SHRP2 SOLUTIONS
STRATEGIC HIGHWAY RESEARCH PROGRAM

Road Weather Management
L01 e-Tool Demo
New Hampshire DOT Winter Weather

U.S. Department of Transportation
Federal Highway Administration

American Association of State Highway and Transportation Officials
AASHTO

Transportation Research Board
of the National Academies

- New Hampshire Department of Transportation (NHDOT)
- Reducing nonrecurring congestion through winter weather management and weather-related incident management activities
- Essential program elements include:
  - weather related messaging on dynamic message signs (DMS) and 511 traveler information
  - advisory speed messaging
  - Night Riders that patrol for icy conditions 24/7 during winter
  - road weather information system (RWIS) stations
  - freeway service patrol that operates during commuting hours
  - reporting of roadway conditions by plow truck drivers to the traffic management center (TMC)

NHDOT has a desire to improve business processes within the following topics:

1. **Communications between Districts and the TMC**
2. Communications between the TMC, plow truck drivers, and first responders
3. Incident timeline reporting during the winter months when operations are turned over to Districts
4. Incident notification time to the public

Step 1: Identifying Influences

The first step in this methodology involves determining what influences made it apparent that there is a need to improve business processes in order to improve travel time reliability. There are three categories of influences identified in the SHRP2 Report: Integrating Business Processes to Improve Travel Time Reliability. They are top down, also known as "big directive", event driven, and needs or opportunity based, also known as "grassroots".

TABLE 3.1. TIER LEVELS FOR PROCESS INFLUENCES

TIER	DESCRIPTION OF INFLUENCE	CASE STUDIES
Tier 1: Big Directive (Top Down)	Big-directive influences are typically legislative requirements or management-level directives. Broad external factors such as safety concerns, economic parameters, or larger governmental accountability initiatives also may drive the influence. Big-directive influences tend to greatly accelerate process development, integration, and change and also increase accountability of those responsible for implementing.	• WSDOT Joint Operations Policy Statement and Instant Tow Program • NCDOT Traffic and Safety Operations Committee • Kansas Speedway Special Event Traffic Management
Tier 2: Event Driven	Event-driven influences are caused by a specific event or hazard that prompts a need for improving process integration. The initial event can prompt change, but if the event does not recur, momentum or support for the change can erode over time.	• MDOT Work Zone Traffic Control Modeling • NDOT I-80 Winter State-Line Closures
Tier 3: Needs Based/ Opportunity Based (Grassroots)	Needs-based/opportunity-based influences evolve over time according to recurring needs. These types of changes typically affect day-to-day operations and begin at the grassroots level of an organization.	• Florida Road Rangers Freeway Service Patrol Program • The Palace at Auburn Hills Special Event Traffic Management • San Pablo Avenue Signal Retiming • AZTech Regional Archived Data Server • United Kingdom Active Traffic Management

To complete Step 1, choose the type of influence applicable to the current process from the drop-down menu below. Use the box below to describe the influences for the process that caused a need to improve travel time reliability.

When finished, click Next at the top/bottom of the screen to move on to step 2.

Choose type of influence: Bottom-up

Please describe your influences:

There is a Needs Based/Opportunity Based (Grassroots) influence at the staff level to improve current business processes for incident management and winter weather management. Commissioner staffers are provided with a weekly incident briefing on assistance call-outs that occurred over the weekend. These include incidents with road closures or road closured due to downed power lines with debris. The purpose of the briefings is to keep Commissioner staff informed of DOT/TMC activities.

Step 2: Defining the specific reliability goal

The second step in this methodology is to identify and define the reliability goal or goals that the agency can use to measure the effect of the business process implemented to improve travel time reliability. A reliability goal focuses agency efforts on the problem at hand regardless of any specific process used to achieve that goal. Goals also assist in the development of benchmarks that an agency can use to determine how well the process is meeting the identified need.

