

Noise Measurements on San Diego Trolley

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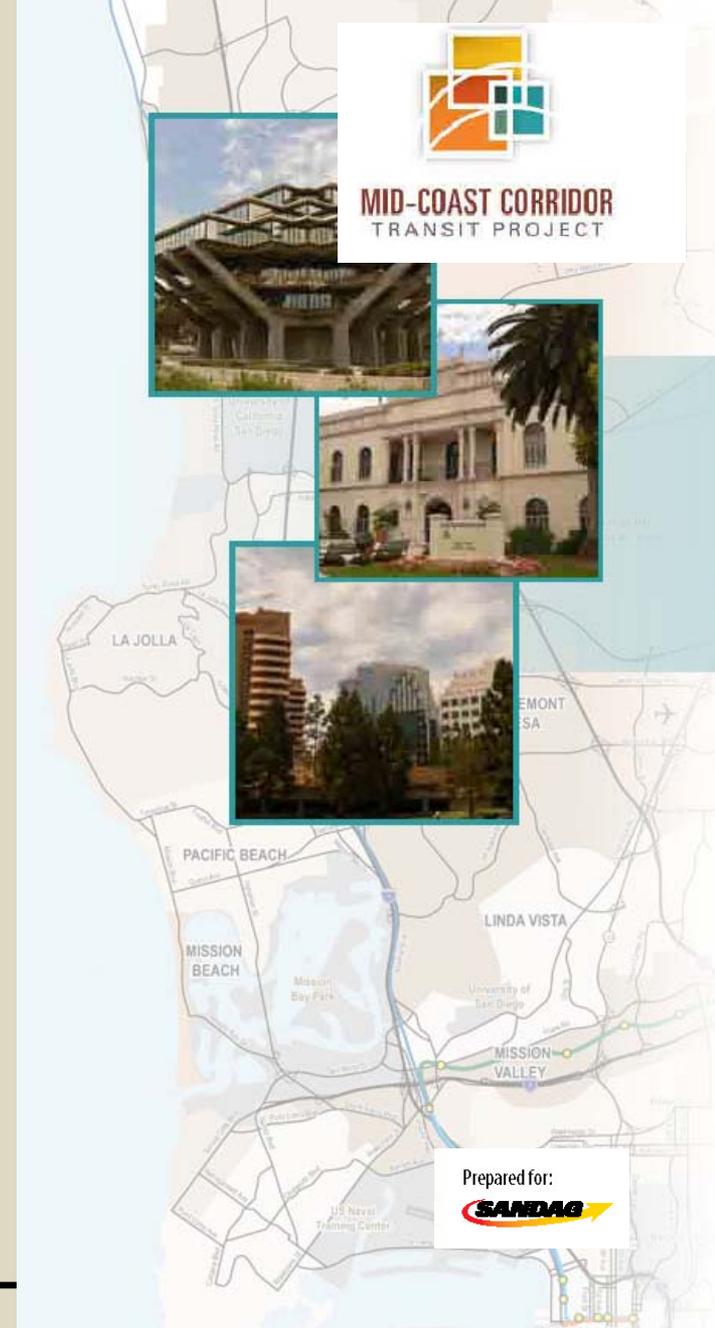
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Background

- Environmental studies for Mid-Coast Corridor
- 11 Mile extension to San Diego Trolley from Old Town to University City
- Originally studied in early '90s.
- Projected:
 - Start of Construction: 2015
 - Operations: 2018



Noise Testing for Environmental Assessment

- Four locations, three ballast & tie, one aerial structure
- Three vehicle types
 - U2 and SD100 (high floor)
 - S70 (low floor)
 - US-S70 (low floor)
- Measurements:
 - Wayside noise
 - Train speed
 - Rail roughness

Site 1: Mt. Hope Cemetery

- Orange Line, an older section of SD Trolley



Site 2: Riverwalk Golf Course

- Mission Valley West segment of the Green Line



Site 3: Vernon Way & Marshall Ave.

