Appendix M

INVEST Evaluation

I-290 Eisenhower Expressway
Cook County, Illinois

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Illinois Department of Transportation

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September 2016

Table of Contents

List of Tables

1.0 Sustainability

The Federal Highway Administration (FHWA) "Infrastructure Voluntary Evaluation Sustainability Tool" (INVEST) is a web-based voluntary tool used to measure the sustainability of transportation projects. It was developed with ongoing input from state and local transportation agencies and professional organizations and is based on the three primary principles of sustainability: social equity, responsible use of natural resources, and economic development. The tool is designed to encourage and help agencies and organizations integrate sustainability best practices into highway and roadway projects.

Based on the Department and Stakeholder interest, the project will use the INVEST evaluation tool as part of the project development. INVEST was not used as a measure to evaluate the alternatives, or to determine their suitability for sustainable practices as compared to each other. The methodology and tools suggested by INVEST are being applied to the Preferred Alternative. There is no credit for completing NEPA documentation because it is required for federally funded projects and by many states.

The current Version 1.2 of the INVEST tool includes sustainability scoring in three main categories of highway development: System Planning and Processes, Project Development, and Operations and Maintenance.

The *System Planning and Processes* category focuses on the sustainability efforts within an agency's system planning processes. The System Planning and Processes category covers a broad spectrum of highway development rather than a singular project. The criteria used for scoring an agency's System Planning and Processes includes the level of integration of long-term plans with local and/or regional plans to coordinate transportation, land use, economic development, nature resource planning, and community goals and visions. Scoring criteria also include consideration of system wide multimodal and freight planning, along with other factors such as travel demand management and congestion management strategies, strategies to reduce emissions and energy consumption, practices of cost estimating and revenue forecasting, and asset management. Since the focus of System Planning and Processes is centered on the overall practices and operations of transportation agencies, it is beyond the scope of the I-290 Phase I Study and would not be considered in the evaluation and scoring for the project.

The *Project Development* category includes evaluation and scoring for two different project types. The basic scorecard is for small reconstruction, preservation, or restoration projects. The second category using an extended scorecard is for new construction projects of new roadway facilities or major reconstruction projects. The focus of the Project Development category is on the actual planning, design, and construction of a new highway facility. Projects are awarded a Bronze, Silver, Gold, or Platinum status based on a total number of points achieved. The criteria used for scoring the sustainability of a project during the Project Development phase covers a wide range of

topics including but not limited to cost benefit analysis, educational outreach, ecological connectivity, freight mobility, pavement design, and construction activities. An evaluation of sustainability during the Project Development phase generally requires an advanced level of project detail to accurately score the project's performance in each criterion.

The *Operations and Maintenance* category includes the criteria for evaluating and scoring an agency's programs and practices for their operations and maintenance of roadway facilities. There are 15 criteria used in evaluating the Operations and Maintenance and include items such as tracking the implementation/fulfillment of environmental commitments; use of pavement, bridge, and maintenance management systems; traffic control maintenance plans; roadside and facilities infrastructure maintenance plans; standards of practice for snow and ice control; and plans to document renewable energy use and reductions in fossil fuel use and emissions during operations and maintenance. Since the Operations and Maintenance phase of a highway project comes after the facility has been constructed, it is not considered in the evaluation and scoring of the current I-290 Phase I Study; however, it could be carried forward to evaluate the I-290 corridor's operations and maintenance when the facility is built.

There are five project types for the Project Development module in INVEST: Paving, Rural Basic, Rural Extended, Urban Basic, and Urban Extended. The best fit for the I-290 Phase I Study was determined to be the Urban Extended, which according to the INVEST Compendium [1]is for urban projects for a new roadway facility; structure projects were nothing of its type currently exists; and major reconstruction projects that add travel lanes to an existing roadway or bridge. The urban designation was used because this project traverses through a densely populated urban area, including the City of Chicago, where transit connectivity amenities and other urban considerations would apply.

