2016 Executive Committee

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INTERSECTION TRAFFIC CONTROL COMMITTEE / PEDESTRIAN AND TRAFFIC SAFETY COMMITTEE JOINT MEETING

Blue Line Pedestrian Grade Crossings
Meeting Minutes
November 11th, 2016

ATTENDEES

<table>
<thead>
<tr>
<th>Name</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Eisinger</td>
<td>Traffic Control Corp.</td>
</tr>
<tr>
<td>Emily Gross</td>
<td>SRF</td>
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<tr>
<td>Joe Gustafson</td>
<td>Washington County</td>
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<tr>
<td>Jerry Kotzenmacher</td>
<td>MnDOT</td>
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<tr>
<td>Tyler Krage</td>
<td>Alliant Engineering</td>
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<tr>
<td>Jon Krieger</td>
<td>Hennepin County</td>
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<tr>
<td>Jonette Kuhnau</td>
<td>Kimley-Horn</td>
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<tr>
<td>Ellie Lee</td>
<td>HDR</td>
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<tr>
<td>Ken Levin</td>
<td>Hennepin County</td>
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<tr>
<td>Natalie Lindsoe</td>
<td>HDR</td>
</tr>
<tr>
<td>Matt May</td>
<td>Dakota County</td>
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<tr>
<td>Nick Ollrich</td>
<td>Metro Transit</td>
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<tr>
<td>Kevin Peterson</td>
<td>Washington County</td>
</tr>
<tr>
<td>Jason Pieper</td>
<td>Hennepin County</td>
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<tr>
<td>Hannah Pritchard</td>
<td>Toole Design Group</td>
</tr>
<tr>
<td>Mark Wagner</td>
<td>SEH</td>
</tr>
<tr>
<td>Caitlin Wotruha</td>
<td>Kimley-Horn</td>
</tr>
<tr>
<td>Sri Durga Yada</td>
<td>HDR</td>
</tr>
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MEETING LOCATION: MnDOT Water’s Edge

I. **Blue Line Pedestrian Grade Crossings**
   Nick Ollrich and Jonette Kuhnau presented on pedestrian grade crossings around the proposed Blue Line site.

   Pedestrian Crash Experience-
   -Pedestrian vs LRT crashes are a concern nationally, usually very severe and largely fatal
   -Poor sight distances, jaywalking, station access, and distraction are major issues with pedestrian/LRT interaction
   -Human factors play large role in safety engineering for LRT

www.nc-ite.org
-Disobedience  
-Failure to Perceive  
-Misinterpretation  
-Violation of Expectations  
-Inattention

Existing Metro Transit Pedestrian Facilities-  
-Traffic signal controlled crossing  
-Pedestrian signs  
-APS  
-Countdown heads  
-Split platforms in areas of light right-of-way  
-Rail controlled crossing  
-Wig-wag indication  
-2 blank out signs advising to look both directions

Pedestrian Grade Crossing Analysis-  
-Created a pedestrian nested decision tree to dictate pedestrian facilities  
-Pedestrian Facility Examples  
-West Broadway Crossing  
- Roundabout, low access, actuated vehicle gate arm in roundabout, and gate arm for pedestrians  
- Oriented pedestrians at right angle to train  
- Gate arm may have low compliance with pedestrians  
-Corvallis Crossing  
- Crossing at tracks  
- Staggered crosswalks oriented at right angles to tracks for optimal pedestrian vision  
-Bass Lake Road Station  
- Similar to Hiawatha line crossings, with increased facilities  
- Pedestrian yielding pork chop  
- Fenced pedestrian diverter for added sight benefit  
-Created scenarios for each location to describe pedestrian experience exactly as it would be seen

Discussion points-  
-No data was found relating to vehicle/pedestrian crashes around LRT facilities. Could yield a valuable insight  
-The pedestrian wait times will be similar to the wait times on the Central Corridor. Flashing beacons were investigated, but were deemed a safety issue.
It was noted that one-stage pedestrian crossing is largely planned at station crossings.
LRT tracks have a covering for ADA compliance, but wheelchairs have slight issues if not crossing at full right angles.