Reliability goals may include

- Reducing incident clearance time
- Providing 24/7 operations
- Improving resource efficiency
- Reducing congestion
- Reducing delays

Use the area below to describe the reliability goal for this process. Be sure to choose a measurable goal related to improving travel time reliability.

When finished, click Next at the top/bottom of the screen to move on to step 3.

Please describe your reliability goal(s):

Reduce incident clearance time. Need to monitor and reduce incident clearance times over time. A base incident clearance time should be established based on historical conditions and then thresholds should be set based on specific type of incidents.

Improve incident notification time to the public. TMC operators are currently tracking incident notification times to see if they are meeting the 10 or 20 minute window for notifying the public. A news agency website (WMUR.com) pushes traveler information to the public via a mobile app and push alerts, and the TMC also displays messages on DMS.

Improve incident timeline reporting to the TMC. The TMC is trying to implement incident severity level reporting, and there has been a good response for crashes on the Turnpike and major highways. However, crashes on state highways and rural routes are not reported to the TMC as often, or the TMC is notified as an incident is being cleared. If there is a major road closure on these routes, the TMC should be notified so they can post a DMS message on adjacent major highways. Minor incidents that can be cleared quickly don't need to be reported to the TMC.

Step 3: Identifying and Documenting Current Business Processes

Once reliability goals are identified, it is important to identify and document the current business process and workflow. A business process defines a series of actions or activities that result in a specific or desired outcome to accomplish a specific organizational goal. The process includes actions that are taken every day, but the connections between all stakeholders, their roles, the communication or data flows, and the intersection of those data or communication flows may not have been formally mapped at this point. The purpose of this step is to formally document the current process to visually facilitate a better understanding of that process.

There are important benefits in documenting the existing or baseline processes. One benefit is understanding how the data flows, the decisions points, and where the process integration occurs. Understanding the critical entities and actions that effect travel time reliability and performance on a broader scale will help an agency identify areas for improvement. By documenting the current processes, the agency or stakeholders will also be able to identify critical gaps or issues and key components or enablers to establish a more efficient process. Documenting the processes also helps to identify stakeholders that are missing from the current process, and formalize roles and responsibilities to improve the continuity of the business process with personnel changes.

