

Maintaining a Legacy Transit Railroad



John W. Binsse, E.I.T.

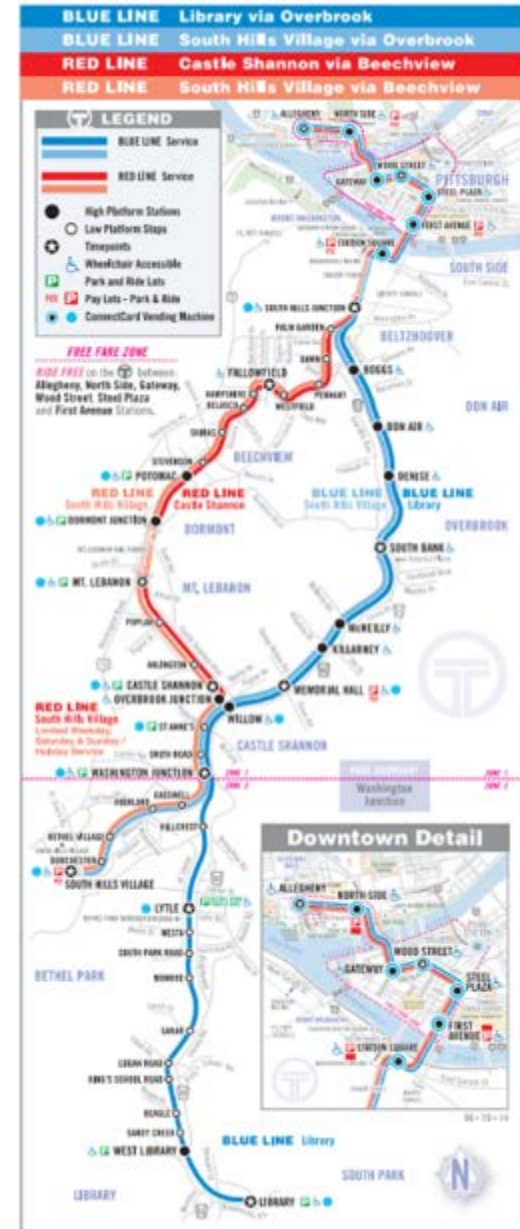
*Port Authority of Allegheny
County, Manager – Way
Department
Pittsburgh, PA*



2018 Rail Conference

Agenda

- System Information
- Strap Guard
- Embedded Switch
- Vegetation Management
- Station Design



System Information Track

- 26 miles of mainline double track
- 40.4 ballast
- 20.4 embedded or direct fix
- 251 switches
- 317 frogs
- 115 lb and 100 lb rail