- After Orange Line and Green Lines merge

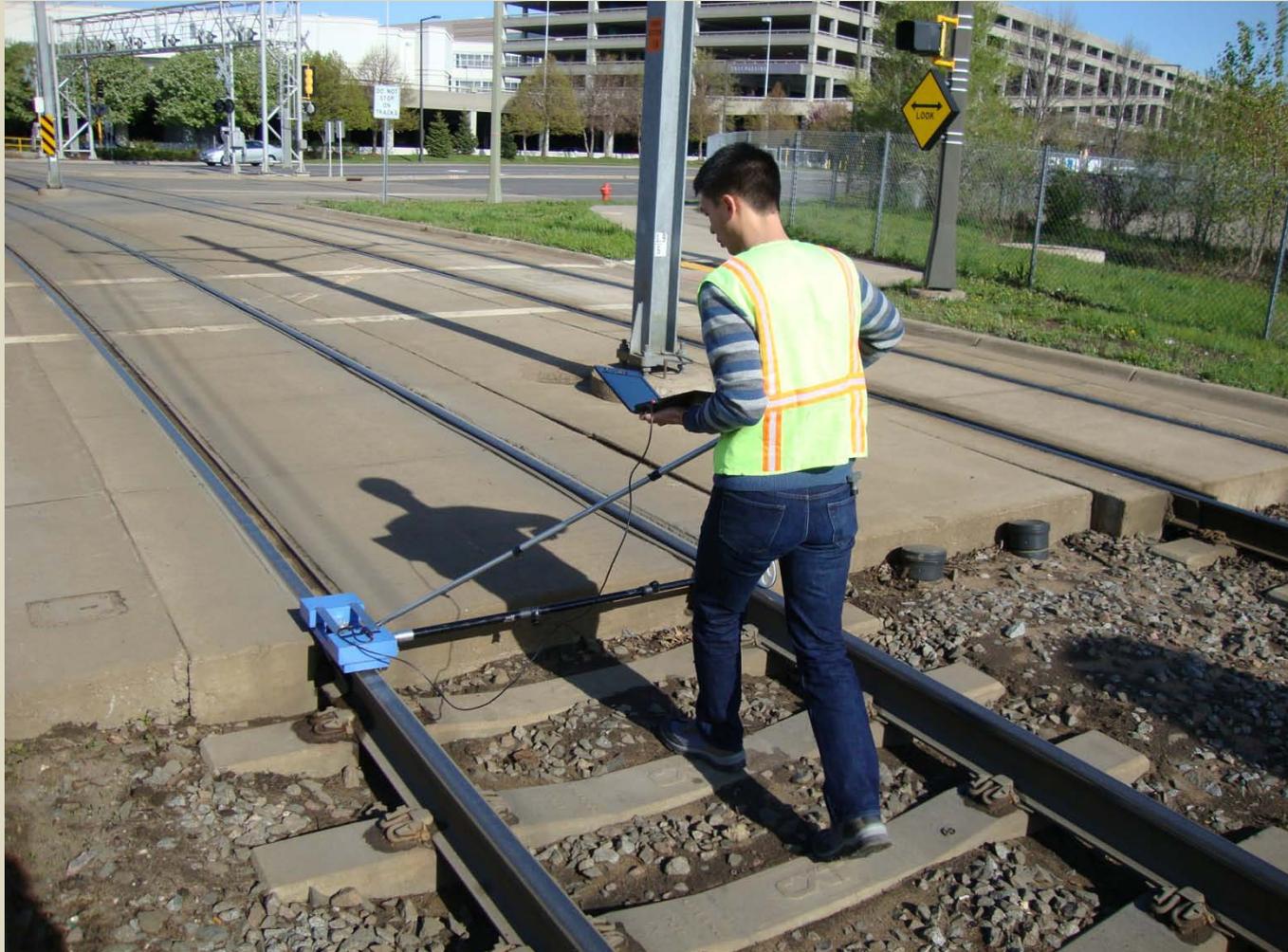


Site 4: Vernon Way and Fletcher Pkwy

- Aerial structure ~1000 ft south of Site 3

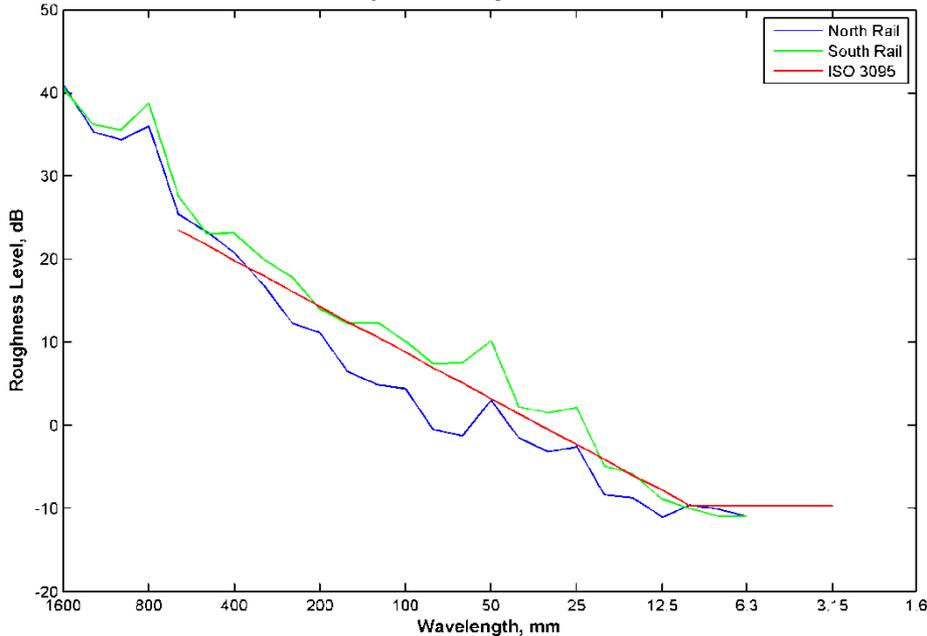


Rail Roughness Measurements

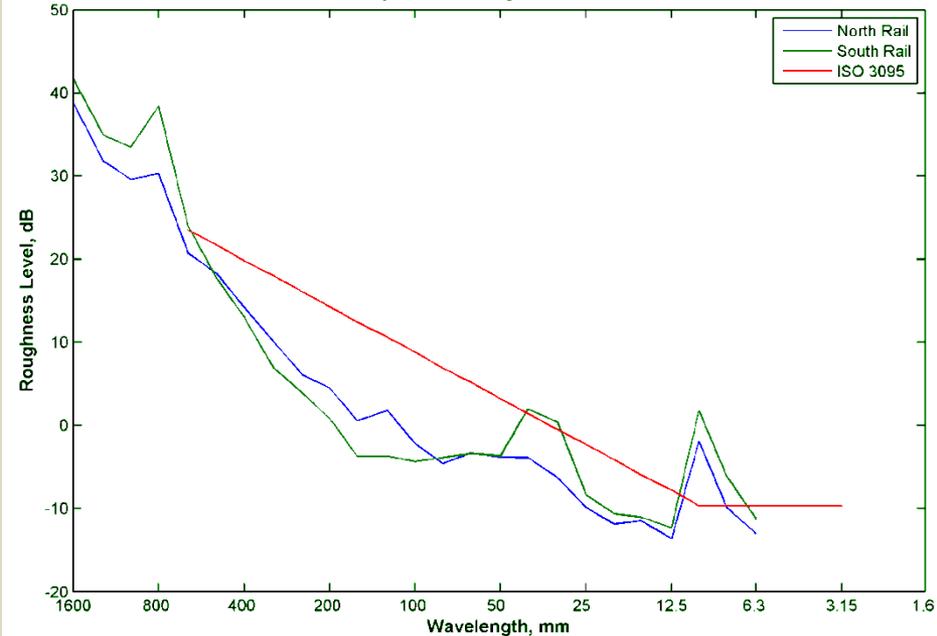


Roughness Results, Site 1: Mt. Hope

Mount Hope Cemetery, East Bound Track

