Illinois DOT's CREATE 75th Street Corridor Improvement Project EIS Noise Analysis Chicago, IL

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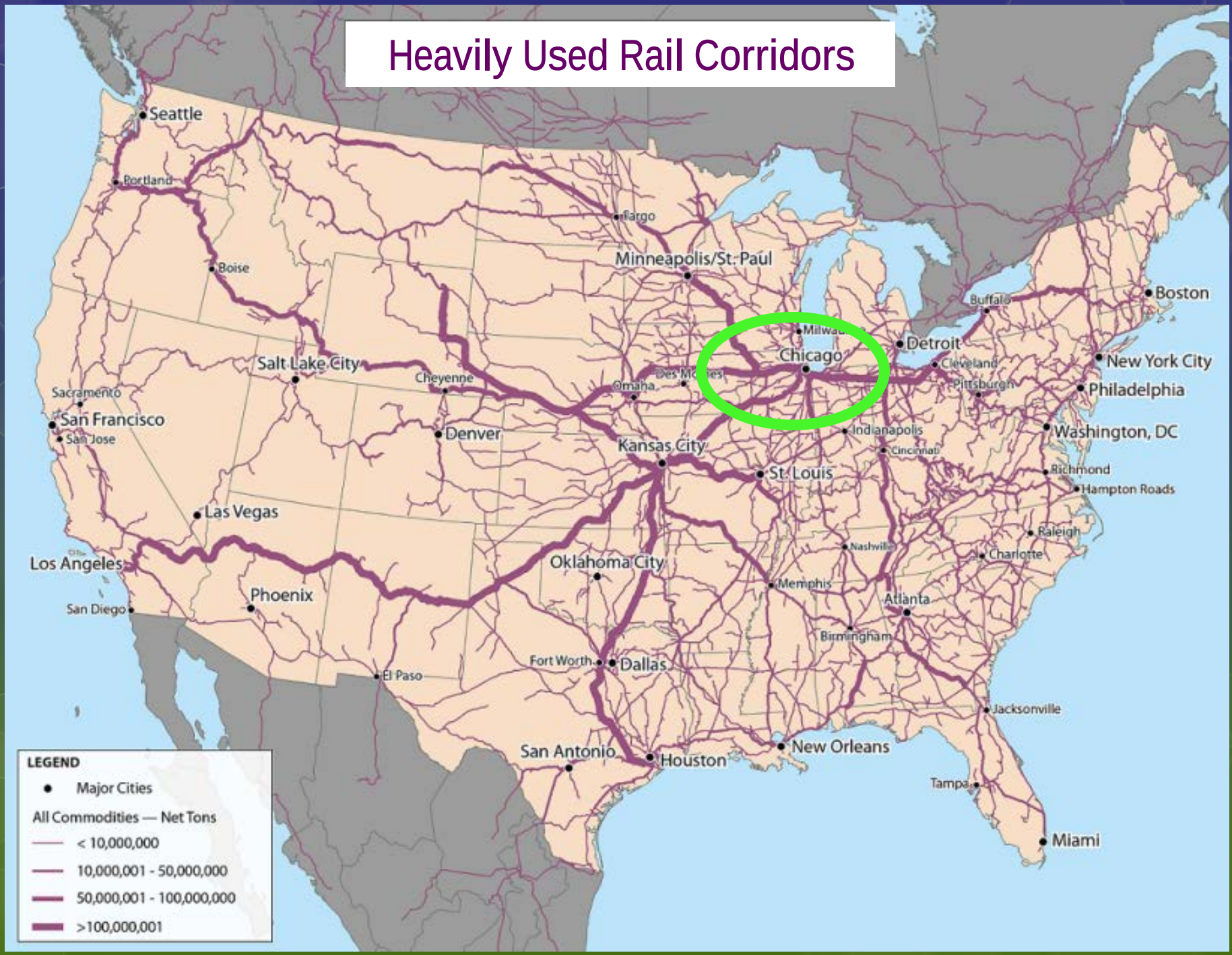
TRB ADC40 2014
Summer Meeting