System Information

Geometry

- 62 ½" guage
- 36' loops
- 82' radius curves
- Grades up to 9.25%



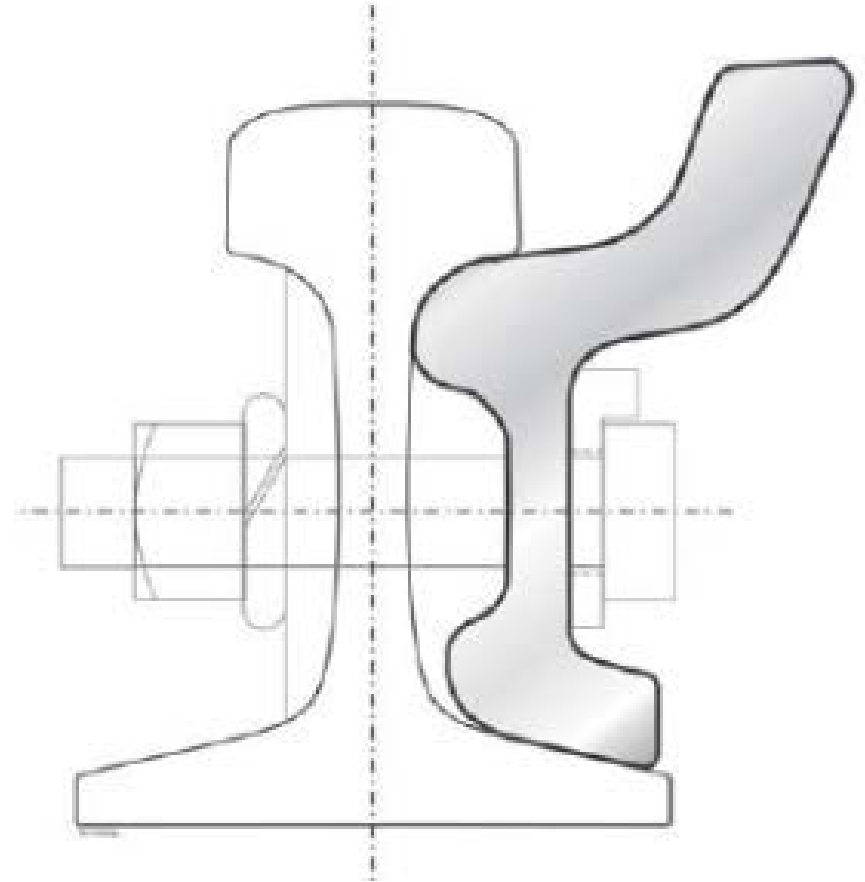
System Information Stations and LRV's

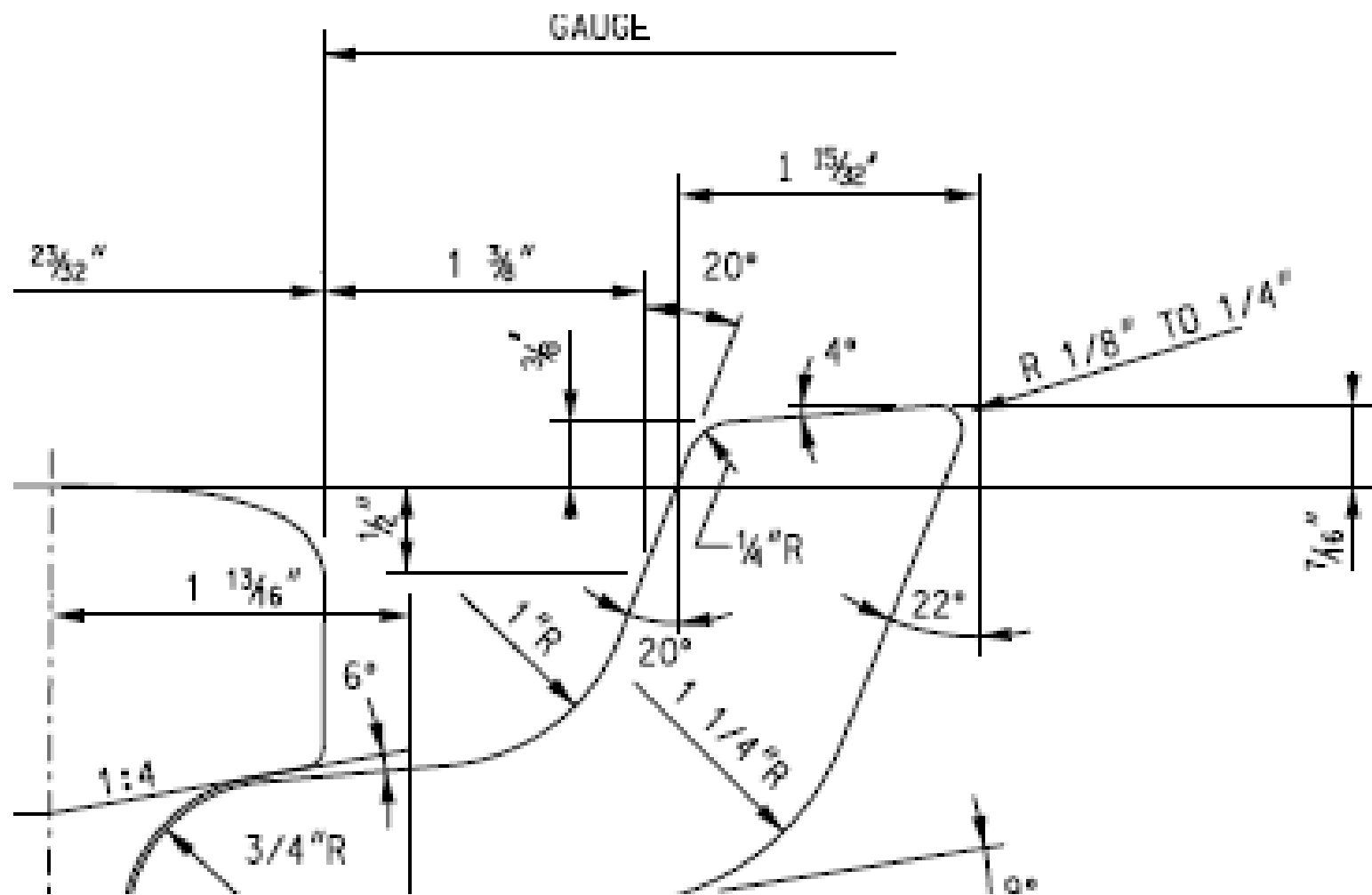
- 65 high and low platform stations
- Wheels
 - Unique flange design
 - Tire Resilient wheel