The INVEST ratings are shown in Table 1. The ratings range from Bronze which would be achieved with 52 points (30 percent), to the highest rating, Platinum, which would be achieved with 103 points (60 percent). Several of the criteria presented require an advanced level of project detail or development. At this stage in the project development process for the I-290 Phase I Study, there is not enough engineering definition and design to assess the project's complete potential implementation of various sustainable practices and strategies. However, an early examination of various sustainable best practices can help inform the future design of the I-290 facility and potential mitigation strategies and help guide decisions regarding roadway design and construction to incorporate as many sustainable elements as appropriate.

[1] INVEST Compendium, Federal Highway Administration, September 2015, https://www.sustainablehighways.org/1524/invest-12-library.html

Table 1. INVEST Ratings for Urban Extended Projects

	Number of Points Required for Each Level
Total Number of Points	172
Bronze (30%)	52
Silver (40%)	69
Gold (50%)	86
Platinum (60%)	103

The preliminary evaluation and scoring for the I-290 Phase I Study is shown in Table 2. Based on this preliminary evaluation, the I-290 Phase I Study achieves 58 out of a maximum 172 points. This provides the current designation of Bronze for the I-290 Phase I Study based on current available information and based on the INVEST 1.2 criteria.

The INVEST scoring will continue to be updated with further project development, including more detailed design. Many of the criteria appear to offer good opportunities to achieve higher ratings at the appropriate time for evaluation by simply following existing state policies. For example, IDOT performs life cycle evaluations of pavement designs (applicable to criterion PD-2) and inserts special provisions in most construction contracts to limit construction emissions (applicable to criterion PD-26). Other criteria (such as criterion PD-8 for ecological connectivity or PD-24 for contractor warranty) require commitments to go above and beyond meeting existing regulatory or policy requirements, but will be considered in current project development.

Table 2. I-290 Phase I Study Preliminary INVEST Scorecard

Criteria	Points
PD-01 **Economic Analyses** Criterion: • Was a benefit-cost analysis (BCA) for the project completed using minimum acceptable industry practices? Points: [0 / 2] • Was an Economic Impact Analysis (EIA) completed that meets all the listed requirements? Points: [3 / 3] Notes: This criterion may need additional evaluation throughout the Phase I process. Some of the results of this type of analysis were presented at CAG/TF Meeting #18.	3/5
PD-02 **Lifecycle Cost Analyses** Criterion: • 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?	0/3

Criteria	Points
Points: [0 / 1] • Was an LCCA performed for all storm water infrastructure alternatives considered? Points: [0 / 1] • 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? Points: [0 / 1] Notes: These will be performed as part of the Phase II design process, but cannot be scored yet.	
PD-03 **Context Sensitive Project Development** Criterion: • 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? Points: [2 / 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? Points: [1 / 1] • 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? Points: [1/ 1] • 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? Points: [1/ 1] • Do project features consider the appropriate scale of the project? Points: [1/1] • Did the project remove objectionable or distracting views? Points: [2/2] • Did the project integrate context sensitive aesthetic treatments? Points: [1/1] • Were aesthetics for structural items incorporated into the design of the project? Points: [1/1]	10/10
PD-04 **Highway and Traffic Safety** Criterion: • Were human factors considerations incorporated? Points: [2 / 2] • Was awareness built among the public regarding contributing factors to crashes? Yes. Points: [1 / 1] • Does the agency conduct explicit consideration of safety using quantitative, scientifically proven methods? Yes. • Was the project type established during scoping of project alternatives through a quantitative, scientifically reliable process? Yes. Points: [1/1] • Were project design and/or operational alternatives developed and evaluated using explicit consideration of substantive safety through quantitative, statistically reliable methods? Yes. Points: [2/2]	9/10

Criteria	Points
• Were quantitative and statistically reliable methods and knowledge used to assess substantive safety performance in the development of preliminary and final design details?: Will incorporate proper safety analysis of design exceptions in both Phase I (Preliminary Design) and Phase II (Final Design)[3/3] • Was a statistically reliable, science-based method used to evaluate the safety effectiveness of the implemented project? No, to be completed after construction. Points: [0/1]	
PD-05 **Educational Outreach** Criterion: • 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 the table provided? Yes. Points: [2 / 2] Note: Sustainability included in project development process; in public involvement; project website; and professional presentations.	2/2
PD-06 **Tracking Environmental Commitments** Criterion: • Was a comprehensive environmental compliance tracking system used for the project and related facilities? No. Points: [0 / 2] • Does the environmental tracking system have a formal mechanism to communicate commitments from transportation planning through design, construction, and maintenance? No. Points: [0 / 1] • 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? To be determined. Points: [0 / 2] Note: More points could be earned for developing an agency strategy for tracking environmental commitments.	0/5