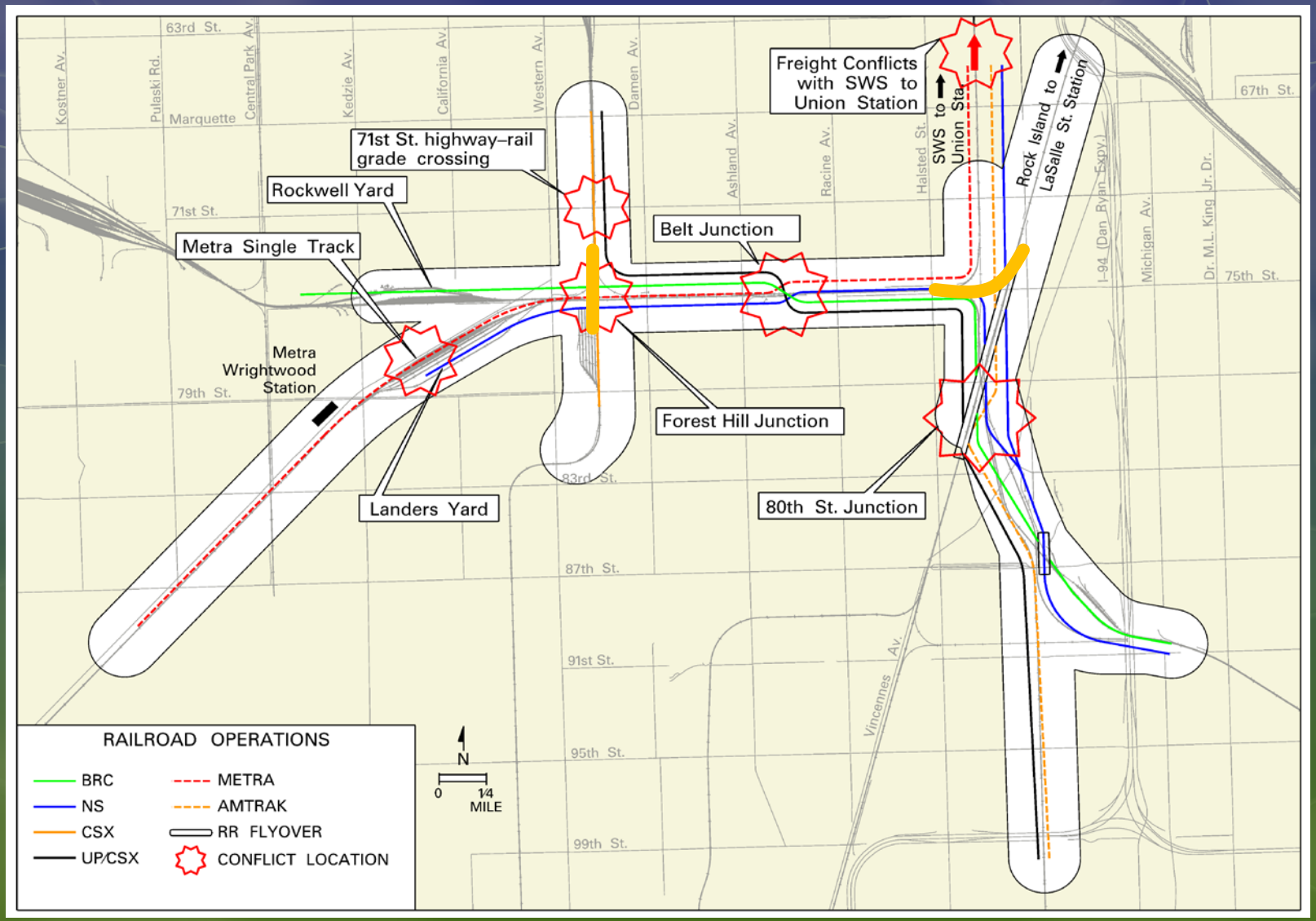
Heavily Used Rail Corridors



The CREATE Program

- **C**hicago
- **R**egion
- **E**nvironmental
- **A**nd
- **T**ransportation
- **E**fficiency
- Program

