I-81/NYS 17 Prospect Mountain Interchange Improvements Project

Broome County, NY

Transportation Research Board ADC40

Transportation-Related Noise & Vibration

2017 Summer Meeting

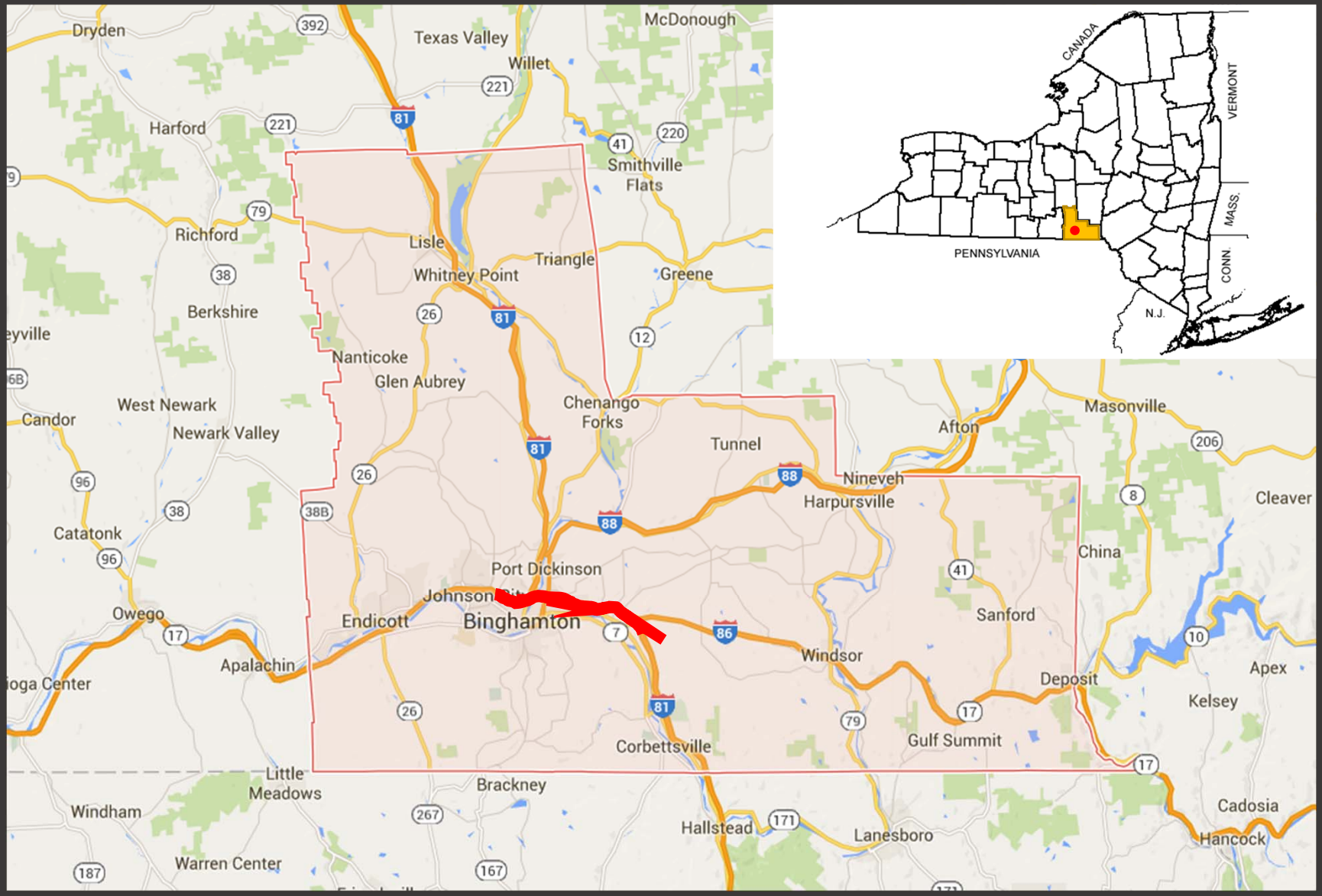
Joe Van Kerkhove, PE

Ken Avery, PE

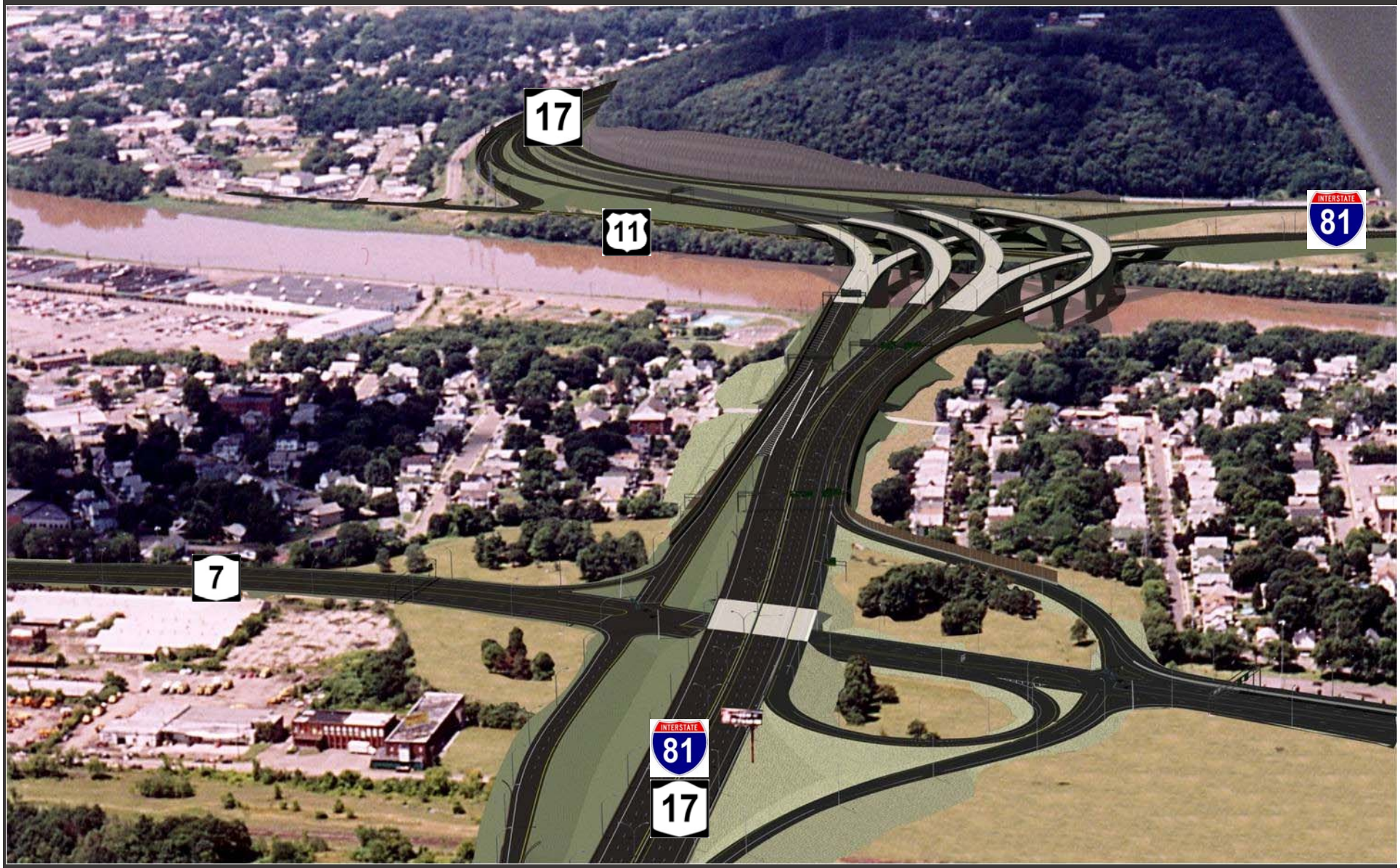
BERGMANN ASSOCIATES

Project Background

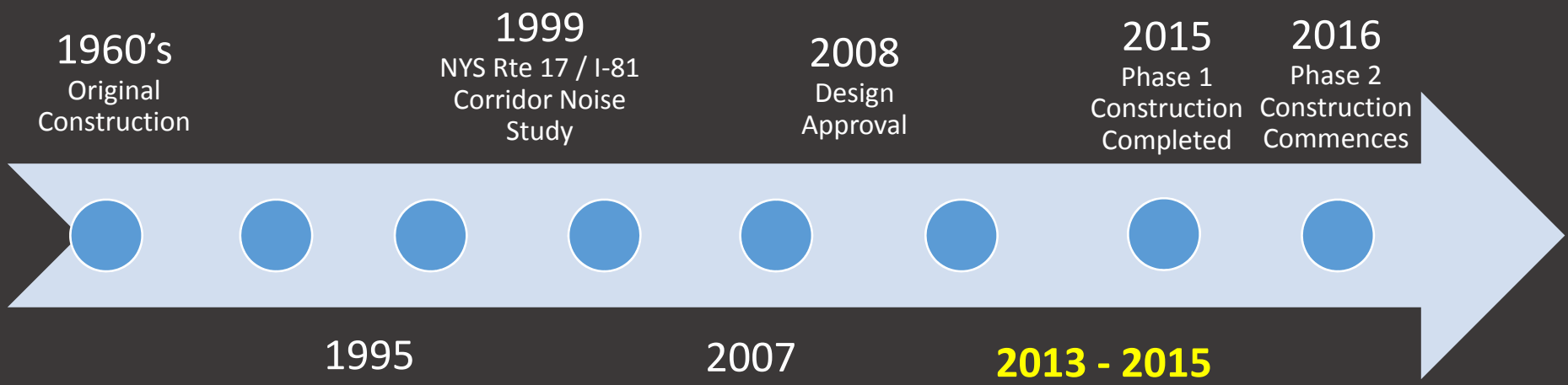
Project Location



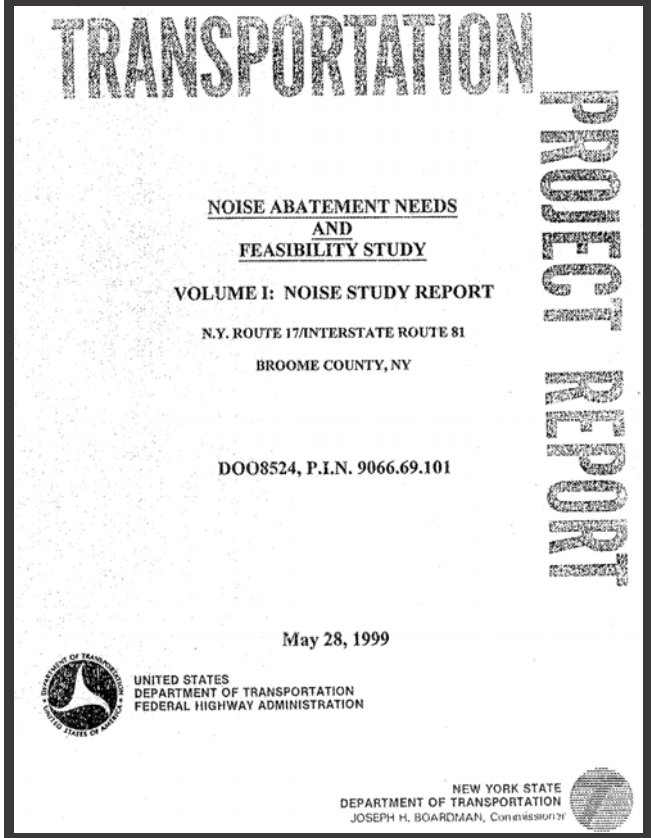
Selected Alternative

