

Active Traffic Management and Part-Time Shoulder Use in Montgomery County, PA

PENN STATE TESC

SESSION 8B – MOVING PENNDOT AND PTC FORWARD

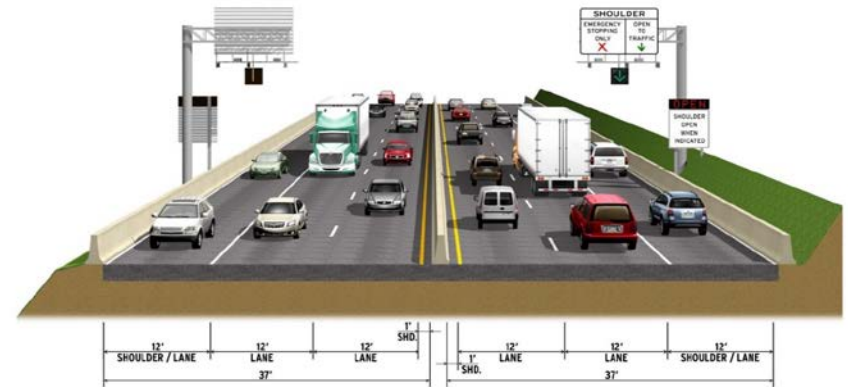
DECEMBER 8, 2017



Agenda

- Define Active Traffic Management and describe techniques.
- Brief Overview of I-76 project / program
- Describe potential ATM applications on I-276
 - Relieve peak period congestion – sensitivity to paying customers.
 - Operate as modern superhighway, including investments in TSM&O
 - Shorter-Term Strategy

Active Traffic Management Techniques



PROPOSED SIGN CONFIGURATION
LOW COST OPTION

Benefits of Active Traffic Management Strategies

- Smaller operational footprint requiring less R/W
- Operations more responsive to current traffic conditions
- Less environmental impacts
- Faster project delivery
- More economical
- Scope is scaled to fit the traffic demand

(source – PennDOT District 6-0)

Variable Speed Limits and Queue Warning

- **Relies on real time data** – Probe and roadside detection
- **Benefits** – Harmonization of vehicle flow and reduction in rear-end and secondary crashes
- **Needs** – Coordination with State Police on enforcement guidelines
- **Implementation** – High crash areas, low-visibility areas, areas prone to recurring/non-recurring congestion

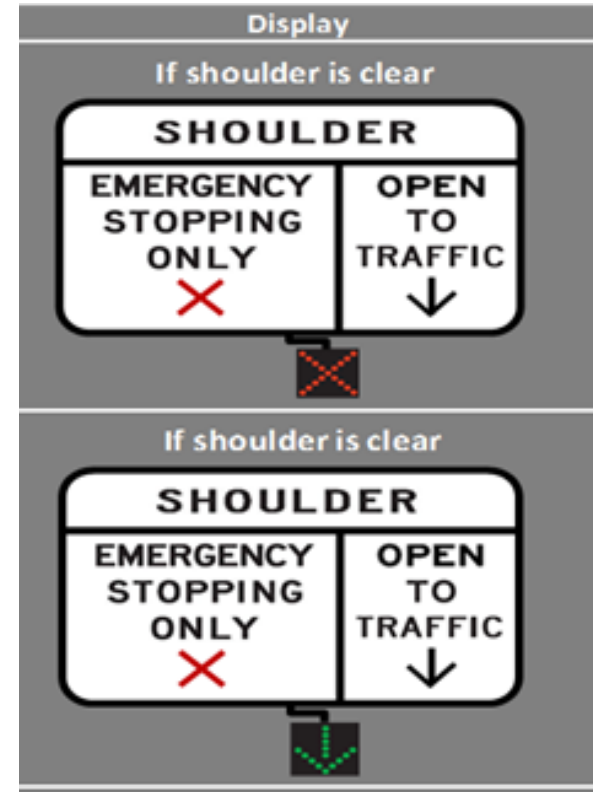
(source – PennDOT District 6-0)



