

INVEST - Sustainable Highways Self-Evaluation Tool

All Project Development Scoring Questions - Version 1.1

PD-01 **Economic Analyses** (5 points)

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.

PD-01.1a Was a benefit-cost analysis (BCA) for the project completed using minimum acceptable industry practices? - 2 points

- Yes (2 points)
- No (0 points)

PD-01.1b Was an Economic Impact Analysis (EIA) completed that meets all the listed requirements? - 3 points

- Yes (3 points)
 - No (0 points)
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PD-02 **Lifecycle Cost Analyses** (3 points)

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.

PD-02.1a Was an LCCA performed for all pavement structure alternatives in accordance with the method described in the FHWA's Technical Bulletin for Life-Cycle Cost Analysis? - 1 point

- Yes (1 point)
- No (0 points)

PD-02.1b Was an LCCA performed for all stormwater infrastructure alternatives considered? - 1 point

- Yes (1 point)
- No (0 points)

PD-02.1c Was an LCCA performed for the project's major feature (bridges, tunnels, retaining walls, or other items not listed in the preceding options) for each of the alternatives considered? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-03 **Context Sensitive Project Development** (5 points)

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

PD-03.1 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? - 2 points

- Yes (2 points)
- No (0 points)

PD-03.2 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

- Yes (1 point)
- No (0 points)

PD-03.3 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

- Yes (1 point)
- No (0 points)

PD-03.4 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? - 1 point

- Yes (1 point)
- No (0 points)

PD-04 Highway and Traffic Safety (10 points)

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.

PD-04.4 Was a statistically reliable, science-based method used to evaluate the safety effectiveness of the implemented project? - 1 point

- Yes (1 point)
- No (0 points)

PD-04.3 Does the agency conduct explicit consideration of safety using quantitative, scientifically proven methods? - 0 points

- Yes (0 points)

PD-04.3a Was the project type established during scoping of project alternatives through a quantitative and statistically reliable process? - 1 point

- Yes (1 point)
- No (0 points)

PD-04.3b Were project design and/or operational alternatives developed and evaluated using explicit consideration of substantive safety through quantitative, statistically reliable methods? - 2 points

- Yes (2 points)
- No (0 points)

PD-04.3c Were quantitative and statistically reliable methods and knowledge used to assess substantive safety performance in the development of preliminary and final design details? - 3 points

- Yes (3 points)
- No (0 points)

- No (0 points)

PD-04.2 Was awareness built among the public regarding contributing factors to crashes? - 1 point

- Yes (1 point)
- No (0 points)

PD-04.1 Were human factors considerations incorporated? - 2 points

- The project relied solely on published design and operational performance standards during the project development process. (0 points)
 - 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) were evaluated, documented, and incorporated. (2 points)
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PD-05 Educational Outreach (2 points)

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

PD-05.1 Did this project incorporate public educational outreach that promotes and educates the public about sustainability by installing or performing a minimum of two different elements from Table PD-05.1.A?

- 2 points

- Yes (2 points)
 - No (0 points)
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PD-06 Tracking Environmental Commitments (5 points)

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

PD-06.2 Has the principal project constructor assigned an independent environmental compliance monitor who will provide quality assurance services and report directly to and make recommendations to the regulatory and Lead Agencies? - 2 points

- Yes (2 points)
- No (0 points)

PD-06.1a Was a comprehensive environmental compliance tracking system used for the project and related facilities? - 2 points

- Yes (2 points)

PD-06.1b Does the environmental tracking system have a formal mechanism to communicate commitments from transportation planning through design, construction and maintenance? - 1 point

- Yes (1 point)
 - No (0 points)
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- No (0 points)
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PD-07 Habitat Restoration (3 points)

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.

PD-07.1 Was project-specific mitigation or mitigation banking used on this project? Use Table PD-07.1.A to determine the points earned. - 3 points

- 1 Point (1 point)
 - 2 Points (2 points)
 - 3 Points (3 points)
 - None (0 points)
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PD-08 Stormwater (9 points)

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.

