COLORADO DEPARTMENT OF TRANSPORTATION **REEVALUATION FORM**	**Original NEPA Approval Date:** 1/19/2017	**Reevaluation Date:** 9/5/2018	**Project Code**: AQC R600-165 **Subaccount:** 13599

Project Name and Location: Central 70 Project: Reevaluation #4, I-70 from I-25 to Chambers Road

NEPA Document Title: I-70 East ROD 1: Phase 1 (Central 70 Project) (January 19, 2017)

Region/Program/Residency: Headquarters – Central 70 Project Office

Project Description:

The Preferred Alternative, Phase 1 (Partial Cover Lowered Alternative with Managed Lanes) selected in the January 19, 2017 Record of Decision (ROD) is the first phase of implementing the Preferred Alternative identified in the FEIS. It removes the existing Interstate 70 (I-70) viaduct between Brighton Boulevard and Colorado Boulevard and lowers the highway below grade in this area, placing a four-acre cover over a portion of the lowered highway (between the Clayton Street and Columbine Street bridges, adjacent to Swansea Elementary School), and adds additional lanes in each direction.

Reevaluation #1 dated 9/18/2017 assessed the impacts of three categories of design alterations: (1) modification to the construction limits determined through coordination with the Union Pacific Railroad (UPRR); (2) changes to the offsite drainage system for the Central 70 Project due to anticipated reduction of stormwater flow volume; and (3) other miscellaneous and slight design adjustments throughout the corridor completed to advance the project.

Reevaluation #2 dated 1/11/2018 assessed the impacts of two design alterations and one existing condition change: (Design Modification #1) temporarily moving a fence and gate within the Ralston Purina Plant/Nestle Petcare Company property to accommodate construction and maintain security of the plant; (Design Modification #2) at 4790 Josephine Street, it was determined that placing a temporary easement on the entirety of this vacant property would be beneficial for construction staging, access, and a potential temporary field office trailer location to facilitate the UPRR construction work; (Changed Conditions #1) 4637 Claude Court, 5DV.9667, is now determined not eligible for the National Register of Historic Places and the finding of effect for this resource has been changed to No Historic Properties Affected.

Reevaluation #3 dated 6/18/2018 assessed the impacts of design alterations between Colorado Boulevard and Quebec Street. These minor adjustments and refinements to the design of the Preferred Alternative, Phase 1 resulted from advanced design and include the following types of modifications; Construction limit adjustments to allow for additional space to facilitate movement of construction equipment and to tie-back slopes along driveway approaches; Minor adjustments to right-of-way acquisition boundaries.

Project Phasing Plan and Portions Completed (if warranted):

Portions Completed: None

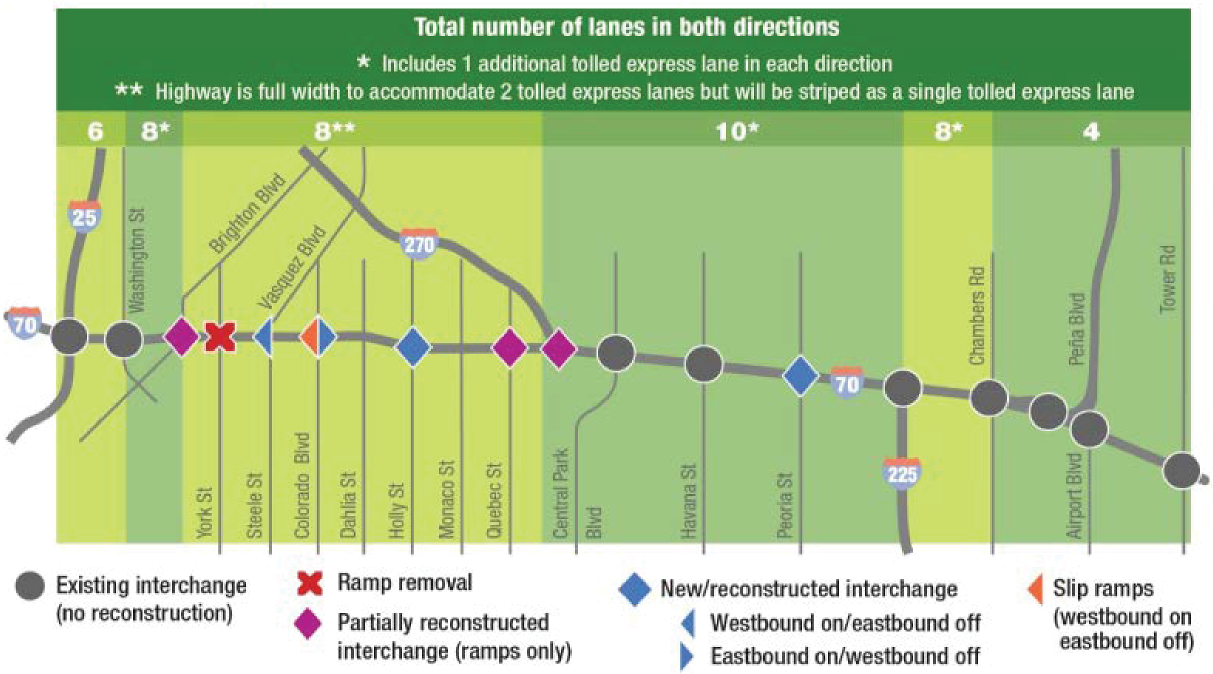
Project Phasing Plan: Phase 1, the Central 70 Project, is the only defined phase for the I-70 East Project at this time. Future phases have not been determined and will rely on future funding.

Portion of Project Currently Being Advanced:

The Central 70 Project advances the portions of the Preferred Alternative for the I-70 East Project selected in the ROD. It includes improvements to an approximately 10-mile stretch of I-70 from I-25 to Chambers Road, adding one new tolled express lane (selected as the type of managed lane) in each direction, removing the over 50-year-old aging viaduct, lowering the highway between Brighton Boulevard and Colorado Boulevard, and placing a four-acre cover over a portion of the lowered highway (between the Clayton Street and Columbine Street bridges, adjacent to Swansea Elementary School). **Figure 1** provides an overview of the Central 70 Project, and **Figure 2** shows the number of lanes and planned interchange modifications.

Figure 1, Central 70 Project Overview

Figure 2, Central 70 Project Lane Configuration and Interchange Reconstruction



Although striped for only one tolled express lane, the lowered section of the highway will be constructed to the full width of the Preferred Alternative as identified in the I-70 East Final Environmental Impact Statement (FEIS) because it is more cost effective to construct the whole width now and it is less disruptive to the community than performing additional future expansion. For lane continuity, only a single additional lane will be striped from Brighton Boulevard to Quebec Street, even though the highway in this area will be wide enough to accommodate two additional lanes.

Date(s) of Prior Reevaluations: Reevaluation #1 - 9/18/2017; Reevaluation #2 – 1/11/2018, Reevaluation #3 –6/18/2018

I. Document Type

- ☐ Categorical Exclusion (CE)
- ☐ Environmental Assessment (EA)
- ☐ Finding of No Significant Impacts (FONSI)
- ☐ Draft Environmental Impact Statement (DEIS)
- ☐ Final Environmental Impact Statement (FEIS)
- ☐ Supplemental Environmental Impact Statement (SEIS)
- ☒ Record of Decision (ROD)
- ☐ Other (such as: local funding, etc.) ______________________________

II. Reason for Reevaluation

- ☐ Project is proceeding to the next major approval or action [23 CFR 771.129(c)]
- ☒ Project changes such as laws, policies, guidelines, design, environmental setting, impacts or mitigation (describe: Changes in project design and environmental impacts as described in Section IV below)
- ☐ Greater than three years have elapsed since FHWA's approval of the DEIS [23 CFR 771.129(a)] or FHWA's last major approval action for the FEIS [23 CFR 771.129(b)]
- ☐ Other:

____

III. Conclusion and Recommendation

- ☒ The above environmental document has been reevaluated as required by 23 CFR 771.129 and it was determined that no substantial changes have occurred in the social, economic, or environmental impacts of the proposed action that would substantially impact the quality of the human, socio-economic, or natural environment. Therefore, the original environmental document or CE designation remains valid for the proposed action. It is recommended that the project identified here-in be advanced to the next phase of project development. A summary of the review is documented in Section IV.
- ☐ The above environmental document has been reevaluated as required by 23 CFR 771.129 and it was determined that the environmental document or CE designation is no longer valid or more information is required. Additional required documentation is identified in Section VII.

David Singer Digitally signed by David Singer Date: 2018.09.04 13:12:03 -06'00'

Regional Planning Environmental Manager or Designee Date

JOHN M CATER Digitally signed by JOHN M CATER Date: 2018.09.04 14:02:39 -06'00'

Federal Highway Administration Division Administrator or Designee Date

IV. Evaluation

- ☐ Level 1: Less than three years since last major step to advance the action (e.g. approval of NEPA document, authority to undertake final design, authority to acquire significant portion of ROW, approval of PS&E) and there are no changes in project scope, environmental conditions, environmental impacts or regulations and guidelines.- OR - The document being re-evaluated is a programmatic Categorical Exclusion regardless of time since the last major step to advance the action (as long as the project would still be covered by a programmatic Categorical Exclusion). All decisions in the prior NEPA document remain valid. No FHWA concurrence is required. Note to file and to distribution below.
- ☒ Level 2: Less than three years since last major step to advance action and there are only minor changes in the project scope and/or updates or explanation needed for one or more resource areas. FHWA concurrence is required.

☐ Level 3: More than three years since last major step to advance action and there are only minor changes in the project scope and/or updates or explanation needed for one or more resource areas. FHWA concurrence is required.

☐ Level 4: Major changes in project scope or environmental commitments, or for EISs when greater than three years have elapsed since the last major project action. Updates or new studies maybe required. A Level 4 Reevaluation may require a separate document. FHWA concurrence is required.

ENVIRONMENT SETTING, AFFECTED ENVIRONMENT, AND ENVIRONMENTAL IMPACT ASSESSMENT:
Document changes to human, socio economic, or natural environment for environmental setting or circumstances.
Document changes in impact status. Place check-mark or description where relevant. Note: this list may be expanded or adjusted to match the headings in the original environmental document reviewed.

Setting/Resource/Circumstance	Change in Affected Environment or Setting		Change in Environmental Impact		Date Reviewed	Highlight Section VI Additional Studies Required or Section IX Attachments
	Yes	No	Yes	No		
Air Quality	☐	☒	☐	☒	December 2017	
Geologic Resources and Soils	☐	☒	☐	☒	December 2017	
Water Quality	☐	☒	☐	☒	December 2017	
Floodplains	☐	☒	☐	☒	December 2017	
Wetlands/Waters of U.S.	☐	☒	☒	☐	May 2018	
Vegetation and Noxious Weeds	☐	☒	☐	☒	December 2017	
Fish and Wildlife	☐	☒	☐	☒	December 2017	
Threatened/Endangered Species	☐	☒	☒	☐	May 2018	See Attachment 3
Historic Resource (includes bridges)	☐	☒	☐	☒	January 2018	
Archaeological Resources	☐	☒	☐	☒	December 2017	
Paleontological Resources	☐	☒	☐	☒	December 2017	
Land Use	☐	☒	☐	☒	December 2017	
Social Resources	☐	☒	☐	☒	December 2017	
Economic Resources	☐	☒	☐	☒	December 2017	
Environmental Justice	☐	☒	☐	☒	December 2017	
Residential/Business Right-of-Way Impacts	☐	☒	☒	☐	May 2018	
Transportation Resources (roadway, rail, bus, bike, pedestrian, etc.)	☐	☒	☐	☒	December 2017	
Utilities and Railroads	☐	☒	☐	☒	December 2017	
Section 4(f)/6(f)	☐	☒	☒	☐	May 2018	
Farmlands	☐	☒	☐	☒	December 2017	
Noise	☐	☒	☒	☐	May 2018	See Attachment 2
Visual Resources/Aesthetics	☐	☒	☐	☒	December 2017	
Energy	☐	☒	☐	☒	December 2017	
Hazardous Materials	☐	☒	☒	☐	May 2018	
Cumulative Impacts	☐	☒	☐	☒	December 2017	
Other(s)Biological Resources	☐	☒	☒	☐	May 2018	

DESIGN ALTERATIONS:

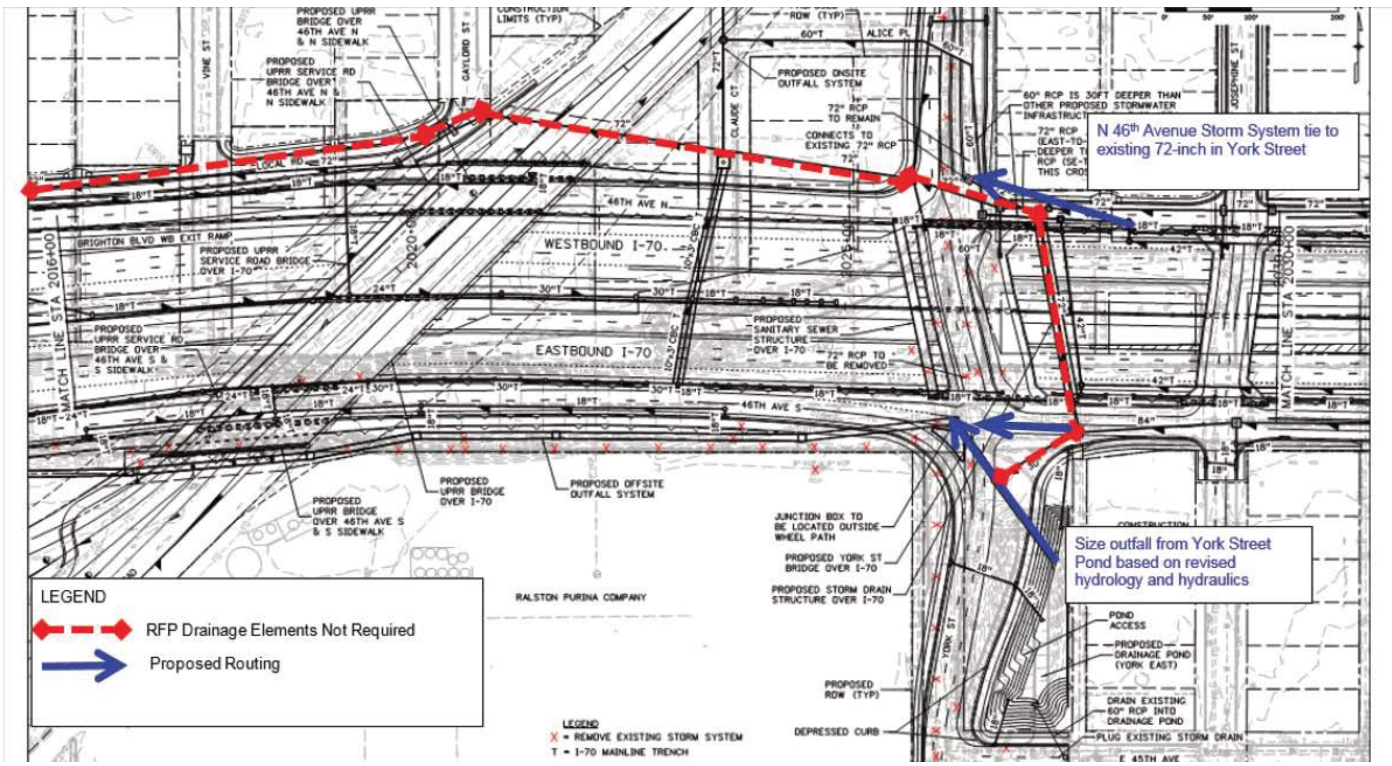
Document changes to project scope and or design criteria:

Through the procurement process, the proposers were allowed to propose Alternative Technical Concepts (ATCs) for ways that would improve the project. This reevaluation covers the changes proposed through the ATC process and included in this project, except ATC 11.2, which will be covered in a future reevaluation. ATCs included in the project and do not change impacts or modify the alternative selected in the ROD are described and listed in **Attachment #1**. The remaining ATCs are included in the body of this reevaluation with a description, description of changes in impacts and any changes in mitigation.

ATC 12.2 – This ATC will eliminate the 72 inch storm sewer bridge over I-70 mainline by connecting to the Offsite Outfall System that was previously identified in Reevaluation #1 dated 9/18/17. See **Figure 4.** The offsite system conveys drainage that originates away from the project area and ROW. The Offsite Outfall System ultimately connects to the Globeville Landing Outfall being constructed independently by the City and County of Denver (CCD), discharging into the South Platte River.

- The new routing scenario will add approximately 230 cubic feet per second to the Offsite Outfall System from where it connects near the southwest corner of I-70 and York Street to the Offsite Outfall's connection with the CCD GLO outfall system.
- The Offsite Outfall System has been evaluated and upsized to accommodate the additional flow, while maintaining the ROD design alignment.
- This ATC (along with ATC 11.2, to be included in another reevaluation) will allow the profile of I-70 mainline to be raised, approximately 4 to 14 feet from west of the UPRR bridge to east of Josephine Street, out of the contaminated groundwater.
- ATC 12.2 will also connect the proposed westbound 46th Ave. North on-site storm system into the 72-inch storm system in York St. instead of the reference design connection point at Race Street shown in the ROD.
- ATC 12.2 is anticipated to positively impact the Project by minimizing the environmental concerns associated with handling, disposal, and treatment of groundwater through the construction and operations and maintenance period.
- ATC 12.2 will eliminate approximately 1,200 linear ft. of pipe. This allows for a reduction of equipment operating times and number of haul trucks through the cycle of producing, delivering, laying, and backfilling of the pipe, further reducing Project impacts.
- ATC 12.2 does not present any potential adverse safety, environmental, social, economic, community, traffic, operations and maintenance, or third party impacts.

Figure 4 - ATC 12.2 design off-site storm sewer routing connecting to GLO



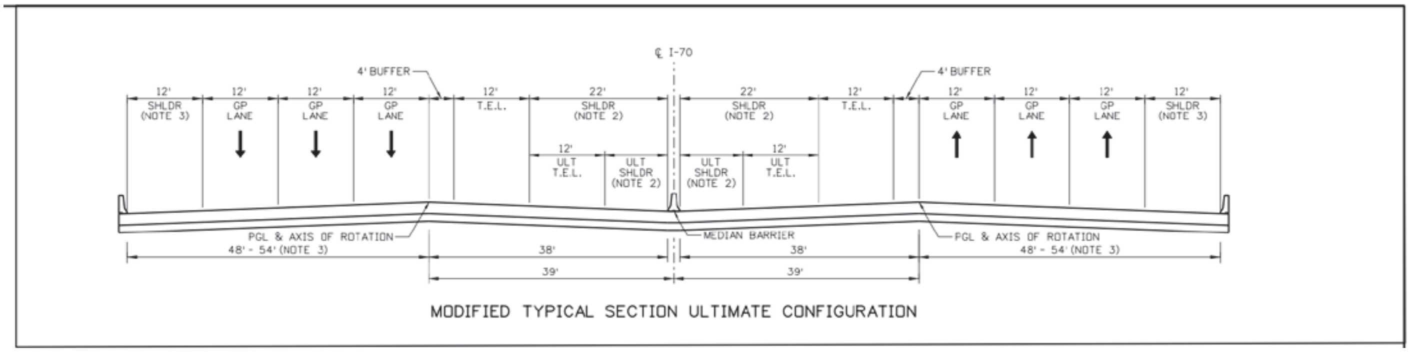
ATC 14.2 - Modify the I-70 typical section to allow for independent profiles of WB and EB traffic shifting the axis of the rotation/pivot point for super elevation, reducing the height of the retaining walls. The modified typical section establishes the outside edge of pavement approximately 10 inches higher than the PA typical section due to the shift of the crown point to the outside edge of the buffer. See **Figure 5**.

- ATC 14.2 reduces the volume of excavation required through the Lowered Section.
- ATC 14.2 reduces the number of catch basins required by approximately 25%: The modified typical section diverts nearly half of the storm water towards the median where a wider 10 ft. inside shoulder, versus a 6 ft. outside shoulder, is available

for spread. The number of catch basins required on the outside is reduced by half, and the median catch basins are spaced further apart.

- ATC 14.2 is anticipated to positively impact the Project by minimizing the environmental concerns associated with handling, disposal, and treatment of groundwater through the construction and operations and maintenance period.
- ATC 14.2 reduces construction impacts. The reduction in quantities of retaining walls, excavations, and catch basins will reduce construction duration and related traffic on the I-70 mainline and local roadways.

Figure 5 – ATC 14.2 Modified typical section



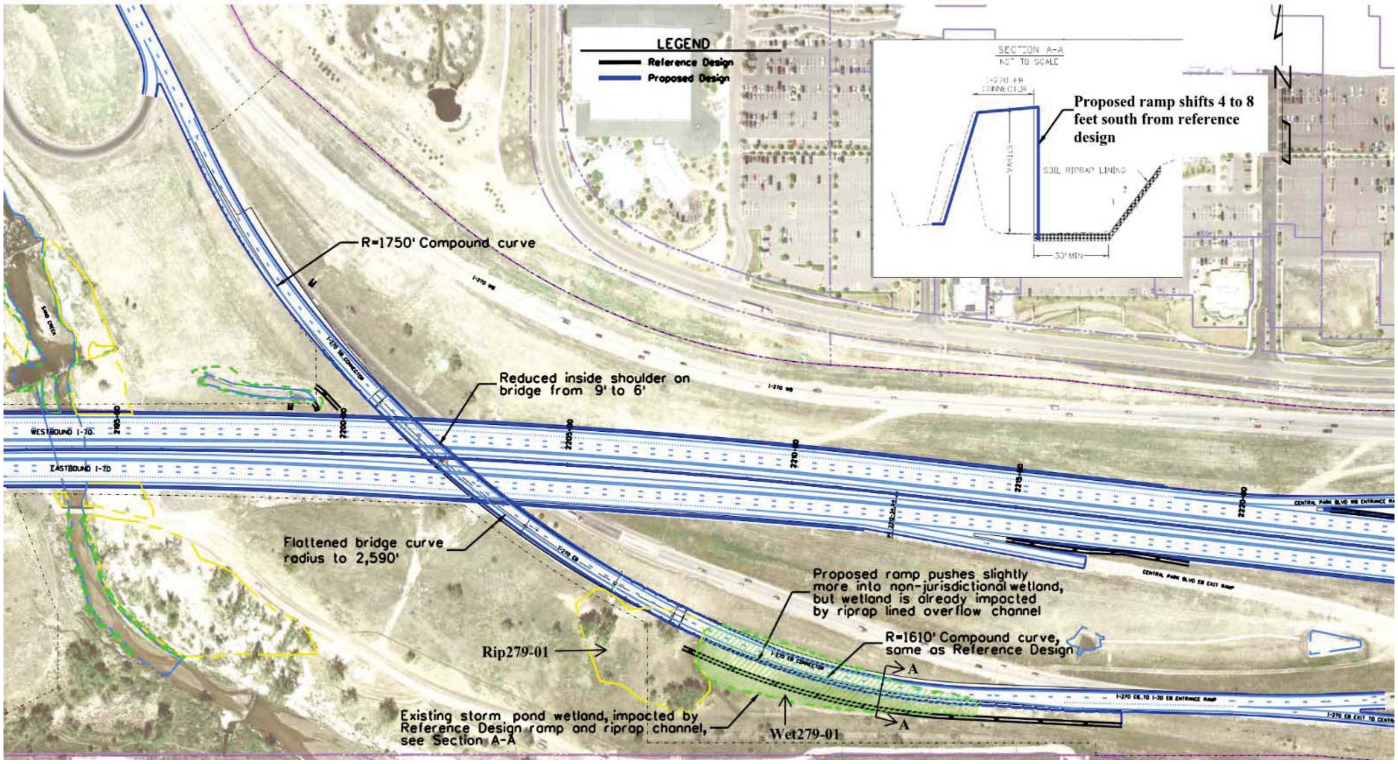
ATC 18.1 - Modify the normal crown cross slope design criteria of 2% with a centerline crown for the cross street bridges at York Street, Josephine Street, Columbine Street, Clayton Street, Filmore Street, Steele Street, Cook Street, Monroe Street, and Colorado Boulevard over I-70 through the Lowered Section and raise the profile of I-70 mainline approximately 6 to 12 inches.

- ATC 18.1 reduces the height of the retaining walls and volume of excavation required through the Lowered Section.
- ATC 18.1 is anticipated to positively impact the Project by minimizing the environmental concerns associated with handling, disposal, and treatment of groundwater through the construction and operations and maintenance period
- ATC 18.1 improves the airflow under the cover at Columbine St. and Clayton St. which optimizes the operations of cover ventilation.
- ATC 18.1 minimize impacts to the traveling public, MOT/Phasing is improved at Colorado Blvd. by allowing I-70 traffic to remain on existing pavement by revising the ramp profiles and raising Colorado Blvd.
- ATC 18.1 eliminates or reduces in the height and length of landscaping walls located at the back of sidewalks in locations with tight right-of-way constraints by raising the sag vertical curves approaching and departing each cross street in order to tie in with the cross street cross slope.

ATC 28.1 - Reduce the inside shoulder width from 9 ft. to 6 ft. on the flyover bridge while maintaining the required horizontal stopping sight distance (HSSD) for the traveling public along I-270 by flattening the radius of 2,184 ft. to a radius of 2,590 ft. See **Figure 6**.

- The proposed geometric adjustment provides for the reduction of bridge deck area on the flyover bridge, while also allowing the use of two girders instead of three for the entire bridge length. Utilize a 4 ft. inside shoulder for the portions of the EB Connector where no barrier obstructs sight distance.
- The retaining wall at the southeast end of the ramp will extend 4 to 8 feet farther south.
- There is a small reduction of impact to riparian habitat associated with this ATC. as shown in **Figure 9**. The riparian area's impact is decreased from 0.566 to 0.563 aces of permanent impacts and decreased from 0.074 to 0.072 acres of temporary impacts.
- The wetland WET-279-1 is identified in the Updates to Wetlands and Other Waters of the U.S. Technical Report Addendum (January, 2017) as totally impacted, therefore there will be no additional wetland impacts from this ATC.

Figure 6 - ATC 28.1 design of I-270 On-Ramp



ATC 68.0 - Modify the Onsite Outfall system to optimize the existing right-of-way and existing drainage infrastructure and eliminate the north outfall included in the ROD. See **Figures 7, 7.1, and 7.2**

- The onsite drainage system will collect stormwater from the Lowered Section and convey it to a pump station located between York St. and Claude Ct. adjacent to the low-point of I-70 mainline.
- The water will be pumped to a water quality pond near the pump station within Project ROW. The water will gravity drain from the water quality pond into an existing 72 in. storm sewer in York Street.
- The hydraulic analyses conducted for ATC 68.0 confirmed that adequate capacity exists and confirms this configuration will not cause adverse impacts to the existing Storm Drain systems.
- ATC 68.0 is anticipated to positively impact the Project with the elimination of the ROD's Onsite Outfall System including; a) elimination of approximately 5,500 LF of storm sewer, b). elimination of the underground CBC detention vault, c) elimination of the Onsite North Detention Pond, d) elimination of the north outfall at the South Platte River, and e) elimination of the 60 inch sanitary sewer relocation.
- Additional benefits of this ATC to the Project include; a) the elimination of the acquisition of 2.153 acres of ROW and 2.083 acres of permanent easements required for the ROD's Onsite Outfall, b) elimination of impacts to Eaton Sales and G&K Services, c) reduction of construction related impacts to Elyria/Swansea neighborhoods or businesses, and d) elimination of a new outfall to the South Platte River.
- ATC 68.0 will reduce the temporary wetland impacts to OW-N_Culv_03 by 0.005 acres. ATC 68.0 will reduce the permanent riparian impacts at Rip_Culv03 by 0.002 acres and the temporary impacts by 0.012 acres.
- ATC 68.0 will eliminate Project construction activities in one affected Solid Waste Landfill location.
- ATC 68.0 eliminates the temporary impacts on the South Platte River Greenway, a Section 6(f) resource.

Figure 7 - ATC 68.0 On-Site Storm Sewer

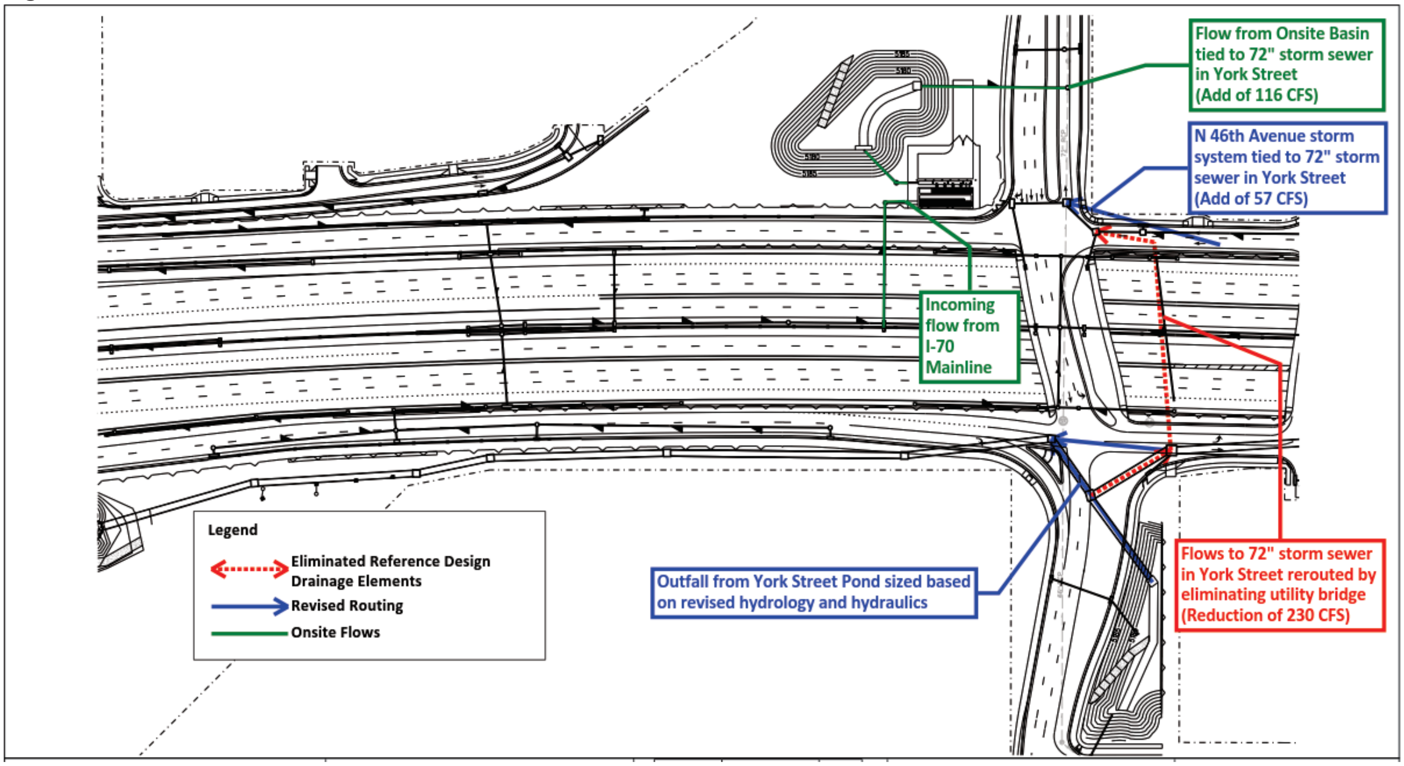


Figure 7.1 – ATC 68.0 On-Site Storm Sewer (replaces the On-Site Storm Sewer Outfall System)

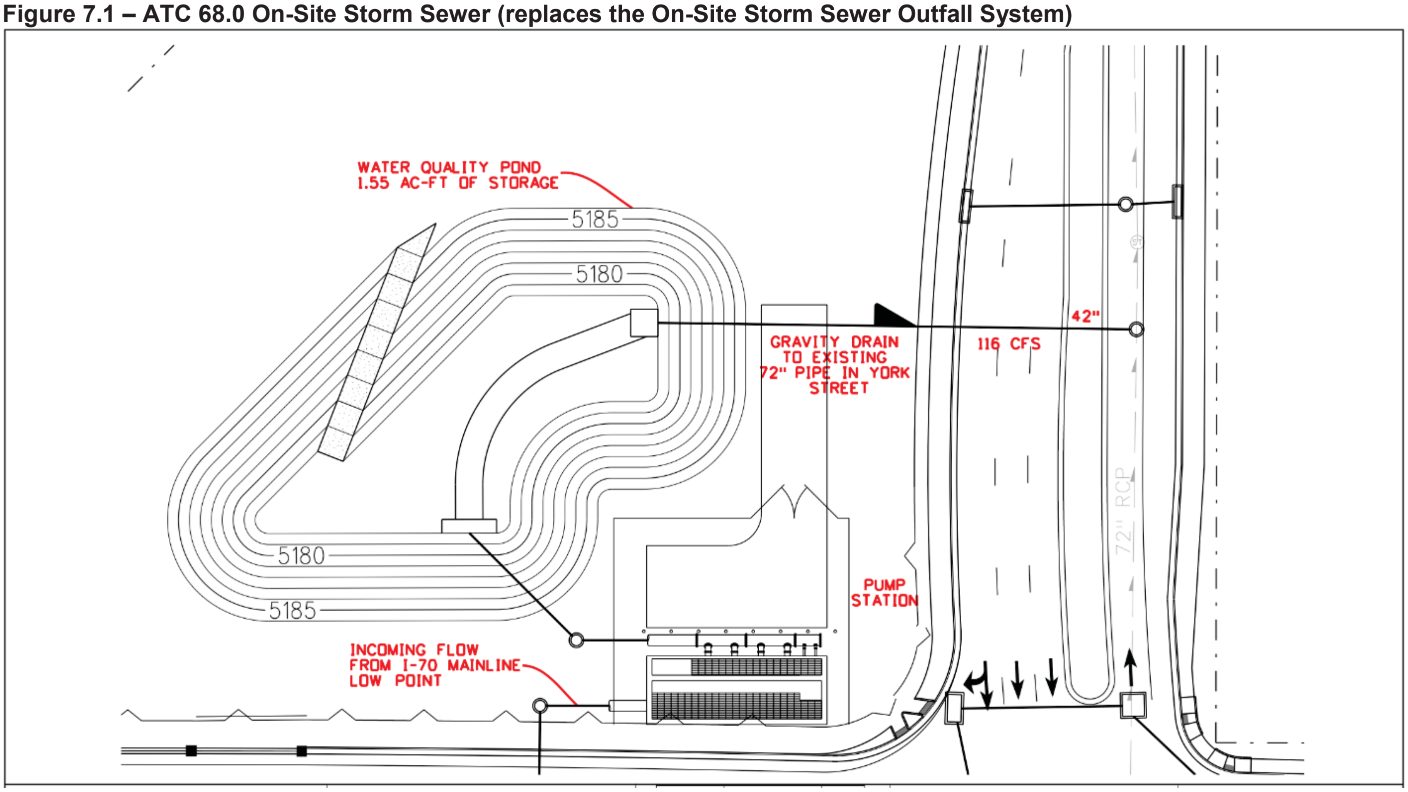


Figure 7.2 ATC 68.0 avoids the right-of-way, ground disturbance, and temporary traffic impacts in the ROD by eliminating the route for the On-Site Storm Sewer that was included in the ROD

= Area of reduced ROW and reduced ground disturbance

REGULATORY CHANGES:

Document changes to laws, regulations, and/or guidelines:

There have been no applicable changes to laws, regulations, and/or guidelines since the completion of the ROD.

