

NDOT TSMO Investment Prioritization Tool (IPT)



By Nevada Department of Transportation

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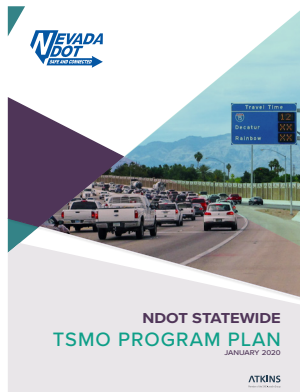
Benefits Statement

The Nevada Department of Transportation's updated TSMO Investment Prioritization Tool improves project selection by considering safety, travel time reliability, and cost efficiency. It saves lives by prioritizing safer roads, saves time through reduced congestion, and saves money by allocating resources efficiently. Additionally, it addresses environmental concerns by reducing greenhouse gas emissions. Enhanced collaboration ensures streamlined decision-making, optimizing resource allocation and potentially reducing project costs. This tool contributes to a more reliable and cost-effective transportation system.

In this case study you will learn:

1. How NDOT upgraded the IPT tool with diverse criteria for project prioritization.
2. How NDOT collaborated with stakeholders and held training sessions for better tool integration.
3. How the update considered urban and rural needs, aided carbon reduction planning, and improved corridor challenges, promoting internal collaboration.

BACKGROUND



The Nevada Department of Transportation (NDOT) Statewide Transportation Systems Management and Operations (TSMO) Program Plan was developed and formally adopted in 2020. As part

of this program, NDOT Traffic Operations (TO) division developed and planned for integration of TSMO business processes, procedures, and tools into NDOT's day-to-day business. One example of the newly adopted business processes was the TSMO Investment Prioritization Tool (IPT), which was initially developed and adopted in 2020. In 2022 and following the agency's TSMO implementation planning phase efforts, NDOT recognized the need to further refine and adjust the tool's prioritization criteria. Therefore, they initiated the TSMO IPT Update project to:

- Include additional quantitative criteria to measure and inform selection of projects that can help address safety, travel time reliability, and congestion improvements.
- Add asset management requirements to the project selection and prioritization process.
- Better assign project deployment time-frames based on data-driven and performance-based analysis of critical corridors.
- Add Greenhouse Gas Emissions (GHG) reduction potential criteria to calculate the projects' contribution to GHG and carbon reduction.



TSMO PLANNING, STRATEGIES AND DEPLOYMENT

NDOT first integrated this tool into the project prioritization process of their Statewide Intelligent Transportation System (ITS) Strategic Deployment Plan (SDP). Following this successful integration, NDOT identified the opportunity to enhance the tool and include additional data-driven and performance-based criteria, enabling further alignment with NDOT's Planning division efforts in selection and funding of Statewide Transportation Investment Plan (STIP) projects. Therefore, in 2022, NDOT initiated the TSMO IPT Update project to update the existing parameters and add planning-level data analysis criteria. Recognizing that the transportation needs and priorities may change, NDOT also introduced a weight factor to the prioritization process.

In collaboration with stakeholders, NDOT updated the TSMO IPT to include the following additional qualitative and quantitative prioritization criteria:

- Quantitative criteria:

- o Crash reduction potential: (crash reduction index + equivalent property damage index) x safety improvement potential score
- o ITS asset improvement: per the ITS assets'

health condition calculations established within the Lifecycle Planning Tool of the NDOT Statewide Transportation Asset Management Plan (TAMP)

o Resilience: per the maintenance/work type cost calculations established within the Lifecycle Planning Tool of the NDOT Statewide TAMP

o Travel time improvements: average versus potential travel time reliability improvements data and the type of proposed travel demand strategies

o Travel time reliability: planning time index x potential reliability improvement score

o Business accessibility: total employment within 1 mile of the project area x total truck movements/average annual truck traffic

o Economic development potential: proximity to an identified economic development zone designated by the Governor's Office of Economic Development

o Access to community destinations: total number of community facilities within 5 miles of the project

o Equity improvements: miles of improvement to the statewide fiber network

- Qualitative criteria:

o Project connectivity: improvement potential of connectivity through the new or existing mobility strategies

o Multimodal access: improvements potential to one or all pedestrian, bicycle, or transit facilities

o GHG emissions reduction: the extent of project's contribution in reducing congestion, encouraging electrification, or diversifying modal choices

o Reduction in future maintenance requirements: maintenance requirements established within the Statewide TAMP

o Strengthen TSMO integration: improvement opportunities to develop or maintain sustainable and balanced design, operations, and maintenance project lifecycle