II. Round Robin

Nick- Reminder YMC social is taking place before NCITE Annual Meeting
Jerry- MnDOT Signal Committee Updates
  - MaxView training has taken place, talk to Mike Fairbanks for questions
  - New cabinets at existing locations will be using new fuses
  - St Paul has been noticing issues with some of their ground rods
  - New dual right blank-out for pedestrians omits right turns with a pedestrian actuation
  - ATC spec is near completion
Hannah- Updating AASHTO bike guide, looking for FHWA requests to experiment
Kevin- Intern scholarship is open and accepting applications until December
Jason- Franklin Avenue is now open to bikes
  - 46th Street has been repaved
  - Sensys detectors have seemed to work well for the county
Mark/Natalie- Both committees looking for a co-chair for the next year
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NEXT ITTC MEETING:

Date: Wednesday, December 7th (8:00-10:00am)
Location: Hennepin County Public Works
1600 Prairie Dr
Medina, MN 55340

Topic: MnDOT ATMS

NEXT Ped/Safety MEETING:

Date: Wednesday, December 7th (1:00-2:30pm)
Location: TBD

Topic: Processing Public Requests

Minutes Submitted By: Tyler Krage

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NCITE ITCC/PTSC Joint Meeting

November 2, 2016
Blue Line Extension Project

• Project Overview
• LRT/Pedestrian Crash Experience
• Existing Metro Transit LRT Pedestrian Treatments
• BLRT Pedestrian Grade Crossing Analysis
  ▪ At-Grade Crossings: Active Warning Devices
  ▪ At-Grade Crossings: Traffic Signals
METRO System

- Light Rail Transit
  - Blue Line (2004)
  - Green Line (2014)
  - Green Line Extension (2020)
  - Blue Line Extension (2021)
- Bus Rapid Transit
  - Red Line (2013)
  - Orange Line (2019)
  - Gold Line (TBD)
Project Overview

- 11 new LRT stations
- 13.5 miles of double track
- 27,000 est. rides by 2040
- Serving Brooklyn Park, Crystal, Robbinsdale, Golden Valley, and Minneapolis
- One seat ride from Brooklyn Park to Bloomington
- New Starts Status: Project Development Continuance
## Project Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Milestone</th>
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<tr>
<td>2014-2016</td>
<td>• Project Development</td>
</tr>
<tr>
<td>2016</td>
<td>• Environmental/Municipal Consent</td>
</tr>
<tr>
<td>2017</td>
<td>• Engineering</td>
</tr>
<tr>
<td>2018</td>
<td>• Full Funding Grant Agreement</td>
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<td>2018-20</td>
<td>• Heavy Construction</td>
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<tr>
<td>2021</td>
<td>• Passenger Operations</td>
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Project Funding

FTA 49% $752.73M
CTIB 30.19% $463.76M
HCRRA 9.74% $149.6M
State 9.74% $149.6M
MnDOT: 0.53% $8.19M
Brooklyn Park: 0.53% $8.18M
Hennepin County: 0.27% $4.12M

Proposed Project Budget: $1.536 Billion
LRT/Pedestrian Crash Experience
LRT/Pedestrian Crash Experience

• Common Pedestrian Safety Issues:
  ▪ Trespassing on the LRT tracks
  ▪ Jaywalking
  ▪ Station and/or cross-street access
  ▪ Limited sight distance at pedestrian crossings
  ▪ Pedestrians darting across LRT tracks without looking

• Severity is a concern:
  ▪ Although crashes between pedestrians and LRVs represent a low percentage of total crashes, they represent a relatively high percentage of all fatalities.
### Pedestrian Fatalities and Injuries (2008-2012)

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
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<th>2012</th>
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<td>Total Pedestrian Fatalities</td>
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<td>6</td>
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<td>Pedestrian Crossing Tracks</td>
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<td>Total Pedestrian Injuries</td>
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<td>Total Non-Pedestrian Injuries</td>
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<td>Total All Injuries</td>
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<td>1,078</td>
<td>925</td>
<td>968</td>
<td>844</td>
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</tbody>
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Source: TCRP Report 175: Guidebook on Pedestrian Crossings of Public Transit Rail Services
Data Source: FTA NTD
Human Factors Related to Safety