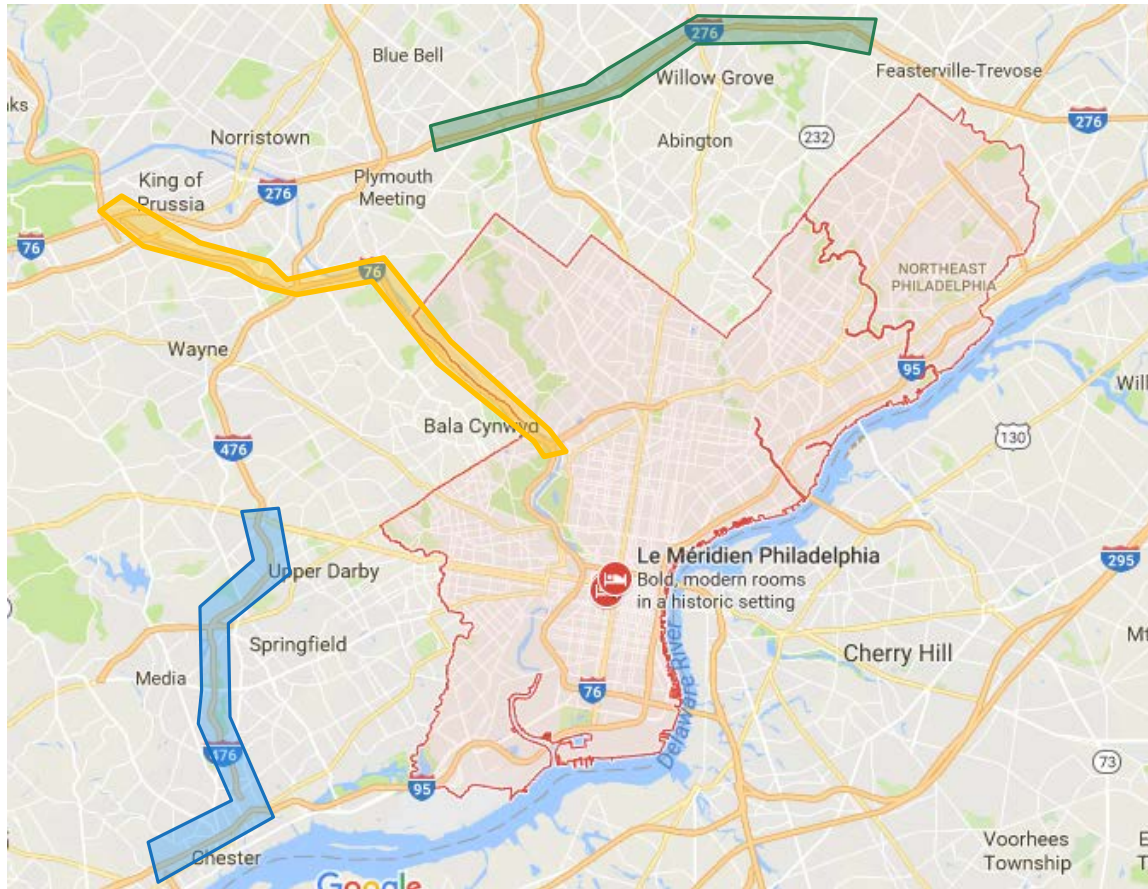
Part-Time Shoulder Use




- Opens shoulder to traffic during peak travel periods.
- Increases mainline throughput by 1,000-1,500 vehicles
- Implementation – Generally along freeway facilities with significant recurring congestion and safety issues
- Operations – Requires diligent surveillance and enhanced asset management.
- Consider – Impacts to emergency responders and enforcement. Emergency refuge. Geometric Constraints

(source – PennDOT District 6-0)



