Managing DC Work Zones: DDOT’s Citywide Transportation Management Plan

ARTBA National Work Zone Management Conference
September 20, 2016
Outline

Citywide Transportation Management Plan (TMP)

- Citywide Work Zone Project Management System
Outline

Citywide Transportation Management Plan (TMP)

- Citywide Work Zone Project Management System

District of Columbia DOT Citywide TMP
10 Top Tourist Attractions in the USA

District of Columbia DOT Citywide TMP
The Challenge

District Department of Transportation

SIX BILLION

DC WATER.COM

pepco

verizon

comcast

RCN D.C. Metro

DC PLUG

Making your electric system more resilient.
The Challenge
The Challenge

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Yearly Delay per Auto Commuter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours</td>
</tr>
<tr>
<td>Very Large Average (15 areas)</td>
<td></td>
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<tr>
<td>Washington DC-VA-MD</td>
<td>67</td>
</tr>
<tr>
<td>Los Angeles-Long Beach-Santa Ana CA</td>
<td>61</td>
</tr>
<tr>
<td>San Francisco-Oakland CA</td>
<td>61</td>
</tr>
<tr>
<td>New York-Newark NY-NJ-CT</td>
<td>59</td>
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<tr>
<td>Boston MA-NH-RI</td>
<td>53</td>
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</table>

National Congestion Tables

Table 1. What Congestion Means to You, 2011

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>Yearly Delay per Auto Commuter</th>
<th>Travel Time Index</th>
<th>Excess Fuel per Auto Commuter</th>
<th>Congestion Cost per Auto Commuter</th>
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<tr>
<td></td>
<td>Hours</td>
<td>Rank</td>
<td>Value</td>
<td>Gallons</td>
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<tr>
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<td>52</td>
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<td>1.27</td>
<td>24</td>
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<tr>
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<tr>
<td>Los Angeles-Long Beach-Santa Ana CA</td>
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<td>2</td>
<td>27</td>
<td>1,300</td>
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<tr>
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<td>2</td>
<td>25</td>
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<td>59</td>
<td>4</td>
<td>28</td>
<td>1,281</td>
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<tr>
<td>Boston MA-NH-RI</td>
<td>53</td>
<td>5</td>
<td>26</td>
<td>1,147</td>
</tr>
</tbody>
</table>

TTI's 2012 Urban Mobility Report Powered by INRIX Traffic Data

District of Columbia DOT Citywide TMP

Notes:
- Please do not place too much emphasis on small differences in the rankings. There may be little difference in congestion between areas ranked (for example) 6th and 12th. The actual measure values should also be examined.

Also note: The best congestion comparisons use multi-year trends and are made between similar urban areas.
The Challenge

Traffic Gridlock Sets New Records for Traveler Misery

AUGUST 26, 2015

Action Needed to Reduce Traffic Congestion’s Impact on Drivers, Businesses and Local Economies

America’s traffic congestion recession is over. Just as the U.S. economy has regained nearly all of the 9 million jobs lost during the downturn, a new report produced by INRIX and the Texas A&M Transportation Institute (TTI) shows that traffic congestion has returned to pre-recession levels.

According to the 2015 Urban Mobility Scorecard, travel delays due to traffic congestion caused drivers to waste more than 3 billion gallons of fuel and kept travelers stuck in their cars for nearly 7 billion extra hours – 42 hours per rush-hour commuter. The total nationwide price tag: $160 billion, or $960 per commuter.

Washington, D.C. tops the list of gridlock-plagued cities, with 82 hours of delay per commuter followed by Los Angeles (80 hours), San Francisco (78 hours), New York (74 hours), and San Jose (67 hours).

The problem has become so bad in major urban areas that drivers have to plan more than twice as much travel time as they would need to arrive on time in light traffic just to account for the effects of irregular delays such as bad weather, collisions, and construction zones. For example, drivers on America’s Top 10 worst roads waste on average 84 hours or 3.5 days a year on average in gridlock – twice the national average. Of these roads, six are in Los Angeles, two are in New York and the remaining two are in Chicago. Nine other cities have roads ranked among the 50 worst.

