

A Better Gateway

Rehabilitation and Enhanced Mobility on the I-95 Portsmouth/Kittery Piscataqua River Bridge



Gateway to Maine



Project Purpose

- Preventative maintenance
- Improve traffic flow at peak volumes
- Improve safety
- This is a “Forever Bridge”

Project Split

- Bridge Rehabilitation & Approach

Widening

- MaineDOT Lead
- T.Y. Lin International Design
- SPS New England Contractor

- ITS/Traffic Management Project

Project Scope

- Asphalt wearing surface replacement
- Deck patching
- Joint replacement
- Fascia & median barrier replacement
- Concrete patching

Project Scope

- Electrical system upgrade
- Preparation for “Part-Time Shoulder Use”
to increase capacity
 - Includes widening Maine approach to Exit 3 NB

Maintaining Traffic

- Three lanes open for summer traffic
 - Daytime, Memorial Day to Columbus Day
 - Work in shoulders, lane shifts
- Daytime single lane closures:
 - After Columbus Day, before Memorial Day
- Nighttime extra lane closures: 7pm - 6am

Maintaining Traffic

- Detailed Lane Closure Tables
- Specific for every day of the year
- Data from MTA Count Station
- Interactive Data Visualization in Tableau

Maintaining Traffic

- Exit closures when necessary:
 - Exit 1 (ME) southbound
 - Exit 7 (NH) northbound
- Public outreach
- Police presence, tow/service vehicle

Maintaining Traffic

- Incentives!
 - Early completion
 - Open on weekends/holidays
- Disincentives
 - Nightly closure overruns
 - Late completion

Cost Estimating

- Steady from PDR to Final
- Spike in labor costs months prior
- Challenging/risky work
- Maintenance of Traffic, Incentives, Disincentives
- Winning bid \$53 million - not Maine/NH contractor

Rehab Project Lessons Learned

- Cost Estimates - think about risk & market
- Rehab Details - tolerance!
- Work on figuring out Maintenance of Traffic paid off. Zipper barrier works.

Beyond the Rehabilitation

Problem Statement

During peak periods of the week and particularly during peak seasons of the year, the travel demand at the High Level Bridge exceeds the available capacity. This congestion leads to an increase in crashes which affects corridor mobility, both on the highway as well as along the adjacent local roadways.

Agency Partnership—The Owners



MaineDOT



New Hampshire
DOT
Department of Transportation

Traffic Patterns

- Typical Conditions
 - AADT ~ 82,000 vpd
- Summer Fridays and Holiday Weekends (pre-COVID)
 - AADT ~ 120,000 vpd
- Est. Annual Growth (post-COVID) at >1%

Project Objectives

- ✓ Reduce Highway Congestion
- ✓ Improve System Safety
- ✓ Enhance Corridor Mobility



Feasibility Study—Alternatives

- How do we address recurring congestion?
 - Widen the Bridge
 - Build a Parallel Bridge
 - Establish Reversible Lanes on the Bridge
 - Part-Time Shoulder Use (PTSU)
 - Ramp Metering
 - Restricting Truck Traffic on the Bridge
 - Transportation Demand Management (TDM)
 - Enhanced Public Transit/Passenger Rail