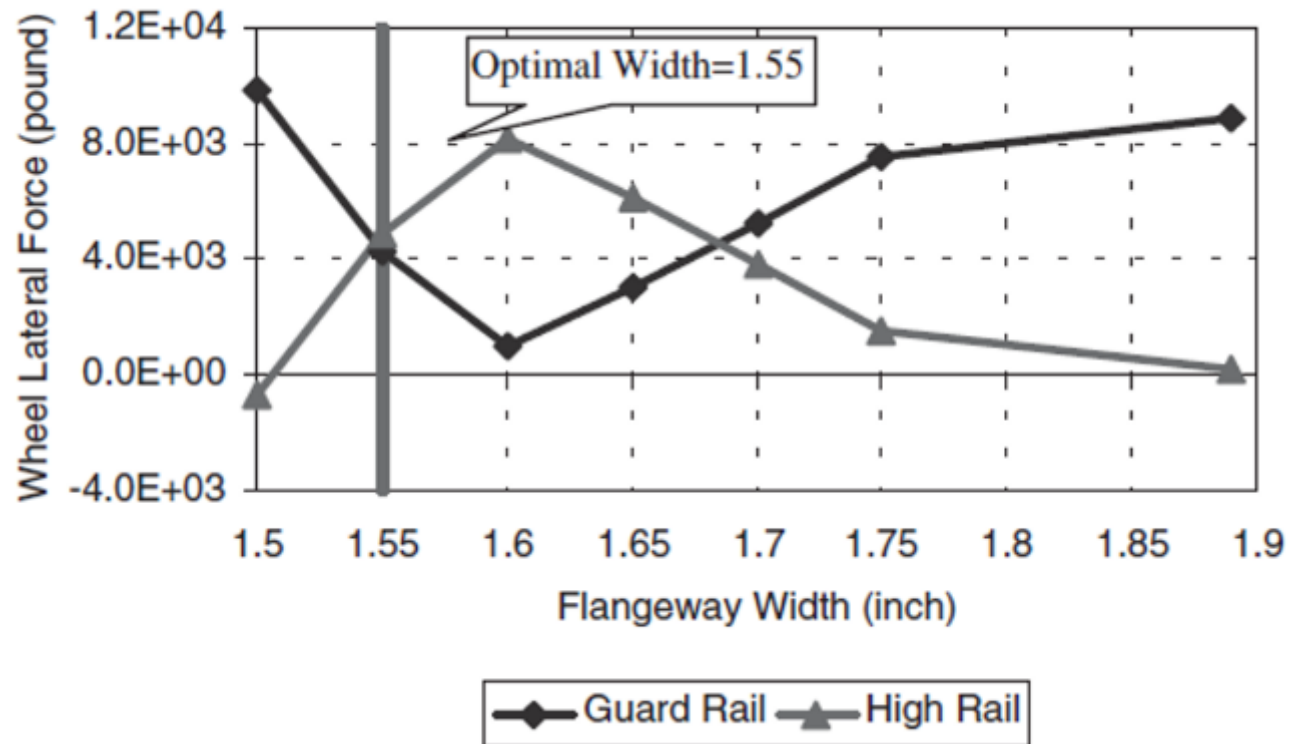
Strap Guard

- Shallow flangeway
 - Excessive wear
 - Flange bearing
- Width is 1.375"
 - 1.55" is appropriate