PD-08.1 Did the project treat at least 80% of the total runoff volume? Use Tables PD-08.1.A and PD-08.1.B to determine points. - 3 points

- No (0 points)
- 1 Point (1 point)
- 2 Points (2 points)
- 3 Points (3 points)

PD-08.2 Did the project manage the flow from at least 80 percent of the total runoff volume, and is flow control based on controlling peak flows or durations from the project site? Use Tables PD-08.2.A and PD-08.1.B to determine points. - 3 points

- No (0 points)
- 1 Point (1 point)
- 2 Points (2 points)
- 3 Points (3 points)

PD-08.3 Did the project use effective BMPs or stormwater management techniques that mimic natural hydrology to treat pollutants? Use Tables PD-08.3.A and PD-08.3.B and PD-08.1.B to determine points. - 3 points

- No (0 points)
- 1 Point (1 point)
- 2 Points (2 points)
- 3 Points (3 points)

PD-09 Ecological Connectivity (3 points)

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

PD-09.1P Was a site-specific ecological assessment of the roadway project using GIS data or regional expertise conducted? - 0 points

- Yes (0 points)

PD-09.1 Were methods used to minimize impacts to ecological connectivity? Use Table PD-09.1.A to determine points. - 3 points

- No (0 points)
 - 1 (1 point)
 - 2 (2 points)
 - 3 (3 points)
- No (0 points)

PD-10 Pedestrian Access (2 points)

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

PD-10.1 Were new pedestrian features implements on this project that were not intended to bring existing facilities up to ADA standards? - 2 points

- PD-10-1a Yes, new features were implemented or existing features were improved that addressed safety, comfort, and connectivity. (1 point)

- PD-10.1b Yes, features in the design and construction were included that addressed safety, comfort, connectivity, and aesthetics/environment. (2 points)
 - No (0 points)
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PD-11 **Bicycle Access** (2 points)

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

PD-11.1 Were bicycle facilities implemented on this project that meet the requirements? - 2 points

- PD-11.1a Yes, new features were implemented or existing features were improved on existing bicycle facilities that addressed safety and connectivity. (1 point)
 - PD-11.1b Yes, features in the design and construction of new bicycle facilities enhance safety, connectivity, aesthetics, comfort, and environment. (2 points)
 - No (0 points)
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PD-12 **Transit and HOV Access** (5 points)

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.

PD-12.1 Were Transit and HOV facilities installed on this project that are consistent with the need, purpose, and appropriateness for transit and HOV access within the project footprint? Use Table PD-12.1.A to determine points. - 5 points

- No (0 points)
 - 1 Point (1 point)
 - 2 Points (2 points)
 - 3 Points (3 points)
 - 4 Points (4 points)
 - 5 Points (5 points)
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PD-13 **Freight Mobility** (7 points)

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

PD-13.1 Were freight facilities installed on this project consistent with the need, purpose, and appropriateness for freight mobility within the project footprint? Use Table PD-13.1.A to determine points. - 7 points

- No (0 points)
 - 1 Point (1 point)
 - 2 Points (2 points)
 - 3 Points (3 points)
 - 4 Points (4 points)
 - 5 Points (5 points)
 - 6 Points (6 points)
 - 7 Points (7 points)
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PD-14 **ITS for System Operations** (5 points)

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

PD-14.1 Were one or more allowable ITS applications installed? Use Table PD-14.1.A to determine points. - 5 points

- No (0 points)
 - At least 1 application in any category (1 point)
 - At least 1 application in 2 separate categories (2 points)
 - At least 1 application in 3 separate categories (3 points)
 - At least 1 application in 4 separate categories (4 points)
 - At least 1 application in 5 separate categories (5 points)
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PD-15 Historical, Archaeological, and Cultural Preservation (3 points)

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.