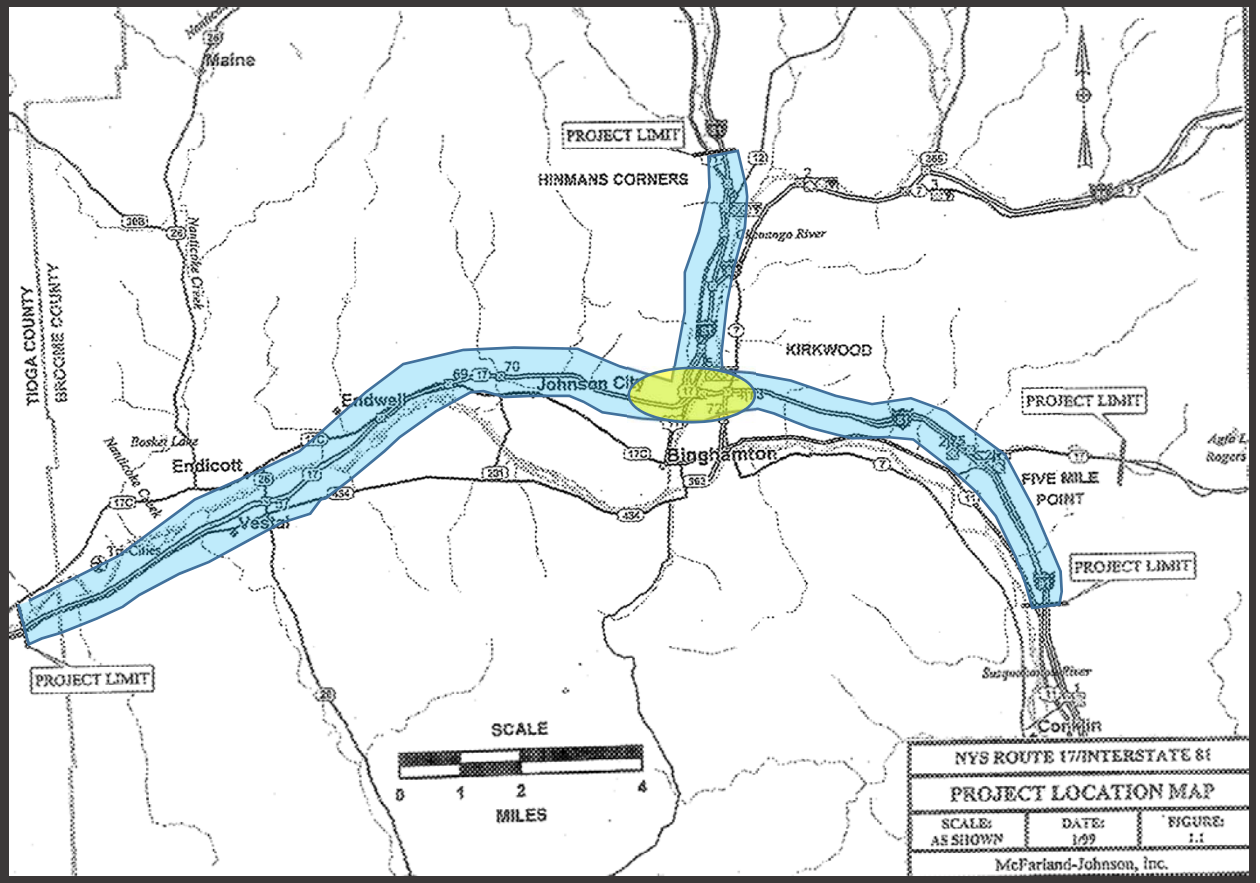


Interchange Timeline



1999 Corridor Noise Study





2007 Original Project Noise Study

TRANSPORTATION

PROJECT REPORT

NOISE REPORT

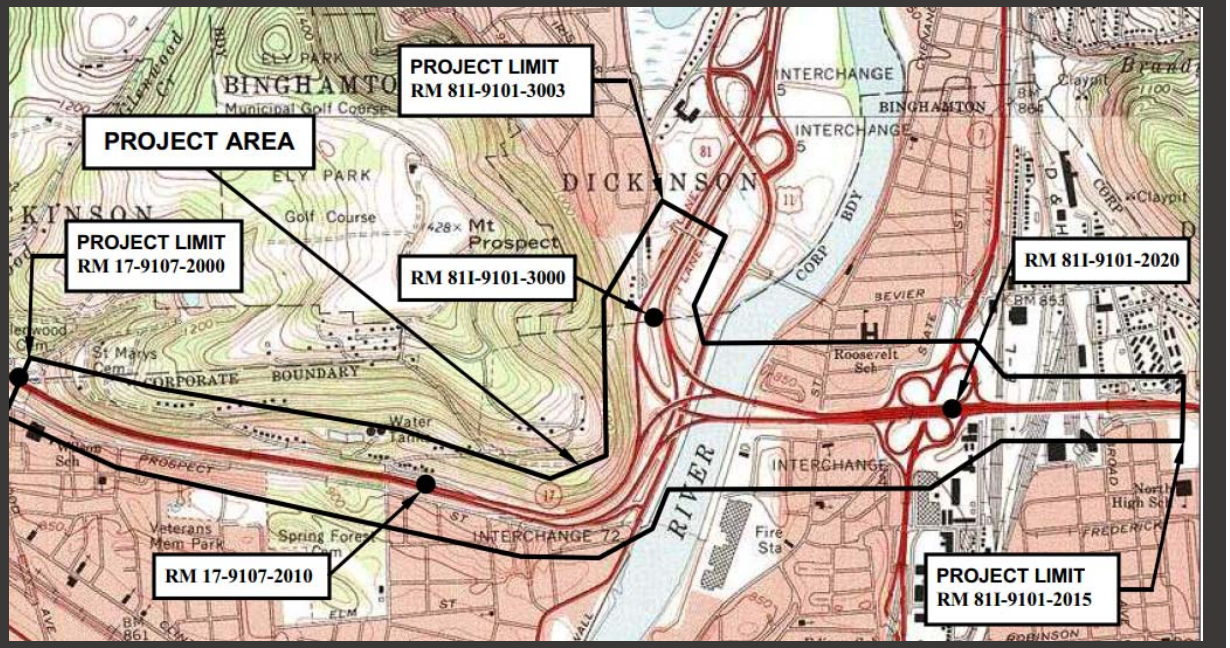
NYS ROUTE 17/INTERSTATE 81 INTERCHANGE
SH 63-24, SH 64-1, SH 64-4, SH 64-5, SH 68-8
PIN 9500.61
CITY OF BINGHAMTON
TOWN OF DICKINSON
BROOME COUNTY

Prepared By:
McFarland-Johnson, Inc.
49 Court St., P.O. Box 1980
Binghamton, NY 13902