IMPACTS ASSESSMENT:

For items checked as changed above: assess the affected natural and socio-economic environment, impacts and new issues/concerns which may now exist:

Air Quality

The air quality analysis for NEPA involved the analysis of impacts at the most congested I-70 interchanges at I-25 and I-225. The changes proposed for the mainline I-70 do not impact the I-25 or I-225 interchanges, so there would be no change to the conclusions presented in the ROD. Likewise, these changes would not impact the findings of the mobile source air toxics analysis for the project area presented in the ROD, because roadway elevation and grade are not inputs to that analysis. The changes in the roadway do not require a new conformity determination. 40 CFR 93.104(d) requires a redetermination of conformity if there is a significant change to the project's design concept and scope. Design concept and design scope are defined in 40 CFR 93.101. The proposed changes do not constitute a significant change in project design concept and scope under the conformity regulations 40 CFR 93.101 and 93.104(d) so a new conformity determination is not necessary.

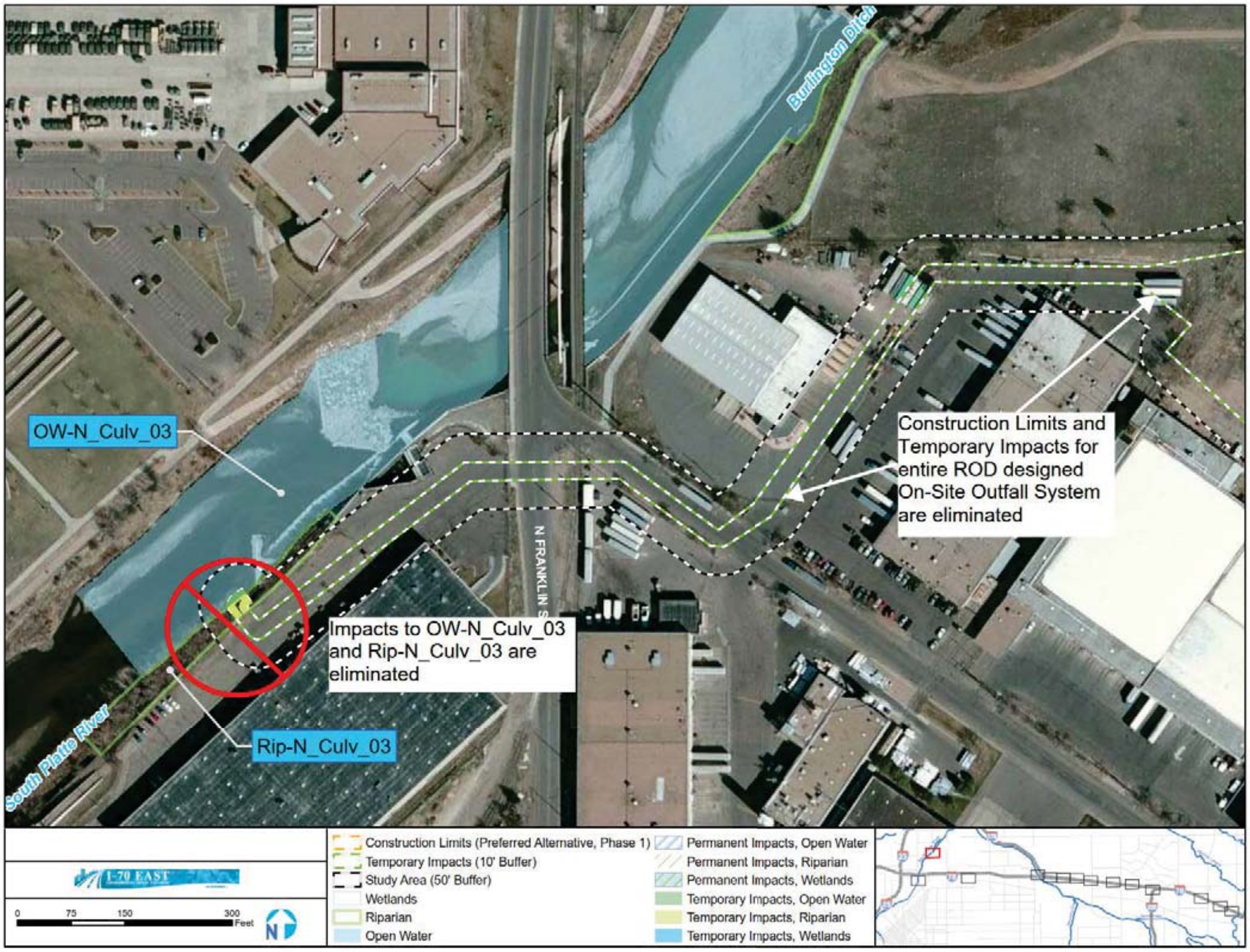
Wetlands/Waters of U.S.

Temporary impacts of 0.005 acres to OW-N_Culv_03 previously identified in the 2017 Wetland Findings Update are eliminated with changes based on ATC 68.0. See **Figure 8**.

Table 1 Updated Impacts to wetlands or other waters of the U.S.

Wetland or Other Waters Feature ID	ROD Permanent Impact	Reevaluation #4 Permanent Impact	Difference in Permanent Impacts	ROD Temporary Impact	Reevaluation #4 Temporary Impact	Difference in Temporary Impacts
OW-N_Culv_03	___	___	___	0.005 acres.	0.000 acres.	-0.005 acres.

Figure 8 - Location where impacts are eliminated to OW-N_Culv_03 and Rip_N_Culv_03



Biological Resources

Because of the construction limit changes associated with ATCs 28.1 and 68.0, permanent direct impacts to wildlife habitat in riparian areas have decreased 0.005 acres from the 0.999 acres in riparian areas identified in the ROD.

The removal of the Onsite Outfall as part of ATC 68.0 results in the reduction of temporary impacts to riparian habitat by 0.012 acres and permanent impacts by 0.002 acres at Rip_N_Culv 03. See **Figure 8**.

Permanent impacts to riparian habitat due to the ATC 28.1 has decreased from 0.566 to 0.563 acres and temporary impacts have decreased from 0.074 to 0.072 acres. See **Figure 9.**

Figure 9 - ATC 28.1 Impacts to Riparian Area

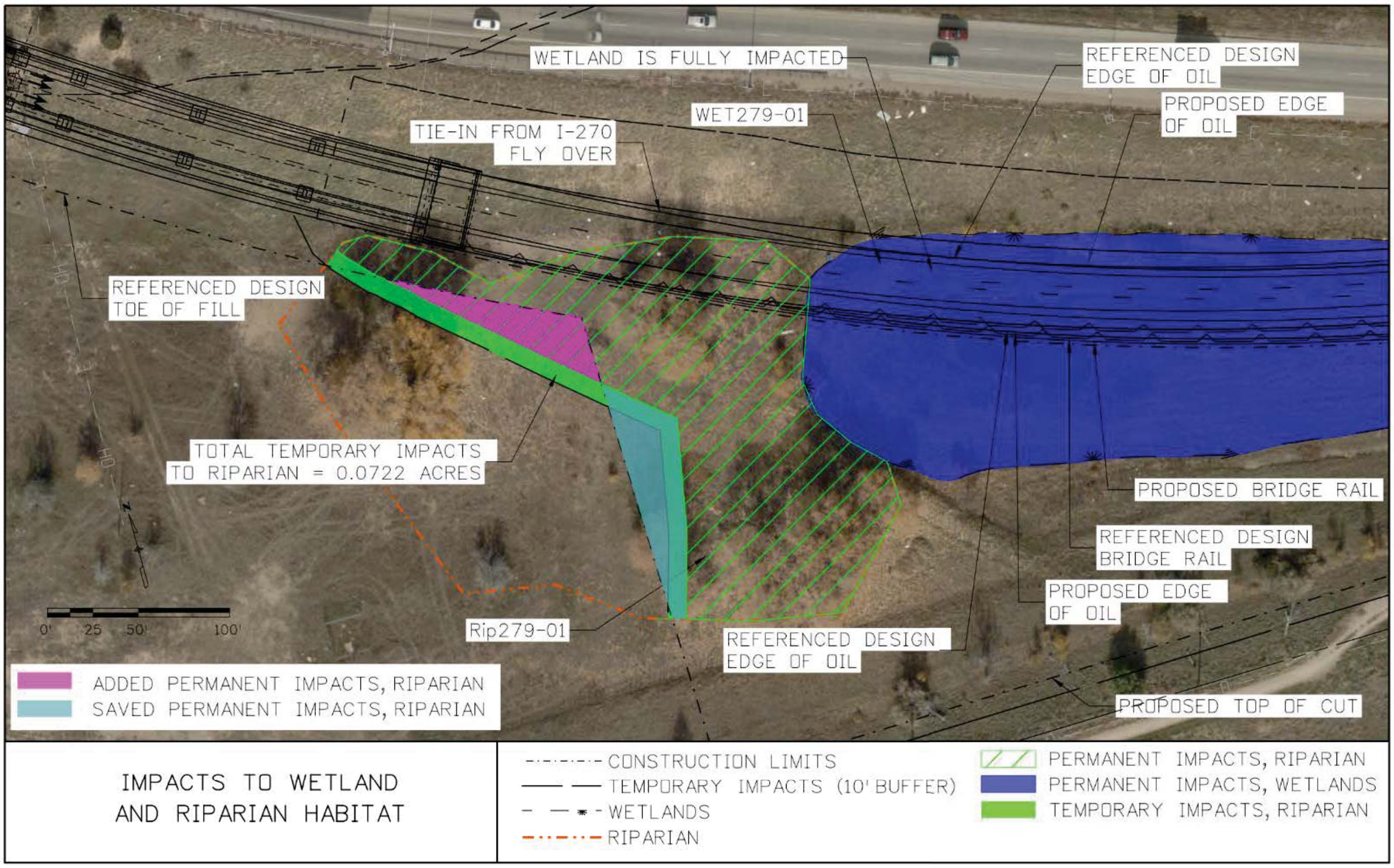


Table 2 Updated Impacts to riparian areas

Feature ID	ROD Permanent Impacts	Reevaluation #4 Permanent Impacts	Difference in Permanent Impacts	ROD Temporary Impacts	Revaluation #4 Temporary Impacts	Difference in Temporary Impacts
Rip_N_Culv03	0.002	0.000	-0.002 acres	0.012	0.000	-0.012 acres.
Rip_279-01	0.566	0.563	-0.003 acres	0.074	0.072	-0.002 acres.
Total	0.568	0.563	-0.005 acres	0.086	0.072	-0.014 acres

Threatened / Endangered Species

Two federally threatened plant species may occur in the riparian areas; the Ute ladies'-tresses orchid and the Colorado butterfly plant. Informal consultation, including a review of potentially suitable habitat in the project area has resulted in a "may affect, but not likely to adversely affect" determination on June 18, 2018 (**Attachment 3**). The determination is based on a conservative interpretation of where these species can potentially occur. As a mitigation measure, botanical surveys of riparian and wetland habitat in project impact areas at Sand Creek will be conducted by a qualified biologist during the appropriate summer months (when the plants are blooming) prior to the initiation of construction. If either species is identified, formal consultation will be completed with the USFWS prior to construction.

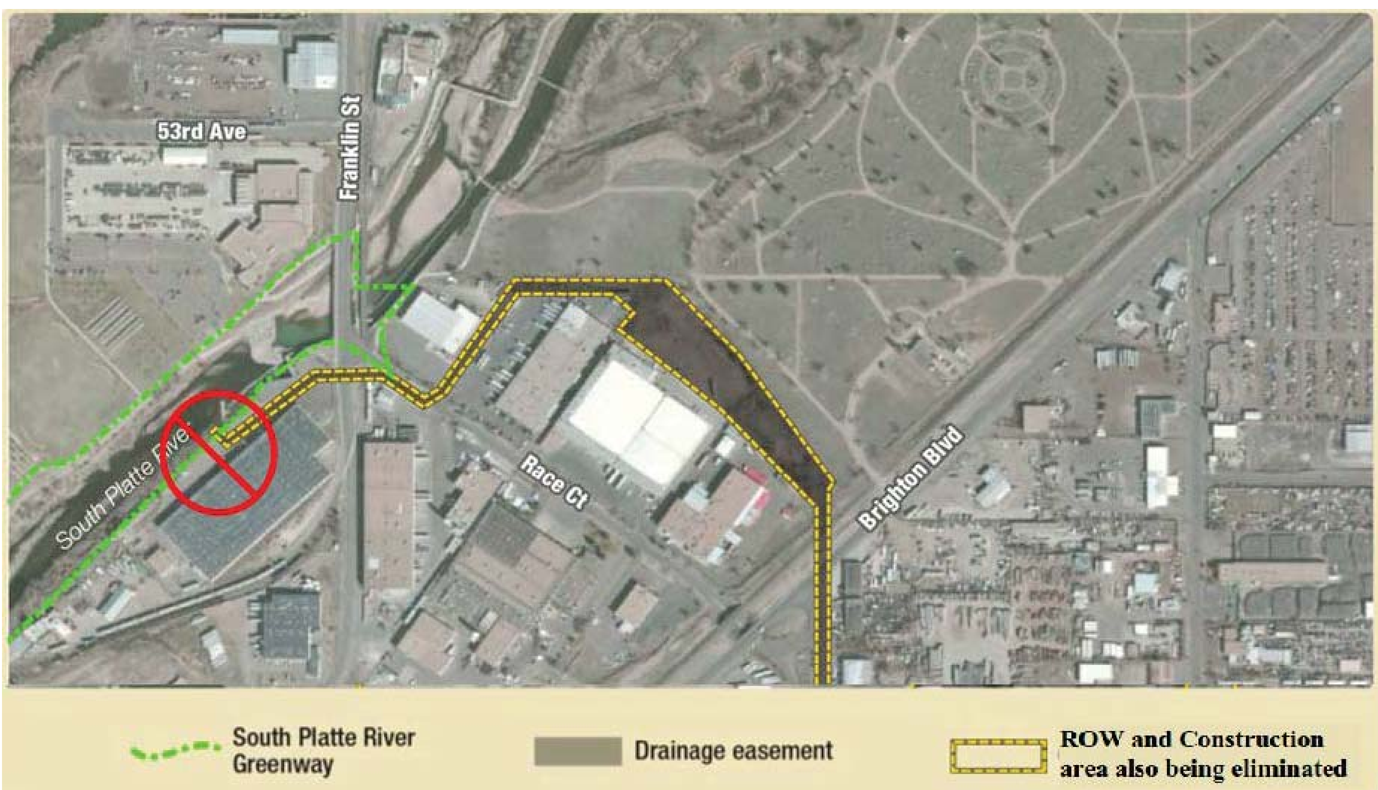
Residential/Business Right-of-Way Impacts

The elimination of the ROD's Onsite Outfall System and redesign using project Right-of-Way and existing drainage systems described in ATC 68.0 allows for removing 2.153 acres of Right-of-Way and 2.083 acres of Permanent Easements. See **Figure 7.2.**

Section 6(f)

The elimination of the ROD's Onsite Outfall System and redesign using project Right-of-Way and existing drainage systems described in ATC 68.0 eliminates the temporary impacts on the South Platte River Greenway, a Section 6(f) resource. See **Figure 10**.

Figure 10 - Location of eliminated impact on South Platte River Greenway (6(f) resource)



Noise

The new vertical profile through the lowered section, the result of ATCs 11.2, 12.2, 14.2, and 18.1, was evaluated in the attached preliminary noise technical report (**Attachment 2**).

The FEIS Noise Technical Report found that barriers between 10 to 20 feet are both reasonable and feasible and should be advanced for study during final design. The ROD Updates to Noise Technical Report found that barriers from 12 to 20 foot tall in the Elyria neighborhood, one on the edge of shoulder from the railroad overpass to the end of the WB off-ramp to Brighton Boulevard and one on the edge of the shoulder (EOS) on the bridge over Brighton Boulevard are both feasible and reasonable. The ROD recommended the average wall height of 16 foot. As part of the final design it is required that the proposed barriers are evaluated following an optimization analysis. The optimization process involves analyzing a change in heights of different barrier sections to determine the optimum perturbed height of the recommended noise barrier.

The optimization process determined that a 10 to 20-foot barrier on the mainline edge of shoulder from the railroad overpass to the end of the WB off-ramp to Brighton Boulevard, with 6 to 7-foot barrier on the edge of shoulder on the bridge over Brighton Boulevard, provided the required noise reduction. The optimized barrier would benefit 57 receptors, 33 of the receptors would experience a seven dB of noise reduction or greater. With the raised profile and proposed mitigation, 45 of the 66 modeled locations have lower predicted noise levels with the optimized barrier than the ROD recommended barrier. Eight of 66 modeled locations have an increase from 1-4 dBA. The increase in noise is primarily closer to York Street, where further noise reduction is not feasible because of the gap caused by the York Street and railroad openings. Although noise levels change, and some additional receptors are impacted, mitigation remains the same as described in the ROD based on CDOT's 2015 Noise Analysis and Abatement Guidelines and completion of the Noise Abatement Determination Worksheets for reasonableness and feasibility.

The residents and property owners who would benefit from the proposed abatement will be surveyed to determine whether the noise abatement measure is wanted.

In the Swansea neighborhood, with profile changes modeled the impacts change from the ROD slightly, but mitigation is still not reasonable and feasible. See Attachment #2 for details. North of I-70, of the 66 modeled locations 19 locations have a greater than 1 dBA reduction and 6 locations increase 1-4 dBA. South of I-70, eight of 87 modeled locations decrease greater than 1 dBA and 27 increase between 1-4 dBA compared to the ROD noise levels. There are only two additional modeled locations impacted exceeding the noise abatement criteria.

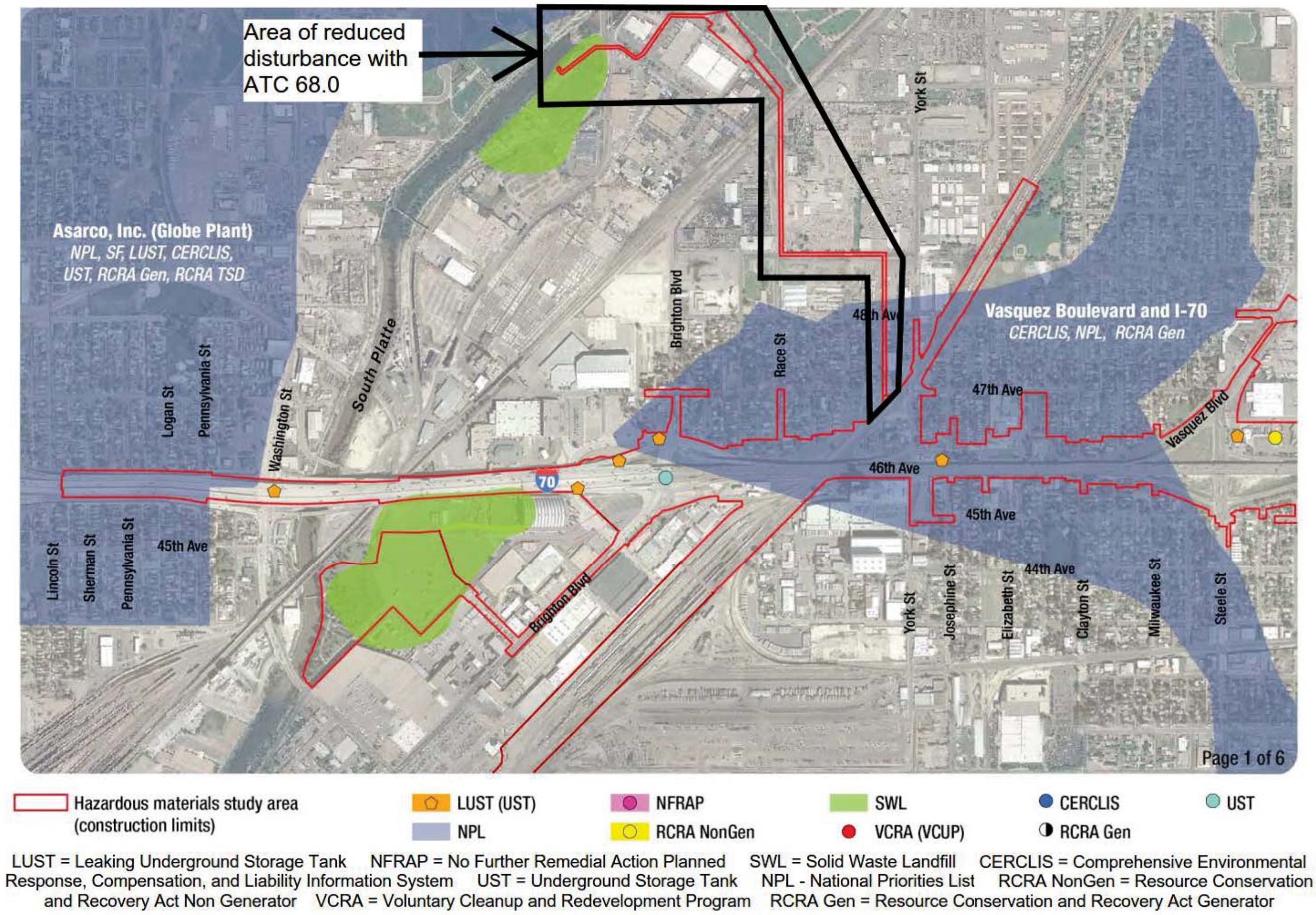
Hazardous Materials

ATC 68, resulted in approximately 6 less acres of disturbance than the ROD as shown in **Table 3** (Also see **Figure 7.2** and **Figure 11**), within the Vasquez and I-70 National Priorities List (NPL) site, Operable Unit 1 (OU1). The NPL site was listed due to metals contamination associated with historic smelter operations and the OU1 area was the subject of an EPA 2003 Record of Decision detailing residential soils contamination and EPA's cleanup decision. There is also a subarea identified as CERCLIS and RCRA Generator through which approximately 900 linear feet of excavation, an average of 40 feet deep, are avoided due to ATC 68.

Table 3 Updated Hazardous Materials Sites Affected and Area of Ground Disturbance

	Reevaluation #3 Impacts	Reevaluation #4 Impacts	Difference in Impacts
Number of sites affected	34	33	-1
Acres disturbed	777	771	-6 acres.

Figure 11 - Location of reduced area of disturbance and reduction in hazardous site by eliminating ROD designed onsite outfall system



MITIGATION:

All mitigation commitment(s) from NEPA document remain the same (discuss status and compliance):

☒ Mitigation measures remain the same as documented in the ROD for all resources

☐ Mitigation commitment(s) have changed from NEPA document.

V. Public/Agency Involvement (optional)

If any, document public meetings, notices, & websites, and/or document agency coordination. For each provide dates, and coordination, where applicable:

VI. Additional Studies Required for Proposed Action

VII. Additional Requirements for Proposed Action

- ☐ An SEIS is required, because the changes to the proposed action will result in significant impacts not evaluated in the EIS.
- ☐ An SEIS is required, because new information or circumstances will result in significant environmental impacts not evaluated in the EIS.
- ☐ A revised ROD is required, because an alternative is recommended that was fully evaluated in an approved FEIS but was not identified as the preferred alternative.
- ☐ Appropriate environmental study or an EA is required, because the significance of new impacts is uncertain.
- ☐ A revised FONSI is required, because an alternative is recommended that was fully evaluated in an approved EA but was not identified as the preferred alternative.
- ☐ Other____________________________________
- ☒ None

VIII. Permits Updated (optional)

This section is only required when the next stage of a project is going to construction.
List permits:

IX. Attachments Listed

List permits, studies, background data, etc.

Attachment 1 – Additional Alternative Technical Concepts
Attachment 2 - Preliminary Noise Technical Report
Attachment 3 – Section 7 Consultation

Kiewit meridiam PARTNERS

Attachment #1

Additional Alternative Technical Concepts

ATC Number	Description	Environmental Resources Impacted	Justification for why ATC not included in Form # 1399
8.1	Modify the roadway embankments material requirements to include onsite native soils even though this material may have a resistance value (R-value) of less than 20.	None	ATC 8.1 allows for use of native, on-site materials for part of the roadway fill. The construction activities and environmental impacts are the same or reduced from the ROD design. Hazardous Materials concerns and addressed with the required Materials Management Plan. It provides standards for handling of native soils, and in conjunction with the Sampling and Analysis Plan, includes characterization and classification of Recognized Hazardous Materials.
9.1	Replace the requirement for an Independent Quality Control Firm (IQCF) with internal resources, supplemented as necessary with third party firms, to self-perform the IQC activities.	None	ATC 9.1 is a modification of the design QC process with no physical changes to ground disturbance, construction activities or construction limits. There will be no impacts to the environmental resources or required mitigation.
17.1	Reconfigure the temporary track work (shoeflies) so that the new UPRR Grade Separation Structure and Service Road Bridge can be constructed in two phases without active tracks on both sides of the construction zone.	None	No change to area of ground disturbance or construction limits. Modifies temporary work phasing only, final configuration has not changed, and there will be no additional or new resource impacts over and above the resource impacts evaluated in the ROD .
30.1	Modify CDOT's B-504 Structural Worksheets, with the modifications applicable to MSE walls. Customize the worksheet MSE wall structure details to the conditions found on the Project.	None	This ATC entails engineering and materials design modifications only and will not affect the location or placement of MSE walls identified in the Reference Design. All improvements remain within the same construction limits with no additional area of ground disturbance. There will be no additional resource impacts over and above the resource impacts evaluated in the ROD

ATC Number	Description	Environmental Resources Impacted	Justification for why ATC not included in Form # 1399
31.1	Apply Practical Design through the use of prudent engineering in the selection of pavement type transitions and to establish the limits of both hot mix asphalt (HMA) and Portland cement concrete pavement (PCCP) along the I-70 mainline.	None	This ATC entails the application of Best Management Practices and Practical Design for pavement type and mix selection. This ATC will not adversely affect any environmental resources identified in the FEIS/ROD.
33.1	Consider all available techniques for the remediation of the existing pavement, including localized repairs, diamond grinding, and overlay on a lane-by-lane basis between Sand Creek and Chambers Rd.	None	This ATC entails the application of Best Management Practice for the remediation and maintenance of existing pavement and will not adversely affect any environmental resources identified in the FEIS/ROD. All improvements remain within the same construction limits and there will be no additional or new resource impacts over and above the resource impacts evaluated in the ROD. BMPs for construction water quality and air quality are identified in the mitigation measures and will be applied.
37.2	Provide emergency power for the cover with an uninterruptable power supply (UPS) and an on-site, stand-alone generator.	None	This ATC will not adversely affect any environmental resources identified in the FEIS/ROD as the emergency power source will be located within the construction limits and will not create any new or additional ground disturbance activities.
38	Use non-standard precast pre-tensioned concrete girders for highway bridges on the project.	None	This ATC entails only the modifications to specifications for the type of concrete girders for the project but not to the physical location or alignment of any highway bridges on the project. This ATC will not adversely affect any environmental resources identified in the FEIS/ROD.

ATC Number	Description	Environmental Resources Impacted	Justification for why ATC not included in Form # 1399
42	Use AASHTO Load and Resistance Factor Design Bridge Design Specifications (LRFD) in place of the CDOT Bridge Design Manual (BDM) for bridge deck overhang dimension criteria.	None	This ATC involves only changes to bridge design procedures and specifications and will not change the physical location or alignment of any bridges on the project. This ATC will not adversely affect any environmental resources identified in the FEIS/ROD.
43	Reconstruct with a high-performance pavement design alternative at select locations along the project from Colorado Blvd. to Sand Creek Bridge. The alternative reconstruction method utilizes the strength and stability of the existing pavement, augmenting with additional pavement structure to provide equal or better performance compared to full reconstruction (removal and replacement).	None	This ATC entails an alternative design to enhance the performance of the pavement to be reconstructed at selected locations on the project while reducing the construction impacts. It will not change any physical pavement locations, the work will occur within the ROD defined construction limits, and will it not adversely affect any environmental resources identified in the FEIS/ROD
47	Reuse existing drainage infrastructure that are functional, in good condition, have adequate remaining design life, and meet all design criteria including cross drains, storm drains, inlets, manholes, headwalls and wingwalls, riprap, embankment protectors, detention pond features, and other appurtenances.	None	This ATC is aimed at the reuse or recycling of existing drainage infrastructure and appurtenances and would not involve the design or installation of any drainage infrastructure in new or different physical locations. The number and location of the drainage infrastructure is undetermined, but any identified will reduce the amount of excavation and construction impacts. This ATC will not adversely affect any environmental resources identified in the FEIS/ROD.
56	Consideration of nonmetallic phenolic fiberglass or galvanized rigid steel for the Cable Management Systems (CMS) in place of stainless steel inside the bores of the Cover. Stainless is still required for the first 24 feet of the entering lanes.	None	This ATC involves only the consideration of modifying the type of materials used in the (CMS). This ATC will not adversely affect any environmental resources identified in the FEIS/ROD.