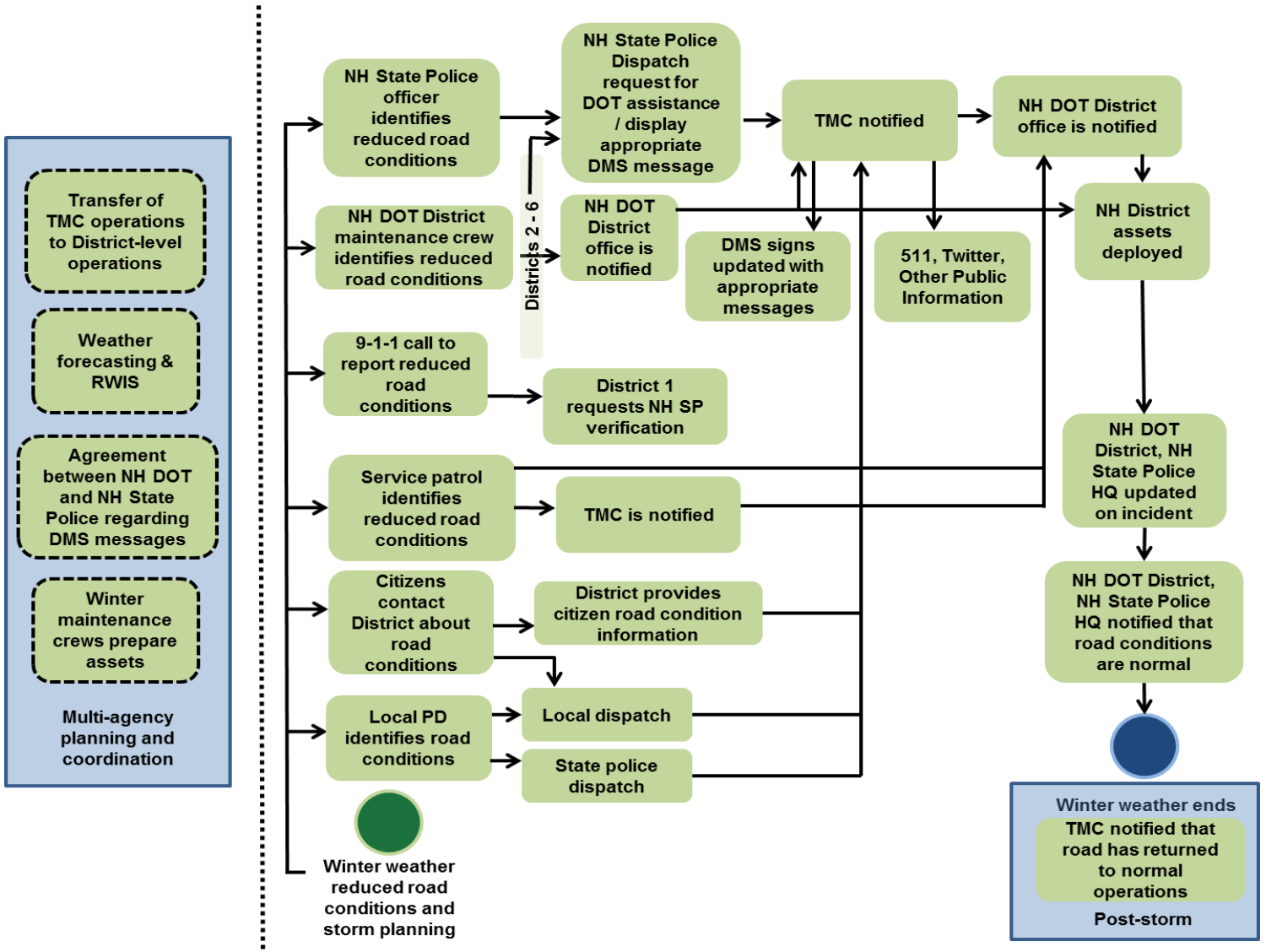
To describe your existing process, either upload a pertinent Business Process Model file or describe the process in the box below. When finished, click Next at the top/bottom of the screen to move on to step 4.

Upload new or select existing Business Process Model file:

Upload | Open | Remove

Please describe your existing process (optional):

- State law dictates that the Fire Department is Commander on Scene for all incidents. This was noted to be added to the map.
- The District 2 Engineer is responsible for sending approved messages to the TMC to forewarn motorists of an upcoming storm. The messages are posted prior to the storm; after the storm hits, TMC staff and State Police update messages as needed.
- If there is an incident on the Interstate, TMC staff enter the information into 511, post messages on Twitter, and display messages on DMS. Advanced messaging is used to support brining operations (Brining Ahead messages), provide advanced notice of a storm, and notify motorists of what's happening during the storm.
- Other TMC resources for distributing information include service patrols and portable message boards. DOT Foremen make the decision on where equipment will be deployed to.
- NHDOT has a Snow & Ice Policy that establishes how they will respond to storm events.
- NH State Police identifies reduced road conditions and notifies State Police dispatch, who determines if DOT assistance is needed. State Police Dispatch notifies the TMC, and TMC staff notify either the District office or Night Riders. The TMC also notifies the public via DMS messages or via 511, Twitter, or other public information system.
- District staff notify the TMC if a roadway closure is anticipated to be 1 hour or longer.


