup> Edition, AASHTO, (2004)*. Points are **not** cumulative; rather the highest point value achieved should be used.

**TABLE 1. AVAILABLE POINTS FOR TRANSIT AND HOV ACCESS FEATURES (CONTINUED ON NEXT PAGE)**

No. Points	Requirements
1	<p>Any of one the following:</p> <ul style="list-style-type: none"> <li>Enhance at least 50 percent of transit station or stop amenities (lighting, trash/recycling bins, benches, bike parking, pay phones, heating and/or cooling, etc.)</li> <li>Improve at least 50 percent of the transit and HOV facility signage (related to transit and HOV) and vehicular access (beyond basic ADA requirements)</li> <li>Provide transit shelters at more than 50 percent of the corridor stations/stops</li> <li>Provide seamless pedestrian and bicycle access to stations within at least a half-mile and three-mile catchment area (see FR notice at <a href="https://www.federalregister.gov/articles/2011/08/19/2011-21273/final-policy-statement-on-the-eligibility-of-pedestrian-and-bicycle-improvements-under-federal">https://www.federalregister.gov/articles/2011/08/19/2011-21273/final-policy-statement-on-the-eligibility-of-pedestrian-and-bicycle-improvements-under-federal</a>) or other.</li> <li>Provide new park &amp; ride lots in strategic locations.</li> </ul>

No. Points	Requirements
2	Any one of the following: <ul style="list-style-type: none"> <li>• Implement two or more of the improvements from the 1 point list above.</li> <li>• Implement physical or constructed changes to the roadway structure, dimensions, or form that provide for <b>future HOV access</b> or minor dedicated transit access within the right-of-way (ROW), such as a carpool lane for HOV vehicle, queue jump lanes for transit vehicles, on-street bus lane, bus rapid transit, or an expressway bus lane.</li> </ul>
3	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide HOV access or minor dedicated transit access within the ROW, such as a <b>carpool lane</b> for HOV vehicles, queue <b>jump lanes</b> for transit vehicles, or <b>shoulder-running buses</b> .
4	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide dedicated transit access within the ROW, such as an <b>on-street bus lane, bus rapid transit, or an expressway bus lane</b> .
5	Implement physical or constructed changes to the roadway structure, dimensions, or form that provide exclusive mass transit access within the ROW, such as <b>at-grade or grade-separated transitways or transit served park-and-ride lots</b> .

### Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need for transit and HOV access on the roadway project, including how it fits with existing land uses and/or existing General and Transportation Plans.
2. Total cost associated with new or improved transit and HOV facilities.
3. Contract specifications and budget items addressing transit and HOV.

# PD-13: Freight Mobility

1-7 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Enhance mobility of freight movements, decrease fuel consumption and emissions impacts, and reduce freight-related noise.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Enhancing freight mobility supports the environmental and economic sustainability principles by providing features that make freight transportation more efficient, thereby reducing fuel consumption, decreasing emissions, and reducing noise pollution.

## Scoring Requirements

Facilities installed for this requirement shall be consistent with the need, purpose, and appropriateness for freight mobility within the project footprint.

**1 – 7 Points:** Implement one or more of the features in Table 1. Points for features are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of seven points.

TABLE 1. POINTS AND REQUIREMENTS FOR FREIGHT ACCESS PROJECT FEATURES (CONTINUED ON THE FOLLOWING PAGE)

Points	Feature	Recommended Requirements
1	No-idling policy and signage (no-idling policy within certain parameters, such as outside air temperature)	<ul style="list-style-type: none"> <li>Implementation and appropriate number consistent with project setting</li> </ul>
1	Construct new rest area or rest stop, or expand existing rest area or rest stop	<ul style="list-style-type: none"> <li>Provides a significant number of new truck parking spots at or within a reasonable distance to a rest area</li> <li>Region near proposed rest area experiences extensive interstate shoulder, interchange shoulder, and/or off-road, non-assigned parking by tractor-trailers</li> </ul>
2	Safety improvements specifically for freight (e.g., additional safety signage, speed warnings systems for hills, other intelligent transportation system solutions)	<ul style="list-style-type: none"> <li>Implementation and appropriate number consistent with project setting</li> <li>Meet requirements in the AASHTO Policy on Geometric Design of Streets and Highways such that there are no height, weight, or turning radius restrictions for freight vehicles</li> </ul>
2	Physical or otherwise constructed grade, alignment, or other design adjustments for truck safety, mobility, and the reduction of freight-related noise	<ul style="list-style-type: none"> <li>Implementation and appropriate number consistent with project setting</li> <li>Include railroad overpass clearance improvements for rail links targeted for freight mobility (i.e., do not preclude rail double stack clearance)</li> <li>Pullout areas for snow chain-up</li> </ul>

Points	Feature	Recommended Requirements
3	Construct new dedicated truck delivery parking areas or repurpose an existing parking area for truck delivery-only.	<ul style="list-style-type: none"> <li>• Speeds 35 miles per hour or less (local traffic)</li> <li>• Accommodate 40-foot delivery trucks</li> <li>• Accessible within the project site (i.e., located in a parking lane on a local street)</li> <li>• Financed with project budget</li> <li>• Appropriate signage (type and number) within project area</li> </ul>
3	Automated Weigh-In-Motion stations	<ul style="list-style-type: none"> <li>• Accessible within the project site (i.e., located along the right-of-way), or in close proximity to the roadway</li> </ul>
4	Virtual Weigh-In-Motion stations	<ul style="list-style-type: none"> <li>• Accessible within the project site (i.e., located along the right-of-way)</li> <li>• Within close proximity to the roadway project right-of-way</li> </ul>
4	Construct a new electrified rest stop or electrify an existing rest stop	<ul style="list-style-type: none"> <li>• Minimum five electric hookups per stop.</li> <li>• Accessible within the project site (i.e., located at a highway exit)</li> <li>• Within close proximity to the roadway project right-of-way.</li> </ul>
5	Construct a new or convert an existing mixed-traffic lane to a truck-only lane	<ul style="list-style-type: none"> <li>• Minimum density of 10% truck traffic (Hansen et al., 2008)</li> <li>• Minimum volume of 1300 trucks per hour per lane (Hansen et al., 2008)</li> </ul>

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Purpose and need for freight access on the roadway project.
2. Results of public input on proposed freight upgrades or installations, if any.
3. Contract documents showing freight facilities.

# PD-14: ITS for System Operations

1-5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Improve the efficiency of transportation systems without adding infrastructure capacity in order to reduce emissions and energy use, and improve economic and social needs.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Intelligent Transportation System (ITS) applications support all of the triple bottom line principles by improving mobility, reducing congestion, and improving safety while avoiding environmentally- and economically-costly capacity increases.

## Scoring Requirements

Include Intelligent Transportation System (ITS) applications listed in the Federal Highway Administration (FHWA) and Research and Innovative Technology Administration's (RITA) Joint Program Office (JPO) of ITS Applications Overview portion of the ITS website (see <http://www.itsoverview.its.dot.gov>) or any equivalent source. FHWA's operations website is located at <http://ops.fhwa.dot.gov>. Table 1 lists the standard ITS applications and FHWA and RITA ITS website categories allowable for this criterion. All applications installed should be compliant with owner and/or state architecture (inter-operability).

**1-5 Points:** Install one or more allowable applications for the categories in Table 1. Points are awarded based on how many categories are installed; multiple applications in one category do not achieve additional points. Points for installing applications from multiple categories are cumulative; however, this criterion shall not exceed a total of five points.

**TABLE 1. ALLOWABLE ITS APPLICATIONS FOR INTELLIGENT TRANSPORTATION SYSTEMS (CONTINUED ON NEXT PAGE)**

Points	Category	Allowable Applications (Install 1 or more)
1	Electronic Payment/Pricing	Toll Collection
1	Emergency Management	Emergency Vehicle Signal Preemption
1	Enforcement	Speed Enforcement Traffic Signal Enforcement Ramp Meter Enforcement
1	Information Dissemination	Dynamic Message Signs (DMS) Highway Advisory Radio (HAR) Dynamic Parking
1	Information Management	Data Archiving
1	ITS Infrastructure Backbone	Empty conduits, pullboxes, and pull ropes for future ITS accommodation



<b>Points</b>	<b>Category</b>	<b>Allowable Applications (Install 1 or more)</b>
1	Lane Management	Reversible Flow Lanes Pricing Lane Control Variable Speed Limits Emergency Evacuation
1	Ramp Control	Ramp Metering
1	Response and treatment	Fixed Winter Maintenance Mobile Winter Maintenance
1	Road Weather Management	Pavement Conditions Atmospheric Conditions Water Level Advanced Decision Support Systems
1	Surveillance	Streaming Video
1	Traffic Control	Adaptive Signal Control Advanced Signal Systems Special Events Vehicle Restrictions
1	Traffic Incident Management	Call Boxes Service Patrols
1	Traveler Information	Internet/Wireless 511
1	Warning Systems	Highway-Rail Crossing Warning Systems Intersection Collision Warning Animal Warning Hazardous Systems

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of the ITS applications and their corresponding categories.
2. Contract documents showing ITS applications to be installed on the project.
3. Photo(s) or other documentation of installed applications.

# PD-15: Historical, Archaeological and Cultural Preservation

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Preserve, protect, or enhance cultural and historic assets, and/or feature National Scenic Byways Program (NSBP) historic, archaeological, or cultural intrinsic qualities in a roadway



Affected Triple Bottom Line Principles

## Sustainability Linkage

Preserving historical, archaeological, and cultural resources supports the social principle by emphasizing significant features that are valued by the community and by providing educational facilities or visual and/or physical access where applicable.

## Scoring Requirements

In order to achieve points for this criterion, one of the following prerequisites must apply:

**Prerequisite 1.** Any part of the project or resource within the project boundaries is listed in the United States National Register of Historic Places (NRHP) or has been determined eligible for the National Register by a State, Local, or Tribal Historic Preservation Officer.

OR

**Prerequisite 2.** Any portion of the project is along one of America’s Byways® (National Scenic Byway or All-American Road – [www.byways.org](http://www.byways.org)), a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such because of its significant *historical, cultural, and/or archaeological* features.

**3 points.** Points shall be achieved per the following table. Points are **not** cumulative; rather the highest point value should be used.

No. Points	Method
1	<b>Minimize Impacts.</b> Show that an effort has been made to minimize “adverse effects” to the features from Prerequisite 1, as described in Section 106 of the National Historic Preservation Act (NHPA).
2	<b>Avoid Impacts.</b> Show that measures have been taken to specifically avoid impacts to the features from Prerequisite 1.
3	<b>Enhance features.</b> Protect, preserve, and/or enhance historic, archaeological, or cultural resources. This could be done through the installation of informational or interpretive facilities (e.g., viewpoint, kiosk, sign, or other installation for visitors detailing historical, archaeological, or cultural significance), where appropriate, to explain the resources or direct roadway users to the site, or through other activities.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the eligibility of the resource or location for the United States NRHP.
2. Documentation from associated organization(s), indicating what recognition of a tribal or other appropriate interests were or will be represented.
3. Description of project features and policies that minimize adverse effects according to Section 106 of NHPA.
4. Description of activities to avoid or improvements to enhance features.

# PD-16: Scenic, Natural, or Recreational Qualities

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Preserve, protect, and/or enhance routes designated with significant scenic, natural, and/or recreational qualities in order to enhance the public enjoyment of facilities.



## Sustainability Linkage

Preserving scenic, natural, or recreational qualities supports the social principle by providing the public with an opportunity for increasing their appreciation and respect of the natural environment through facilities such as visitor centers, recreational features, and/or scenic viewpoints, and through promoting community use of facilities.

## Scoring Requirements

In order to achieve points for this criterion, both of the following prerequisites must apply:

**Prerequisite 1.** Any portion of the project is along one of America’s Byways® (National Scenic Byway or All-American Road – [www.byways.org](http://www.byways.org)), a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such because of its significant scenic, natural, and/or recreational qualities. This includes bridges spanning scenic and recreational waterways.

AND

**Prerequisite 2.** Existing access to scenic, natural, or recreational qualities has not been removed as a part of this project unless it is specifically removed to protect the scenic, natural, and/or recreational qualities themselves.

**3 points.** Points shall be achieved per the following table. Points are **not** cumulative; rather the highest point value should be used.

No. Points	Method
1	<b>Minimize Impacts.</b> Show that an effort has been made to minimize “adverse effects” to the features from Prerequisite 1.
1	<b>Provide Access.</b> Provide at least one access from the project to a designated area for vehicles to exit the traffic stream, stop, and experience scenic, natural, or recreational features along the roadway. These areas may be scenic viewpoints or overlooks, welcome centers, tourist activities, or information centers or recreation areas. They must be identified with signage conforming to 23 CFR 655 (the Manual on Uniform Traffic Control Devices, current revision) Part 2 – Signs.
2	<b>Avoid Impacts.</b> Show that measures have been taken to specifically avoid impacts to the features from Prerequisite 1.
3	<b>Enhance Features.</b> Protect, preserve, or enhance scenic, natural, and/or recreational qualities along the roadway. This may include improvements to existing access points, signage, views, or to the scenic, natural, and/or recreational qualities themselves. Also included would be protecting these qualities by the removal of an existing access point if it has been determined that the access threatens them.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Documentation of national, State, or Indian tribe designation if a byway designation is used to satisfy this criterion or other documentation showing scenic, natural, or recreational values of a project.
2. Contract documents showing roadside access point or other protection, preservation, or enhancements.
3. Description of activities to minimize impacts to features.
4. Description of activities to avoid or improvements to enhance features.

# PD-17: Energy Efficiency

1-8 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce energy consumption of lighting systems through the installation of efficient fixtures and the creation and use of renewable energy.



## Sustainability Linkage

Reduction of energy consumption and conversion to renewable energy sources support the environmental and economic sustainability principles by reducing the demand for fossil fuel generated energy, reducing emissions, and reducing in long-term energy costs.

## Scoring Requirements

**1 Point.** Evaluate energy needs for the project and implement alternatives to reduce power consumption while still meeting lighting and safety standards. These alternatives could include reduction of lighting; retrofit or installation of energy efficient luminaires, beacons, and traffic signal equipment and lamps; and installation of renewable energy sources.

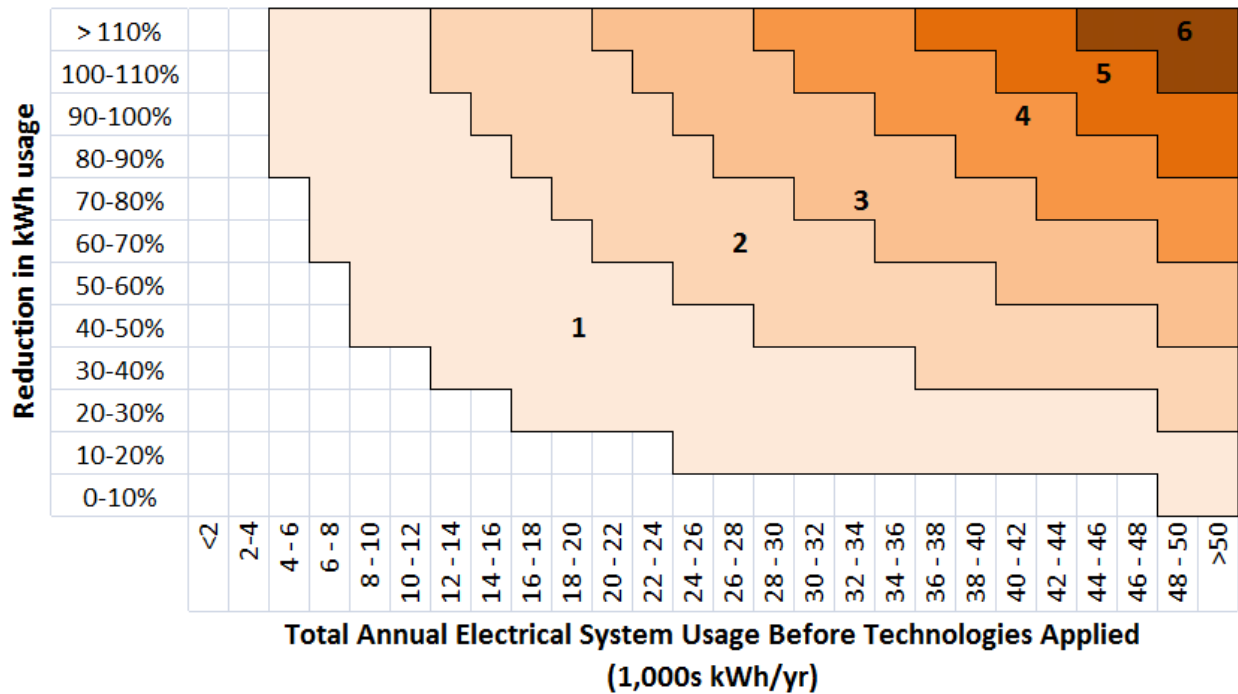
**1-6 Points.** Reduce the energy consumption on the project through the installation of energy efficient lighting and signal fixtures (e.g. LED lighting, induction lighting, or other new technology that is Underwriters Laboratories Inc. (UL) Listed for the intended use) and through the installation of autonomous, on-site, renewable power sources (e.g., solar panels). All lighting facilities and systems considered for this criterion must be appropriate for the project. This means that installing pedestrian safety lighting on a project with no pedestrian accessibility will not be awarded credit. Similarly, lighting for new and/or improved driveways and parking lots are subject to the credits only if they are included within the project scope and budget boundaries.