- Disobedience – low perception of risk due to lack of consequence at conventional intersections or other factors
- Failure to Perceive – people do not observe the appropriate traffic control devices
- Misinterpretation – related to expectation errors and cognitive limitations
- Violation of Expectations – anticipating a movement or operation based on common or past practice
- Inattention – people can be distracted by a variety of other stimuli
Safety Devices Should Be

- Clear / Intuitive
- Visual
- Actionable / Directive
- Consistent
- Maintainable
Existing Metro Transit LRT Pedestrian Safety Treatments
Existing MT LRT Pedestrian Treatments

- Traffic Signal Controlled Crossing
  - Pedestrian-Actuated Traffic Signals
  - APS Push Buttons
  - Countdown Pedestrian Signal Heads
Existing MT LRT Pedestrian Treatments

• Rail Signal Controlled Crossing
  ▪ Activated Blank-Out Signs (2nd Train Coming)
  ▪ Activated Blank-Out Signs (Knee Wall)
  ▪ Pedestrian Flashing-Light Signals
  ▪ Audible Warning Devices
  ▪ Look Sign (R15-8)
Existing MT LRT Pedestrian Treatments

- All Crossings
  - Detectable Warning Surface, and Crossing Delineation
  - Channelization, Barriers, and Fences
  - Lighting
BLRT Pedestrian Grade Crossing Analysis
Blue Line Extension LRT
Pedestrian Grade Crossing Decision Tree

Legend
- Decision Point
- Standard treatment
- Guidance treatment
- Option treatment

Street-running alignment?
- Semi-Exclusive
  - Regional trail crossing?
  - Restricted sight distance?
  - Near a high pedestrian attractor (i.e., stations, etc.) or part of a School Zone?
- Train speed > 40 mph?
  - Multiple concurrent types of train operations? (i.e., shared crossing with freight)
- Street Running
  - Is the rail crossing controlled by a traffic signal?
  - Train speed > 20 mph?

Criteria

Treatments
- Detectable Warning Surface
- Static Signs
- Channelization
- Crossing Delineation
- Audible Device
- Flashing-Light Signals
- Blank-out Sign
- Pedestrian Gates
- Pedestrian Indications

Standard treatments should be implemented, unless the site conditions do not allow.
Guidance treatments should be considered for implementation, based on a study of the site conditions.
Option treatments may be considered for implementation, based on a study of the site conditions.

This decision tree is intended as a tool to guide designers in the selection of appropriate control devices at pedestrian grade crossings. Final treatment selection should be determined through an engineering study.
Blue Line Extension LRT
Pedestrian Grade Crossing Decision Decision Tree

Legend
- Decision Point
- Standard treatment
- Guidance treatment
- Option treatment

Criteria

Street-running alignment?

Semi-Exclusive
Regional trail crossing?

Restricted sight distance?

Near a high pedestrian attractor (i.e. stations, etc.) or part of a School Zone?

Train speed > 40 mph?

Multiple concurrent types of train operations? (i.e. shared crossing with freight)

Street Running
Is the rail crossing controlled by a traffic signal?
Train speed > 20 mph?
Street Running

Is the rail crossing controlled by a traffic signal?

Train speed > 20 mph?

Detectable Warning Surface

Static Signs

Channelization

Crossing Delineation

Audible Device

Flashing-Light Signals

Blank-out Sign

Pedestrian Gates

Pedestrian Indications

Standard treatments should be implemented, unless the site conditions do not allow.
Guidance treatments should be considered for implementation, based on a study of the site conditions.
Option treatments may be considered for implementation, based on a study of the site conditions.

This decision tree is intended as a tool to guide designers in the selection of appropriate control devices at pedestrian grade crossings. Final treatment selection should be determined through an engineering study.
At-Grade Crossings: Active Warning Devices
LRT Design Speed
SB 65 mph
NB 65 mph

LRT Operating Speeds
SB 65.0 mph
NB 65.0 mph

Existing Ped/Bike Traffic
22 crossings/day

Estimated Station Ped/Bike Traffic
0 crossings/day

Additional Considerations
Crash history (2005-2014)
0 crashes with train
1 single vehicle crash with RR crossing device (Sat 1:50 am)

Freight traffic - through movements only (no switching)
LRT Design Speed
SB 65 mph
NB 65 mph