PD-15.1P Is any part of the project or resource listed in the NRHP or been determined eligible for the NHRP by a State, Local, or Tribal Historic Preservation Officer? - 0 points

- Yes (0 points)

PD-15.1 Has an effort been made to minimize impacts, avoid impacts, or enhance features? - 3 points

- PD-15.1a An effort has been made to minimize the "adverse effects" to the features from PD-15.1P. (1 point)
- PD-15.1b Measures have been taken to specifically avoid impacts to the features from PD-15.1P. (2 points)
- PD-15.1c Actions have been taken to enhance features through the protection, preservation, and/or enhancement of historic, archaeological, or cultural resources. (3 points)
- No (0 points)

- No (0 points)

PD-15.2P Is a portion of the project along one of Americas Byways, a State Scenic Byway, an Indian Tribe Scenic Byway, or other route designated or officially recognized as significantly historical, cultural, or archaeological? - 0 points

- Yes (0 points)

PD-15.1 Has An Effort Been Made To Minimize Impacts, Avoid Impacts, Or Enhance Features? - 3 points

- PD-15.1a An effort has been made to minimize the "adverse effects" to the features from PD-15.1P. (1 point)
- PD-15.1b Measures have been taken to specifically avoid impacts to the features from PD-15.1P. (2 points)
- PD-15.1c Actions have been taken to enhance features through the protection, preservation, and/or enhancement of historic, archaeological, or cultural resources. (3 points)
- No (0 points)

- No (0 points)
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PD-16 Scenic, Natural, or Recreational Qualities (3 points)

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

PD-16.1P Is any portion of the project along one of America's Byways®, a State Scenic Byway, an Indian Tribe Scenic Byway, or other route that was designated or officially recognized as such? - 0 points

- Yes (0 points)

PD-16.2P Was existing access to scenic, natural, or recreational qualities not removed (i.e., maintained) as a part of this project unless it was specifically removed to protect the scenic, natural, and/or recreational qualities themselves? - 0 points

- Yes (0 points)

PD-16.1 Were efforts made to avoid or minimize impacts, or enhance features, of the scenic, natural, and/or recreational qualities? - 3 points

- PD-16.1a An effort has been made to minimize "adverse effects" to the scenic, natural, or recreational qualities to the features from PD-16.1P. (1 point)
- PD-16.1b At least one access was provided from the project to a designated area for vehicles to exit traffic and experience the scenic, natural, or recreational quality. (1 point)
- PD-16.1c Measures were taken to specifically avoid impacts to the scenic, natural, or recreational qualities to the features from PD-16.1P. (2 points)
- PD-16.1d Efforts were made to protect, preserve, or enhance scenic, natural, or recreational qualities along the roadway. (3 points)

- No (0 points)

- No (0 points)
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PD-17 Energy Efficiency (8 points)

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

PD-17.1 Were energy needs evaluated for the project? - 0 points

- Yes (0 points)

PD-17.1 Were alternatives implemented to reduce power consumption while still meeting lighting and safety standards? - 1 point

- Yes (1 point)
- No (0 points)

- No (0 points)

PD-17.2 Was the energy consumption on the project reduced through the installation of energy efficient lighting and signal fixtures and through the installation of autonomous, on-site, renewable power sources? -

0 points

- Yes (0 points)

PD-17.2 Points are awarded based on the percentage of reduced power use. Based on Table PD-17.2.A, how many points did the project earn? - 6 points

- 1 Point (1 point)
- 2 Points (2 points)
- 3 Points (3 points)
- 4 Points (4 points)
- 5 Points (5 points)
- 6 Points (6 points)
- None (0 points)

- No (0 points)

PD-17.3 Was a plan established for auditing energy use after project completion as part of operations and maintenance? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-18 Site Vegetation (3 points)

Promote sustainable site vegetation within the project footprint that does not require long-term irrigation, consistent mowing, or invasive/noxious weed species removal by selecting plants and maintenance methods that benefit the ecosystem.