ATM Projects in Philadelphia's Pennsylvania Suburbs

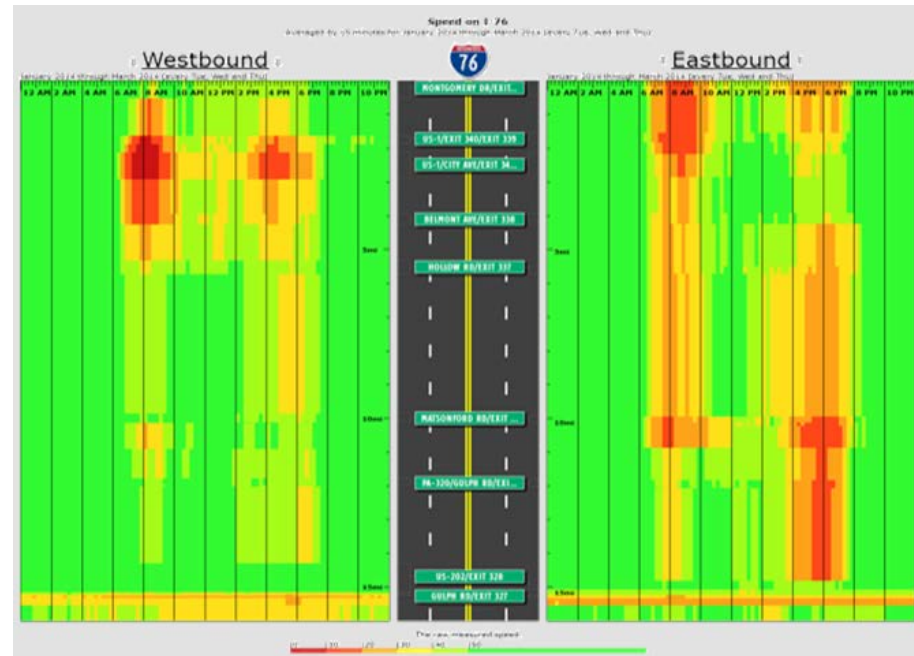


-  I-76 ICM Project (PennDOT)
-  I-476 / I-95 HSR Project (PennDOT)
-  I-276 Part-Time Shoulder / ATM Project (PTC)

I-76 Integrated Corridor Management

- Limits – I-76: PA Turnpike to US Route 1
- ADT: 115,000
- Year Built: 1954
- Number of Lanes: 2/Direction

(source – PennDOT District 6-0)



I-76 Integrated Corridor Management

Phase 1

CENTER CITY 40 MIN
 USE EXIT 338
 FOR REGIONAL RAIL

Phase 2

TRAIN TIME 27 MIN
 NEXT TRAIN AT 8:00
 SPOTS AVAILABLE 48



Strategies Under Consideration:

- Variable Speed Limits
- Queue Detection
- Ramp Metering
- Junction Control
- Part-Time Shoulder Use
- Parallel Arterials / ICM
- Multi-Modal Improvements

(source – PennDOT District 6-0)

