

TENNESSEE DEPARTMENT OF TRANSPORTATION (TDOT) STATEWIDE ENVIRONMENTAL MANAGEMENT SYSTEM (SEMS)

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ABSTRACT

Project Objective

The objective of the **Statewide Environmental Management System (SEMS)** is to coordinate, develop, and implement a streamlined enhanced transportation management system resource that is transparent, seamless, accessible, timely, and supportive of Tennessee Department of Transportation (TDOT) and its partners' transportation project delivery for the citizens of Tennessee.

Project Approach

“**SMART Delivery**” is a TDOT's approach to providing transportation services to the driving public in Tennessee through a streamlined, manageable, accountable, responsible and transparent (SMART) project delivery process. The basic principle of this new approach is simple: work smart and get it right the first time. This can be easier said than done, but it is possible. The department started paving the way in 2006 to accomplish SMART Delivery through various initiatives focused on improving performance without compromising environmental stewardship and while enhancing stakeholder involvement. SEMS is one of these initiatives envisioned to be a comprehensive group of processes that will streamline TDOT's project delivery process by connecting the stakeholders in each phase of project development from Long Range Planning to Maintenance. SEMS will deploy a shared Geographic Information System (GIS) with analysis tools, a workflow/tracking application for the transportation decision-making processes, and the organizational change management initiatives to facilitate the implementation of the new processes throughout TDOT and in partnership with the appropriate local, state and federal agencies.

Current or Anticipated Results

SEMS is envisioned to establish a collaborative approach and tools to facilitate an enhanced transportation decision-making process from project inception through delivery and maintenance. Specifically the benefits include the following:

- Provides a transparent project delivery process in a digital environment
- Facilitates decision making through wizard driven workflows
- Provides a mechanism configurable to user's workflow to advance work products through the delivery process
- Supports collaboration both externally and internally and provides continuity between TDOT functional groups

- Provides spatial analysis tools and facilitates data sharing through GIS Data Clearinghouse
- Adds efficiency through pre-population of data in “fill-able” forms
- Supports TDOT’s SMART Delivery initiatives and ties them together
- Reduces paper based tracking with an electronic tracking system

Significance of Results

Implementation of SEMS resulting in improved communication both internally and externally will lead to enhanced business processes focused on multiagency communication and collaboration in establishing realistic timeframes and working cooperatively to adhere to those timeframes. This will in turn ensure a better planning and coordination to more efficiently advance a safer and effective transportation program and strengthen stewardship and oversight.

TDOT'S RESEARCH AND FINDING THE RIGHT SOLUTION

Environmental Management System (EMS) is developed to complement the existing environmental processes within the organization. The purpose of such systems is not to re-engineer the environmental processes but to use a system to efficiently manage and coordinate on these processes. Agencies typically may have realized the need to streamline existing processes or there's a new regulation which drives them to explore implementation of an EMS. Most agencies start with a research of existing solution that can be implemented. But considering the nature of these processes and how they differ from one agency to another, agencies quickly learn about the need for a custom solution that meets their need best.

Tennessee Department of Transportation (TDOT) started with a similar process where they interviewed five State Department of Transportation and obtained information on how their EMS improved communication and collaboration and accountability for stakeholders while allowing them to leverage existing investments and manage organizational change. Business drivers that inspired this initiative included the following.

- Streamline Environmental documentation process and pursue improvements
- Develop consistent business practices
- Process transparency and accountability
- Leverage technology to introduce process efficiency
- Improve communication and collaboration both internally within TDOT as well as with resource agencies and project stakeholders.
- Eliminate data redundancy

After the interview, TDOT determined that while existing EMS solutions provided valuable features to the agencies that have implemented them, it would be challenging to reuse those solutions at TDOT as TDOT's workflow was different from that of other agencies. TDOT concluded the research with the decision to implement a workflow based custom solution that leveraged lessons learned from interviewing process and other existing investments made internally at TDOT. TDOT's custom EMS was envisioned to integrate with their project tracking system and other initiatives relating to development of environmental document templates per

FHWA guidelines that were already in progress. In addition, the custom solution was envisioned to establish a collaborative approach and tools to facilitate an enhanced transportation decision-making process from project inception through delivery and maintenance.

