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Stantec transportation green infrastructure/low-impact development application on Scott Avenue Roadway, City of Tucson, Ariz. Photos: Courtesy of Stantec

## SUSTAINABILITY PROFESSIONALS OPERATING AT A HIGHER LEVEL

By John Williams, ENV SP, Level I FSA

**TRANSPORTATION DEPARTMENTS**, water agencies, transit systems, power utilities, and public works departments have to make a dollars- or returns-based case for the pursuit of sustainable infrastructure solutions. This article provides four examples where professionals made the connection between sustainability and project economics. In each case, the results were happy customers and interest in broader use — by engineers — of sustainable infrastructure tools.

### Engineers and economic assessments

In the infrastructure delivery world, economic assessments are typically left to project sponsors and specialists, including economists, accountants, and consultants. These studies tend to have short lives largely because they require extensive research of subject matter that includes aging data as well as an understanding of analytical processes. Because they are expensive (\$50,000 to \$250,000 per run), only the largest projects use them. When they are used, it is only once to justify spending. After that, they are shelved as thousands of decisions are made that impact economic outcomes.

This work is excluded from typical engineering scopes, yet the information required to complete these assessments is in the hands of project designers from early stage project planning through design, construction, operations, and decommissioning. Engineers are relied upon for feasibility studies, project planning, stakeholder outreach, design, environmental assessments, construction oversight, and operations monitoring. The primary reason for past practices of withholding economic assessments from project scopes has to do with the complexity of cost benefit, life cycle, and triple bottom line analysis.

### Envision ‘Rising Stars’

It’s all starting to change. The Institute for Sustainable Infrastructure (ISI; [www.sustainableinfrastructure.org](http://www.sustainableinfrastructure.org)) and the Envision “Rising Stars” are paving the way. Envision Sustainability Professionals (ENV SPs) — those credentialed in the use of the Envision rating system for sustainable infrastructure — now number more than 4,500. Each has made a commitment to training, testing, and practice yielding a higher level of competence within the infrastructure design community. They are to be applauded.

This article is dedicated to a small but growing subset of ENV SPs. You might call them Envision “Rising Stars” because they have recognized, and more importantly, acted on the needs of most project sponsors.

## Running economic assessment alongside Envision ratings

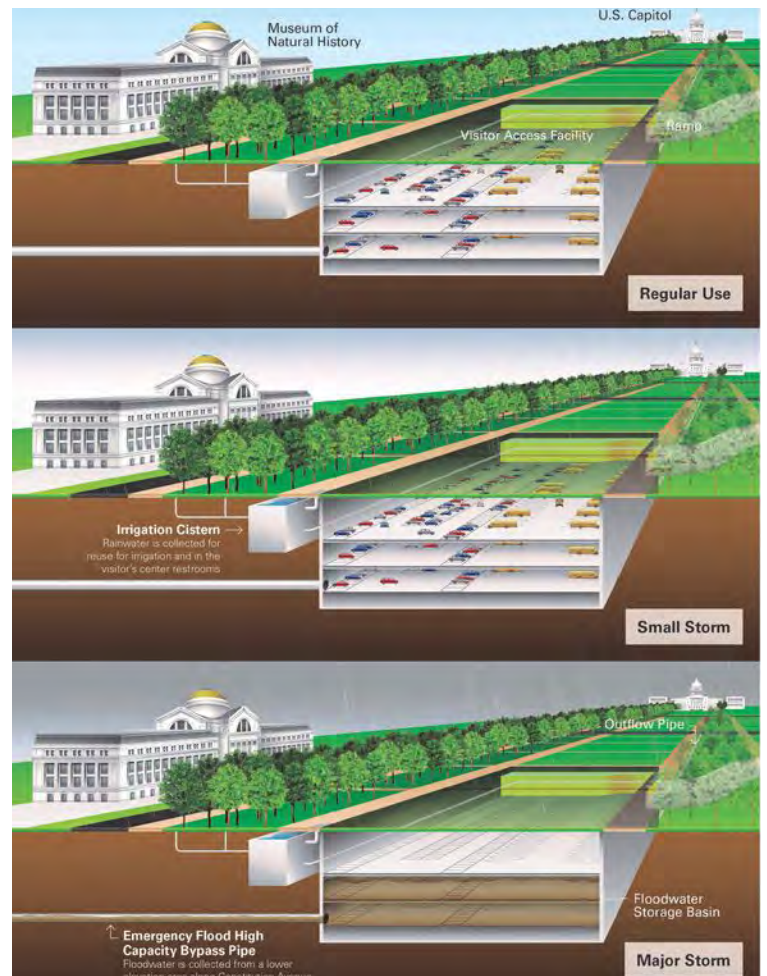
With one exception, each of these Rising Stars were members of ISI's Economics Committee from 2012 to 2015 to develop economic assessment tools that run alongside of and map to Envision. Impact Infrastructure ([www.impactinfrastructure.com](http://www.impactinfrastructure.com)), an ISI Charter Member, provided a team of economists with backgrounds in infrastructure development to work for 2.5 years on a pro-bono basis with the Economics Committee. They created Excel-based tools, user manuals, and documentation referred to as Business Case Evaluators (BCEs). The BCEs have been made available, free of charge. Once the BCEs were pushed into the public domain, Impact Infrastructure created a commercial product called AutoCASE for Sites (a cloud-based automated business case analysis tool) and extensions that enable an engineer-focused analytical interface with Autodesk Building Information Modeling products including AutoCAD Building Information Modeling products including AutoCAD Civil3D and InfraWorks 360. These BIM tools are used for planning and design by engineers around the world.