I-76 Integrated Corridor Management



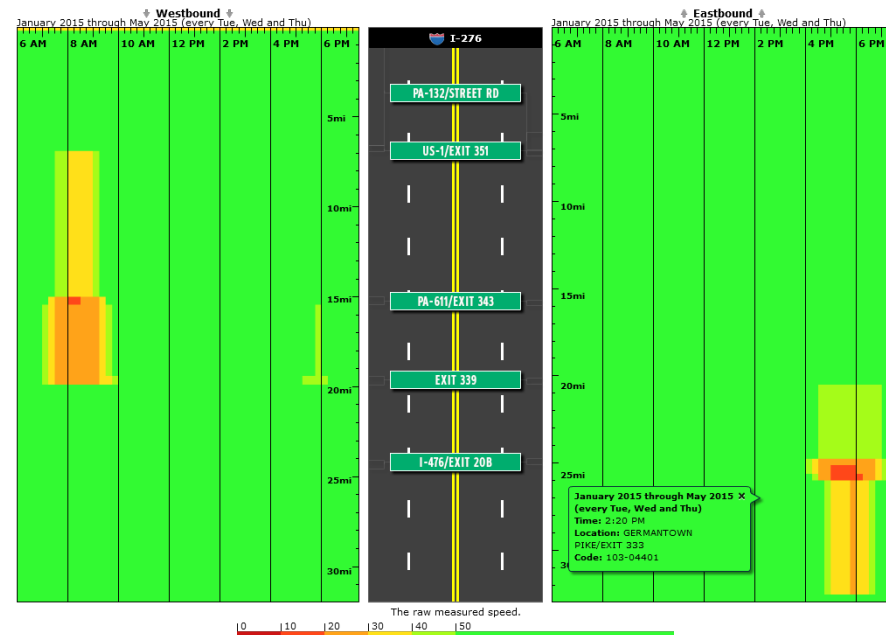
Project Status

- Concept of Operations completed Fall 2016.
- Variable Speed Limit / Queue Warning Construction in 2018.
- Alternatives Analysis / Systems Engineering On-going.
- Anticipated Mainline Construction – 2022.

(source – PennDOT District 6-0)

I-276 – Norristown to Bensalem

- Limits – Roughly I-476 to US 1
- ADT: 126,000
- Year Built: 1954; Widened 1987
- Number of Lanes: 3/Direction





Norristown to Bensalem (MP 333-351)

Transportation Improvement Study

July 2017

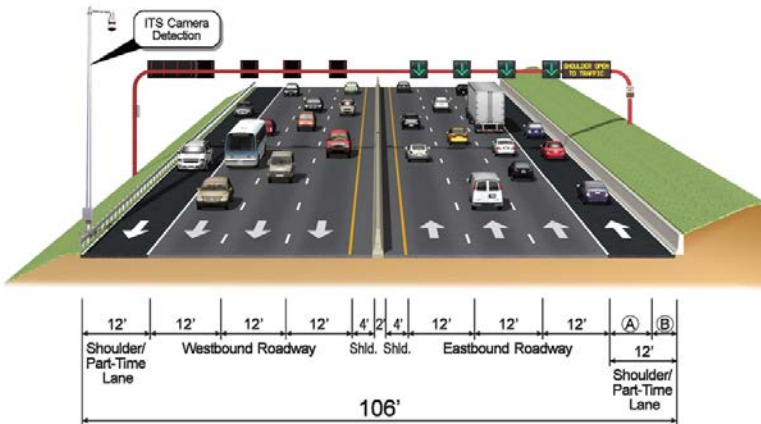


Initial Study Purpose

Upgrade and modernize this segment of mainline Turnpike

- Originally constructed and opened to traffic as four lane segment in 1950s.
- Widened to six lanes in 1980s
 - Original base pavement, overhead bridges not reconstructed
 - Mainline bridges, culverts widened, not replaced
- Provide short-term relief, long-term reconstruction
 - Operate as modern superhighway, including investments in TSM&O
 - Develop alternatives for total reconstruction

Interim Improvements



- Geared towards addressing short-term needs
 - Congestion relief
 - Reduce number of crashes
 - Lessen impact of non-recurring congestion

- Part-Time Shoulder Lane / ATM
 - Requires one overhead bridge replacement or elimination between I-476 and PA 309.
 - Extends functional lifespan of six lane segment.

- Emergency Access Gates – Median & Shoulder

- Enhanced Freeway Service Patrol – Full Function
 - Includes Roving Patrols with dedicated tow vehicles