GOAL OF IMPLEMENTING AN ENVIRONMENTAL MANAGEMENT SYSTEM

As stated previously, in early 2006, TDOT began the process of undertaking a comprehensive review of the Department's business processes with the overall goal of streamlining the project development process. SEMS was a major component of this streamlining. Early on, six goals were set for the project:

- Streamline project delivery
- Promote environmental stewardship
- Improve communication and collaboration
- Demonstrate accountability
- Manage organizational and cultural change
- Leverage existing technology investments

With the implementation of the system, the six goals set out for SEMS have all been attained. Information on how each of these goals has been met is outlined in the table below.

Goal	SEMS Accomplishment
SEMS streamlines project delivery	Speeding up project delivery timetables is dependent upon managers and administrators having critical information at their fingertips. SEMS helps provide this information via the Dashboard which shows important information at a glance. Managers and administrators working in the early phases of transportation projects can quickly see the status of each project and make adjustments to keep projects on track.
SEMS promotes environmental stewardship	The Environmental Protection Agency defines environmental stewardship as “the responsibility for environmental quality shared by all those whose actions affect the environment.” To help promote environmental stewardship and sustainability, the GIS-based Map Viewer in SEMS graphically depicts natural and cultural resources that could potentially be affected by a project while the Commitment Manager documents in one location every commitment made for a project.

SEMS improves communication and collaboration	The system design of SEMS has resulted in the inclusion of many powerful tools that promote communication and collaboration. These include the Document Manager, Stakeholder Manager, and Meeting Manager which provide each SEMS user with the opportunity to contribute or rapidly access information on critical information regarding projects.
SEMS demonstrates accountability	SEMS helps users follow adopted rules and procedures by ensuring that reviews and analyses are all conducted in a standard way by individuals in the right positions. And Module Overviews, which exist for each type of process, document the decisions that were made every step of the way.
SEMS manages organizational and cultural change	The implementation of SEMS is creating operational change in the way many TDOT divisions do their work, ushering in the move to a more digital environment. In addition, SEMS is promoting technological change within the agency.
SEMS leverages existing technology investments	SEMS pulls information from and exports information to existing TDOT technology investments, including PPRM, TNMap, and FileNet. And SEMS technology is a foundation on which TDOT can build other sophisticated applications.

USERS OF AN SEMS

The research, requirements identification and design and development of the system was lead by TDOT Executive Management, TDOT IT, Long Range Planning, Short Range Planning, Project Safety Office, Conceptual NEPA Planning, Environmental Documentation Office and various Environmental technical study groups. However, users of TDOT's SEMS include TDOT users, consultant community, Federal, State and Local agencies and any other interested parties. Users are required to request access to the SEMS to be able to log in to it. Primary users of the system include individuals from the following.

- TDOT Environment and Planning Bureau
 - Long Range Planning Division
 - Project Planning Division
 - Environmental Division
- Metropolitan planning organizations
- Rural planning organizations
- Federal Highway Administration
- TESA Resources Agencies
- Consultants working on behalf of agencies listed above

FEATURES THAT SEMS OFFERS

Task Assignment and Management

The underpinning of SEMS is task assignment and task management. Once a process for a project is initiated within SEMS by an administrator or other authorized user, the system manages the remainder of the project based upon decisions made by the individuals involved. A single project may involve dozens of SEMS users at various points as the need for specific expertise and consultation is reflected by the system. When a user completes one task, a new task is assigned by the system to one or more people to advance the project until the process is complete.

The Dashboard and SEMS Tabs provide standard interfaces that allow users to quickly get to frequently used portions of the system including several powerful interfaces for managing information about projects and reviewing what has previously occurred for a project. Document templates for faster document turnaround and interactive mapping appear within tasks at appropriate points along the way.

SEMS Statewide Environmental Management System

Report a Bug | Suggest a Feature | My Profile | Logout

Manager's Dashboard | My Tasks | Projects | Clearinghouse

My Tasks

0 New | 0 In Progress | 0 Overdue

Currently, you do not have any tasks.

Actions

- Long Range Planning
 - + [Add New Study Request](#)
 - + [View Long Range Planning Studies](#)
 - + [Manage Agency Documents](#)
- + Project Planning
- + Environmental
- + Permits
- + Inspections

System News

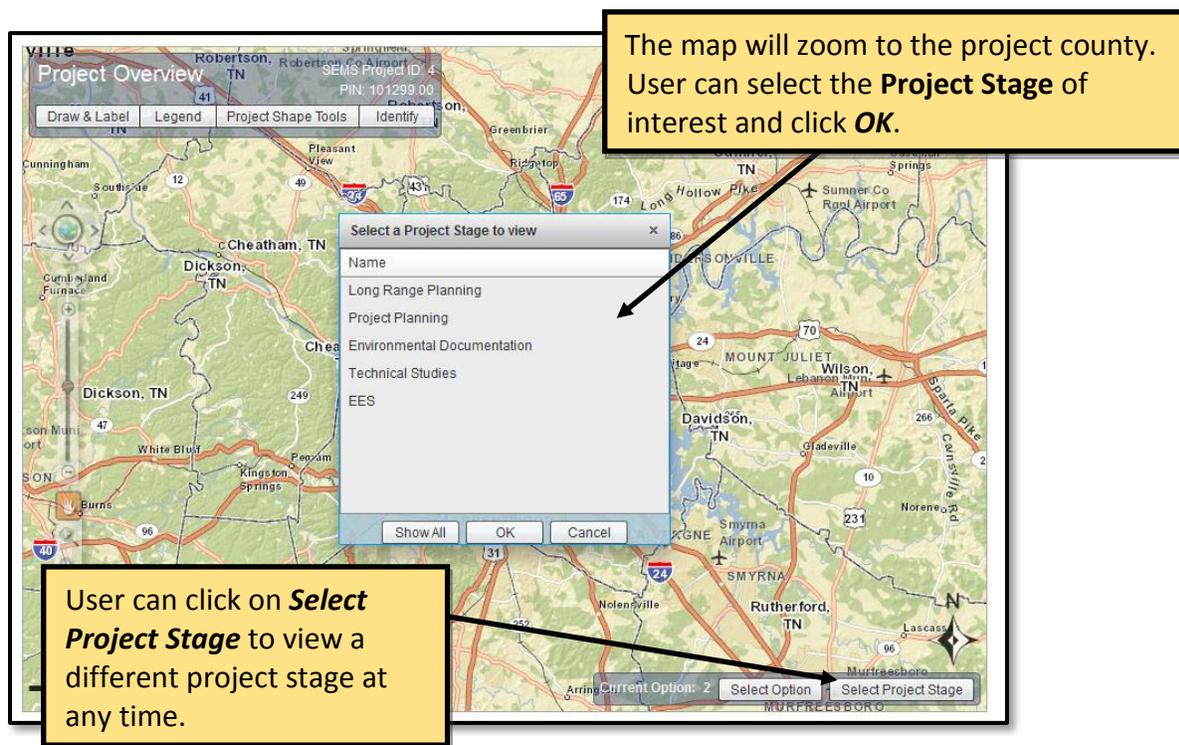
- Testing Sessions

TDOT will be performing user acceptance testing on the SEMS application. Environmental Documentation is scheduled for late February. Technical Studies, Long Range Planning, and Project Planning are scheduled for March.
- + Support Documentation
- + System Support

SEMS also contains a variety of tools. These include a Clearinghouse for geographic and other information, an interface for managing your profile information, a wide range of help options, and administrative tools that allow managers to work with some of the behind-the-scenes elements of the system.

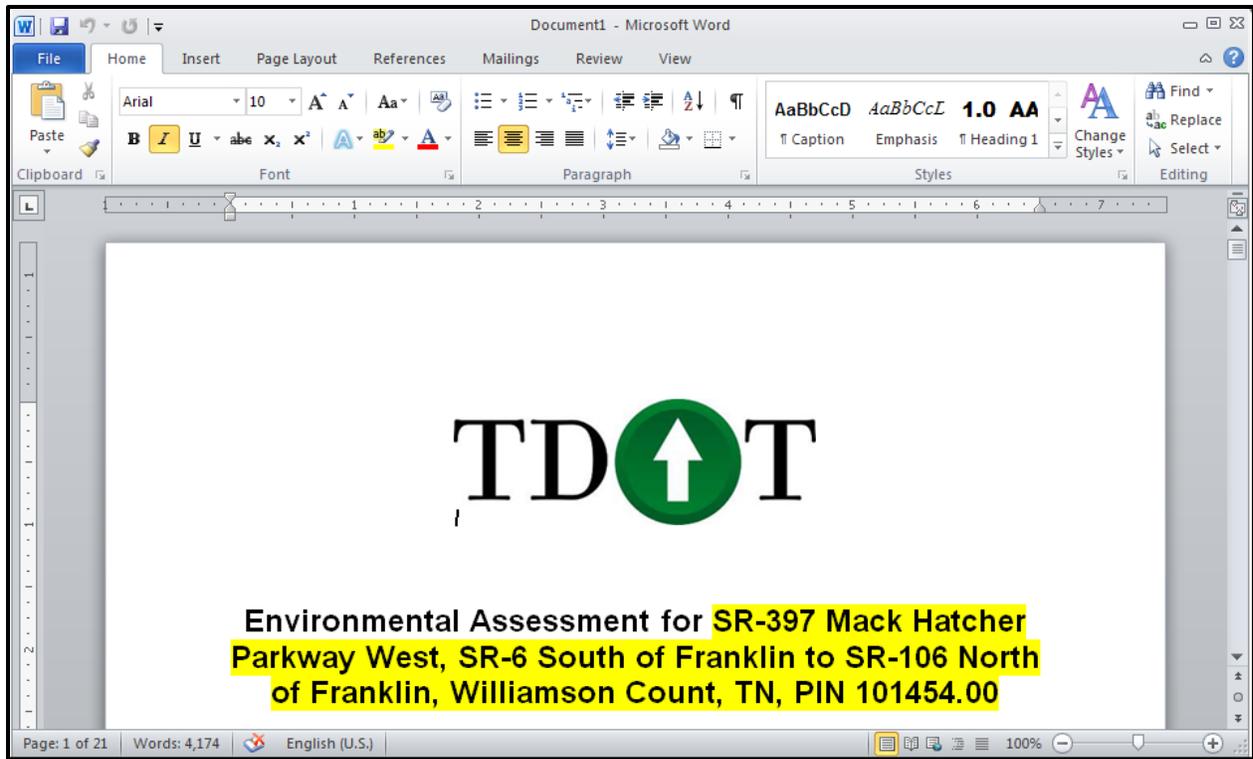
Project Mapping

The Map Viewer provides general users access to view the project location and project shapes created for the project. The general user has the ability to draw a temporary project shape (by using the Route ID), turn on/off base map layers, change the background, add temporary labels, identify features, and take a screenshot. The general user does not have the ability to edit or store data through the Map Viewer.



Templates

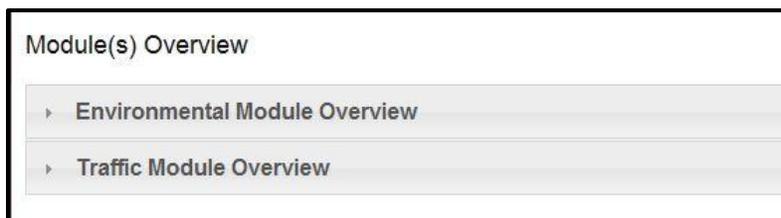
There are many instances in SEMS where the user is prompted to begin drafting a document that needs to be submitted as part of the task assigned to the user. SEMS incorporates many Microsoft Word and Microsoft Excel templates throughout the system that are customized to meet TDOT requirements. SEMS provides access to these templates at the appropriate points in tasks, pushing project information into the template document such as basic project information, the date, and the project description.



The template is generated, filled with project specific information, saved locally, revised, and then uploaded to the system. After the user has completed the task, the document is accessible at any time from the Document Manager.

Project History

For each process initiated in the system via the Actions interface, SEMS has a module to manage what tasks are to be completed. The Module(s) Overview is where the user can find information about what was done every step of the way for completed projects or for those currently being handled by the system. The Module(s) Overview can be found at the bottom of the Project Overview, and each module related to a particular project has its own button to access the relevant information. An example of what Module(s) Overview might look like when two modules are involved is:



So in the example above, if the user wanted to see how the NEPA process progressed for the project, the user would click on the *Environmental Module Overview* button. But if the user

wanted to know more about permits issued for the project, the user would click on *Traffic Module Overview*.