Points are awarded based on the percentage of reduced power use. To determine this reduction, compare the annual power consumption for the baseline condition to the power consumption for the energy efficient electrical system design. Calculations for power consumption should be based on the following assumptions:

- The baseline condition should be calculated using the existing electrical system and assuming new improvements were to be constructed with high-pressure sodium (HPS) luminaires with cut-off optics.
- The baseline condition should be based on the lighting system operating 12 hours/day and 7 days/week.
- The two designs must both meet the same lighting standards.
- Wattage used for energy consumption shall be based on luminaire "input wattage" not lamp wattage.
- Consider contributions by renewable energy sources as a reduction in the power required.
- Do not include power savings associated with daylight sensors and activity level sensors.

Use Table 1 to calculate the number of points awarded based on these calculations.

**TABLE 1. POINTS EARNED FOR ENERGY EFFICIENT ELECTRICAL SYSTEM DESIGN**



**1 point.** Establish a plan for auditing energy use after the project is complete, as part of operations and maintenance.

### Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of energy usage evaluation and reduction plan.
2. Calculations documenting energy usage if the roadway project was to be constructed with high-pressure sodium (HPS) luminaires and fixtures, the expected energy usage as designed, and the resulting energy savings as a percentage of calculation no. 1.
3. Contract documents and/or cut sheets of the luminaires being installed on the project.
4. Sample cut sheets and specifications for each technology installed on the project that shows the expected wattage of the component(s) used or generated.
5. Documentation of plan for auditing energy use after construction.

# PD-18: Site Vegetation

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Promote sustainable site vegetation within the project footprint that does not require long-term irrigation, consistent mowing, or invasive/noxious weed species removal.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Using sustainable site vegetation supports the environmental and economic sustainability principles by protecting the ecosystem by choosing non-invasive and non-toxic species, and by reducing maintenance costs.

## Scoring Requirements

“Site vegetation” is defined as all vegetation associated with a particular roadway project and shall include all vegetation within the roadway’s right-of-way or disturbed area associated with the roadway project (whichever is greater). This can include, but is not limited to, roadside vegetation, decorative planting (e.g., planter boxes or potted plants in urban areas), and vegetation contained in stormwater facilities (e.g., bioswales and rain gardens).

*In order to achieve points for this criterion, the following prerequisite must be met:*

**Prerequisite 1.** All site vegetation shall use non-invasive species only, use non-toxic species only, use seeding that does not require consistent mowing for a viable stand of grass, and minimize disturbance of native species.

**1 – 3 Points:** Implement one or more of the features in Table 1. Points for features are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of three points.

**TABLE 1. SITE VEGETATION POINTS (CONTINUED ON NEXT PAGE)**

Points	Feature	Minimum Requirements
1	Non-mechanical maintenance	No mowing or other mechanical means of maintenance is required.
1	No long-term irrigation	Do not use water (no irrigation) after the plant establishment period.
1	Greywater or reclaimed water irrigation – plant establishment	Use greywater to irrigate plants if needed during the plant establishment period.
1	Greywater or reclaimed water irrigation – ongoing	Use greywater to irrigate plants if needed beyond the plant establishment period.



Points	Feature	Minimum Requirements
1	Native species	<ul style="list-style-type: none"> <li>• Use native plant species only. “Native plant species” are plants native to the EPA Level III ecoregion that contains the roadway project site or known to naturally occur within 200 miles of the roadway construction site (Sustainable Sites Initiative, 2009a). Non-native plants transplanted from impact areas within the project limits may be used.</li> <li>• Salvage rare plants and retain existing vegetation where possible.</li> <li>• Remove all invasive existing plant species or, in cases where irradiation is impossible, implement management plan.</li> </ul>
1	Long-term vegetation planning	Have a management plan to maintain the corridor, including management of site vegetation and management of invasive species (or continued efforts to irradiate them). This could include a plan and/or financing to support site vegetation in the project corridor.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A vegetation or landscape plan showing type, size, and location of all plant species. This can often be found in the standard project plans.
2. The specification sections relating to site vegetation. These are typically found in the technical specifications.
3. A copy of, or reference to (e.g., web address), the policy or procedure used to select plant species.
4. A design study report approved by the appropriate agency or authority that includes analysis of existing site vegetation, impacts, reuse of vegetation, references to evaluate the invasive species and noxious plants, and planned vegetation species.

# PD-19: Reduce and Reuse Materials

1-8 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce lifecycle impacts from extraction and production of virgin materials by recycling materials.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Reducing and reusing materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.

## Scoring Requirements

This criterion focuses on reducing and reusing materials and *PD-20: Recycle Materials* focuses on efforts to recycle materials per the descriptions and definitions provided below.

## Background

When pavements are originally constructed, the best materials available at the time are usually sourced and used during construction. As resources diminish, that often means that the best materials available for reconstruction are already in place in the existing infrastructure. In addition to reducing waste, recycling pavements allows us to reclaim the best materials that were originally available for construction.

Programs for waste reduction in the United States have generally taken on the concept of the 3Rs: reduce, reuse, and recycle. For the purposes of this criterion, as well as to *PD-20: Recycle Materials*, the following definitions apply:

- “Reducing” is used in this tool to refer to processes that reduce the need for virgin paving and structural materials. Examples include soil stabilization methods to reduce the need for structural backfill or to reduce the required thickness of a new pavement or overlay; pavement preservation technologies that extend the life of existing pavements and reduce the need for new materials; bridge preservation technologies that extend the life of existing bridges and reduce the need for new structures and materials; retrofitting existing bridge structures to reduce the need for new structures and materials; or processes that incorporate existing pavement structures into new pavement structures (such as crack-and-seat and rubblization) to reduce the need for new materials and avoid the transportation of the existing used materials which would otherwise be removed from a project.
- “Reusing” is the reuse of a material or by-product from another industry for a new function in a transportation application. Examples of the beneficial use of industrial by-products include the incorporation of materials such as coal ash, fly ash, foundry sand, slag, asphalt shingles, construction and demolition materials, or other materials into a transportation project. These reused materials replace traditional materials with similar properties in specific applications. The reuse of these materials should assure that the engineering properties of the final product or mixture are equal to or better than obtained from using traditional materials, and that their economic value is demonstrated in accordance with the FHWA Recycling Policy. Reused materials provide environmental benefit by reducing the unnecessary

landfilling of these materials. With proper engineering, these materials can be successfully incorporated into transportation applications and provide economic value to our projects.

- “Recycling” is the use of old materials for a new and similar use in a transportation application, or the salvaging and reprocessing of previously used materials from other transportation applications into a new transportation project. See PD-20: Recycle Materials for examples.
- “Retrofit” is defined as the reinforcement of structures to become more resistant and resilient to the forces of natural hazards and other environmental factors such as aging and weathering. It involves the consideration of changes in the mass, stiffness, damping, load path, and ductility of materials, as well as radical changes such as the introduction of energy absorbing dampers and base isolation systems.
- “Existing pavement material” is defined as all material within the project limits in the existing pavement structure (including surfacing and base material). This includes travelled lanes and shoulders, and pavement structures for physically separated bicycle and pedestrian pathways.
- “Existing structural material” is defined as all material within the project limits in existing non-pavement structures such as bridges (including overpasses), retaining walls, and stormwater infrastructure, such as vaults, pipes, and culverts. All existing structural materials include their foundations, for which volumes may be difficult to estimate. Where actual weights are not available, reasonable estimates may be used or volume may be estimated. To compute volume of hollow structural sections such as prefabricated members or corrugated steel, estimate the mass of the material and adjust for material density to determine volume. Note that for typical reinforced concrete sections, the steel does not need to be separated from the composite section for purposes of volume calculations and a composite density may be used.

## Scoring

Implement one or more of the methods listed below. Points for different methods are cumulative; however, this criterion shall not exceed a total of eight points.

- **1-4 points.** Pavement Preservation

Perform pavement preservation activities such as crack sealing, chip sealing, slurry sealing, microsurfacing, or thin ACP overlays that extend the remaining service life of pavements. This scoring requirement applies to pavement preservations and not rehabilitation or reconstruction activities. An FHWA memo defining pavement preservation can be found at <http://www.fhwa.dot.gov/pavement/preservation/091205.cfm>. Points are awarded based on increase in remaining service life per Table 1.

**TABLE 1: POINTS AWARDED FOR PAVEMENT PRESERVATION ACTIVITIES**

Points	Increase in Remaining Service Life <sup>1</sup>
1	1 to 2 years
2	2 to 5 years
3	5 to 7 years
4	7 to 10 years

<sup>1</sup> More than 10 years is considered rehabilitation and isn't eligible for this scoring requirement.

- **1-3 points.** Reduce Pavement Materials

Reduce the amount of new pavement materials needed through soil stabilization methods that incorporate existing pavement structures into new pavement structures (such as fractured slab techniques, including crack-and-seat and rubblization). Points are awarded per Table 2 based on the percentage of pavement area treated. The area treated is calculated based on the entire area of existing pavement materials that are preserved or reconstructed.

**TABLE 2: POINTS AWARDED FOR REDUCING PAVEMENT MATERIALS**

Points	Percentage Pavement Area Treated
1	50–74%
2	75–99%
3	100%

- **2-4 points.** Bridge Preservation

Perform bridge preservation activities such as deck overlays, crack sealing, joint sealing, removing channel debris, lubricating bearings, cathodic protection, electrochemical chloride extraction and cleaning, and painting that extend the remaining service life of bridges. This scoring requirement applies to bridge preservations and not rehabilitation or reconstruction activities. For definitions and examples of bridge preservation, see the FHWA Bridge Preservation Guide, which can be found at <http://www.fhwa.dot.gov/bridge/preservation/guide/guide.pdf>. Points are awarded based on increase in remaining service life per Table 3.

**TABLE 3: POINTS AWARDED FOR BRIDGE PRESERVATION ACTIVITIES**

Points	Increase in Remaining Service Life
2	2 to 5 years
3	5 to 7 years
4	7 to 10 years

- **1-3 points.** Retrofitting Bridges

Retrofit existing bridge structures to reduce the need for new structures and materials. This could include methods such that improve or add: stainless steel wire mesh composites, full height steel jackets, elastomeric bearings, steel restrainer cables, shear keys, fiber reinforced polymers wraps, shape memory alloy devices, metallic and viscoelastic dampers, or pipe seat extenders. Points are awarded based on increase in remaining service life per Table 3 above.

- **1-3 points.** Repurpose Pavements or Structures

Reuse existing pavements, structures, or structural elements for a new use by repurposing them for a use that requires equal or less loading. The purpose of this scoring requirement is to maintain and leverage existing pavements, structures, and structural elements for new uses where possible instead of using new materials. One method is to maintain existing pavements when new alignments are proposed and use the existing pavement for a new use, such as realigning a highway but maintaining the old one as a frontage

road or multiuse path. Another method is to convert existing pavement to a different use, such as converting parking to travelled lanes (or vice versa) or converting pavement to multiuse paths or plazas. Points are awarded per Table 4 based on the percentage of existing pavement material (by area) reused and repurposed calculated based on the entire area of existing pavement materials included in the project.

**TABLE4: POINTS AWARDED FOR REUSING AND REPURPOSING PAVEMENTS IN PLACE**

Points	Percentage Pavement Reused and Repurposed
1	25–49%
2	50–74%
3	75% or more

- **2-3 points.** Reuse Industrial By-Products
  - 2 points. Reuse industrial by-products in pavement materials, ancillary structures, and other roadway elements. These could include one or more of the following: coal ash, fly ash, foundry sand, slag, tires, asphalt shingles, and construction and demolition materials.
  - 1 point. Using foundry sand or other industrial by-products in pipe bedding and backfill.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. Calculations showing the remaining service life of pavements or bridges expected before the project and after, and clearly demonstrating an extended service life as a result of the treatments applied.
2. Calculation of the percentage pavement area treated, including the area of pavement treated and the existing pavement area preserved and retrofitted.
3. The approved mix design for the pavement materials.

# PD-20: Recycle Materials

1-8 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce lifecycle impacts from extraction, production, and transportation of virgin materials by recycling materials.

## Sustainability Linkage

Recycling materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.



## Scoring Requirements

This criterion focuses on recycling of materials and *PD-19: Reduce and Reuse Materials* focuses on efforts to reduce and reuse materials per the descriptions and definitions provided below.

## Background

When pavements are originally constructed, the best materials available at the time are usually sourced and used during construction. As resources have diminished, that often means that the best materials available for reconstruction are already in place in the existing infrastructure. In addition to reducing waste, recycling pavements allows us to reclaim the best materials that were originally available for construction.

Programs for waste reduction in the United States have generally taken on the concept of the 3Rs: reduce, reuse, and recycle. For the purposes of this criterion, as well as for *PD-19: Reduce and Reuse Materials*, the following definitions apply:

- “Reducing” is used in this tool to refer to processes that reduce the need for virgin paving and structural materials. See *PD-19: Reduce and Reuse Materials* for examples.
- “Reusing” is the reuse of a material or by-product from another industry for a new function in a transportation application. See *PD-19: Reduce and Reuse Materials* for examples.
- “Recycling” is the use of old materials for a new and similar use in a transportation application, or the salvaging and reprocessing of previously used materials from other transportation applications into a new transportation project. Examples of recycling solutions include the incorporation of reclaimed asphalt pavement (RAP) and recycled concrete aggregate (RCA); cold-in-place recycling (CIR); hot-in-place recycling (HIR); and full depth reclamation (FDR). Also included are the salvage and recycling of aggregate, rock, asphalt, concrete, wood, metal (rebar, sign posts, signal poles, etc.), and other materials that have previously been used in other transportation applications and can be incorporated into a new project. Examples include the salvage and recycling of sign posts, signal poles, luminaries, rock or concrete used as rip-rap, and asphalt millings used as a shouldering material. For bridges, an example would be using recycled steel girders from a roadway bridge for a new pedestrian structure.
- “Existing pavement material” is defined as all material within the project limits in the existing pavement structure (including surfacing and base material). This includes travelled lanes and shoulders, and pavement structures for physically separated bicycle and pedestrian pathways.

- “Existing structural material” is defined as all material within the project limits in existing non-pavement structures, such as bridges (including overpasses), retaining walls, and stormwater infrastructure such as vaults, pipes, and culverts. All existing structural materials include their foundations, for which volumes may be difficult to estimate. Where actual weights are not available, reasonable estimates may be used or volume may be estimated. To compute volume of hollow structural sections such as prefabricated members or corrugated steel, estimate the mass of the material and adjust for material density to determine volume. Note that for typical reinforced concrete sections, the steel does not need to be separated from the composite section for purposes of volume calculations and a composite density may be used.

## Scoring

Implement one or more of the methods listed below. Points for different methods are cumulative; however, this criterion shall not exceed a total of eight points.

- **1-5 points. Recycled Asphalt Pavement or Recycled Concrete Aggregate**

Use RAP or RCA in new pavement lifts or granular base course or embankments. The recycled materials can originate on the project or from an offsite source, but no points are awarded for removing paving materials from the project and sending them offsite to be recycled.

Points are awarded based on the Average Recycled Content (ARC) per the following calculation and using Table 1 as follows below.

$$ARC (\%) = \frac{\sum r_n}{\sum W_n} \times 100\%$$

Where:

$r_n$  is the total weight or volume of RAP or RCA.