ATC Number	Description	Environmental Resources Impacted	Justification for why ATC not included in Form # 1399
57	Modify the local roadway closure restrictions to allow concurrent closures of Columbine and Clayton streets with no adverse impacts to north-south connectivity, RTD Bus Routes, or Swansea Elementary School.	None	Construction phasing related - Changes phasing only and still meets the requirements for local and school access. This ATC does not adversely affect any environmental resources identified in the FEIS/ROD, including Environmental Justice populations. North-south access is maintained and the construction duration is reduced.
58	Clarify the minimum vertical clearance requirements for all overhead signs, including electronic signs and ITS devices, along the I-70 Mainline at 17.5 ft. This will allow for a reduction in sign post size and drilled shafts.	None	This ATC involves the clarification of conflicting design requirements related to vertical sign clearance. The overhead signs will still be in the same location and no additional area of ground disturbance or excavation is required. There is no additional affect to any environmental resources identified in the FEIS/ROD.
62	Remove the prescribed requirement for the use of “Acryli-Master” anti-graffiti coating on all concrete surfaces. and rely solely on the performance requirements of Appendix A-1 to Schedule 11 for graffiti removal.	None	This ATC involves changing the requirement for a specific anti-graffiti coating to using the performance requirements specified in the PA. There will be no physical changes to any structure or surface locations on the project and there will be no adverse affects to any environmental resources identified in the FEIS/ROD resulting from this ATC.

REEVALUATION #4

Kiewit meridiam PARTNERS

Attachment #2

Preliminary Noise Technical Report

CO CDOT

ENVIRONMENTAL *April , 2018*

Kiewit meridiam PARTNERS

Central 70 Project

Preliminary Noise Technical Report

CDOT

Central 70 Project,

I-70 East from I-25 to Tower Road, Denver Colorado

Preliminary Noise Technical Report

Prepared for:
Colorado Department of Transportation
Federal Highway Administration

Prepared by:

WSP

April, 2018

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1.1 INTRODUCTION/BACKGROUND

This Noise Technical Report documents a noise analysis and study conducted in support of final design for the Central 70 Project (the Project), I-70 between I-25 and Chambers Road. A traffic noise analysis is required for the Project because it includes the addition of through-travel lanes by new construction on an existing highway, meeting the definition of a Type I Project.

The intent of this Noise Technical Report is to reevaluate the build noise environment based on the final design in the same locations of the analysis that were included in the I-70 East Final Environmental Impact Statement (**FEIS**) and the Record of Decision (**ROD**). These locations include the neighborhoods of Globeville, Elryia, Swansea, Northeast Park Hill, Stapleton, Montbello, and Gateway. This report will also optimize the design of the proposed noise mitigation and address the design changes made after the ROD release.

1.2 HISTORY

The FHWA and CDOT issued the FEIS on January 15, 2016. On January 19, 2017, the FHWA issued the ROD for Phase 1 of the Partial Cover Lowered Alternative, also known as the Central 70 project. The Project was contracted as a design, build, finance, operate and maintain project.

1.3 STUDY AREA

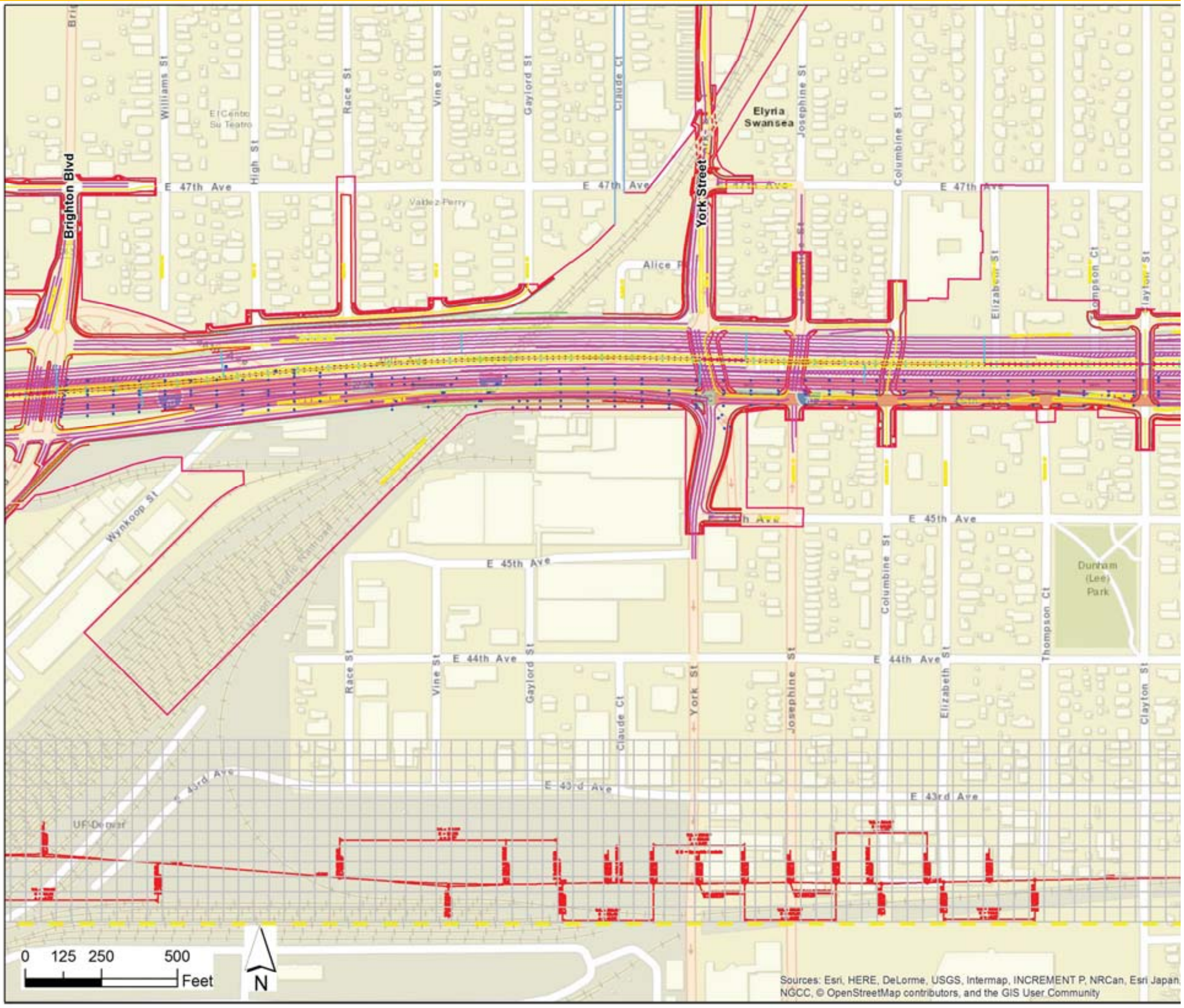
The project limits extend along I-70 between I-25 and Chambers Road. The project area encompasses parts of the City and County of Denver, the cities of Commerce City and Aurora and Adams County. The area includes the neighborhoods of Globeville, Elryia, Swansea, Northeast Park Hill, Stapleton, Montbello, and Gateway.

The roadway design in the neighborhoods of Globeville, Northeast Park Hill, Stapleton, Montbello and Gateway have not been changed vertically or horizontally from the design used to model the noise levels in the FEIS and the ROD. The noise levels, noise impacts, and proposed mitigation remains the same as those reported in the FEIS and the ROD. This report also addresses design changes proposed to the I-70 corridor through the Elyria and Swansea neighborhoods since the ROD was approved. **Figure 1** depicts the reevaluation area. No other design changes are currently being considered for the project. **Appendix C** contains the profiles from the FEIS/ROD design and the profiles from the current design in this area.

1.4 PURPOSE FOR PRELIMINARY NOISE TECHNICAL REPORT

The intent of this Noise Technical Report is to reevaluate the build noise environment for the Project due to design changes and to optimize the proposed noise mitigation committed to in the ROD.

Figure 1. Central 70 Reevaluation Due to Design Changes



Source: WSP 2017.

2 Noise regulations and impact criteria

2.0 FEDERAL REGULATIONS

Applicable noise regulations and guidelines provide a basis for evaluating potential noise impacts. For highway transportation projects with FHWA involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. **Table 1** shows the federal NAC and the CDOT NAC.

2.1 IMPACT CRITERIA

The noise regulations govern noise prediction requirements, noise analysis, noise abatement criteria (NAC), and requirements for informing local officials. The NAC are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). Noise levels for undeveloped or vacant lands (e.g., NAC G) are predicted to aid local agencies, such as the City and County of Denver and Adams County, in their planning efforts. For example, the data in this report could be used to assist planning agencies in developing code to prohibit noise-sensitive land use development near major sources of noise.

For perspective on the actual and predicted highway noise levels, **Table A-1** in **Appendix A**. compares transportation-related noise levels to other common activities.

2.2 CDOT NOISE POLICY

CDOT implements FHWA noise regulations in the State of Colorado in accordance with the CDOT Noise Analysis and Abatement Guidelines (CDOT 2015). This analysis follows the CDOT guidelines. Per the guidelines, a noise impact occurs when the future noise level for one or more build Alternative results in a substantial increase in the noise level (defined as a 10-dBA or more increase over the existing noise levels) or when the future noise level for the build alternative exceeds the noise abatement approach criteria (NAC). CDOT noise policy defines the NAC as 1 dBA less than the FHWA NAC. **Table 1** shows the federal NAC and the CDOT NAC.

Table 1. FHWA Noise Abatement Criteria - CDOT Noise Abatement Criteria Hourly A-Weighted Sound Level Decibels (DBA)

	Activity Criteria[a] $L_{eq(h)}$			
Activity Category	**FHWA NAC[b]**	**CDOT NAC[c]**	**Evaluation Location**	**Activity Description**
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[d]	67	66	Exterior	Residential
C[d]	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or non-profit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	51	Interior	Auditoriums, campgrounds, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or non-profit institutional structures, radio studios, recording studios, schools, and television studios.
E[d]	72	71	Exterior	Hotels, offices, restaurants/bars, and other develop lands, properties, or activities not included in A through D or F.
F	_	_	_	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	_	_	_	Undeveloped lands that are not permitted.

[a] The $L_{eq(h)}$ Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.
[b] Federal Highway Administration noise abatement criteria
[c] Colorado Department of Transportation noise abatement approach criteria
[d] Includes undeveloped lands permitted for this activity category

3 Methodology

3.0 TRAFFIC NOISE

This Noise Technical Report documents a noise analysis and study conducted in support of final design for the Project. This analysis serves to document and evaluate the project noise levels with the current design and comparing them to ROD to identify any areas where changes are recommended in the analysis or the results provided in previous documentation. The ROD noise analysis was the most recent noise analysis conducted in project study area. The two studies are appropriate comparisons because the ROD only included this project's highway improvements and the traffic noise analysis conformed with CDOT's 2015 revised Noise Analysis and Abatement Guidelines (CDOT 2015).

The Traffic Noise Model (TNM) Version 2.5 computer model was used to assess the noise levels using the following general methodology. Traffic noise models from the ROD were modified to match the new roadway design and were used to predict hourly equivalent sound level ($L_{eq(h)}$) traffic noise levels. No changes were made to any receptors or to those structures of appurtenances that create existing shielding in the area. Traffic volumes were not changed from the modeling used in the ROD.

No additional field measurements were performed for this analysis. For information regarding field monitoring and site validation used in this study, refer to the FEIS and the ROD.

All modeled locations included in this noise study were placed at outdoor use locations of residences.

4 Comparison to Noise Impacts and Mitigation in FEIS and ROD

The western end of the ROD TNM incorporates reconstruction of the roadway from an existing elevated viaduct to a depressed section about 30 feet below existing grade. In CDOT's base design, the roadway surface of the depressed roadway is below the water table. Being below the water table presents undesirable conditions for long term pavement maintenance, therefore options were evaluated to raise the roadway profile. Currently the roadway design profile from west of the UPRR bridge to east of Josephine Street has been raised approximately 4 to 14 feet from CDOT's design. Although the changed profile remains depressed 25 feet, this review was performed to confirm that predicted noise levels are not creating higher than expected noise levels.

4.1 CHANGE IN RESOURCE BASE SINCE FEIS/ROD

No noticeable changes are present in land uses located near the Project area as compared to land uses described in the FEIS or ROD. Land use in the area primarily consists of a mix of single-family and multi-family residential developments, commercial business districts, and undeveloped vacant land. Additional details describing area land use are provided in the FEIS. Noise levels at receptors vary depending on their proximity to I-70 and by localized shielding provided by topography and nearby structures.

Pursuant to *CDOT Noise Analysis and Abatement Guidelines,* if building permits have been submitted and are on the books for undeveloped properties, the proposed development will be included in the noise study.

4.1 EXISTING NOISE CONDITIONS

Three existing noise barriers are located along the I-70 Project area. The FEIS and the ROD specified that the existing noise walls should remain, and that replacing them with longer or higher barriers was not recommended to be feasible or reasonable.

Existing conditions traffic noise levels from the FEIS and ROD can be found in **Appendix B**. This report compares the build noise levels and proposed mitigation from the ROD to the modeling conducted with the current design.

4.2 FUTURE NOISE CONDITIONS

Future year 2035 traffic noise levels were developed using TNM files from the ROD. TNM files were updated for the Project to incorporate the project design and any changes related to development and shielding as described in the Methodology Section of this report (Section 3). The Build Alternative noise levels along the proposed roadway improvements would be dependent upon the distance and shielding conditions present, as well as changes to the roadway design and geometry.

The roadway design in the neighborhoods of Globeville, Northeast Park Hill, Stapleton, Montbello and Gateway have not been changed vertically or horizontally from the design used to model the noise levels in the FEIS. The noise levels, noise impacts, and proposed mitigation remains the same as those reported in the FEIS and the ROD and are included in **Appendix B**.

The TNM 2.5 noise models used to predict the noise level for the ROD were used to analyze the design change impacts on noise levels. The TNM points were overlaid on the modified design and the TNM elevations were revised to match the current design, in both the TNM files without mitigation and with proposed mitigation. The future year 2035 traffic noise model included 221 modeled receptors.

Table 2 and **Figure 2** and **Figure 3** show the results of the redesigned TNM model compared to the TNM modeling completed in the ROD. Overall, with the new design, the change in noise levels range from 4.7 dBA lower to 3.9 dBA higher than the ROD modeling. The areas where the noise levels increased the highest are located near the York Street Interchange.

No new issues or circumstances related to the noise environment or the noise study area have been identified during the time between completion of the ROD and this noise study.

Table 2. Predicted Future Traffic Noise Levels ROD and with Current Design (December, 2017)

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
1	1	66/B	64.3	64.0	-0.3
2	2	66/B	65.4	65.1	-0.3
3	1	66/B	65.6	65.3	-0.3
4	1	66/B	67.1	66.8	-0.3
5	1	66/B	68.4	68.0	-0.4
6	1	66/B	63.3	63.1	-0.2
7	1	66/B	63.9	63.6	-0.3
8	2	66/B	67.3	66.6	-0.7
9	1	66/B	65.7	64.8	-0.9
10	2	66/B	69.0	68.2	-0.8
11	2	66/B	68.6	67.8	-0.8
12	1	66/B	67.9	66.8	-1.1
13	2	66/B	65.1	64.4	-0.7
14	3	66/B	66.6	65.9	-0.7
15	2	66/B	68.2	67.4	-0.8
16	1	66/B	64.0	63.5	-0.5
17	2	66/B	69.9	69.0	-0.9
18	1	66/B	63.7	63.1	-0.6
19	1	66/B	65.7	64.7	-1.0
20	2	66/B	75.8	74.2	-1.6
21	4	66/B	68.3	66.6	-1.7
22	2	66/B	69.9	68.2	-1.7
23	1	66/B	62.8	62.1	-0.7
24	3	66/B	72.5	71.6	-0.9
25	1	66/B	64.6	63.9	-0.7
26	2	66/B	65.7	65.1	-0.6
27	3	66/B	67.9	67.1	-0.8
28	2	66/B	63.0	63.0	0.0

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
29	1	66/B	62.9	62.5	-0.4
30	1	66/B	69.5	69.1	-0.4
31	2	66/B	64.7	64.8	0.1
32	3	66/B	74.9	74.5	-0.4
33	3	66/B	68.2	68.0	-0.2
34	2	66/B	69.3	69.2	-0.1
35	2	66/B	63.7	64.0	0.3
36	4	66/B	66.4	66.4	0.0
37	3	66/B	74.5	74.2	-0.3
38	2	66/B	62.1	62.1	0.0
39	2	66/B	61.3	61.7	0.4
40	2	66/B	65.5	65.0	-0.5
41	1	66/B	61.2	61.3	0.1
42	4	66/B	70.6	69.5	-1.1
43	2	66/B	63.0	62.7	-0.3
44	3	66/B	65.9	65.4	-0.5
45	3	66/B	71.7	71.4	-0.3
46	3	66/B	63.2	63.0	-0.2
47	2	66/B	60.5	60.8	0.3
48	2	66/B	59.7	60.3	0.6
49	2	66/B	69.2	70.2	1.0
50	1	66/B	63.8	67.3	3.5
51	2	66/B	62.5	62.8	0.3
52	1	66/B	61.1	61.1	0.0
53	2	66/B	66.7	68.3	1.6
54	4	66/B	63.5	64.1	0.6
55	4	66/B	61.1	61.3	0.2
56	2	66/B	59.7	60.5	0.8
57	2	66/B & C	60.6	62.8	2.2

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
58	2	66/B	67.7	68.1	0.4
59	3	66/B	62.9	64.8	1.9
60	1	66/B	64.6	66.3	1.7
61	2	66/B	65.1	65.9	0.8
62	1	66/B	63.5	64.4	0.9
63	1	66/B	60.8	62.3	1.5
64	2	66/B	60.1	61.5	1.4
65	1	66/B	62.1	62.1	0.0
66	1	66/B	61.8	61.8	0.0
67	1	66/B	69.6	70.3	0.7
68	3	66/B	66.5	66.8	0.3
69	2	66/B	64.6	65.0	0.4
70	2	66/B	62.9	63.3	0.4
71	3	66/B	62.0	61.7	-0.3
72	2	66/B	62.9	60.9	-2.0
73	1	66/B	59.8	59.7	-0.1
74	1	66/B	64.6	65.0	0.4
75	2	66/B	64.7	65.1	0.4
76	3	66/B	61.0	61.2	0.2
77	2	66/B	57.6	57.2	-0.4
78	3	66/B	62.4	62.8	0.4
79	3	66/B	69.2	69.1	-0.1
80	2	66/B	63.8	62.9	-0.9
81	2	66/B	60.8	60.1	-0.7
82	2	66/B	58.1	58.2	0.1
83	2	66/B	59.3	58.9	-0.4
84	1	66/B	57.0	57.4	0.4
85	2	66/B	70.5	71.4	0.9
86	3	66/B	64.8	64.1	-0.7

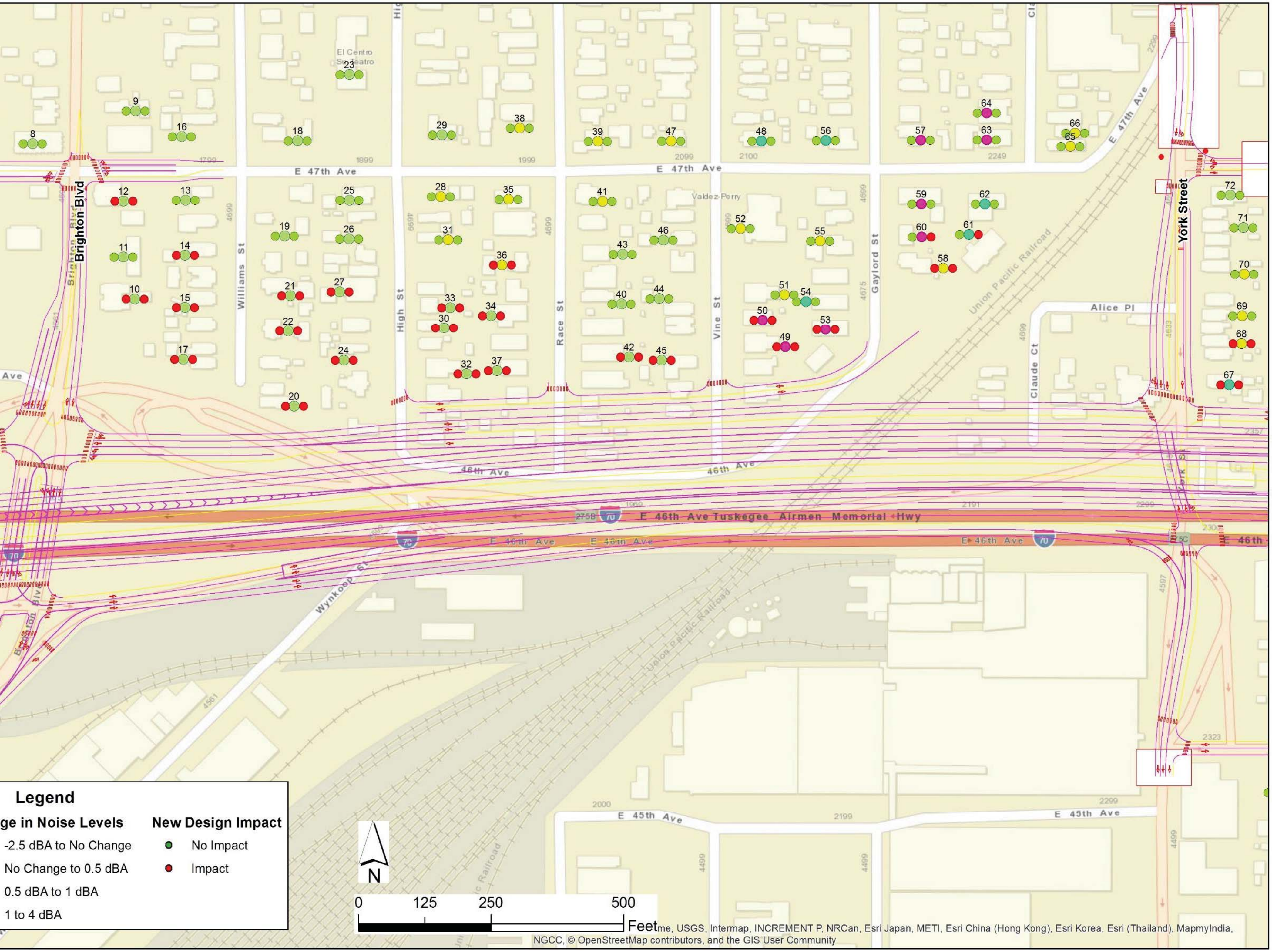
Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
87	2	66/B	60.5	59.5	-1.0
88	3	66/B	61.9	61.3	-0.6
89	2	66/B	58.9	58.3	-0.6
90	1	66/B	70.0	69.8	-0.2
91	1	66/B	52.4	53.0	0.6
92	1	66/B	64.9	64.9	0.0
93	1	66/B	54.3	54.2	-0.1
94	3	66/B	55.1	55.3	0.2
95	2	66/B	58.2	58.8	0.6
96	1	66/B	60.9	61.6	0.7
97	1	66/B	66.7	67.1	0.4
98	2	66/B	63.5	64.0	0.5
99	2	66/B	59.2	60.0	0.8
100	2	66/B	57.3	57.6	0.3
101	1	66/B	55.5	56.6	1.1
102	1	66/B	71.5	72.6	1.1
103	2	66/B	67.6	68.7	1.1
104	2	66/B	61.7	62.5	0.8
105	2	66/B	58.2	59.0	0.8
106	1	66/B	56.6	57.1	0.5
107	1	66/B	56.0	56.4	0.4
108	2	66/B	63.9	64.3	0.4
109	2	66/B	57.6	58.6	1.0
110	2	66/B	59.3	60.7	1.4
111	2	66/B	56.8	58.1	1.3
112	2	66/B	68.1	68.1	0.0
113	2	66/B	64.2	64.2	0.0
114	2	66/B	60.3	60.4	0.1
115	1	66/B	58.3	58.6	0.3

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
116	1	66/B	58.2	58.5	0.3
117	1	66/B	68.7	68.5	-0.2
118	2	66/B	65.3	65.1	-0.2
119	2	66/B	61.6	61.3	-0.3
120	2	66/B	58.4	58.9	0.5
121	1	66/B	57.4	57.8	0.4
122	2	66/B	69.9	69.5	-0.4
123	2	66/B	64.3	64.5	0.2
124	2	66/B	61.6	62.1	0.5
125	2	66/B	58.7	59.3	0.6
126	2	66/B	57.6	58.2	0.6
127	2	66/B	62.6	63.2	0.6
128	2	66/B	60.0	60.3	0.3
129	2	66/B	60.2	60.7	0.5
130	3	66/B	64.7	65.0	0.3
131	2	66/B	66.0	66.6	0.6
132	1	66/B	64.4	63.6	-0.8
133	1	66/B	63.6	61.1	-2.5
134	2	66/B	61.1	60.7	-0.4
135	1	66/B	60.5	60.0	-0.5
136	2	66/B	64.0	65.0	1.0
137	1	66/B	65.4	66.4	1.0
138	1	66/B	68.2	69.1	0.9
139	3	66/B	56.3	56.3	0.0
140	2	66/B	56.7	57.4	0.7
141	1	66/B	56.8	57.5	0.7
142	2	66/B	58.1	58.8	0.7
143	1	66/B	59.6	60.4	0.8
144	4	66/B	61.6	62.5	0.9

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
145	4	66/B	65.8	66.1	0.3
146	1	66/B	70.0	70.8	0.8
147	2	66/B	57.8	58.7	0.9
148	3	66/B	62.1	62.7	0.6
149	3	66/B	64.7	64.9	0.2
150	2	66/B	68.9	70.5	1.6
151	3	66/B	60.6	61.6	1.0
152	2	66/B	56.7	60.5	3.8
153	3	66/B	55.6	58.6	3.0
154	1	66/B	56.8	59.5	2.7
155	2	66/B	56.9	60.0	3.1
156	1	66/B	67.3	69.2	1.9
157	2	66/B	57.1	60.1	3.0
158	1	66/B	59.7	63.6	3.9
159	1	66/B	61.7	65.4	3.7
160	1	66/B	68.3	68.7	0.4
161	1	66/B	74.3	69.6	-4.7
162	1	66/B	60.0	62.9	2.9
163	2	66/B	61.9	65.0	3.1
164	1	66/B	66.3	68.4	2.1
165	1	66/B	56.1	57.4	1.3
166	1	66/B	57.7	59.3	1.6
167	3	66/B	60.0	62.2	2.2
168	2	66/B	62.7	64.1	1.4
169	2	66/B	70.5	73.4	2.9
170	2	66/B	66.9	69.2	2.3
171	1	66/B	58.8	60.2	1.4
172	1	66/B	57.9	59.4	1.5
173	2	66/B	61.6	62.1	0.5

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
174	2	66/B	63.5	64.1	0.6
175	2	66/B	65.4	66.1	0.7
176	2	66/B	58.4	59.2	0.8
177	4	66/B	68.0	69.4	1.4
178	1	66/B	60.1	60.5	0.4
179	2	66/B	57.9	58.8	0.9
180	2	66/B	62.8	63.0	0.2
181	2	66/B	66.1	66.7	0.6
182	1	66/B	58.0	58.6	0.6
183	2	66/B	68.4	69.3	0.9
184	1	66/B	57.5	57.9	0.4
185	1	66/B	61.3	61.7	0.4
186	2	66/B	59.5	59.8	0.3
187	5	66/B	64.6	65.5	0.9
188	2	66/B	70.4	71.2	0.8
189	2	66/B	58.0	58.9	0.9
190	3	66/B	62.5	63.6	1.1
191	1	66/B	59.4	60.5	1.1
192	1	66/B	73.1	74.4	1.3
193	2	66/B	67.7	68.5	0.8
194	2	66/B	63.6	64.1	0.5
195	2	66/B	58.7	59.1	0.4
196	2	66/B	60.3	61.1	0.8
197	2	66/B	57.6	58.2	0.6
198	2	66/B	58.6	59.4	0.8
199	1	66/B	66.5	67.1	0.6
200	2	66/B	60.7	60.6	-0.1
201	2	66/B	61.6	61.6	0.0
202	2	66/B	62.3	62.9	0.6
203	2	66/B	63.6	62.8	-0.8

Site Number	Dwellings per Site	CDOT NAC dBA $L_{eq(h)}$)/ Activity Category	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation ROD	2035 Build Traffic Noise Level dBA $L_{eq(h)}$ with Existing Mitigation with Current Design	Difference in Traffic Noise Level dBA $L_{eq(h)}$ from ROD to New Design
204	2	66/B	64.5	63.7	-0.8
205	2	66/B	65.6	64.9	-0.7
206	4	66/B	61.1	61.3	0.2
207	2	66/B	59.5	59.5	0.0
208	1	66/B	60.4	60.3	-0.1
209	3	66/B	62.2	62.2	0.0
210	1	66/B	64.2	64.5	0.3
211	2	66/B	59.0	59.4	0.4
212	2	66/B	60.0	60.4	0.4
213	1	66/B	63.4	64.0	0.6
214	2	66/B	60.2	60.5	0.3
215	1	66/B	60.7	60.9	0.2
216	3	66/B	63.7	64.2	0.5
217	2	66/B	59.4	59.8	0.4
218	2	66/B	58.5	58.9	0.4
219	1	66/B	65.6	66.4	0.8
220	1	66/B	62.5	63.2	0.7
221	1	66/B	64.9	64.8	-0.1



E 47th Ave
E 47th Ave
Brighton Blvd
Williams St
High St
Race St
Vine St
Gaylord St
Claude Ct
Alice Pl
York Street
Union Pacific Railroad
El Centro Su Teatro
Valdez-Perry
46th Ave
E 46th Ave Tuskegee Airmen Memorial Hwy
E 46th Ave
Wynkoop St
E 45th Ave
Legend
ge in Noise Levels
-2.5 dBA to No Change
No Change to 0.5 dBA
0.5 dBA to 1 dBA
1 to 4 dBA
New Design Impact
No Impact
Impact
N
0
125
250
500
Feet
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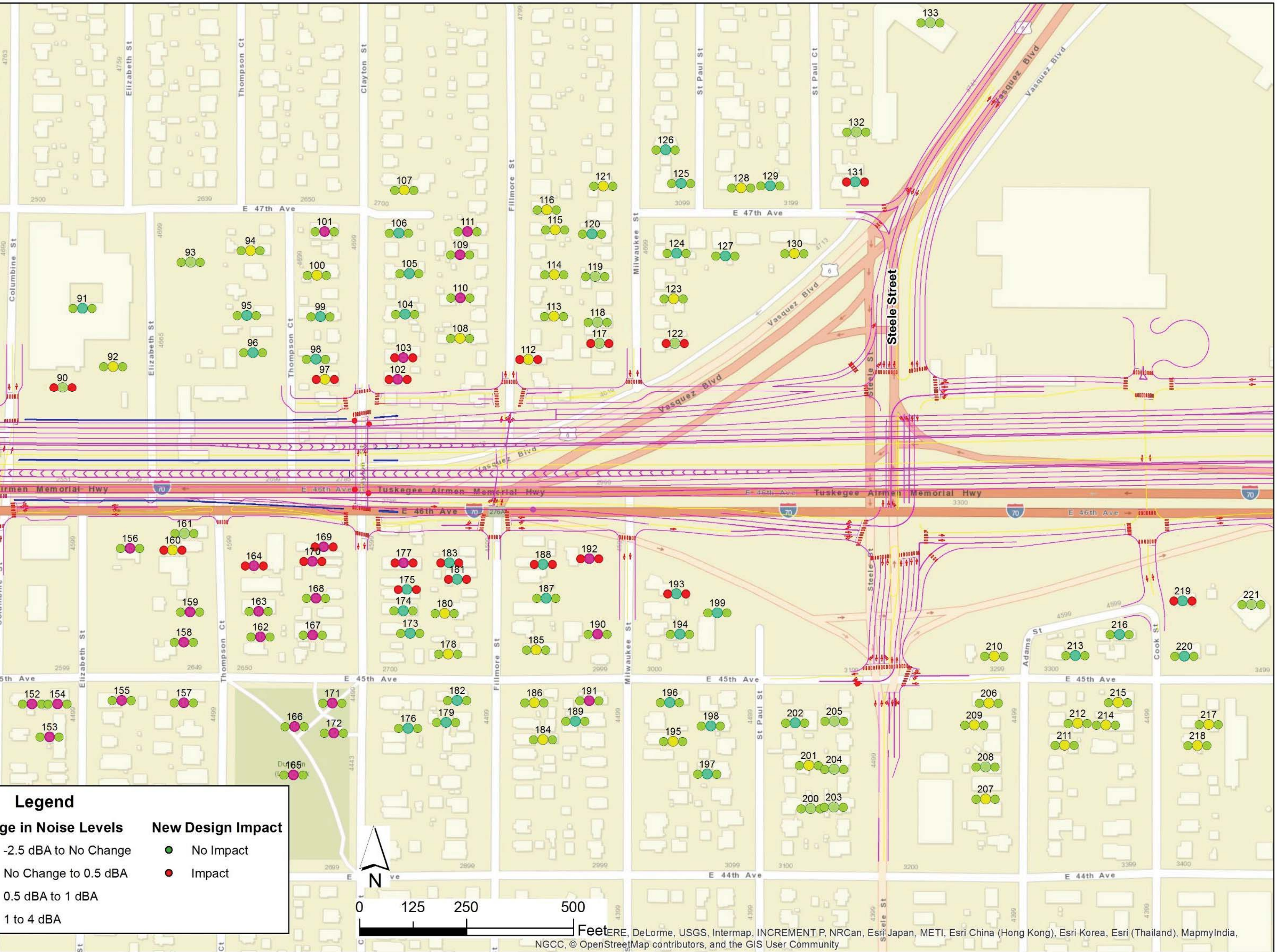
Figure 3. Changes in Noise Levels Due to Design Change York Street to Steele Street



4.3 SUMMARY OF TRAFFIC NOISE IMPACTS

4.3.1 GLOBEVILLE

The Globeville Neighborhood is located both north and south of the I-70, between I-25 and Washington street. The design in this area has not been changed from the ROD.