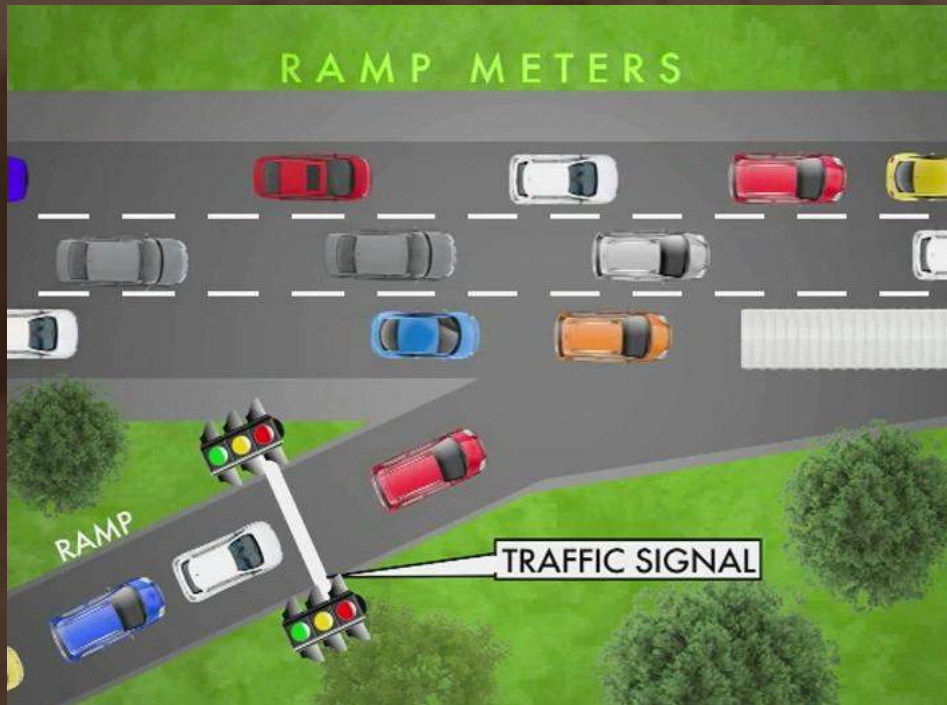
Feasibility Study—Alternatives

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 - Part-Time Shoulder Use (PTSU)—\$\$\$
 - Ramp Metering—\$\$
 - Restricting Truck Traffic on the Bridge—\$
 - Transportation Demand Management (TDM)—???
 - Enhanced Public Transit/Passenger Rail—\$\$\$\$

Alternatives Advanced to Modeling

Ramp Metering

The use of traffic signals along an on-ramp to control the flow of traffic entering the freeway



Part-Time Shoulder Use

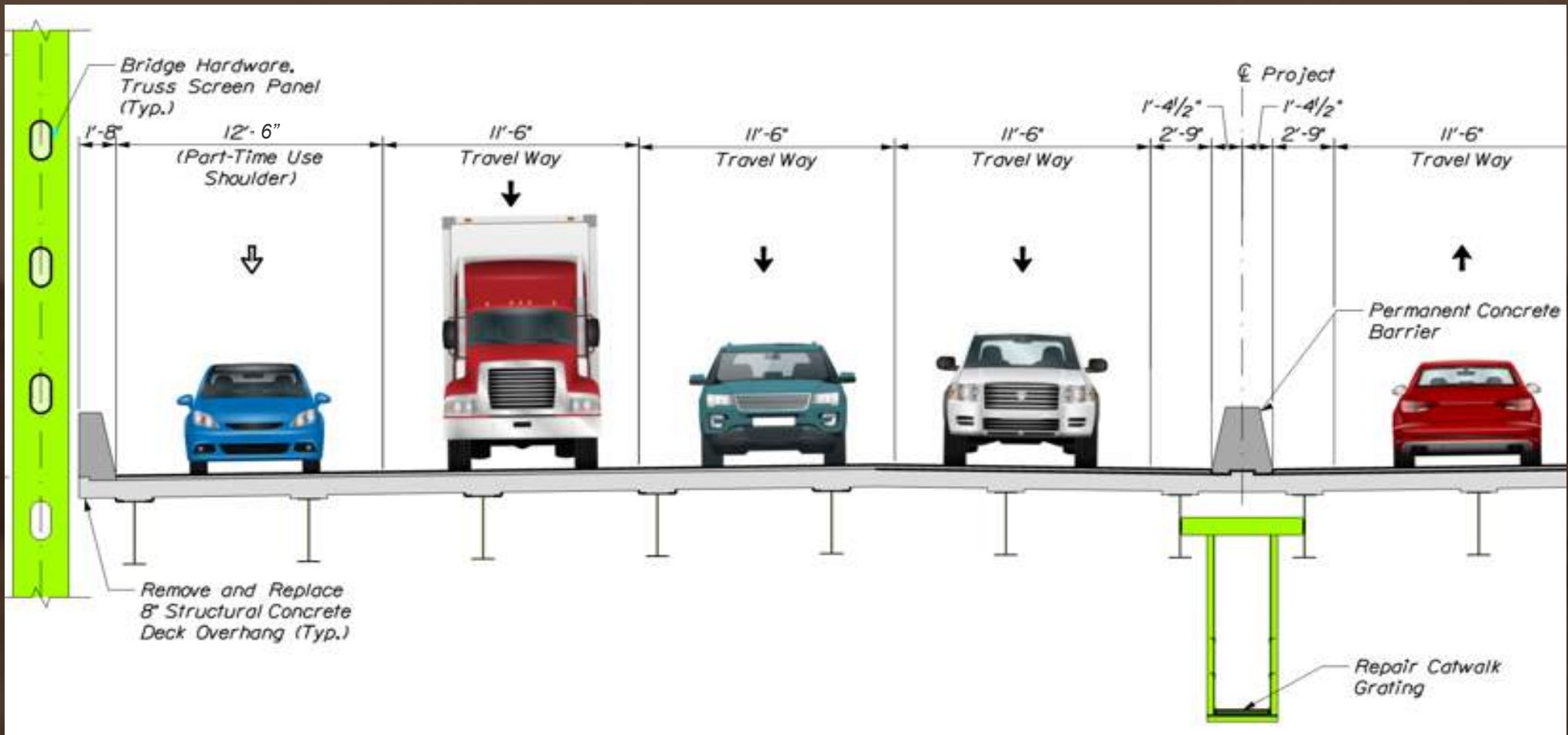
Allows vehicle traffic to use the shoulder area as a travel lane during specific time periods