$W_n$  is the total weight or volume of either all existing pavement materials or all bedding, backfill, and granular embankment materials per the method of recycling used.

$n$  represents the number of materials considered in accordance with the method used.

**TABLE 1: POINTS FOR AVERAGE RECYCLED CONTENT (PERCENT BY WEIGHT OR VOLUME OF MATERIALS)**

Recycling Method Used	Points Earned				
	1	2	3	4	5
Percent average recycled material (ARC) required for recycling in pavements	10%	20%	30%	40%	50% or more
Percent average recycled material (ARC) required for granular base course or embankments	20%	30%	40%	50%	60% or more

- **2-6 points. In-Place Pavement Recycling**

Recycle pavement materials in place using cold-in-place recycling, hot-in-place recycling, and full depth reclamation methods. Points are awarded based on the percentage of pavement area recycled compared to the entire area of existing pavement materials.

**TABLE 2: POINTS AWARDED FOR IN PLACE RECYCLING**

Percentage Pavement Area Recycled	Points Awarded by Method of Recycling		
	HIR	CIR	FDR
50–74%	2	3	4
75–99%	3	4	5
100%	4	5	6

- **1 point. Recycle Minor Structural Elements**

Relocate and reuse at least 90 percent of the minor structural elements, including existing luminaires, signal poles, and sign structures that are required to be removed and/or relocated onsite. Signs mounted on posts are not included in this criterion.

In order to achieve credit, the minor structural elements must be moved and reused onsite. Elements shall be counted by numbers of foundations without regard to size of the structure. In this case, a signal pole would be counted as a single structure and an overhead sign structure would be counted twice because it has two foundations.

### Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more following documentation sources (or equal where not available):

1. A calculation that shows the computed percentage of pavement and/or structural material recycled.
2. Calculation of the percentage pavement area recycled in-place.
3. A calculation that shows the percentage of luminaires, signal poles, and sign structures reused.



# PD-21: Earthwork Balance

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce the need for transport of earthen materials by balancing cut and fill quantities.



## Sustainability Linkage

Balancing cut and fill quantities in a project supports the environmental and economic sustainability principles by reducing the environmental and economic costs associated with the transport of earthen materials.

## Requirements

Balance earthwork cut (excavation) and fill (embankment) volumes such that the percent difference between cut and fill is less than or equal to 10 percent of the average total volume of material moved. For purposes of this criterion, it is recommended that the owner use the following method and definitions, or equivalent, to compute cut and fill volumes. Include miscellaneous additional cut and fill such as outlet ditches and muck excavations, and account for moisture and density as well as shrink and swell. Note that for purposes of this criterion, all volumes are positive quantities.

**3 points.** Show that that design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet:

$$\frac{(A + C) - (B + D)}{\frac{1}{2}(A + C + B + D)} \times 100\% \leq 10\%$$

A = Volume of Cross Section Cut

B = Volume of Cross Section Fill

C = Volume of Miscellaneous Cut

D = Volume of Miscellaneous Fill

**Include** the following materials in the calculations: (1) Soil stabilizer materials or other soil additives, (2) Removed topsoil materials, and (3) Unused cut or imported fill materials placed in stockpiles.

**Exclude** the following materials from the calculations: (1) Mechanical stabilizers such as rock bolts and geotextile fabric materials, (2) Structural aggregate for base courses in pavements, foundations, or superstructures such as bridges, (3) Structural backfill and drain rock specifically intended for utility trenches and stormwater infrastructure, and (4) Rock (Stable Rock, defined by the Occupational Health and Safety Administration) cuts sourced within the project boundary that are intended for use as structural aggregate within the project boundary.

OR

**1 point.** Show that the design volumes (for projects that haven't been constructed) or actual construction volumes (for projects that have been constructed) meet this criterion only if construction banking is used and the following requirements are met:

- Construction banking may be accomplished using adjacent projects or other phases of the same project.
- Trucking distance from banking stockpiles to project limits must be less than 10 miles.

- Banking stockpiles must be used and earthwork balanced within a period of 24 months.
- All stockpiles must have a temporary erosion and sedimentation control (TESC) plan in place and appropriate measures must be installed. Maintenance for TESC methods must be accounted for in the project being evaluated or the adjacent project sharing earthwork banking and maintenance must be completed and documented.

## Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Grading plan, reporting total cut and fill quantities and total miscellaneous cut/fill.
2. Inspector or Contractor's actual construction earthwork volumes for the project, including actual cut and fill, volume of unused embankment materials, and volumes of imports to and exports from site.

# PD-22: Long-Life Pavement Design

5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Minimize life-cycle costs by designing long-lasting pavement structures.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Including long-life pavement supports the environmental and economic principles by reducing the life-cycle costs of the road and the need for raw materials over time.

## Scoring Requirements

The definition of long-life pavement for this criterion is:

- Service life of 40+ years for new construction and major reconstruction projects that add travel lanes to an existing roadway or bridge. Service life of 20+ years for small reconstruction and bridge replacement projects that do not expand capacity of the roadway, preservation projects, and restoration projects.
- Pavement will not exhibit premature construction and materials-related distress.
- Pavement will have reduced potential for cracking, faulting, and spalling.
- Pavement will maintain desirable ride and surface texture characteristics with minimal intervention activities, if warranted, for ride and texture, joint resealing, and minor repairs.

This criterion is not applicable to roads that are not surfaced with hot mix asphalt (HMA) or portland cement concrete (PCC), such as gravel roads, dirt roads, and roads sealed with bituminous surface treatments. Existing pavements that are to at least partially remain in place (in any condition) can also qualify for this criterion. In these cases, evaluation shall be based on the final pavement structure, which may include (1) existing pavement remaining in place, and (2) any new pavement structure added. In this manner, a diamond grind of an existing PCC pavement or an overlay of an existing HMA pavement can qualify for this criterion if the resultant pavement structure meets the requirements stated above.

**5 points.** Both requirements must be met to achieve this criterion.

**Requirement 1:** Design at least 75 percent of the total new or reconstructed pavement surface area for regularly trafficked lanes of pavement to meet long-life pavement design criteria. Compute the total surface area of all trafficked lanes and show that, at a minimum, 75 percent of that area is designed for long-life. Do not include shoulders, medians, sidewalks, and other paved areas in the computation.

AND

**Requirement 2:** Pavement design is in accordance with a design procedure that is formally recognized, adopted, and documented by the project owner. In many instances (but not all), this could be the process described in the 1993 AASHTO Design of Pavement Structures manual or the process described in AASHTO MEPDG-1 Mechanistic-Empirical Pavement Design Guide, Interim Edition: A Manual of Practice.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

- Calculations indicating the total percentage of trafficked lane pavement surface areas designed for long-life.
- The project owner's formally recognized, adopted, and documented pavement design procedure.
- Documentation showing long-life pavement was designed using a minimum 20- or 40-year service life (per the appropriate requirements above).

# PD-23: Reduced Energy and Emissions in Pavement Materials

3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce energy use in the production of pavement materials.

## Sustainability Linkage

Reducing energy use in the production of pavement materials supports all of the triple bottom line principles by lessening impacts to air quality through reduced emissions and reducing energy consumption.



Affected Triple Bottom Line Principles

## Scoring Requirements

**3 points.** Use low-energy material for at least 50 percent of the total project pavement material (hot mix asphalt (HMA) or concrete) by weight. Low-energy material may be defined by any of the following options.

**Option 1. Asphalt Production.** Either of the following options meets this requirement.

- **Option 1A.** Use Warm Mix Asphalt. Reduce the mixing temperature of hot mix asphalt by a minimum of 50°F from that recommended as the mixing temperature by the asphalt binder supplier. Mixing temperature shall be measured as the temperature of the mixture as it exits the mixing drum (for drum plants) or pugmill (for batch plants). This credit requires a recommended HMA mixing temperature to be provided by the asphalt binder supplier. This recommended temperature should be as if no WMA technology were to be used. If the recommended mixing temperature is provided as a range, use high end of the range for calculation of the required 50°F degree reduction.
- **Option 1B.** Burn recycled oil, waste materials, or other fuel saving technologies in HMA plant to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other fuel technologies that can be shown to reduce the normal electricity or petroleum fuel usage by 25 percent.

**Option 2. Raw Material – Cement Production.** Either of the following options meets this requirement.

- **Option 2A.** Use an ENERGY STAR® certified cement production plant for cement materials used on the project. To be ENERGY STAR® certified, the plant must score in the top 25 percent based on the EPA National Energy Performance Energy Rating System.
- **Option 2B.** Burn recycled oil, waste materials, or other fuel saving technologies in cement production plant to reduce conventional fuel usage by a minimum of 25 percent. Recycled oils, garbage, or other materials that would otherwise go to waste that are used for burner fuel or any other fuel technologies that can be shown to reduce the normal electricity or petroleum fuel usage by 25 percent.

**Option 3. Concrete Production.** Any one of the following three options meets this requirement.

- **Option 3A.** Concrete shall be supplied from a concrete plant that can demonstrate a carbon footprint and embodied energy 15 percent below the national averages as established in the National Ready Mixed Concrete Association's (NRMCA) Sustainable Concrete Plant Guidelines (<http://www.nrmca.org/sustainability/Certification/SCP%20Guidelines%20Version%201.1.pdf>). Carbon footprint and embodied energy shall be calculated using the NRMCA Carbon Calculator (<http://www.nrmca.org/sustainability/Certification/PlantCertification.asp>).

- **Option 3B.** Concrete shall be supplied from a concrete plant that is an NRMCA Sustainable Concrete Plant Certified Silver (<http://www.nrmca.org/sustainability/Certification/PlantCertification.asp>).
- **Option 3C.** Blended cement using limestone addition. Per ASTM C 150/AASHTO M85 the use of 5 percent ground limestone in cement is permitted, which reduces the cement clinker in concrete and ultimately reduces the carbon footprint (<http://www.fhwa.dot.gov/pavement/concrete/pubs/hif11025/index.cfm>).

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Calculations to show at least 50 percent of the total project pavement material meets requirement options 1, 2, or 3.
2. Asphalt or concrete pavement mix designs showing the requirements of options 1 or options 3 were met.
3. Documentation for the cement production facility, asphalt plant, or concrete mixing plant showing the requirements were met.

# PD-24: Contractor Warranty

1-3 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Improve quality and minimize life-cycle costs by promoting the use of extended contractor warranties for pavement.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Using extended contractor warranties for pavement promotes higher quality construction and supports the environmental and economic principles of the triple bottom line by minimizing life-cycle costs and raw material usage.

## Scoring Requirements

The project construction contract should include a warranty for constructed portions of the pavement structure to include surfacing (e.g., hot mix asphalt, portland cement concrete, etc.), as well as any underlying layers (e.g., granular base material). Other items may also be included in the warranty but are not required for this criterion. Points are awarded based on the length of the warranty period as follows:

**1 point. 3-year warranty**

**3 points. 5-year warranty**

The terms of the warranty shall be defined by the owner and may include contractor input if desired. As a minimum, the contractual warranty specifications shall include: Definition of what product(s) are warranted

- Length of the warranty period
- Responsibilities of the owner
- Responsibilities of the contractor
- Responsibility for maintenance
- Conflict resolution process
- Contractor quality control plan
- Measurement methods
- Performance-based requirements and associated threshold levels that require corrective action by the contractor
- Requirements for remedial corrective action
- Requirements for elective or preventative actions
- Basis of payment
- Final warranty acceptance

The intention of this criterion is to include a 3- or 5-year pavement warranty in the contract specifications. This warranty duration is intended to be long enough to cover any pavement performance issues due to poor quality construction, but short enough so as not to create warranty bonding issues associated with contractor assumption of risk for unduly long periods of time. Ultimately, warranties must meet all applicable local and federal regulations. Federal regulations are described in 23 CFR 635, Subpart D, Section 413, Guarantee and Warranty

Clauses. Also refer to the Transportation Research Board's Transportation Research Circular Number E-C154, Development of Warranty Programs for Hot-Mix Asphalt Pavements dated June 2011 for additional information on this topic.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of the following documentation sources (or equal where not available):

1. Contract documents including the warranty specifications.



# PD-25: Construction Environmental Training

1 point

SCORECARDS:

Paving

Rural Basic

Rural Extended

Urban Basic

Urban Extended

**Goal:** Provide construction personnel with the knowledge to identify environmental issues and best practice methods to minimize impacts to the human and natural environment.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Environmental training for construction personnel supports the environmental and social principles by ensuring that workers understand the importance of protecting and enhancing the human and natural environment, follow environmental regulations, and implement sustainable construction methods correctly.

## Requirements

**1 Point.** The owner shall require the Contractor to plan and implement a formal environmental awareness training program during construction in order to provide tools and information to assist staff in ensuring that projects stay in compliance with environmental laws, regulations, and policies.

The Contractor shall provide an environmental awareness training plan that is customized to the project, including:

- A list of the types of project personnel to be trained. This list may be by job-type and/or by employer and need not contain actual employee names. Personnel should include members of the owner's organization or its construction representative, and prime and subcontractors. Suggested classifications of personnel to be trained include, but are not limited to, managers, inspectors, superintendents, operators, and laborers.
- A description of the types, goals, and objectives of training to be given. Types of training might include one or more of the following: topic-specific trainings, topic-specific emails, regular toolbox meetings, standing topics on regular agendas, classroom training, and more. This criterion cannot be met by one-time-only discussions of environmental topics, such as at a preconstruction meeting. Training does not have to be lengthy classroom training and it does not need to be dedicated to environmental issues only.
- A process to track training efforts, including dates, means (e.g., online, classroom, field training), topics, the identification of those participating in training, and attendance numbers.
- A process to measure training effectiveness such as self-assessment, pre-test and post-test, and productivity measurement.

The environmental awareness training plan shall address the following training elements as a minimum, or state why any are inappropriate:

- Permit conditions, performance standards, environmental commitments, and environmental regulations related to the project
- Overall importance of environmental issues
- Identifying work activities that present the greatest risk for compliance
- Required environmental qualifications/certifications
- Environmental records management

- Environmental compliance monitoring and reporting procedures
- Environmental notification triggers and emergency response procedures
- Oil spill prevention and response procedures
- Construction stormwater management, erosion and sediment control procedures, and in-water work
- Reduction of air pollution
- Management of known or suspected contamination
- Hazardous materials management

Some types of environmental training may be required by regulation. These requirements should be included in the plan; however, the plan should go above and beyond what is required by regulations and should cover all potential environmental issues.

## Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Documents showing an Environmental Awareness Training Plan is required.
2. Contractors' Environmental Awareness Training Plan.

# PD-26: Construction Equipment Emission Reduction

1-2 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce air emissions from non-road construction equipment.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Reducing emissions from construction equipment supports environmental and social principles by lessening impacts to air quality and reducing fossil fuel consumption.

## Requirements

**1-2 points.** Implement one or more of the methods to reduce non-road emissions in Table 1. Points for methods are cumulative if roadways have more than one feature; however, this criterion shall not exceed a total of two points.

**TABLE 1. POINTS AND METHODS TO REDUCE NON-ROAD CONSTRUCTION EQUIPMENT EMISSIONS (CONTINUED ON NEXT PAGE)**

No. Points	Method
1	Use non-road construction equipment that have engines that meet the current U.S. Environmental Protection Agency (EPA) Tier emission standards (Tier 3/Interim, Tier 4 as of April 2011) in effect for non-road engines of the applicable engine power group and account for at least 50 percent of the non-road construction equipment fleet operating hours for the project.
1	Use non-road construction equipment that have diesel retrofit devices for after-treatment pollution control verified by EPA or the California Air Resources Board (CARB) for use with non-road engines and account for at least 50 percent of the non-road construction equipment fleet operating hours for the project.
1	Owner shall require contractor to implement a no-idling policy during construction. The policy should include, at a minimum, the following topics (or equivalents): <ul style="list-style-type: none"> <li>• When drivers arrive at loading or unloading areas to drop off or pick up passengers, they should turn off their vehicles as soon as practical to eliminate idling time and reduce harmful emissions. Vehicles should not be restarted until passengers are ready to depart. Exceptions include conditions that would compromise passenger safety, such as extreme weather or idling in traffic.</li> <li>• Delivery vehicles should turn off their engines while making deliveries to the construction site.</li> <li>• All drivers of any company vehicle should receive a copy of the policy and have an opportunity to discuss it at the beginning of construction.</li> </ul>
1	Contractor reduces emissions related to hauling earthwork onsite by using larger non-road hauling vehicles.