Criteria	Points
PD-07 **Habitat Restoration** Criterion: • Was project-specific mitigation or mitigation banking used on this project? No. Points: [0/ 3] • Were high quality aquatic resources (HQAR) avoided or were the impacts minimized on this project? No. Points: [0/2] • Were high quality environmental resources avoided or were the impacts minimized on this project? No. Points: [0/2] Note: No points were given because there are no natural habitats in the project area that needed to be avoided.	0/7
PD-08 **Stormwater** Criterion: • Did the project treat at least 80 percent of the total runoff volume? Points: [0/ 3] • 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? Points: [0 / 3] Note: These criteria will need further consultation from the Hydraulics Unit and CBBEL to discuss the scoring requirements when final drainage plan is complete.	0/6
PD-09 **Ecological Connectivity** Criterion: • Was a site-specific ecological assessment of the roadway project using GIS data or regional expertise conducted? Yes. • Were methods used to minimize impacts to ecological connectivity Points: [3 / 3] • Did the project team engage natural resources and regulatory agencies throughout the planning process and ensure consistency with broader planning goals and objectives? Points: [1/1] Note: There will be a animal crossing at the Des Plaines River.	4/4
PD-10 **Pedestrian Access** Criterion: • Were all facilities upgraded to meet ADA standards and do responses below exclude any projects to upgrade facilities to ADA Standards? Yes. • Were missing pedestrian connections installed per master plan or relevant documents? Yes. Points: [1/1] • Were pedestrian features installed that are safe, comfortable, convenient and connected? Yes. Points: [2/2]	3/3
PD-11 **Bicycle Access** Criterion:	3/3

Criteria	Points
• Were missing bicycle connections installed per master plan or other relevant documents? Yes. Points: [1/1] • Were bicycle features installed that are safe, comfortable, convenient and connected? Yes. Points: [2/2]	
PD-12 **Transit and HOV Access** Criterion: • Were Transit and HOV facilities installed on this project that is consistent with the need, purpose, and appropriateness for transit and HOV access within the project footprint? Points [4/5]	4/5
PD-13 **Freight Mobility** Criterion: • Were freight facilities installed on this project consistent with the need, purpose, and appropriateness for freight mobility within the project footprint? Points: [4 / 7] Note: The points were received for improving railroad overpass clearances and safety improvements.	4/7
PD-14 **ITS for System Operations** Criterion: • Were one or more allowable ITS applications installed? Yes. Points: [5 / 5] Note: The points in this criterion were achieved for: toll collection; DMS signs; lane management; emergency vehicle signal preemption; enforcement; ramp metering; and surveillance.	5/5

Criteria	Points
PD-15 **Historical, Archaeological, and Cultural Preservation** Criterion: • 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? Yes. • Has an effort been made to minimize impacts, avoid impacts, or enhance features? Yes, there will be landscaping enhancements in Columbus Park. Points: [3 / 3] Note: This study is avoiding any impacts to these properties.	3/3
PD-16 **Scenic, Natural, or Recreational Qualities** Criterion: • 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? Points: [0 / 0] • 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? Points: [0 / 0] • Were efforts made to minimize impacts, avoid impacts, or enhance features of the scenic, natural, and/or recreational qualities? Points: [0 / 0] Note: I-290 is not designated as a America's Byway, a State Scenic Byway	0/3
PD-17 **Energy Efficiency** Criterion: • Were energy needs evaluated for the project? Not at the present time. Points: [0 / 1] • 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? Yes. • Points are awarded based on the percentage of power use. Based on table PD-17.2.A, how many points did the project earn? Points: [1/6] • Was a plan established for auditing energy use after project completion as part of operations and maintenance? To be determined. Points: [0 / 1] Note: The Lighting Plan is not determined yet. One point was earned for now with the anticipation of LED lighting.	1/8
PD-18 **Site Vegetation** Criterion: • Does all site vegetation use non-invasive species only, use non-noxious species only, use seeding that does not require consistent mowing for a viable stand of grass, and minimize disturbance of native species? Yes. • Based on Table PD-18.1.A, how many points did the project earn? Points are feature are additive, however the criterion shall not exceed a total of 3 points. Points: [3 / 3] • Based on Table PD-18.2.A, how many points did the project earn for vegetative maintenance? Points for features are cumulative; however this scoring requirement shall not exceed a total of 3 points. Points: [2/3]	5/6