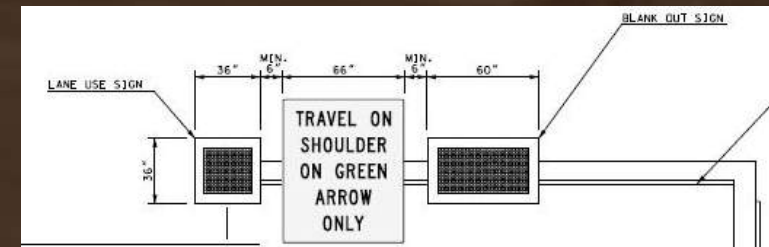
Study Findings

- Ramp Metering
 - Minimal improvement over existing conditions
 - Ramps are inadequate for potential queues
- Part-Time Shoulder Use (PTSU)
 - Significant improvements during peak periods
 - Fixed Schedule PTSU vs. Adaptive PTSU

Selected Alternative—PTSU



Next Step—Concept of Operations



Concept of Operations (ConOps)

- Dynamically turn on/off system remotely
- NH Exit 5 through ME Exit 3
- Typical Operations
 - NB—Summer Friday Afternoons/Evenings
 - NB & SB—Summer Saturday Mid-Days
 - SB—Summer Sunday Afternoons/Evenings
 - Holiday Traffic

System Operations and Safety

- Able to be controlled from MaineDOT TMC, NHDOT TMC and MTA TMCC
- 100% Camera Coverage through corridor
- Radar sensors throughout to monitor speeds and traffic flow
- Safety Patrol to verify clearance prior to activation
- Coordination with First Responders

Work Completed To-Date

- Site Investigations
- Utility Coordination
- Pavement Marking Plans
- Drone Views
- Existing Structure Analysis
- Draft Project Documents
- 60% Plans