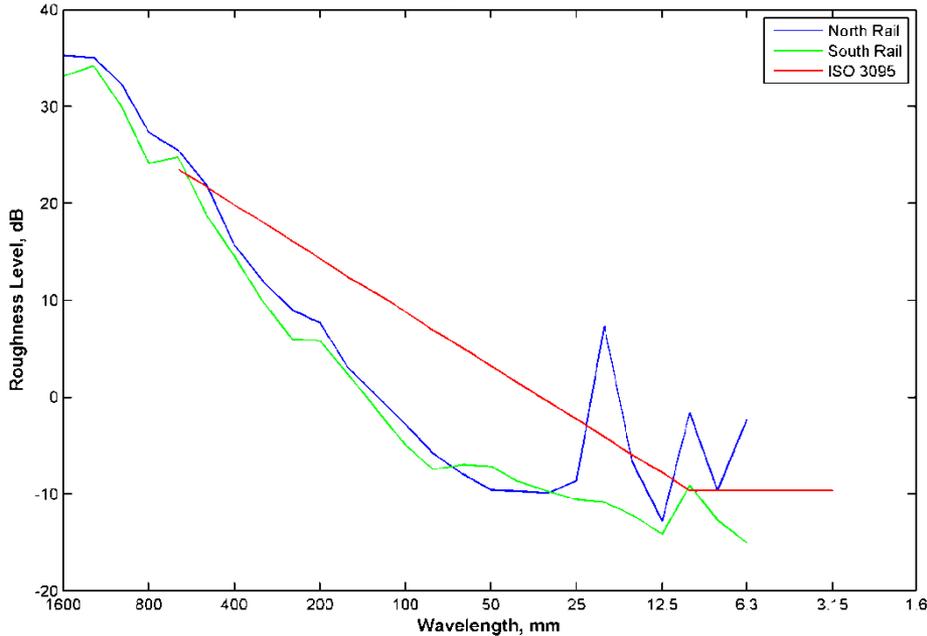


Mount Hope Cemetery, Westbound Track

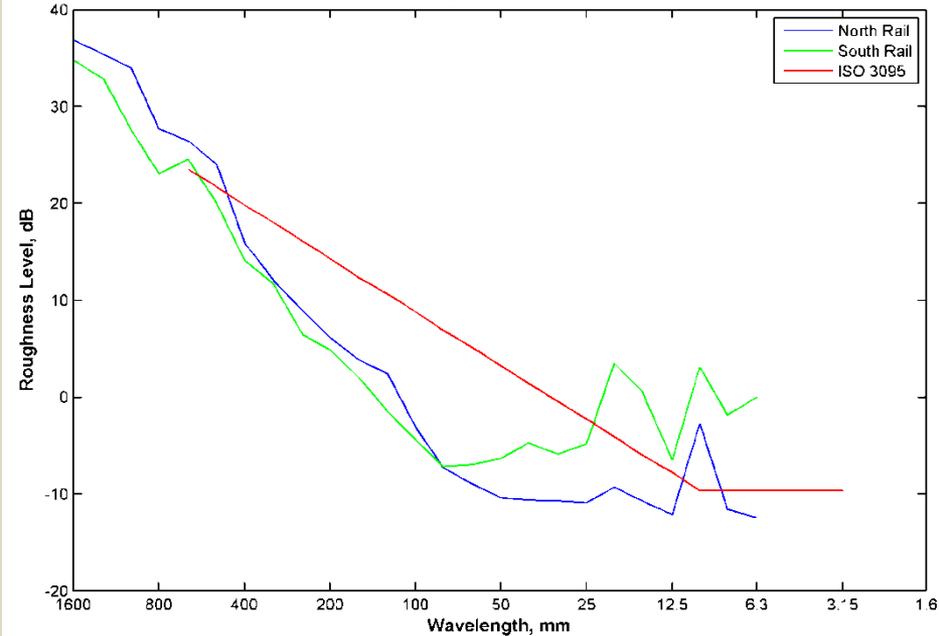


Roughness Results, Qualcomm

Qualcomm, East Bound Track

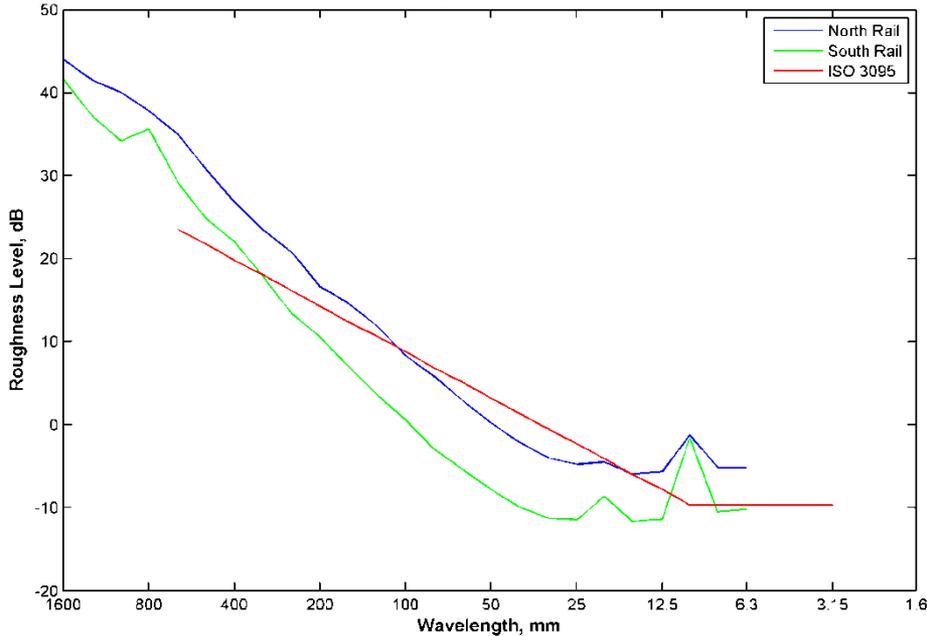


Qualcomm, West Bound Track

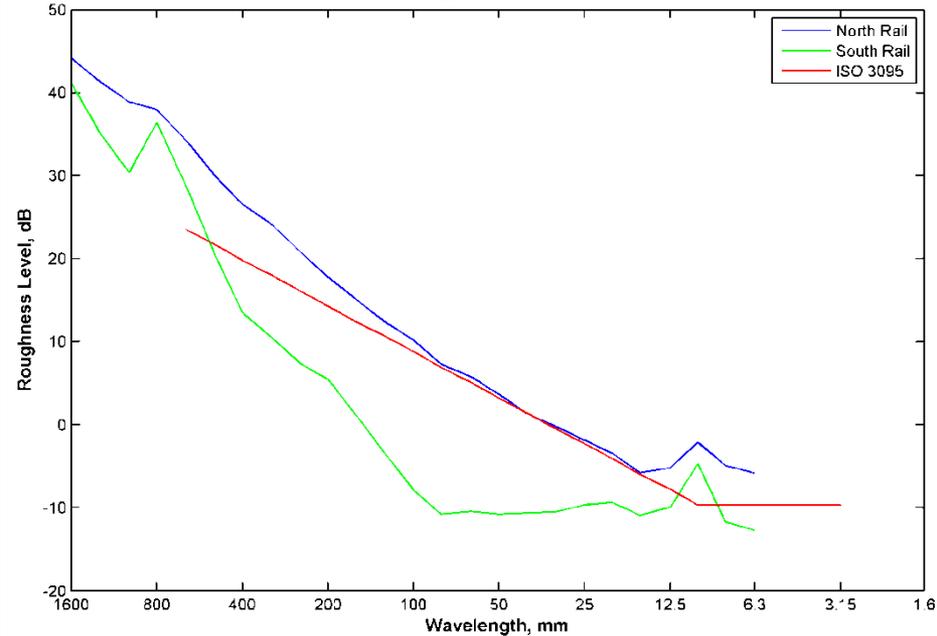


Roughness Results, Site 2: Riverwalk

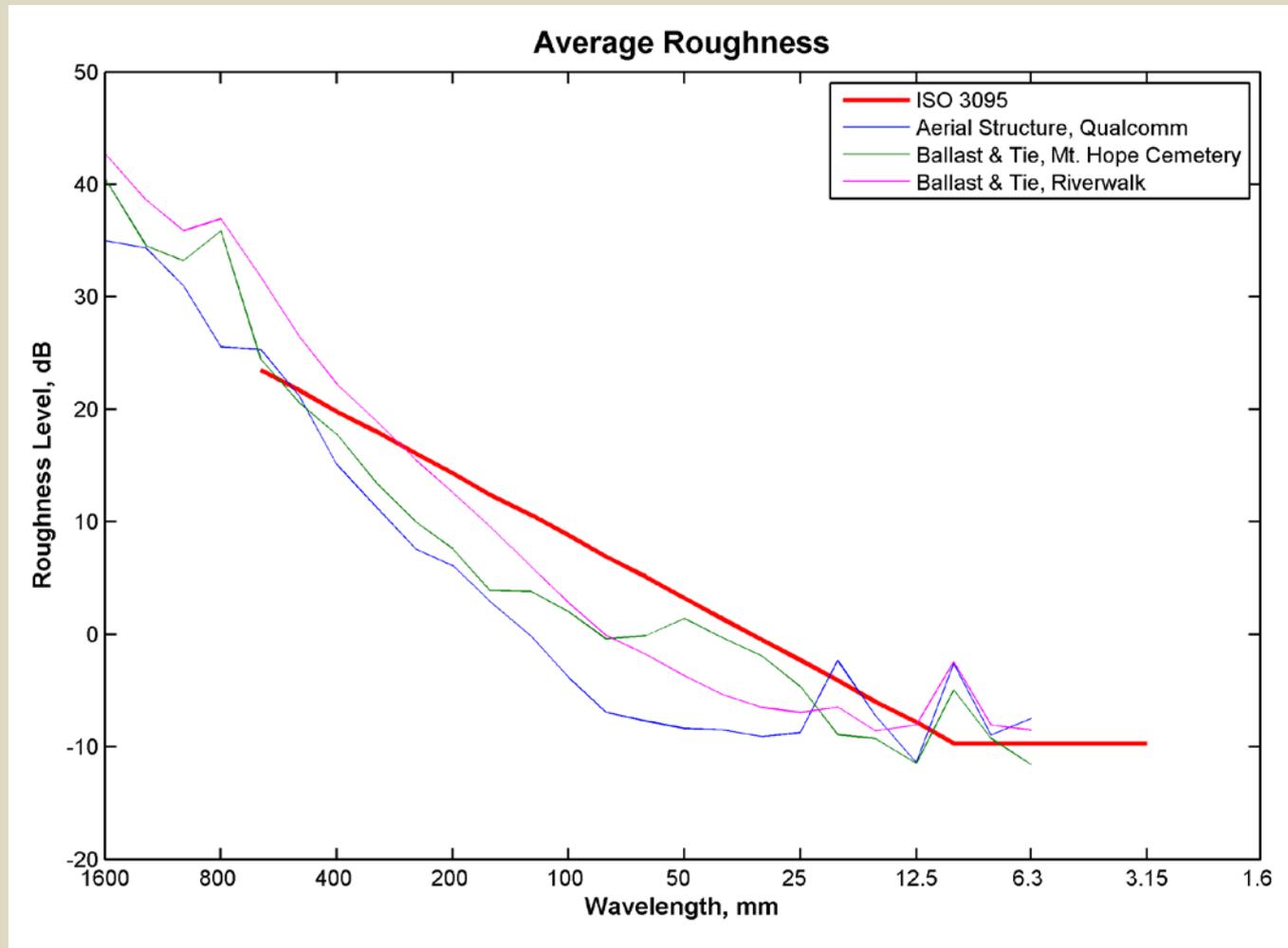
Riverwalk, East Bound Track



Riverwalk, West Bound Track



Average Roughness



Final Results

Site	Track Type	Lmax, dBA	
		S70/US-70	SD100
1	Ballast & Tie	--	77
2	Ballast & Tie	74	--
3	Ballast & Tie	73	75
4	Aerial, Direct Fixation	76	77

Values normalized to 40 mph, 50 ft from track centerline, and 2-car trains.

FTA suggested reference level: 77 dBA, 40 mph, 50 ft, single car, ballast & tie track.

Equivalent levels on other LRT systems as high as 85 dBA.

Qualifiers

- Do not have any information on wheel condition
 - Levels between trains very consistent between trains
- There were near track/far track differences, sometime attributable to site conditions, other times apparently due to track conditions
 - Up to 5 dB difference apparently due to difference in track condition
 - 3 to 5 dB difference due to site conditions

Bottom Line

- Justified using a reference level lower than FTA recommendation and substantially lower than recently measured on similar LRT systems.
- Amount of noise mitigation (sound walls) substantially reduced.