For the Managed Lanes Option, noise levels are anticipated to range from 60 dBA to 70 dBA north of I-70, which is equal to or as much as 3 dBA higher than existing noise levels. Noise levels would range from 61 dBA to 68 dBA south of I-70, which is an increase of 1 dBA to 3 dBA over existing noise levels. Of the 232 Activity Category B, C, and E receptors in Globeville, 32 (13 north of I-70 and 19 south of I-70; 15 modeled locations, see Figure 2) are anticipated to meet or exceed their respective NAC thresholds. None of the Globeville receptors experience a substantial (10 dBA or greater) increase over existing noise levels for the Managed Lanes Option. The representative points modeled and their impacts in TNM are summarized in **Figure 4** and **Table 3**. For more information on the results of TNM, see **Appendix B**.

Figure 4. Globleville Impacts:Build Alternative

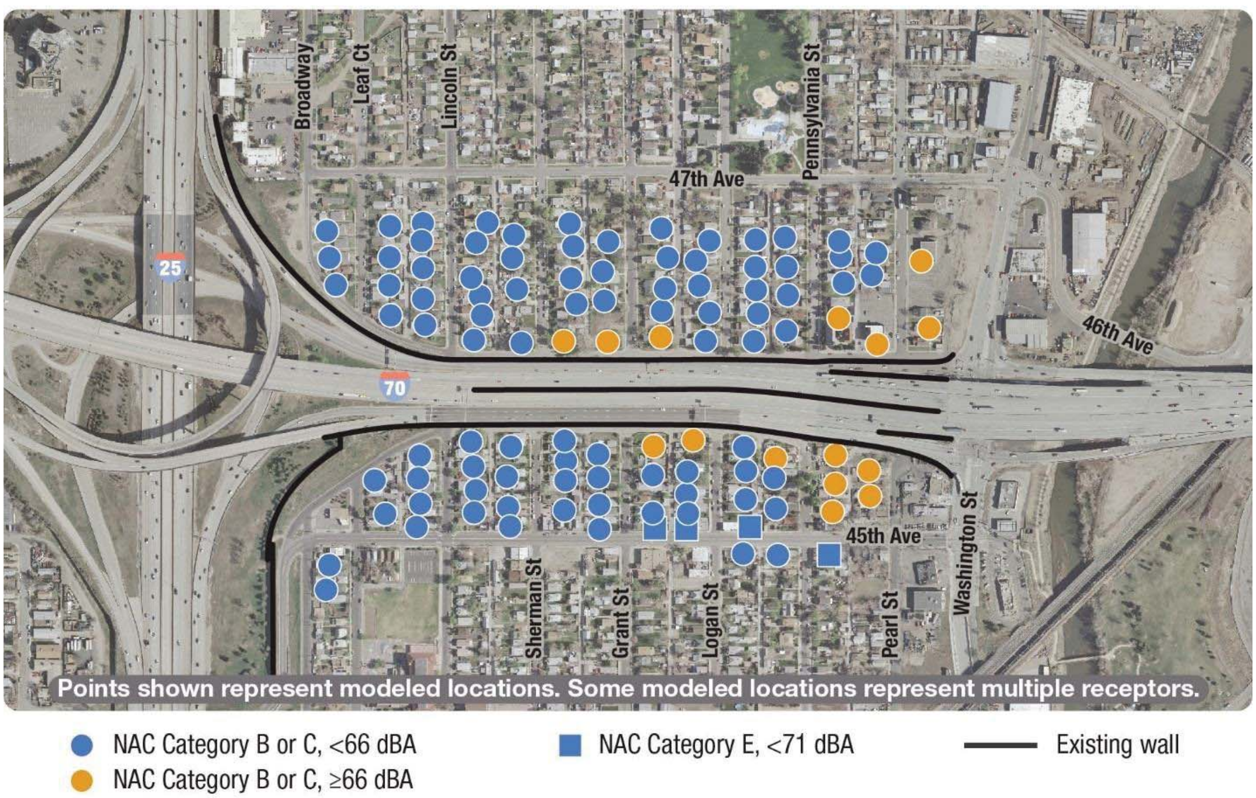


Table 3. Globeville Impact Summary Build Alternative

Noise Impacts	Globeville North of I-70	Globeville South of I-70
	Managed Lanes Option	Managed Lanes Option
Number of Receptors	130	102
Number of Impacts (≥NAC)	13	19
Number of Substantial Increase Impacts (≥10 dBA)	0	0
Leq(h) (dBA) Min	60	61
Leq(h) (dBA) Max	70	68

Hourly equivalent noise level Leq(h)

There are existing noise walls in this area varying in height from eight to 12 feet. The existing noise walls are on the Edge of Shoulder on both side of I-70, extending from Washington Street on to the I-25. The FEIS and the ROD found that the proposed project would not impact any of the existing noise walls in the area. Noise levels in the area were predicted to increase 1 to 3 dBA over the existing levels, and 15 sites would be over the NAC.

4.3.2 ELYRIA AND SWANSEA

The design in the Elyria and Swansea neighborhoods has changed from the ROD. The roadway's vertical profile was raised to keep it above the water table. **Table 2** and **Figure 2** and **3** show the changes in noise levels that resulted from this design change.

For this portion of the East I-70 Project, noise impacts were predicted at residences on the north side of I-70 in the Elyria neighborhood and on the north and south sides of I-70 in the Swansea neighborhood.

Four receptors, 60, 61, 145 and 146, were identified as having noise impacts not identified in the ROD. Overall 55 receivers in the Elyria area, 21 receivers in the Swansea area North of the I-70, and 31 receivers in the Swansea Area south of I-70, are above the NAC.

4.3.3 STAPLETON

In the Northfield Stapleton Area, there are three hotels near Quebec Street and three restaurants in the within the study limits of 500 feet of the edge of travel. These receptors are classified as NAC E, with a threshold of 71 dBA to be considered for abatement.
None of the receptors in this area meet or exceed the NAC threshold under the Build Alternative, with the Managed Lanes Option. The noise levels at the modeled receptors for the Managed Lanes Option would range from 61 dBA to 68 dBA, which is an increase of 2 dBA to 5 dBA greater than existing noise levels. None of the six receptors meet or exceed their respective NAC thresholds or experience a substantial increase in noise (10 dBA or more). The representative points modeled and their impacts in TNM are summarized in **Table 4** and **Figure 5**.

Table 4. Stapleton Impact Summary Build Alternative

Noise Impacts	Managed Lanes Option
Number of Receptors	6
Number of Impacts (≥NAC)	0
Number of Substantial Increase Impacts (≥10 dBA)	0
Leq(h) (dBA) Minimum	61
Leq(h) (dBA) Maximum	68

Figure 5. Stapleton Impacts: Build Alternative

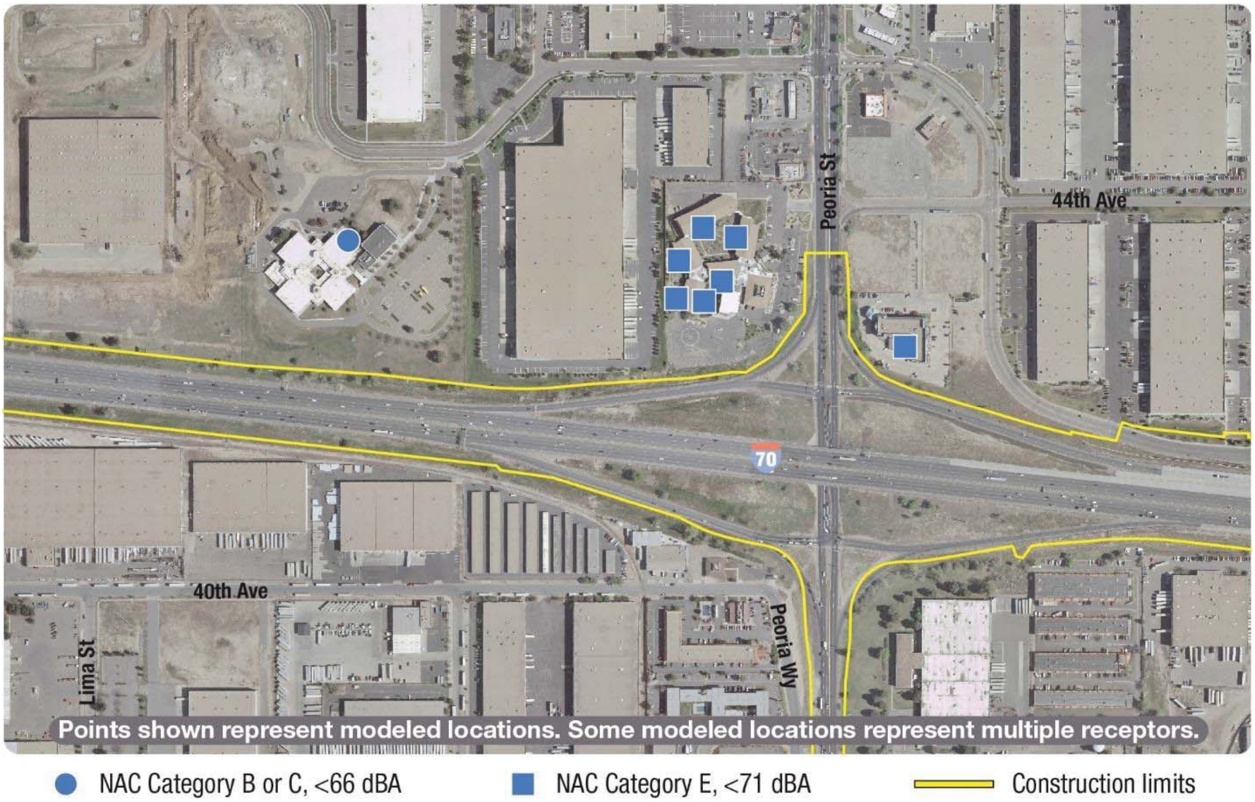
4.3.4 PEORIA STREET

Noise levels for the Managed Lanes Option would range from 62 dBA to 70 dBA, which is equal to or as much as 4 dBA greater than existing noise levels. Of the 100 receptors (14 modeled locations), one receptor (one modeled location) would meet or exceed the NAC threshold in the General-Purpose Lanes Option, and no receptors would meet or exceed their NAC threshold in the Managed Lanes Option. None of the 100 receptors would experience a substantial increase in noise levels (10 dBA or more). The results of the Build Alternative are shown in **Table 5** and **Figure 6**.

Table 5. Peoria Impact Summary Build Alternative

Noise Impacts	Managed Lanes Option
Number of Receptors	100
Number of Impacts (≥NAC)	0
Number of Substantial Increase Impacts (≥10 dBA)	0
Leq(h) (dBA) Minimum	62
Leq(h) (dBA) Maximum	70

Figure 6. Peoria Impacts: Build Alternative



**Note that the six NAC Category E locations shown to the west of Peoria street actually represent 12 modeled locations due to receptors being located on two stories of the hotel buildings.*

4.3.5 MONTEBELLO

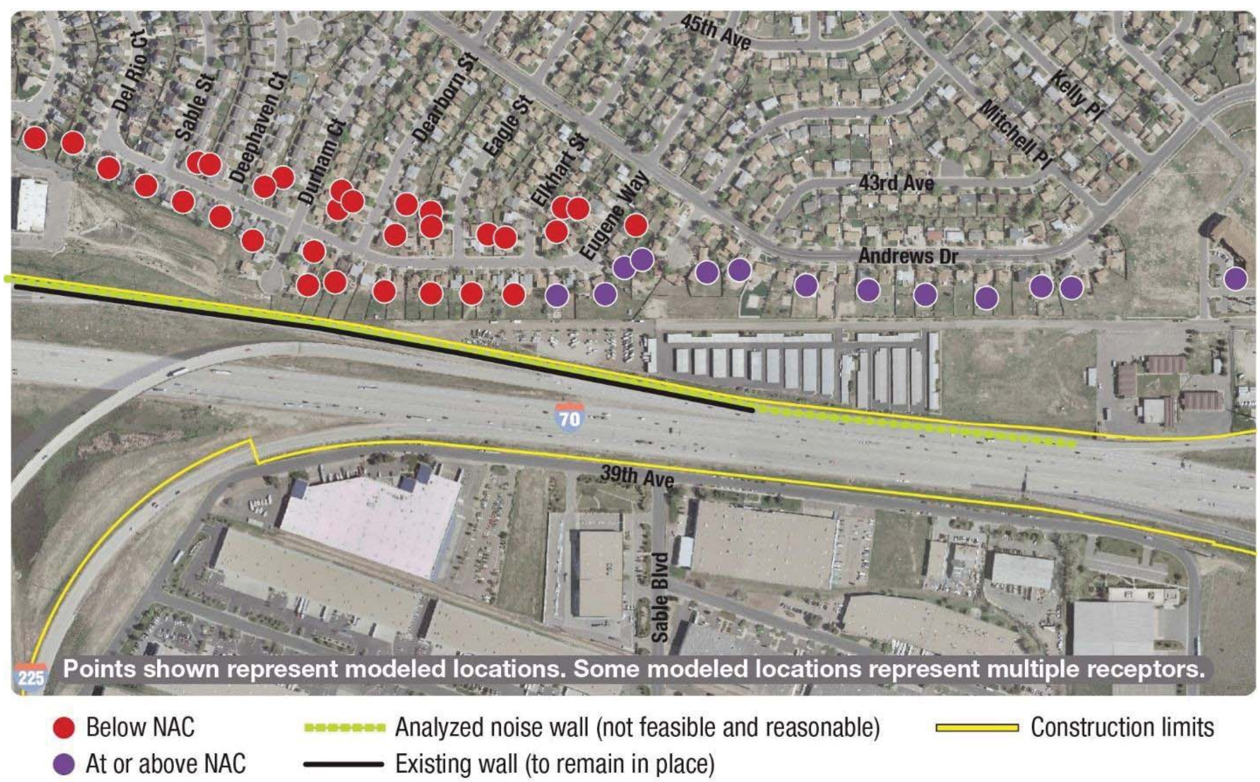
The Montbello area includes a residential neighborhood/commercial area northeast of the I-70/Interstate 225 (I-225) interchange. Under the Build Alternative, the existing noise wall will remain in place based on the proposed roadway construction limits.

The analysis of the Build Alternative was conducted with the existing 10-foot noise wall included. **Figure 7** shows under the the Managed Lanes Option, 32 (13 modeled locations) of the 112 receptors would meet or exceed their NAC threshold, but none of the 32 impacted receptors would experience a substantial noise increase (10 dBA or more). Noise levels will range from 59 dBA to 69 dBA, which is 1 dBA to 6 dBA greater than existing noise levels (see **Figure 12**). A summary of updated noise impacts can be seen in **Table 6**.

Table 6. Montbello Impact Summary Build Alternative

Noise Impacts	Managed Lanes Option
Number of Receptors	112
Number of Impacts (≥NAC)	32
Number of Substantial Increase Impacts (≥10 dBA)	0
Leq(h) (dBA) Minimum	59
Leq(h) (dBA) Maximum	69

Figure 7. Montbello Impacts: Build Alternative



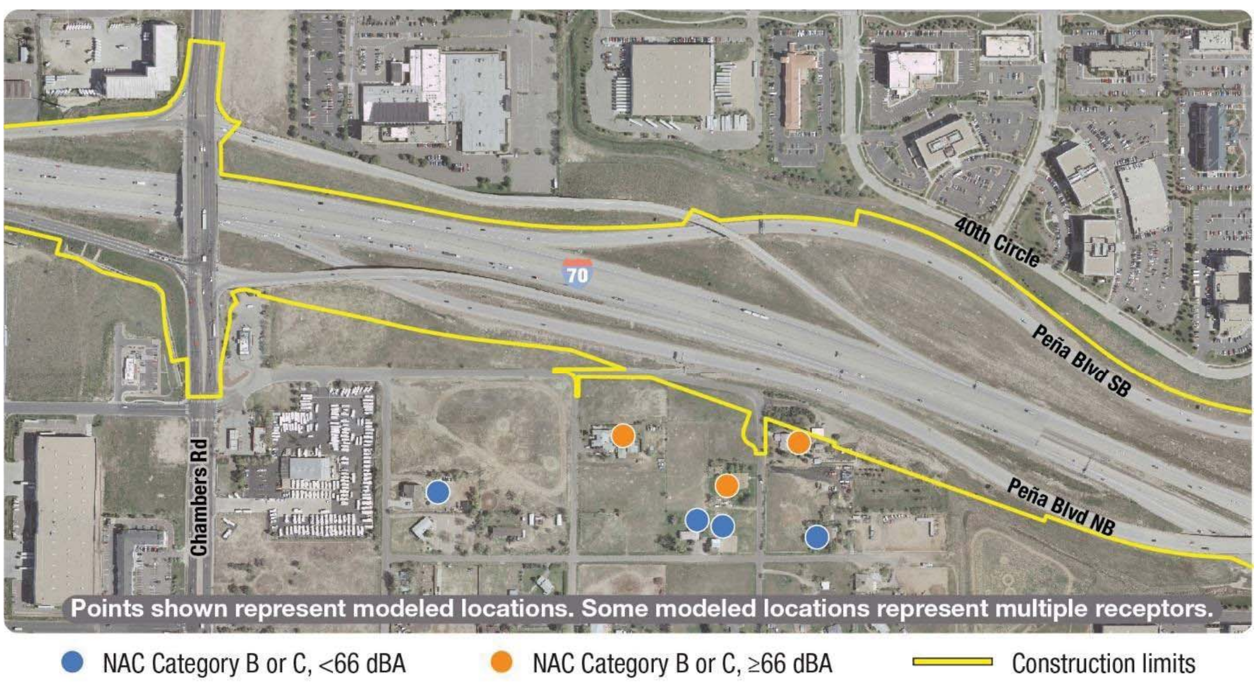
4.3.6 AURORA

In the Aurora Neighborhood, there are seven residential properties within the study limits of 500 feet of the edge of travel. Under Managed Lanes Option, the noise levels for the receptors range from 61 dBA to 70 dBA, which is 2 dBA lower to 0 dBA higher than existing conditions. Three of the receptors would meet or exceed their respective NAC thresholds, but none would experience a substantial noise increase (10 dBA or more). The results of the Build Alternative, Managed Lanes Option noise levels for Aurora is shown in **Figure 8**. A summary of updated noise impacts can be seen in **Table 7**.

Table 7. Aurora Impact Summary Build Alternative

Noise Impacts	Managed Lanes Option
Number of Receptors	7
Number of Impacts (≥NAC)	3
Number of Substantial Increase Impacts (≥10 dBA)	0
Leq(h) (dBA) Minimum	61
Leq(h) (dBA) Maximum	70

Figure 8. Aurora Impacts: Build Alternative



5 Noise Mitigation

5.0.1 GLOBEVILLE

Noise levels in the area were predicted to increase 1 to 3 dBA over the existing levels, and nine sites would be over the NAC.

Noise mitigation with higher walls does not appear to be feasible or reasonable along the north side of I-70 since no receptors were benefitted by 5 dBA. Along the south side of I-70, higher noise walls were determined to be neither reasonable nor feasible because the walls do not benefit at least one receptor by 5 dBA. Taller noise walls are not recommended for advancement in the Globeville Neighborhood for the Managed Lanes Option. Analyzed noise wall locations can be seen in **Figure 9**. For more information on the abatement determination, see the associated CDOT Noise Abatement forms included in **Appendix F**. For a summary of noise impacts and mitigation for Globeville, see **Table 8**.

Figure 9. Globleville Mitigation: Build Alternative

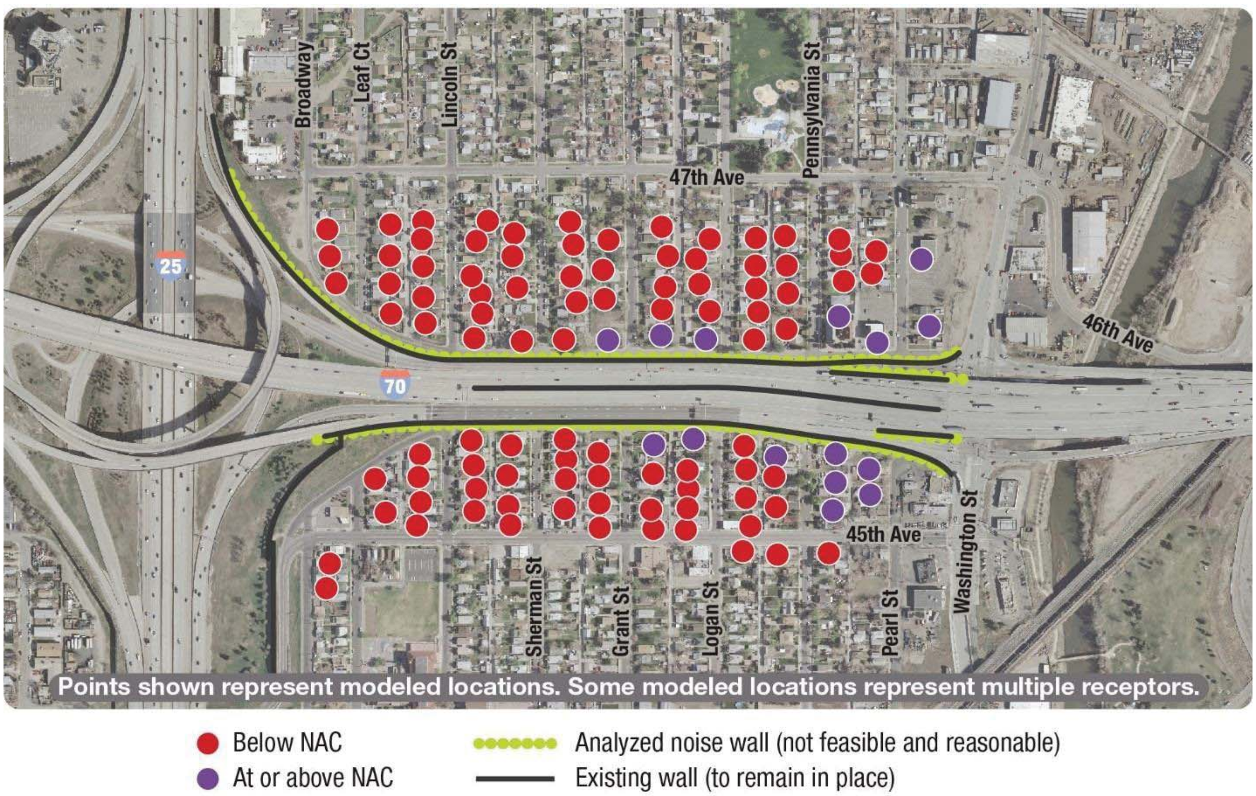


Table 8. Globeville Mitigation Summary Build Alternative

Mitigation Criteria	Globeville North of I-70		Globeville South of I-70	
	General-Purpose Lanes Option	Managed Lanes Option	General-Purpose Lanes Option	Managed Lanes Option
Evaluated Wall Heights (ft)	12 to 20	12 to 20	12 to 20	12 to 20
Feasible Wall Heights (ft)	None	None	18 to 20	None
Reasonable Wall Heights (ft)	None	None	None	None
Wall Heights (ft) Recommended for Advancement	None	None	None	None
Wall Height (ft)	N/A	N/A	N/A	N/A
Wall Height	12 to 20	12 to 20	12 to 20	12 to 20
Number of Receptors with ≥7-dBA reduction	0	0	0	0

5.0.2 ELYRIA AND SWANSEA

The FEIS Noise Technical Report study found that a noise barrier for the Elyria neighborhood was reasonable and feasible and the ROD Updates for Noise Technical Report recommended new noise mitigation for the Elyria neighborhood between Brighton Boulevard and the railroad overpass. The ROD identified two 16-foot-tall barriers for this neighborhood, one on the edge of shoulder from the railroad overpass to the end of the WB off-ramp to Brighton Boulevard, and one on the edge of the shoulder (EOS) on the bridge over Brighton Boulevard. Analyzed noise wall locations can be seen in Figure 10. For more information on the abatement determination, see the associated CDOT Noise Abatement forms included in **Appendix F**. This is the only noise abatement found to be reasonable and feasible in the FEIS or ROD, section 6 shows the results of the optimizing studies for this barrier.

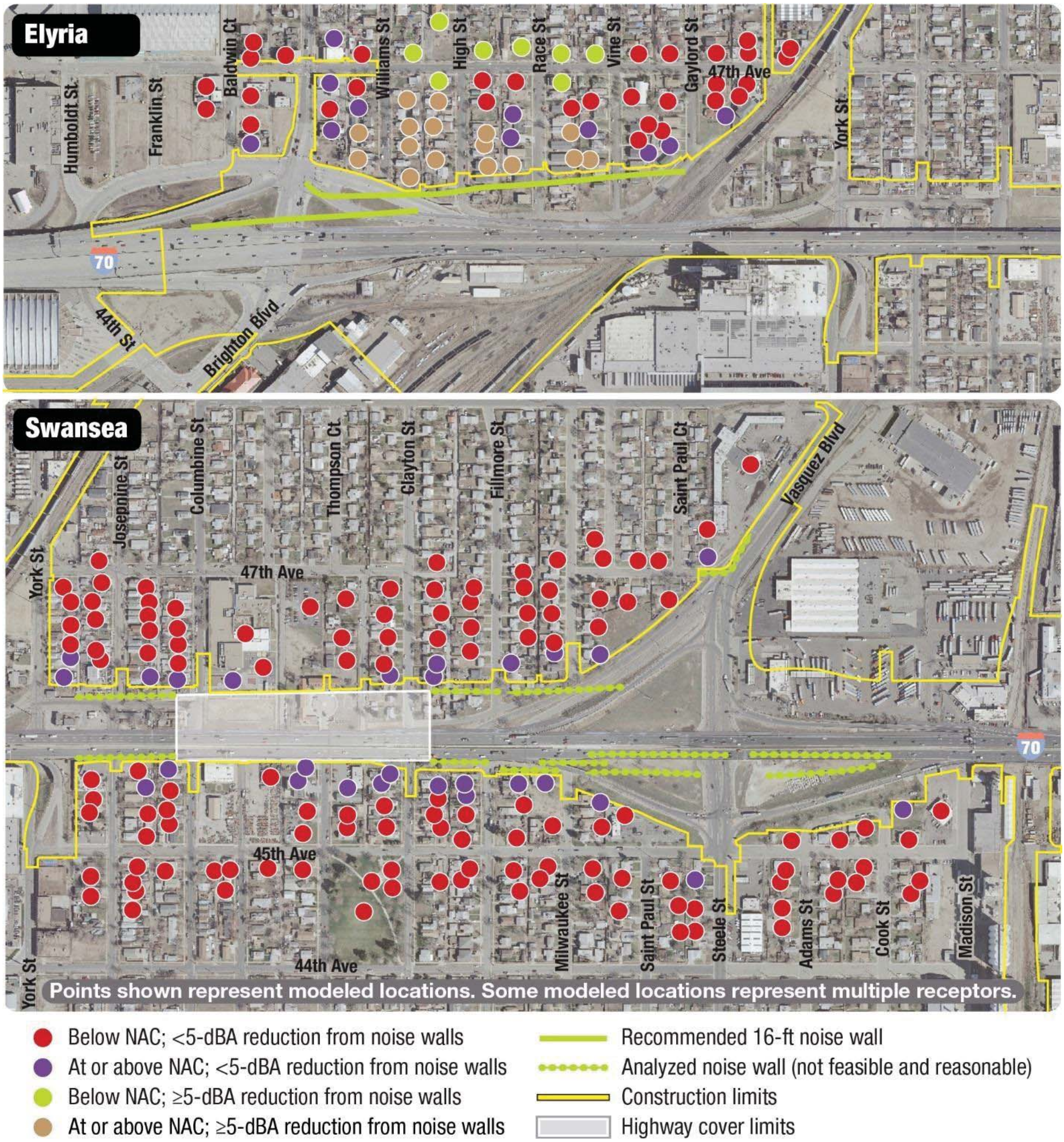
The FEIS noise study found that noise barriers for the Swansea neighborhood could not be designed to get the required 5 dBA reduction for these areas to be considered feasible. For receivers 145 and 146, the opening in the barrier needed for cross street traffic movements on York, Josephine and Columbine Streets prevents a continuous wall that would be needed to provide the necessary 5 dBA in noise reduction. Analyzed noise wall locations can be seen in **Figure 10**. For more information on the abatement determination, see the associated CDOT Noise Abatement forms included in **Appendix F**. **Table 9** a summary of noise impacts and mitigation for Swansea.

Table 9. Swansea Mitigation Summary Build Alternative

Mitigation Criteria	Swansea North of I-70	Swansea South of I-70
Evaluated Wall Heights (ft)	8 to 20	8 to 20
Feasible Wall Heights (ft)	None	8 to 20
Reasonable Wall Heights (ft)	None	None
Wall Heights (ft) Recommended for Advancement	None	None
Wall Height	8 to 20	8 to 20
Number of Receptors with ≥7-dBA reduction	0	0 to 6
Number of Receptors with ≥5-dBA reduction	0	3 to 18
Length of Wall (feet)	1,270	3,580
Cost of Wall	$457,200 to $1,143,000	$1,288,800 to $3,222,000
dBA Benefit of Receptors with ≥5-dBA reduction	0	18 to 121
Cost-Benefit Index	None	$26,610 to $70,040

Note: This is the wall height rounded to the nearest two-foot increment that benefits the average number of receptors

Figure 10. Elyria and Swansea Mitigation: Build Alternative



5.0.3 STAPLETON

In the Northfield Stapleton Area, there are three hotels near Quebec Street and three restaurants in the within the study limits of 500 feet of the edge of travel. These receptors are classified as NAC E, with a threshold of 71 dBA to be considered for abatement. None of the receptors meet or exceed their respective NAC thresholds or experience a substantial increase in noise (10 dBA or more). For this reason, mitigation consideration is not required.

5.0.4 PEORIA STREET AREA

For the Peoria Street area, the Managed Lanes option had no noise impacts at any of the receivers. No noise walls were proposed.

5.0.5 MONTBELLO

For the Managed Lanes Option, analysis was performed to determine if a taller noise wall (12-foot, 14-foot, 16-foot, 18-foot, or 20-foot)—as compared to the existing 10-foot wall— would be feasible and reasonable in the Montbello area to block the additional traffic noise predicted for the future. Additionally, a new 1,050-foot-long wall was analyzed at heights of eight feet to 20 feet as an extension of the existing 3,200-foot-long wall. For the new wall at eight feet and 10 feet, the existing wall was left at its existing 10-foot height. Heights greater than 10 feet (12 feet to 20 feet) were analyzed with both the existing wall and the new wall modeled at the same taller height. The combined 4,250-foot-long wall complex was found to be feasible from 14 feet to 20 feet in height, but was not found to be reasonable as no receptor receiver a benefit of 7 dBA. No new noise walls are recommended for advancement in the Montbello Neighborhood, but the existing 3,200-foot-long, 10-foottall noise wall will remain in place.