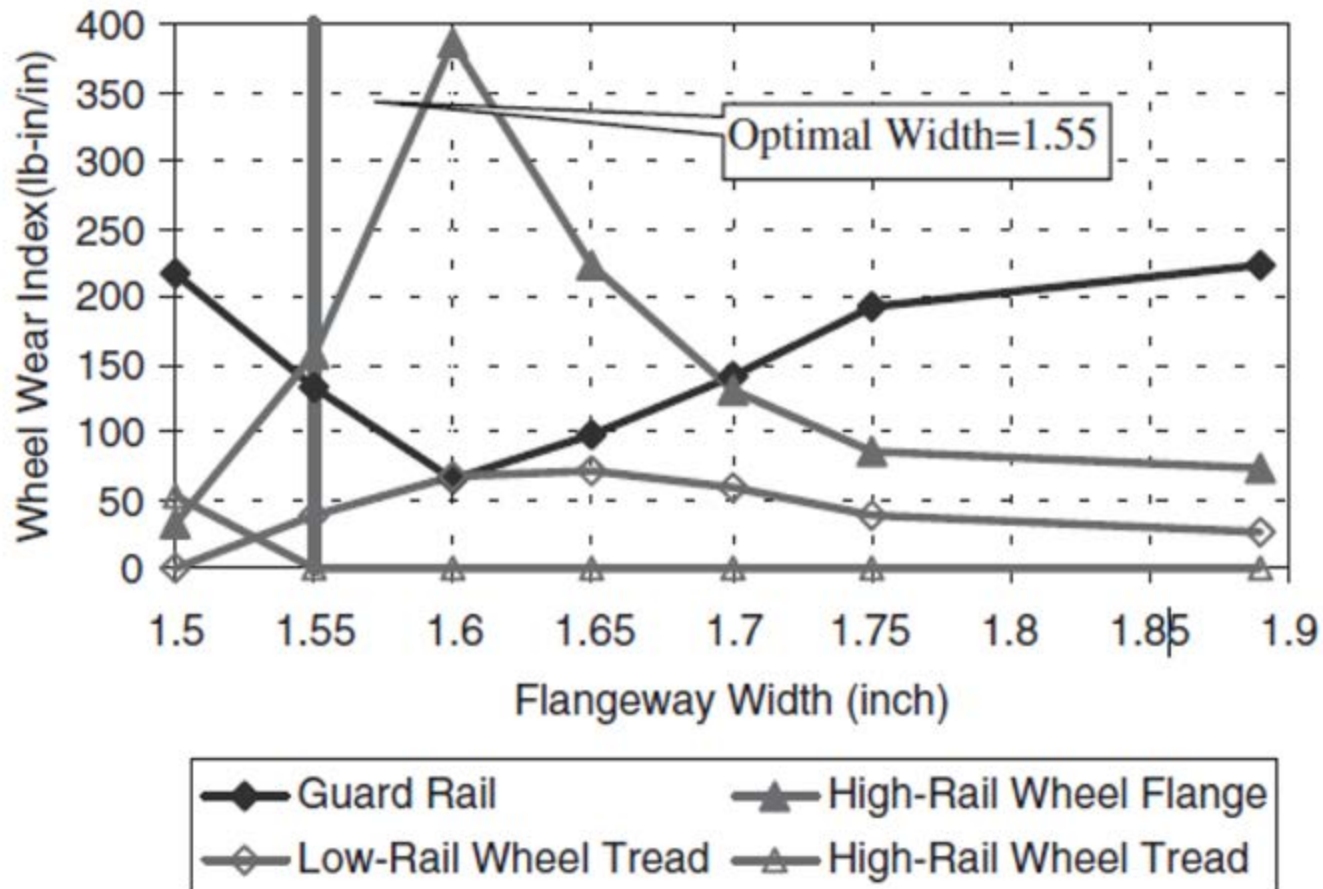




Wheel Lateral Forces



Wheel Wear Index



Bending Strap



Current Guarding Criteria Primary

- Inside rail
 - <500' ballast
 - <750' Embedded
- Both rails
 - <125'

