



Case Study:

Laurel Valley Transportation Improvement Project

Westmoreland County, Pennsylvania

Lead Agency: Pennsylvania Department of Transportation (PennDOT)

INVEST Module: Project Development (PD)

Link: <http://www.laurelvalleyproject.com/>

The Project Development module of INVEST was used to evaluate the application of “triple bottom line” sustainability principles during the Preliminary Engineering (PE) phase of PennDOT’s SR 981 Section Q20 project. This analysis required the project team to evaluate several multi-disciplined components of the design throughout the PE phase, as well as considering activities that could apply to later phases of the project development process. As part of this process, the design team developed a custom INVEST scorecard to help determine the success of the project team in addressing sustainability within Preliminary Engineering.

About the Project

The Laurel Valley Transportation Improvement Project (LVTIP) will upgrade a key north/south roadway corridor through Mount Pleasant and Unity Townships, Westmoreland County, Pennsylvania, in order to enhance multimodal access within the local communities and provide improved regional access to support economic development and job growth. The project will improve transportation safety while providing more consistent and reliable travel times for residents and businesses.

The idea for major roadway improvements in the Laurel Valley corridor was first proposed in 1967 to improve access to the communities of New Stanton, Latrobe, Derry, Unity and Mount Pleasant. The original concept of a new limited access expressway was eventually deemed unrealistic due to funding limitations and projected community impacts, but the need for transportation improvements remained. PennDOT subsequently undertook a feasibility study and alternatives analysis to identify projects with logical termini that could address the transportation needs in a more cost effective and context-sensitive way. The SR 981 Section Q20 project is the first section of the overall LVTIP to be advanced by PennDOT District 12.

SR 981, Section Q20 was identified as a candidate for application of the INVEST tool because of its importance to the surrounding communities, sensitivity to environmental resources within the project area, focus of safety to multi-modal users, and the desire to ensure sustainable outcomes in these rural communities. The INVEST analysis began in late 2017 and concluded in early 2019.

INVEST Evaluation

The project team began the INVEST process by developing an initial work plan. The consultant design project team familiarized themselves with the Project Development module and assigned Criteria Leaders to each criterion based on their technical disciplines. The criterion was evaluated and refined based on the project approach and a Custom Scorecard for the LVTIP project was developed. Members of the consultant design project team, DOT staff, FHWA representatives and MPO staff met at various times throughout the process to discuss project design updates as well as INVEST scoring details and revisions based on these design changes. These meetings helped to ensure that the scoring and application of the INVEST criteria was consistently applied across each discipline.

The initial scoring workshop was conducted at the beginning of the INVEST process. Attendees discussed each scoring category and offered input and suggestions. A definitive determination could not be made on some criteria because design had not progressed far enough. As designed progressed, further refinements were made to the scorecard and to the INVEST scoring analysis. Because this analysis focused strictly on the PE phase of the project, additional columns were added to the SR 981, Section Q20 Custom Scorecard to account for criteria points that were not applicable to this phase of the project. (i.e. Final Design and Construction).

A table showing the customized score for each criterion is included below:

INVEST v1.2 Project Development (PD) Scorecard & Questions							
Project	Laurel Valley Transportation Improvement Project - Section Q20	157	66	33	41	7	15
	<small>Note: The scores for each criterion, as a sum of its questions, populate the summary worksheet automatically. Maybe = proposed score for this criterion, but need additional information before determining a "yes" or "no" response. For example, a project team may need to consult additional experts and/or staff to confirm whether or not the criterion requirements have been met before determining the point total.</small>	POSSIBLE POINTS	YES	NO	FINAL DESIGN	CONSTR	N/A
PD-01	Economic Analyses - Up to 5 points	5	2	3	0	0	0
PD-02	Lifecycle Cost Analyses - Up to 3 points	3	2	0	1	0	0
PD-03	Context Sensitive Project Development - Up to 10 points	10	6	0	4	0	0
PD-04	Highway and Traffic Safety - Up to 10 points	10	6	0	3	0	1
PD-05	Educational Outreach - Up to 2 points	2	2	0	0	0	0
PD-06	Tracking Environmental Commitments - Up to 5 points	5	3	0	0	2	0
PD-07	Habitat Restoration - Up to 7 points	7	6	1	0	0	0
PD-08	Stormwater Quality and Flow Control - Up to 6 points	6	4	2	0	0	0
PD-09	Ecological Connectivity - Up to 4 points	4	3	1	0	0	0
PD-10	Pedestrian Facilities - Up to 3 points	3	2	1	0	0	0
PD-11	Bicycle Facilities - Up to 3 points	3	1	2	0	0	0
PD-13	Freight Mobility - Up to 7 points	7	3	0	0	0	4
PD-14	ITS for System Operations - Up to 5 points	5	1	4	0	0	0
PD-15	Historic, Archaeological, and Cultural Preservation - Up to 3 points	3	1	2	0	0	0
PD-17	Energy Efficiency - Up to 8 points	8	2	6	0	0	0
PD-18	Site Vegetation, Maintenance and Irrigation - Up to 6 points	6	3	1	0	0	2
PD-19	Reduce, Reuse and Repurpose Materials - Up to 12 points	12	4	3	5	0	0
PD-20	Recycle Materials - Up to 10 points	10	0	3	6	0	1
PD-21	Earthwork Balance - Up to 5 points	5	4	0	1	0	0
PD-22	Long-Life Pavement - Up to 7 points	7	0	0	7	0	0
PD-23	Reduced Energy and Emissions in Pavement Materials - Up to 3 points	3	0	0	3	0	0
PD-24	Permeable Pavement - Up to 2 points	2	0	0	0	0	2
PD-26	Construction Equipment Emission Reduction - Up to 2 points	2	0	0	0	2	0
PD-28	Construction Quality Control Plan - Up to 5 points	5	0	0	5	0	0
PD-29	Construction Waste Management - Up to 4 points	4	0	0	1	3	0
PD-30	Low Impact Development - Up to 3 points	3	3	0	0	0	0
PD-31	Infrastructure Resiliency Planning and Design - Up to 12 points	12	8	4	0	0	0
PD-33	Noise Abatement - Up to 5 points	5	0	0	5	0	5

Next Steps

Many of the criteria considered as part of the INVEST evaluation followed closely with considerations integrated into PennDOT's project development process. Evaluating each criterion in detail reinforced the value and comprehensiveness of key steps in PennDOT's project development process. In a number of the scoring criteria, the score was achieved with the design that was already being developed and not as a result of new information provided through INVEST. The process provided the project team more broad design elements to consider related to sustainability, such as climate change and the reuse of materials as part of the project.

The final results and scoring show that the process the design team is following is consistent with INVEST principles and adequately considers sustainability. While it does not appear that further use of INVEST in subsequent stages of this project would add significant value as the project advances, the SR 981 project did benefit from the use of INVEST to validate the design team's approach related to sustainability.

Key Outcomes of Using INVEST

This was the first time in Pennsylvania that the Project Development module of INVEST was applied to a state highway design project. As with any "first", this provides lessons learned and opportunities for an assessment of the available processes and tools.

- Items were incorporated into the SR 981 Q20 project in line with the criteria outlined in the INVEST Project Development Module. Some of these items likely would have been considered without undertaking the INVEST process, but using INVEST helped to reinforce and emphasize their importance and ensure they were not overlooked.
- The most prevalent limitation that the project team identified with applying the INVEST Project Development module during the Preliminary Engineering phase was that many of the scoring criteria were not able to be evaluated or scored until later phases of the project. It would be beneficial to develop a scorecard with criteria differentiated by project phase, and in this case, specific to the typical activities completed during Preliminary Engineering. This could be done by creating separate scorecards applicable to each project phase or a consolidated scorecard that allows criteria to be toggled on and off or selected according to project phase. Additionally, there are some components within INVEST that do not apply to the project being evaluated, so an option such as "not applicable" could be considered for project customization. As projects are further developed, previously unscored criteria could be selected. Providing an INVEST spreadsheet or on-line tool to allow the user to toggle on and off and select criteria, as required, would also provide an easier way to customize the scorecard for each specific project phase and remove criteria that are not applicable.