Criteria	Points
PD-19 **Reduce and Reuse Materials** Criterion: • Was remaining service life increased through pavement preservation activities? Points are awarded per Table PD-19.1.A. TBD. Points: [0/4] • Was the amount of new pavement materials needed reduced? Points are awarded per Table PD-19.2.A. TBD. Points: [0/3] • Was remaining service life increased through bridge preservation activities? Points are awarded per Table PD-19.3.A. TBD. Points: [0/4] • Was remaining service life increased through retrofitting existing bridge structures? Points are awarded per Table PD-19.3.A. TBD. Points: [0/3] • Were existing pavements, structures, or structural elements reused for a new use? Points are awarded per Table PD-19.5.A. TBD. Points: [0/3] • Were industrial by-products reused in pavement materials, ancillary structures, and other roadway elements? TBD. Points: [0 / 2] • Was a project-specific plan for the recycling and reuse plan developed as described? No. Points: [0/1] Note: Defer to Phase II/III	0/12
PD-20 **Recycle Materials** Criterion: • Was RAP or RCA used in new pavement lifts, granular base course, or embankments? TBD. Points: [0/5] • 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. TBD. Points: [0/6] • Did the project reuse subbase granular material as subgrade embankment or as part of the new subbase? TBD. Points: [0/2] • Did the project relocate and reuse at least 90 percent of the minor structural elements, including existing luminaries, signal poles, and sign structures that are required to be removed and/or relocated onsite? TBD. Points: [0 /1] • Did the project salvage or relocate existing buildings? TBD. Points: [0/2] Note: Defer to Phase II/III	0/10
PD-21 **Earthwork Balance** Criterion: • Are the design cut and fill volumes or the actual construction cut and fill volumes balanced to within 10 percent? TBD. Points: [0 / 3] • Has an earthwork management plan been established, implemented and actively managed on this project? TBD. Points: [0/1] • Has topsoil been preserved or reused on this project? TBD. Points: [0/1] Note: Defer to Phase II/III	0/5
PD-22 **Long-Life Pavement Design** Criterion: • Which of the following best describes how long-life pavement was used on this project? TBD. No long life pavement was used or it was and did not meet the minimum requirements of the options below. TBD. Points: [0 / 5]	0/7

Criteria	Points
• Was the asphalt density of 100 percent of the total new or reconstructed pavement increased to a minimum of 94 percent? TBD. Points: [0/5] • Was a performance-based pay incentive for pavement smoothness used on this project? TBD. Points: [0/2] Note: Defer to Phase II/III	
PD-23 **Reduced Energy and Emissions in Pavement Materials** Criterion: • Was at least 50 percent of the total project pavement material (by weight) a low-energy material from asphalt production? TBD. Points: [0 / 3] • Was at least 50 percent of the total project pavement material (by weight) a low-energy material from cement production? TBD. Points: [0 / 3] • Was at least 50 percent of the total project pavement material (by weight) a low-energy material from concrete production? TBD. Points: [0 / 3] Note: Defer to Phase II/III	0/3
PD-24 **Permeable Pavement** Criterion: • Does the project include a maintenance plan for permeable pavements and are permeable pavements placed in areas where no sand will be used for snow and ice control or pavement sealing? TBD. Points: [0 /2] Note: Defer to Phase II/III – Spec, this pavement could be used on the new East-West trail.	0/2
PD-25 **Construction Environmental Training** Criterion: • Did the 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? TBD. Points: [0 / 1] Note: Defer to Phase II/III – Spec	0/1
PD-26 **Construction Equipment Emission Reduction** Criterion: • Were one or more methods implemented to reduce non-road emissions? Points are awarded per Table PD-26.1.A. TBD. Points: [0 / 2] Note: Defer to Phase III	0/2
PD-27 **Construction Noise Mitigation** Criterion: • Is the contractor required to establish, implement, and maintain a formal Noise Mitigation Plan (NMP) during roadway construction? TBD. Points: [0/1] • Has the contractor monitored noise and the effectiveness of mitigation measures at the receptors throughout construction to ensure compliance with the NMP? TBD. Points: [0/1]	0/2