- Other qualitative/quantitative criteria

o Cost: initial cost of the project procurement and/or deployment

o District priority: preferred implementation time frames

o Dependencies, business risk, and limitations: level of risks and degree of impact of a specific project

o Risks severity: risk level based on the qualitative analysis of dependencies, business risks, and limitations

o Benefit/cost ratio (BCR): level of BCR, depending on the proven BCR of the proposed project

o Strategic value: assess the strategic demand or need for implementation

o Communication infrastructure needs: reviews by the IT Group to identify potential challenges and/or communication infrastructure needs

Based on the above criteria, the tool will then assign an overall TSMO score to the project and prioritize them based on this score from highest to lowest.

COMMUNICATIONS PLANNING AND EXECUTION

NDOT TO worked closely with the Planning division to ensure the tool's criteria are aligned with the One Nevada Plan (Statewide Long-range Transportation Plan) . Once the tool was updated, NDOT held workshops with all districts and stakeholders to educate and train the districts on the utilization of the tool and explained the incorporation process of the tool into everyday business. Adjustments and changes were then made to incorporate stakeholders' comments and feedback. These played a key role in ensuring that not only the tool maximizes integration of TSMO, but also is comprehensive to meet the specific needs of each district.

In addition, NDOT developed an online TSMO IPT training module to further educate existing and new internal and external team members. This training was developed as part of the NDOT TSMO Staffing and Workforce Development Plan. This tool has been successfully integrated into the Statewide ITS and ATM Master Plan, TAMP, and Maintenance and Asset Management Program (MAMP).

OUTCOME, BENEFITS AND LEARNINGS

Much was achieved and learned through the successful update and implementation of the NDOT TSMO IPT, including:

- In the update process, NDOT not only used the Federal Highway Administration's (FHWA) existing benefit-cost tools for TSMO strategies, but also developed a methodology to determine level of benefits in both rural and urban application of specific strategies. This step was critical as the strategies' benefits may vary depending on the nature of needs and priorities in rural versus urban areas.
- Although the primary goal with this project was to incorporate data-driven and performance-based criteria, NDOT identified the need to ensure the updates are made with consideration to available data and performance measures. In addition, considering the diverse nature of the state's transportation system (rural versus urban) NDOT recognized the importance of ensuring that the criteria is a good reflection of stakeholders' needs and priorities and all stakeholders have an equal chance for resource allocation. Furthermore, internal collaboration and coordination between TO and Planning divisions enabled integration of planning-level analysis and integration for TSMO implementation.
- This exercise provided the Planning division with the opportunity to integrate TSMO elements into the Nevada Carbon Reduction Strategy, which is due to FHWA by November 2023. This enabled inclusion of several demand management and multimodal strategies to assist NDOT and metropolitan planning organizations (MPO) in formal planning for and allocating resources to TSMO

strategies' implementation.

- The two-way communication between TO and the Planning division enabled identification of gaps and needs in the project prioritization process of both divisions.
- Improved capability maturity through the confidence, knowledge, and experience of addressing institutional, organization, and procedural needs to implement the tool. In addition, it identified the need to develop a TSMO-specific training module on how to use this tool, which is available both internally and externally.
- Bridged the gap between TO and Planning divisions' project selection and prioritization process, enhancing TSMO culture at the agency level.
- Through the updated TSMO IPT, NDOT can now better address safety, travel-time reliability, and congestion challenges, especially within the critical corridors and on the critical assets as identified by the Statewide ITS and ATM Master Plan.
- Enhanced internal collaboration with the IT Group to determine infrastructure needs and readiness for the proposed projects.