Scorecard findings also illustrate how traffic congestion isn’t just a big-city issue. Cities of all sizes are experiencing the challenges seen before the start of
The Challenge

D.C. area is No. 1 nationwide in traffic congestion, study says

By Ashley Halsey III, Published: September 27

Washington suffers from the worst traffic congestion in the nation, with drivers spending more than three days out of every 365 caught in traffic.

Helped along by a relatively robust economy, the Washington region forged well ahead of perennial rivals Chicago and Los Angeles, which ranked second and third in an extensive study conducted annually by a research group at Texas A&M University.

“This is one of those odd times when bad news is good news,” said Virginia Transportation Secretary Sean T. Connnaughton. “The reason we have more congestion is that the Washington region has a very strong economy. I go to other parts of the state and they say they have no transportation problems.”

The 74 hours the average commuter is stuck in traffic each year burns 37 gallons of fuel; the average cost per area driver at the pump and in lost wages comes to $1,495. Local drivers travel bumper to bumper more than twice the national average of 34 hours.

“The biggest change in the commute has been all the construction,” said Darryl Colbert, who has driven into the District from Bowie for 20 years. “A good example is Central Avenue. I used to take that to avoid a backup on Route 50, but now they’ve got steel plates there for the Addison Road construction, and that causes a backup because nobody wants to tear their car up.”
The Challenge

Can we change this part of the Traffic Control Plan? We really need to get this work done next week!

We have these 8 major projects going to construction next fall, what will traffic be like?

We have a conflict! We closed the left lane and someone else is setting up to close the right lane! HELP!

Why is the right lane closed again, when the utility company just finished their work?

If we close this ramp for the next 2 months, what detour alternatives do we have?
DDOT Needed a Dynamic and Regional Approach to Managing Work Zones!

Citywide Work Zone Project Management System

- Planning tool to proactively track and analyze multiple work zones & special events for a five-year rolling period
- Identify the cumulative impacts
- Generate cost-effective and targeted mitigation strategies
- Provide timely and data-driven responses to stakeholder questions and concerns

District of Columbia DOT Citywide TMP

Improve safety and mobility!
Citywide Work Zone Project Management System

A Citywide Transportation Management Plan to manage and analyze work zone and special event impacts for the next five years, to generate regional mitigation strategies that address areas of significant impacts, respond to stakeholder and motorist concerns, and ultimately improve mobility and safety throughout the District.

**Inputs**
- Project information (DDOT, Developer, Utility, etc.)
- Detailed work zone information (user input)
- Road network information

1. **Work Zone Tracking Tool** (SmartNET)
- Configurable work zone reports
- Interactive work zone map
- Revised work zone schedules
- XML data feed to CapTop

2. **Traffic Analysis Tool**
- Analysis summary reports
- Weekday peak period scenario results
- Regional congestion “hot spot” map
- TMP / MOT alternatives

3. **Citywide TMP Document Development**
- 5-years worth of work zone mitigation strategies
- Customized regional TDM plans
- Mitigation strategy budget estimate

4. **Citywide TMP Implementation And Monitoring**
- Reduced congestion in work zones
- Reduced work zone crashes
- Improved public perception

**Outputs**
- Avoid work zone location conflicts
- Identify and minimize cumulative work zone impacts
- Identify corridor / area work zone mitigation strategies
- Improve safety and mobility in work zones

**Goals**

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Citywide Transportation Management Plan

Project Diagram

November 13, 2013

District of Columbia DOT Citywide TMP
The Approach: Work Zone Tracking Tool

Citywide Work Zone Project Management System

Tracking System Concept of Operations

- Configurable work zone reports
- Interactive work zone map
- Revised work zone schedules
- XML data feed to CapTop
- Avoid work zone location conflicts

District of Columbia DOT Citywide TMP
The Approach: Work Zone Tracking Tool

- Construction Event and Special Event Management
  - Capital, developer & utility projects
  - Shoulder, lane & road closures including date and time

- Project Coordination
  - Within single project
  - Among multiple projects

- Conflict Monitoring
  - Mapping
  - Reporting
The Approach: Work Zone Tracking Tool