No. Points	Method
2	Use non-road construction equipment that have engines that meet the current U.S. EPA Tier emission standards (Tier 3/Interim, Tier 4 as of April 2011) in effect for non-road engines of the applicable engine power group and account for at least 75 percent of the non-road construction equipment fleet operating hours for the project.
2	Use non-road construction equipment that have diesel retrofit devices for after-treatment pollution control verified by EPA or the CARB for use with non-road engines and account for at least 75 percent of the non-road construction equipment fleet operating hours for the project.

## Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A signed letter from the prime contractor stating the total non-road construction fleet operating hours and the percentage of those operating hours that meet at least one of the three criteria.
2. Provide a list of all non-road construction equipment used on the project that contains the following information for each piece of equipment:
  - Make and model of each piece of equipment.
  - Operating hours associated with the project.
3. Contract Documents requiring the Contractor to have a no-idling policy.

# PD-27: Construction Noise Mitigation

1-2 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Reduce or eliminate annoyance or disturbance to surrounding neighborhoods and environments from road construction noise, and improve human health.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Reducing noise from construction supports environmental and social principles by reducing impacts to quality of life, community facilities, and sensitive habitat.

## Requirements

Require the Contractor to plan and monitor noise control measures throughout construction with care above and beyond what is typically required by regulations (i.e., NEPA).

**1 Point.** The Owner shall require the Contractor to establish, implement, and maintain a formal Noise Mitigation Plan (NMP) during roadway construction. The Contract Documents should include a requirement for a NMP that contains, at minimum, the following information for all elements of construction:

1. Responsible party for noise mitigation activities, contact information, their responsibilities, and qualifications. Include information for the NMP preparer, if applicable, or if completed by an outside party.
2. Project location and distance to closest receptor of noise. Include a description of the surrounding zoning and parcel information (i.e., commercial, residential, hospitals, schools, parks, sensitive habitat).
3. A list of proposed construction activities (e.g., demolition, excavation, paving, bridge foundations, finishing).
4. Dates and working hours of proposed construction activities.
5. A list of noise-generating devices used during each construction activity listed in #3.
6. A list of noise-mitigating devices used during each construction activity listed in #3, including personal safety equipment requirements for all site employees.
7. Noise permit numbers, agency, or local authority policies associated with construction work, as applicable.
8. Description of noise monitoring standards, methods, and acceptable levels.
9. Description of correction procedures for non-compliant noise levels.
10. Description of complaint or feedback mechanism for public use.
11. Signature of responsible party.

Some state and local owner agencies already have requirements for such plans written into their standard specifications. However, a written specification requiring the prime contractor to have an NMP is insufficient, especially because many local authorities and owner agencies offer certain exemptions to their policies, such as daylight work schedules or projects with minimal areas of land-disturbing activities.

**1 Point.** Require contractor to monitor noise and the effectiveness of mitigation measures at the receptors throughout construction to ensure compliance with the NMP.

## Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract documents requiring contractor to develop a Noise Mitigation Plan and/or monitor noise during construction.
2. Noise Mitigation Plan.
3. Applicable noise permits, or agency or local authority noise policies.

# PD-28: Construction Quality Control Plan

2-5 points

SCORECARDS:  Paving  Rural Basic  Rural Extended  Urban Basic  Urban Extended

**Goal:** Improve quality by requiring the contractor to have a formal Quality Control Plan (QCP).

## Sustainability Linkage

Implementation of a Construction Quality Control Plan promotes higher quality construction and supports the environmental and economic principles of the triple bottom line by minimizing life-cycle costs and raw material usage.



## Scoring Requirements

**3 Points.** Require the Contractor to plan and implement quality control measures throughout construction with care and for materials above and beyond what is typically required by specifications and regulations. The Owner shall require the Contractor to establish, implement, and maintain a formal QCP during roadway construction. The Contract Documents should include a requirement for a QCP that includes, at a minimum, the following information:

- Key quality control personnel, their responsibilities, and qualifications (resumes, certifications with expiration dates, etc.).
- Project location and locations of major pavement and earthwork sources.
- Procedures used to control quality during construction including (as a minimum):
  - Items to be monitored (including pavement mix designs)
  - Submittals required, approximate dates, responsible person, and submittal process
  - Testing to be done (including testing standards and frequency)
  - When corrective action is required (action limits)
  - Procedures to implement corrective action
  - Procedures to modify QCP if ineffective or when modifications are necessary
  - Critical inspection point notification plan. As an example, 48 hours before concrete delivery, 48 hours before asphalt paving operations begin, etc.
- The QCP should cover all project construction; not just the pavement.
- Subcontractors need to be included in this plan, which typically means identifying a responsible party and obtaining a quality control procedure from the subcontractor. The Prime contractor shall maintain authority to enforce the QCP for work performed by all subcontractors. Expected beginning and ending dates for the subcontractors should be included.
- The QCP should be approved by the owner before construction begins.

Some state and local owner agencies already have requirements for such plans written in to their standard specifications. Such existing requirements should be able to meet the requirements above; however, some only address construction quality for hot mix asphalt (HMA) or Portland cement concrete (PCC) paving and not construction of the overall project. While paving needs to be covered in the QCP, all other major components of construction (e.g., structures, earthwork, drainage, traffic control items, etc.) must also be covered.

Some state highway agencies use contractor testing in their acceptance process. In these cases, the independent assurance tests must be performed on samples that are taken independently of quality control samples. QCPs are required in these cases, as defined in CFR 637, Title 23.

A large document that repeats language from the contract specifications need not be generated for this scoring requirement. Rather, the document should clearly identify the major aspects of the prime contractor's plan to control project construction quality and who is responsible for quality control for a particular item or process, when key inspections are made, when corrective actions are to be taken, and how they are to be taken.

**2 Points.** Leverage the use of Quality Price Adjustment Clauses to link payment and performance of the constructed products. Quality Assurance specifications generally include statistically based acceptance plans, require contractor process control testing, and have provisions for pay adjustments based on the degree of compliance with specified requirements. Quality assurance specifications and programs may lead to better contractor control of the quality of the specified product; however, they do not diminish the need for effective construction inspection. For more information, see FHWA's "Technical Guidance on Price Adjustment Clauses for Quality," January 24, 1992 and <http://www.fhwa.dot.gov/programadmin/contracts/core03.cfm>

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Document Specifications requiring contractor to establish and implement a project-specific QCP.
2. Contract Document Specifications requiring quality price adjustment clauses.



# PD-29: Construction Waste Management

1-3 points

SCORECARDS:



✓Paving



✓Rural Basic



✓Rural Extended



✓Urban Basic



**Goal:** Utilize a management plan for road construction waste materials to minimize the amount of construction-related waste destined for landfill.



## Sustainability Linkage

Managing construction waste supports the environmental and economic principles of the triple bottom line by reducing landfill waste and by encouraging recycling and reuse of construction materials, thereby decreasing raw material consumption.

## Scoring Requirements

**1 Point.** The Owner shall require the Contractor to establish, implement, and maintain a formal Construction and Demolition Waste Management Plan (CWMP) during roadway construction, or its functional equivalent. The Contract Documents should include a requirement for a CWMP that contains, at minimum, the following information:

- Type of construction and demolition waste expected (C&D waste)
- Expected (or actual) tonnage
- Goal for percentage of waste diverted from landfills
- Contact information of responsible party for hauling
- Destination of waste (e.g., recycling facility, landfill, contractor's backyard)
- Contact information of responsible party at disposal site
- Strategy for waste generated from mobile office activities and personal worker (household) waste
- Opportunities for recycling of construction waste materials.

C&D waste constitutes any material that must be hauled off-site for disposal or reprocessing, or, if disposed (stockpiled) within the project right-of-way (ROW), is not intended for use as structural material (e.g., pavements, embankments, shoulders, base materials, and fill). Materials that leave the ROW for reprocessing (recycling) activities to return later for use on within the project boundaries are not considered C&D waste. Typical C&D waste for roadway construction projects may include (but is not limited to) any of the following:

- Paving process waste (e.g., asphalt, concrete)
- Milling waste, concrete slough and grindings, cobble
- Metals (e.g., waste steel rebar, metal guardrails, pipes, luminaires, signs, aluminum, and various household metals)
- Plastic (e.g., waste plastic pipes)
- Excavated soil cuttings and boulders
- Sediment removed from temporary construction settling ponds
- Land clearing debris or excess topsoil
- Hazardous materials including liquids

- Wood and paper products (e.g., packaging materials, copier paper, paper products, cardboard, and pallets)
- Glass
- Household trash or compostables (including recyclable materials generated from mobile office)
- Packaging

The CWMP is typically completed by the prime contractor, submitted to the owner agency for approval, and implemented by all parties on the construction site. The CWMP need only apply to wastes generated during the project construction phase.

**1-2 Points.** The Owner demonstrates that a percentage of the construction waste, including the materials listed above, has been diverted from landfills. The percentage diverted should be calculated by weight. One of the following scores applies:

- **1 point.** Divert at least 50 percent of the construction waste from landfills.
- **2 points.** Divert at least 75 percent of the construction waste from landfills.

## Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Contract Document requiring contractor to establish and implement a project-specific CWMP or its functional equivalent.
2. Documentation showing the construction materials were diverted from landfills. This should include trucking tickets with weights, destinations, and materials, and calculations of percentages diverted from landfills.

# Operations and Maintenance

OM-1: Internal Sustainability Plan .....	OM-1
OM-2: Electrical Energy Efficiency and Use .....	OM-2
OM-3: Vehicle Fuel Efficiency and Use .....	OM-3
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OM-5: Safety Management .....	OM-5
OM-6: Environmental Commitments Tracking System .....	OM-6
OM-7: Pavement Management System.....	OM-7
OM-8: Bridge Management System .....	OM-8
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OM-10: Highway Infrastructure Preservation and Maintenance .....	OM-10
OM-11: Traffic Control Infrastructure Maintenance .....	OM-11
OM-12: Road Weather Management Program .....	OM-12
OM-13: Transportation Management and Operations .....	OM-13
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# OM-1: Internal Sustainability Plan

1-15 points

**Goal:** Focus on sustainability improvements within the agency's internal operations that affect all three principles of the triple bottom line.



## Sustainability Linkage

Implementation of a sustainability plan shows organizational commitment to all of the triple bottom line principles by being dedicated to the responsible use of natural resources, providing alternative commuting options, and training employees about sustainability.

## Scoring Requirements

### Background

The purpose of this criterion is to focus on improving the sustainability of the agency itself. Also see the following, related criteria:

- OM-2: Electrical Energy Efficiency and Use
- OM-3: Vehicle Fuel Efficiency and Use
- OM-4: Reuse and Recycle

Where overlap exists with plans identified in these three related criteria, those plans should be included in the Comprehensive Internal Sustainability Plan as an element of the plan or by reference.

For the purposes of this criterion, the following definitions apply:

- **“Internal”**– Internal refers to an agency's internal operations and should address the agency's energy consumption, solid waste production, recycling rate, employee commute, water consumption, stormwater management, and procurement policies. Generally, internal operations refer to those areas over which a transportation agency has complete control. For sustainability planning related to the transportation system that the agency manages, travel demand management programs for agency employees, or professional development education programs, see System Planning and Project Development criteria.
- **“Sustainability”** – The sustainability plan should incorporate all three of the triple bottom line sustainability principles (environmental, social, and economic). A plan does not need to use the term “sustainability” to receive points, so long as the contents of the plan can clearly be demonstrated to relate back to the three sustainability principles.
- **“Plan”** – For this criterion, a plan can be a list of actions that tie back to clearly stated objectives. The plan can be in the form of a published document, website, brochure, or other format, so long as the elements under the requirement section can be clearly demonstrated.
- **“Performance Measurement”** – A fully developed internal sustainability plan should contain a performance measurement system that includes goals, performance metrics, quantifiable targets, strategies, and actions designed to help meet the overall plan objectives.

## Scoring

### 2 points. Executive Commitment

Agency sustainability commitment is endorsed by senior executives. Evidence of this could include an executive order or policy statement, organizational directive, endorsement of the Sustainability Plan, a memo to staff, or other document.

### 4 points. Develop a Comprehensive Internal Sustainability Plan

The agency has a Comprehensive Internal Sustainability Plan that includes goals, performance metrics, quantifiable targets, strategies, and actions designed to help meet the overall plan objectives. The following table shows examples of each of these components.

TABLE 1. COMPONENTS OF A COMPREHENSIVE INTERNAL SUSTAINABILITY PLAN

Component	Example
A <b>goal</b> is the area that needs to be improved.	A transportation agency wants to reduce its environmental footprint.
A <b>performance metric</b> will be used to evaluate the progress being made towards the goal area.	To measure its performance, the agency will track its energy consumption.
A <b>target</b> uses the selected performance metric and identifies specific objectives to be achieved in the future.	The target is to reduce the agency's annual energy consumption 20% below current levels 2 years from now. (The baseline is how much energy the agency currently consumes per year.)
<b>Strategies</b> are categories of actions used to achieve the target.	The agency will use three main strategies to reach the target: (1) consume less electricity, (2) consume less gasoline and diesel fuel, and (3) consume less natural gas.
<b>Actions</b> are specific things that can be done to implement the strategies.	To implement the strategy of consuming less electricity the agency will: (1) replace incandescent light bulbs with compact fluorescents, (2) replace broken office equipment with energy efficient models, and (3) install occupancy sensors in the lighting system.

Common performance metrics for internal sustainability plans include:

- Annual electricity, natural gas, gasoline, and diesel fuel consumption (see OM-2 and OM-3)
- Annual renewable energy consumption (see OM-2)
- Agency fleet fuel efficiency (see OM-3)
- Agency fleet annual vehicle miles traveled (see OM-3)
- Annual tons of solid waste produced (see OM-4)
- Annual recycling rate (see OM-4)
- Annual reams of paper consumed (see OM-4)
- Annual water consumption
- Stormwater infiltrations rates at agency-owned facilities

- Percent of procured items that are sustainably produced, contain recycled materials, produced locally, etc.
- Percent of building inventory meeting green or sustainable building criteria

If an agency is growing in size, one option may be to select performance metrics that are normalized by the number of employees. This way an agency can seek to reduce the amount of materials consumed per employee, rather than the total amount consumed across the agency. However, this approach can result in an overall increase in an agency's environmental footprint, even though it appears to be meeting its sustainability goals.

### **3 points. Components of a Comprehensive Internal Sustainability Plan**

Points are assigned for integration of the following features:

- **1 point.** Coordination: It is integrated with national, state, and/or regional sustainability goals.
- **1 point.** Implementation: It has an implementation section that includes responsible parties, timelines, and potential funding sources.
- **1 point.** Monitoring and Tracking: It includes a performance measurement system, a plan for monitoring the plan's progress, and a schedule for updating the plan as needed.

### **2 points. Employee Engagement and Training**

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** Sustainability training is provided for staff, including an introduction to the Comprehensive Internal Sustainability Plan.
- **1 point.** The agency has an employee committee that promotes sustainability. Sometimes called a green team, this committee is focused on implementing more sustainable measures throughout the agency.

### **2 points. Commuting Options**

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** The agency implements at least two Travel Demand Management options including, but not limited to, compressed work weeks, alternative working hours, carpooling/vanpooling support, virtual meetings, teleworking options, bicycle and pedestrian amenities (e.g., parking, showers, lockers, etc.), and subsidized transit.
- **1 point.** The agency provides support for alternative fuel vehicles used for commuting. This could include providing electric vehicle plug in stations, providing alternative fuel vanpools, or other options.

### **2 points. Demonstrate Sustainable Outcomes**

Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

## **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Comprehensive Internal Sustainability Plan, or similar document.
2. An attachment to the plan that clearly describes how the plan includes measurements of performance.
3. Plan progress report (likely produced independently of this application) that provides evidence that the agency has been monitoring and tracking its performance towards meeting the plan's goals. The report should include quantifiable metrics (such as water or energy reduced per employee) that demonstrates the agency's commitment to tracking its progress.

# OM-2: Electrical Energy Efficiency and Use

1-15 points

**Goal:** Reduce the consumption of fossil fuels during operation and maintenance of agency owned and/or operated facilities through improvements in efficiency and the use and/or generation of renewable energy sources.



## Sustainability Linkage

Reducing energy consumption and converting to renewable energy sources contributes to the environmental and economic principles by reducing fossil fuel usage and associated emissions, and reducing long-term energy costs.