The list of modules that the user may see in SEMS when using the Module(s) Overview is:

- Long Range Planning Module
- Project Planning Module
- Traffic Module
- Conceptual NEPA Planning Module
- Environmental Module
 - Technical Studies Modules
- Permits Module
- Inspections Module
- Reevaluation Module

▼ PP Module Overview

Open Tasks: 0 Completed Tasks: 22

Short Range Planning Study Summary

View	Request Date	Status
	5/22/2013	Active

Tasks

Show entries Search:

Task	Status	Assigned By	Assigned On	Assigned To	Due	Completed
Request for TPR	Completed	Manager PP	5/22/2013	Manager PP	6/20/2013	5/22/2013
New TPR Assignment	Completed	Manager PP	5/22/2013	Planner PP	6/20/2013	5/22/2013
Request Supplemental Information	Completed	Planner PP	5/22/2013	Planner PP	6/12/2013	5/22/2013
Request for Crash Data	Completed	Planner PP	5/22/2013	Crash PP	7/3/2013	5/22/2013

In any list of tasks in Module(s) Overview, the most recent tasks appear at the top while older tasks appear near the bottom. The list includes tasks that have been completed as well as those that are in progress or new. Each line has a blue hyperlink labeled with the task name – clicking on it takes user to a screen where the user can see what was done for that particular task as well as what decisions were made.

Document Review through Agency Coordination

Sometimes it is necessary for documents to go through a document review process. Typically this takes place between TDOT and outside agencies such as a TESA agency or an MPO, but these reviews can also take place internally between planners and managers. When a document review is included in a process, it appears as tasks within SEMS at appropriate points.

The purpose of the Document Review area within SEMS is to provide an area where questions and comments can be asked and answered before final versions of documents are approved. Any files ready for review are presented in table format with search and sort capabilities for times when there are a large number of files available.

View	Type	Name	Date	By
		Knox fv11_14_tip.pdf	3/29/2011	PM, MPO

Showing 1 to 1 of 1 entries

At the bottom of the page is the questions and comments section:

Questions
Comments

Question History

There are no questions to display.

When the user submits a question or comment, two things happen:

- Question or comment is logged in the Question and Comment History
- An email notification is sent to the Document Review Point of Contact letting them know of the request

A response to comments is actually optional, so the point of contact for the review is not required to respond to comments; however, the point of contact should reply to any questions you have submitted.

BENEFITS OF IMPLEMENTING AN EMS

A major benefit of SEMS is the provision of a streamlined approach that allows regulatory and resource agencies, the public, and other interested stakeholders to be involved early and throughout the project development process. Using the Stakeholder Manager tool, administrators can easily add individuals as interested stakeholders for any project initiated in the system.

SEMS also helps ensure that environmental and other project-related commitments are documented and ultimately fulfilled as part of a project. The Commitment Manager tool allows SEMS users to monitor commitments that have been made for each project.

Other overall benefits of SEMS include:

- A transparent project delivery process in a digital environment
- Improved business processes and transportation decision-making
- A customized Dashboard assisting each user in performing their responsibilities
- Pre-population of information into numerous editable forms
- A new focus on multi-agency communications and collaboration
- Better planning and coordination
- The establishment of realistic timeframes for completing tasks
- Strengthened stewardship and oversight
- Online spatial analysis tools
- Facilitated data sharing through the Clearinghouse

RECOMMENDATIONS FOR FUTURE

TDOT like any other DOT is faced with ever-mounting pressure to improve transportation decision making process and performance. An ongoing review of SEMS from an operational and strategic standpoint is recommended for future. SEMS will need to go through TDOT's change control process to accommodate any changes as a result of the review process.

BIOGRAPHICAL SKETCH

Sangeeta Reddy, PMP has over 14 years of experience in Information Technology (IT) Software Development Management in implementing solutions within the Transportation industry. Mrs. Reddy's experience includes project management and implementation of mid-large scale Environmental Management Systems, quality control and assurance, enterprise systems integrations, systems architecture developments as well as client/server and web-based application development and hosting. Mrs. Reddy has implemented systems that streamlined environmental management processes including technical studies for Department of Transportation including Florida(FDOT), Tennessee (TDOT), Colorado (CDOT) and recently a collaboration tool for FHWA Headquarters. Mrs. Reddy has provided technical oversight, developed workflows which were later incorporated into the standard operating procedures at these agencies, implemented features which ensured QA/QC of documents, collaboration with resource agencies and administrative record keeping throughout the project documentation process and ongoing training and maintenance.