May 2007

UNITED STATES
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
ASTRID C. GLYNN, Commissioner
ELIOT L. SPITZER, Governor



2013 – 2014 Additional Noise Analyses

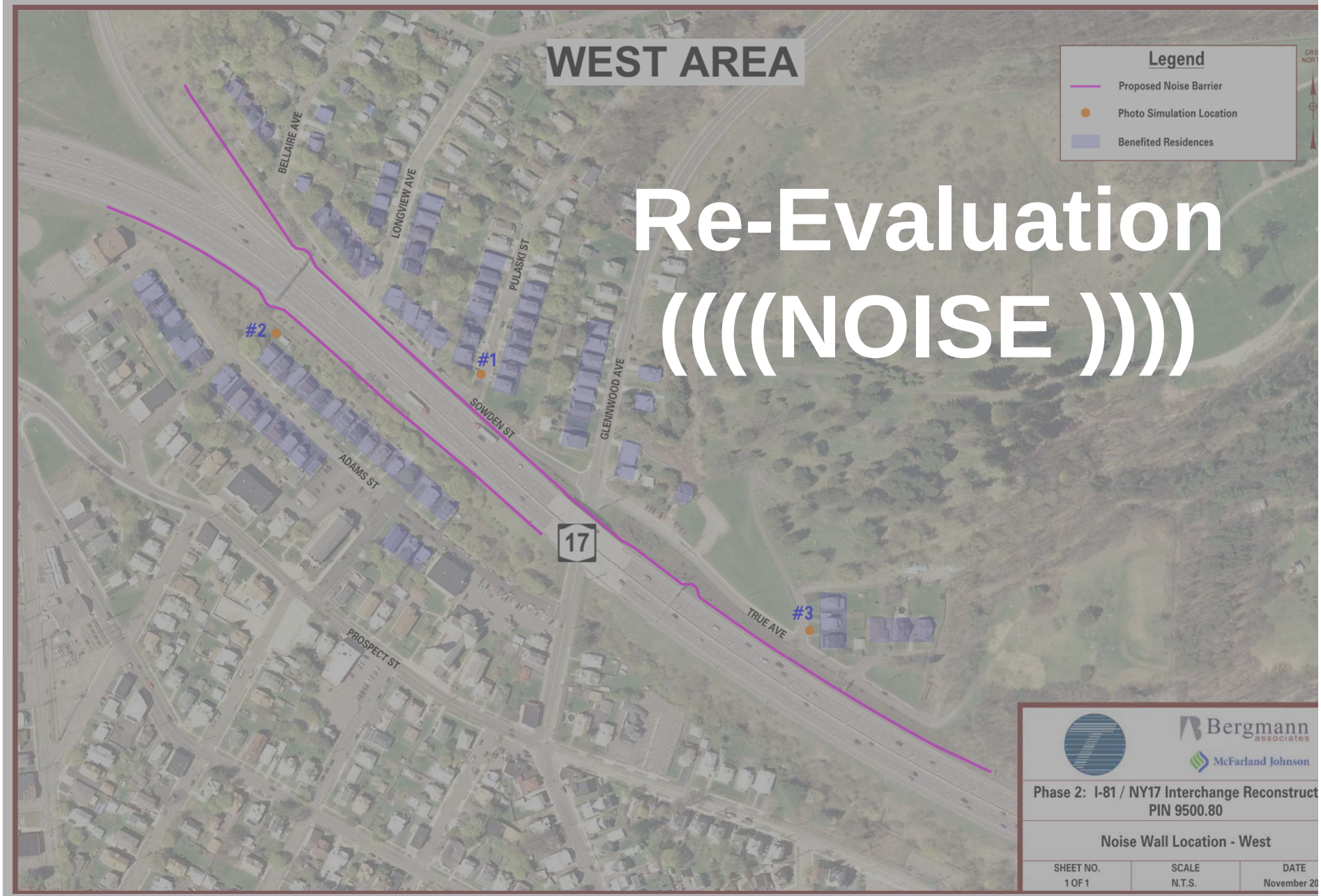
Western Limit Extends to NYS 17 at Airport Road
Eastern Limit Extends to I-81/NYS 17 at I-86
Approx. 7.5 miles

Original 2007 Noise Study Limits

Phase 2 Design
BERGMANN ASSOCIATES

Phase 2 – Noise Analysis & Design

- NYSDOT added adjacent Noise study areas from the 1999 Corridor Study – Bergmann scoped to complete noise analyses of these areas
- Bergmann also scoped with Final design of 6,500 ft of Noise Barriers that were already recommended for construction in the 2007 Noise Study
- As a result of Bergmann 2013 Noise Analyses, additional noise barriers are recommended for construction
- NYSDOT DETERMINES THAT ADDITIONAL NOISE REVIEW MUST FALL UNDER A RE-EVAUATION PROCESS

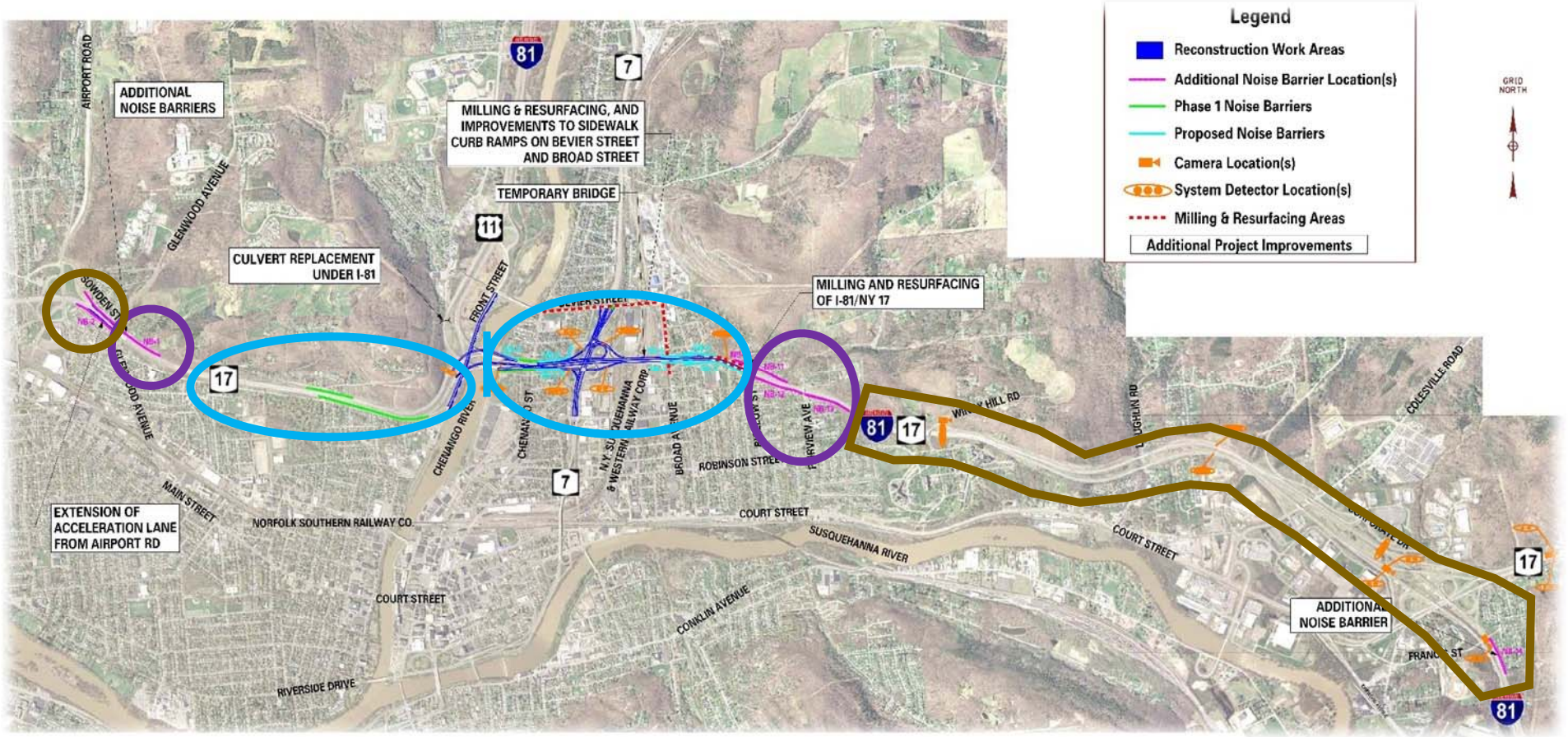

WEST AREA
Legend
Proposed Noise Barrier
Photo Simulation Location
Benefited Residences
Re-Evaluation
((((NOISE))))
BELLAIRE AVE
LONGVIEW AVE
PULASKI ST
GLENWOOD AVE
SOWDEN ST
ADAMS ST
PROSPECT ST
TRUE AVE
17
#1
#2
#3
Bergmann associates
McFarland Johnson
Phase 2: I-81 / NY17 Interchange Reconstruct
PIN 9500.80
Noise Wall Location - West
SHEET NO.
1 OF 1
SCALE
N.T.S.
DATE
November 20

Phase 2 Project Elements (Re-Evaluation Items)

NEPA Re-Evaluation Statement!