The combination of AutoCASE ([www.autocase.com](http://www.autocase.com)) and BIM makes it possible for engineers to conduct real-time economic assessments at each decision point in project development and operations. Each assessment can be done at a cost comparable to a steel or concrete take-off. As planning or design decisions are made, engineers can tag features in their solutions, push a "Run Analysis" button, and within seconds have real-time feedback as to the financial, social, and environmental returns associated with the alternative under consideration. Within the same analysis, those returns are divided among Envision categories to show which ones provide the greatest overall value to the stakeholders involved (project owner, financier, host community, taxpayers, and environmental community).

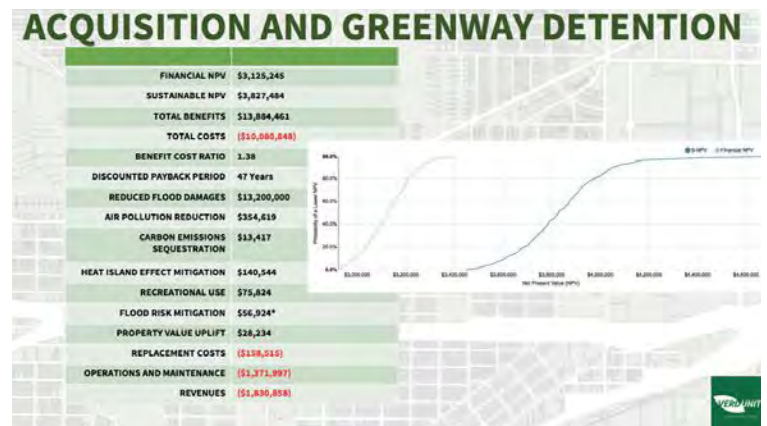
**Case 1** — John Wise, P.E., CFM, ENV SP, and his team from Stantec used a combination of these tools mapped to Envision to evaluate stormwater solutions (both public- and private-sector projects) for Pima County, Ariz. They paid particular attention to the unique characteristics of desert environments. The project sponsors were so pleased that they held a series of public meetings with support from the City of Tucson and Pima Association of Governments showcasing their findings and promoted the tools for use in transportation and associated green infrastructure/low-impact development (LID) stormwater-related projects.

**Case 2** — Kevin Shepherd, ENV SP, and Mikel Wilkins, ENV SP, of VERDUNITY brought the tools to the attention of the Trinity River Vision Authority (TRVA) in Fort Worth, Texas. TRVA was faced with the challenge of evaluating multiple levels of LID for the Trinity Uptown Development Program. VERDUNITY applied the tools to evaluate costs and benefits and Envision responsiveness for a series of alternatives. The effort armed TRVA with the case they needed to justify green solutions. VERDUNITY has since been tasked to provide similar services for other agencies and municipalities in North Texas to facilitate capital improvement plan prioritization efforts.