PD-18.1P Does all site vegetation use native and/or non-invasive species and non-noxious species only, and minimize disturbance of native species? - 0 points

- Yes (0 points)

PD-18.1 Based on Table PD-18.1.A, how many points did the project earn for vegetation planning and selection? Points for features are cumulative, however this scoring requirement shall not exceed a total of 3 points. - 3 points

- 1 Point (1 point)
 - 2 Points (2 points)
 - 3 Points (3 points)
 - None (0 points)
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- No (0 points)
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PD-19 Reduce and Reuse Materials (8 points)

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

PD-19 Points for different methods are cumulative; however, this criterion shall not exceed a total of eight points. Points exceeding eight will not contribute to overall score. - 0 points

- I understand. (0 points)

PD-19.1 Was remaining service life increased through pavement preservation activities? Points are awarded per Table PD-19.1.A. - 4 points

- No (0 points)
- 1 (1 point)
- 2 (2 points)
- 3 (3 points)
- 4 (4 points)

PD-19.2 Was the amount of new pavement materials needed reduced? Points are awarded per Table PD-19.2.A. - 3 points

- No (0 points)
- 1 (1 point)
- 2 (2 points)
- 3 (3 points)

PD-19.3 Was remaining service life increased through bridge preservation activities? Points are awarded per Table PD-19.3.A. - 4 points

- No (0 points)
- 2 (2 points)
- 3 (3 points)
- 4 (4 points)

PD-19.4 Was remaining service life increased through retrofitting existing bridge structures? Points are awarded per Table PD-19.3.A. - 3 points

- No (0 points)
- 1 (1 point)
- 2 (2 points)
- 3 (3 points)

PD-19.5 Were existing pavements, structures, or structural elements reused for a new use? Points are awarded per Table PD-19.5.A. - 3 points

- No (0 points)
- 1 (1 point)
- 2 (2 points)
- 3 (3 points)

PD-19.6a Were foundry sand or other industrial by-products used in pipe bedding and backfill? - 1 point

- Yes (1 point)
- No (0 points)

PD-19.6b Were industrial by-products reused in pavement materials, ancillary structures, and other roadway elements? - 2 points

- Yes (2 points)
 - No (0 points)
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PD-20 Recycle Materials (8 points)

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

PD-20 Points for different methods are cumulative; however, this criterion shall not exceed a total of eight points. Points exceeding eight will not contribute to overall score. - 0 points

- I understand. (0 points)

PD-20.1 Was RAP or RCA used in new pavement lifts, granular base course, or embankments? Points are awarded per Table PD-20.1.A. - 5 points

- No (0 points)
- 1 (1 point)
- 2 (2 points)
- 3 (3 points)
- 4 (4 points)
- 5 (5 points)

PD-20.2 Were pavement materials recycled in place using cold-in-place recycling, hot-in-place recycling, and full depth reclamation methods? Points are awarded per Table PD-20.2.A. - 6 points

- No (0 points)
- 2 points (2 points)
- 3 points (3 points)
- 4 points (4 points)
- 5 points (5 points)
- 6 points (6 points)

PD-20.3 Did the project 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? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-21 Earthwork Balance (3 points)

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

PD-21.1a Are the design cut and fill volumes or the actual construction cut and fill volumes balanced to within 10%? - 3 points

- Yes (3 points)

- No (0 points)

PD-21.1b Are the design cut and fill volumes or the actual construction cut and fill volumes balanced to within 10% if construction banking is used? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-22 Long-Life Pavement Design (5 points)

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

PD-22.1 Is 75% or greater of the total new or reconstructed pavement surface area for regularly trafficked lanes designed for long-life (min. 40 years)? - 0 points

- Yes (0 points)

PD-22.1 Was Pavement Design Completed In Accordance With A Design Procedure That Is Formally Recognized, Adopted, And Documented By The Project Owner? - 5 points

- Yes (5 points)
- No (0 points)

- No (0 points)
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PD-23 Reduced Energy and Emissions in Pavement Materials (3 points)

Reduce energy use in the production of pavement materials.