A. Non-Standard Highway Features
B. Milling and Resurfacing Roadways
C. Modifications / Reconstruction of Highway X-Culvert
D. Additional Drainage Inlets
E. Extension of Acceleration Lane
F. Addition of Temporary Bridge
G. Addition of Concrete Median
H. Extension of Eastern & Western Limits for the Purpose of Noise Analyses to coincide with limits of Enhanced ITS work

Phase 2 Further Extends Noise Project Area Limits



Phase 2 Project Elements (NYSDOT Noise Policy)

- 2007 Study was performed using Previous Policy
- Updated NYSDOT Policy in 2011 was in place during 2013 & 2014 Studies
- Major Change in Policy was the reasonableness Cost Index for abatement measures
- Previous Policy – A maximum $50,000 wall cost per benefitted receptor applied

  Current Policy – A maximum of 2000 sq-ft of wall per benefited receptor applies
- Decision made to use Previous Policy since noise barriers were found feasible & reasonable to build in the original study area of the Project

Phase 2 Project Elements (Additional Noise Analysis Locations)

- NYSDOT requested that Bergmann perform additional noise measurements and analyze locations not included in the studies - Residential property owners claimed that they were not considered in any of the Project Noise Studies

- Seemed to be problematic at first because the noise studies had already identified impacts and recommended noise barriers for construction

- Fortunately, we able to resolve these issues

Phase 2 Project Elements
(Additional Noise Analysis Locations)

Additional Site #1

Residential Property fell inside a “gap” in the defined noise study area from the original 2007 study, and the study area scoped by NYSDOT for the 2013 study; and was then overlooked when defining study areas in 2014

Phase 2 Project Elements (Additional Noise Analysis – Site #1)

- Measurements were taken, and analysis was performed using the TNM model already created for the 2013 Study.
- NO Traffic Noise Impacts identified at this residential property
- An updated barrier analysis was performed by extending the adjacent recommended wall (NB-1)
- Wall height in excess of 30 feet was required to achieve a 5 dBA reduction at the property
- Additional wall area would make it fail reasonableness criteria – NB-1 remained as identified in 2013 Study

Phase 2 Project Elements
(Additional Noise Analysis Locations)

Additional Site #2

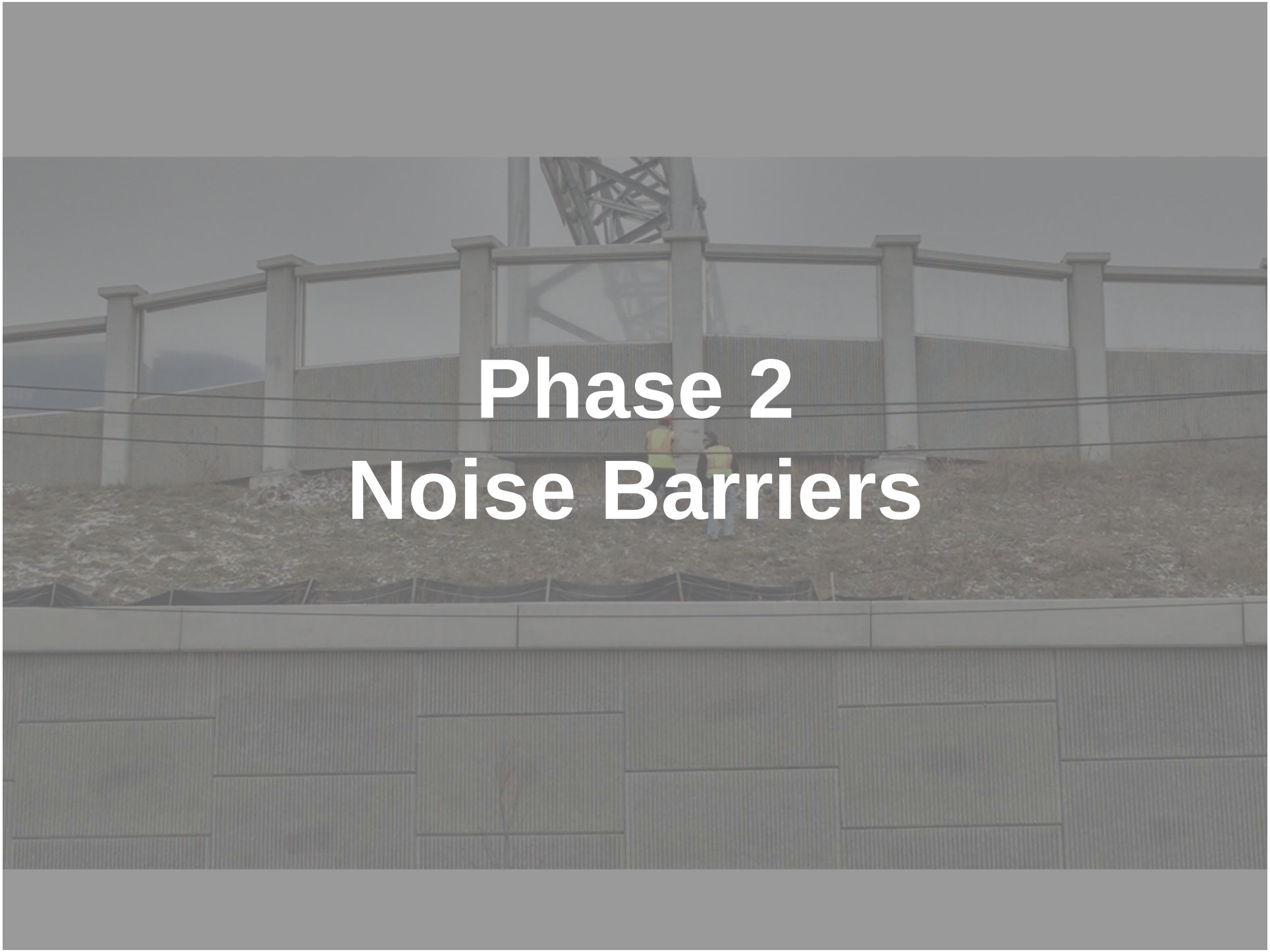
Residential Property was not within any of the noise study areas from the 1999 study, and during the re-evaluation review this neighborhood was left out of the noise study due to its distance from the highway.

Phase 2 Project Elements
(Additional Noise Analysis – Site #2)

- Measurements were taken, and analysis was performed using the TNM model already created for the 2013 Study.
- NO Traffic Noise Impacts identified at this residential property
- An updated barrier analysis was performed by extending the adjacent recommended wall (NB-13)
- Distance between highway and nearest property is (~400 ft), and it was not possible to achieve a 5 dBA reduction at the property
- NB-13 remained as identified in 2013 Study

Phase 1 Construction Photos

Phase 1 Construction



Phase 2
Noise Barriers

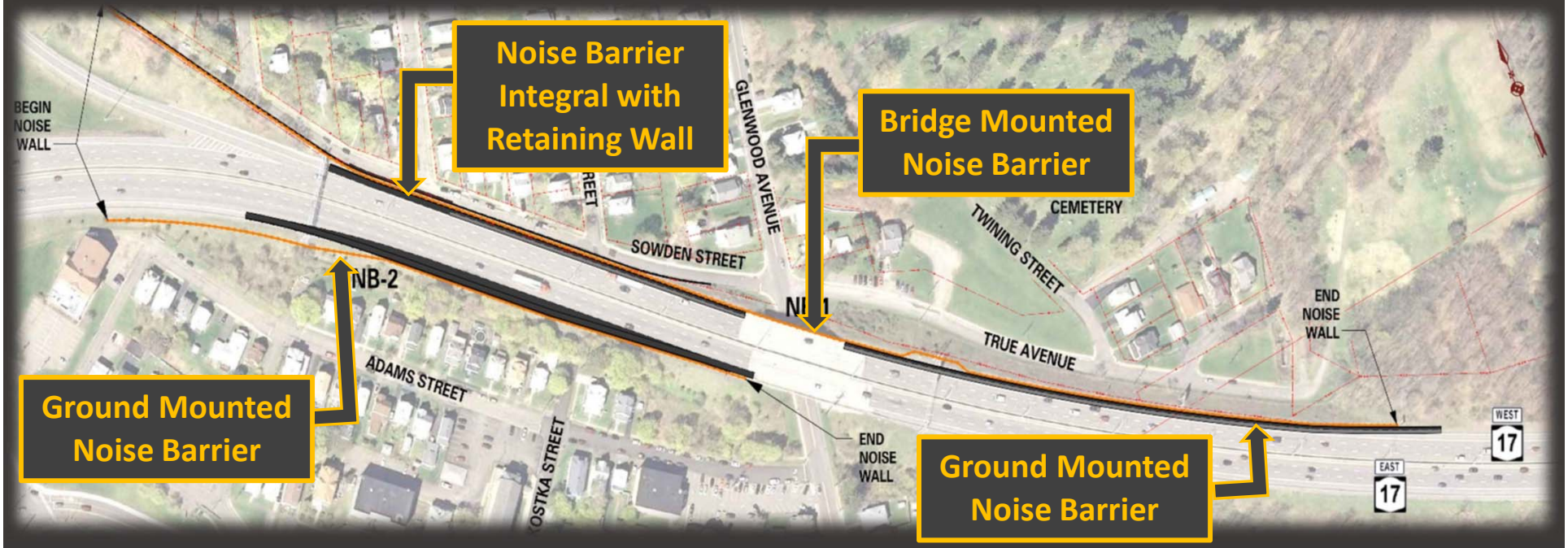
Phase 2 Noise Barriers

Match Phase 1 Noise Barriers

Most Noise Barriers being Constructed are standard ground-mounted but several other foundation types / mounting systems were used