The CREATE 75th Street CIP Project



Metra Flyover Photosimulation

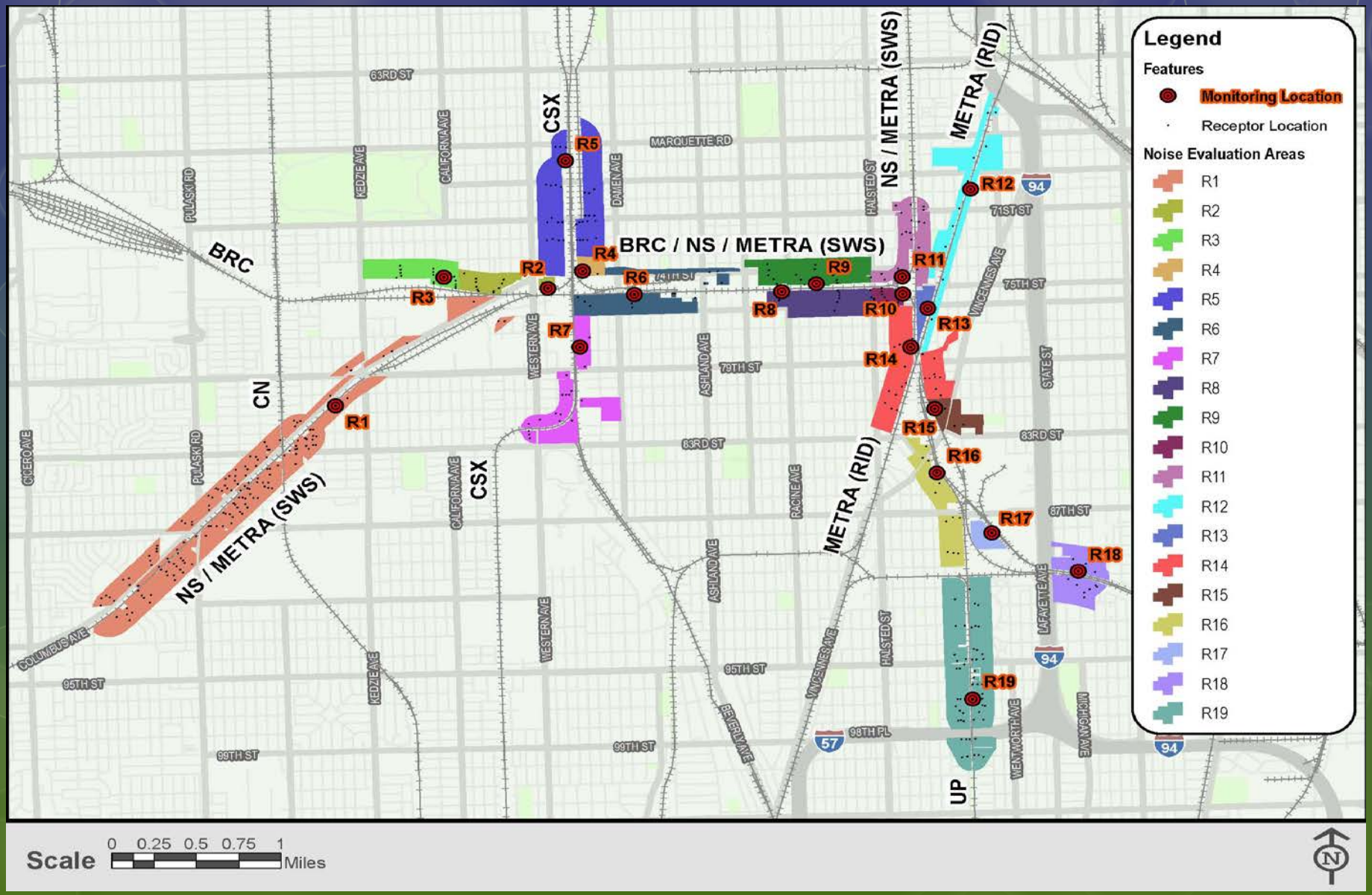
Methodology

- CREATE Noise and Vibration Assessment Methodology
  - Based on FTA Noise and Vibration Impact Assessment
  - modifications to add freight traffic
- IDOT Manuals
  - Highway Traffic Noise Assessment Manual
  - IDOT Bureau of Design and Environment Manual

