Traffic Queue Warning System

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St. Louis County

MnDOT District Safety Plans, Rail Safety Plans, and ITS Rail Safety Strategies
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Existing Conditions

• Project located within the City of Hermantown

• Roadway Information
  – US-2 AADT = 5,500 veh/day
  – Midway Road (CSAH 13) AADT = 7,200 veh/day
  – Intersection of US-2 and CSAH 13 controlled by a traffic signal

• Railroad Crossing Information
  – Train volume = 11 trains/day
  – Crossing controlled by gates/signals
  – Major trunk line for the railroad carrying international freight

• Traffic conditions
  – During high volume conditions on Midway Road, traffic queues have been observed to exceed 2,000 ft in length when a train occupies the railroad crossing
Existing Conditions
The Problem

A safety issue arises when the traffic queue extends into the critical stopping sight distance area.

Top of Vertical Curve (Hill)  
Railroad Crossing  
Critical Stopping Sight Distance  
US-2
Systems Engineering

• Concept of Operations
  – System scope
  – Operational description
  – System overview

• System Needs and Requirements
  – What does the system need to do

• Testing Plan
  – Functions of sub-systems
  – Testing

• Operations and Management Procedures
  – Repairs
  – Periodic review
Operation

• The Dynamic Message Sign is the only interface with drivers. The sign faces northbound drivers only. It will display two messages based upon two difference scenarios.

  • Scenario 1
    – A train is detected at the railroad crossing **and** traffic **does not** queue to the critical area
    – Message Displayed: TRAIN AHEAD

  • Scenario 2
    – A train is detected at the railroad crossing **and** traffic **does** queue to the critical area
    – Message Displayed: TRAFFIC BACK UP AHEAD/BE PREPARED TO STOP
Plan Development

See Sheet 4

See Sheet 5

See Sheet 6

See Sheet 7
Plan Development

1. Install DMS Post Mounted (35’ x 2’)
2. Install Cabinet
   - DMS Radio Equipment (1-COMPAK 1/2 B, 1-ANTENNA)
3. DMS 2” Duct & 4-1/2” Ins No. 6
4. DMS Service Equipment
5. DMS 2” Bored Conduit & 3/4” Pull Rope
   - Power Cables (by Minnesota Power)
6. DMS Pull Vault
7. DMS 2” Duct & 3/4” Pull Rope
   - Power Cables (by Minnesota Power)
8. Replace Sub (Ground Mounted Transformers)
   (Coordinate Concrete Foundation with Minnesota Power)
Plan Development
Plan Development
Plan Development

GENERAL NOTES

1. COORDINATE WITH JOHN HOVIV (INFRASTRUCTURE DISTRICT) (210-733-3790) FOR ALL TRAFFIC SIGNAL INSTALLATION WORK.
Plan Development

NOTES:
1. RADIO CONFIGURATION AND TESTING BY COUNTY.
2. WAVETRONIX TRAFFIC DETECTOR AND CABINETS FURNISHED BY COUNTY.
3. SEE SPECIAL PROVISIONS FOR EQUIPMENT DETAILS.
Equipment Pole
Antennas
View of Dynamic Message Sign
Costs

• Project was completed by direct purchasing and construction contract

• Direct Purchasing
  – Dynamic Message Sign = $45,194.00
  – Train Detector = $942.00
  – Traffic Detector = $11,961.00
  – Sub-Total = $58,097.00

• Construction Contract
  – Sub-Total = $81,726.04

• **Total Project Cost = $139,823.04**
Consider Maintenance

• Installing the Traffic Queue Warning System is not the final step...consider how your agency will maintain this system

• Some options...
  – Maintain the system by internal agency forces
  – Develop a maintenance contract with an electrical contractor to maintain the system
    • Types of contracts
      – Pay per repair
      – Fixed fee (pay a yearly fee regardless of the maintenance frequency)
  • Consider the following requirements
    – Initial response time to diagnose (48 hours?)
    – Time to repair
    – Keep items on the shelf to reduce time to repair
Closing Thoughts...

- It is very important to work closely with partnering agencies to ensure the design meets their expectations and requirements.
- Railroads have special concern for connected systems displaying textual information to drivers.
- Always a bit of skepticism with these projects, it is important to be able to clearly articulate their need.
- Remember maintenance...
Contact Information

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