Western Limit Noise Barriers

West of Phase 1



North Side (NB-1): 775 m (+/-)
South Side (NB-2): 375 m (+/-)

Sub-Total (This Graphic): 1,150 m (+/-)

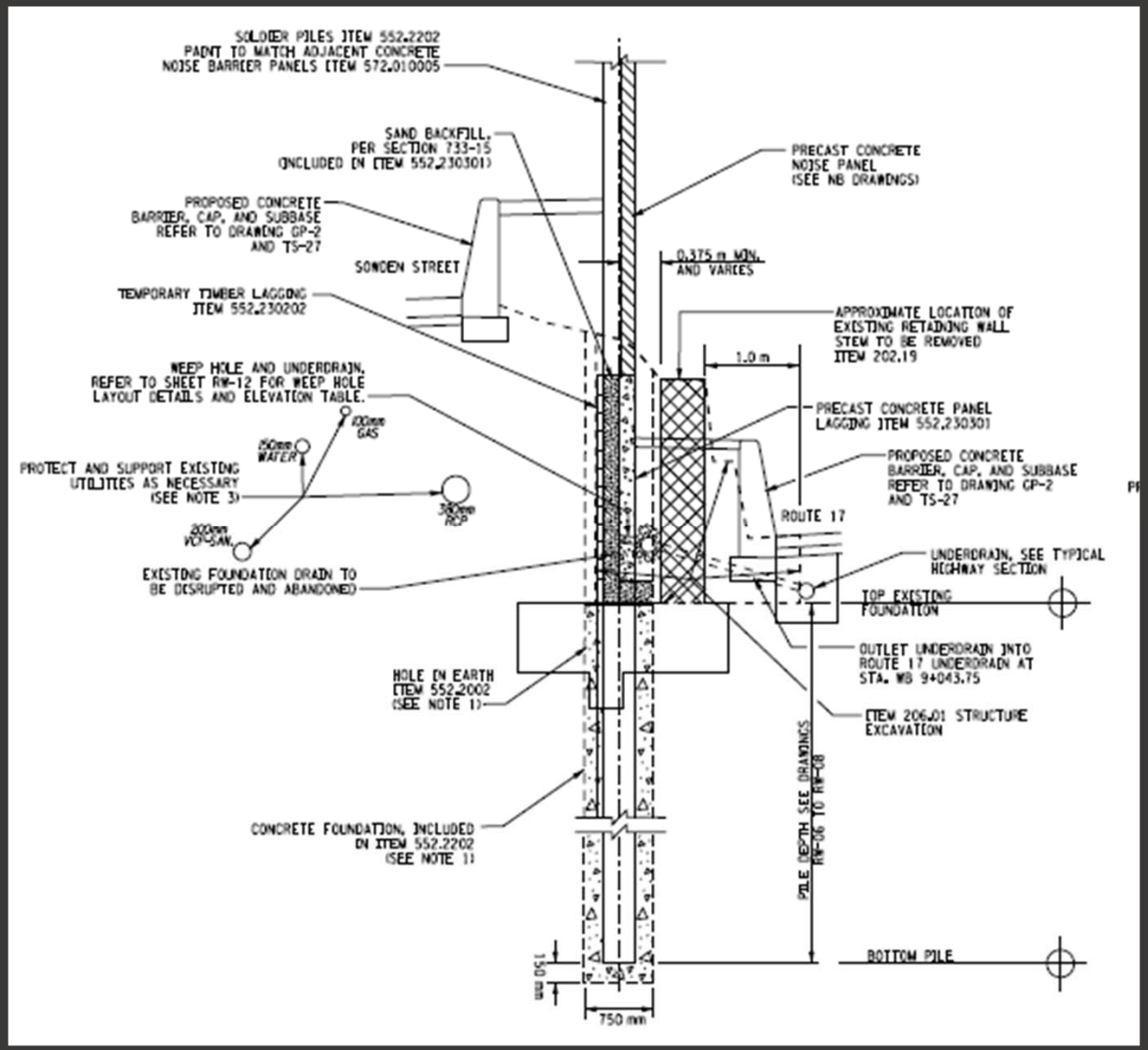
Soldier Pile Wall

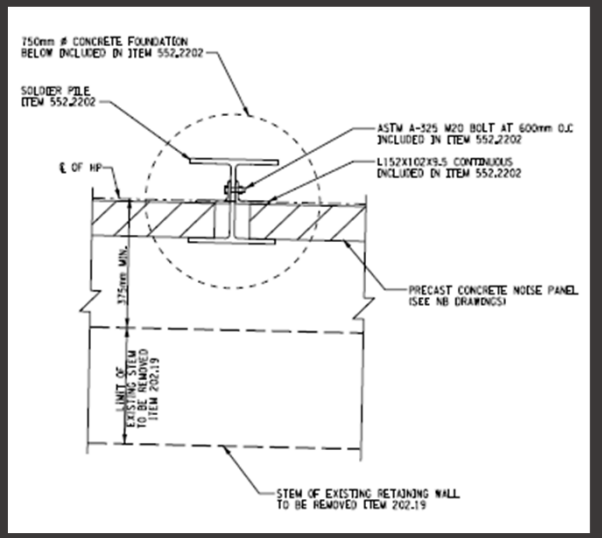
Sowden Street

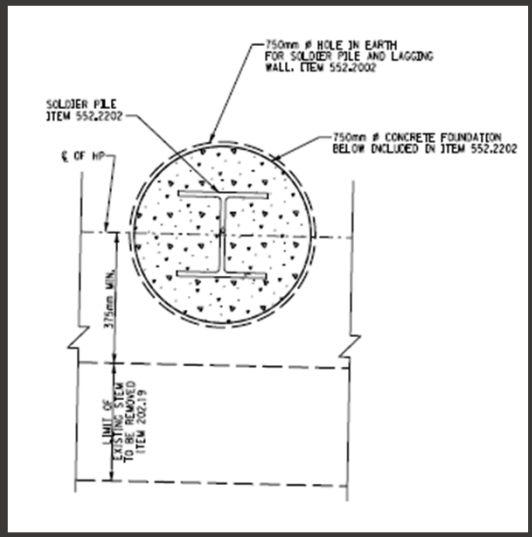
Narrow Bifurcated Median!