Work Plan

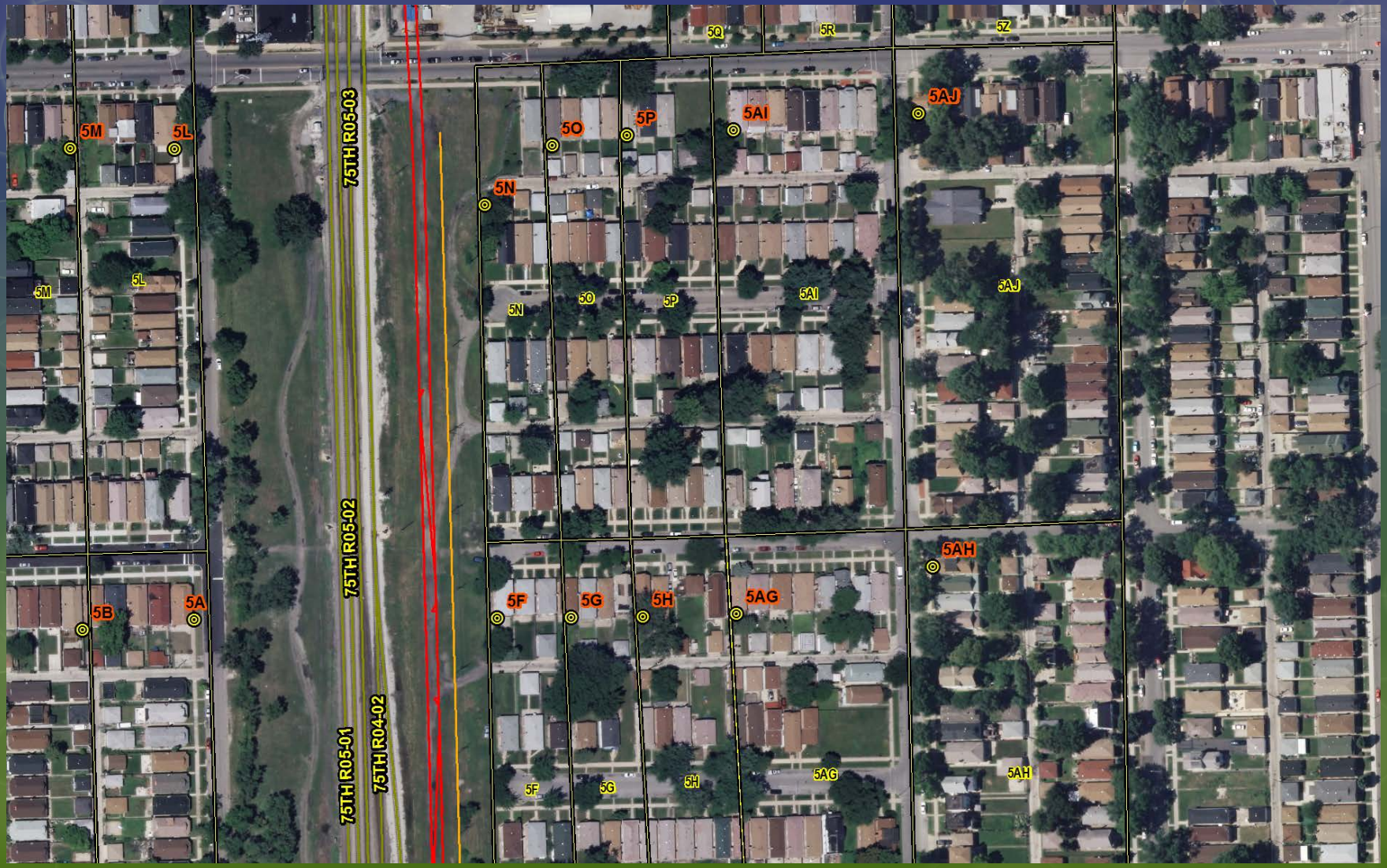
1. Identification of Screening Distances
   - Existing sound levels – monitoring data collected excluding train passbys
   - Train volumes
   - Population density
   - Distance from a grade crossing
2. Model Existing, No-Build and Build
   - *General analysis*
3. Identify impacts, then refine model
   - *Detailed analysis*
4. Design and evaluate barriers