## Scoring Requirements

### Background

The EPA's Green Power Partnership explains that a Renewable Energy Certificate (REC) represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation. A REC and its associated attributes and benefits can be sold separately from the underlying physical electricity associated with a renewable-based generation source. RECs provide buyers flexibility:

- In procuring green power across a diverse geographical area.
- In applying the renewable attributes to the electricity use at a facility of choice.

This flexibility allows organizations to support renewable energy development and protect the environment when green power products are not locally available. For more information, see the EPA's Green Power Partnership website at <http://www.epa.gov/greenpower/gpmarket/rec.htm>.

Renewable resources shall be as defined by the Green-e Energy National Standard at <http://www.green-e.org> or [http://www.green-e.org/getcert\\_re\\_stan.shtml#standard](http://www.green-e.org/getcert_re_stan.shtml#standard).

### Scoring

#### 4 points. Set Energy Reduction and Renewable Energy Usage Goals

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Set an energy reduction goal to be obtained (usually a percentage reduction as compared to current usage).
- **2 points.** Set a goal for buying RECs (in addition to energy reduction goals) that is at least equivalent to one of the following options:
  - Your current state's Renewable Portfolio Standard (RPS). Currently 24 states and the District of Columbia have RPSs in place representing more than half of the energy consumed in the United States.
  - Your state's non-binding renewable energy goal. Five other states (as of July 2011) have non-binding goals for renewable energy.
  - If your state does not have a RPS or a non-binding goal, 20 percent of operational energy use should be used as the goal.

#### **4 points. Develop a Plan**

Develop a documented plan that outlines how the energy reduction and renewable energy goals set above will be accomplished. The plan (could be multiple documents) should state what energy-efficiency measures are planned and how renewable energy will be procured for operations and maintenance of facilities, including roadway lighting, traffic control, rest areas, maintenance & operations facilities, and other agency-operated administration facilities. This should include current energy usage and projected energy usage for the next two years as a minimum. Owned renewable energy sources may be factored into these calculations.

One of the following scores applies:

- **0 points.** No plan is created.
- **2 points.** A plan is developed to meet either the energy reduction or renewable energy usage goals.
- **4 points.** A plan is developed to meet both the energy reduction and renewable energy usage goals.

#### **2 points. Measure Progress and Monitor Performance**

Develop and maintain an electricity monitoring system for operations and maintenance that tracks electricity usage for all highway facilities. This database should help to monitor any issues or inefficiencies that may exist or develop over time.

#### **2 points. Employee Awareness Program**

Scoring for this requirement is based on the following, cumulative elements.

- **1 point.** Develop and implement an employee awareness program that educates employees about the sources and costs of energy usage in agency-owned/operated facilities and what they could do to reduce energy usage and how that links to sustainability.
- **1 point.** Create and maintain an employee committee focused on the reduction of energy consumption. This committee could have a larger focus, but must have reduction of energy usage as one of their goals.

#### **3 points. Demonstrate Sustainable Outcomes**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Execute a contract for a minimum of two years of renewable energy, or create and operate renewable energy facilities within the agency-owned properties to meet the selected goal.
- **1 point.** Monitor performance and demonstrate attainment of the agency's energy reduction goal over at least a one-year period.

### **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Energy efficiency and renewable energy plan(s) with current energy usage and projected energy usage for the next two years.
2. Copy of the electricity monitoring system.
3. Statement of renewable energy goal and documentation of Green-e contract or equivalent meeting that goal, according to energy projections, for two years. If a Green-e equivalent source is used, documentation to show that the source is indeed equivalent.
4. Documentation of employee awareness program and/or employee committee focused on reduction of energy usage.
5. Documentation showing reduction in energy consumption over the prior year meets goals set.



# OM-3: Vehicle Fuel Efficiency and Use

1-15 points

**Goal:** Reduce fossil fuel use and emissions in vehicles used for operations and maintenance.

## Sustainability Linkage

Reducing fossil fuel usage contributes to all of the triple bottom line principles by improving public health, reducing energy usage and costs, and reducing the impacts from associated emissions.



Affected Triple Bottom Line Principles

## Scoring Requirements

Reduction of fossil fuels is the overall goal of this criteria, whether that is achieved through the use of electric vehicles, alternative fuels, reduced idling, etc. The performance measurement tool should be used to report actual percentage reduction of fossil fuels used. If an increase or decrease in overall fleet size is required during the program, it could be used as an opportunity for improvement.

### 4 points. Set Fuel Usage Goals

Set goals for fossil fuel use reduction and set a time frame in which these goals should be achieved. Some agencies manage their light-duty fleet vehicles separately from their heavy-duty fleet and off-road equipment—in these cases, goals may be included in multiple documents.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Goals are set for either light-duty fleet or for heavy-duty and off-road equipment.
- **4 points.** Goals are set for both light-duty fleet and for heavy-duty and off-road equipment.

### 4 points. Develop a Fleet Management Plan

Have a documented fleet management plan that, at a minimum, describes the agency's planned actions to reduce fossil fuel usage, transition to alternative fuels or energy sources, increase overall fuel efficiency, and reduce vehicle miles travelled (VMT). Some examples of reduction actions include:

- **Alternate energy source.** The purchase of vehicles powered by such alternative fuels as electricity, propane, natural gas, E-85, or biodiesel can reduce the use of fossil fuels. Hybrid electric vehicles and even high mileage standard vehicles can also contribute to fossil fuel use reduction.
- **Anti-idling policy.** Anti-idling policies can be implemented that reduce the amount of fuel used unnecessarily when the vehicle is not in motion. These policies often specify a time limit for any vehicle idling or an amount of idling allowed during a certain time frame. There are idling reduction technologies that can be installed on heavy vehicles to help reduce idling. Argonne National Laboratories performed a study comparing some of these technologies for cost and fuel savings. Information from the study can be found here: <http://www.transportation.anl.gov/pdfs/EE/533.pdf>.
- **Maintenance and operation.** Proper maintenance and operation can improve fuel efficiency. Training employees to properly inspect vehicles before use, drive efficiently, and identify maintenance issues can help prevent fuel waste.

- **Right-sizing vehicles.** Agencies may want to examine what each vehicle in their fleet is used for and ensure that vehicles are sized appropriately. For example, using light-duty trucks instead of heavy-duty trucks can often meet the needs of the user while reducing the amount of fuel consumed.
- **Vehicle technologies.** Tow plows and wing plows are two examples of modifications of snow plow equipment that can contribute to overall fuel efficiency by using a single vehicle to do more work without requiring significantly more fuel. Installing GPS in vehicles has also been shown to reduce the miles actually travelled by vehicle operators.
- **Employee training.** Appropriate training of staff that operate equipment and vehicles can significantly improve adherence with planned reduction actions and the commitment to help achieve the set goals.

One of the following scores applies:

- **0 points.** No plan is created.
- **2 points.** A plan is developed for either light-duty fleet or for heavy-duty and off-road equipment.
- **4 points.** A plan is developed for both light-duty fleet and for heavy-duty and off-road equipment.

### **3 points. Test Alternative Fuels and Reduction Methods**

The agency is actively testing the use of alternative fuels or reduction methods in order to analyze the feasibility for incorporation in the agency's light-duty fleet or heavy-duty or off-road equipment use.

### **2 points. Measure Progress and Monitor Performance**

Have a fleet tracking program, spreadsheet, or other document that monitors vehicle use and fuel consumption. This could likely be integrated into an existing vehicle usage or maintenance database. Use this tool to identify where the greatest improvements can be made and to monitor progress once improvements are implemented. This applied to Fuel Reduction Plans described above and/or Testing of Alternative Fuels and Reduction Methods as noted above.

In addition to measuring fuel consumption, other measures may help the organization analyze where fuel consumption is reduced. Examples include measuring vehicle miles traveled or carbon footprint reduction (which would measure emissions reductions as well as fuel reductions).

### **2 points. Demonstrate Sustainable Outcomes**

Use the fleet tracking system that was set up to measure performance and track progress toward these goals for at least one year. Show that progress has been made toward the stated goals.

## **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Fleet management plan to reduce fossil fuel usage.
2. Copy of fleet performance tracking tool with list of current fleet vehicles and fuel usage.
3. Goal statement and documentation of progress toward goals for at least the first year.

# OM-4: Reuse and Recycle

1-15 points

**Goal:** Create and pursue a formal recycling and reuse plan for agency operated facilities and maintenance activities.

## Sustainability Linkage

Reducing, reusing, and recycling materials supports the environmental and economic principles of the triple bottom line by reducing the consumption of raw materials, reducing landfill waste, and encouraging cost savings.



## Scoring Requirements

### Background

“Operation and maintenance material” waste for roadway maintenance and operations included in this criterion includes both office waste and construction and maintenance waste. Office waste includes, but is not limited to, paper products (e.g., packaging materials, copier paper, paper products, cardboard, and pallets), glass, trash, or compostables (including recyclable materials generated from office facilities). Construction and maintenance waste includes, but is not limited to, pavement waste from pothole/roadways repairs, metals (e.g., guidrails, pipes, luminaires, signs, aluminum, and various other metals), excess topsoil or removed vegetation, hazardous materials and liquids, or wood.

For the purposes of this criterion, “Recycle” is defined as recovering a portion of a used product or material from the waste stream for reprocessing and/or repurposing, and “Reuse” is defined as a continued use or repurposing of existing materials without reprocessing. Materials do not need to be reused or repurposed within the same project limits.

The Construction Materials Recycling Association (CMRA) provides links to a variety of localities that offer construction and demolition waste recycling services. The list can be accessed at <http://www.cmra.org>.

### Scoring

#### 4 points. Set Recycle and Reuse Goals

Set goals for operation and maintenance material reuse and recycling. These goals do not need to be included in a formal Recycle and Reuse plan.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Goals are set for either office waste or construction and maintenance waste.
- **4 points.** Goals are set for both office waste and construction and maintenance waste.

#### 4 points. Develop a Recycle and Reuse Plan

Develop a documented plan (could be multiple documents) that outlines how the recycle and reuse goals set above will be accomplished. The plan should describe the agency’s proposed recycling and reuse measures at agency-owned and operated facilities, including rest areas, maintenance & operations facilities, and other agency-operated administration facilities.

Some potential recycle and reuse measures include, but are not limited to:

- Keep accurate records and retain all waste handling invoices and receipts.
- Locate recycling receptacles in all facilities and offices to encourage waste reduction of basic materials and small items.
- Clearly label receptacles and recycling locations. Large color photos of what is recyclable and what is not are often very helpful, especially, for multi-lingual work environments.
- Provide waste receptacles that are smaller than the recycling receptacles to provide a visual or behavioral cue indicating that the trash is supposed to be limited and there are ample recycling alternatives.
- Provide training to workers to educate them on recycling and reuse and the specifics of the efforts being made to reduce waste.
- Create an incentive or recognition plan for workers to engage actively in recycling efforts of personal trash that rewards positive and successful behavior.
- Hire an experienced waste transport company to manage site waste and monitor waste streams for unacceptable materials.
- Provide handling and storage areas for construction and operations materials to be recycled and reused to provide a visual and behavioral cue indicating that trash is supposed to be limited and there are ample recycling alternatives.
- Identify local facilities that accept recyclables or salvaged materials. This is important in designating types of waste to separate and in making arrangements for drop-off or delivery of materials.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** A plan is developed for either administration (office waste) or maintenance and operations (construction and maintenance waste) facilities.
- **4 points.** A plan is developed for both administration (office waste) and maintenance and operations (construction and maintenance waste) facilities.

#### **4 points. Measure Progress and Monitor Performance**

Track the agency waste streams and report the amount of waste produced and the amount of material reused and recycled.

One of the following scores applies:

- **0 points.** No goals are set.
- **2 points.** Waste streams are tracked for either administration (office waste) or maintenance and operations (construction and maintenance waste) facilities.
- **4 points.** Waste streams are tracked for both administration (office waste) and maintenance and operations (construction and maintenance waste) facilities.

#### **3 points. Demonstrate Sustainable Outcomes**

Track the progress toward these goals with the performance measurement system for at least one year. Monitor the percentages of materials that go to waste, reuse, or recycling and show advancement toward the stated goals.

## Scoring Sources

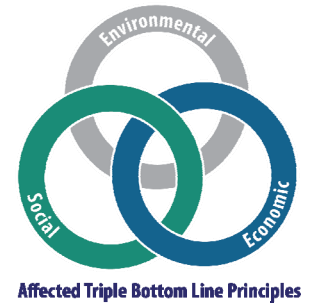
The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Recycling and Reuse Plan with description of strategies to be used to reduce waste.
2. Recycling and Reuse goals.
3. Agency waste stream report and goal tracking for at least the first year.

# OM-5: Safety Management

1-15 points

**Goal:** Maximize the safety of the existing roadway network through a systematic and comprehensive review of safety data and the allocation of resources in planning and programming to support safety in operations and maintenance.



## Sustainability Linkage

Reducing fatal and serious injuries contributes to the social and economic principles by reducing the impacts associated with personal and public property damage, injury, and loss of life.

## Scoring Requirements

### 4 points. Assess Current Safety Performance

Assess the current safety performance of the state or region, identify prevailing trends in fatal and serious injuries based on a variety of metrics, and identify safety performance metrics most appropriate to assess progress in improvement of the safety performance of the state or region.

Prevailing trends reflect the characteristics of the safety performance of the state or region that would most benefit from improvement, that measure performance of the system for vulnerable user groups, and that reflect the reliability of the system (for example, as it relates to incidents and crashes on major through routes). Once the agency identified a set of safety performance metrics that define safety performance for the region (measures that reflect areas associated with the largest amount of fatal and serious injuries and those associated with vulnerable users and system reliability), the agency quantifies the current or base safety performance of the system.

Safety performance metrics typically account for fatal and serious injuries related to, for example, collision types, user groups involved, behavioral characteristics, vehicle types involved, or other crash-related circumstances. Safety performance metrics may also account for, for example, particular fatal and serious crash characteristics showing increasing trends.

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Evaluate Safety Performance of the State or Region
- **2 points.** Identify Safety Performance Metrics for the Reduction of Fatal and Serious Injuries in the State or Region

### 2 points. Evaluate Safety Performance of the State or Region

#### For state agencies:

One of the following scores applies:

- **0 points.** Quantify the safety performance of the state in terms of a rate or solely with the use of one metric: the overall number of fatalities or fatal and serious injuries in the state.
- **2 points.** Identify safety performance measures for the state and evaluate the safety performance of the state through a quantitative evaluation of the safety performance of the state in terms of:

- The number of fatal and serious injuries across collision types, and user groups; and where particular user behaviors are present that would increase the risk of fatal and serious injury crashes (for example, unbelted vehicle occupants), and
- Fatal and serious crash characteristics that reflect the status of safety culture among road users (for example, drinking and driving).

In most cases, such quantitative assessments are included as part of the development of the SHSP (refer to the *FHWA Strategic Highway Safety Plans: A Champion's Guide to Saving Lives* (<http://safety.fhwa.dot.gov/safetealu/guides/guideshsp040506/guideshsp040506.pdf>); and other SHSP-related resources) and those reflecting safety culture.

**For regional agencies (metropolitan, county, local):**

One of the following scores applies:

- **0 points.** Quantify the safety performance of the region in terms of a rate or solely with the use of the overall number of fatalities or fatal and serious injuries in the region.
- **2 points.** Perform a safety performance evaluation:
  - Evaluate the safety performance of the region across the emphasis areas in the SHSP.
  - Evaluate regional safety performance related databases (crash, roadway, and other databases mentioned in the *FHWA Strategic Highway Safety Plans: A Champion's Guide to Saving Lives* guide) to identify any additional emphasis areas that may be unique to the region or different from state priorities. These additional emphasis areas reflect regional differences in the nature of these crashes, road network characteristics, and community priorities.

The product of this activity is a list of emphasis areas along with the number of fatal and serious injuries associated with each emphasis area where feasible. The list of emphasis areas would also include those for which the number of associated fatal and serious injuries would be difficult to quantify; for example, EMS, data and analysis, and workforce development.