Soldier Pile Wall

Sowden Street

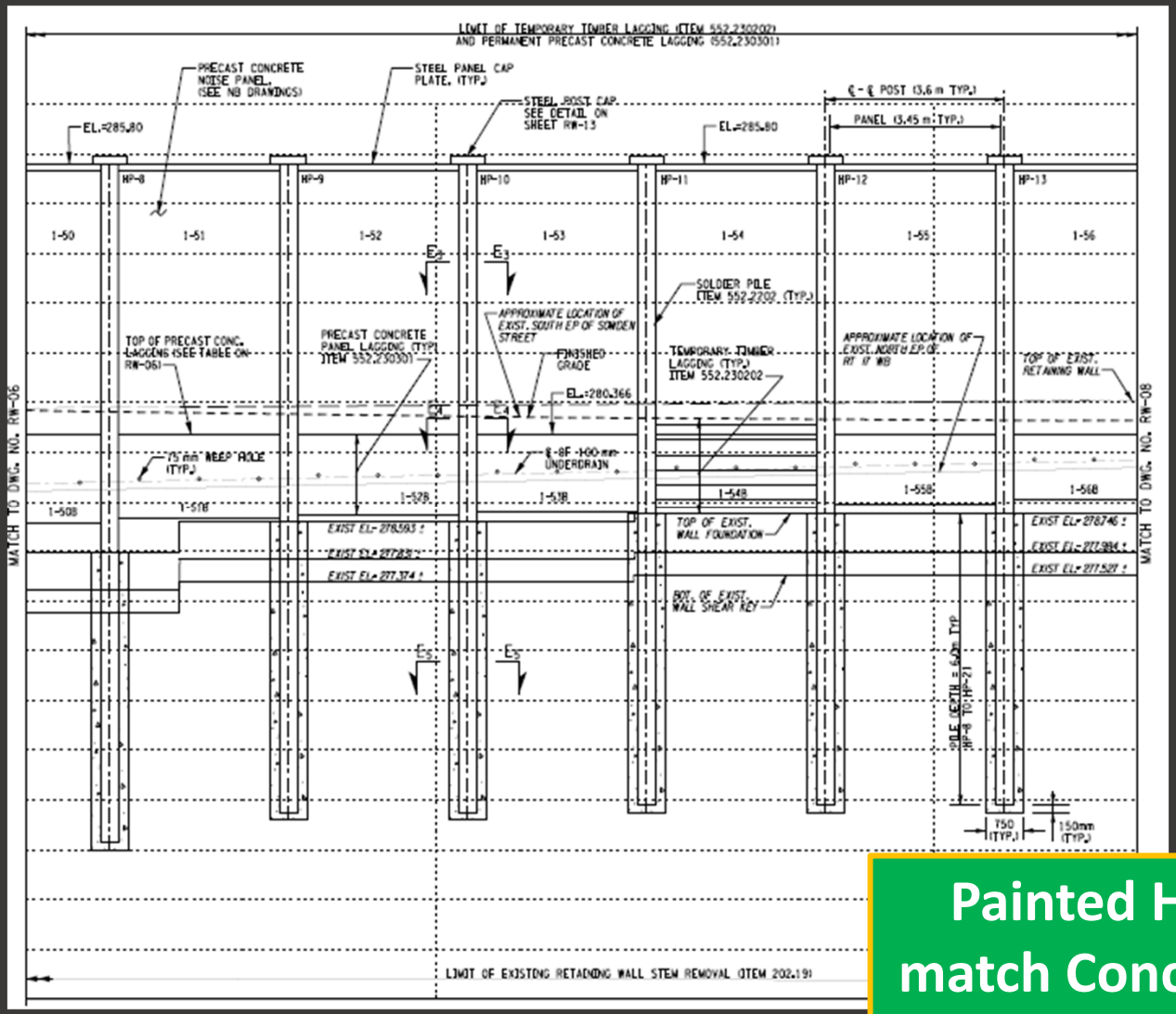






Soldier Pile Wall

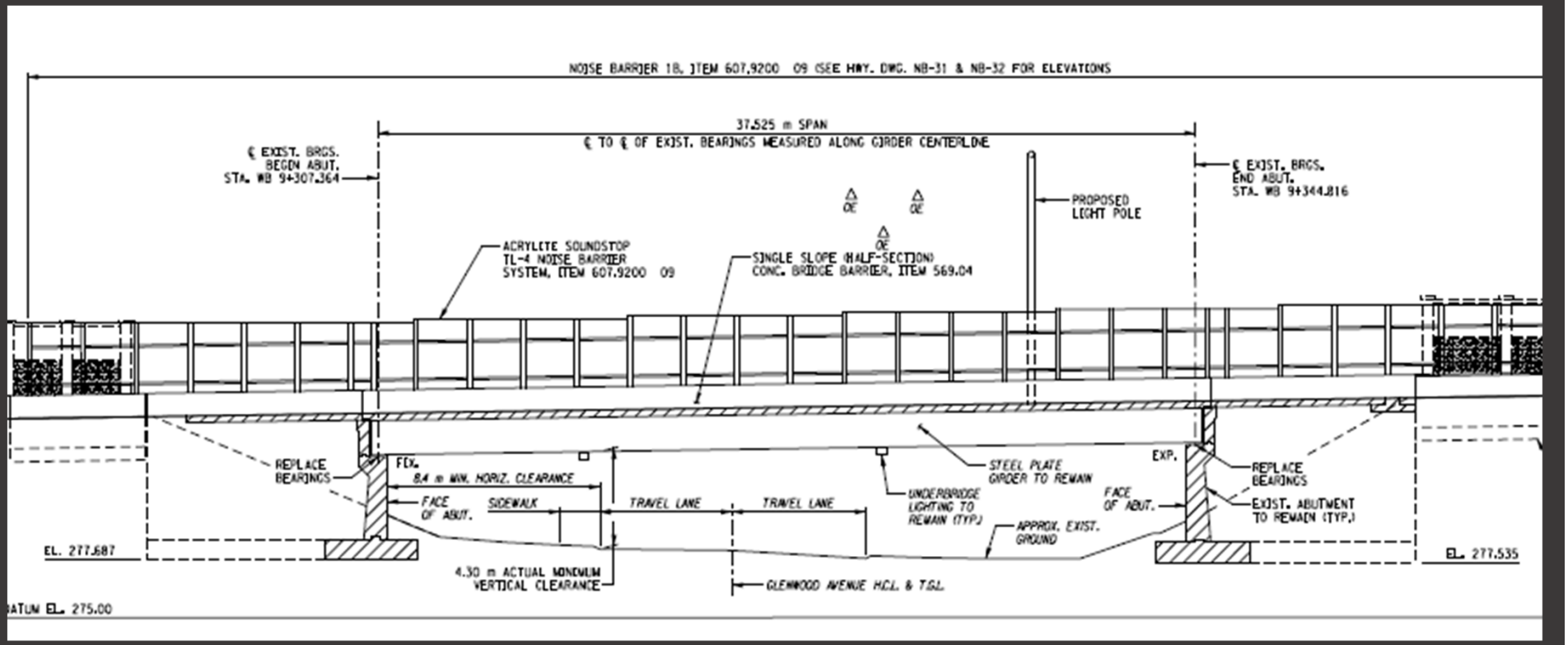
Sowden Street



Painted H-Piles to match Concrete Noise Barrier Posts!

