Utah Statewide Pedestrian Treatment Guidance Manual
Standards for At-Grade Crossings
10661 F-ST99(180)

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August 7, 2013
Goals

• **ZERO Fatalities** on All Transportation Facilities  
  
• Develop a Statewide Pedestrian Treatment Guidance Manual
  
  1. Establish a Consistent Procedure to Evaluate At-Grade Pedestrian Crossings
  2. Establish a Consistent Application for Control Devices
  3. Develop Standard Drawings
Objectives #1

• Develop an Acceptable Procedure to Evaluate Pedestrian At-Grade Crossings
  – Review Current Process
  – Review Best Practices
  – Compare Current with Accepted Procedures
Objectives #2

- Define Consistent Application of Devices
  - MUTCD
  - UDOT Railroad Coordination Manual of Instructions (MOI)
  - Utah Transit Authority (UTA) Design Criteria
  - UPRR
  - California Public Utility Commission (CPUC)
  - TCRP Report 17 – Integration of Light Rail Into City Streets
  - TCRP 137 – Improving Pedestrian and Motorist Safety Along Light Rail Alignments
  - TCRP 69 – Light Rail Service; Pedestrian & Vehicle Safety
  - NCHRP Report 470 – Traffic Control Devices for Passive Railroad
    - Highway Grade Crossing

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Objectives #3

• Develop Standard Drawings
  – MUTCD
  – UDOT Railroad Coordination Manual of Instructions (MOI)
  – Utah Transit Authority (UTA) Design Criteria
  – UPRR
  – California Public Utility Commission (CPUC)
  – TCRP Report 17 – Integration of Light Rail Into City Streets
  – TCRP 137 – Improving Pedestrian and Motorist Safety Along Light Rail Alignments
  – TCRP 69 – Light Rail Service; Pedestrian & Vehicle Safety
  – Highway Grade Crossing

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Current Evaluation Procedure

Current Evaluation Procedure

- MUCTD 2009 - FHWA Grade Crossing Handbook - UDOT MOI for Railroads – UTA Design Criteria;
  - Large number of significant variables to be considered, No single standard system is universal.
  - Engineering Study to determine deficiencies / needs of the system.
  - These criteria serve as guidelines and do not substitute for engineering judgment and sound engineering.
Current Evaluation Procedure

- MUCTD 2009;
  - Jurisdiction & Regulatory Agency
- FHWA Railroad Highway Grade Crossing Handbook
  - Diagnostic Team
- UDOT Railroad Coordination MOI;
  - Diagnostic Team
- UTA Light Rail Design Criteria Chapter 19
  - Diagnostic Team
Evaluation Procedure

FHWA Railroad Highway Grade Crossing Handbook

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<table>
<thead>
<tr>
<th>Grade Crossing: OVERLAND AVENUE</th>
<th>Prepared by: J Van Hoff</th>
<th>Date: 4/12/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossing No. 848 – 109.5</td>
<td>Reviewed by:</td>
<td>Date:</td>
</tr>
<tr>
<td>USDOT No.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Train Speed:** 55 mph  

**Type of Train Operation:**  
- Exclusive: Yes  
- Semi-exclusive: No  
- Street Running: No  
- No Mixed flow, LRT/Ped Mall, Separates: Yes  
- No Grade Separated: Yes

**Frequency of Trains (per hr in each direction) 6/hr/4r**  
- Yes  
- No  
- At-Grade with fencing/barriers between crossings: Yes  
- No

**Roadway Width: 76ft**  
- LADOT Volumes: ADT: 44,000

**No. of Lanes per direction 3-NB & 3-SB**  
- LADOT Volumes: ADT: 44,000

**POTENTIAL HAZARD**  
- Hazards Identifier:  
  - Vehicular queue from Asbury intersection onto crossing (Influence zone)
  - Vehicular queue from Coventry intersection onto crossing (Influence zone)
  - Vehicular queue from crossing into Asbury intersection (Spillback zone)
  - Vehicular queue from crossing into Coventry intersection (Spillback zone)

**Possible Mitigations:**  
- Right turn movement across tracks  
- Insufficient Clear Storage Area for design vehicle
  - Truck Route - %Trucks
  - School Bus Route
- No

- Right turn onto Northvale Rd will be controlled by the queue cut-off signal and crossing controls.

- 250' Storage with 375' p.m. queue.
  - A Queue Cutter signal will be installed and interconnected with Asbury Ave.
    for preemption.

- 250' storage with 567' p.m. queue.
  - Ashby Ave shall be interconnected with the crossing control for preemption. A third lane will be installed for both NB and SH.

