

Case Study:

Roundabouts and Local Partnerships

Arizona

Lead Agency: Arizona Department of Transportation (ADOT)

INVEST Module: Project Development

Link: <https://www.azdot.gov/business/environmental-planning/programs/sustainable-transportation-program>

The Arizona Department of Transportation (ADOT) used all three INVEST modules to validate strategic directions, increase knowledge across core functions, and advance a decision-making framework around sustainability best practices. This case study focuses on ADOT's use of the Project Development module to score and improve the sustainability of twenty roundabout construction projects as well as ADOT's use of INVEST training workshops to facilitate collaboration internally and with local governments.

ADOT Improves the Sustainability of Roundabout Construction

Roundabouts have seen increased application across the United States and in Arizona due to their safety and congestion reduction benefits. Using INVEST, ADOT scored twenty planned or under construction roundabouts. ADOT found the scoring process helpful both in improving the sustainability of the individual roundabout projects and in understanding the sustainability of the state's roundabout program as a whole.

The intersection of State Route (SR) 89 and Perkinsville Road in Yavapai County provides an example of one of the roundabout projects scored. SR 89 is the only state highway connecting Prescott, Prescott Valley and Chino Valley and serves as a key alternative route to Interstate 17 and ultimately Interstate 40. According to the final project assessment, "the goal of this project is to enhance the overall safety of the existing signalized intersection with a solution that best fits the location based on the existing and future geometric, environmental, traffic, drainage and local stakeholder design considerations." Agency cooperation included ADOT, FHWA, Central Yavapai Metropolitan Planning Organization (CYMPO) and the Town of Chino Valley.

*"INVEST was irrefutably acknowledged as a beneficial tool which may continue to broaden lines of discussion, facilitate essential communication and lead to further innovation of design."
- ADOT*

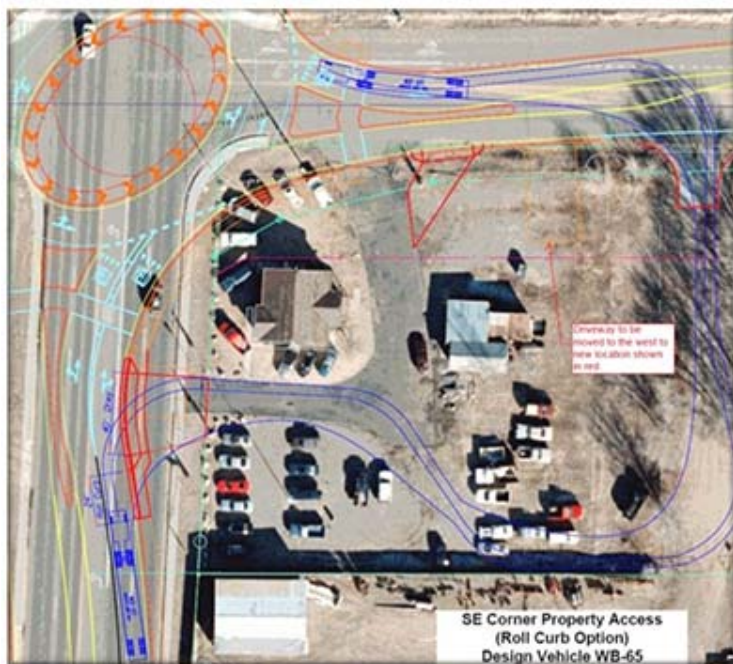
To appropriately blend ADOT's roundabout design criteria and the INVEST framework, the project team started with these nine objectives:

- Apply the project goals that the town, public, regional planning organization, and ADOT district developed in connection with this project.
- Identify how the roundabout would promote and enhance growth given the traffic needs of an economically developing area.
- Design the basic dimensions of the roundabout while fitting within the available right-of-way.
- Identify sustainability criteria most related to construction of this roundabout.

- Consider the impact of commercial truck thru traffic, local commercial truck traffic and the commercial business at the intersection.
- Integrate overall FHWA sustainable highway goals into the project.
- Stress implementation of sustainable practices and gain consensus.
- Make wise investment decisions with limited resources.
- Encourage changes in professional practice and go beyond compliance.