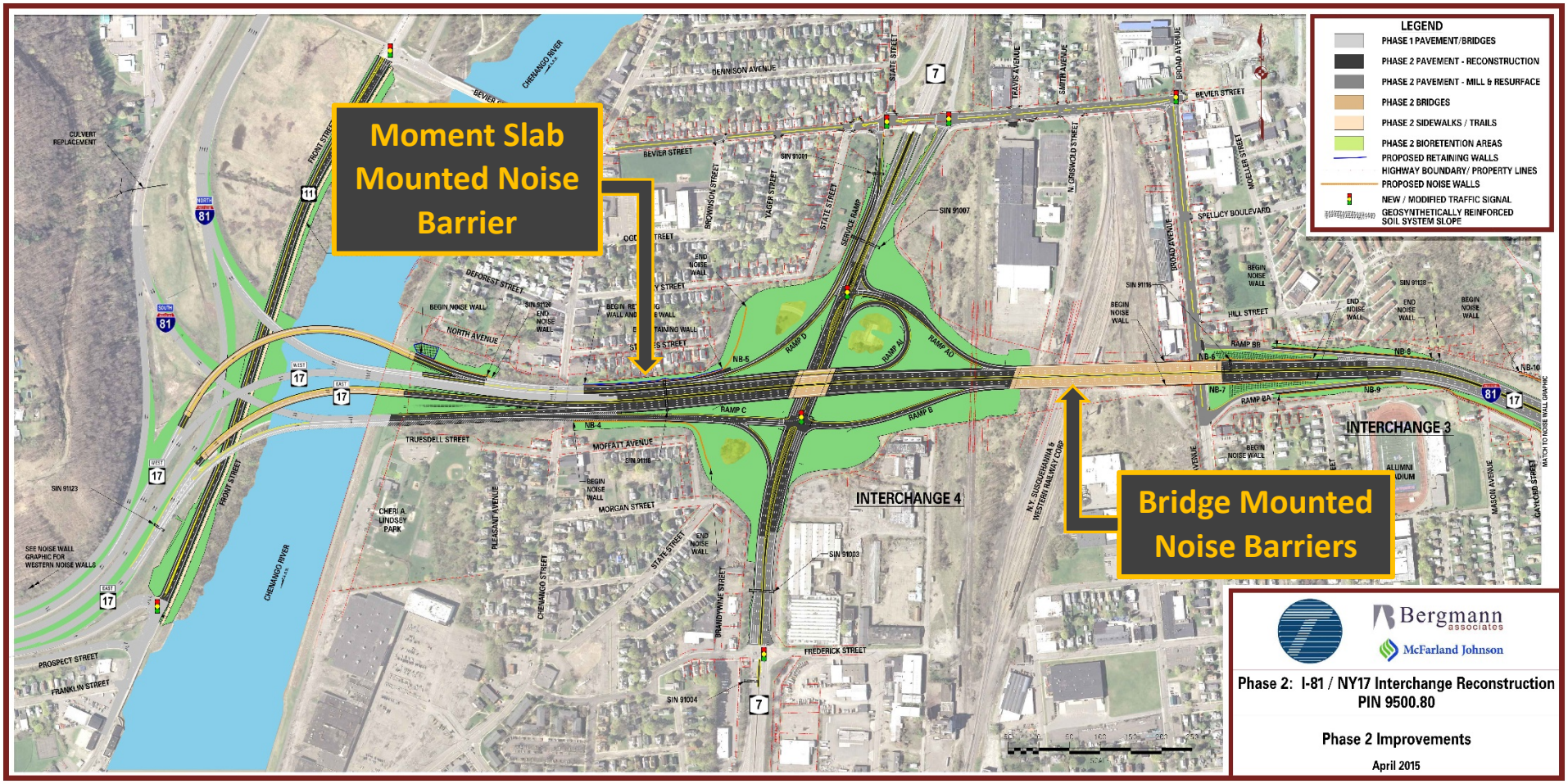
NY 17 WB Over Glenwood Ave

NY 17 WB Over Glenwood Ave



Phase 2 Noise Barriers

Interchange 3 and 4

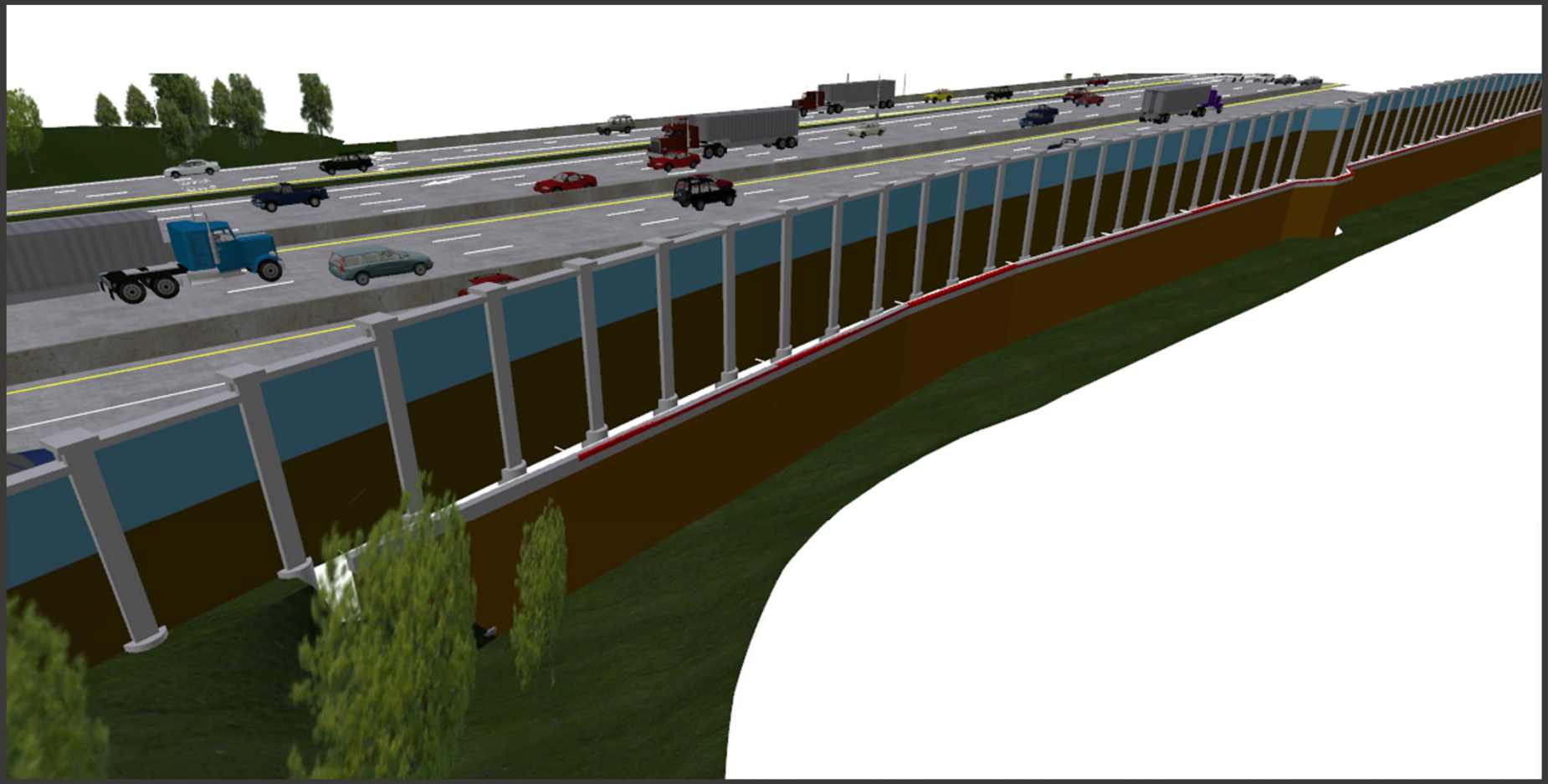


North side (NB-3, 5, 6 & 8): 125 m, 340 m, 240 m & 250 m (+/-)
South side (NB-4, 7, & 9): 270 m, 245 m and 530 m (+/-)

Sub-Total (This Graphic): 2,000 meters (+/-)

Fill-Type Retaining Wall

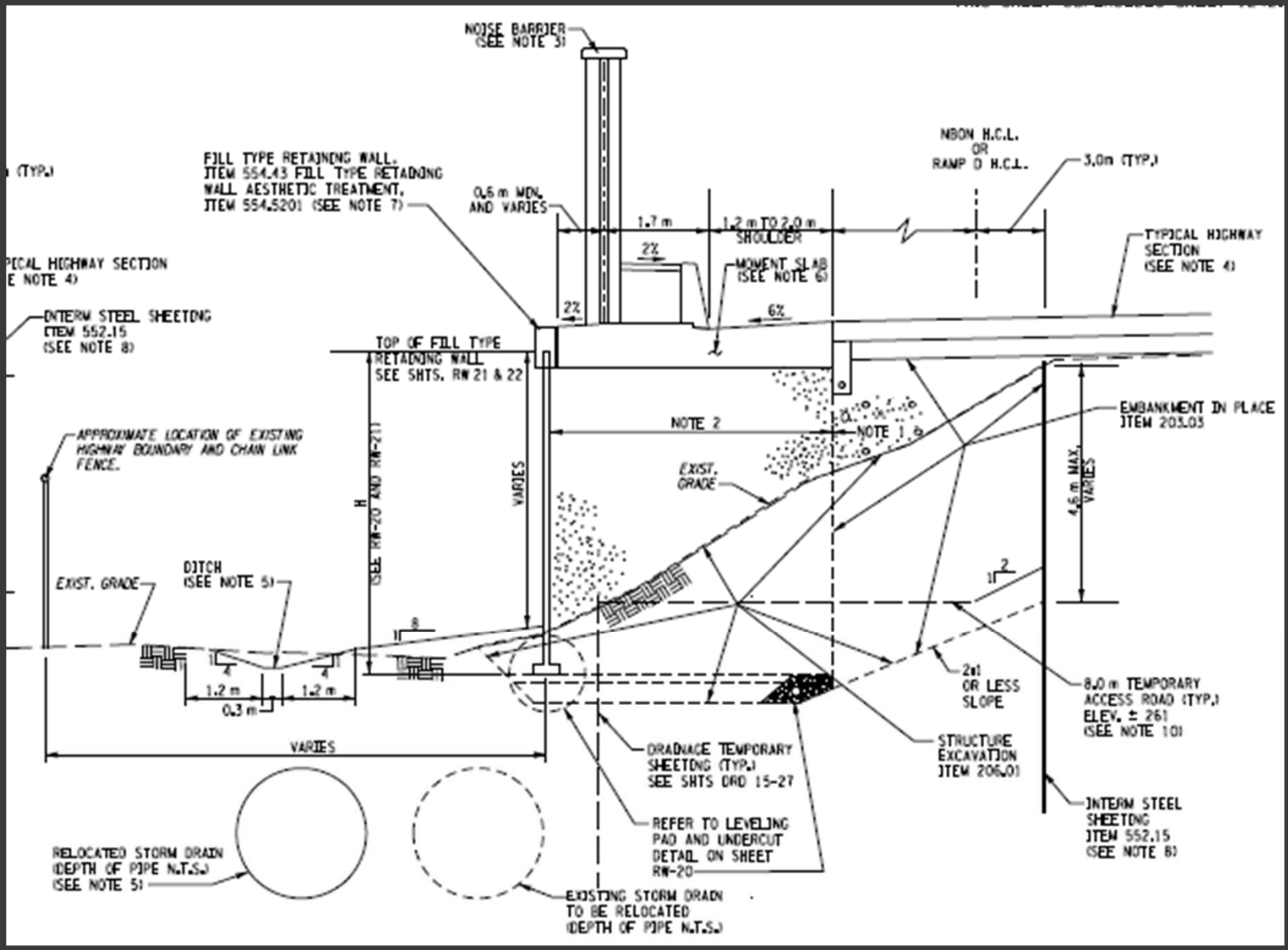
NBON



Noise Barrier mounted on Moment Slabs on top of Retaining Wall

Fill-Type Retaining Wall

NBON



Noise Barrier (Transparent-Bridge Mount)