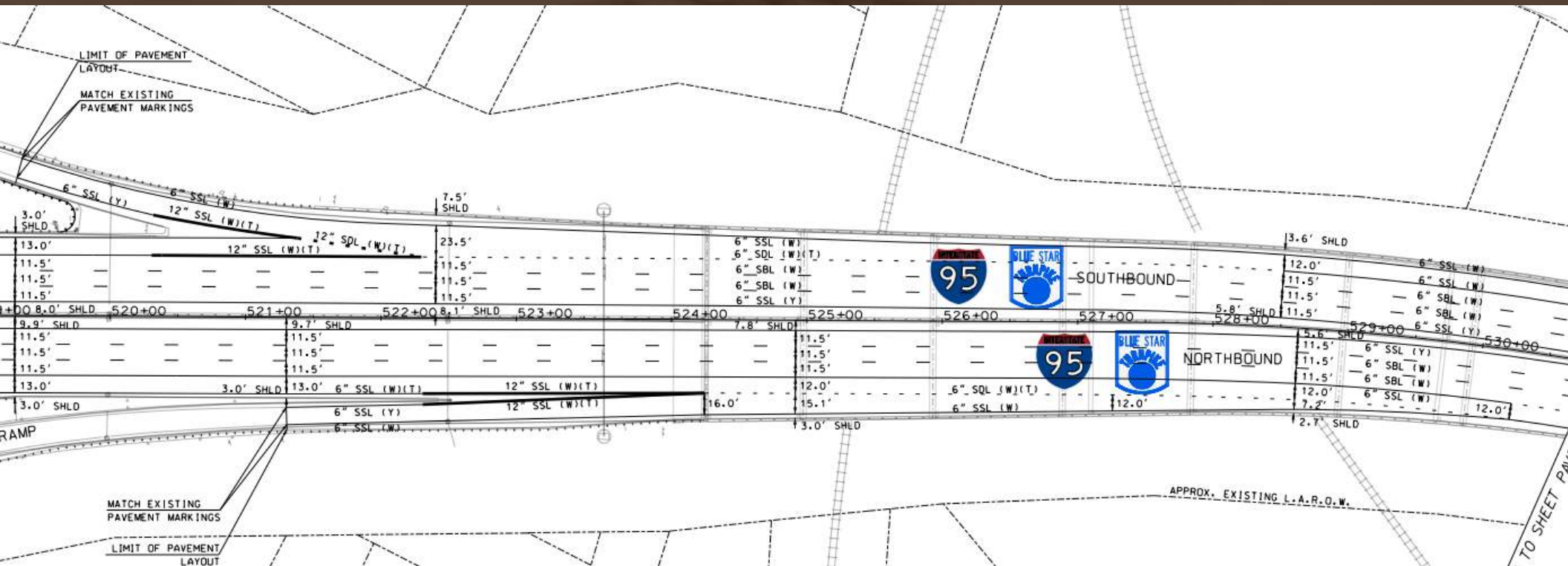
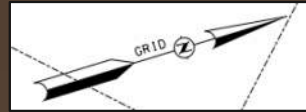
Design Elements

- System of Devices
- Software Integration
- Solar and hardwired power
- Wired, Wireless, and Cellular Communications
- 120' Communications Tower
- Communications Shelters
- Bridge Conduit Routing

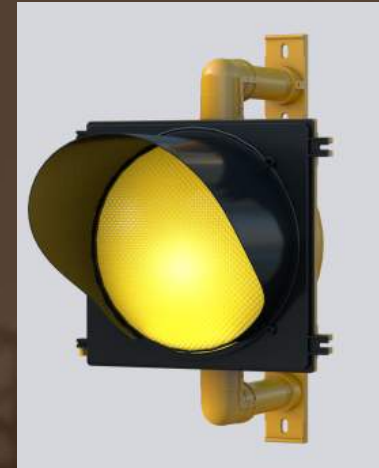


Design - Pavement Marking Plans

NH Exit 7



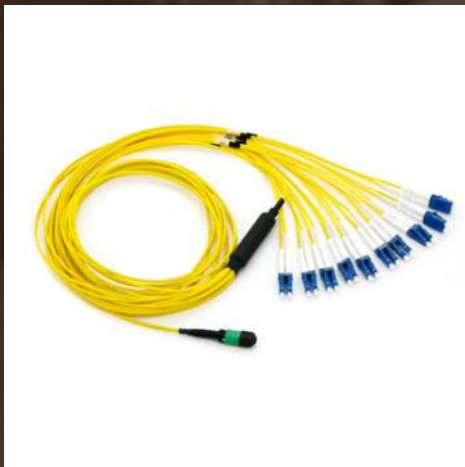
Design — Field Devices



Design – Cabinet Equipment



Design – Communications



Upcoming Tasks

- Additional Coordination
- Final Project Documentation
- 60% -> 98% -> RFC Plans
- Early Construction Items



Future Tasks

- Construction
- Software Development
- Testing
- Maintenance & Operations



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- We are all hiring!