Improving Freight Mobility

ADOT's project goals aligned with INVEST PD-13 Freight Mobility by providing features that make freight transportation more efficient, thereby reducing fuel consumption, decreasing emissions and reducing noise pollution. The SR 89 Perkinsville roundabout project aimed to reduce rush hour traffic queuing, especially of commercial trucks which may be utilizing SR 89 as an I-17 alternate. Local agriculture commercial truck traffic on the southeast corner of the roundabout was a consideration (see figure 2). Project design considerations included commercial truck traffic context sensitive solutions, commercial truck ingress and egress, truck apron width, and commercial truck traffic continuous flow. The INVEST scoring exercise was an additional platform in which all these issues could be scored, reviewed and assessed. ADOT benefited from using INVEST as a simple and easy format to determine sustainability linkages and introduce the sustainability return on investment concept.



Freight Considerations - State Route 89 and Perkinsville Road, Chino Valley, AZ
PD-13: Freight Mobility Score – 7/7

- 2 Points – Safety improvements specific to freight
 - 2 Points – Design and construction adjustments specific to freight
 - 3 Points – Construct dedicated truck delivery ingress and egress
- Overall, the project scored 41 points in INVEST, giving it a Silver rating.**

Sustainability Improvements Spurred by INVEST

Through an additional scoring effort of non-roundabout projects using INVEST criterion PD—29 Construction Waste Management, ADOT learned that it could make gains on managing waste streams from pavement preservation projects. When ADOT conducts a mill and replace pavement preservation project there can typically be up to three inches of pavement removed in order to then repave and smooth the driving surface. The waste from the road millings must then be stockpiled onsite or elsewhere. Reducing the distance dump trucks need to haul the waste can significantly reduce emissions. ADOT is working to standardize coordination with contractors responsible for removing the waste to ensure waste streams are considered and documented much earlier in the design process, possibly as early as the project scoping document.

Through evaluating project performance on INVEST criterion PD-21 Earthwork Balance, ADOT learned that it could maximize sustainability improvements in this area by focusing on rural projects. 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. ADOT's urban projects are more centrally located to construction fill material sources and hence earthen materials do not need to be transported as far. At the other end of the spectrum are the remote rural projects that incur extensive distances to access available construction fill material. As such, focusing on rural areas will maximize impact. ADOT has already documented examples where design teams have reconsidered construction fill destinations and adjusted the balances needed by maximizing on-site excavation availability.

ADOT is also considering how to further link asset management and planning within the agency, as described in INVEST criterion SP-15 Linking Asset Management and Planning. Building on this, ADOT is assessing the viability of using INVEST to document and support transportation asset management plan reporting requirements in federal transportation law.

INVEST Facilitates Collaboration with Local Governments and across ADOT

Local governments are key ADOT partners. Many have transportation projects administered by ADOT, and for some remote towns, the state highway is the sole arterial. ADOT developed a local government training on INVEST and scheduled workshops with the cities of Sedona, Flagstaff, and Scottsdale, with plans to expand to others. ADOT found the trainings to be a powerful partnering tool. ADOT and its local partners used the INVEST sustainability framework to develop shared visions for sustainability and specific project improvements.

The City of Sedona, Arizona used INVEST to examine one of the largest ADOT / Sedona roadway projects the two entities have undertaken in recent years – the design, development and construction of seven roundabouts and the further mainline roadway redevelopment on State Routes 179 and 89A (four of the roundabouts can be found in Figure 3 below). Sedona found that the INVEST criteria aligned well with the city's planning goals. Seeing value in the process, Sedona decided to continue working with INVEST.



The SR 179 Roundabouts project in Sedona, AZ scored 75 points, or Platinum level, on INVEST.

INVEST also helped ADOT further internal lines of communication, sparking new types of discussion and collaboration. ADOT found that INVEST's utility could be maximized through a "cradle to grave" scoring process - a collaborative approach in which a scoring project is handed off between planning, project and maintenance personnel to score. INVEST scoring would begin in the early planning and design phases; seamlessly move into environmental, materials and other technical studies; and conclude after construction and mitigation are complete.

Key Outcomes of Using INVEST:

- Integration into ADOT decision-making of a comprehensive platform for assessing programs and practices using a holistic sustainability lens.
- Plans to improve management of waste streams from pavement preservation projects.
- Integration of key ADOT partners into the transportation sustainability conversation.
- ADOT is now using INVEST for other projects in addition to roundabouts. ADOT is evaluating projects ranging from pavement preservation, to bridge deck rehabilitation, to new lane miles.