PD-23.1 Was at least 50 percent of the total project pavement material (by weight) a low-energy material? - points

- Yes (0 points)

PD-23.1 Which Requirement was used? - 0 points

- PD-23.1a Asphalt Production (0 points)

Which of the following options was used to meet the requirement? - 3 points

- PD-23.1a Warm Mix Asphalt. Used WMA to reduce the mixing temperature of HMA by a minimum of 50°F from that recommended as the mixing temperature by the asphalt binder supplier. (3 points)
- PD-23.1b Asphalt Production Using Fuel Saving Technologies. Burn recycled oil, waste materials, or other fuel saving technologies in HMA plant to reduce conventional fuel usage by a minimum of 25 percent. (3 points)

- PD-23.1b Raw Material – Cement Production (0 points)

Which of the following options was used to meet the requirement? - 3 points

- PD-23.2a Cement Production Using ENERGY STAR® Certified Plant. Use an ENERGY STAR® certified cement production plant for cement materials used on the project. (3 points)
- PD-23.2b Cement Production Using Fuel Saving Technologies. 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. (3 points)

- PD-23.1c Concrete Production (0 points)

Which of the following options was used to meet the requirement? - 3 points

- PD-23.3a Concrete Production in Plant with Demonstrated Reduction in Energy and Carbon Footprint. Obtained concrete from a concrete plant that can demonstrate a carbon footprint and embodied energy 15

percent below the national averages. (3 points)

- PD-23.3b Concrete Production in NRMCA Sustainable Concrete Plant. Obtained concrete from a concrete plant that is an NRMCA Sustainable Concrete Plant Certified Silver. (3 points)
- PD-23.3c Cement Production Using Limestone Additive. Blended cement using limestone addition. (3 points)

- No (0 points)
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PD-24 **Contractor Warranty** (3 points)

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

PD-24.1 Does the project construction contract include a warranty for the constructed portion of the pavement structure? - 3 points

- Yes, 3-year warranty that meets the minimum contractual warranty specifications listed (1 point)
 - Yes, 5-year warranty that meets the minimum contractual warranty specifications listed (3 points)
 - No, or the warranty does not meet the minimum contractual warranty specifications listed (0 points)
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PD-25 **Construction Environmental Training** (1 point)

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

PD-25.1 Did owner require the Contractor to plan and implement a formal environmental awareness training program during construction to ensure the project stay in compliance with environmental laws, regulations, and policies? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-26 **Construction Equipment Emission Reduction** (2 points)

Reduce air emissions from non-road construction equipment.

PD-26.1 Were one or more methods implemented to reduce non-road emissions? Points are awarded per Table PD-26.1.A. - 2 points

- 1 (1 point)
 - 2 (2 points)
 - No (0 points)
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PD-27 **Construction Noise Mitigation** (2 points)

Reduce annoyance or disturbance to surrounding neighborhoods and environments from road construction noise.

PD-27.2 Has the contractor monitored noise and the effectiveness of mitigation measures at the receptors throughout construction to ensure compliance with the NMP? - 1 point

- Yes (1 point)
- No (0 points)

PD-27.1 Is the contractor required to establish, implement, and maintain a formal Noise Mitigation Plan (NMP) during roadway construction? - 1 point

- Yes (1 point)
 - No (0 points)
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PD-28 **Construction Quality Control Plan** (5 points)

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

PD-28.1 Is the Contractor required 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? -

3 points

- Yes (3 points)
- No (0 points)

PD-28.2 Does the contract leverage the use of Quality Price Adjustment Clauses to link payment and performance of the constructed products? - 2 points

- Yes (2 points)
 - No (0 points)
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PD-29 Construction Waste Management (3 points)

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

PD-29.1 Is the contractor required to establish, implement, and maintain a formal Construction and Demolition Waste Management Plan (CWMP) during roadway construction, or its functional equivalent? - 1 point

- Yes (1 point)
- No (0 points)

PD-29.2 Can the owner demonstrate that a percentage of the construction waste has been diverted from landfills? - 2 points

- No, or diverted less than 50 percent of the construction waste from landfills (0 points)
 - Diverted at least 50 percent of the construction waste from landfills (1 point)
 - Diverted at least 75 percent of the construction waste from landfills (2 points)
-