ACRYLITE® Soundstop

TL4 System

Meets NCHRP 350, Test Level 4 crash test and 2012 AASHTO LRFD

Eastern Limit Noise Barriers

East of Interchange 3 and Bigelow Street

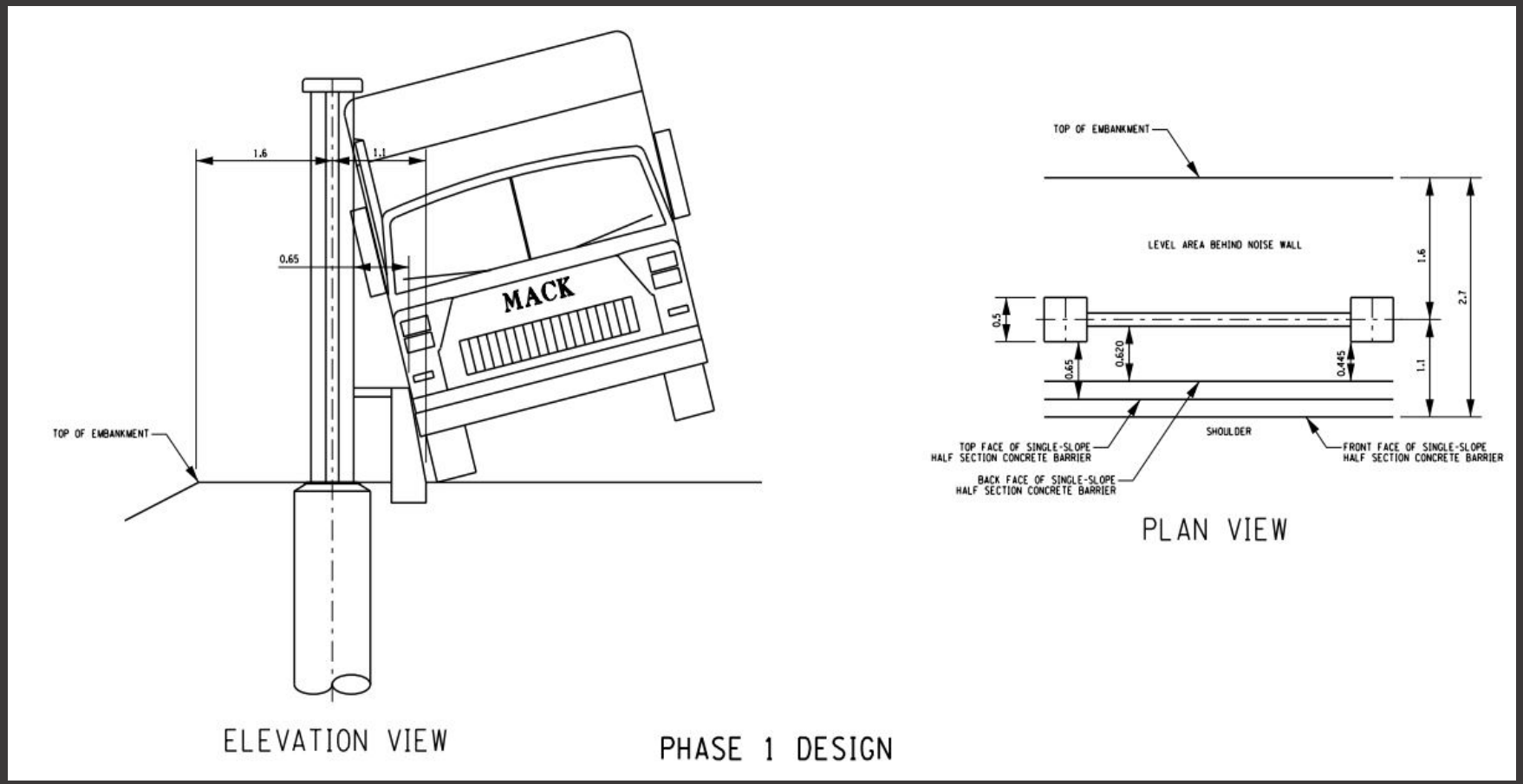
North Side (NB-11 & 14): 305 m & 320 m (+/-)
South Side (NB-12 & 13): 405 m & 370 m (+/-)

Sub-Total (This Graphic): 1,400 meters (+/-)

Phase 2 Total: 4,550 m (+/-) Approx. 3 miles

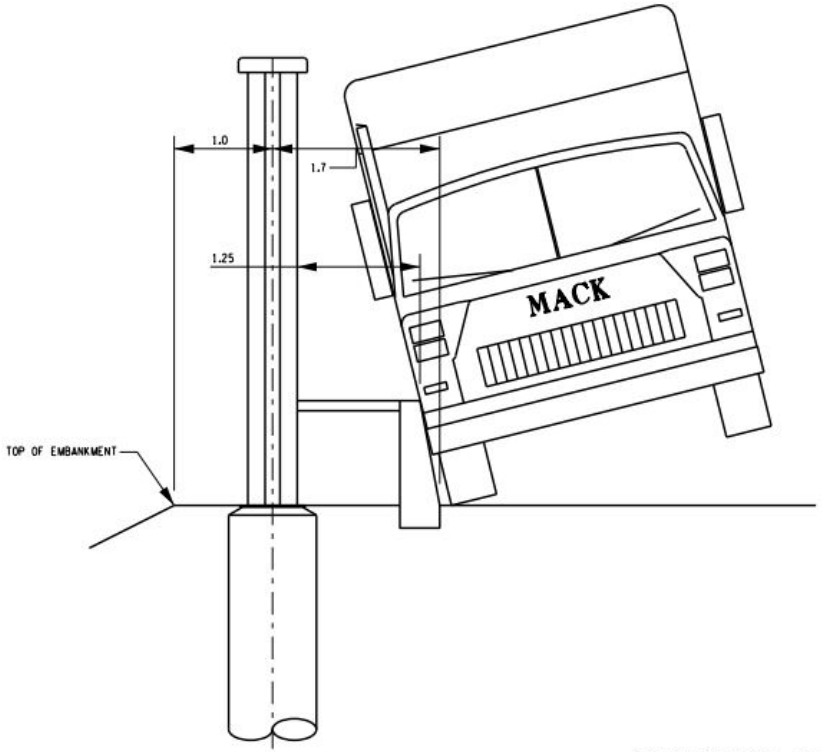
Noise Barrier (Ground Mount)

Phase 1 Design

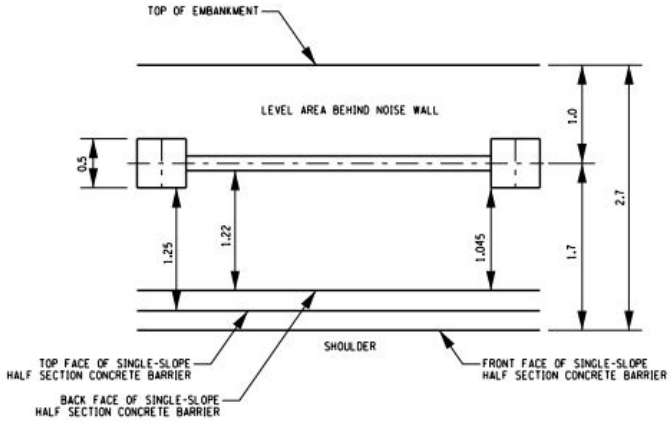


Noise Barrier (Ground Mount)

Phase 2 Design



ELEVATION VIEW



PLAN VIEW

CURRENT DESIGN
(MEETS 2012 LRFD)

- **2012 LRFD – Noise Barriers must resist vehicular collision forces unless it has been crash-tested or meets setback requirements.**
- **Requirements adopted by NYSDOT in April 2014**

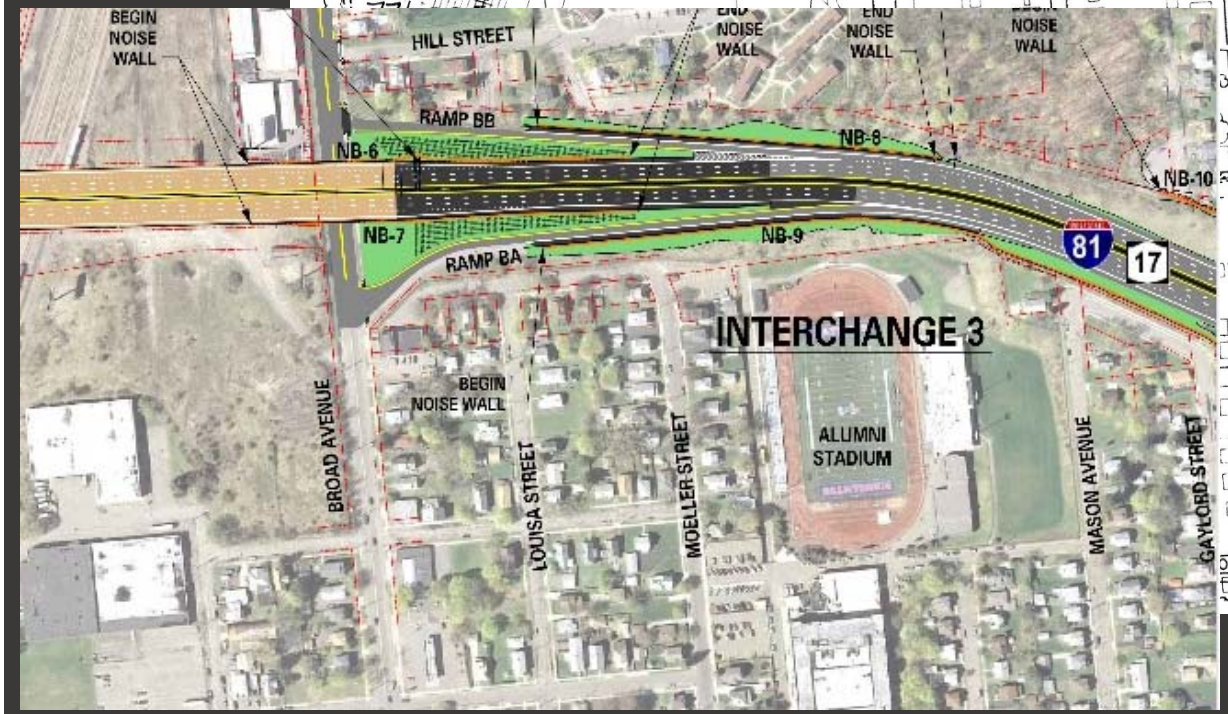
Phase 2 Cost

Total Project BID = $150 Million

Noise Barrier Items BID = $15 Million

Noise Barriers 10% of Overall Project

TNM Training Comes to Life




Questions?