**Case 3** — Lidia Berger, ENV SP, LEED Fellow, with Dewberry worked with a Dewberry team of engineers engaged in the planning



Washington Mall Underground use scenarios. Image: Courtesy of Dewberry



VERDUNITY's Neighborhood Retrofit Workshop Project valuation results, Central Arlington Heights, Fort Worth, Texas. Image: Courtesy of VERDUNITY

phase for the proposed Washington Mall Underground (NMU). This project is the vision of Washington, D.C., real estate developer and philanthropist Albert H. Small and architect Arthur Cotton Moore, FAIA, working together with the nonprofit National Mall Coalition. NMU is aimed at addressing a combination of stormwater and flood control measures along with pressing needs for increased parking capacity, particularly for the many tourist buses that idle on the streets of D.C., clogging the road network and polluting the air.

Dewberry used these tools to evaluate the financial, social, and environmental returns associated with various green and resiliency strategies such as the reuse of rainwater for irrigation, a green roof, or allowing the lower levels of the parking garage to operate as stormwater detention vaults. Dewberry's analysis revealed that the financial returns for this large-scale underground parking structure were untenable from a cost standpoint; however, this multipurpose, flood mitigation system can operate at a fraction of the cost of a standalone system and provide sustainability and resiliency benefits to the district. The value of public benefit, including social and environmental returns, is significant, causing local officials to give careful consideration to advancing the project. The tools were so helpful that Dewberry is now applying them on behalf of a number of new projects, including its new headquarters building.

**Case 4** — Thomas Batrone, ENV SP, of Hatch Mott MacDonald was not part of the ISI Economics Committee initiative but learned about the combination of Envision and the BCEs on the ISI website. They are engaged in a number of sustainability and resilience assignments on behalf of the City of Pittsburgh and the Pittsburgh Water and Sewer Authority. They have introduced the tools into a stormwater management, green development, and transit projects. The city's chief resilience officer is now encouraging operating departments and closely tied authorities to consider sustainability and comprehensive business cases as strategies for raising the planning and development bar within the City of Pittsburgh.

## Conclusion

More and more, public entities are learning that they can have the benefits of Envision coupled with comprehensive, triple bottom line-based financial assessments at a small fraction of the cost of custom studies. This is possible because their existing engineering teams (especially those with Envision Rising Stars) have access to tools that provide the data they need and automated process for analyzing it. The same engineers and project sponsors know that the use of these tools will enable them to tune their design solutions to reach the highest levels of sustainability for the greatest financial, social, and economics returns.

Each of the Envision Rising Stars have demonstrated competence and their competitive prowess by recognizing the need for sustainability ratings that are tied to comprehensive business cases. They have discovered that their access to information, technology, and analytical skills have given them the upper hand in solving their customers' problems.

**JOHN WILLIAMS, ENV SP, LEVEL I FSA**, chairman and CEO of Impact Infrastructure, Inc. ([www.impactinfrastructure.com](http://www.impactinfrastructure.com)), based in New York City, has spent 37 years in the infrastructure and building delivery industry. Four years ago he founded Impact Infrastructure, Inc., a software as a service company, working in a strategic partnership with Autodesk, with the goal of bringing economic assessment tools to the AEC industry, enabling design professionals to create objective, credible, and affordable assessments for projects of all sizes. He joined the Institute for Sustainable Infrastructure board of directors in 2015.

# CIVIL + STRUCTURAL ENGINEER PROVIDES THE LATEST PRODUCTS AND SERVICES DESIGNED FOR THE ENGINEERING COMMUNITY

The screenshot displays the website for 'civil + structural ENGINEER'. At the top, a navigation bar includes links for CIVIL, STRUCTURAL, MAGAZINE, CONTINUING EDUCATION, CASE STUDIES & WHITEPAPERS, PRODUCTS & SERVICES, and RESOURCES. A prominent blue call-to-action button reads 'VISIT www.cenews.com/products/services'. Below the navigation, a featured article titled 'ROBERT PENCE: LEADING THROUGH EVALUATION' is shown, along with a video player for 'PLAY PRECAST CONCRETE VIDEO'. The 'PRODUCTS & SERVICES' section highlights 'FOUNDATIONS' and 'STRAIGHT-SEAM ERW ATLAS PIPE PILES', featuring an image of pipe piles and descriptive text about their benefits and specifications.