- Provide raised median with 4-quadrant gate system and a queue cut-off signal. Ashby Ave shall be interconnected with the crossing control for preemption.

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Application of Devices

• MUTCD Pedestrian Standards
  – As a minimum Crossbuck with Number of Tracks shall be used
    (8B.03)
Application of Devices

• MUTCD Pedestrian Standards
  – Flashing Light Signal should be installed where sight distance is not sufficient to complete crossing prior to train arrival (8C.13)
Adequate Sight Distance

FHWA Transportation Working Group
Guidance for speed & distance values

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Application of Devices

- MUTCD Pedestrian Standards
  - Consider “LOOK” & Automatic Ped Gates where Flashing Light Signal does not provide sufficient notice (8C.13)
Application of Devices

- UDOT Pedestrian Gate Standards

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Application of Devices

- MUTCD Pedestrian Standards
  - Optional use of Ped Swing Gates (8C.13)

Figure 8C-8. Example of Swing Gates

Contrasting pavement color or texture

Legend
- Direction of travel

Fence with 43-inch MAX. height

 UDOT udot.utah.gov

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Application of Devices

- MUTCD Pedestrian Standards
  - Optional use of Ped Barriers (8C.13)

Figure 8C-9. Example of Pedestrian Barriers at an Offset Grade Crossing

Legend
- Direction of travel

Fence with 43-inch MAX. height

Contrasting pavement color or texture

Pedestrian barriers with 43-inch MAX. height

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Application of Devices

- UDOT Channelization Standard

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Application of Devices

• MUTCD Pathway Standards
  – Sidewalk considered part of highway-rail crossing rather than a pathway (8D.01)
  – Crossbuck with Number of Tracks (8D.05)
    – Omit if pathway is within 25’ of highway-rail crossing
  – Flashing Light Signal (minimum diameter 4”) where sight distance is not sufficient to complete crossing prior to train arrival (8D.06)
  – Automatic Ped Gates where Flashing Light Signal does not provide sufficient notice (8D.06)
  – Optional use of Ped Swing Gates (8D.06)
  – Advance Warning Signs if multi-use trail (8D.03)
Application of Devices

Rural Pedestrian Grade Crossing Flow Chart

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

Notes:
1. If crossing is >90 degrees from perpendicular, consider a 90 degree crossing design or add a skewed crossing sign (W11-12) to alert non-motorized crossing users, especially toddlers, of the potential hazard.
2. If the pedestrian crossing is <20 ft from a highway-rail grade crossing, the vehicle control treatments may provide some of the required pedestrian treatments.

Conditions:
- Do not include <1000 persons within 1 sq. mi. of the crossing?
- Pedestrian access prohibited?
- Restricted sight distance?
- Near a high pedestrian attractor (e.g., recreation areas, malls, etc.) or part of a School Zone?

Treatments for Conditions:
- Detractate Warning Surface (if paved crossing)
- "Look" Sign (R15-6)
- "Stop" Pavement Marking
- Pathway Definition (direct through crossing)
- Channelization
- Curb to crossing
- Barriers (including curb control)
- Audible Device
- Flashing Light Signals

This flow chart is a companion to the USDOT Pedestrian Grade Crossing Manual. It 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.
Pedestrian Behavior

- Take the shortest route
- Create their own pathways
- Tend to look down
  - Tripping hazards
  - Texting
- Lack of awareness or distracted
Pedestrians Behavior

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Pedestrian’s take the shortest route
Pedestrian Behavior

Pedestrian’s create their own pathways

UPRR, Pomona, CA
Coaster, San Diego, CA

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Pedestrian Behavior

Pedestrian tend to look down

LA Metro Blue Line, Los Angeles, CA

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Pedestrian Behavior

UTA Red Line, Salt Lake City, UT

Pedestrian may lack awareness or be distracted

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Requirement for Pedestrian Safety

- Awareness of the Crossing
- Control of Pedestrian Path
- Awareness of Approaching Train
  - Adequate Sight Distance
- Communicate an Understanding of Potential Hazard

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Hiawatha Line, Minneapolis, MN  
TRAX Salt Lake City, CA
Control of Pedestrian Path

TRAX Sandy, Ut
Chicane Crossing

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Control of Pedestrian Path

TRAX Sandy, Ut
Chicane Crossing

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Awareness of Approaching Train Adequate Sight Distance

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Guidance for speed & distance values

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Awareness of Approaching Train
Adequate Sight Distance

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Communicating Understanding of Potential Hazard

TRAX, Salt Lake City, UT

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Communicating Understanding of Potential Hazard

TRAIN ACTIVATED BLANKOUT SIGN
DETAIL B
Communicating Understanding of Potential Hazard
QUESTIONS