Current Guarding Criteria

Secondary

- Inside rail
 - <300' speed <15mph
 - <750' Embedded
- Both rails
 - <100' speed <15 mph

Proposed Guarding Criteria

Primary

- Inside rail
 - <500' Ballasted
 - <750' Embedded
- Both rails
 - Eliminate use of double guarding

Proposed Guarding Criteria Secondary

- Inside rail
 - <300' speed <15mph
- Both rails
 - Eliminate use of double guarding



Strap Guard Failures

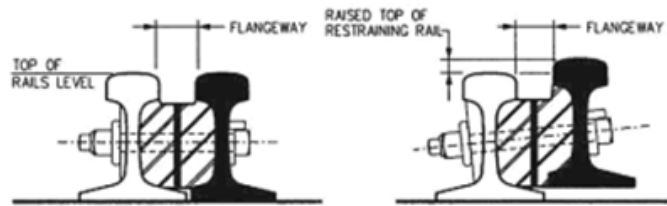


Key Take Aways

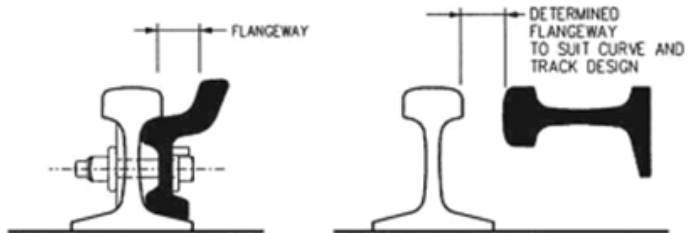
- Wheel loading
- PCC
 - early form of resilient wheel
 - More tolerant of back of wheel flange loading
- LRV's resilient wheel
 - Rubber blocks absorb forces solely through shear resistance. Not designed for this.