**2 points. Identify Safety Performance Metrics for the Reduction of Fatal and Serious Injuries in the State or Region**

One of the following scores applies:

- **0 points.** Use the rate or total number of fatal and serious injuries as the sole safety performance metric for the state or region.
- **2 points.** Identify safety performance metrics for each of the emphasis areas identified during the evaluation of the safety performance of the state or region:
  - For emphasis areas related to particular collision types or users, each of the metrics measures the change in the number of fatal and serious injuries for the particular collision type or user group.
  - For user behavior-related metrics the associated metrics reflect the change in the number of fatal and serious injuries in crashes where these behaviors are present; and the change in the portion of overall fatal and serious injuries where the behavior is reported. For example, if an emphasis area is identified as: *Reduce the fatal and serious injuries involving drinking and driving*, then the metrics include at least the following: (a) the number of fatal and serious injuries sustained in crashes where one or more drivers were drinking and driving; and (b) the portion of drivers that were drinking in driving in fatal and serious injury crashes.

- For emphasis areas that cannot be readily measured in terms of fatal and serious injuries, metrics would identify improvement in these areas based on other criteria. For example, for EMS, the metrics may include the number of drivers that die on the scene and the number of drivers that die on their way to a hospital or trauma center.

NOTE: Regional (metropolitan, county, local) agencies. Evaluate the incidence of fatal and serious injury crashes in the jurisdiction and identify emphasis areas based on the evaluation. For a metropolitan area, not all the emphasis areas in the SHSP may be applicable due to the urban nature of the area, and for rural counties, some of the more urban emphasis areas may not be relevant.

### **3 points. Set Goals and Targets**

Set goals and targets for each of the safety performance metrics identified for the reduction in fatal and serious injuries.

One of the following scores applies:

- **0 points.** Set no safety performance goals, or performance goals are expressed solely as a rate (for example, crash rate, fatal and serious injury crash rate).
- **1 point.** Set safety performance goals that can be readily achieved under current program and agency activity priorities.
- **2 points.** Set long-term goals and intermediate targets for improvements in the safety performance metrics in addition to the State’s fatality reduction goal (which is set under an agreement reached between NHTSA and GHSA). Goals and targets set by the agency should reflect meaningful reductions on an ongoing basis; acceleration in reductions that would require a concerted effort to achieve. These goals should measure the numeric change in fatalities and serious injuries across emphasis areas, and the incidence of behaviors that increases the risk of fatal and serious injury crashes.

For example, for the emphasis area “Reduce drinking and driving,” the safety performance metrics would include: (a) change in the outcome of crashes where one or more drivers were drinking (change in the number of fatal and serious injuries sustained in crashes where one or more drivers were drinking); and b) change in the portion of fatal and serious injury crashes where one or more drivers were drinking. In other words, the metrics should direct, for example, changes in user behavior in addition to overall reductions within an emphasis area.

#### **For state agencies:**

Safety performance metrics should be consistent with the emphasis areas in the state SHSP.

#### **For regional agencies (metropolitan, county, local):**

Set safety performance metrics for each of the emphasis areas identified during the evaluation process described earlier, and where applicable, metrics in the SHSP that also reflects prevailing trends in the region.

- **Additional 1 point.** Integrate these goals to make resource decisions for maintenance, repair, and operations activity.

### **2 points. Develop a Plan**

Develop a plan to support the reduction in fatal and serious injuries in the state or region.

One of the following scores applies:

- **0 points.** No plan exists, or the plan does not (a) incorporate all the emphasis areas; (b) identify strategies and lead agencies; and (c) present a system-wide approach to identify expenditure on programs, projects, and activities targeting a reduction in fatal and serious injuries in the region.

- **1 point.** Develop a statewide or regional safety plan as part of a collaborative effort across all levels of government (federal, state, and local level). The plan:
  - Presents a system-wide approach to reduce the risk of fatal and serious injuries that rely on systematic and scientific methods and approaches that (i) account for regression-to-the mean; (ii) are aimed at reducing the overall severity of crashes rather than the frequency of crashes; and (iii) incorporate performance thresholds (base performance).
  - Includes specific strategies and lead agencies for each the emphasis areas in the plan.
  - Supports integrated and multidisciplinary approaches to reduce the number of fatal and serious injuries on the entire public highway system.
  - Demonstrates a commitment to prioritize safety improvements through their programming decisions for safety projects and the use of safety funding.

The plan could be a single statewide plan or a combination of SOPs at headquarters and district/regional levels; or a plan for a county, metropolitan area, or regional council area.

- **Additional 1 point.** Include, as part of the plan, specific strategies and activities to support improvement of data and analysis capabilities across the public highway system. For example, improvement of the quality and accuracy of crash location information within a geographic framework (GIS), improved traffic record systems, improved analysis tools, linkage across databases (for example, medical, asset management, incident management). These activities should be part of the larger state traffic records program coordinated and supported by the state Traffic Records Coordinating Committee (TRCC). The benefits of such a process include, but are not limited to: improved data quality, improved safety performance metrics, improved reliability of analysis results, improved the ability to identify appropriate emphasis area needs, improved implementation by targeting funding where it is needed most, improved reliability of economic evaluations, and improved ability to evaluate and monitor the safety performance of the public highway system.

### **3 points. Implement the Plan**

#### **For state agencies:**

One of the following scores applies:

- **0 points.** No plan exists, or implementation of projects, activities, and programs occur within agencies without integration or collaboration across state and regional agencies in support of the common goal to reduce fatal and serious injuries on the public highway system.
- **3 points.** Implement the plan in an integrated and multidisciplinary manner. Implementation needs to incorporate proactive and reactive approaches to fatal and serious injury reduction:
  - Programming and implementation of projects, activities, and programs reflects priorities of the plan.
  - Implementation of strategies within the plan occurs in an integrated, coordinated, and multidisciplinary way, involving different technical areas (planning and engineering), other disciplines such as EMS and public health.
  - Specified implementation actions require the involvement of different state, federal, and local agencies across multiple disciplines.
  - Implementation includes strategies that are proactive as well as reactive.
  - Implementation reflects an approach that incorporates consideration of the reduction of the risk that a crash occurs, reduction of the risk of fatal and serious injury during the crash, and reduction of the crash outcome. For example, drinking and driving increases the risk of a crash occurring; installation of cable



median barrier reduces the risk of fatal and serious injury during a crash; and short response times by qualified and skilled EMS improves the likelihood that injured victims will survive the crash.

- Consider implementation of systemic approaches to reduce fatal and serious injury risk on the public highway system.

**For regional planning agencies (metropolitan, county, local):**

One of the following scores applies:

- **0 points.** No plan exists, or implementation of projects, activities, and programs occur within agencies without integration or collaboration across state and regional agencies in support of the common goal to reduce fatal and serious injuries on the public highway system.
- **1 point.** Implement the plan in close cooperation with local agencies. Facilitate and support allocation of funding that reflects the priorities of the plan to the extent possible.
- **2 points.** Adopt PlanSafe or its equivalent as an integral part of the agency's technical process for conducting transportation planning.

PlanSafe is an advanced quantitative tool that uses macro-level predictive models to assess the impact of long-range planning (20-year horizon) on safety performance. The results provide a quantitative and statistically reliable forecast of crashes for a given future travel demand (using output from travel demand models) and socio-demographics if no particular improvements in safety culture, infrastructure, EMS, and other areas occur other than what exists at the base year of the analysis. Future forecast assists in identifying actual improvements in safety performance needed over longer period (20 years) to meet long-term safety performance goals.

**3 points. Measure Progress and Monitor Performance**

One of the following scores applies:

- **0 points.** Measure progress and change in the system safety performance solely based on the overall crash rate, crash rates for typical facilities, the rate of fatal and serious injuries, or the total number of fatal and serious injuries.
- **1 point.** Measure progress using some of the safety performance metrics previously identified. The evaluation is limited to an overall summary of the number of fatal and serious injuries across the state or region.
- **3 points.** Measure the performance of the public highway system in the region with the identified safety performance metrics.

The 3 points represent a combination of the following points:

- **2 points.** Use advanced and statistically sound methods to perform evaluations of the safety performance of the system. Advanced methods set a baseline for performance without change brought about by the plan, accounts for the unique nature of crash data, and account for volume and socio-demographic changes. Agencies can use tools such as PlanSafe to estimate anticipated performance of the system without intervention and compare results with actual performance with implementation.
- **1 point.** Incorporate project and program evaluations into the monitoring process. Use statistically sound evaluation approaches. Statistically sound approaches accounts for crash data as count data that are heavily skewed. Agencies can use the advanced evaluation methods in Chapter 9 of the Highway Safety Manual (HSM) for project and program evaluation (these advanced methods account for regression to the mean (RTM) effects that are common to safety studies and applications). While treatments at sites require monitoring over the first year to identify any unintended effects, it is necessary to extend the evaluation period to a three to five year before and after period to support statistically valid evaluation.

## Scoring Sources

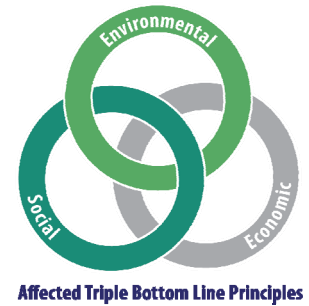
The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. The agency's plan for safety improvements.
2. The state SHSP, Highway Safety Plans, and Annual Report submitted annually for the Highway Safety Program for NHTSA.
3. Annual review of safety performance of the system, data, trends, 3- or 5-year averages.
4. Annually collected documentation that measures safety performance of the road network, including fatalities and serious injuries for all facilities within their jurisdiction. The report would outline changes in aggregate safety performance across the safety performance metrics, identify the actions taken through projects, activities and programs to reduce the fatal and serious injury crashes, and results from evaluations of the safety performance of implemented projects, activities, and programs.
5. Maintenance project reports, technical memos, or other supporting documentation that demonstrate application of evaluation methods such as those described in the Highway Safety Manual (HSM); and report on the existing system safety performance (frequency, crash type, severity) and comparisons with appropriate benchmarks.
6. Memoranda or calculations documenting the effectiveness over the life of the solution, treatment, or countermeasure in reducing crashes. Using processes outlined in the AASHTO HSM determine the benefit-cost ratio (reduction in total crash cost anticipated for the project investment), or net present value (difference between the anticipated reduction in total crash cost and the project investment) for the project.
7. Research report that documents a post-implementation effectiveness evaluation of projects. Such a report shall include collection of actual crash data before and after implementation, and shall follow the Empirical Bayes process or advanced methods that account for RTM where feasible. Feasible refers to the availability to perform the evaluation using predictive methods; for example, availability of calibrated HSM SPFs or state-specific SPFs available for appropriate application of the EB method.
8. A report that documents system safety performance evaluation and performance across various performance measures identified as part of the state or regional safety plan.
9. A capital improvement program description that documents how the agency specifically prioritizes ongoing safety improvements through allocation of funds to safety-based programs. For example, documentation of the projects funded in safety-based programs and their relative anticipated impact on fatal and serious injury crashes.

# OM-6: Environmental Commitments Tracking System

1-15 points

**Goal:** Ensure that environmental commitments made during project development related to operations and maintenance are documented, tracked, and fulfilled.



## Sustainability Linkage

Tracking commitments supports the environmental and social principles by ensuring that adherence to commitments made to stakeholders and the environment are consistently met throughout project development.

## Scoring Requirements

### 2 points. Develop a Comprehensive Environmental Compliance Tracking System

Develop and use a comprehensive environmental compliance tracking system (ECTS) that ensures that commitments made during project development are tracked, fulfilled, and verified throughout operations & maintenance activities. In this case, a system could include a wide range of solutions from project worksheets to detailed databases. Points are achieved by incorporating the following elements:

The ECTS should include all regulatory and non-regulatory commitments that apply to the development work and additional properties, including: stormwater management facilities, wetland restoration areas, stream restoration areas, reforestation areas, sound walls, wildlife crossing structures, surveys, borings, batch plants, staging, equipment storage, employee parking, and field offices; and land that is purchased, leased, occupied, or used for the work.

### 5 points. Integrate Key Functions of an ECTS

At a minimum, the ECTS should identify commitments in a single list, identify environmental compliance manager(s), and be updated and maintained as projects are constructed and throughout any monitoring period. Points are assigned for integration of the following functions:

- **1 point.** Ensure that environmental commitments are communicated from project development (including project planning, design, and construction) to operations & maintenance.
- **1 point.** Leverage tracking mechanisms (such as databases, forms, or lists).
- **1 point.** Identify periodic training needed for necessary maintenance and operations staff.
- **1 point.** Provide periodic reports verifying the commitments have been fulfilled.
- **1 point.** Establish quantifiable performance metrics for the environmental commitment tracking system. These can either be assigned to individual roadways and bridges or the aggregated network.

### 2 points. Require Use of ECTS

The agency has official policies and procedures in place that require use of the ECTS by project development, construction, and maintenance and operations staff.

### 2 points. GIS-based ECTS

The agency has an ECTS that is geographic information system (GIS)-based and on a platform consistent with the agency's planning, asset management, and maintenance systems, if applicable.

#### 4 points. Measure Progress and Monitor Performance

Use established quantifiable performance metrics for the environmental commitment tracking system (assigned to individual roadways and bridges or the aggregated network) to evaluate the overall performance of the environmental commitment tracking program. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points:** Set goals for compliance with environmental commitments and set a time frame in which these goals should be achieved.
- **Additional 2 points:** Use the environmental commitment tracking system that was set up to measure performance and track progress toward these goals for at least one year. Show that progress has been made toward the stated goals.

#### Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Copies of the databases, forms, lists, and hold points used for environmental commitment tracking.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

# OM-7: Pavement Management System

1-15 points

**Goal:** Leverage a pavement management system to balance activities that extend the life and function of pavements with impacts to the human and natural environment.

## Sustainability Linkage

Maintaining and using a pavement management system supports the environmental and economic principles by optimizing the management of pavements, including preservation, restoration, and replacement, to maximize their lifetime. This reduces costs, the environmental impacts of construction, and raw material usage.



## Scoring Requirements

Agencies can earn points according to the following. Unless noted otherwise, each of the scoring options are independent and cumulative, and can be achieved without prerequisites.

### 1 point. Develop a Pavement Management System and Collect Data

The agency has a Pavement Management System (PMS). An effective PMS is a systematic process that provides information for use in implementing cost-effective pavement reconstruction, rehabilitation, and preventative maintenance programs, and results in pavements designed to accommodate current and forecasted traffic in a safe, durable, and cost-effective manner. The PMS should be based on the “AASHTO Guidelines for Pavement Management Systems” and should include:

- An inventory;
- A condition assessment;
- Determination of needs;
- Prioritization of projects needing maintenance and rehabilitation;
- A method to determine the impact of funding decisions; and
- A feedback process.

Note, the first three functions are requirements of GASB 34. This information must be stored in a retrievable format and made available to the agency’s PMS user.

One of the following scores applies:

- **0 points.** The agency does not have a PMS that includes all six functions shown above.
- **1 point.** The agency has a PMS that includes at all six of the functions noted above and collects system-wide data.

### 3 points. Track Pavement Network Performance

Points are assigned for tracking pavement network performance, including the following features:

- **1 point.** Overall network condition using common metrics. At least one of the following common metrics should be used as a minimum: roughness (any commonly accepted measure is acceptable), cracking (or structural condition), rutting and faulting (for concrete pavements). The network condition should also state or show the fraction of the overall network the agency categorizes as “acceptable” and “deficient.” The

specific definitions of these terms are left to the agency but they must be clearly identified in the PMS documentation.

- **2 points.** Project timeliness. Have measures related to project timeliness of rehabilitation, preservation, and maintenance activities. For example, an agency may identify projects and activities to be completed within 3 years that they can later assess to evaluate the timeliness of their actual implementation.

#### **2 points. Set Goals and Monitor Progress**

Set pavement system performance goals and monitor progress toward goals.

One of the following scores applies:

- **0 points.** Do not set quantifiable goals relating to both condition and timeliness as noted above; or set quantifiable goals relating to both condition and timeliness but do not monitor, or have not monitored progress towards goals for at least one year after goal establishment.
- **2 points:** Set quantifiable goals relating to both condition and project timeliness as noted above, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.

#### **7 points. Leverage Data to Demonstrate Sustainable Outcomes**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Prioritize projects based on system modeling, scenario analyses, trade-off analyses, and system optimization rather than a “worst-first” approach.
- **2 points.** Leverage life-cycle cost analysis (LCCA) techniques to predict costs and to perform short- and long-term budget forecasting.
- **1 point.** Include routine pavement preservation needs in the annual UPWP or STIP/TIP that are based on the condition and timeliness goals set above.
- **2 points.** Leverage PMS to link pavement repair, preservation, and maintenance projects to adjacent capital projects.