Figure 11 show the location of the wall modeled in TNM. **Table 10** summarizes mitigation measures for Montbello. The noise walls shown are based on preliminary design and are subject to change. For more detailed mitigation analysis, see **Appendix B**, Noise Wall Mitigation Tables.

Figure 11. Montbello Mitigation: Build Alternative

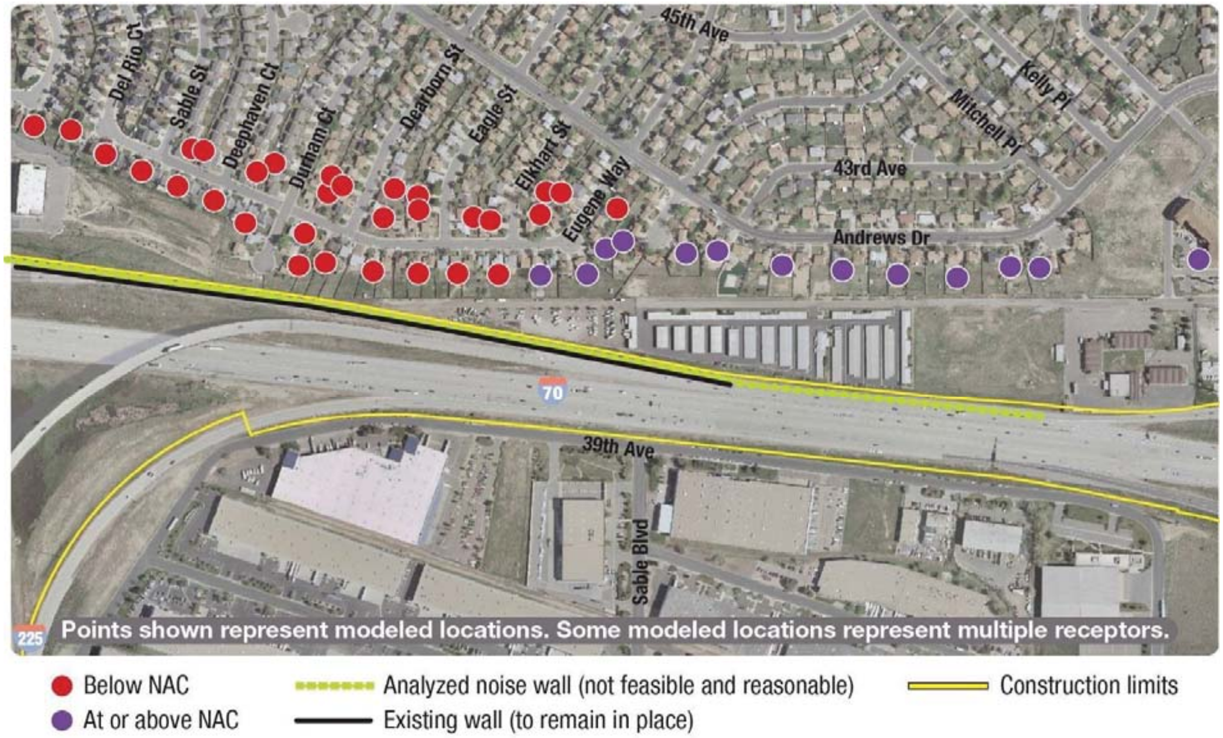


Table 10. Montbello Mitigation Summary Build Alternative

Mitigation Criteria	Managed Lanes Option
Evaluated Wall Heights (ft)	8 to 20
Feasible Wall Heights (ft)	14 to 20
Reasonable Wall Heights (ft)	None
Wall Heights (ft) Recommended for Advancement	None
Wall Height	8 to 20
Number of Receptors with ≥7-dBA reduction	0
Number of Receptors with ≥5-dBA reduction	0 to 15
Length of Wall (feet)	1,050 to 4,250
Cost of Wall	$378,000 to $3,825,000
dBA Benefit of Receptors with ≥5-dBA reduction	0 to 90
Cost-Benefit Index	$42,360 or higher

5.0.6 AURORA

For the Managed Lanes Option, the wall was found to be feasible from 10 feet to 20 feet in height, but was not found to be reasonable since it exceeded the cost-benefit index and/or no receptors received a benefit of 7 dBA. From this update, noise mitigation is not reasonable for providing mitigation to a small number of receptors.

Figure 12 shows the location of the wall modeled in TNM for the Managed Lanes Option in Aurora. Based on this information, noise mitigation does appear to be feasible, but it is not reasonable because the cost is greater than CDOT's cost-benefit index. **Table 11** summarizes the mitigation measures for the Aurora Neighborhood. The noise walls shown are based on preliminary design and are subject to change. For more detailed mitigation analysis, see **Appendix B**, Noise Wall Mitigation.

Figure 12. Aurora Mitigation: Build Alternative

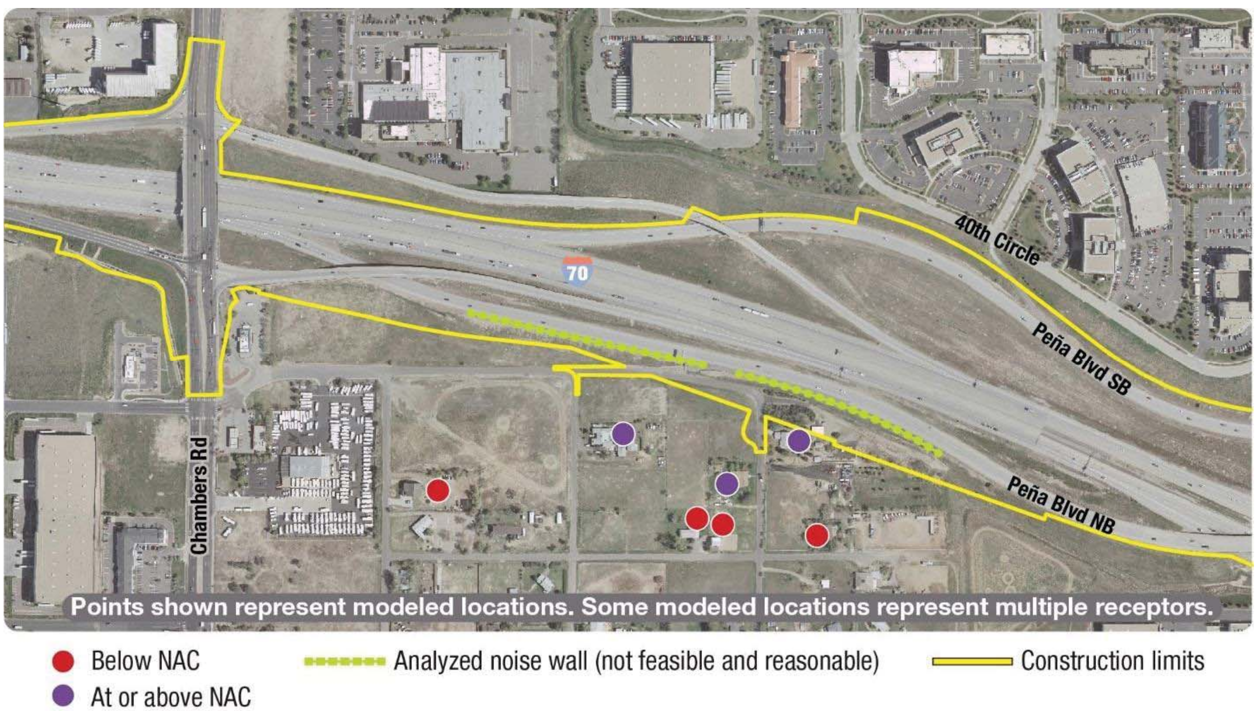


Table 11. Aurora Mitigation Summary Build Alternative

Mitigation Criteria	Managed Lanes Option
Evaluated Wall Heights (ft)	8 to 20
Feasible Wall Heights (ft)	10 to 20
Reasonable Wall Heights (ft)	None
Wall Heights (ft) Recommended for Advancement	None
Wall Height	8 to 20
Number of Receptors with ≥7-dBA reduction	0 to 1
Number of Receptors with ≥5-dBA reduction	0 to 2
Length of Wall (feet)	1,750
Cost of Wall	$630,000 to $1,575,000
dBA Benefit of Receptors with ≥5-dBA reduction	0 to 14
Cost-Benefit Index	$114,130 or higher

6 Noise Barriers

Noise barriers include noise walls, berms, and buildings. A noise barrier's effectiveness is determined by its height and length and by project site topography. To be effective, the barrier must block the line-of-sight between the highest point of a noise source (e.g., a truck's exhaust stack) and the receptor. It must be long enough (at least four times of the distance from the home or receptor to the barrier) to prevent sounds from passing around the ends, have no openings (e.g., driveway connections), and be dense enough so that noise would not be transmitted through it. Existing structures or buildings provide shielding benefits for noise abatement.

CDOT evaluates many factors to determine whether barriers would be feasible and reasonable. Any specific abatement measure recommended as noise mitigation for the I-70 Project must be both feasible and reasonable. The *CDOT Noise Analysis and Abatement Guidelines* (2015) define each of these two criteria:

- For abatement to be feasible, CDOT requires that a barrier design achieve a perceptible noise reduction of at least 5 decibels at one or more receptors; and
- Constructability factors such as barrier height, safety, topography, drainage, utilities, and access issues must meet normal engineering requirements and standards.

For abatement to be reasonable, all three of the following criteria must be successfully met:

- The abatement measure must provide a design goal minimum reduction of 7 dBA noise reduction for at least one receptor;
- A cost-effectiveness index for the abatement measure must be less than $6,800 per residence per decibel reduced; and

* The residents and property owners who would benefit from the proposed abatement must be surveyed to determine whether the noise abatement measure is wanted.

6.0.1 ELYRIA BARRIER OPTIMIZATION

The FEIS Noise Technical Report found that barriers between 10 to 20 feet should be advanced for study during final design. The ROD Updates to Noise Technical Report found that a 16-foot barrier in the Elyria neighborhood is both feasible and reasonable. As part of the final design it is required that the proposed barriers are evaluated following an optimization analysis. The optimization process involves analyzing a change in heights of different barrier sections to determine the wall profile that will provide the best noise reduction for the most reasonable cost.

The optimization process determined that a 10 to 20-foot barrier on the mainline edge of shoulder from the railroad overpass to the end of the WB off-ramp to Brighton Boulevard, with 6 to 7-foot barrier on the edge of shoulder on the bridge over Brighton Boulevard, provided the required noise reduction. The optimized barrier would benefit 57 dwelling units, 33 of the 64 receptors would experience a seven dB of noise reduction or greater. The ROD identified the Elyria barrier as benefiting 49 receptors, resulting in 22 of the 51 receptors experiencing a noise reduction of 7 dB or greater.

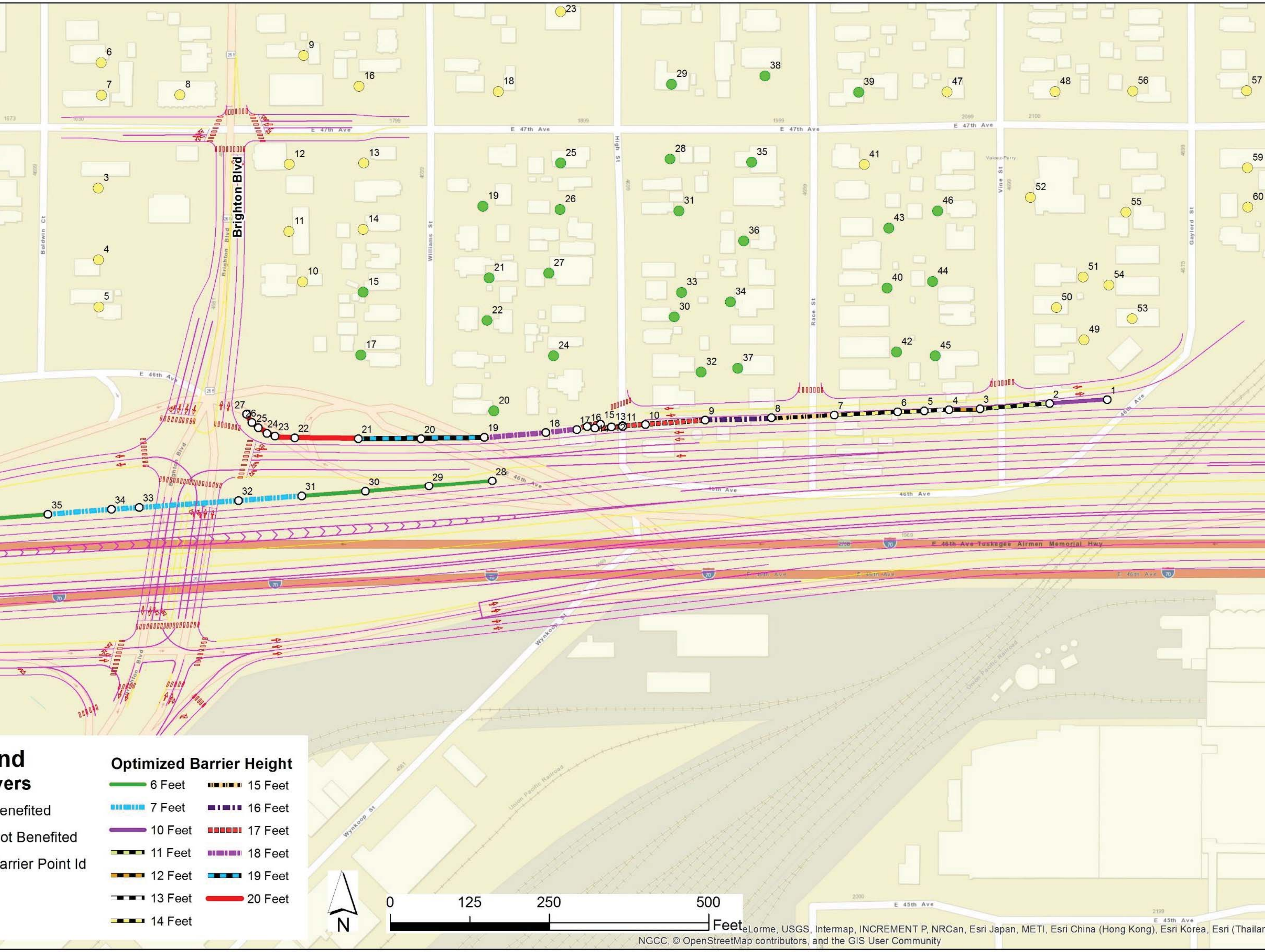
Table 12 depicts the noise reduction provided for each receptor from the optimized Elyria neighborhood barrier. **Figure 13** depicts a plan view of the barrier placement.

Table 12. Elyria Optimized Barrier Noise Reduction

Site Number	Dwellings per Site	ROD Design No Barrier Leq	ROD Barrier Noise Level	ROD Barrier Noise Reduction	WSP Design No Barrier Leq	Optimized Barrier Noise Level	Optimized Barrier Noise Reduction
1	1	64.10	61.8	2.3	64.0	62.6	1.4
2	2	65.30	62.8	2.5	65.1	63.7	1.4
3	1	65.40	62.8	2.6	65.3	63.9	1.4
4	1	66.90	64.2	2.7	66.8	65.3	1.5
5	1	68.10	65.4	2.7	68.0	66.5	1.5
6	1	63.40	60.9	2.5	63.1	61.9	1.2
7	1	63.80	61.3	2.5	63.6	62.3	1.3
8	2	66.70	66.2	0.5	66.6	65.9	0.7
9	1	65.00	64.3	0.7	64.8	63.7	1.1
10	2	68.50	65	3.5	68.2	65.6	2.6
11	2	68.00	66.2	1.8	67.8	66.2	1.6
12	1	67.10	66.2	0.9	66.8	65.6	1.2
13	2	64.90	61.4	3.5	64.4	61.9	2.5
14	3	66.40	61.9	4.5	65.9	62.5	3.4
15	2	67.90	62	5.9	67.4	62.8	4.6
16	1	63.70	61	2.7	63.5	61.4	2.1
17	2	69.30	61.8	7.5	69	62.4	6.6
18	1	63.30	58.5	4.8	63.1	59.0	4.1
19	1	64.80	59	5.8	64.7	59.5	5.2
20	2	74.60	62	12.6	74.2	62.4	11.8
21	4	67.10	59.5	7.6	66.6	59.6	7.0

Site Number	Dwellings per Site	ROD Design No Barrier Leq	ROD Barrier Noise Noise Level	ROD Barrier Noise Reduction	WSP Design No Barrier Leq	Optimized Barrier Noise Noise Level	Opitmized Barrier Noise Reduction
22	2	68.80	60.3	8.5	68.2	60.3	7.9
23	1	62.70	57.7	5	62.1	58.4	3.7
24	3	71.70	61.9	9.8	71.6	62.0	9.6
25	1	64.20	58.2	6	63.9	58.6	5.3
26	2	65.20	58.6	6.6	65.1	58.7	6.4
27	3	67.30	59.6	7.7	67.1	59.8	7.3
28	2	63.20	59.6	3.6	63	56.7	6.3
29	1	63.00	57.5	5.5	62.5	57.6	4.9
30	1	68.90	63.7	5.2	69.1	60.5	8.6
31	2	64.90	61.4	3.5	64.8	57.7	7.1
32	3	74.20	63.6	10.6	74.5	64.0	10.5
33	3	67.90	63.2	4.7	68	59.8	8.2
34	2	69.10	65.3	3.8	69.2	61.2	8.0
35	2	64.00	59	5	64	57.0	7.0
36	4	66.50	62	4.5	66.4	58.7	7.7
37	3	73.80	67.2	6.6	74.2	63.3	10.9
38	2	62.30	59.7	2.6	62.1	57.2	4.9
39	2	61.60	55.9	5.7	61.7	56.7	5.0
40	2	64.70	59.5	5.2	65	60.0	5.0
41	1	61.10	56.1	5	61.3	56.8	4.5
42	4	69.40	64	5.4	69.5	63.9	5.6
43	2	62.50	59.1	3.4	62.7	57.9	4.8
44	3	65.20	61.3	3.9	65.4	60.3	5.1
45	3	71.00	63.9	7.1	71.4	63.7	7.7
46	3	62.60	59.1	3.5	63	57.9	5.1
47	2	60.50	55.5	5	60.8	56.6	4.2
48	2	59.90	56	3.9	60.3	56.9	3.4
49	2	69.00	66.2	2.8	70.2	69.2	1.0

Site Number	Dwellings per Site	ROD Design No Barrier Leq	ROD Barrier Noise Noise Level	ROD Barrier Noise Reduction	WSP Design No Barrier Leq	Optimized Barrier Noise Noise Level	Opitmized Barrier Noise Reduction
50	1	65.60	62	3.6	67.3	66.4	0.9
51	2	61.90	60.7	1.2	62.8	61.4	1.4
52	1	60.60	57.7	2.9	61.1	58.5	2.6
53	2	67.30	63.5	3.8	68.3	67	1.3
54	4	62.90	61.2	1.7	64.1	62.9	1.2
55	4	60.50	58.7	1.8	61.3	59.8	1.5
56	2	59.80	57.1	2.7	60.5	57.9	2.6
57	2	60.80	59	1.8	62.8	62.1	0.7
58	2	66.80	67.1	0.5	68.1	67.8	0.3
59	3	63.20	61.9	1.3	64.8	64.3	0.5
60	1	64.80	64.1	0.7	66.3	66	0.3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46th Ave
E 45th Ave
Wynkoop St
Williams St
High St
Race St
Vine St
Gaylord St
Baldwin Ct
Union Pacific Railroad
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Appendix A – Introduction to Acoustics

Sound is created when objects vibrate, resulting in a minute variation in surrounding atmospheric pressure called sound pressure. The human response to sound depends on the magnitude of a sound as a function of its frequency and time pattern (EPA 1974). Magnitude measures the physical sound energy in the air. The range of magnitude, from the faintest to the loudest sound the ear can hear, is very large so, for convenience, sound pressure is expressed on a logarithmic scale in units called decibels (dB). Loudness, compared with physical sound measurement, refers to how people subjectively judge a sound. This varies from person to person. **Table A-1** shows the magnitudes of typical noise sources.

Humans respond to a sound's frequency or pitch. The human ear can very effectively perceive sounds with a frequency between approximately 500 and 5,000 Hz, but the efficiency decreases outside this range. Environmental noise is composed of many frequencies, each occurring simultaneously at its own sound pressure level. Frequency weighting, which is applied electronically by a sound level meter, combines the overall sound spectrum into one sound level that simulates how a typical person hears sounds. The commonly used frequency weighting for environmental noise is weighting (dBA), which is most similar to how humans perceive sounds of low to moderate magnitude.

Because of the logarithmic decibel scale, a doubling of the number of sound sources (such as the number of cars operating on a roadway) increases noise levels by 3 dBA. A ten-fold increase in the number of sound sources would add 10 dBA. As a result, a sound source emitting a sound level of 60 dBA combined with another sound source of 60 dBA yields a combined sound level of 63 dBA, not 120 dBA. The human ear can barely perceive a 3-dBA increase, but a 5- or 6-dBA increase is readily noticeable and appears as if the sound is about one and one-half times as loud. A 10-dBA increase appears to be a doubling in sound level to most listeners.

Noise levels from traffic sources depend on traffic volume, vehicle speed, type of vehicle, and pavement surface conditions. Generally, an increase in traffic volume, speed, or vehicle size increases traffic noise levels. Vehicular noise is a combination of noises from the engine, exhaust, and tires. Other conditions affecting the propagation of traffic noise include defective mufflers, steep grades, terrain, vegetation, distance from the roadway, and shielding by barriers and buildings.

Sound levels decrease with distance from the source. For a line source, such as a roadway, sound levels decrease 3 dBA over hard ground (concrete, pavement) or 4.5 dBA over soft ground (grass) for every doubling of distance between the source and the receptor. For a point source, such as construction sources, sound levels would decrease between 6 and 7.5 dBA for every doubling of distance from the source.

The propagation of sound can be greatly affected by terrain and the elevation of the receptor relative to the sound source. Level ground is the simplest scenario: sound travels in a straight line-of-sight path between the source and receptor. If the sound source is depressed or the receptor is elevated, sound generally travels directly to the receptor. Sound levels may be reduced because the terrain crests between the source and receptor, resulting in a partial sound barrier near the receptor. If the sound source is elevated or the receptor is depressed, sound often is reduced at the receptor. The edge of the roadway can act as a partial sound barrier, blocking some sound transmission between the source and receptor.

Even a short barrier, such as a solid concrete jersey-type safety barrier, can be effective at further reducing traffic noise levels. However, to be truly effective, a noise barrier must break the line-of-sight between a noise source and the listener. Breaking the line-of-sight between the receptor and the highest sound source typically results in a noise reduction of approximately 5 dBA. Noise levels can be reduced by as much as 15 dBA with a well-designed and properly constructed noise barrier.

TABLE A-1. TYPICAL NOISE LEVELS

Transportation Sources	Sound Level (dBA)	Other Sources	Description
	130		Painfully loud
Jet takeoff (200 feet)	120		
Car horn (3 feet)	110		Maximum vocal effort
	100	Shout (0.5 feet)	
	95		Very annoying
Heavy truck (50 feet)	90	Jack hammer (50 feet)	Loss of hearing with prolonged exposure
		Home shop tools (3 feet)	
Train on a structure (50 feet)	85	Backhoe (50 feet)	
City bus (50 feet)	80	Bulldozer (50 feet)	Annoying
		Vacuum cleaner (3 feet)	
Train (50 feet)	75	Blender (3 feet)	
City bus at stop (50 feet)			
Freeway traffic (50 feet)	70	Lawn mower (50 feet)	
		Large office	
Train in station (50 feet)	65	Washing machine (3 feet)	Intrusive
	60	TV (10 feet)	
Light traffic (50 feet)	55	Talking (10 feet)	
Light traffic (100 feet)	50		Quiet
	45	Refrigerator (3 feet)	
	40	Library	
	30	Soft whisper (15 feet)	Very quiet

Sources: USDOT (1995); EPA (1971, 1974).

Sound Level Descriptors

A widely-used descriptor for environmental noise is the equivalent sound level (L_{eq}). The L_{eq} can be considered a measure of the average sound energy during a specified period of time. L_{eq} is defined as the constant level that, over a given period of time, transmits to the receptor the same amount of acoustical energy as the actual time-varying sound. For example, two sounds, one of which contains twice as much energy but lasts only half as long, have the same L_{eq} sound levels. L_{eq} measured over a one-hour period is the hourly L_{eq} [$L_{eq(h)}$], which is used for highway noise impact and abatement analyses.

Short-term sound levels, such as those from a single truck passing by, can be described by either the total sound energy or the highest instantaneous sound level that occurs during the event. The sound exposure level (SEL) is a measure of total sound energy from an event and is useful in determining what the L_{eq} would be over a period of time when several sound events occur. The maximum sound level ($L_{max)}$ is the greatest short-duration sound level that occurs during a single event. L_{max} is related to impacts on speech interference and sleep disruption. In comparison, L_{min} is the minimum sound level during a period of time.

People generally find a moderately high, constant sound level more tolerable than a quiet background level interrupted by frequent high-level noise intrusions. An individual's response to sound depends greatly on the range that the sound varies in a given environment. For example, steady traffic noise from a highway is normally less bothersome than occasional aircraft flyovers in a relatively quiet area. Considering this subjective response, it is often useful to look at a statistical distribution of sound levels over a given time period in addition to the average sound level. Such distributions identify the sound level exceeded and the percentage of time exceeded. It therefore allows for a more thorough description of the range of sound levels during the given measurement period. These distributions are identified with an L_n where n is the percentage of time that the levels are exceeded. For example, the L_{10} level is the noise level that is exceeded 10 percent of the time.

Effects of Noise

Environmental noise at high intensities directly affects human health by causing the disease of hearing loss. Prolonged exposure to very high levels of environmental noise can cause hearing loss. The EPA has established a protective level of 70 dBA L_{eq} (24), below which hearing is conserved for exposure over a 40-year period (EPA 1974). OSHA exposure standards for noise under working conditions are a different set of health-related criteria, not related to the ambient FHWA Highway Traffic Noise criteria or EPA recommendation. Although scientific evidence is not currently conclusive, noise is suspected of causing or aggravating other diseases. Environmental noise indirectly affects human welfare by interfering with sleep, thought, and conversation. The FHWA noise abatement criteria are based on speech interference, which is a well-documented impact that is relatively reproducible in human response studies. Noise also can affect wildlife.

Appendix B – Existing and Build Noise Levels

Globeville Receivers North of I-70																
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))													
			Existing	2035 No Action	2035 Managed Lanes											
					10 ft Existing Walls	12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
1	B	2	63.9	65	65.1	64.5	0.6	63.9	1.2	63.3	1.8	62.8	2.3	62.4	2.7
2	B	2	63.4	64.6	64.3	63.4	0.9	62.7	1.6	62.2	2.1	61.8	2.5	61.4	2.9
3	B	2	62.5	63.5	62.6	61.7	0.9	61.2	1.4	60.8	1.8	60.5	2.1	60.1	2.5
4	B	3	59.9	61.4	62.2	61.6	0.6	61	1.2	60.4	1.8	59.8	2.4	59.4	2.8
5	B	2	60.5	62	62.9	61.9	1	61.2	1.7	60.4	2.5	59.7	3.2	59.3	3.6
6	B	2	61.1	62.7	63.5	62.2	1.3	61.4	2.1	60.7	2.8	60.2	3.3	59.9	3.6
7	B	2	58.8	60.3	60	59	1	58.6	1.4	58.4	1.6	58.2	1.8	57.9	2.1
8	B	3	59.8	61.2	62.1	61.4	0.7	60.7	1.4	60.2	1.9	59.6	2.5	59.2	2.9
9	B	3	60.1	61.7	62.5	61.6	0.9	61	1.5	60.4	2.1	59.7	2.8	59.3	3.2
10	B	2	60.6	62.2	63.2	62.1	1.1	61.3	1.9	60.7	2.5	60.1	3.1	59.5	3.7
11	B	3	61	62.9	63.7	62.3	1.4	61.5	2.2	60.9	2.8	60.5	3.2	60.1	3.6
12	B	3	60.9	62.9	63.1	61.7	1.4	61.1	2	60.7	2.4	60.4	2.7	60.2	2.9
13	B	2	58.6	60	61	59.9	1.1	59.1	1.9	58.4	2.6	57.9	3.1	57.3	3.7
14	B	3	58.5	60.2	61.2	59.9	1.3	59	2.2	58.3	2.9	57.7	3.5	57.1	4.1
15	B	2	59	61.2	62.3	60.6	1.7	59.7	2.6	59	3.3	58.4	3.9	57.8	4.5
16	B	3	59.8	61.6	63.1	61.2	1.9	60.4	2.7	59.7	3.4	59.2	3.9	58.7	4.4
17	B	1	60	62.3	63	61.8	1.2	61.1	1.9	60.5	2.5	60.1	2.9	59.6	3.4
18	B	2	60.2	62.2	62.5	62	0.5	61.4	1.1	60.9	1.6	60.5	2	60	2.5
19	B	2	59.2	60.8	61.6	60.2	1.4	59.4	2.2	58.6	3	58.1	3.5	57.5	4.1
20	B	3	59.6	61.4	62.2	60.8	1.4	59.9	2.3	59.2	3	58.4	3.8	58	4.2
21	B	3	60	62.3	63	61.3	1.7	60.5	2.5	59.8	3.2	59.3	3.7	58.8	4.2
22	B	2	61.2	64.1	64.3	63.4	0.9	62.8	1.5	62.3	2	61.7	2.6	61.4	2.9
23	B	1	58.9	59.7	60.3	58.8	1.5	57.9	2.4	57.3	3	56.9	3.4	56.5	3.8
24	B	3	60	60.9	61.4	59.6	1.8	58.9	2.5	58.3	3.1	57.9	3.5	57.5	3.9
25	B	3	61.1	62.5	62.8	60.7	2.1	60	2.8	59.4	3.4	59.1	3.7	58.7	4.1

Globeville Receivers North of I-70															
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))												
			Existing	2035 No Action	2035 Managed Lanes										
					10 ft Existing Walls	12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
26	B	3	61.8	63.8	64	61.9	2.1	61.1	2.9	60.5	3.5	60.1	3.9	59.7	4.3
27	B	2	62	64.8	65	64.1	0.9	63.5	1.5	62.9	2.1	62.4	2.6	62	3
28	B	2	60.2	61	61.5	59.9	1.6	59.1	2.4	58.5	3	57.9	3.6	57.5	4
29	B	2	61.6	62.7	63.1	61.2	1.9	60.4	2.7	59.8	3.3	59.3	3.8	58.9	4.2
30	B	2	62.6	64.2	64.6	62.4	2.2	61.6	3	60.9	3.7	60.9	3.7	60.9	3.7
31	B	1	62.5	65.4	65.6	64.7	0.9	64	1.6	63.3	2.3	63.3	2.3	63.3	2.3
32	B	2	58.5	59.6	60.1	58.8	1.3	57.9	2.2	57.4	2.7	57.4	2.7	57.4	2.7
33	B	2	60.8	61.4	61.9	60.2	1.7	59.4	2.5	58.8	3.1	58.8	3.1	58.8	3.1
34	B	1	62.3	63.4	63.8	62.1	1.7	61.2	2.6	60.7	3.1	60.7	3.1	60.7	3.1
35	B	1	63.4	65.2	65.4	63.5	1.9	62.6	2.8	62	3.4	62	3.4	62	3.4
36	B	2	63.6	65.9	66.3	65	1.3	64.2	2.1	63.5	2.8	63.5	2.8	63.5	2.8
37	B	2	59.7	60.2	60.7	59.5	1.2	58.6	2.1	58	2.7	58	2.7	58	2.7
38	B	3	60.8	61.5	62	60.5	1.5	59.5	2.5	59	3	59	3	59	3
39	B	2	61.3	62.3	62.7	61.1	1.6	60.2	2.5	59.7	3	59.7	3	59.7	3
40	B	2	62.7	64.3	64.7	63.1	1.6	62.3	2.4	61.6	3.1	61.6	3.1	61.6	3.1
41	B	4	63.2	65.3	65.7	64.8	0.9	64	1.7	63.4	2.3	63.4	2.3	63.4	2.3
42	B	3	58.6	60	61.2	60	1.2	59.5	1.7	59.1	2.1	59.1	2.1	59.1	2.1
43	B	3	60	61.8	62.8	61.5	1.3	61	1.8	60.6	2.2	60.6	2.2	60.6	2.2
44	B	3	60.7	62.5	63.4	62.2	1.2	61.6	1.8	61.2	2.2	61.2	2.2	61.2	2.2
45	B	2	61.6	63.4	64.2	62.9	1.3	62.3	1.9	61.7	2.5	61.7	2.5	61.7	2.5
46	B	3	61.5	63.2	63.8	63	0.8	62.3	1.5	61.7	2.1	61.7	2.1	61.7	2.1
47	B	2	58.7	60	61.1	60	1.1	59.2	1.9	58.7	2.4	58.7	2.4	58.7	2.4
48	B	2	60.1	61.7	62.8	61.4	1.4	60.7	2.1	60.3	2.5	60.3	2.5	60.3	2.5
49	B	2	61.2	62.9	63.8	62.5	1.3	61.9	1.9	61.4	2.4	61.4	2.4	61.4	2.4
50	B	3	62.2	64.3	65	63.4	1.6	62.7	2.3	62.1	2.9	62.1	2.9	62.1	2.9