Solutions

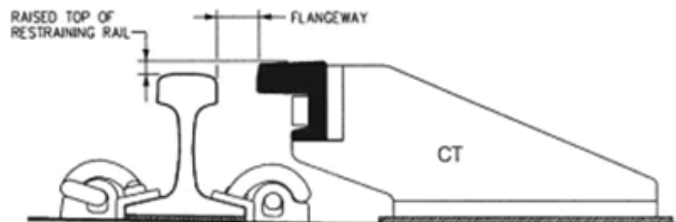


VERTICALLY MOUNTED RESTRAINING RAILS

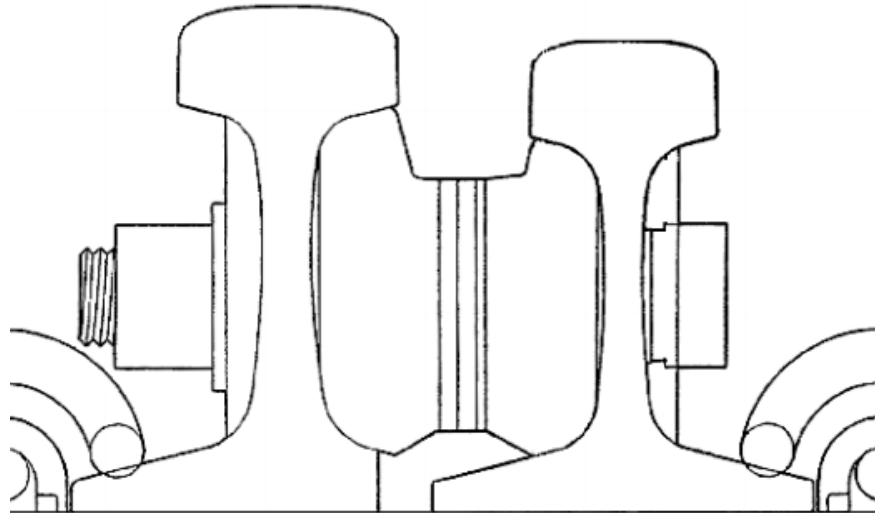


STRAP GUARD RAIL

HORIZONTALLY MOUNTED RESTRAINING RAIL



33C1 RESTRAINING RAIL



Reccomendations

- Discontinue use of double strap guard criteria
- Replace with restraining rail alternatives
- Remove strap on high side and replace low side as time permits



Embedded Switch

- Originally installed during Stage 2
- Replaced
- Previous design
 - Unservicable
- New Design
 - Modular
 - Incorporated restraining rail

Embedded Switch



Embedded Switch



Embedded Switch



Vegetation Management

- Preventative Pruning
 - Mechanical
 - Mowing, Brush Hogging, Trimming, Winter/Growing Season
 - Chemical
 - Ballast, Brush, Turf, Ornamentals/Beds
 - Bare Ground, Contact, Systemic, Brush Control, Turf Management