#### **2 points. Sustainable Specifications**

In addition to having and using a PMS, consider sustainable pavement solutions, including warm mix asphalt, long life pavement, recycled asphalt pavement, and others.

One of the following scores applies:

- **0 points.** The agency is testing sustainable pavement solutions.
- **1 point.** The agency has special provisions specific to at least one sustainable pavement solution that allow the use of this solution.
- **2 points.** The agency has standard specifications and/or special provisions specific to at least one sustainable pavement solution and requires the consideration of sustainable pavements as a first solution.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a PMS.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of PMS goals including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.
5. Standard specifications or special provisions.

# OM-8: Bridge Management System

1-15 points

**Goal:** Leverage a bridge management system (BMS) to balance activities that extend the life and function of bridges with impacts to the human and natural environment.

## Sustainability Linkage

Maintaining and using a bridge management system supports the environmental and economic principles by optimizing the management of bridge structures, including preservation, restoration, and replacement, to maximize their lifetimes. This reduces costs, the environmental impacts of construction, and raw material usage.



## Scoring Requirements

Bridge preservation is defined as actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition, and extend their life. Preservation actions may be preventive or condition-driven.

Agencies can earn points according to the following. Unless noted otherwise, each of the scoring options are independent and cumulative, and can be achieved without prerequisites.

### 2 points. Develop a Bridge Management System and Collect Data

An effective BMS for bridges on and off Federal-aid highways that should be based on the “AASHTO Guidelines for Bridge Management Systems” and that supplies analyses and summaries of data, uses mathematical models to make forecasts and recommendations, and provides the means by which alternative policies and programs may be efficiently considered. An effective BMS should include, as a minimum, formal procedures for:

- Collecting, processing, and updating data;
- Predicting deterioration;
- Identifying alternative actions;
- Predicting costs;
- Determining optimal policies;
- Performing short- and long-term budget forecasting; and
- Recommending programs and schedules for implementation within policy and budget constraints.

One of the following scores applies:

- **0 points.** The agency does not have a BMS or has a BMS but does not collect data.
- **1 point.** The agency has a BMS that includes at least five of the seven procedures noted above and collects system-wide data.
- **2 points.** The agency has a BMS that includes at all seven of the procedures noted above and collects system-wide data.

### 4 points. Track Bridge Network Performance

Points are assigned for tracking bridge network performance, including the following features:

- **1 point.** Overall bridge network condition using common metrics. Create a database of structural health for each bridge managed by the agency. Rate the superstructure, substructure, and deck of each bridge on the ten-point scale defined for reporting to the National Bridge Inventory, or gather more quantified data using an element level inspection approach.
- **1 point.** Operational limits. Report any bridges that are in service with posted weight limits or have functional limitations.
- **2 points.** Project timeliness. Have measures related to project timeliness of rehabilitation, preservation, and maintenance activities. For example, an agency may identify projects and activities to be completed within 3 years that they can later assess to evaluate the timeliness of their actual implementation.

## **2 points. Set Goals and Monitor Progress**

Set bridge system performance goals and monitor progress toward goals.

One of the following scores applies:

- **0 points.** Set quantifiable goals relating to less than two of the three metrics listed above for agency bridges; or set quantifiable goals relating to at least two of the three metrics listed above for agency bridges but do not monitor or have not monitored progress towards goals for at least one year after goal establishment.
- **1 point:** Set quantifiable goals relating to at least two of the three metrics listed above for agency bridges, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.
- **2 points.** Set quantifiable goals relating to all three of the metrics listed above for agency bridges, including when these goals are to be achieved, and monitor progress towards goals for at least one year after goal establishment.

## **7 points. Leverage Data to Demonstrate Sustainable Outcomes**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** Use BMS to perform sophisticated modeling, including forecasting, scenario analyses, trade-off analyses, and system optimization.
- **2 points.** Leverage life-cycle cost analysis (LCCA) techniques to predict costs and to perform short- and long-term budget forecasting.
- **1 point.** Include routine bridge preservation needs in the annual UPWP or STIP/TIP that are based on the condition and timeliness goals set above.
- **2 points.** Leverage BMS to link bridge repair, preservation, and maintenance projects to adjacent capital projects.

## **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a BMS.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of BMS goals including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.
5. Standard specifications or special provisions.



# OM-9: Maintenance Management System

1-15 points

**Goal:** Leverage a Maintenance Management System (MMS) to inventory, assess, analyze, plan, program, implement, and monitor maintenance activities to effectively and efficiently extend the life of the system, improve the service, and reduce the impacts to the human and natural environment.



Affected Triple Bottom Line Principles

## Sustainability Linkage

Utilizing an MMS supports all of the triple bottom line principles by facilitating efficient and cost-effective decision-making, better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental impacts of construction and raw material use.

## Scoring Requirements

### Background

An MMS is a computerized database that is designed to integrate an agency's asset management and maintenance management systems in order to optimize the management of maintenance. The MMS provides managers with processes, tools, and data necessary to make decisions in order to help maintenance staff do their jobs more effectively and to help management make informed decisions.

This criterion is largely based on AASHTO's "Guidelines for Maintenance Management Systems" (GMMS). The following definitions from the GMMS apply:

- "Maintenance Management" – refers to all of the actions that managers undertake in their daily responsibilities of overseeing the maintenance program.
- "Maintenance Management System" – the set of tools, technologies, and processes that help the manager make better decisions and manage more effectively.

### Scoring

#### 2 points. Integrate Key Elements of MMS

The agency has an MMS that includes, at a minimum, modules for:

- Planning, including asset inventory, maintenance activity guidelines, customer input, performance targets, and condition assessment.
- Programming and Budgeting, including performance-based budget analysis, annual work program, and annual budget.
- Resource Management, including resource needs analysis, staffing allocations, equipment management, and private contracting.
- Scheduling, including work needs identification, customer service program, and short-term work scheduling.
- Monitoring and Evaluation, including performance measures, work reporting, and management analysis.
- Maintenance Support and Administration, including permit processing and tracking, Adopt-a-Highway program, risk management, and stockpile management.

One of the following scores applies:

- **0 points.** The agency does not have an MMS or has an MMS that has less than three of the modules listed above.
- **1 point.** The agency has an MMS that has three or four of the modules listed above.
- **2 points.** The agency has an MMS that has five or six of the modules listed above.

### **2 points. Integrate Vehicle-Based Technology**

Leverage vehicle-based technologies to connect to MMS and provide input information, such as end of shift reports. Also leverage MMS outputs to vehicles to assist with efficient and effective maintenance operations.

### **5 points. Integrated Maintenance Management System**

The agency has an MMS that integrates, at a minimum, a Pavement Management System (see OM-7), a Bridge Management System (see OM-8), Highway Infrastructure Preservation and Maintenance (see OM-10), and a Traffic Control Infrastructure Maintenance System (see OM-11). Points will be assigned for integration of the following features (see GMMS for more definition):

- **1 point.** Roadway Inventory Systems
- **1 point.** Financial Management Systems
- **1 point.** Construction/Project Management Systems
- **1 point.** Equipment Management Systems
- **1 point.** Environmental Commitment Tracking System (see OM-02)

### **3 points. Leverage MMS to Define Projects**

The MMS ties into the agency's PMS and BMS and exchanges information. That information is used to link pavement/bridge repair, preservation, and maintenance projects to adjacent maintenance needs (e.g., updating traffic safety devices and signage within the same project limits).

### **3 points. Maintenance Quality Assurance**

Maintenance Quality Assurance (MQA) is a process that uses quantitative quality indicators to assess the performance of maintenance programs. These programs are outcome-based and provide statistically valid, reliable, and repeatable measures of asset conditions. Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** The agency has a MQA program that relates highway maintenance to highway performance.
- **Additional 1 point.** The MQA program is being used to help managers to understand maintenance conditions, set priorities, and document the relationship between costs and outcomes.

## **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Existence and use of a MMS.
2. Documentation of features and elements of the MMS.
3. Documentation of MQA processes and procedures.

# OM-10: Highway Infrastructure Preservation and Maintenance

1-15 points

**Goal:** Make paved roadway surfaces, bridges, tunnels, roadsides, and their appurtenance facilities last longer and perform better by undertaking preservation and routine maintenance on them.



## Sustainability Linkage

Infrastructure preservation and maintenance activities support all of the triple bottom line principles by better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental.

## Scoring Requirements

Preservation and maintenance activities for pavements, bridges, and their appurtenant facilities should be generated from a Pavement Management System (OM-7) and a Bridge Management System (OM-8), in conjunction with a Maintenance Management System (OM-9), if these systems exist within an organization.

The organization and operation of preservation and maintenance functions within different agencies are unique. As a result, the Road Maintenance Plan (RMP) discussed in this criterion and the Traffic Control Maintenance Plan discussed in OM-08 may actually be multiple documents that cover different assets, functions, or geographies. For the purposes of this tool, the user should score the RMP, including all relevant documents necessary to cover the assets and functions discussed in each criterion.

### 4 points. Develop a Road Maintenance Plan

Develop and implement an RMP that covers highway infrastructure systems and includes the four core assets listed below and their appurtenant facilities. The RMP refers to document(s) that address, at a minimum, responsible parties/organizations, inventory of assets, standards, schedule, methods/standard operating procedure (SOP) to be used, and funding sources. The RMP should include preservation and maintenance (including repair, cleaning, and litter control) activities for the following infrastructure systems.

#### **Core assets that must be included:**

- Pavements
- Bridges
- Tunnels
- Stormwater system
- Appurtenant facilities

#### **Additional assets that may be included:**

- Shoulder/sidewalks
- Slopes, rock-fall, and slope protection
- Vegetation
- Appurtenant facilities

One of the following scores applies:

- **0 points.** The agency does not have an RMP that covers the four core systems listed above.
- **1 point.** The agency has an RMP consisting of multiple documents that covers the core assets only.
- **2 points.** The agency has an RMP consisting of multiple documents that covers the core assets and at least two additional assets noted above, or the agency has a consolidated RMP that covers the core assets only.
- **3 points.** The agency has an RMP consisting of multiple documents that covers the core assets and all of the additional assets noted above, or the agency has a consolidated RMP that covers the core assets and at least two of the additional assets noted above.
- **4 points.** The agency has a consolidated RMP that covers the core assets and all of the additional assets noted above.

#### **4 points. Establish Metrics and Measure Performance**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** Establish quantifiable performance metrics for the RMP. Separate metrics may be established for the above categories of infrastructure assets. These can be assigned to individual roadways or the aggregated network. Measures could be based on condition of infrastructure, functionality of drainage systems, effluent water quality, presence of noxious weeds or obstructive vegetation, and other relevant parameters. Measures could be qualitative and/or quantitative.
- **Additional 2 points.** Use these to evaluate the overall performance of the roadside infrastructure maintenance plan/SOP on an annual basis.

#### **3 points. Set Goals and Monitor Progress**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point:** Set quantifiable goals relating to the metrics above for agency infrastructure assets, including when these goals are to be achieved. For example, an agency might set a goal that all drainage structures are to be cleaned annually.
- **Additional 2 points:** Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

#### **4 points. Sustainable Maintenance and Operations**

Scoring for this requirement is based on the following, cumulative elements.

- **2 points.** The RMP specifically mentions sustainability and highlights procedures, specifications, and activities that contribute to sustainability during preservation and maintenance activities. For example, non-idling procedures could be included in standard operating procedures for maintenance crews.
- **2 points.** The RMP specifically mentions sustainability and includes procedures, specifications, or measures that contribute to the sustainability of infrastructure assets. For example, a standard operating procedure could require that drainage grates within pedestrian/bicycling limits and with existing openings parallel to the traveled way be replaced with reticuline grates that will not catch wheelchair or bicycle tires.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of each item that addresses responsible parties, schedule, methods, standard operating procedure (SOP), and funding sources.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Document goals for the maintenance plan, including quantifiable objectives and timeframes. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

# OM-11: Traffic Control Infrastructure Maintenance

1-15 points

**Goal:** Increase safety and operational efficiency by maintaining roadway traffic controls.

## Sustainability Linkage

Infrastructure preservation and maintenance activities supports all of the triple bottom line principles by better leveraging funds, improving system quality and customer satisfaction, and more effectively maintaining assets, which reduces cost and the environmental impacts of construction and raw material use.



## Scoring Requirements

This criterion covers the preservation and maintenance of permanent traffic control, Intelligent transportation system (ITS), and safety devices. Two related criteria include OM-14: Work Zone Traffic Control, which includes temporary traffic control, ITS, and safety devices, and OM-13: Transportation Management and Operations, which covers the operation of permanent traffic control and ITS systems.

Preservation and maintenance activities for traffic control infrastructure should be generated in conjunction with a Maintenance Management System (OM-9), if one exists within an organization.

The organization and operation of preservation and maintenance functions within different agencies are unique. As a result, the Traffic Control Maintenance Plan (TCMP) may actually be multiple documents that cover different assets, functions, or geographies. For the purposes of this tool, the user should score the TCMP including all relevant documents necessary to cover the assets and functions discussed in each criterion.

### 2 points. Develop a Traffic Control Maintenance Plan

The agency shall have and implement a comprehensive TCMP. This plan must address, at a minimum, responsible parties/organizations, standards, schedule, methods to be used, and funding sources for the following items:

- Pavement marking maintenance and repair: Restriping activities;
- Sign maintenance and repair: Reflectivity assessment, sign replacement, signpost repair;
- Safety device (e.g., guardrail, traffic attenuators, delineators, etc.) maintenance and repair;
- Traffic signal maintenance and repair;
- Roadway lighting maintenance and repair: Electrical service, bulb replacement; and
- Intelligent transportation system (ITS) maintenance and repair.

One of the following scores applies:

- **0 points.** The agency does not have a TCMP that covers the items listed above.
- **1 point.** The agency has a TCMP consisting of multiple documents that covers all of the items listed above or the agency has a consolidated TCMP that covers at least four of the six items listed above.
- **2 points.** The agency a consolidated TCMP that covers the all of the items listed above.

#### **4 points. Establish Metrics and Measure Performance**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points.** Establish quantifiable performance metrics for the TCMP. These can be based on evaluation of individual roadways or the aggregated network, and should be based on level-of-service, readability of signage, adequacy of lighting, presence of deficient traffic control devices, timeliness of maintenance activities, and other relevant parameters.
- **Additional 2 points.** Use these to evaluate the overall performance of the TCMP.

#### **3 points. Set Goals and Monitor Progress**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** Set quantifiable goals relating to the metrics above for agency traffic control devices, including when these goals are to be achieved. For example, an agency might set a goal that all painted centerline stripes are to be repainted bi-annually.
- **Additional 2 points.** Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

#### **6 points. Sustainable Maintenance and Operations**

Scoring for this requirement is based on the following, cumulative elements.

- **3 points.** The TCMP specifically mentions sustainability and highlights procedures, specifications, and activities that contribute to sustainability during preservation and maintenance activities. For example, non-idling procedures could be included in standard operating procedures for maintenance crews.
- **3 points.** The TCMP specifically mentions sustainability and includes procedures, specifications, or measures that contribute to the sustainability of infrastructure assets. For example, a standard operating procedure could require that HPS luminaires to be replaced shall be upgraded to more efficient lamps (e.g., LED).

### **Scoring Sources**

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. A list of each item that addresses responsible parties, schedule, methods, and funding sources.
2. If performance is measured, a chart, table, or spreadsheet that summarizes system performance.
3. Documentation of the goals of the maintenance plan, including quantifiable objectives and timeframes.
4. If progress is monitored, a chart, table, or spreadsheet progression towards the above goal over time.

# OM-12: Road Weather Management Program

1-15 points

**Goal:** Plan, implement, and monitor road weather management (including snow and ice control) program to reduce environmental impacts with continued or better level of service.



## Sustainability Linkage

Implementing an effective and efficient road weather management program supports all of the triple bottom line principles by improving safety, increasing mobility, reducing delay and traffic interruptions, increasing productivity of the labor force, and reducing impacts of materials used for management on the human and natural environments.

## Scoring Requirements

Intelligent Transportation Systems (ITS)-related solutions are included in OM-13: Transportation Management and Operations and are not duplicated here.

### 2 points. Develop a Road Weather Management Program

A Road Weather Management Program (RWMP) includes strategies that can be used to mitigate the impacts of rain, snow, ice, fog, high winds, flooding, tornadoes, hurricanes, avalanches, and other inclement weather on traffic. The RWMP will vary in size and scope depending on the needs of the agency. It could be a combination of multiple documents that cover management of different conditions or different regions, or could be a single, consolidated document. For the purposes of evaluating this criterion, the agency should consider all applicable materials and respond according per the majority of their practices.