Screening Area

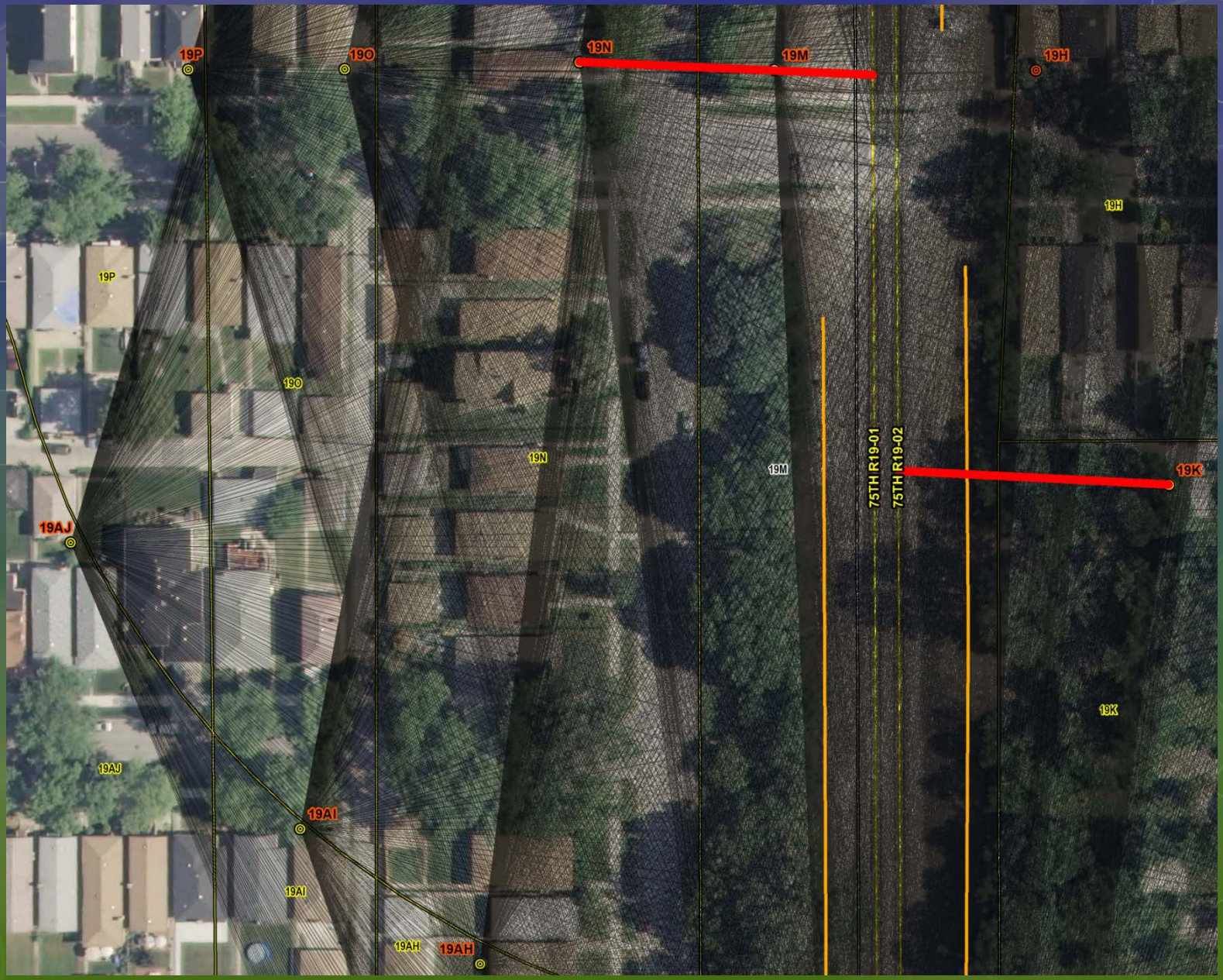


Cluster Map Near Grade Crossings

GIS-Based Analysis of Distances Between Rail Lines and Receptors



GIS-Based Computation of Distances



FTA Spreadsheets Used in Database

Noise Model Based on Federal Transit Adminstration General Transit Noise Assessment
Developed for Chicago Create Project
Copyright 2006, HMMH Inc.
Case:

RESULTS			
Noise Source	**Leq - 1-hr (dB)**		
All Sources	66.234842679		
Source 1	58.024562619		
Source 2	61.722176061		
Source 3	62.597887583		
Source 4	51.579010772		
Source 5	46		
Source 6	47		
Source 7	40		
Source 8	43		

Enter noise receiver land use category below.

LAND USE CATEGORY	
Noise receiver land use category (1, 2 or 3)	3

Enter data for up to 7L R04-04 | 7L R04-04 | 7L R07-02

NOISE SOURCE PARAMETERS							
Parameter	**Source 1**		**Source 2**		**Source 3**		
Source Num.	Freight Locomotive	9	Freight Cars	10	Commuter Diese	2	
Distance (source to	distance (ft)	72	distance (ft)	72	distance (ft)	50	
Noisiest Hour of	speed (mph)	19	speed (mph)	19	speed (mph)	24	
Activity During	trains/hour	1	trains/hour	1	trains/hour	1	
Sensitive Hours	locos/train	2	length of cars (ft) / train	7304	locos/train	2	
		27.6		27.6		23	
		0.55556		0.55556		0.2222	
		2		6608.2		2	
Wheel Flats?			% of cars w/ wheel flats	1.00%			% o
Jointed Track?	Y/N		Y/N		Y/N		Y/N
Embedded Track?	Y/N		Y/N		Y/N		Y/N
Aerial Structure?	Y/N	y	Y/N		Y/N		Y/N
Barrier Present?	Y/N	y	Y/N		Y/N		Y/N
Intervening Rows of	number of rows	0	number of rows	0	number of rows	0	num

CALCULATION OF $A_{barrier}$

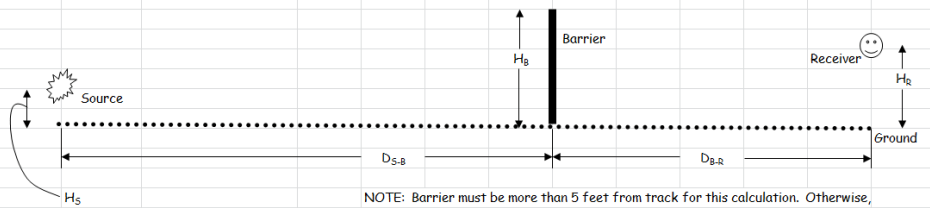
Source Height (H_S) + Embankment Height (H_E) = 30
Barrier Height (H_B) = 28
Receiver Height (H_R) = 5
} Input automatic from first sheet

$A_{barrier}$ = 9.45 — $A_{barrier}$ to Use in $IL_{barrier}$ Calculation

Note: This can not be used if D_{S-B} is less than 5 ft

Note: Do not need this if no barrier present

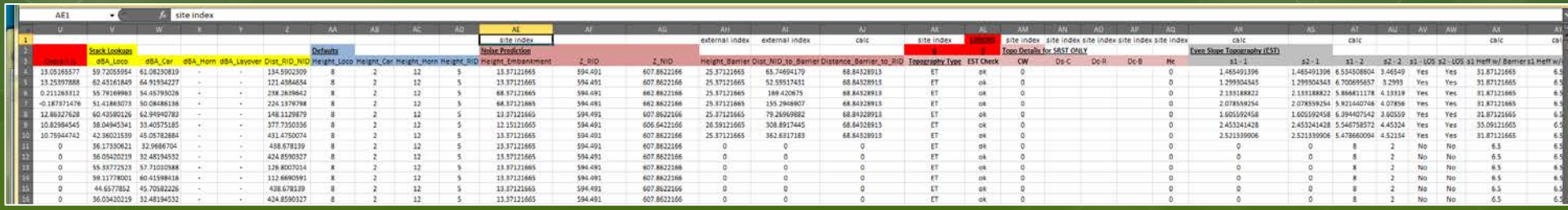
Distance from Source to Barrier (D_{S-B}) = 10
Distance from Barrier to Receiver (D_{B-R}) = 40
} Input automatic from first sheet