I-276 – Norristown to Bensalem

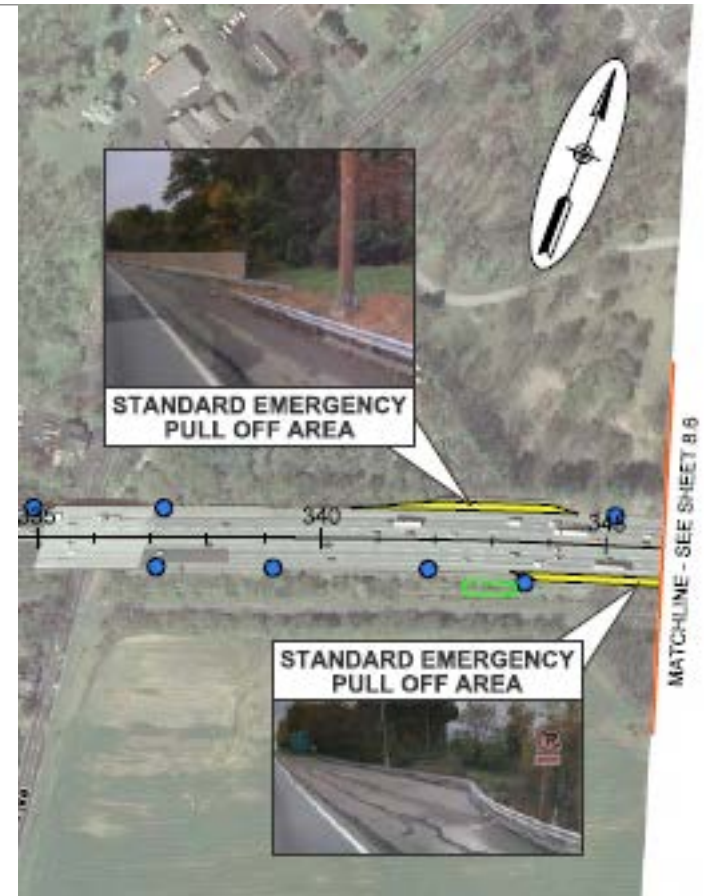


Using ATM for lane closures on I-94 in Minneapolis (Photo Courtesy FHWA)

- Strategies Under Consideration
 - Part-Time Shoulder Use
 - Variable Speed Limit / Queue Warning
 - Dynamic Lane Use Control
- Strategies Removed from Consideration
 - Ramp Metering.
 - Junction Control.
- Current Efforts – Concept of Operations
 - Engineering Feasibility Previously Evaluated

I-276 – Norristown to Bensalem

- Availability of Shoulder
 - 85% of corridor has full-depth, full width (12'+) shoulder available.
 - Shoulders reduced to nearly zero underneath OH bridges
 - Limited at-grade widening needed.
- Other Geometric Elements
 - Horizontal Stopping Sight Distance – 1 curve
 - Emergency Pulloff Areas.
- Additional Civil Infrastructure
 - Drainage Adjustments
 - Stormwater Management
 - Traffic Control for Long-Term Reconstruction



Joshua Road (SR 3014) Overhead Bridge Project



- Critical Bridge for Short Term Needs
 - Elimination of shoulder width restriction needed for Part Time Shoulder Use (PTSU).
 - Only lateral obstruction between Mid-County (I-476) and Fort Washington (PA 309)
 - Current AADT of 4,760.
 - Travel Distance:
 - Existing with Joshua Road – 2,660 feet
 - Proposed without Joshua Road – 4,820 feet
- Options under evaluation
 - May require roadway improvements

I-276 – Norristown to Bensalem



Primary Benefit – Immediate Congestion Relief

- Part-Time Shoulder Use from Mid-County (I-476) to Fort Washington (PA 309)
 - Alleviates 10+ mile daily queues
 - Reduces likelihood of recurring congestion in both directions during both peaks.
- Extends lifespan of existing facility
 - Anticipated 15+ years of benefit.
 - Ft. Washington to Willow Grove (PA 611) next segment to cause congestion.

I-276 – Norristown to Bensalem



Next Steps

- Concept of Operations Development
 - Includes potential immediate strategies

- Evaluation of Civil Infrastructure Options
 - Joshua Road Bridge
 - Horizontal Sight Distance

Similar Strategies – Similar Considerations

- First Response
 - Fire / EMS – overlap between facilities.
 - Pennsylvania State Police
- Stakeholder Discussions
- Performance-Based Practical Design Elements

Questions?

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Please travel home safely!!!