Brown Shaded cells highlight above the NAC

Globeville Receivers North of I-70															
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))												
			Existing	2035 No Action	2035 Managed Lanes										
					10 ft Existing Walls	12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
51	B	1	60.1	61.4	63	62.5	0.5	62.2	0.8	62	1	62	1	62	1
52	B	2	60.5	62	63.6	63	0.6	62.7	0.9	62.5	1.1	62.5	1.1	62.5	1.1
53	B	2	62.1	63.4	65	64.2	0.8	63.8	1.2	63.5	1.5	63.5	1.5	63.5	1.5
54	C	1	63	64.7	66	64.8	1.2	64.2	1.8	63.7	2.3	63.7	2.3	63.7	2.3
55	B	2	60.8	62.1	64	63.4	0.6	63.1	0.9	62.9	1.1	62.9	1.1	62.9	1.1
56	B	2	61.4	62.7	64.5	63.8	0.7	63.5	1	63.2	1.3	63.2	1.3	63.2	1.3
57	C	1	63.3	64.9	66.2	65.3	0.9	64.2	2	63.4	2.8	63.4	2.8	63.4	2.8
58	C	1	63.4	64.9	66.4	66.1	0.3	65.9	0.5	65.9	0.5	65.9	0.5	65.9	0.5
59	B	3	66.3	67.8	69.7	69.2	0.5	68.7	1	67.7	2	67.7	2	67.7	2

	Total Receptors	Existing Impacts	No Action Impacts	Managed Lanes Impacts
Globeville North Total	130	3	5	13

Brown Shaded cells highlight above the NAC

Globeville Receivers South of I-70															
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))												
			Existing	2035 No Action	2035 Managed Lanes										
					10 ft Existing Walls	12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
60	B	3	61.6	63	63.3	63.2	0.1	63.1	0.2	63.1	0.2	63.1	0.2	63.1	0.2
61	B	3	61.5	62.9	63.3	63.1	0.2	63	0.3	62.9	0.4	62.9	0.4	62.9	0.4
62	B	2	60	61.7	62.4	61.8	0.6	61.4	1	60.8	1.6	60.8	1.6	60.8	1.6
63	B	3	59.9	61.2	61.8	61.2	0.6	60.9	0.9	60.5	1.3	60.5	1.3	60.5	1.3
64	B	2	59.6	61.2	61.9	61.3	0.6	60.8	1.1	60.4	1.5	60.4	1.5	60.4	1.5
65	B	3	59.9	61.4	62	61.2	0.8	60.9	1.1	60.4	1.6	60	2	59.7	2.3
66	B	3	59.9	61.2	61.8	61.1	0.7	60.7	1.1	60.3	1.5	60.3	1.5	60.3	1.5
67	C	1	59.8	61.1	61.8	61	0.8	60.7	1.1	60.3	1.5	60.3	1.5	60.3	1.5
68	B	2	59.3	61.1	61.7	61	0.7	60.5	1.2	60	1.7	60	1.7	60	1.7
69	B	2	59.6	61.2	61.9	60.9	1	60.3	1.6	59.8	2.1	59.8	2.1	59.8	2.1
70	B	2	59.5	60.9	61.6	60.2	1.4	59.5	2.1	59	2.6	59	2.6	59	2.6
71	B	2	59	60.2	61.2	59.6	1.6	58.7	2.5	58.3	2.9	58.3	2.9	58.3	2.9
72	B	2	59.9	62.2	62.8	62	0.8	61.5	1.3	61.3	1.5	61.3	1.5	61.3	1.5
73	B	2	60.2	61.9	62.4	61	1.4	60.4	2	59.9	2.5	59.9	2.5	59.9	2.5
74	B	3	59.7	61	61.7	60.2	1.5	59.5	2.2	59	2.7	59	2.7	59	2.7
75	B	1	59.3	60.5	61.2	59.9	1.3	59.3	1.9	58.8	2.4	58.8	2.4	58.8	2.4
76	B	2	61.2	63.9	64.4	63.6	0.8	63	1.4	62.3	2.1	62.3	2.1	62.3	2.1
77	B	2	61.5	63.5	63.8	62.2	1.6	61.5	2.3	60.9	2.9	60.9	2.9	60.9	2.9
78	B	2	61.2	62.5	63	61.2	1.8	60.4	2.6	59.7	3.3	59.7	3.3	59.7	3.3
79	B	3	60.9	62.1	62.6	61.1	1.5	60	2.6	59.3	3.3	59.3	3.3	59.3	3.3
80	B	3	62	64.2	64.5	62.8	1.7	62.1	2.4	61.5	3	61.5	3	61.5	3
81	B	2	61.6	63.2	63.6	61.6	2	60.8	2.8	60.2	3.4	60.2	3.4	60.2	3.4
82	B	3	60.8	62.2	62.7	60.9	1.8	59.9	2.8	59.2	3.5	59.2	3.5	59.2	3.5
83	B	1	60.2	61.4	61.9	60.5	1.4	59.4	2.5	58.8	3.1	58.8	3.1	58.8	3.1
84	B	2	63.9	66.1	66.4	64.4	2	63.4	3	62.6	3.8	62.6	3.8	62.6	3.8

Brown Shaded cells highlight above the NAC

Globeville Receivers South of I-70

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))												
			Existing	2035 No Action	2035 Managed Lanes										
					10 ft Existing Walls	12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
85	B	2	62.7	64.7	65.1	63	2.1	61.6	3.5	60.7	4.4	60.7	4.4	60.7	4.4
86	B	3	60.8	62.2	62.7	61.7	1	59.9	2.8	59.2	3.5	59.2	3.5	59.2	3.5
87	E	1	60.3	61.5	62.1	61.3	0.8	59.5	2.6	58.9	3.2	58.9	3.2	58.9	3.2
88	B	2	64.5	67.3	67.5	65.7	1.8	64.8	2.7	64	3.5	64	3.5	64	3.5
89	B	3	63.1	65	65.4	63.4	2	61.9	3.5	61	4.4	61	4.4	61	4.4
90	B	3	61.8	63.4	63.8	62.5	1.3	60.6	3.2	59.7	4.1	59.7	4.1	59.7	4.1
91	B	1	60.7	62	62.5	61.6	0.9	59.6	2.9	58.8	3.7	58.8	3.7	58.8	3.7
92	E	1	60.1	61.3	61.8	61.1	0.7	59.1	2.7	58.4	3.4	58.4	3.4	58.4	3.4
93	B	2	62.8	64.8	65.4	64.3	1.1	63.6	1.8	62.9	2.5	62.9	2.5	62.9	2.5
94	B	2	62.8	64.5	65.2	63.5	1.7	62.6	2.6	61.7	3.5	61.7	3.5	61.7	3.5
95	B	3	62	63.4	64.3	63.2	1.1	62.2	2.1	61.6	2.7	61.6	2.7	61.6	2.7
96	E	1	61.3	62.6	63.5	62.6	0.9	61.7	1.8	61.2	2.3	61.2	2.3	61.2	2.3
97	B	1	61	62.3	63.1	62.7	0.4	61.8	1.3	61.4	1.7	61.4	1.7	61.4	1.7
98	B	3	63.2	64.6	65.5	63.9	1.6	63.1	2.4	62.3	3.2	62.3	3.2	62.3	3.2
99	B	2	62.9	64.4	65.2	63.6	1.6	62.7	2.5	61.8	3.4	61.8	3.4	61.8	3.4
100	B	2	61.6	63	63.9	62.7	1.2	61.7	2.2	61.1	2.8	61.1	2.8	61.1	2.8
101	B	1	60.3	61.3	62.3	61.7	0.6	60.8	1.5	60.3	2	60.3	2	60.3	2
102	B	1	64.3	64.8	65.5	64.5	1	63.8	1.7	63.1	2.4	62.6	2.9	62.1	3.4
103	B	2	63.8	65.4	66.4	65.4	1	64.5	1.9	63.7	2.7	63.7	2.7	63.7	2.7
104	B	3	63	64.5	65.7	65	0.7	64.4	1.3	63.9	1.8	63.9	1.8	63.9	1.8
105	E	1	62.3	63.7	64.7	64.2	0.5	63.8	0.9	63.6	1.1	63.6	1.1	63.6	1.1
106	B	3	63.7	64.6	66	64.6	1.4	63.6	2.4	62.8	3.2	62.8	3.2	62.8	3.2
107	B	3	62.9	64.4	66.3	65.4	0.9	64.7	1.6	63.7	2.6	63.7	2.6	63.7	2.6

	Total Receptors	Existing Impacts	No Action Impacts	Managed Lanes Impacts
Globeville South Total	102	0	4	19
Globeville Total	232	3	9	32

Brown Shaded cells highlight above the NAC

Elyria-Swansea Receivers North of I-70																			
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing	2035 Partial Cover Lowered															
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
1	E	1	60.9	64.3	62.6	1.7	62.3	2	62	2.3	61.9	2.4	61.8	2.5	61.7	2.6	61.7	2.6
2	B	2	62	65.4	63.6	1.8	63.3	2.1	63	2.4	62.8	2.6	62.8	2.6	62.7	2.7	62.7	2.7
3	E	1	62.4	65.6	63.7	1.9	63.4	2.2	63	2.6	62.9	2.7	62.8	2.8	62.7	2.9	62.7	2.9
4	E	1	63.9	67.1	65	2.1	64.6	2.5	64.4	2.7	64.3	2.8	64.2	2.9	64.1	3	64.1	3
5	B	1	65.2	68.4	66.2	2.2	65.7	2.7	65.6	2.8	65.4	3	65.4	3	65.3	3.1	65.3	3.1
6	B	1	60.4	63.3	61.7	1.6	61.5	1.8	61.1	2.2	61	2.3	60.9	2.4	60.8	2.5	60.8	2.5
7	B	1	60.9	63.9	62.2	1.7	61.9	2	61.6	2.3	61.4	2.5	61.3	2.6	61.3	2.6	61.2	2.7
8	E	2	64.2	67.3	66.6	0.7	66.5	0.8	66.3	1	66.3	1	66.2	1.1	66.2	1.1	66.2	1.1
9	B	1	62.9	65.7	64.7	1	64.6	1.1	64.4	1.3	64.4	1.3	64.3	1.4	64.3	1.4	64.2	1.5
10	B	2	64.9	69	66.5	2.5	66.2	2.8	65.5	3.5	65.2	3.8	65	4	64.9	4.1	64.7	4.3
11	E	2	65.8	68.6	67	1.6	66.8	1.8	66.5	2.1	66.3	2.3	66.2	2.4	66.1	2.5	66	2.6
12	B	1	65.2	67.9	66.7	1.2	66.5	1.4	66.3	1.6	66.3	1.6	66.2	1.7	66.1	1.8	66.1	1.8
13	B	2	61	65.1	62.7	2.4	62.4	2.7	61.8	3.3	61.6	3.5	61.4	3.7	61.3	3.8	61	4.1
14	B	3	61.7	66.6	63.8	2.8	63.3	3.3	62.6	4	62.2	4.4	61.9	4.7	61.7	4.9	61.4	5.2
15	B	2	62.3	68.2	64.9	3.3	64.3	3.9	63.1	5.1	62.4	5.8	62	6.2	61.6	6.6	61.3	6.9
16	B	1	60.7	64	62	2	61.7	2.3	61.2	2.8	61.1	2.9	61	3	60.9	3.1	60.7	3.3
17	B	2	60	69.9	65.9	4	64.3	5.6	63.1	6.8	62.3	7.6	61.8	8.1	61.4	8.5	60.9	9
18	B	1	58.6	63.7	60.5	3.2	60.1	3.6	59.3	4.4	58.7	5	58.5	5.2	58.1	5.6	57.8	5.9
19	B	1	59.2	65.7	62	3.7	61.4	4.3	60.2	5.5	59.6	6.1	59	6.7	58.5	7.2	58.2	7.5
20	B	2	59.1	75.8	66.1	9.7	64.7	11.1	63.5	12.3	62.6	13.2	62	13.8	61.3	14.5	60.7	15.1
21	B	4	59.5	68.3	63.7	4.6	62.8	5.5	61.2	7.1	60.3	8	59.5	8.8	58.9	9.4	58.3	10
22	B	2	59.7	69.9	65	4.9	63.5	6.4	61.9	8	61	8.9	60.3	9.6	59.6	10.3	59.1	10.8
23	B	1	59	62.8	59.4	3.4	59.1	3.7	58.4	4.4	57.9	4.9	57.7	5.1	57.4	5.4	57.1	5.7
24	B	3	59.3	72.5	67	5.5	65.2	7.3	63.7	8.8	62.7	9.8	61.9	10.6	61.3	11.2	60.7	11.8

Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

Elyria-Swansea Receivers North of I-70																			
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing	2035 Partial Cover Lowered															
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
25	B	1	58.1	64.6	61	3.6	60.5	4.1	59.3	5.3	58.7	5.9	58.2	6.4	57.7	6.9	57.4	7.2
26	B	2	58.3	65.7	62	3.7	61.3	4.4	59.9	5.8	59.1	6.6	58.6	7.1	58	7.7	57.5	8.2
27	B	3	59.3	67.9	63.8	4.1	62.9	5	61.3	6.6	60.4	7.5	59.6	8.3	59	8.9	58.4	9.5
28	B	2	58.9	63	61.1	1.9	60.9	2.1	60.5	2.5	59.9	3.1	59.6	3.4	59.4	3.6	59.1	3.9
29	B	1	59.1	62.9	59.6	3.3	59.2	3.7	58.7	4.2	57.9	5	57.5	5.4	57.1	5.8	56.8	6.1
30	B	1	60.5	69.5	66.1	3.4	65.6	3.9	64.8	4.7	64.2	5.3	63.7	5.8	63.3	6.2	63	6.5
31	B	2	59.5	64.7	62.9	1.8	62.6	2.1	62.2	2.5	61.7	3	61.4	3.3	61.2	3.5	60.9	3.8
32	B	3	61.4	74.9	68	6.9	66.6	8.3	65.3	9.6	64.3	10.6	63.6	11.3	62.8	12.1	62.2	12.7
33	B	3	60.4	68.2	65.2	3	64.9	3.3	64.2	4	63.7	4.5	63.2	5	62.7	5.5	62.4	5.8
34	B	2	60.8	69.3	67.2	2.1	66.7	2.6	66.2	3.1	65.6	3.7	65.3	4	65	4.3	64.7	4.6
35	B	2	58.6	63.7	61.1	2.6	60.7	3	60.3	3.4	59.5	4.2	59	4.7	58.6	5.1	58.3	5.4
36	B	4	59.9	66.4	64.1	2.3	63.6	2.8	63.1	3.3	62.4	4	62	4.4	61.6	4.8	61.4	5
37	B	3	61.2	74.5	69.3	5.2	68.8	5.7	68.4	6.1	67.8	6.7	67.2	7.3	66.8	7.7	66.5	8
38	B	2	59.6	62.1	58.7	3.4	58.3	3.8	57.9	4.2	57.2	4.9	56.7	5.4	56.4	5.7	56.1	6
39	B	2	60.2	61.3	58	3.3	57.4	3.9	56.9	4.4	56.4	4.9	55.9	5.4	55.5	5.8	55.2	6.1
40	B	2	63.6	65.5	61.6	3.9	60.9	4.6	60.3	5.2	59.8	5.7	59.5	6	59.2	6.3	58.8	6.7
41	B	1	61	61.2	57.8	3.4	57.3	3.9	57	4.2	56.5	4.7	56.1	5.1	55.7	5.5	55.4	5.8
42	B	4	65.4	70.6	66	4.6	65.4	5.2	65	5.6	64.5	6.1	64	6.6	63.5	7.1	63.1	7.5
43	B	2	62.3	63	60.1	2.9	59.8	3.2	59.6	3.4	59.4	3.6	59.1	3.9	58.8	4.2	58.6	4.4
44	B	3	63.6	65.9	62.6	3.3	62.2	3.7	61.9	4	61.6	4.3	61.3	4.6	60.9	5	60.5	5.4
45	B	3	65.7	71.7	66.2	5.5	65.5	6.2	64.9	6.8	64.4	7.3	63.9	7.8	63.5	8.2	63	8.7
46	B	3	62.1	63.2	59.9	3.3	59.6	3.6	59.5	3.7	59.4	3.8	59.1	4.1	58.8	4.4	58.6	4.6

Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

Elyria-Swansea Receivers North of I-70																				
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																	
			Existing	2035 Partial Cover Lowered																
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls			
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)		
53	B	2	65.3	66.7	64.5	2.2	64.1	2.6	63.9	2.8	63.7	3	63.5	3.2	63.4	3.3	63.3	3.4		
54	B	4	65.3	63.5	61.9	1.6	61.6	1.9	61.4	2.1	61.2	2.3	61.2	2.3	61	2.5	60.8	2.7		
55	B	4	63.3	61.1	59.5	1.6	59.3	1.8	59.2	1.9	58.9	2.2	58.7	2.4	58.6	2.5	58.4	2.7		
56	B	2	61.4	59.7	58	1.7	57.8	1.9	57.6	2.1	57.3	2.4	57.1	2.6	57	2.7	56.8	2.9		
57	B	2	61.6	60.6	59.6	1	59.4	1.2	59.3	1.3	59.1	1.5	59	1.6	59	1.6	58.9	1.7		
58	B	2	65	67.6	67.2	0.4	67.2	0.4	67.1	0.5	67.1	0.5	67.1	0.5	67.1	0.5	67.1	0.5		
59	B	3	63.2	62.9	62.2	0.7	62.1	0.8	62	0.9	61.9	1	61.8	1.1	61.8	1.1	61.8	1.1		
60	B	1	64	64.6	64.2	0.4	64.2	0.4	64.1	0.5	64.1	0.5	64.1	0.5	64	0.6	64	0.6		
61	B	2	63.9	65.1	64.6	0.5	64.5	0.6	64.5	0.6	64.5	0.6	64.5	0.6	64.5	0.6	64.5	0.6		
62	B	1	63.1	63.5	62.9	0.6	62.9	0.6	62.8	0.7	62.7	0.8	62.7	0.8	62.7	0.8	62.6	0.9		
63	B	1	61.5	60.8	60.1	0.7	60	0.8	59.9	0.9	59.8	1	59.8	1	59.7	1.1	59.7	1.1		
64	B	2	60.9	60.1	59.2	0.9	59.1	1	59	1.1	58.9	1.2	58.9	1.2	58.8	1.3	58.8	1.3		
65	E	1	61.8	62.1	61.6	0.5	61.5	0.6	61.4	0.7	61.4	0.7	61.4	0.7	61.3	0.8	61.3	0.8		
66	B	1	61.6	61.8	61.2	0.6	61.1	0.7	61.1	0.7	61	0.8	60.9	0.9	60.9	0.9	60.9	0.9		

	Total Receptors	Existing Impacts	Partial Cover Lowered Impacts
Elyria Total	129	5	63

Brown Shaded cells highlight above the NAC

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Elyria-Swansea Receivers North of I-70																			
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing	2035 Partial Cover Lowered															
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
67	B	1	63.4	69.6	67.6	2	67.5	2.1	67.4	2.2	67.3	2.3	67.2	2.4	67.2	2.4	67.1	2.5
68	B	3	64.4	66.5	64.9	1.6	64.8	1.7	64.7	1.8	64.6	1.9	64.5	2	64.5	2	64.5	2
69	B	2	63.7	64.6	63.3	1.3	63.2	1.4	63.1	1.5	63	1.6	62.9	1.7	62.9	1.7	62.9	1.7
70	B	2	62.8	62.9	61.7	1.2	61.7	1.2	61.6	1.3	61.5	1.4	61.5	1.4	61.4	1.5	61.4	1.5
71	B	3	62	62	60.9	1.1	60.8	1.2	60.7	1.3	60.7	1.3	60.6	1.4	60.6	1.4	60.6	1.4
72	B	2	61.8	62.9	62.2	0.7	62.2	0.7	62.1	0.8	62.1	0.8	62.1	0.8	62.1	0.8	62.1	0.8
73	B	1	61.2	59.8	58.6	1.2	58.5	1.3	58.3	1.5	58.3	1.5	58.2	1.6	58.2	1.6	58.1	1.7
74	B	1	62.7	64.6	63.3	1.3	63.2	1.4	63.1	1.5	63	1.6	62.9	1.7	62.9	1.7	62.8	1.8
75	B	2	63.4	64.7	63.4	1.3	63.2	1.5	63.1	1.6	63.1	1.6	63	1.7	62.9	1.8	62.8	1.9
76	B	3	61.8	61	59.4	1.6	59.3	1.7	59.2	1.8	59.1	1.9	59	2	58.9	2.1	58.8	2.2
77	B	2	60.4	57.6	56.6	1	56.5	1.1	56.4	1.2	56.4	1.2	56.3	1.3	56.2	1.4	56.2	1.4
78	B	3	62.6	62.4	61	1.4	60.9	1.5	60.8	1.6	60.7	1.7	60.6	1.8	60.5	1.9	60.5	1.9
79	B	3	63.6	69.2	66.6	2.6	66.5	2.7	66.3	2.9	66.2	3	66.1	3.1	66.1	3.1	66	3.2
80	B	2	62.3	63.8	61	2.8	60.8	3	60.6	3.2	60.5	3.3	60.4	3.4	60.3	3.5	60.3	3.5
81	B	2	60.7	60.8	58.1	2.7	57.9	2.9	57.8	3	57.7	3.1	57.6	3.2	57.5	3.3	57.4	3.4
82	B	2	59.6	58.1	56.1	2	55.9	2.2	55.8	2.3	55.8	2.3	55.7	2.4	55.7	2.4	55.6	2.5
83	B	2	60	59.3	56.9	2.4	56.7	2.6	56.6	2.7	56.5	2.8	56.4	2.9	56.3	3	56.3	3
84	B	1	59.5	57	55.2	1.8	55.1	1.9	55	2	54.9	2.1	54.8	2.2	54.8	2.2	54.7	2.3
85	B	2	63	70.5	69.3	1.2	69.2	1.3	69.1	1.4	69.1	1.4	69	1.5	69	1.5	68.9	1.6
86	B	3	62.5	64.8	62.7	2.1	62.6	2.2	62.5	2.3	62.4	2.4	62.3	2.5	62.2	2.6	62.2	2.6
87	B	2	59.8	60.5	58	2.5	57.8	2.7	57.7	2.8	57.6	2.9	57.5	3	57.5	3	57.4	3.1
88	B	3	61	61.9	59.6	2.3	59.4	2.5	59.3	2.6	59.2	2.7	59.1	2.8	59.1	2.8	59	2.9
89	B	2	59.4	58.9	56.6	2.3	56.4	2.5	56.3	2.6	56.3	2.6	56.2	2.7	56.2	2.7	56.2	2.7
90	B	1	63.7	70	69.9	0.1	69.9	0.1	69.8	0.2	69.8	0.2	69.8	0.2	69.8	0.2	69.8	0.2
91	B	1	57.2	52.4	51.8	0.6	51.7	0.7	51.7	0.7	51.6	0.8	51.6	0.8	51.5	0.9	51.5	0.9

Brown Shaded cells highlight above the NAC

Elyria-Swansea Receivers North of I-70

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))															
			Existing	2035 Partial Cover Lowered														
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
92	B	1	63.2	64.9	64.7	0.2	64.7	0.2	64.7	0.2	64.6	0.3	64.6	0.3	64.6	0.3	64.6	0.3
93	B	1	60.3	54.3	52.7	1.6	52.6	1.7	52.6	1.7	52.5	1.8	52.4	1.9	52.4	1.9	52.3	2
94	B	3	60.7	55.1	53.1	2	53	2.1	53	2.1	52.9	2.2	52.9	2.2	52.8	2.3	52.7	2.4
95	B	2	62.8	58.2	57.6	0.6	57.5	0.7	57.5	0.7	57.5	0.7	57.5	0.7	57.4	0.8	57.4	0.8
96	B	1	64.4	60.9	60.6	0.3	60.6	0.3	60.5	0.4	60.5	0.4	60.4	0.5	60.4	0.5	60.4	0.5
97	B	1	66.4	66.7	66.2	0.5	66.1	0.6	66.1	0.6	66.1	0.6	66	0.7	66	0.7	66	0.7
98	B	2	65.4	63.5	63.1	0.4	63	0.5	63	0.5	62.9	0.6	62.9	0.6	62.8	0.7	62.8	0.7
99	B	2	63.5	59.2	58.5	0.7	58.5	0.7	58.4	0.8	58.4	0.8	58.3	0.9	58.3	0.9	58.2	1
100	B	2	61.9	57.3	56	1.3	56	1.3	55.9	1.4	55.9	1.4	55.8	1.5	55.7	1.6	55.7	1.6
101	B	1	60.7	55.5	54.7	0.8	54.7	0.8	54.6	0.9	54.5	1	54.5	1	54.4	1.1	54.4	1.1
102	B	1	67.7	71.5	69.5	2	69.3	2.2	69.1	2.4	69	2.5	69	2.5	68.9	2.6	68.9	2.6
103	B	2	66.8	67.6	65.6	2	65.4	2.2	65.3	2.3	65.2	2.4	65.1	2.5	65	2.6	64.9	2.7
104	B	2	64.8	61.7	60.4	1.3	60.4	1.3	60.3	1.4	60.1	1.6	60	1.7	59.9	1.8	59.8	1.9
105	B	2	63.1	58.2	57.2	1	57.2	1	57	1.2	56.9	1.3	56.8	1.4	56.7	1.5	56.6	1.6
106	B	1	61.6	56.6	55.3	1.3	55.4	1.2	55.2	1.4	55.1	1.5	55	1.6	54.9	1.7	54.8	1.8
107	B	1	60.7	56	55	1	54.9	1.1	54.7	1.3	54.6	1.4	54.5	1.5	54.5	1.5	54.4	1.6
108	B	2	65.8	63.9	62.4	1.5	62.3	1.6	62.1	1.8	61.9	2	61.7	2.2	61.6	2.3	61.4	2.5
109	B	2	62.7	57.6	56	1.6	55.8	1.8	55.6	2	55.4	2.2	55.3	2.3	55.2	2.4	55.1	2.5
110	B	2	63.9	59.3	58	1.3	58	1.3	57.8	1.5	57.6	1.7	57.4	1.9	57.3	2	57.2	2.1
111	B	2	61.6	56.8	55.4	1.4	55.2	1.6	55	1.8	54.9	1.9	54.8	2	54.7	2.1	54.6	2.2
112	B	2	65.7	68.1	66.5	1.6	66.4	1.7	66.2	1.9	66.1	2	66	2.1	66	2.1	65.9	2.2
113	B	2	64.6	64.2	61.7	2.5	61.4	2.8	61.1	3.1	60.9	3.3	60.7	3.5	60.5	3.7	60.3	3.9
114	B	2	62.9	60.3	58.4	1.9	58.4	1.9	58.2	2.1	58	2.3	57.8	2.5	57.7	2.6	57.5	2.8
115	B	1	61.5	58.3	56.8	1.5	56.8	1.5	56.6	1.7	56.5	1.8	56.3	2	56.3	2	56.2	2.1

Brown Shaded cells highlight above the NAC

Elyria-Swansea Receivers North of I-70																				
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																	
			Existing	2035 Partial Cover Lowered																
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls			
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)		
116	B	1	60.9	58.2	56.7	1.5	56.7	1.5	56.5	1.7	56.4	1.8	56.3	1.9	56.2	2	56.1	2.1		
117	B	1	65.8	68.7	65.1	3.6	64.8	3.9	64.5	4.2	64.3	4.4	64.1	4.6	64	4.7	63.9	4.8		
118	B	2	64.7	65.3	62.5	2.8	62.2	3.1	62	3.3	61.8	3.5	61.6	3.7	61.4	3.9	61.3	4		
119	B	2	63	61.6	59	2.6	58.9	2.7	58.6	3	58.4	3.2	58.3	3.3	58.2	3.4	58	3.6		
120	B	2	61.5	58.4	57.2	1.2	57.1	1.3	56.9	1.5	56.8	1.6	56.7	1.7	56.6	1.8	56.5	1.9		
121	B	1	60	57.4	56.4	1	56.3	1.1	56.2	1.2	56.1	1.3	56	1.4	56	1.4	55.9	1.5		
122	B	2	65.2	69.9	67.6	2.3	67.3	2.6	67.2	2.7	67.1	2.8	67	2.9	66.9	3	66.9	3		
123	B	2	64.2	64.3	62.9	1.4	62.8	1.5	62.6	1.7	62.5	1.8	62.5	1.8	62.4	1.9	62.3	2		
124	B	2	62.6	61.6	60.2	1.4	60.2	1.4	60	1.6	59.9	1.7	59.9	1.7	59.8	1.8	59.8	1.8		
125	B	2	59.4	58.7	57.5	1.2	57.5	1.2	57.3	1.4	57.2	1.5	57.2	1.5	57.1	1.6	57.1	1.6		
126	B	2	59	57.6	56.3	1.3	56.3	1.3	56.2	1.4	56.1	1.5	56	1.6	56	1.6	56	1.6		
127	B	2	63.6	62.6	61.6	1	61.5	1.1	61.4	1.2	61.3	1.3	61.2	1.4	61.2	1.4	61.2	1.4		
128	B	2	61	60	59.2	0.8	59.2	0.8	59.1	0.9	59	1	59	1	59	1	58.9	1.1		
129	B	2	60.7	60.2	59.3	0.9	59.2	1	59	1.2	59	1.2	58.9	1.3	58.9	1.3	58.9	1.3		
130	B	3	64.9	64.7	63.9	0.8	63.9	0.8	63.8	0.9	63.8	0.9	63.7	1	63.7	1	63.7	1		
131	B	2	65.5	66	63	3	62.7	3.3	62.5	3.5	62.4	3.6	62.3	3.7	62.2	3.8	62.1	3.9		
132	B	1	62	64.4	62.1	2.3	61.8	2.6	61.7	2.7	61.6	2.8	61.5	2.9	61.4	3	61.4	3		
133	B	1	60.3	63.6	62.9	0.7	62.8	0.8	62.8	0.8	62.8	0.8	62.8	0.8	62.8	0.8	62.7	0.9		

	Total Receptors	Existing Impacts	Partial Cover Lowered Impacts
Swansea North Total	123	11	21
Elyria-Swansea North Total	252	16	84