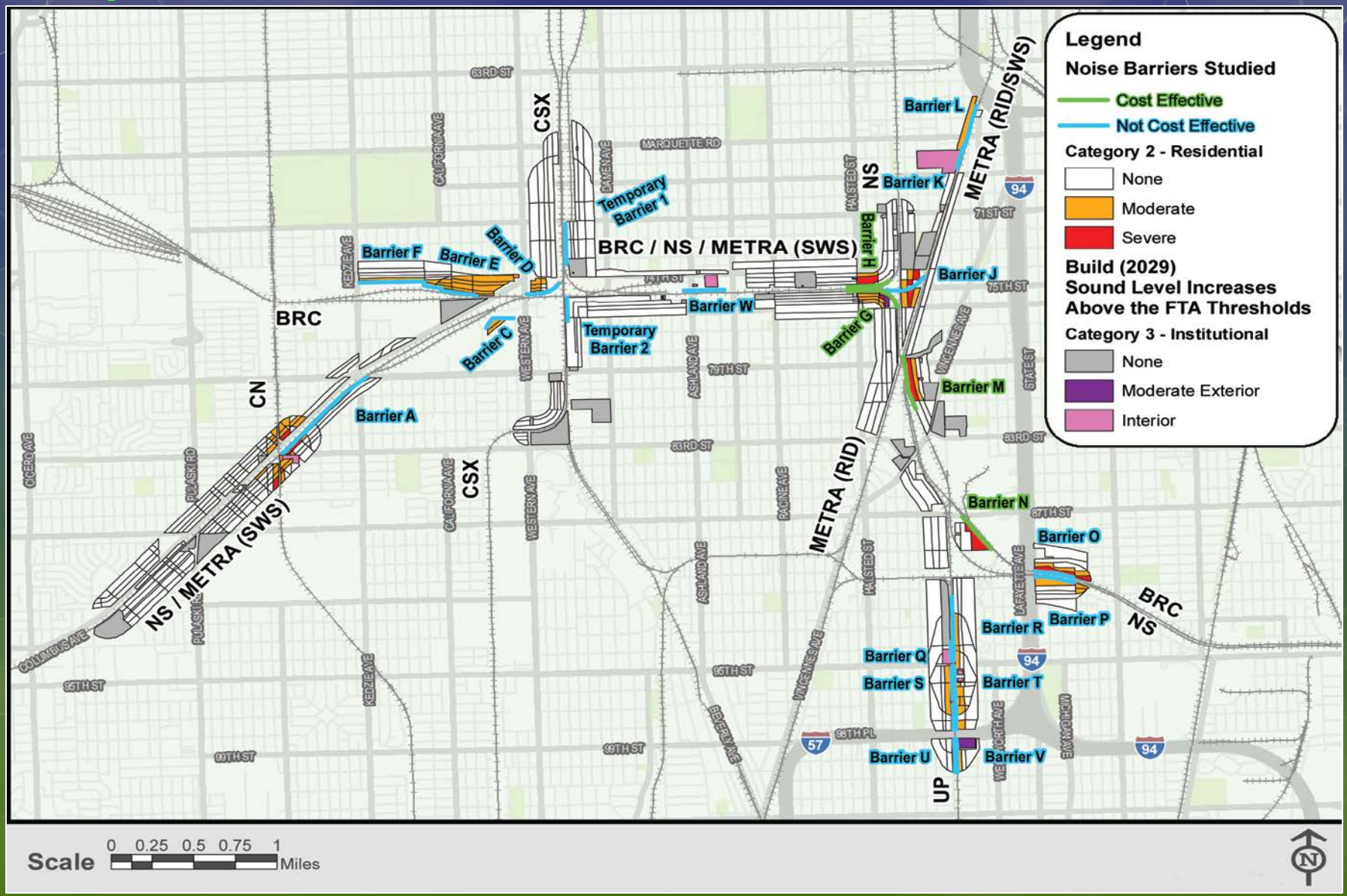
NOTE: Barrier must be more than 5 feet from track for this calculation. Otherwise, see page 6-24 in *FTA Transit Noise and Vibraiton Impact Assessment* manual.