Criteria	Points
Note: Defer to Phase II/III-Spec	
PD-28 **Construction Quality Control Plan** Criterion: • 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? TBD. Points: [0 / 3] • Does the contract leverage the use of Quality Price Adjustment Clauses to link payment and performance of the constructed products? TBD. Points: [0 / 2] Note: Defer to Phase II/III-Spec	0/5

Criteria	Points
PD-29 **Construction Waste Management** Criterion: • 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? TBD. Points: [0 / 1] • Can the owner demonstrate that a percentage of the construction waste has been diverted from landfills? TBD. Points: [0 / 2] • Were excess materials hauled directly to other project sites for recycling on those projects? TBD. Points: [0/1] Note: Defer to Phase II/II-Spec	0/4
PD-30 **Low Impact Development** Criterion: • Did the project use effective BMPs or stormwater management techniques that mimic natural hydrology to treat pollutants? Use Tables PD-30.1.A and PD-30.1.B and PD-30.1.C to determine points. TBD. Points: [0/3] Note: These criteria will need further consultation from the Hydraulics Unit and CBBEL to discuss the scoring requirements when final drainage plan is complete.	0/3
PD-31 **Infrastructure Resiliency Planning and Design** Criterion: • Did the project incorporate consideration of climate change at a project-specific level in project development and environmental reviews? Not considering at this time. Will need to reevaluate in Phase II. Points: [0/2] • Did the project incorporate future consideration of climate change effects in the design process? Not considering at this time. Will need to reevaluate in Phase II. Points: [0/6] • Did the project mitigate the effects of GHG emissions through design efforts above and beyond requirements and regulations? Not considering at this time. Will need to reevaluate in Phase II. There may be an opportunity for points with congestion pricing and traffic management. Points: [0/4]	0/12
PD-32 **Light Pollution** Criterion: • Were the uplighting ratings met on this project per Table PD-32.1.A? TBD. Points [0/1] • Were the backlighting ratings met on this project per Table PD-32.2.A? TBD. Points [0/1] • Were the glare ratings met on this project per Table PD-32.3.A? TBD. Points [0/1]	0/3

Criteria	Points
PD-33 **Noise Abatement** Criterion: • Was a specialized noise barrier used on this project? Yes. Points [2/2] • Were traffic system management techniques used to reduce existing noise levels? TBD. Points [0/2] • Were buffer zones provided for adjacent noise sensitive receptors? TBD. Points [0/2] • Were quiet pavements used on the project? Use Table PD-33.4.A. TBD. Points [0/3] • Were plantings used as a sight screen to separate noise receptors from the project? TBD. Possibly at Columbus Park. Points [0/1]	2/3

Additional opportunities for INVEST credit appear to be highest in the following areas, which could be addressed during further project development. Achievement of most of these opportunities, along with improvements in remaining categories, indicates that Platinum Status (requiring an additional 49 points) should be a reasonable achievement to meet or exceed with the I-290 Project.

- PD-08 Storm water (6 additional points possible)
- PD-17 Energy Efficiency (7 additional points possible)
- PD-19 Reduce and Re-use Materials (12 additional points possible)
- PD-20 Recycling (10 additional points possible)
- PD-21 Earthwork Balance (5 additional points possible)
- PD-22 Long-life Pavement Design (7 additional points possible)
- PD-28 Construction Quality Control Plan (5 additional points possible)
- PD-31 Infrastructure Resiliency Planning and Design (12 additional points possible)