Vegetation Management



Vegetation Management

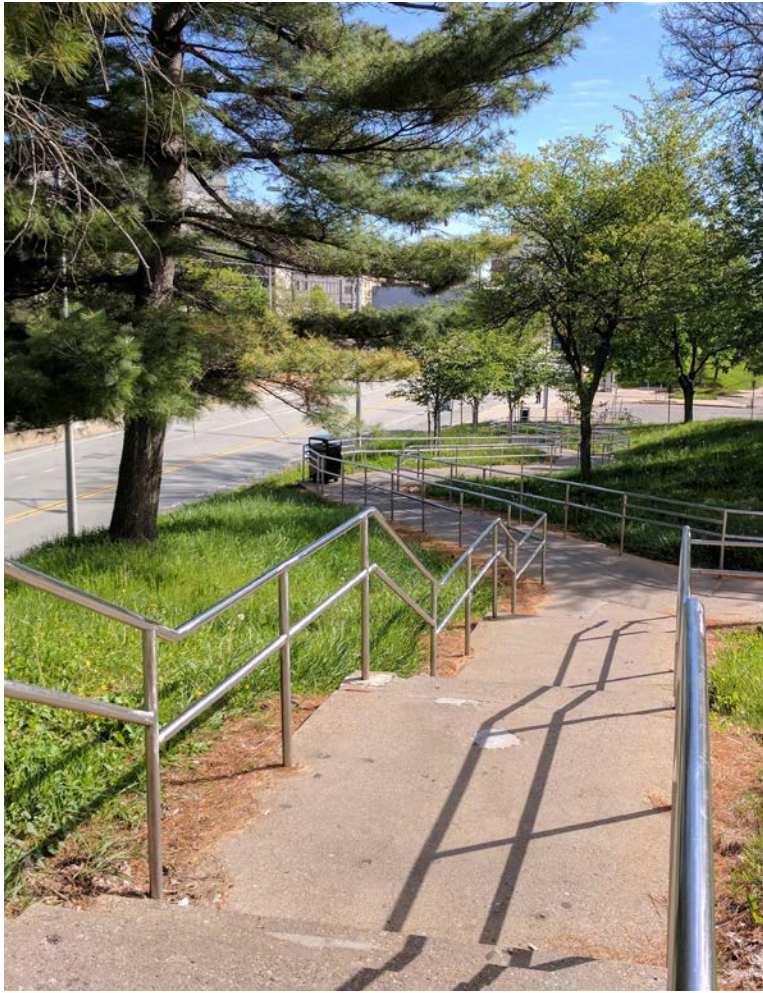


Vegetation Management

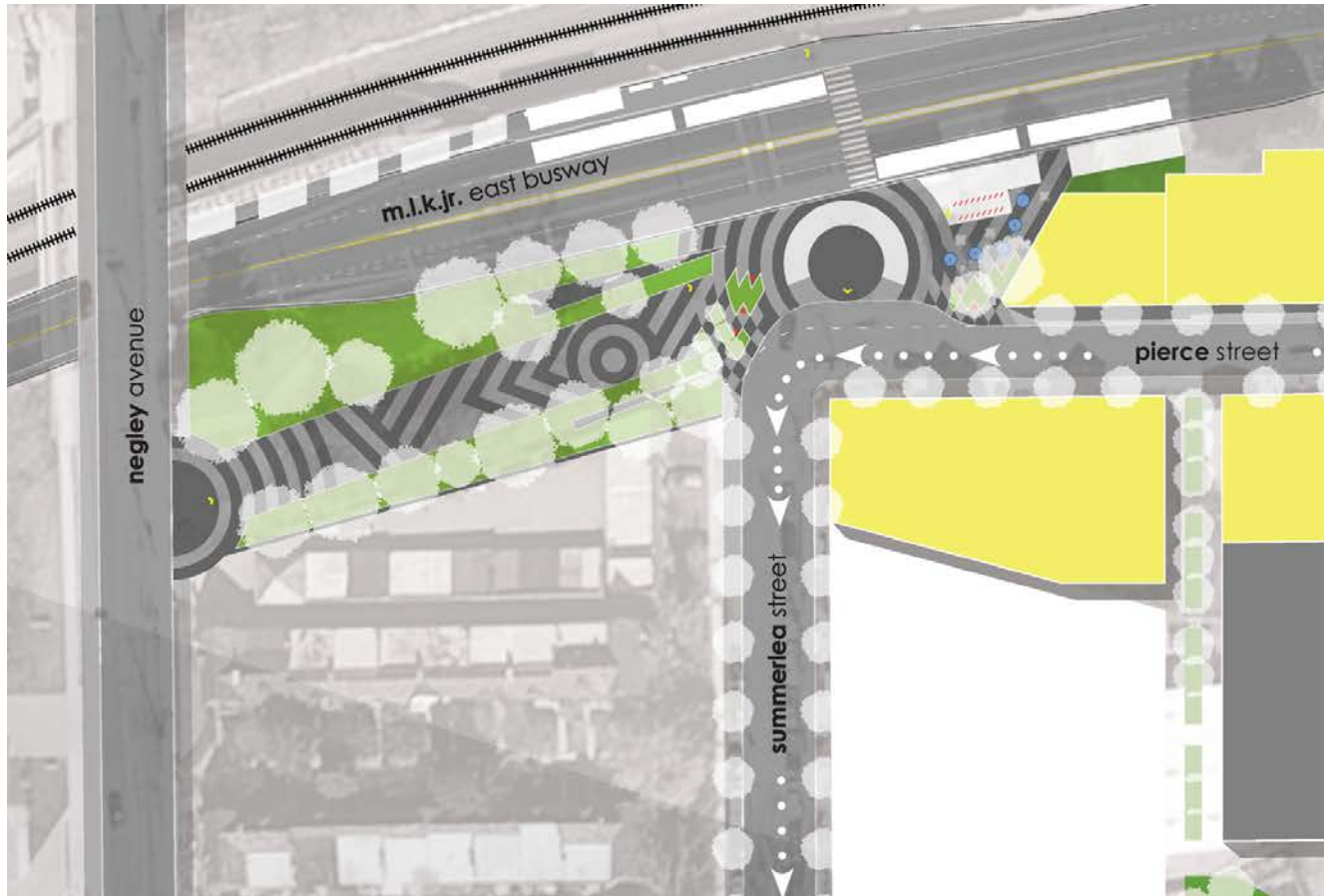
- Emergency
 - Mechanical
 - Year Round



Station Design



Station Design



Closing

- Unique system
- Strap -Restraining rail
- Embmedded switch - Serviceable
- Vegetation Management - Preventative
- Station Design - Sustainable maintenance



Credits

- Eric S. Doyle Supervisor – Way Department
Port Authority of Allegheny County
- Mott MacDonald Task 5 Report –
Assessment of Strap Guard Fitment 2016
- TCRP 82 2007



Questions?