LRT Operating Speeds
SB 65.0 mph
NB 65.0 mph

Existing Ped/Bike Traffic
47 crossings/day

Estimated Station Ped/Bike Traffic
0 crossings/day

Additional Considerations
Crash history (2005-2014) 0 crashes
Freight traffic - through movements only (no switching)
LRT Design Speed
SB 65 mph
NB 65 mph

LRT Operating Speeds
Accel 3.0 m/s^2
SB 56.3 mph
NB 53.9 mph
Service Braking 2.0 m/s^2
Emergency Braking 4.3 m/s^2

Existing Ped/Bike Traffic
217 crossings/day

Estimated Station Ped/Bike Traffic
320 crossings/day

Additional Considerations
Skewed crossing
Adjacent to elementary school
Consistency with 42nd Ave crossing
Crash history (2005-2014) 1 vehicle crash (injury)
Freight traffic - through movements only (no switching)
LRT Design Speed
- SB 45 mph
- NB 35 mph

LRT Operating Speeds
- Accel 3.0 mphps
- Service Braking 3.0 mphps
- Emergency Braking 4.7 mphps
- NB 31.0 mph
- SB 41.7 mph
- NB 45.0 mph

Existing Ped/Bike Traffic
- 125 crossings/day

Estimated Station Ped/Bike Traffic
- 2,100 crossings/day

Additional Considerations
- Crash history (2005-2014): 0 crashes with train
- Freight traffic - through movements only (no switching)
Rail Corridor Station - Scenario 1

- Westbound pedestrian crossing on south side of street
- No train
Rail Corridor Station - Scenario 2

- Westbound pedestrian crossing on south side of street
- LRT train approaching crossing (in either direction)

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 3

- Westbound pedestrian crossing on south side of street
- Southbound LRT train in crossing

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 4

- Westbound pedestrian crossing on south side of street
- Southbound LRT train in crossing
- Northbound LRT train approaching crossing

*Example of pedestrian active warning for freight and LRT*
Rail Corridor Station - Scenario 5

- Westbound pedestrian crossing on south side of street
- Northbound LRT train in crossing

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 6

- Westbound pedestrian crossing on south side of street
- Northbound LRT train in crossing
- Southbound LRT train approaching crossing

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 7

- Westbound pedestrian crossing on south side of street
- Freight train in crossing

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 8

- Westbound pedestrian crossing on south side of street
- Freight train in crossing
- Southbound LRT train in crossing

Example of pedestrian active warning for freight and LRT
Rail Corridor Station - Scenario 9

- Westbound pedestrian crossing on south side of street
- Freight train in crossing
- Northbound LRT train in crossing

Example of pedestrian active warning for freight and LRT
At-Grade Crossings: Traffic Signals
Station Intersection - Scenario 1

- Northbound pedestrian crossing at southwest corner
- No train

Examples of pedestrian signals

Pedestrian location

Devices seen and/or heard by pedestrian
Station Intersection - Scenario 2

- Northbound pedestrian crossing at southwest corner
- Train approaching crossing (either direction)

Examples of pedestrian signals

Example of pedestrian active warning for LRT

Pedestrian location

Devices seen and/or heard by pedestrian
Station Intersection - Scenario 3

- Northbound pedestrian crossing at southwest corner
- Westbound train in crossing

Examples of pedestrian signals

Example of pedestrian active warning for LRT

Pedestrian location

Devices seen and/or heard by pedestrian
Station Intersection - Scenario 4

- Northbound pedestrian crossing at southwest corner
- Westbound train in crossing
- Eastbound train approaching crossing

Examples of pedestrian signals

Example of pedestrian active warning for LRT

Pedestrian location

Devices seen and/or heard by pedestrian
Station Intersection - Scenario 5

- Northbound pedestrian crossing at southwest corner
- Eastbound train in crossing
Station Intersection - Scenario 6

- Northbound pedestrian crossing at southwest corner
- Eastbound train in crossing
- Westbound train approaching crossing

Examples of pedestrian signals

Pedestrian location

Devices seen and/or heard by pedestrian
Questions?
More Information

Website: BlueLineExt.org
Email: BlueLineExt@metrotransit.org
Twitter: @BlueLineExt