Project Initiation with Mapping Tool Speeds MassDOT Project Delivery

An online project planning application developed by the Massachusetts Department of Transportation is expected to speed up project delivery while improving stakeholder engagement and environmental outcomes.

The MassDOT Project Intake Tool (MaPIT) streamlines project initiation and approval while also screening against multiple databases to flag any potential permitting logjams.

MaPIT uses a map-based interface and accesses the agency’s various transportation asset, environmental, and safety datasets to make the path from project initiation to environmental permitting, project priority scoring, and project delivery more seamless and efficient.

The process of meeting with proponents, initiating the project, and having these projects approved “has absolutely been faster,” said Michael Bolduc, Transportation Planner and GIS Specialist at MassDOT. “We’ve had a lot of really positive feedback,” he said.

Screening Against Multiple Databases

MaPIT streamlines project delivery by integrating several processes. At MassDOT, a transportation project intended for the Transportation Improvement Plan begins with two forms. The Project Need Form describes existing conditions and why a project is needed, and the Project Initiation Form describes what is being proposed and the scope of the project. Projects can be initiated either internally by MassDOT or externally by a city, town, or other local authority, according to Bolduc.

The MaPIT tool merges these two separate processes into a single online application. At the same time, as the project need is being developed, the tool screens against multiple geographic information system (GIS) layers, including:

- road inventory,
- highway facility information,
- roadway condition,
- bridge database,
- transit routes,
- rail inventory,
- crash data,
- environmental concerns,
- social equity concerns.

Also, mapping is handled earlier in the project cycle, which creates a better workflow for the agency’s digital mapping staff, according to Kevin Lopes, Manager of GIS Services at MassDOT.

MassDOT District Project Development teams are notified by MaPIT when a project is ready to be reviewed for approval. Upon approval, the tool pushes all the information acquired during initiation process directly into MassDOT’s project management database and system of record—
known as ProjectInfo—and the project is assigned a number. Efficiencies are realized because MaPIT populates the project database with relevant data “in one fell swoop,” Bolduc said.

MaPIT is part of MassDOT’s suite of tools called geoPASS—the Geospatial Planning, Analysis, and Screening Suite—that includes interactive descriptions of planned capital investments and maps of current approved MassDOT Projects.

Tool to Do More

The tool originally was conceived as an environmental screening tool but the development team soon recognized its potential to be much more. MassDOT applied for funding under Round 2 of the SHRP2 Implementation Assistance Program’s expediting project delivery focus area. SHRP2 funding was critical for getting the tool launched, said Tim Dexter, with MassDOT’s Environmental Services Section and a key member of the team developing the concept. “We had this grand idea with really no way to actually move it forward” if it weren’t for SHRP2, he said.

As the project scope expanded, the team looked at making the project initiation, mapping, and scoping process more efficient. Under the state’s system, the GIS staff would begin mapping only after projects were planned, approved, and entered into the ProjectInfo database. This required them to retrieve projects from the database and “individually draw each project, which is fairly labor intensive,” Dexter said. The MaPIT tool streamlines that process, automatically providing the project limits in a GIS format. It also can be used to create maps of project locations for public notice and engagement.

When initiating a project with MaPIT, the user draws the project boundaries on a map and then the tool automatically checks against all of MassDOT’s relevant GIS layers. “The hope is to not only help you through the application processes but also to screen against any potential problems” early in the process, Bolduc said. When considering land use, habitat, and wetland concerns, for instance, MaPIT will help planners identify any potential permitting issue and avoid problems later on, he said.

Improved Outcomes

The tool also is expected to improved environmental outcomes. For projects initiated before MaPIT was launched, the Environmental Services Section typically got involved after a project was about 25 percent de-
signed, Dexter said. Staff would begin design reviews and the permitting process, but the scope of work would already have been set. If at that point MassDOT staff or one of the state or Federal regulatory agencies had significant concerns about the design, then “we’re going backwards in the whole design process,” he said.

With MaPIT, staff are now able to ask informed questions when the project is planned, scoping the project accordingly to address those concerns. “The ultimate goal from the environmental perspective is to ask the right questions when you plan a project, before you scope it and design it,” Dexter said.

**Version 1.0**

MaPIT was introduced around the beginning of December 2017 to cities, towns, and other local authorities. According to Bolduc, there are many more pieces that MassDOT wants to add to MaPIT to make it even more useful. For instance, the tool currently identifies environmental justice and Title VI populations, but more could be done. According to Bolduc, there are plans to incorporate information from one of the interactive maps called the **Engage Tool**, which uses census data to help identify historically underserved populations.

Also, as MassDOT develops risk and vulnerability information for its transportation assets, all of the vulnerability data will be incorporated into MaPIT. Just as a project can be screened for critical habitat or crash clusters, “we’ll be able to screen for what assets may be vulnerable to severe storms, whether it’s a coastal storm or an inland storm,” Dexter said. “This is how we’re going to integrate climate change adaptation and planning into our project development process,” he said.

So far, MassDOT, the Department of Conservation and Recreation, and several municipal proponents and design consultants have entered several batches of projects into MaPIT. MassDOT will have a better understanding of the benefits with regard to multi-year projects as more projects are initiated, said Bolduc.

**Challenges and Lessons Learned**

The project was undertaken in partnership with ESRI, the GIS company. ESRI dedicated staff to the project, helping keep the project on schedule as the team worked through requirements changes and data mappings. However, ESR went through some staffing changes mid-way through, which required MassDOT to spend time getting the replacement up to speed on the project, Lopes said.
Also, the tool requires the use of the Massachusetts government’s XML Gateway, which is managed by the state’s IT office, according to Lopes. The IT office provided MassDOT with resources to develop the project, but the development environment was not very stable and it had negative impacts on tool testing and staff training, Lopes said. However, it was a good learning experience for MassDOT.

**Transferability and Advice**

MaPIT could be a model for other state DOTs without too much concern about their GIS platform, Lopes said. If another state “had minimal GIS licensing, they could still get the same functionality out of it,” Lopes said. “It’s all about the data.” According to Lopes, Rhode Island is looking into doing something similar.

Also, other states that consider developing a tool should make sure the project is fully scoped before budgeting. Changes in the scope of the MaPIT development project meant that MassDOT’s budget for the effort was insufficient.

More realistic budget estimates could be developed by spending more time upfront analyzing the effort and complexities involved with working with third parties, such as ESRI and the state’s IT office.

Additionally, MassDOT suggests working closely with partners to ensure the availability of needed resources.

A video about the tool may be viewed on YouTube.

For more information contact:

Michael Bolduc, Transportation Planner and GIS Specialist at Michael.Bolduc@state.ma.us;

Kevin Lopes, Manager of GIS Services at Kevin.Lopes@state.ma.us; or

Tim Dexter, Environmental Services Section at Timothy.Dexter@state.ma.us.