### 3 points. Set Goals and Monitor Progress

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points:** Establish quantifiable performance metrics for the RWMP program. Measures could be based on level of service, amount of materials used per event, and other relevant parameters. Measures could be qualitative and/or quantitative.
- **Additional 1 point:** Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

### 3 points. Implement a Road Weather Information Systems

Roadway Weather Information Systems (RWIS) are a way to monitor pavement and weather conditions in real-time using sensors to measure atmospheric, pavement, and/or water level conditions. Atmospheric data include air temperature and humidity, visibility distance, wind speed and direction, precipitation type and rate, tornado or waterspout occurrence, lightning, storm cell location and track, as well as air quality. Pavement data include pavement temperature, pavement freezing point, pavement condition (e.g., wet, icy, flooded), pavement chemical concentration, and subsurface conditions (e.g., soil temperature). Water level data include tide levels (e.g., hurricane storm surge) as well as stream, river, and lake levels near roads. This data allows the operator to make the best decisions about how to respond, for example, when to apply chemicals, how much to apply, and what



type of chemical to apply, thereby reducing the amount of salt and chemical applied and increasing its effectiveness.

The agency implements a RWIS which measures the weather and road conditions using sensors on the side of the road to track weather and road conditions to plan and implement the appropriate treatment actions. The RWIS should provide timely information on prevailing and predicted conditions to both transportation managers and motorists (e.g., posting fog warnings on Changeable Message Signs and listing flooded routes on web sites).

One of the following scores applies:

- **0 points.** The agency does not have an RWIS.
- **1 point.** The agency is testing an RWIS in only a few locations.
- **2 points.** The agency implements a RWIS in select areas identified, but has not implemented a system agency-wide.
- **3 points.** The agency implements a RWIS agency-wide in most or all areas identified vulnerable to weather conditions (e.g., mountain passes, high wind areas, bridges, etc.)

### **2 points. Implement the Standards of Practice or Standard Operating Procedure (SOP) for Snow and Ice Control**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **1 point.** Have an RWMP that includes, at a minimum, the following elements specific to snow and ice control:
  - Reducing salt use in environmentally sensitive areas
  - Existence of an anti-icing program
  - Conducting periodical training program for proper use of salt and chemicals
  - Best Management Practice (BMP) for chemical storage facilities
  - Proper storage of chemical and chemical-abrasive stockpiles
  - Proper calibration of equipment
  - Reducing cost and improving fuel efficiency by planning and optimizing routes
- **Additional 1 point.** The agency's program includes performance standards that take into account sustainability, and demonstrate a reduction in materials and truck fuel usage.

### **2 points. Implement Materials Management Plan**

Successful implementation of a Materials Management Plan to monitor quantities of salt applied and level of service (e.g., interstates bare and dry 1 hour after event) during and after an event; includes salt, chemicals (de-icing agents), sand, etc.

### **3 points. Implement a Maintenance Decision Support System**

Develop a Maintenance Decision Support System (MDSS) to improve the effectiveness and efficiency of roadway weather treatments and implement best practices. The MDSS can be based on weather report monitoring or based on RWIS sensing technologies installed roadside or mounted on maintenance vehicles to measure and monitor the road conditions.

One of the following scores applies:

- **0 points.** The agency does not have an MDSS.
- **1 point.** The agency has MDSS processes that are not based on roadside or vehicle mounted sensing technologies.
- **2 points.** The agency has MDSS processes that are based on either roadside or vehicle mounted sensing technologies.

- **3 points.** The agency has MDSS processes that are based on both roadside and vehicle mounted sensing technologies.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Road Weather Management Program, and related plans and programs.
2. Materials Management Plan, MDSS, and documentation of RWIS for the jurisdiction (state, county, city). A qualified plan should include quantitative goals for reductions in chloride and other chemical applications, reduction of plow truck mileage, and a description of the tools and hardware used to monitor and operate the snow and ice control activities. A qualifying plan shall outline specific strategies to be implemented by specific agencies or stakeholders to achieve the plan.
3. Annual reports of plan progress, including data supporting goal performance and actions taken during the previous period. Minutes of monthly or quarterly meetings of interagency stakeholders to demonstrate active efforts to implement the plan.

# OM-13: Transportation Management and Operations

1-15 points

**Goal:** Maximize the utility of the existing roadway network through use of technology and management of operations.

## Sustainability Linkage

Transportation management and operations support all of the triple bottom line principles. More efficient operations of the roadway network will result in a reduction of fossil fuel usage and related emissions; a reduction in the number and severity of crashes and therefore private and public property loss, injury, and loss of life; and a reduction in the resources and related costs needed to expand capacity of the network.



## Scoring Requirements

### Background

This criterion covers the operation of permanent traffic control and ITS systems. Three related criteria include: OM-11: Traffic Control Infrastructure Maintenance, which covers the preservation and maintenance of permanent traffic control, ITS, and safety devices; OM-12: Road Weather Management Program; and OM-14: Work Zone Traffic Control, which includes temporary traffic control, ITS, and safety devices.

The intent of this criterion is to encourage active management of vehicles within the existing roadway infrastructure to alleviate the major causes of congestion, including insufficient capacity (bottlenecks), substandard transportation operations systems (such as traffic signal systems with poor signal timing), incidents (crashes, disabled vehicles), weather (snow, ice, fog), work zones, and non-recurring events (special events).

### Scoring

The plans and applications included in the following scoring requirements will vary in size and scope depending on the needs of the agency. They could be a combination of multiple documents that cover management of different conditions or regions, or could be a single, consolidated document. For the purposes of evaluating this criterion, the agency should consider all applicable materials in aggregate and respond according per the majority of their practices unless further direction is provided.

Additionally, implementation of applications may vary from test projects, to geographic improvements, to statewide implementation both as applicable/relevant and as the agency is rolling-out or testing specific technologies. For the purposes of evaluating this criterion, the agency should consider whether the technologies are implemented in a majority of the relevant areas and respond accordingly unless further direction is provided.

### 3 points. Conduct Enhanced or Expedited Compliance

The agency takes steps or measures beyond (or faster than) what is required under existing operations regulations and certifications to improve mobility and user level of service. Existing regulations and certifications include Congestion Management Process, work zone rules, Real Time Traveler Information, and the Manual on Uniform Traffic Control Devices. Examples of measures that “enhance” compliance include procedures for work zone

impact assessments, which are encouraged but not required under regulation. Enhancements might also include the development of public information and outreach strategies.

**6 points. Include Operation-Based Programs and Develop Performance Measures**

The agency has in place programs and plans for system-wide improvements to the mobility and safety of the roadway network. Implement strategies and technologies to increase user level of service, roadway capacity, and while decreasing collisions and their effects on mobility. These can include use of incident response teams, provision of communication services, and inclusion of system-wide ITS. These can also include programs for small investments focused on relieving bottlenecks, programs for coordinating signals and enhancing signal timing efficiency, programs to coordinate work zones within metropolitan areas, traffic smoothing techniques (ramp meters or variable speed facilities), managed lanes, and variable/managed use of pavement by time of day (reversible lanes, use of shoulders, etc). Information about common ITS practices can be accessed from the National ITS program (<http://www.iteris.com/itsarch/index.htm>) and the Federal Highway Administration’s (FHWA) Research and Innovative Technology Administration (RITA) Intelligent Transportation Systems Joint Program Office (<http://www.its.dot.gov>). Table 1 shows standard ITS technologies available for this criterion.

Install one or more allowable applications for the categories in Table 1. Points are awarded based on how many categories are installed system-wide (in areas identified as relevant to application). Multiple applications in one category do not achieve additional points. Points for installing applications from multiple categories are cumulative; however, this criterion shall not exceed a total of six points.

**TABLE 1. ITS TECHNOLOGIES (CONTINUED ON NEXT PAGE)**

System	Application
Traffic Management	Statewide traffic operation Center coordinated traffic signal systems Local agency traffic management centers Traffic surveillance systems Traffic signal control systems Adaptive signal control systems Advanced signal systems Coordinated signal operations (interjurisdictional) Specialized signal heads Traffic control Lane management applications Special event transportation management systems Automated systems enforcing speed limits Traffic incident management
Traveler Information	Pre-trip information (Internet web sites, 511, other telephone, radio/TV, or kiosks) En route information Traveler Services Information

System	Application
Transit Management	Transit ITS and central operations Transit trip planner Transit signal priority Automatic vehicle location (AVL) Computer-aided dispatch (CAD) systems Operations and fleet management Advanced traveler information systems (ATIS) Integrated corridor management (ICM)
Electronic Payment and Pricing	Electronic toll collection (ETC) systems Multi-use payment systems Congestion pricing
Information Management	Archived data management systems Transportation management centers Information dissemination (portable dynamic message signs (DMS)), Highway advisory radio (HAR)
Road Weather Management	Road weather surveillance, monitoring, and prediction Advisory strategies (e.g., road weather information dissemination) Control strategies (e.g., traffic control based on adverse weather) Treatment strategies (e.g., winter maintenance)
Incident Management	Signal timing changes Detours and alternate routes 511 messaging Information dissemination (portable dynamic message signs)
Communication linkages	Center-to center (C2C) Communications
Commercial Vehicle Operations	Commercial vehicle information systems and networks (CVISN) <ul style="list-style-type: none"> <li>• Credentials administration</li> <li>• Safety assurance</li> <li>• Electronic screening</li> <li>• Carrier operations and fleet management</li> <li>• Security operations</li> <li>• Weigh-in-motion stations</li> </ul>
Emergency Management	Emergency medical services Hazardous materials management Advanced automated collision notification (ACN) Telemedicine Response and recovery Emergency traveler information Early warning system Coordinated emergency response Collision notification systems

System	Application
Advanced Vehicle Safety Systems	Road geometry warning Intersection collision warning systems Animal Warning Collision Avoidance systems (CICAS) Forward collision warning systems (FCW) Road departure warning (RDCW) Lane departure warning (LDW)
Maintenance and Construction Management	Work zone management Winter maintenance

**3 points. Integrate operations strategies and projects into systems planning and establish performance goals and monitor progress**

The agency considers operations strategies and projects early during systems planning and project selection to maximize their potential to improve mobility and to account for the effect of operational strategies in determining infrastructure needs.

**3 points. Set Goals and Monitor Progress**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points:** Establish at least one safety and one mobility performance metric to evaluate the performance of the operational system that is relevant to the implementation of ITS solutions. Examples include travel times, incident response times, and incident frequency.
- **Additional 1 point:** Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

### Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Improvement plan with list of implementable strategies and technologies that are applicable to the system.
2. Well developed (mature) programs in place for signal timing and coordination, work zone coordination, and incident management.
3. Performance metric and report of where the greatest improvements can be made.
4. Plan and project selection documents showing early consideration of operation strategies and projects.
5. List of goals to be achieved and proof of progress toward these goals for the first year, as defined by the performance metric.

# OM-14: Work Zone Traffic Control

1-15 points

**Goal:** Plan, implement, and monitor Work Zone Traffic Control (WZTC) methods that maximize safety of workers and system users with continued or better level of service.

## Sustainability Linkage

Work zone traffic control supports all of the triple bottom line principles by improving safety for construction workers and, for system users, reducing crash-related and construction-related congestion, user costs, and incident-related costs.



## Scoring Requirements

This criterion covers WZTC related to preservation and maintenance activities undertaken by an agency's staff (or contracted staff) and programmatic WZTC activities. It does not include project-specific WZTC. Two related criteria include OM-11: Traffic Control Infrastructure Maintenance, which covers the preservation and maintenance of permanent traffic control, ITS, and safety devices, and OM-13: Transportation Management and Operations, which covers the operation of permanent traffic control and ITS systems.

The agency must have a program, committee, or task force that reviews and establishes policies regarding WZTC. In addition to ensuring compliance of the FHWA Work Zone Safety and Mobility Rule as required to receive federal funding on projects, the task force agenda includes training, standards, new products, innovative practices, and legislation.

### 3 points. Develop a Program

Develop a WZTC program that includes the following elements:

- Have a policy in place to conduct an annual Work Zone Process Review using FHWA's Work Zone Process Review Toolbox ([http://ops.fhwa.dot.gov/wz/prtoolbox/pr\\_toolbox.htm](http://ops.fhwa.dot.gov/wz/prtoolbox/pr_toolbox.htm)) to review how an agency's work zone management is performing on a system-wide basis.
- Examine current work zone trends and issues in work zone safety, and identify current contributing factors that cause injury and fatal work zone crashes.
- Update and adopt new policies and procedures as needed to correct shortcomings in work zone safety policies and to improve level of service in work zones.
- Work with law enforcement to ensure work zone accident reports are accurately reported.
- Organize and provide training both for workers and for use in drivers' education classes.
- Review new technologies and innovations for use in work zones.
- Consider FHWA's WZTC self-assessment tool and best practices ([http://ops.fhwa.dot.gov/wz/decision\\_support/self-assess.htm](http://ops.fhwa.dot.gov/wz/decision_support/self-assess.htm)).

One of the following scores applies:

- **0 points.** The agency does not have a WZTC program that covers two or more of the elements listed above.
- **1 point.** The agency has a WZTC program that covers two or three of the elements listed above.

- **2 points.** The agency has a WZTC program that covers four or five of the elements listed above.
- **3 points.** The agency has a WZTC program that covers six or seven of the elements listed above.

#### **4 points. Set Goals and Monitor Progress**

Scoring for this requirement is based on the following, cumulative elements. The first element must be accomplished to earn the second.

- **2 points:** Establish quantifiable performance metrics for the WZTC program. Measures could be based on level of service, number and severity of accidents, and other relevant parameters. Measures could be qualitative and/or quantitative.
- **Additional 2 points:** Monitor progress towards goals for at least one year after goal establishment and show measurable advancement towards stated goals.

#### **2 points. Use Intelligent Transportation Systems (ITS) to Anticipate and Reduce Congestion**

In order to obtain credit for this criterion, the agency must routinely maintain signal systems and ITS during construction. Use ITS to anticipate and reduce congestion caused by highway work zones and to warn drivers of an upcoming work zone. This could include the use of portable camera systems, highway advisory radios, variable speed limits, ramp metering, traveler information, merge guidance, queue detection information, and traffic analysis tools (e.g., Quick Zone), and is aimed at increasing safety for both workers and road users.

One of the following scores applies:

- **0 points.** The agency does not use ITS to anticipate and reduce congestion.
- **1 point.** The agency allows and has a few projects using ITS to anticipate and reduce congestion.
- **2 points.** The agency routinely uses ITS to anticipate and reduce congestion.

#### **1 point. Apply and Review ITS Technologies and Innovations**

Apply and review new ITS technologies and applications for use in work zones, such as:

- Use of safety intrusion alarms in work zones
- CB Wizard
- Drone radar and radar speed advisory devices

#### **3 points. Leverage Contracting Innovations**

Contracting incentives can encourage contractors to reduce and optimize construction time lines and therefore reduce impact to the travelling public and exposure of workers to traffic. Strategies such as Lane Rental, A+B bidding, Interim completion dates, and flexible start dates can be effective strategies for reducing impact to the public.

One of the following scores applies:

- **0 points.** The agency does not use innovative contracting to encourage contractors to reduce and optimize construction time lines.
- **1 point.** The agency has test cases that use innovative contracting to encourage contractors to reduce and optimize construction time lines.
- **2 points.** The agency routinely includes the use of innovative contracting to encourage contractors to reduce and optimize construction time lines in design-build contracts only.
- **3 points.** The agency routinely includes the use of innovative contracting to encourage contractors to reduce and optimize construction time lines in both design-bid-build and design-build contracts.

#### **1 point. Coordinate with the Public**



Agency uses a public involvement or WZTC representative to communicate regularly with property owners and businesses affected by work. Consideration is given to reduce impacts to businesses through effective and clear WZTC (e.g., driveway open or business open signage).

**1 point. Promote Public Awareness**

Participate in National Work Zone Awareness Week and develop a campaign to promote work zone safety awareness.

## Scoring Sources

The program is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Documentation of the Work Zone Traffic Control program, committee, or task force including its members, goals, actions, and scope.
2. Documentation of policies, procedures, and guidance for the use of ITS in work zone traffic control.
3. Summary of Contracting Innovations and when they are appropriate to use.
4. Documentation of the activities to promote public awareness of work zone safety.