### DDOT Work Zone Tracking Tool

<table>
<thead>
<tr>
<th>Type</th>
<th>DSS</th>
<th>Project #</th>
<th>Location/Roadway</th>
<th>Description</th>
<th>County</th>
<th>Last Update Time</th>
<th>Organization</th>
<th>Map</th>
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<tr>
<td>Construction</td>
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<td>ASTOR PL SE</td>
<td></td>
<td>DDOT: construction work on ASTOR PL SE between 53RD ST SE and CENTRAL AVE SE (3300 - 5399 BLOCK OF ASTOR PLACE SE), 09/08/2015 12:00:00 AM through 10/06/2015 11:59:00 PM, 1 lane closed</td>
<td>WASHINGTON</td>
<td>09/16/2015 10:35:22 PM</td>
<td>DDOT</td>
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<tr>
<td>Construction</td>
<td>PA10209865</td>
<td>MORTON ST NW</td>
<td></td>
<td>DDOT: construction work on MORTON ST NW between GEORGIA AVE NW and SHERMAN AVE NW (747 MORTON STREET NW), 09/23/2015 12:00:00 AM through 10/20/2015 11:59:00 PM, 1 lane closed</td>
<td>WASHINGTON</td>
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<tr>
<td>Construction</td>
<td>PA10210190</td>
<td>F ST NW</td>
<td></td>
<td>DDOT: construction work on F ST NW between 22ND ST NW and 23RD ST NW (2224 F STREET NW), 09/15/2015 12:00:00 AM through 10/13/2015 11:59:00 PM, 2 lanes closed</td>
<td>WASHINGTON</td>
<td>09/19/2015 10:35:22 PM</td>
<td>DDOT</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
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<td></td>
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<td>WASHINGTON</td>
<td>09/19/2015 10:35:22 PM</td>
<td>DDOT</td>
<td></td>
</tr>
</tbody>
</table>

### Traffic Incident View

- **Location and Ownership**
  - Reported by:
  - Local:
  - State:
  - County:
  - City:
  - Source:
  - Incident Type:
  - Facility/Route:
  - Article:
  - From:
  - To:
  - Direction:
  - Project Number:
  - Roadway Detail: Event Name:
  - Weather Conditions: Capacity:
  - pavement Conditions:
  - No. of Lanes:
  - Lane Detail:
  - Total Lanes:
  - Lane Status:
The Approach: Traffic Analysis Tool

- Customized mesoscopic simulation model
- Simulates operations during construction
- Link capacity reduction for work zones

TRAFFIC ANALYSIS TOOL

- Analysis summary reports
- Weekday peak period scenario results
- Regional congestion “hot spot” map
- TMP / MOT alternatives

Identify and minimize cumulative work zone impacts
The Approach: Traffic Analysis Tool

- Assesses the *cumulative* impacts of work zones and special events
  - AM, PM, midday & weekend peak periods
- Network includes Collectors and higher classification roadways
- Utilizes signal timing and detailed lane configuration
- Generates reports of anticipated delay, LOS and queuing
- Provides the ability to minimize work zone
The Approach: Traffic Analysis Tool

District of Columbia DOT Citywide TMP
The Approach: Traffic Analysis Tool

Project Map
The Approach: Traffic Analysis Tool

- Delay Maps
  - Intersections
  - Segments
  - Average Delay
  - Percent Delay Increase

District of Columbia DOT Citywide TMP
The Approach: Traffic Analysis Tool

Level of Service Map

Legend

- A
- B
- C
- D
- E
- F

Map Contents

Layers:
- Project
- Intersection
- Segment

BaseMaps:
- None
- DC_GIS
- Google Map

High Accident Location

District of Columbia DOT Citywide TMP
The Approach: Traffic Analysis Tool

Work Zone “Hot Spot” Map (with High

District of Columbia DOT Citywide TMP
Focus on *Cumulative* Work Zone Impacts

- Does not replace project-specific TMPs

Initial Citywide TMP

- Identifies major projects, key corridors, and potential conflict areas
- Recommends mitigation strategies including:
  - Transportation Demand Management (TDM)
  - Public Outreach