Brown Shaded cells highlight above the NAC

Elyria-Swansea Receivers South of I-70																		
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))															
			Existing	2035 Partial Cover Lowered														
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
134	B	2	63.8	61.1	60.6	0.5	60.5	0.6	60.5	0.6	60.5	0.6	60.5	0.6	60.5	0.6	60.5	0.6
135	B	1	63.7	60.5	60	0.5	60	0.5	60	0.5	60	0.5	60	0.5	60	0.5	60	0.5
136	B	2	66.1	64	63.2	0.8	63.1	0.9	63.1	0.9	63.1	0.9	63	1	63	1	63	1
137	B	1	66.7	65.4	64.6	0.8	64.5	0.9	64.5	0.9	64.4	1	64.4	1	64.4	1	64.4	1
138	E	1	67	68.2	67.3	0.9	67.3	0.9	67.3	0.9	67.2	1	67.2	1	67.2	1	67.2	1
139	B	3	61.1	56.3	55.3	1	55.3	1	55.2	1.1	55.2	1.1	55.2	1.1	55.1	1.2	55.1	1.2
140	B	2	60.9	56.7	55.7	1	55.6	1.1	55.6	1.1	55.5	1.2	55.5	1.2	55.5	1.2	55.5	1.2
141	B	1	61.5	56.8	55.6	1.2	55.6	1.2	55.5	1.3	55.5	1.3	55.4	1.4	55.4	1.4	55.4	1.4
142	B	2	60.9	58.1	56.9	1.2	56.8	1.3	56.7	1.4	56.7	1.4	56.6	1.5	56.6	1.5	56.6	1.5
143	B	1	62.3	59.6	58.2	1.4	58.2	1.4	58.1	1.5	58.1	1.5	58	1.6	58	1.6	58	1.6
144	B	4	62.1	61.6	60.3	1.3	60.2	1.4	60.2	1.4	60.1	1.5	60.1	1.5	60	1.6	60	1.6
145	B	4	63.5	65.8	64.7	1.1	64.6	1.2	64.5	1.3	64.5	1.3	64.4	1.4	64.4	1.4	64.3	1.5
146	E	1	67.2	70	69.1	0.9	69	1	68.9	1.1	68.9	1.1	68.8	1.2	68.8	1.2	68.8	1.2
147	B	2	59.1	57.8	56.7	1.1	56.6	1.2	56.5	1.3	56.5	1.3	56.5	1.3	56.4	1.4	56.4	1.4
148	B	3	60.6	62.1	60.6	1.5	60.5	1.6	60.5	1.6	60.4	1.7	60.4	1.7	60.3	1.8	60.3	1.8
149	B	3	62	64.7	63.6	1.1	63.5	1.2	63.4	1.3	63.4	1.3	63.3	1.4	63.3	1.4	63.2	1.5
150	B	2	65.9	68.9	68.3	0.6	68.2	0.7	68.2	0.7	68.1	0.8	68	0.9	68	0.9	68	0.9
151	B	3	60.1	60.6	59.2	1.4	59.1	1.5	59	1.6	58.9	1.7	58.9	1.7	58.8	1.8	58.8	1.8
152	B	2	57.9	56.7	55.8	0.9	55.7	1	55.6	1.1	55.6	1.1	55.6	1.1	55.6	1.1	55.5	1.2
153	B	3	57.2	55.6	54.6	1	54.5	1.1	54.5	1.1	54.4	1.2	54.4	1.2	54.4	1.2	54.3	1.3
154	B	1	57.4	56.8	55.7	1.1	55.6	1.2	55.5	1.3	55.5	1.3	55.4	1.4	55.4	1.4	55.4	1.4
155	B	2	58.5	56.9	55.9	1	55.8	1.1	55.8	1.1	55.7	1.2	55.7	1.2	55.6	1.3	55.6	1.3
156	E	1	64.5	67.3	67.1	0.2	67.1	0.2	67.1	0.2	67.1	0.2	67.1	0.2	67.1	0.2	67.1	0.2
157	B	2	58.6	57.1	56.1	1	56.1	1	56	1.1	56	1.1	55.9	1.2	55.9	1.2	55.9	1.2

Brown Shaded cells highlight above the NAC

Elyria-Swansea Receivers South of I-70																				
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																	
				2035 Partial Cover Lowered																
			Existing	No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
158	B	1	61	59.7	58.9	0.8	58.8	0.9	58.8	0.9	58.7	1	58.7	1	58.6	1.1	58.6	1.1
159	B	1	61.2	61.7	60.9	0.8	60.9	0.8	60.9	0.8	60.8	0.9	60.8	0.9	60.8	0.9	60.7	1
160	B	1	64.7	68.3	68.2	0.1	68.2	0.1	68.2	0.1	68.2	0.1	68.2	0.1	68.2	0.1	68.2	0.1
161	E	1	66.4	74.3	74.2	0.1	74.2	0.1	74.2	0.1	74.2	0.1	74.2	0.1	74.2	0.1	74.2	0.1
162	B	1	60.9	60	59	1	58.9	1.1	58.9	1.1	58.8	1.2	58.7	1.3	58.7	1.3	58.7	1.3
163	B	2	61.3	61.9	61	0.9	61	0.9	61	0.9	60.9	1	60.8	1.1	60.8	1.1	60.8	1.1
164	B	1	63.1	66.3	65.9	0.4	65.9	0.4	65.8	0.5	65.8	0.5	65.8	0.5	65.8	0.5	65.8	0.5
165	B	1	58.8	56.1	54.4	1.7	54.3	1.8	54.1	2	54	2.1	53.9	2.2	53.8	2.3	53.6	2.5
166	B	1	59.8	57.7	56.1	1.6	56	1.7	55.9	1.8	55.7	2	55.7	2	55.6	2.1	55.5	2.2
167	B	3	60.9	60	59	1	59	1	58.9	1.1	58.8	1.2	58.8	1.2	58.7	1.3	58.7	1.3
168	B	2	61.1	62.7	62	0.7	61.9	0.8	61.8	0.9	61.8	0.9	61.8	0.9	61.7	1	61.7	1
169	B	2	65.2	70.5	70.1	0.4	70	0.5	70	0.5	70	0.5	70	0.5	69.9	0.6	69.9	0.6
170	B	2	63.3	66.9	66.5	0.4	66.4	0.5	66.4	0.5	66.4	0.5	66.4	0.5	66.4	0.5	66.3	0.6
171	B	1	60.8	58.8	57.2	1.6	57.1	1.7	57	1.8	56.9	1.9	56.8	2	56.6	2.2	56.6	2.2
172	B	1	60	57.9	56.3	1.6	56.2	1.7	56.1	1.8	55.9	2	55.8	2.1	55.7	2.2	55.6	2.3
173	B	2	62.8	61.6	59.4	2.2	59.3	2.3	58.8	2.8	58.6	3	58.5	3.1	58.4	3.2	58.3	3.3
174	B	2	63.8	63.5	61.2	2.3	61	2.5	60.6	2.9	60.4	3.1	60.3	3.2	60.1	3.4	60	3.5
175	B	2	64.9	65.4	62.6	2.8	62.1	3.3	61.8	3.6	61.7	3.7	61.5	3.9	61.5	3.9	61.4	4
176	B	2	60.8	58.4	56.6	1.8	56.5	1.9	56.3	2.1	56.1	2.3	55.8	2.6	55.7	2.7	55.6	2.8
177	B	4	66.2	68	64.9	3.1	64.3	3.7	64	4	63.9	4.1	63.8	4.2	63.8	4.2	63.7	4.3
178	B	1	62.3	60.1	58	2.1	57.6	2.5	57.3	2.8	57.2	2.9	57	3.1	56.9	3.2	56.8	3.3
179	B	2	59.9	57.9	56.2	1.7	56	1.9	55.7	2.2	55.5	2.4	55.3	2.6	55.2	2.7	55.1	2.8
180	B	2	64.2	62.8	60.1	2.7	59.6	3.2	59.2	3.6	59	3.8	58.9	3.9	58.7	4.1	58.6	4.2
181	B	2	67	66.1	62.6	3.5	62.4	3.7	62.1	4	61.9	4.2	61.7	4.4	61.6	4.5	61.5	4.6

Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

Elyria-Swansea Receivers South of I-70

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing	2035 Partial Cover Lowered															
				No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
				Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
182	B	1	59.2	58	56.3	1.7	56.1	1.9	55.9	2.1	55.6	2.4	55.4	2.6	55.2	2.8	55.1	2.9
183	B	2	68.7	68.4	64.2	4.2	64	4.4	63.6	4.8	63.5	4.9	63.4	5	63.3	5.1	63.2	5.2
184	B	1	60.7	57.5	55.5	2	55.1	2.4	54.7	2.8	54.2	3.3	54	3.5	53.7	3.8	53.4	4.1
185	B	1	63.9	61.3	59.2	2.1	58.8	2.5	58.5	2.8	58	3.3	57.6	3.7	57.3	4	57	4.3
186	B	2	62.7	59.5	57.4	2.1	57.2	2.3	56.8	2.7	56.4	3.1	56.1	3.4	55.8	3.7	55.6	3.9
187	B	5	66.5	64.6	61.8	2.8	61.4	3.2	61	3.6	60.4	4.2	60	4.6	59.6	5	59.3	5.3
188	B	2	68.6	70.4	64.4	6	63.7	6.7	63	7.4	62.5	7.9	62	8.4	61.6	8.8	61.2	9.2
189	B	2	61.5	58	56.1	1.9	55.7	2.3	55.2	2.8	54.9	3.1	54.6	3.4	54.3	3.7	54.1	3.9
190	B	3	65.3	62.5	60.2	2.3	59.6	2.9	59.1	3.4	58.5	4	58	4.5	57.5	5	57.1	5.4
191	B	1	62.9	59.4	57.5	1.9	57.1	2.3	56.7	2.7	56.3	3.1	56	3.4	55.7	3.7	55.4	4
192	B	1	71.1	73.1	66.7	6.4	65.9	7.2	65	8.1	64.2	8.9	63.7	9.4	63.2	9.9	62.8	10.3
193	B	2	64	67.7	63.6	4.1	62.8	4.9	62	5.7	60.9	6.8	59.4	8.3	58.8	8.9	58.5	9.2
194	B	2	65.4	63.6	60.8	2.8	60.2	3.4	59.6	4	58.5	5.1	57.7	5.9	57.3	6.3	57.1	6.5
195	B	2	61.2	58.7	56.4	2.3	56.3	2.4	55.8	2.9	55.1	3.6	54.8	3.9	54.4	4.3	54.3	4.4
196	B	2	63.2	60.3	58	2.3	57.8	2.5	57.3	3	56.7	3.6	56.3	4	56	4.3	55.8	4.5
197	B	2	60.1	57.6	55.1	2.5	55	2.6	54.5	3.1	53.9	3.7	53.6	4	53.3	4.3	53.1	4.5
198	B	2	61.4	58.6	56.4	2.2	56.2	2.4	55.7	2.9	55.3	3.3	54.9	3.7	54.7	3.9	54.5	4.1
199	E	1	66	66.5	62.7	3.8	62.1	4.4	60.6	5.9	59.9	6.6	59.2	7.3	58.9	7.6	58.6	7.9
200	B	2	61.7	60.7	59.8	0.9	59.7	1	59.5	1.2	59.5	1.2	59.4	1.3	59.4	1.3	59.4	1.3
201	B	2	62.3	61.6	60.6	1	60.5	1.1	60.4	1.2	60.3	1.3	60.3	1.3	60.2	1.4	60.2	1.4
202	B	2	63.7	62.3	60.6	1.7	60.5	1.8	60.2	2.1	60.1	2.2	60	2.3	60	2.3	59.9	2.4
203	B	2	63.2	63.6	63.1	0.5	63.1	0.5	63	0.6	63	0.6	63	0.6	63	0.6	63	0.6
204	B	2	64	64.5	64	0.5	63.9	0.6	63.9	0.6	63.9	0.6	63.8	0.7	63.8	0.7	63.8	0.7

Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

Elyria-Swansea Receivers South of I-70

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing		2035 Partial Cover Lowered														
					No Walls	8 ft Walls		10 ft Walls		12 ft Walls		14 ft Walls		16 ft Walls		18 ft Walls		20 ft Walls	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
205	B	2	65.2	65.6	64.9	0.7	64.8	0.8	64.8	0.8	64.7	0.9	64.7	0.9	64.7	0.9	64.7	0.9	205
206	B	4	61.8		61.1	59.4	1.7	59.2	1.9	59.1	2	59	2.1	58.9	2.2	58.9	2.2	58.8	2.3
207	B	2	60.9		59.5	57.8	1.7	57.7	1.8	57.6	1.9	57.5	2	57.4	2.1	57.4	2.1	57.3	2.2
208	B	1	61.7		60.4	58.8	1.6	58.7	1.7	58.5	1.9	58.5	1.9	58.4	2	58.4	2	58.3	2.1
209	B	3	62.9		62.2	60.7	1.5	60.6	1.6	60.5	1.7	60.4	1.8	60.4	1.8	60.3	1.9	60.3	1.9
210	B	1	66.2		64.2	62.1	2.1	61.8	2.4	61.7	2.5	61.6	2.6	61.5	2.7	61.5	2.7	61.4	2.8
211	B	2	61.8		59	56.6	2.4	56.4	2.6	56.2	2.8	56	3	55.9	3.1	55.8	3.2	55.7	3.3
212	B	2	63		60	57.1	2.9	56.9	3.1	56.7	3.3	56.6	3.4	56.4	3.6	56.4	3.6	56.3	3.7
213	B	1	66		63.4	60.3	3.1	59.9	3.5	59.6	3.8	59.5	3.9	59.3	4.1	59.3	4.1	59.2	4.2
214	B	2	62.9		60.2	57.2	3	57.1	3.1	56.9	3.3	56.7	3.5	56.6	3.6	56.5	3.7	56.5	3.7
215	B	1	63.2		60.7	58	2.7	57.7	3	57.5	3.2	57.4	3.3	57.2	3.5	57.1	3.6	57.1	3.6
216	B	3	66.7		63.7	60.5	3.2	60.3	3.4	60	3.7	59.8	3.9	59.7	4	59.6	4.1	59.5	4.2
217	B	2	63.9		59.4	57.6	1.8	57.4	2	57.2	2.2	57	2.4	56.9	2.5	56.8	2.6	56.7	2.7
218	B	2	62.9		58.5	56.4	2.1	56.2	2.3	56.1	2.4	56	2.5	55.9	2.6	55.8	2.7	55.8	2.7
219	B	1	67.2		65.6	62.9	2.7	62.6	3	62.4	3.2	62.2	3.4	62.1	3.5	62	3.6	61.9	3.7
220	B	1	66.5		62.5	59.9	2.6	59.6	2.9	59.4	3.1	59.3	3.2	59.2	3.3	59.1	3.4	59	3.5
221	E	1	68.6		64.9	62.2	2.7	62	2.9	61.7	3.2	61.5	3.4	61.4	3.5	61.3	3.6	61.2	3.7

	Total Receptors	Existing Impacts	Partial Cover Lowered Impacts
Swansea South Total	164	28	29

Brown Shaded cells highlight above the NAC

Northfield Stapleton						
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))			
			Existing	2035 No Action	2035 General Purpose	2035 Managed Lanes
284	E	1	59	60.4	61.1	60.9
285	E	1	61.8	63.2	64.2	63.8
286	E	1	60.5	62.3	66.3	65.6
287	E	1	62.4	63.7	66.4	64.8
288	E	1	64.9	66.5	68.9	68
289	E	1	64	65.6	68	67.2

	Total Receptors	Existing Impacts	No Action Impacts	General Purpose Impacts	Managed Lanes Impacts
Stapleton Totals	6	0	0	0	0

Peoria					
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))		
			Existing	2035 No Action	2035 Managed Lanes
290	C	1	61	61.9	64.4
291	E	11	60.9	61.7	61.6
292	E	11	63.7	64.5	64.6
293	E	8	60.6	61.3	64.3
294	E	8	64.5	65.1	67.1
295	E	8	62.1	62.7	65.9
296	E	8	66.1	66.6	68.5
297	E	9	62.8	63.6	62.9
298	E	9	65.5	66.4	66.1
299	E	6	61.7	62.5	62.1
300	E	6	64.4	65.2	65.4
301	E	7	64.6	65.2	66.2
302	E	7	67.2	67.6	69.3
303	E	1	68.7	69.4	69.7

	Total Receptors	Existing Impacts	No Action Impacts	Managed Lanes Impacts
Peoria ML Totals	100	0	0	0

Montbello

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																	
			Existing	2035 No Action	2035 Managed Lanes															
					10 ft Existing Walls	8 ft Walls (New) with 10 ft Existing Walls		10 ft Walls (New) with 10 ft Existing Walls		12 ft		14 ft		16 ft		18 ft		20 ft	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
304	B	4	57.3	57.1	58.5	58.4	0.1	58.4	0.1	57.7	0.8	57.4	1.1	57.1	1.4	56.8	1.7	56.5	2
305	B	2	57.3	57.3	58.7	58.6	0.1	58.6	0.1	57.9	0.8	57.6	1.1	57.3	1.4	57.1	1.6	56.8	1.9
306	B	3	57.9	58	59.3	59.1	0.2	59.1	0.2	58.2	1.1	57.8	1.5	57.5	1.8	57.2	2.1	56.8	2.5
307	B	3	58.6	58.7	60	59.8	0.2	59.8	0.2	58.8	1.2	58.3	1.7	57.9	2.1	57.6	2.4	57.2	2.8
308	B	3	59.2	59.4	60.5	60.3	0.2	60.3	0.2	59.1	1.4	58.6	1.9	58.2	2.3	57.8	2.7	57.4	3.1
309	B	2	57.9	58.2	59.6	59.4	0.2	59.4	0.2	58.6	1	58.3	1.3	57.7	1.9	57.2	2.4	56.8	2.8
310	B	2	58	58.4	59.5	59.3	0.2	59.3	0.2	58.6	0.9	58.2	1.3	57.6	1.9	57.1	2.4	56.7	2.8
311	B	3	59.8	60.1	61.4	61.2	0.2	61.2	0.2	60	1.4	59.3	2.1	58.9	2.5	58.4	3	58	3.4
312	B	5	60.4	60.8	61.6	61.4	0.2	61.4	0.2	60.6	1	60	1.6	59.2	2.4	58.8	2.8	58.5	3.1
313	B	2	58.8	59.1	60.2	60	0.2	60	0.2	59.3	0.9	58.9	1.3	58.3	1.9	57.6	2.6	57.2	3
314	B	3	58.6	58.9	60.1	59.9	0.2	59.9	0.2	59.2	0.9	58.9	1.2	58.4	1.7	57.6	2.5	57.2	2.9
315	B	2	59.2	59.7	61	60.8	0.2	60.8	0.2	60.2	0.8	59.8	1.2	59.3	1.7	58.5	2.5	57.8	3.2
316	B	3	59.8	60.1	61.5	61.3	0.2	61.3	0.2	60.7	0.8	60.3	1.2	59.7	1.8	58.7	2.8	58.2	3.3
317	B	2	59.6	60	61.4	61.1	0.3	61.1	0.3	60.5	0.9	60.1	1.3	59.6	1.8	58.7	2.7	58	3.4
318	B	2	61.3	61.5	63	63	0	63	0	61.9	1.1	60.9	2.1	60.3	2.7	59.5	3.5	58.8	4.2
319	B	2	60.8	61.2	63	62.9	0.1	62.8	0.2	61.3	1.7	60.7	2.3	60.1	2.9	59.7	3.3	59.3	3.7
320	B	3	61.5	61.9	63.3	63.1	0.2	63.1	0.2	62	1.3	60.7	2.6	60.1	3.2	59.6	3.7	59.2	4.1
321	B	2	59.8	60.4	62	61.7	0.3	61.7	0.3	61.1	0.9	60.6	1.4	60.1	1.9	59.5	2.5	58.7	3.3
322	B	2	61.2	61.3	62.7	62.4	0.3	62.4	0.3	61.7	1	61.1	1.6	60.6	2.1	59.6	3.1	58.8	3.9
323	B	3	61.9	62.3	63.6	63.5	0.1	63.5	0.1	62.2	1.4	61.2	2.4	60.6	3	60.1	3.5	59.6	4
324	B	2	60	60.8	62.6	62.3	0.3	62.3	0.3	61.8	0.8	61.3	1.3	60.9	1.7	60.3	2.3	59.6	3
325	B	3	60.6	61.2	62.5	62.2	0.3	62.2	0.3	61.5	1	60.9	1.6	60.5	2	59.9	2.6	59.1	3.4
326	B	3	62.8	63.2	64.8	64.6	0.2	64.6	0.2	63.1	1.7	62.1	2.7	61.5	3.3	60.8	4	60.3	4.5
327	B	3	63.3	63.7	65	64.7	0.3	64.7	0.3	63.4	1.6	62.6	2.4	61.9	3.1	61.2	3.8	60.7	4.3
328	B	2	61.2	61.9	64.1	63.7	0.4	63.7	0.4	63	1.1	62.4	1.7	61.9	2.2	61.4	2.7	60.9	3.2

Montbello

Receiver Number	NAC Category	Receptors Modeled	Results (dB(A))																
			Existing	2035 No Action	2035 Managed Lanes														
					10 ft Existing Walls	8 ft Walls (New) with 10 ft Existing Walls		10 ft Walls (New) with 10 ft Existing Walls		12 ft		14 ft		16 ft		18 ft		20 ft	
					Results	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)	Results	Benefit (dBA)
329	B	2	61.3	61.8	63.8	63.3	0.5	63.3	0.5	62.8	1	62.1	1.7	61.5	2.3	60.9	2.9	60.3	3.5
330	B	3	63.5	64	65.3	65	0.3	65	0.3	63.8	1.5	63	2.3	62.4	2.9	61.7	3.6	61.1	4.2
331	B	2	59.8	60.6	62.7	62.1	0.6	62.1	0.6	61.5	1.2	60.5	2.2	60	2.7	59.5	3.2	59.1	3.6
332	B	3	61	61.7	63.8	63.1	0.7	63.1	0.7	62.6	1.2	61.6	2.2	61	2.8	60.6	3.2	60.2	3.6
333	B	3	63.7	64.2	65.8	65.3	0.5	65.4	0.4	64.1	1.7	63.3	2.5	62.7	3.1	62	3.8	61.5	4.3
334	B	1	59.7	60.6	62.7	62	0.7	62	0.7	61.4	1.3	60.4	2.3	59.9	2.8	59.4	3.3	59	3.7
335	B	2	63.9	64.5	66.3	65.7	0.6	65.7	0.6	64.4	1.9	63.6	2.7	62.9	3.4	62.3	4	61.7	4.6
336	B	2	62.8	63.6	65.9	65	0.9	65	0.9	64.4	1.5	63.1	2.8	62.4	3.5	61.9	4	61.3	4.6
337	B	3	60.4	61.4	63.6	62.7	0.9	62.6	1	62.1	1.5	61	2.6	60.5	3.1	60.1	3.5	59.7	3.9
338	B	2	62.2	63.1	65.5	64.5	1	64.5	1	63.9	1.6	62.6	2.9	62	3.5	61.5	4	61	4.5
339	B	3	62.4	63.4	66.3	64.8	1.5	64.7	1.6	64	2.3	62.7	3.6	62.2	4.1	61.7	4.6	61.2	5.1
340	B	3	62	62.9	66.4	64.3	2.1	64.2	2.2	63.3	3.1	62.3	4.1	61.7	4.7	61.3	5.1	60.9	5.5
341	B	3	62.5	63.5	68.2	64.7	3.5	64.4	3.8	63.4	4.8	62.6	5.6	62.1	6.1	61.7	6.5	61.3	6.9
342	B	3	63.1	64.4	69.2	65.6	3.6	65.3	3.9	64.5	4.7	63.6	5.6	63.1	6.1	62.8	6.4	62.4	6.8
343	B	3	63.4	64.5	68.3	65.3	3	65	3.3	64.1	4.2	63.4	4.9	63.1	5.2	62.8	5.5	62.5	5.8
344	B	3	63.7	64.7	68.3	65.5	2.8	65.2	3.1	64.6	3.7	64.2	4.1	63.9	4.4	63.7	4.6	63.5	4.8
345	B	2	63	63.9	66.9	65.3	1.6	65.2	1.7	64.8	2.1	64.5	2.4	64.4	2.5	64.2	2.7	64.2	2.7
346	B	2	63	64	66.9	65.6	1.3	65.5	1.4	65.2	1.7	64.9	2	64.8	2.1	64.7	2.2	64.7	2.2
347	B	1	61.6	63.2	65.7	65.1	0.6	65.1	0.6	65	0.7	65	0.7	64.9	0.8	64.9	0.8	64.9	0.8

	Total Receptors	Existing Impacts	No Action Impacts	Managed Lanes Impacts
Montbello ML Totals	112	0	0	32

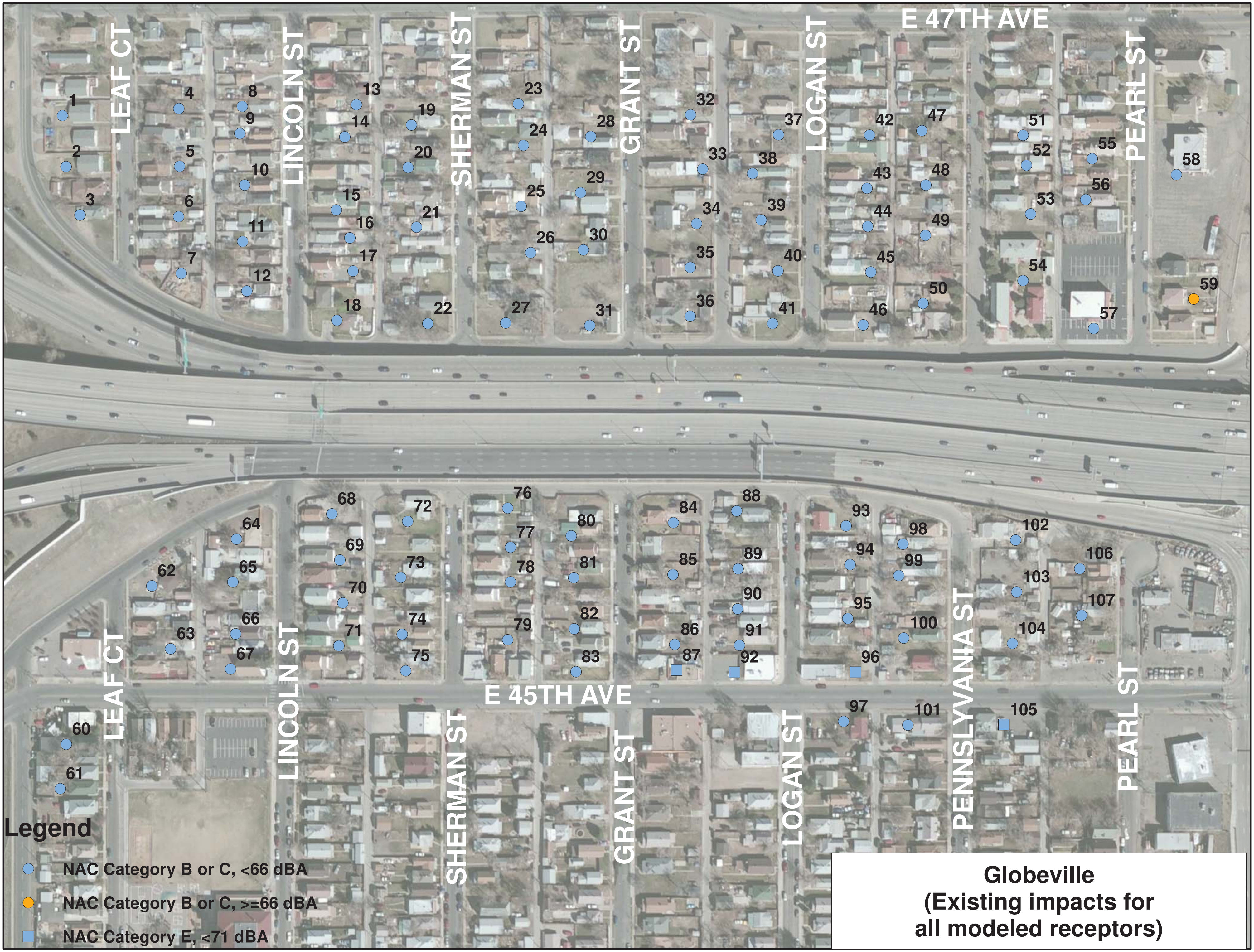
Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

Aurora

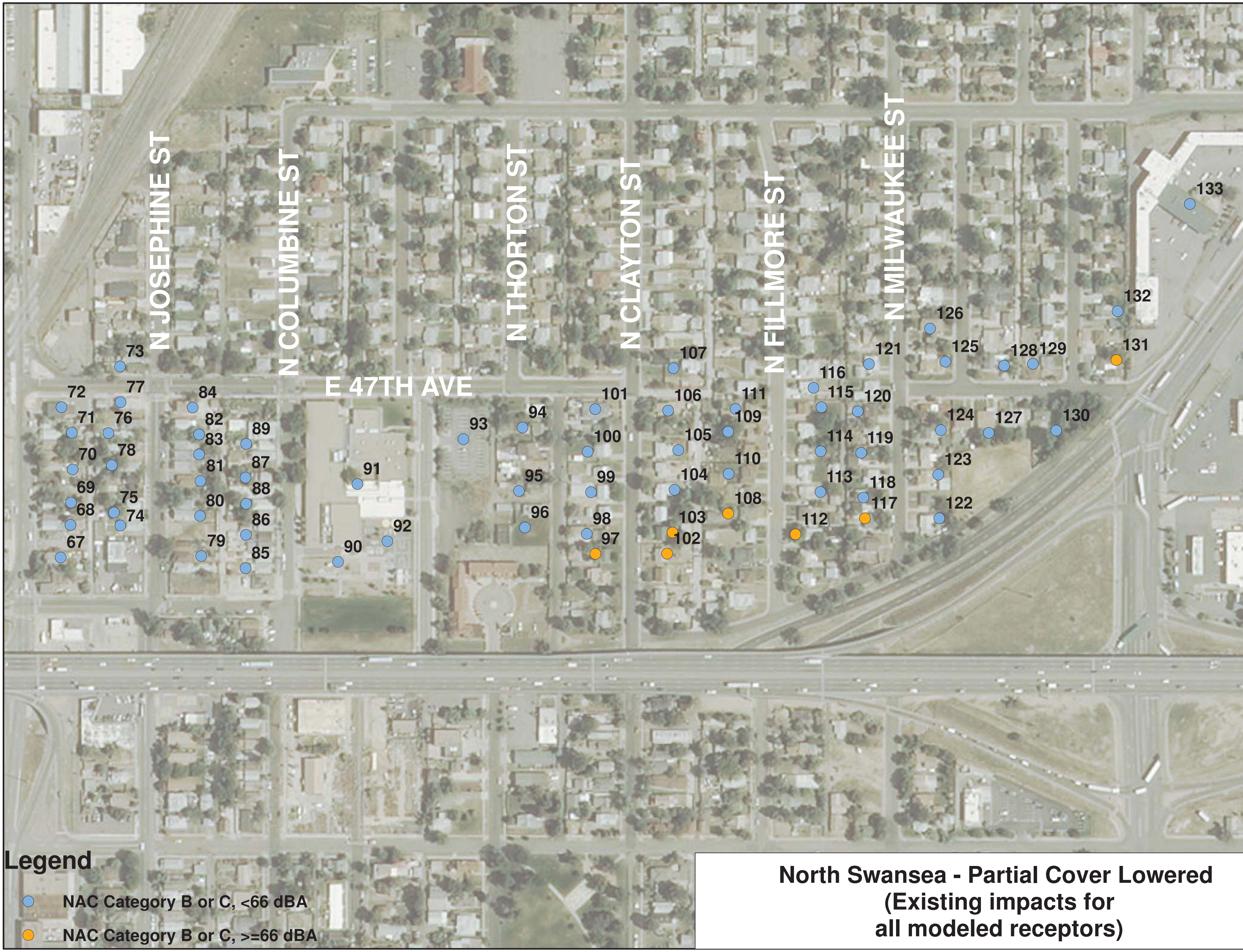
Receiver Number	NAC Category	Receptors Modeled	Results (dB(A)) Existing	2035 No Action	2035 Managed Lanes No Walls Results	8 ft Walls Results	8 ft Walls Benefit (dBA)	10 ft Walls Results	10 ft Walls Benefit (dBA)	12 ft Walls Results	12 ft Walls Benefit (dBA)	14 ft Walls Results	14 ft Walls Benefit (dBA)	16 ft Walls Results	16 ft Walls Benefit (dBA)	18 ft Walls Results	18 ft Walls Benefit (dBA)	20 ft Walls Results	20 ft Walls Benefit (dBA)
348	B	1	61.2	61.6	61.1	60.4	0.7	60.4	0.7	60.2	0.9	60	1.1	60	1.1	59.9	1.2	59.8	1.3
349	B	1	67.7	67.8	66.5	64.4	2.1	63.7	2.8	62.9	3.6	62.4	4.1	62.1	4.4	61.7	4.8	61.4	5.1
350	B	1	64.8	64.9	63.6	61.5	2.1	61.1	2.5	60.4	3.2	60	3.6	59.8	3.8	59.5	4.1	59.4	4.2
351	B	1	67.8	67.9	65.7	63.9	1.8	63.5	2.2	62.6	3.1	62	3.7	61.6	4.1	61.3	4.4	60.9	4.8
352	B	1	64.8	64.9	63.6	62	1.6	61.7	1.9	61	2.6	60.4	3.2	60.1	3.5	59.8	3.8	59.6	4
353	B	1	69.9	70.3	70.2	65.6	4.6	64.5	5.7	63.4	6.8	62.8	7.4	62.3	7.9	61.9	8.3	61.5	8.7
354	B	1	66.7	67	64.7	63.2	1.5	63	1.7	62.4	2.3	61.7	3	61.3	3.4	61	3.7	60.8	3.9

Brown Shaded cells highlight above the NAC
Green Shaded cells show feasible barrier heights.