Transfer of TMC operations to District-level operations
Weather forecasting & RWIS
Agreement between NH DOT and NH State Police regarding DMS messages
Winter maintenance crews prepare assets
Multi-agency planning and coordination
NH State Police officer identifies reduced road conditions
NH State Police Dispatch request for DOT assistance / display appropriate DMS message
TMC notified
NH DOT District office is notified
NH DOT District maintenance crew identifies reduced road conditions
Districts 2 - 6
NH DOT District office is notified
DMS signs updated with appropriate messages
511, Twitter, Other Public Information
NH District assets deployed
9-1-1 call to report reduced road conditions
District 1 requests NH SP verification
Service patrol identifies reduced road conditions
TMC is notified
NH DOT District, NH State Police HQ updated on incident
Citizens contact District about road conditions
District provides citizen road condition information
NH DOT District, NH State Police HQ notified that road conditions are normal
Local PD identifies road conditions
Local dispatch
State police dispatch
Winter weather reduced road conditions and storm planning
Winter weather ends
TMC notified that road has returned to normal operations
Post-storm

Step 4: Developing/Changing and Implementing Process

This step is broken down into two parts. The first, develop or change the process, builds upon the process map built in step 3. Solutions to identified needs and goals are addressed here and incorporated into the existing process maps. Utilizing the influences identified in Step 1 will help to guide the changes in processes to improve travel time reliability. Involving key personnel that work closest to the process is beneficial, as they will have extra incentive to produce an effective process.

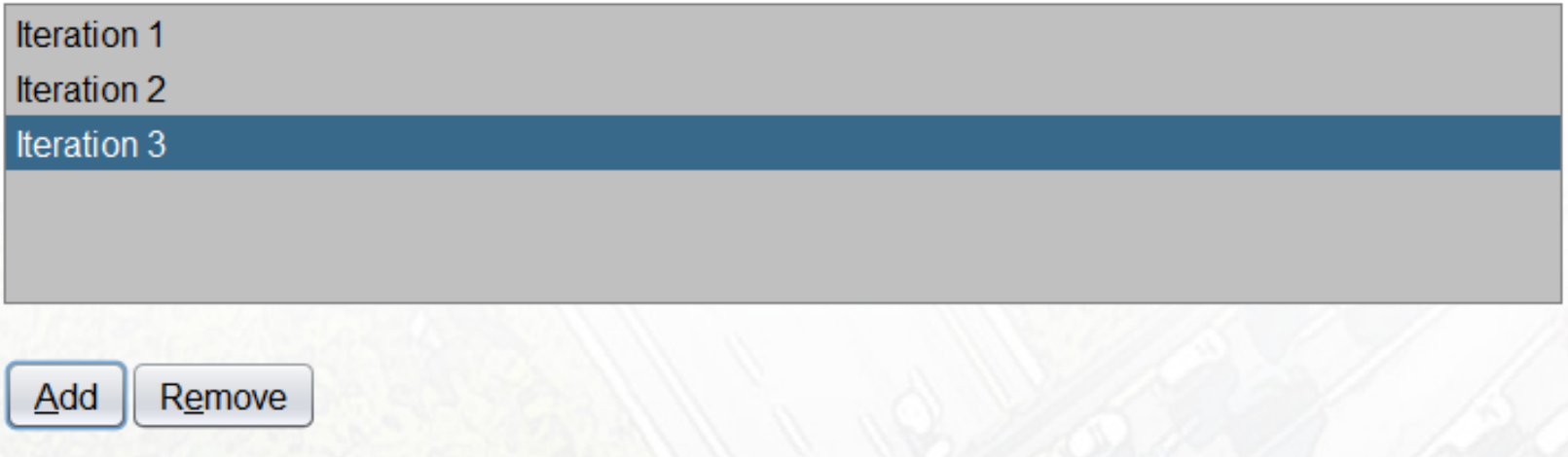
Because step 4 may have multiple iterations before it is deemed acceptable to move on, this tool will allow the storage of information for multiple iterations.

To add an iteration, click the Add button then update the process maps and use the text box at the bottom of the page to describe how the changes were implemented.

To view or edit an old iteration, click on the appropriate iteration.

When finished, click Next at the top/bottom of the screen to move on to step 5.

Iterations:



Add New Or Changed Process Documents in Iteration 1:

Upload Open Remove

Please describe your newly developed or changed process in Iteration 1 (optional):

Improve communication between first responders and the TMC.

