

# REDUCING CONSTRUCTION/MAINTENANCE INTERFERENCE

## Description

Construction and maintenance on congested freeways can create major disruptions in traffic flow. Reducing the disruption is critical to minimizing additional congestion that is created, lowering project costs, reducing required construction time, and decreasing the overall frustration felt by drivers and agencies due to the project. This is best accomplished through the development and implementation of a Transportation Management Plan (TMP). A TMP is required for all federal-aid projects designated as “significant” by the operating agency. A significant project is “one that, alone or in combination with nearby concurrent projects, is anticipated to cause sustained work zone impacts greater than what is considered tolerable based on state policy and/or engineering judgment.”<sup>1</sup>

A TMP should coordinate efforts by several stakeholders, shape public expectations, and include three elements for controlling and managing traffic operations during the project:

- *A Temporary Traffic Control (TTC) plan* that defines the type and location of traffic control devices used to guide traffic through the work zone.
- *A Transportation Operations (TO) plan* that defines the strategies to be applied within the work zone and on alternative routes or modes to mitigate project-induced congestion in the corridor or region.
- *A Public Information (PI) plan* that defines what information is going to be communicated to the public before and during the project, and how it is going to be disseminated.



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<b>Cost:</b>	●●○○○
<b>Time:</b>	<b>Short</b>
<b>Impact:</b>	<b>Spot/Corridor</b>
<b>Who:</b>	<b>State/City</b>
<b>Hurdles:</b>	<b>Coordination</b>

In many cases, a TMP can help agencies in their overall project programming efforts by identifying which projects need to be performed on adjacent roadways to improve capacity or traffic flow before a significant project is initiated.

A new technique for reducing congestion at construction sites is the zipper (also late or joint) merge where drivers are asked to take turns merging into one lane at a merge point. Merging too soon can often cause needless backups and delay in construction zones, encourage rear-end and side swipe crashes, and ignite tempers in drivers. The zipper merge uses signs to tell drivers to use both lanes until a merge must occur. Signs and arrows then direct drivers to take turns at the merge point. This shortens the length that cars are using a single lane. The difficulty with this technique is convincing drivers that a once-offensive maneuver is now socially acceptable and desired.

## Target Market

As noted above, the target markets for this strategy are significant projects with expected work zone impacts greater than what are considered tolerable. Determination of what is considered tolerable depends on the characteristics of the region, type of work that must be accomplished, and other factors. TMPs should be developed for any construction location where the work may interfere with traffic flow.

## How Will This Help?

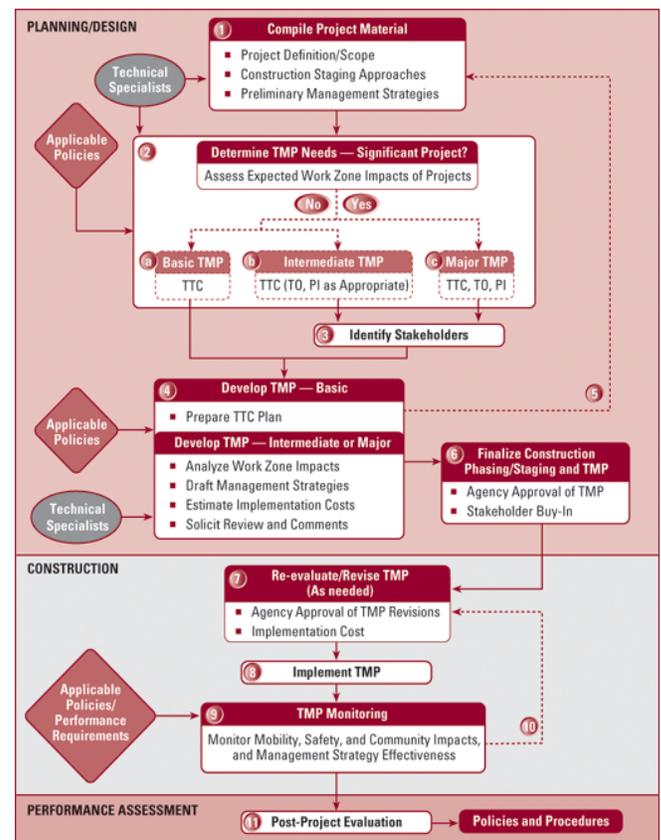
Adoption and implementation of this strategy helps the agency, contractor, and the public in three ways:

- It can help mitigate congestion and reduce delay – Construction activities can create or significantly increase congestion on a high-volume facility or on other nearby routes if it causes diversion to those other routes. The creation of a TMP requires all affected entities to consider the impacts of construction on congestion and come up with ways to mitigate those impacts. The plan also helps to identify interdependencies between strategies and even a critical path timeline for implementation.
- It can help increase safety – Construction activities may also adversely affect safety. A significant increase in congestion can increase rear-end crashes, and may lead to vehicle intrusions into the work space if not protected by temporary barrier. A TMP that mitigates congestion can have a significant safety benefit as well.
- It can help expedite construction – Many construction tasks require timely delivery of materials. Traffic congestion will increase travel time of material delivery, requiring the contractor to

increase the number of vehicles providing the material in order to maintain a desired rate of production. A TMP can help define how travel times during periods of construction activity will be maintained at acceptable levels, and facilitate contractor productivity.

## Implementation Examples

*Available FHWA Guidance* – After the completion of rulemaking to require TMPs for significant projects, FHWA placed a good amount of emphasis on developing a variety of products to help state and local agencies become compliant with the new regulations. The *Developing and Implementing Transportation Management Plans for Work Zones* document was one of the more successful efforts in this area. This comprehensive document provides useful advice on the TMP development process, TMP performance assessment, potential components in a TMP, and the potential impact management strategies available. A simple checklist of potential TMP components help guide agencies



through the development process, and a TMP strategy matrix is available to help an agency consider the types of impacts they want to mitigate, triggers for consideration, and potential challenges. See the For More Information section for a link to the complete document.

*Transportation Management Plan Requirements, Virginia Department of Transportation IIM-LD-241.4* – This instructional and information memorandum developed by VDOT presents a specific step-by-step process for developing TMPs for state contracts. Key roles and responsibilities of various involved individuals and entities are outlined, as are detailed site conditions to check for strategy appropriateness. See the For More Information section for a link to the complete memorandum.

*Zipper Merge Usage in Colorado and Minnesota* – Both the Colorado Department of Transportation and the Minnesota Department of Transportation have adopted zipper or late merge strategies in their respective states. Both have found that extensive educational and public outreach programs are needed to inform drivers that this behavior is desirable, how to properly perform the maneuver, and that it does reduce congestion and safety. Study data in Colorado have shown that late merges can reduce queue length in construction zones by up to 35 percent. A study from Louisiana State University simulating the merge has found that average speeds were six percent higher, braking force was 34 percent lower, and drivers were overall more aware and relaxed in their surroundings.

### **Application Principles and Techniques**

The focus of a TMP is on the identification and implementation of impact mitigation strategies that will reduce the adverse effects of construction and maintenance on traveler safety and mobility. Mitigation strategies to be considered under the temporary traffic control plan component of the TMP include various control techniques and devices, as well as

project coordination, contracting, and innovative construction methods. Under the public information plan component of the TMP, various public awareness and motorist information strategies are available for consideration. Finally, under the traffic operations plan component, various mitigation strategies exist to promote demand management (encouraging both departure time and mode choice diversions), corridor or network operations strategies, work zone safety management strategies, and traffic incident management and enforcement strategies.

A key point to remember when developing an effective TMP is in recognizing the interdependencies that exist between the various impact mitigation strategies that can be considered for implementation. Certain strategies work best when implemented in combination, that is, they are complementary. Examples would include the establishment of high-occupancy vehicle priority ramps and lanes through the work zone or on alternative routes. Interdependencies can also limit the effectiveness of multiple strategy implementations if the strategies are redundant. For example, adding both additional buses and light rail cars to a transit system may not result in a significantly higher utilization of transit during construction than the implementation of either one of these improvements.

### **Issues**

There are no major implementation issues associated with developing a traffic management plan. Planners must communicate with and include all stakeholders early in the development process to ensure the plan covers all elements of the project, including utility management, safety, incident management, emergency services, law enforcement, and public awareness.

## Who Is Responsible?

Ultimately, the operating agency initiating the construction or maintenance work will have primary responsibility for ensuring that the TMP is developed and implemented. However, a TMP generally requires buy-in and assistance from all stakeholders potentially affected by the construction activities or the changes in traffic conditions that result from the activities. Consequently, many TMPs in urban areas are multi-jurisdictional and involve significant public-private partnering.