Identify corridor / area work zone mitigation strategies

Performance measures to...
Work Zone Mitigation Strategies

**Goal:** Maximize mobility while minimizing impacts

- Supplement project-specific mitigation strategies
- Two (2) primary types of regional mitigation strategies
  - Citywide initiatives
  - Targeted strategies for identified hotspots
The Approach: Citywide TMP

Document

Work Zone Mitigation Strategies

- Mitigation budget developed for next five years
- Proactive approach
  - Make work zone mitigation a priority, not an afterthought
Benefits

- Reduced work zone conflicts
- Promotes proactive collaboration rather than reactive
- Reduces complaints
- Minimizes surprises
Benefits

- Manages expectations
  - Elected officials, residents, business owners, ANC’s, BID’s
- Promotes economic vitality
  - Businesses in proximity to work zones
Benefits

- Identifies work zone hotspots → Targeted mitigation strategies
  - Mitigation strategies are based on data-driven work zone “hot spots”
- Proactive work zone outreach
  - Messaging distributed in advance to elected officials, media & public
Benefits

- Improves safety & mobility in work zones
- Supports the Mayor’s Vision Zero initiative

  “By the year 2024, Washington, DC will reach zero fatalities and serious injuries through more effective use of data, education, enforcement, and engineering.”
Outline

**Citywide Transportation Management Plan (TMP)**

- Citywide Work Zone Project Management System

![Map of District of Columbia with various symbols and signs indicating traffic management and work zones.](image)

**Work Zone Management Manual for the District of Columbia**

January 2016
Challenges: District of Columbia

- Maintaining ADA accessibility
- Suitability and appropriate use of traffic control devices
- Inconsistency of flagging operations
- Block spacing (sign spacing)
- Maintaining bicycle facilities
Why Develop Jurisdiction-based Work Zone Standards?

- Specifically & autonomously define the conditions & policies for closures based on jurisdictional characteristics
- Address specific agency challenges
- Allows for “breaking out” of facilities (i.e., pedestrian, bike) to define their policies
- Engage departmental staff
District of Columbia DOT Citywide TMP

Project Goals: Work Zone Management Manual

- Update Primary Work Zone Documents
- Create a Comprehensive Documentation of all DDOT Work Zone Policies
- Improve Temporary Traffic Control Plan Quality
- Work Towards Minimizing Work Zone Impacts
- Improve Safety & Operations through Work Areas

WORK ZONE DOCUMENTATION
- Transportation Facilities Closure Policy (formerly Business Rules)
- Pocket Guide
- Work Zone Safety & Mobility Policy
- Specifications
- DC Temporary Traffic Control Manual

WORK ZONE MANAGEMENT MANUAL
Primary Work Zone Management Manual Elements

- **Work Zone Safety & Mobility Policy** – How work zone management techniques are integrated

- **Transportation Facility Closure Policy** – What steps and considerations DDOT and contractors must consider when restricting access

- **DC Temporary Traffic Control Manual** – DC’s version of the MUTCD
1. Work Zone Safety & Mobility Policy

GOALS:

- Better consistency with federal standards
- Clarify “Significant Project”
- Guidance for TMP Levels
  - Type A TMP – Basic
  - Type B TMP – Intermediate
  - Type C TMP – Major
- Specific work zone management tools for TMP
Jurisdiction-Based Considerations

Work Zone Safety & Mobility Policy

- Refine roles for constantly evolving agency
- Consistency in planning of transportation management similar project scales
- New standards and practices already in use
- Need for public outreach & engagement
**Work Zone Safety & Mobility Policy**

**Tools**

### Identifying TMP Type

- **Is this a significant project?**
  - NO → **Type A TMP**
  - YES → **Would the project benefit from Public Outreach or Transportation Operations Strategies?**
    - NO → **Type B TMP**
    - YES → **Type C TMP**

### Identifying Strategy Implementation Levels

<table>
<thead>
<tr>
<th>STRATEGY CATEGORIES</th>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
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<tbody>
<tr>
<td><strong>Temporary Traffic Control (TTC)</strong></td>
<td>Full</td>
<td>Full</td>
<td>Full</td>
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<tr>
<td><strong>Transportation Operations (TO)</strong></td>
<td>Minimal</td>
<td>Partial</td>
<td>Full</td>
</tr>
<tr>
<td><strong>Public Information (PI)</strong></td>
<td>Minimal</td>
<td>Partial</td>
<td>Full</td>
</tr>
</tbody>
</table>
2. DC Transportation Facility Closure Policy