Calculations

A =	10.19804	(A=Path length from Source to top of Barrier)
B =	46.14109	(B=Path length from top of Barrier to Receiver)
C =	55.90170	(C=Path length from Source to Receiver)
P =	0.43743	(P=Difference in path length between with Barrier and without Barrier)
$A_{barrier}$ =	9.45015	(Calculated $A_{barrier}$. Maximum $A_{barrier}$ used for predictions is 15)



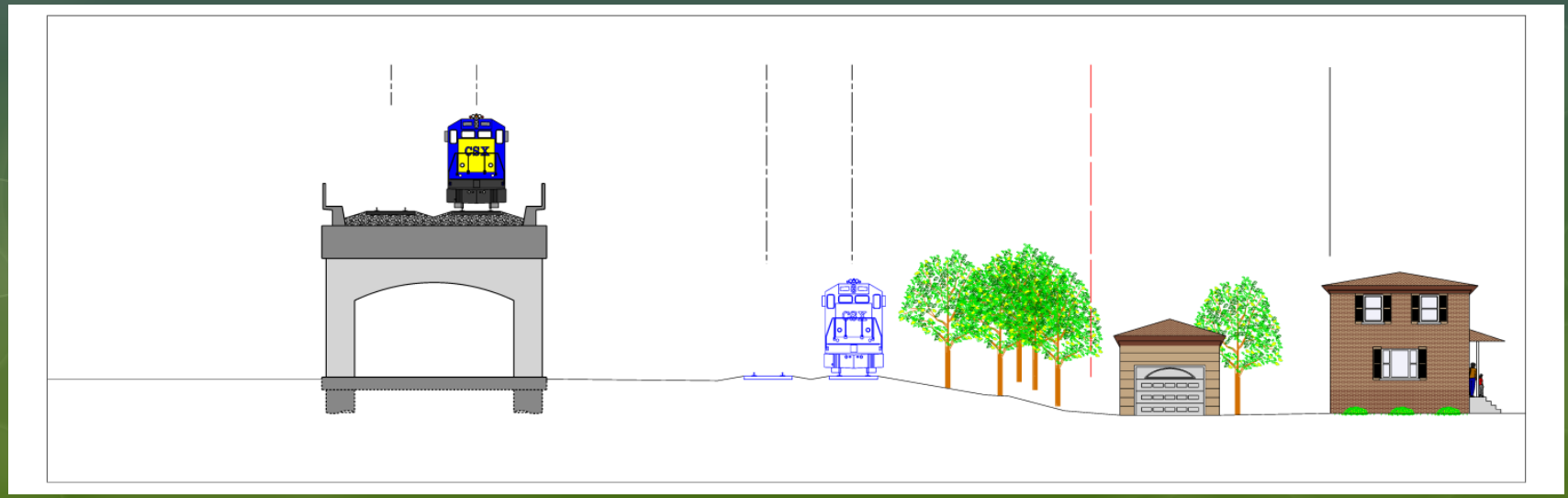
Impacts and Noise Barriers Studied



No-Build vs. Build

	No-Build Alternative	Build	Mitigated
Residences above the FTA moderate impact threshold	1,009	1,092	**66**
Residences above the FTA severe impact threshold	90	267	**180**
Institutional facilities above FTA moderate impact threshold	1	3	**1**
Institutional facilities above FTA interior impact threshold	7	7	**0**
Total	1,107	1,369	**249**

Temporary Track Impacts



Lessons Learned

- Identify the constraints associated with the construction of noise barriers
  - How close can the barrier be to the railroad?
  - Is access to the railroad necessary?
  - Are there overhead elements that would conflict with barrier?
  - Will the barrier block required sightlines?
- Identify what is included in barrier cost effectiveness evaluation
  - If elevated, include the additional cost to either widen the structure or the berm?
  - If the barrier would be outside of ROW, include the additional land acquisition cost?