## Project Timeframe

The amount of time required to develop and implement a TMP depends heavily on the type and magnitude of mitigation strategies to be implemented. For very large projects on highly-congested roadways, a year or more lead time may be required to implement the strategies needed on alternative routes, suggesting that the TMP itself would need to be developed as much as two years prior to the anticipated start of work on the significant project. For more moderate projects, only a few months may be required to implement the necessary mitigation

strategies in the corridor, and so a TMP may be needed several months to a year prior to the start of construction.

## Cost

The cost of developing and implementing a TMP depends on the size of the project and area potentially to be impacted by construction, as well as the mitigation strategies selected for implementation. FHWA does allow mitigation strategies to be paid for as part of construction project expenditures.

## Data Needs

TMP development does depend on a reasonable estimate of traffic impacts under the work zone maintenance-of-traffic approach being considered. Data needs for impact assessment vary by type of tool use (network-based planning models, microscopic simulation tools, etc.). Information on the costs of the various strategies will also be needed. Finally, monitoring and evaluating the TMP is key to making incremental improvements over time or in transferring any lessons learned from one project or corridor to the next.

### Reducing Construction/Maintenance Interference Best Practice

- Type of Location: Anywhere a significant project affects traffic beyond tolerable conditions.
- Agency Practices: Involve all stakeholders potentially affected by the project and consider multiple projects together, when appropriate. Recognize any interdependencies in mitigation strategies to be implemented.
- Frequency of Reanalysis: Before any significant construction project begins.
- Supporting Policies or Actions Needed: Multijurisdictional agreements, dedication to involve all stakeholders.
- Complementary Strategies: Construction contracting options, traveler information systems, aggressive incident clearance, innovative construction methods, active traffic management, and travel option strategies.

## For More Information

Jeannotte, K. and A. Chandra. *Developing and Implementing Transportation Management Plans for Work Zones*. Report No. FHWA-HOP-05-066. FHWA, U.S. Department of Transportation, Washington, DC. December 2005. Accessible at [http://ops.fhwa.dot.gov/wz/resources/publications/trans\\_mgmt\\_plans/index.htm](http://ops.fhwa.dot.gov/wz/resources/publications/trans_mgmt_plans/index.htm).

*Transportation Management Plan Requirements*. Report No. IIM-LD-241.4. Virginia Department of Transportation, Richmond, VA. [http://www.virginiadot.org/business/resources/traffic\\_engineering/memos2/TE-351.2\\_Transportation\\_Management\\_Plan\\_Requirements.pdf](http://www.virginiadot.org/business/resources/traffic_engineering/memos2/TE-351.2_Transportation_Management_Plan_Requirements.pdf)

## References

1. Jeannotte, K. and A. Chandra. *Developing and Implementing Transportation Management Plans for Work Zones*. Report No. FHWA-HOP-05-066. FHWA, U.S. Department of Transportation, Washington, DC. December 2005. Accessible at [http://ops.fhwa.dot.gov/wz/resources/publications/trans\\_mgmt\\_plans/tech\\_report.htm](http://ops.fhwa.dot.gov/wz/resources/publications/trans_mgmt_plans/tech_report.htm).
2. Scriba, T., P. Sankar, and K. Jeannotte. *Implementing the Rule on Work Zone Safety and Mobility*. Report No. FHWA-HOP-05-065. FHWA, U.S. Department of Transportation, Washington, DC. September 2005. Accessible at [http://ops.fhwa.dot.gov/wz/rule\\_guide/tech\\_report.htm](http://ops.fhwa.dot.gov/wz/rule_guide/tech_report.htm).
3. *Transportation Management Plan Guidelines*. Division of Operations, California Department of Transportation, Sacramento, CA. June 2009. Accessible at [http://www.dot.ca.gov/hq/traffops/TMP\\_Guidelines\\_June\\_2009.pdf](http://www.dot.ca.gov/hq/traffops/TMP_Guidelines_June_2009.pdf).
4. *Traffic Mitigation Guidelines for Work Zone Safety and Mobility*. New Jersey Department of Transportation, Trenton, NJ. October 2007. Accessible at <http://nj.gov/transportation/eng/documents/BDC/pdf/attachmentbdc07t07.pdf>.
5. *The Joint Merge: Improving Work Zone Traffic Flows*. UTC Spotlight. Office of Research, Development and Technology, U.S. Department of Transportation, Washington, D.C. July 2013.