GOALS:

- How? When? To What Extent?
- Detail closure policies for all types of facilities
- Define closure process (i.e., planned & unplanned)
- Establish waiver process
- Clarify roles & responsibilities
Jurisdiction-Based Considerations

Transportation Facility Closure Policy

- More stringent policies needed regarding pedestrians and bicycles
- Need to define closure policy for different facilities
- Impact of parking losses
- Addressing special events, emergency repairs, etc.
3. DC Temporary Traffic Control

Manual

GOALS:

- Consolidate DDOT’s Current Policies & Practices
- Integrate latest version of MUTCD Part 6
- Incorporate National Best Practices and State-of-the-Practice Strategies
- Tailor Content to the Urban Environment
Jurisdiction-Based Considerations

Temporary Traffic Control Manual

- Alternative modes ("streetcars, pedestrians, and cyclists")
- Need to specify ADA
- Daily, Weekly, Hourly TTC Review
- Training Requirements (staff & supervisors)
- Roadway Layout
- DC-specific traffic controls
Best Practices Review
- Federal, Maryland, Virginia, California, Delaware, and yes...DC

Led to Comparative Matrices
- TTCM Narrative, Approved Signs, Typical Applications

Stakeholder Meetings
- Division / Discipline-based
- IPMA, PTSA, PPSA, PSRA, TOA
DC Temporary Traffic Control Manual
Comparative Matrices

Use of 5 States (including DC)
- Every Chapter: 6A through 6I
- Comparison of Every Paragraph
- Cross-Comparison with DDOT Policies

<table>
<thead>
<tr>
<th>Section / Paragraph</th>
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<th>VA</th>
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</table>

Option:

When work occurs on a high-volume, highly congested facility, a vehicle storage or staging space may be provided for incident response and emergency vehicles (for example, tow trucks and fire apparatus) so that these vehicles can respond quickly to road user incidents.

Standard:

(DDOT Revision) With the exception of the protection vehicle placed near the work area, no storage of equipment, vehicles, or material shall be permitted within the buffer space.
DC Temporary Traffic Control Manual

“Urbanizing” Figures
**Table 6C-2a. Length of Optional Longitudinal Buffer Space (Urban)**

<table>
<thead>
<tr>
<th>Speed*</th>
<th>Distance</th>
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<tbody>
<tr>
<td>20 mph</td>
<td>35 feet</td>
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<tr>
<td>25 mph</td>
<td>55 feet</td>
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<tr>
<td>30 mph</td>
<td>85 feet</td>
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<tr>
<td>35 mph</td>
<td>120 feet</td>
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<td>40 mph</td>
<td>170 feet</td>
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<tr>
<td>50 mph</td>
<td>280 feet</td>
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<tr>
<td>55 mph</td>
<td>335 feet</td>
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<tr>
<td>60 mph</td>
<td>415 feet</td>
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<tr>
<td>65 mph</td>
<td>485 feet</td>
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* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.

**Table 6C-2b. Length of Longitudinal Buffer Space (Freeway/Expressway)**

<table>
<thead>
<tr>
<th>Speed*</th>
<th>Distance</th>
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</thead>
<tbody>
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<tr>
<td>45 mph</td>
<td>360 feet</td>
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<tr>
<td>50 mph</td>
<td>425 feet</td>
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<tr>
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<td>60 mph</td>
<td>570 feet</td>
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<td>645 feet</td>
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<tr>
<td>75 mph</td>
<td>820 feet</td>
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</table>

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.
Pedestrian and bicycle traffic controls required for all closures or disruptions.

- Maintain access to businesses, residences, and crosswalks
- Adherence required for public ROW occupancy permit
- Blockage of sidewalk or bicycle facilities treated in same manner as lane closure
Moving Forward – Future of the DDOT

WZMM

- Constantly-evolving document
- Integration of Smart Work Zone standards
- More Consideration for Transit
  - DC Streetcar
- Multiple delivery platforms