Please describe how you will implement your process in Iteration 1:

State Police, County Sheriff's Offices, and local police departments all notify the TMC of incidents; however, there is often a breakdown in communication with smaller, local agencies. For example, there was a major incident that occurred recently, and the TMC was not notified until the incident was being cleaned up. In other cases, a road may be closed for several hours, but the TMC is never notified. There is a need to improve relationships with these smaller agencies and encourage them to include TMC notification as part of their standard protocol.

Step 5: Assessing Process

Step 5 involves assessing the process. Some level of assessment is important to determine the effectiveness of that process. Step 5 is the third part of the iterative cycle introduced in step 4. The results of this assessment are then either fed back into step 4 in order to make additional changes, or are used in moving forward to the next step of the overall process.

Ensuring that a measure of success, a method for continuous evaluation, and data needed to complete the evaluation is important. These things provide a means to communicate the effectiveness of the process with senior managers and vital staff. By measuring the effectiveness of the process, opportunities are available to periodically evaluate performance in an ongoing effort for improvement of travel time reliability. It is also important to assess processes against pre-implementation conditions; this will provide an opportunity to determine if any changes made to business processes are effective at improving travel time reliability.

Iterations created in step 4 are viewed and edited for step 5.

To view or edit an iteration, click on the appropriate iteration.

The requested information below is designed to assist the group in completing this step and determining the next step forward.

Iterations:

- Iteration 1
- Iteration 2
- Iteration 3

Please describe the performance measures you will be assessing in Iteration 1:

Please describe the methods you will use to evaluate your performance measures in Iteration 1:

Please describe the data you will need to evaluate your performance measures in Iteration 1:

Please enter the collected data you need to evaluate your performance measures in Iteration 1:

Please detail the findings/results of your evaluation in Iteration 1:

Step 6: Documenting Process

Documentation typically occurs once the process has been implemented and proven effective. Documentation is intended to provide detailed steps of the business process, the evaluation process, and the stated benefits and lessons learned. Documentation should also include the roles and responsibilities of the stakeholders involved in the future.

Documentation will help to demonstrate performance against the goals identified in Step 2 and will also facilitate easier updates and modifications to the process in the future. If time is not available to prepare detailed process models, it is recommended that at minimum, key steps, relationships, information exchanges, and other details be documented. These types of documentation can be achieved through developing internal memorandums, informal memorandums of understanding (MOU), user guides, or other complex agreements between stakeholders.

Below is an area available to describe the documentation for this process, as well as an option to upload the documentation. Large documents, such as user guides, and diagrams should be uploaded. To access a document that has been uploaded, select the document, and then click Open. When finished, click Next to move on to the final step.

Please describe how you will document your process/changes:

Step 7: Institutionalizing the Process

The seventh and final step is institutionalizing the process. It is the way in which a new or changed process is incorporated into existing policies or management programs. Institutionalizing typically starts at the higher levels of an organization, but must be able to survive changes in management and personnel. The most successful business processes rely on linking the process to firmly established agency goals, objectives, or mission-critical activities.

There are four main strategies and considerations to keep in mind when institutionalizing processes. The first item to keep in mind is the importance of buy-in and ongoing support for the process. If the stakeholders do not support and encourage the use of identified business processes, it may not remain a viable process. The second strategy that will greatly assist in institutionalizing business processes is developing formal documentation that is accessible and available to all stakeholders. This formal documentation and accessibility of the documentation will help institutionalize implemented processes to improve travel time reliability.

The third consideration is focusing on the sustainability of the documentation. Formal agreements tend to last longer than informal ones. Lastly, remember that performance management programs can provide an important back-check and justification for continued support of implemented processes. A success performance management program extends beyond monitoring and reporting on key performance indicators by using the outcomes to better inform management and programmatic decisions.

Use the text box below to describe how the process will be institutionalized. Keep the strategies and considerations discussed above in mind when completing this section.

Please describe how you will institutionalize your process: