Active Transportation and Demand Management

U.S. Department of Transportation
Federal Highway Administration

ATDM Planning Brief: ATM Feasibility and Screening Guide

In the context of Active Transportation and Demand Management (ATDM), Active Traffic Management (ATM) strategies focus on influencing travel behavior during a trip with respect to operations and lane and facility choices. ATM is the ability to **dynamically** manage recurrent and nonrecurrent congestion based on prevailing and predicted traffic conditions. Focusing on trip reliability, ATM maximizes the effectiveness and efficiency of the facility, while also increasing safety and throughput by using integrated systems with new and automated technologies. Additional information on these strategies can be found in the ATM informational brief at http://www.ops.fhwa.dot.gov/publications/fhwahop13003/index.htm.

ATM strategies have been receiving significant attention of late given the operational benefits that have and can potentially accrue from deploying these strategies—as summarized in Table 1 below—thereby helping to achieve one or more regional transportation goals, such as safety, mobility, reliability, environmental, improved transit operations, and accessibility. At the same time, implementing ATM strategies can involve significant capital costs, followed by ongoing operations and maintenance requirements. As such, some or all ATM strategies may not be cost effective for certain segments and links of the surface transportation network.

Active Traffic Management (ATM) Strategies

- Adaptive Ramp Metering (ARM)
- Adaptive Traffic Signal Control (ATSC)
- Dynamic Junction Control (DJC)
- Dynamic Lane Assignment (DLA)
- Dynamic Lane Reversal (DLR)
- Dynamic Merge Control (DMC)
- Dynamic Shoulder Lanes (DShL)
- Dynamic Speed Limits (DSpL)
- Queue Warning (QW)
- Transit Signal Priority (TSP)

FHWA has developed an *ATM Feasibility and Screening Guide* (the Guide) to assist agencies in making informed investment decisions by determining the feasibility of ATM strategies before committing significant resources. The Guide addresses ATM strategies at the feasibility and screening analyses level, enabling practitioners—be they operators or planners, representing departments of transportation, metropolitan planning organizations, or other transportation entities—to answer the following questions with reasonable confidence:

- What roadway networks and facilities would be best suited for ATM in my region?
- What specific or combination of ATM strategies would work best?
- What would be the range of expected benefits?
- What would be the expected costs (capital and ongoing)?

Table 1. Sample Active Traffic Management (ATM) Benefits from U.S. Deployments

Strategies and Location	Benefits
DSpL, DLA, and QW: Seattle, WA, along northbound I-5. This 7-mile corridor was already actively managed via ramp metering, a robust incident management program, and traveler information.  *Source: Washington State DOT.*	• A before-and-after study (3 years for each period) showed total crashes decreased 4.1 percent along the ATM segment. (During the same period, the southbound segment of I-5 – without ATM – experienced a 4.4 percent increase in the number of crashes.)

Table 1. Sample Active Traffic Management (ATM) Benefits from U.S. Deployments

Strategies and Location	Benefits
DJC: Los Angeles, CA, at the northbound SR 110 connector to northbound I-5. The DJC system allows the lane adjacent to the exit-only lane to also be used as an exit lane (in addition to remaining a through lane) during peak periods.  *Source: Caltrans.*	Following implementation of DJC: • Average ramp delay reduced from greater than 20 minutes to under 5 minutes. • Crashes decreased 30 percent from previous year.
DSpL, DLA, QW, and DShL (for high-occupancy toll [HOT] lanes): Minneapolis, MN, along I-35W. The DSpL consisted of speed advisories—not legal speed limits.  *Source: Minnesota DOT.*	• On average, the morning peak experienced 17 percent less congestion with DSpL. • Crash reductions in the 6-month post-deployment period were as follows: o 9 percent reduction in fatal plus injury crashes o Greater than 20 percent reduction in property damage only crashes.
Benefit information on other strategies, such as ARM, TSP, ATSC, and shoulder lanes reserved for buses ("bus on shoulder") can be found in the Guide and at the USDOT benefits and costs database: http://www.itsknowledgeresources.its.dot.gov/.	

The Guide presents a recommended process—a series of steps as summarized in Table 2 below—with additional information and examples provided in the Guide for each step and activity. This information includes flowcharts for each step and for most ATM strategies, along with discussions of potential issues, criteria, and available tools. References and links where more detailed information can be obtained are also included.

Table 2. Overview of Active Traffic Management (ATM) Feasibility and Screening Guidance: Process Steps, Activities, and Example Application

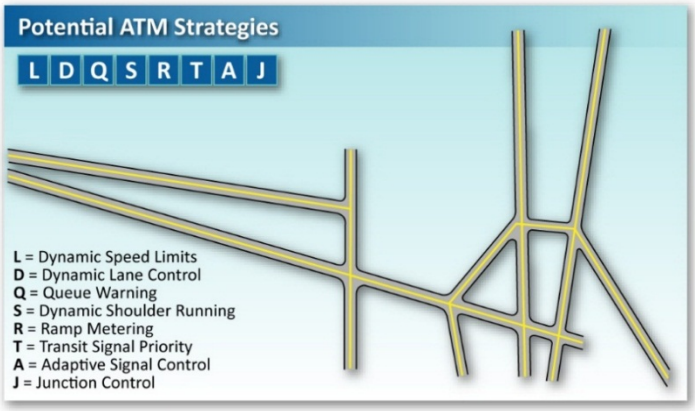
Steps and Activities	Example Application (Graphical View)
Get Started—Preparation • Ensure ATM supports regional goals. • Identify relevant objectives for ATM. • Define network to be analyzed. • Identify and collaborate with stakeholders. • Commence data collection. • Review recent literature. Graphic shows a generic roadway network and all available ATM strategies.	

Table 2. Overview of Active Traffic Management (ATM) Feasibility and Screening Guidance: Process Steps, Activities, and Example Application

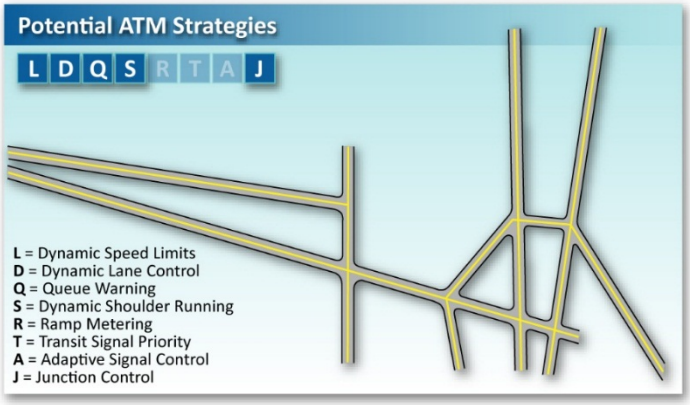
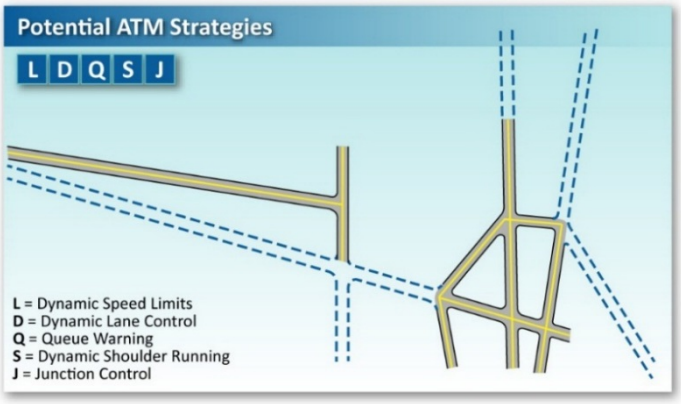
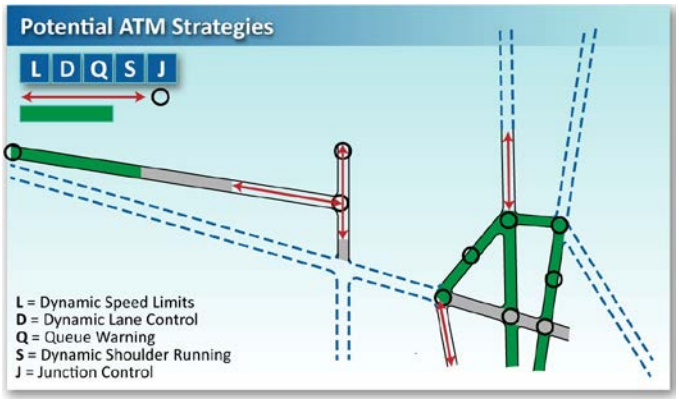
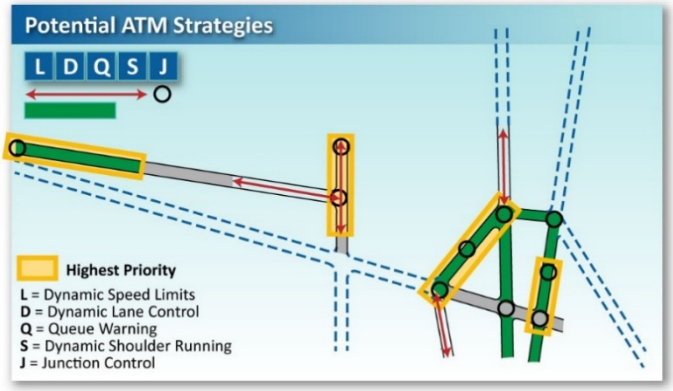
Steps and Activities	Example Application (Graphical View)
Assess Agency Policies and Capabilities for ATM • Define applicable ATM strategies in terms of network features, project scope, agency policies, and legal considerations. • Confirm supporting institutional framework is in place. In the graphic, strategies "A" and "T" are not appropriate to the agency's transportation network (i.e., freeway), and strategy "R" does not conform to agency's policies.	
Identify Major Roadway Segments for Potential ATM • Determine level of transportation systems management and operations (TSM&O) deployment along segments; consider other TSM&O strategies in lieu of ATM as appropriate. • Identify major segments that will likely benefit from deploying ATM, based on congestion, crash rates, bottlenecks, and other considerations. In the graphic, the "blue dashed segments are less likely to benefit from ATM, possibly due to fewer mobility and/or safety issues relative to the other segments, the lack of other TSM&O strategies along these segments, or some combination.	
Analyze and Prioritize Individual Roadway Links and ATM Strategies • Analyze and prioritize individual links for ATM deployment. • Determine appropriate ATM strategies for each link. • Combine strategies for each link and ensure compatibility across the network. In the graphic, strategies "L," "D," and "Q" are recommended for links shown in "green," with strategy "S" also included for those links with "red" arrows. Circles indicate locations for "J."	

Table 2. Overview of Active Traffic Management (ATM) Feasibility and Screening Guidance: Process Steps, Activities, and Example Application

Steps and Activities	Example Application (Graphical View)
Estimate Benefits and Costs • Consider key ATM cost factors. • Perform high-level estimates of benefits and costs using available tools. In the graphic, those segments outlined in yellow provide the greatest estimated benefit/cost ratios and are, therefore, the highest priority for moving ATM forward.	

The information and outputs obtained from following this ATM feasibility and screening process will help agencies create ATM deployment programs and strategic plans in their region or on specific corridors that are aligned with their region's needs, goals, objectives, and the overall metropolitan transportation planning process, thereby supporting the identification of ATM projects to include in the transportation improvement program and other funding plans. The outputs from the applying this guidance can also set the stage for performing more detailed analyses in accordance with the principles of systems engineering (e.g., develop a concept of operations). Perhaps most importantly, the outputs from applying this guidance can help an agency (or agencies) make a business case to managers and decision-makers of the value of applying ATM strategies and concepts in their region.

ATDM Project Informational Briefs

This informational brief is one of the ATDM brief in the "Planning" category of the FHWA ATDM brief series. ATDM briefs are or will be available in the following categories:

- ATDM Program **Yellow**
- ATDM Planning **Purple**
- ATDM Analysis **Orange**
- ATDM Design **Green**
- ATDM Operations **Red**

ATM Feasibility and Screening Guide

The Guide is available on the Resources page of the FHWA ATDM Program website at: http://www.ops.fhwa.dot.gov/atdm/resources/publications.htm.

For More Information

The FHWA ATDM Program website contains more information about ATDM approaches and strategies, all of the ATDM briefs, guidance documents, and resources and links to external stakeholder resources: http://www.ops.fhwa.dot.gov/atdm/index.htm.

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FHWA-HOP-14-018 / May 2015