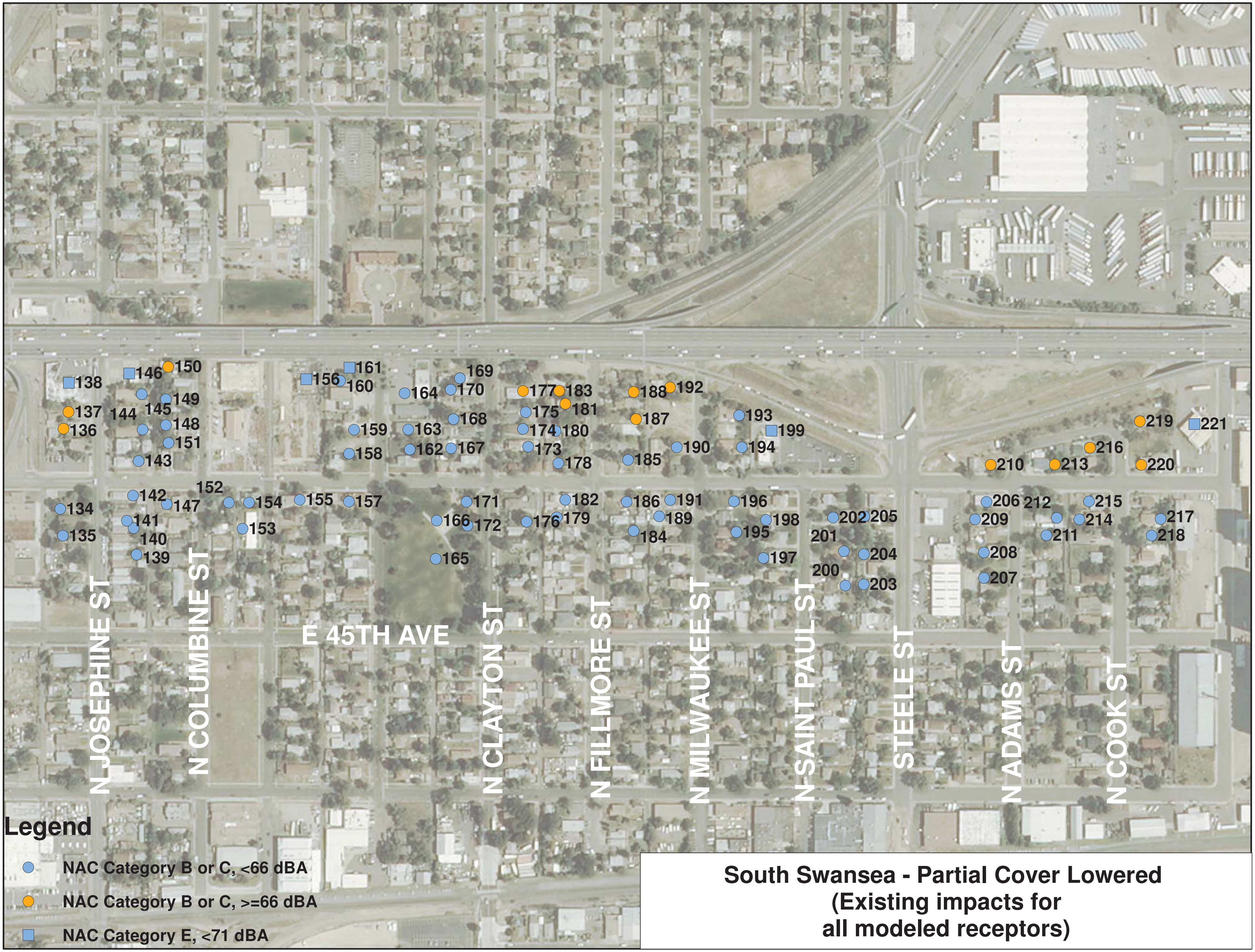
	Total Receptors	Existing Impacts	No Action Impacts	General Purpose Impacts	Managed Lanes Impacts
Aurora Totals	7	4	4	3	3


E 47TH AVE
LEAF CT
LINCOLN ST
SHERMAN ST
GRANT ST
LOGAN ST
PEARL ST
E 45TH AVE
PENNSYLVANIA ST
Legend
NAC Category B or C, <66 dBA
NAC Category B or C, >=66 dBA
NAC Category E, <71 dBA
Globeville
(Existing impacts for
all modeled receptors)


BRIGHTON BLVD
N WILLIAMS ST
N HIGH ST
N RACE ST
N VINE ST
N GAYLORD ST
E ALICE PL
Legend
NAC Category B or C, <66 dBA
NAC Category B or C, >=66 dBA
NAC Category E, <71 dBA
Elyria- Partial Cover Lowered
(Existing impacts for
all modeled receptors)



North Swansea - Partial Cover Lowered (Existing impacts for all modeled receptors)


N JOSEPHINE ST
N COLUMBINE ST
E 45TH AVE
N CLAYTON ST
N FILLMORE ST
N MILWAUKEE ST
N SAINT PAUL ST
STEELE ST
N ADAMS ST
N COOK ST
134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221
Legend
NAC Category B or C, <66 dBA
NAC Category B or C, >=66 dBA
NAC Category E, <71 dBA
South Swansea - Partial Cover Lowered
(Existing impacts for
all modeled receptors)

Northfield Stapleton (Existing impacts for all modeled receptors)


E 45TH AVE
N PEORIA ST
290
292
291
298
297
294
293
300
299
296
295
302
301
303
Legend
NAC Category B or C, <66 dBA
NAC Category E, <71 dBA
Peoria
(Existing impacts for
all modeled receptors)

Montbello West
(Existing impacts for
all modeled receptors)

Montbello East (Existing impacts for all modeled receptors)

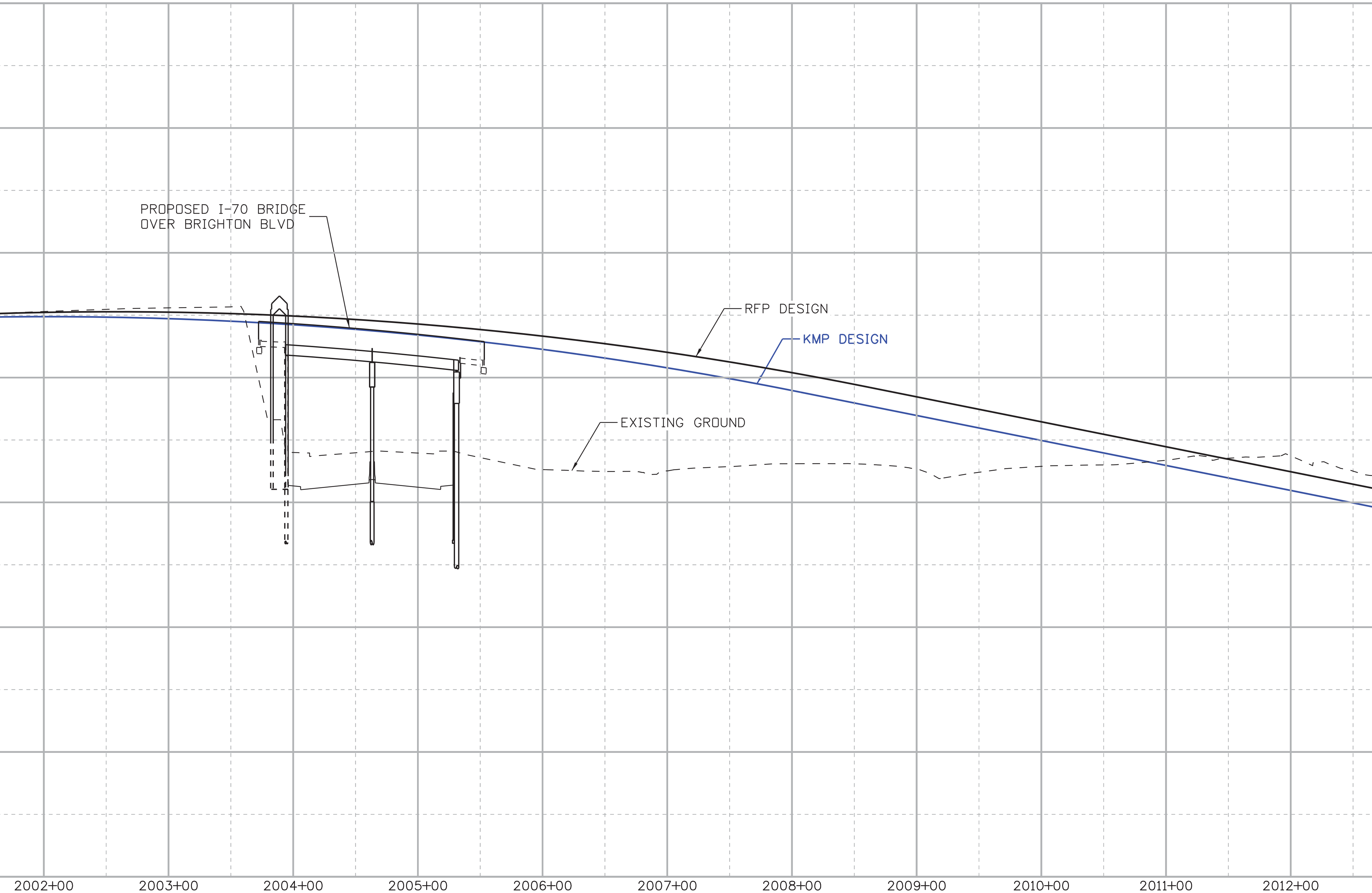
Legend

NAC Category B or C, <66 dBA

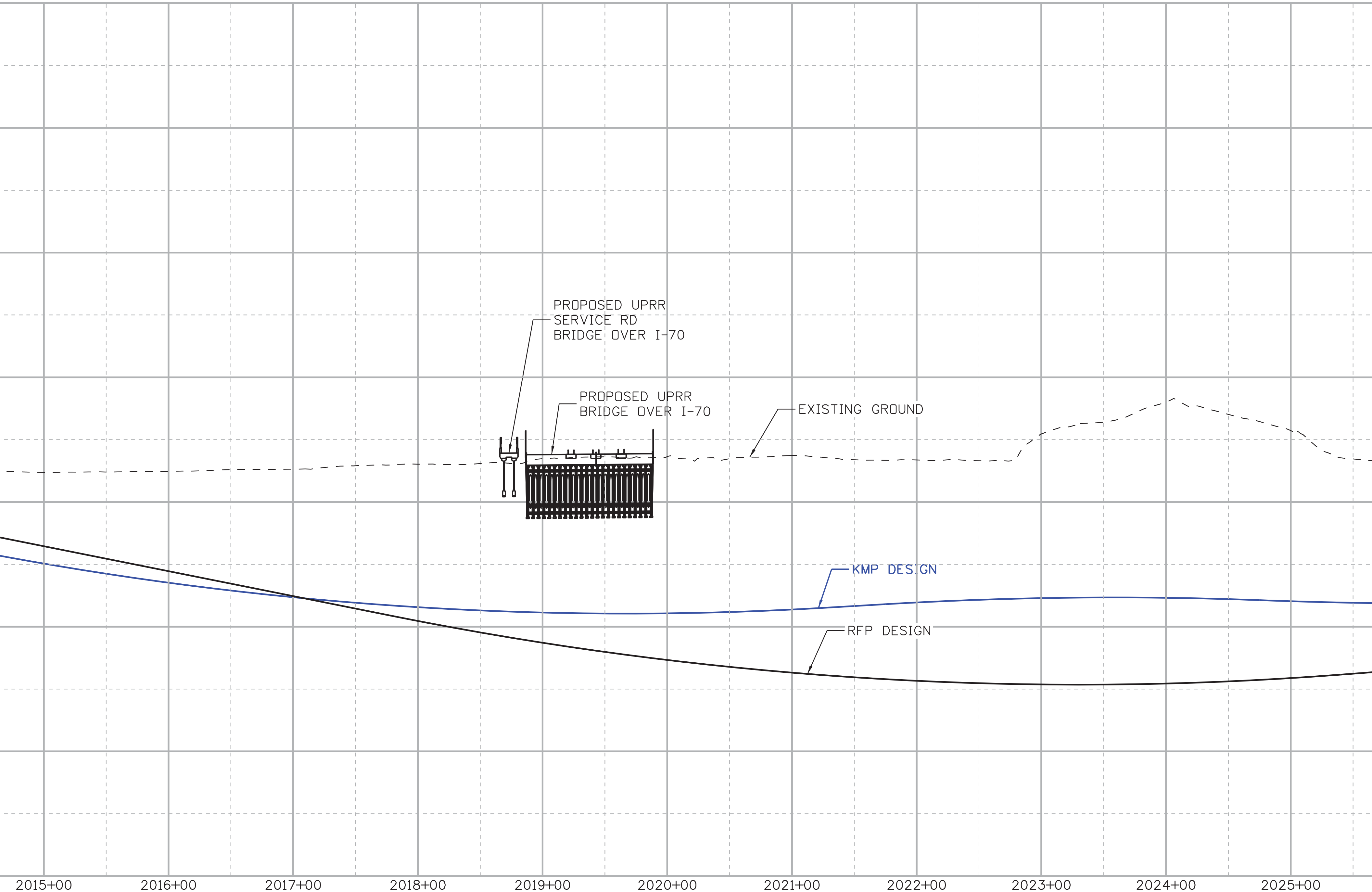
NAC Category B or C, >=66 dBA

Aurora
(Existing impacts for all modeled receptors)

Appendix C – Profiles from FEIS/ROD Design and Design Build Design



Sheet Revisions	Colorado Department of Transportation	As Constructed	VERTICAL PROFI

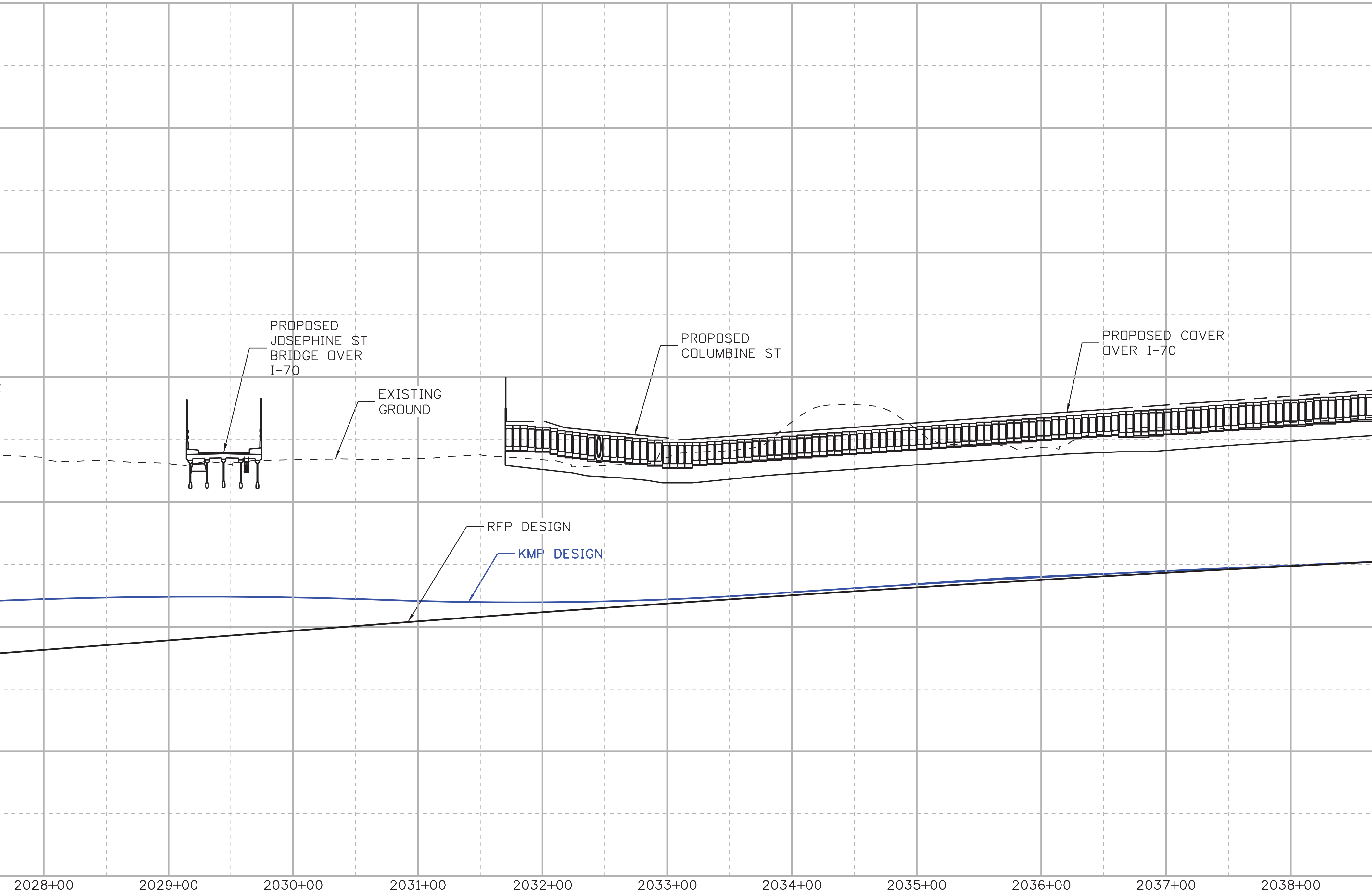


Sheet Revisions

Colorado Department of Transportation

As Constructed

VERTICAL PROFI
KMP DESIGN VS RFP



Sheet Revisions

Colorado Department of Transportation

As Constructed

VERTICAL PROFI
KMP DESIGN VS RFP

Appendix D – Proposed Noise Barrier Heights and Lengths by Barrier Segment

Proposed optimized noise barrier heights and lengths are provided by barrier segment in Table D-1.

TABLE D-1: ELYRIA NOISE BARRIER HEIGHTS AND LENGTHS BY BARRIER SEGMENT

Barrier Segment Name and Location (Barrier or Rail)	Barrier Point Id at Wall Height Change	Barrier Segment Height at Start Point (ft)	Barrier Segment Average Height (ft)	Barrier Segment Height at End Point (ft)	Barrier Segment Length (ft)	Noise Barrier Area (ft^2)
Barrier on Edge of Shoulder (EOS) East of Break for Sidewalk(EW)	1	10	10	10	91	910
Barrier on EOS (EW)	2	11	11	11	110	1210
Barrier on EOS (EW)	3	12	12	12	50	600
Barrier on EOS (EW)	4	13	13	13	40	520
Barrier on EOS (EW)	5	14	14	14	142	1988
Barrier on EOS (EW)	7	15	15	15	100	1500
Barrier on EOS (EW)	8	16	16	16	104	1664
Barrier on EOS (EW)	9	17	17	17	174	2958
Total Barrier 1 East					**811**	**11350**
Barrier on EOS West of Break for Sidewalk(WW)	15	17	17	17	39	374
Barrier on EOS(WW)	17	18	18	18	146	2628
Barrier on EOS(WW)	19	19	19	19	198	3762
Barrier on EOS(WW)	21	20	20	20	189	3780
Total Barrier 1 West					**572**	**10833**
Barrier on Brighton Bridge	28	6	6	6	300	1800
Barrier on Brighton Bridge	31	7	7	7	400	2800
Barrier on Brighton Bridge	35	6	6	6	156	936
Total Barrier on Bridge					**856**	**5536**

Source: WSP 2017.

Appendix E– Coordinates for Proposed Noise Barriers

Noise barrier coordinates provided in Table E-1 have been incorporated into the final project design.

TABLE E-1: ELYRIA NOISE BARRIER COORDINATES, ELEVATIONS, AND HEIGHT

Barrier Point Id	(X) Coordinate	(Y) Coordinate	Ground Elevation (ft)	Top of Noise Barrier Elevation (ft)	Noise Barrier Height (ft)
	EOS Barrier East of Break for Side Walk				
1	652,219.10	456,300.50	5,174.30	5,184.30	10
2	652,128.70	456,294.40	5,179.30	5,190.30	11
3	652,019.40	456,286.30	5,183.55	5,195.55	12
4	651,970.70	456,284.70	5,183.40	5,196.40	13
5	651,931.60	456,283.00	5,184.44	5,198.44	14
6	651,890.00	456,281.40	5,184.60	5,198.60	14
7	651,790.60	456,276.40	5,184.10	5,199.10	15
8	651,691.90	456,272.30	5,184.40	5,200.40	16
9	651,587.10	456,266.90	5,185.10	5,202.10	17
10	651,493.80	456,261.50	5,183.90	5,200.90	17
11	651,458.20	456,258.90	5,184.25	5,201.25	17
12	651,458.00	456,259.70	5,184.61	5,201.61	17
13	651,440.30	456,258.10	5,185.32	5,202.32	17
14	651,414.40	456,256.10	5,187.50	5,204.50	17
	EOS Barrier West of Break for Side Walk				
15	651,423.30	456,262.20	5,187.00	5,204.00	17
16	651,402.10	456,258.30	5,187.52	5,204.52	17
17	651,386.00	456,253.90	5,188.00	5,206.00	18
18	651,337.30	456,249.10	5,188.52	5,206.52	18
19	651,240.60	456,241.70	5,190.52	5,209.52	19
20	651,141.60	456,239.30	5,191.32	5,210.32	19
21	651,042.80	456,239.50	5,190.92	5,210.92	20
22	650,943.00	456,240.80	5,189.34	5,209.34	20
23	650,912.10	456,243.40	5,188.55	5,208.55	20

Barrier Point Id	(X) Coordinate	(Y) Coordinate	Ground Elevation (ft)	Top of Noise Barrier Elevation (ft)	Noise Barrier Height (ft)
24	650,899.30	456,247.80	5,188.25	5,208.25	20
25	650,885.90	456,256.60	5,187.95	5,207.95	20
26	650,875.80	456,264.90	5,187.65	5,207.65	20
27	650,867.40	456,277.80	5,187.50	5,207.50	20
	Bridge Barrier				
28	651,253.40	456,172.80	5,194.40	5,200.40	6
39	651,153.80	456,164.50	5,198.40	5,204.40	6
30	651,054.10	456,156.40	5,202.10	5,208.10	6
31	650,954.30	456,148.80	5,205.10	5,212.10	7
32	650,854.60	456,141.40	5,207.50	5,214.50	7
33	650,699.00	456,130.70	5,209.70	5,216.70	7
34	650,655.00	456,127.80	5,210.20	5,217.20	7
35	650,555.50	456,120.00	5,210.60	5,217.60	6
36	650,455.80	456,112.00	5,210.30	5,216.30	6
37	650,399.60	456,107.40	5,209.90	5,215.90	6

Source: WSP 2017.

Appendix F – Noise Abatement Determination Worksheets

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS - Globeville North of I-70; General-Purpose and Managed Lanes

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ❒ YES ☒ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ❒ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ❒ YES ☒ NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ❒ YES ☒ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ❒ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ❒ YES ❒ NO

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ❒ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
   ❒ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
   ❒ YES ❒ NO

D. ADDITIONAL CONSIDERATIONS:

E. STATEMENT OF LIKELIHOOD:

1. Are noise mitigation measures feasible?
   ☒ YES ❒ NO
2. Are noise mitigation measures reasonable?
   ❒ YES ❒ NO
3. Is insulation of buildings both feasible and reasonable?
   ❒ YES ☒ NO
4. Shall noise abatement measures be provided?
   ❒ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS - Globeville South of I-70; General-Purpose and Managed Lanes

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☒ YES ☐ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☐ YES ☒ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
   ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
   ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
   ☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Elyria North of I-70; Partial Cover Lowered Alternative

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
☒ YES ☐ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
☒ YES ☐ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
☒ YES ☐ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
☐ YES ☒ NO
If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
☐ YES ☒ NO
b. If yes, is it reasonable and feasible to provide insulation for these buildings?
☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:
Barrier recommended in the FIES and ROD was optimized.

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
☒ YES ☐ NO
3. Is insulation of buildings both feasible and reasonable?
☐ YES ☒ NO
4. Shall noise abatement measures be provided?
☒ YES ☐ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

Completed by: Kevin Keller Date: 3/14/2018A

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ___________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Swansea North of I-70; Parial Cover Lowered Alternative

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ❒ YES ☒ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ❒ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ❒ YES ☒ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ❒ YES ☒ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ❒ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ❒ YES ❒ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ❒ YES ☒ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
      ❒ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
      ❒ YES ❒ NO

D. ADDITIONAL CONSIDERATIONS:

1,270 ft of noise walls, 8-ft to 20-ft wall heights are neither feasible nor reasonable.

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
   ❒ YES ☒ NO
2. Are noise mitigation measures reasonable?
   ❒ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ❒ YES ☒ NO
4. Shall noise abatement measures be provided?
   ❒ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

An 8-ft, 10-ft, 12-ft, 14-ft, 16-ft, 18-ft, and 20-ft wall height did not provide sufficient reduction to be feasible and reasonable. Barriers are not recommended.

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Swansea South of I-70; Parial Cover Lowered Alternative

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☒ YES ☐ NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☒ YES ☐ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
   ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
   ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

3,580 ft of nose walls, 8-ft to 20-ft wall heights are feasible, but are not reasonable.

E. STATEMENT OF LIKELIHOOD:

1. Are noise mitigation measures feasible?
   ☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

An 8-ft, 10-ft, 12-ft, 14-ft, 16-ft, 18-ft, and 20-ft wall height did not provide sufficient reduction to be feasible and reasonable. Barriers are not recommended.

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ___________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Peoria Street Area; General-Purpose Lanes

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☐ YES ☒ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☐ YES ☒ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☐ YES ☒ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
      ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
      ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

420 ft of noise walls , 8-ft to 20-ft tall, do not provide 5-dBA benefit for any receptors.

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
   ☐ YES ☒ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

An 8-ft, 10-ft, 12-ft, 14-ft, 16-ft, 18-ft, and 20-ft wall height did not provide sufficient reduction to be feasible and reasonable. Barriers are not recommended.

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ___________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Montbello Neighborhood; General-Purpose Lanes

A. FEASIBILITY:

1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☒ YES ☐ NO

B. REASONABLENESS:

1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☐ YES ☒ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:

1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
      ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
      ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

4,250 ft of noise walls, 16-ft to 20-ft tall, are feasible, but not reasonable.

E. STATEMENT OF LIKELIHOOD:

1. Are noise mitigation measures feasible?
   ☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☒ YES ☐ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

An 8-ft, 10-ft, 12-ft, 14-ft, 16-ft, 18-ft, and 20-ft wall height did not provide sufficient reduction to be feasible and reasonable. The existing noise wall (10-ft) shall be replaced, if demolished.

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Montbello Neighborhood; Managed Lanes

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☒ YES ☐ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☒ YES ☐ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
      ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
      ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

4,250 ft of noise walls, 14-ft to 20-ft tall, are feasible, but not reasonable.

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
   ☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

An 8-ft, 10-ft, 12-ft, 14-ft, 16-ft, 18-ft, and 20-ft wall height did not provide sufficient reduction to be feasible and reasonable. The existing noise wall (10-ft) shall be replaced, if demolished.

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ___________________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Aurora Neighborhood; General-Purpose Lanes

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
☒ YES ☐ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
☒ YES ☐ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
☒ YES ☐ NO
If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
☐ YES ☒ NO
b. If yes, is it reasonable and feasible to provide insulation for these buildings?
☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
☐ YES ☒ NO
4. Shall noise abatement measures be provided?
☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

Completed by: Kevin Keller Date: 3/14/2018

COLORADO DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT DETERMINATION WORKSHEET

Instructions: To complete this form refer to CDOT Noise Analysis Guidelines

STIP # ____________ Date of Analysis: 1/5/2018

Project Name & Location: I-70 East FEIS; Aurora Neighborhood; Managed Lanes

A. FEASIBILITY:
1. Can a 5dBA noise reduction be achieved by constructing a noise barrier or berm?
   ☒ YES ☐ NO
2. Are there any fatal flaw drainage, terrain, safety, or maintenance issues involving the proposed noise barrier or berm?
   ☐ YES ☒ NO
3. Can a noise barrier or berm less than 20 feet tall be constructed?
   ☒ YES ☐ NO

B. REASONABLENESS:
1. Has the Design goal of 7 dBA noise reduction for abatement measure been met for at least one impacted receptor?
   ☒ YES ☐ NO
2. Is the Cost Benefit Index below $6800 per receptor per dBA?
   ☐ YES ☒ NO
3. Are more than 50% of responding benefited resident/owners in favor of the recommended noise abatement measure?
   ☐ YES ☐ NO

C. INSULATION CONSIDERATION:
1. Are normal noise abatement measures physically infeasible or economically unreasonable?
   ☒ YES ☐ NO
   If the answer to 1 is YES, then:
2. a. Does this project have noise impacts to NAC Activity Category D?
   ☐ YES ☒ NO
   b. If yes, is it reasonable and feasible to provide insulation for these buildings?
   ☐ YES ☐ NO

D. ADDITIONAL CONSIDERATIONS:

E. STATEMENT OF LIKELIHOOD:
1. Are noise mitigation measures feasible?
   ☒ YES ☐ NO
2. Are noise mitigation measures reasonable?
   ☐ YES ☒ NO
3. Is insulation of buildings both feasible and reasonable?
   ☐ YES ☒ NO
4. Shall noise abatement measures be provided?
   ☐ YES ☒ NO

F. ABATEMENT DECISION DESCRIPTION AND JUSTIFICATION:

Completed by: Kevin Keller Date: 3/14/2018

Appendix G – Preparer's Qualifications

KEVIN KELLER, AICP

YEARS WITH FIRM

25

YEARS TOTAL

28

AREAS OF PRACTICE

Highway Noise and Barrier Analyze

High Speed Rail Noise and Vibration Analyze

Light-Rail Noise and Vibration Analyze

Buses Rapid Transit Noise and Vibration Analyze

Construction Noise and Vibration Analyze

Geographic Information Systems

LANGUAGES

English

SUPERVISING ENVIRONMENTAL PLANNER

PROFILE

Kevin Keller has prepared numerous noise analyses and technical studies using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM), the FHWA Stamina Highway Traffic Noise Model and Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Worksheet. He used SoundPlan software to model construction and industrial noise level and proposed abatement for several large-scale, long-term construction projects. He has conducted field noise measurements to identify existing noise levels for use in calibrating noise models. He has generated noise contour maps to show areas affected by project noise levels and has been responsible for the design of highway soundwalls as part of final engineering efforts.

Mr. Keller also has experience in the operation of Geographic Information Systems (GIS) and Computer Aided Drafting and Design (CADD) software programs, including Arc Info, ArcView, ERDAS Imagine, ATLAS AMP, MICRO STATION (Intergraph's CADD program), AUTOCADD, and GTW. He has been involved with the implementation of GIS at WSP / PB since the beginning and has trained junior staff over the years. His understanding of the transportation and environmental fields has provided him with the knowledge to provide GIS solutions for comprehensive transportation plans, traffic and noise analyses integrated with modeling, corridor studies, and socioeconomic and environmental analyses. He also has experience in the use and application of Global Positioning Systems (GPS).

PROFESSIONAL QUALIFICATIONS

American Planning Association; American Institute of Certified Planners, 2000, #015744

EDUCATION

B.A., Geography, Minor in History, California State University at Fullerton 1987

ADDITIONAL TRAINING

FHWA Traffic Noise Model 2.5 – Bowlby & Associates, Inc.	2010
FTA Course on Transit Noise and Vibration Assessment, HMMH INC.	2004
Principles of Acoustics and Measurement of Sound, Bruel and Kjaer Seminar	1999
Highway Noise Analysis Seminar, University of Louisville	1996

PROFESSIONAL MEMBERSHIPS

American Planning Association; American Institute of Certified Planners

Transportation Research Board, Transportation-Related Noise and Vibration Subcommittee (ADC40)

PROFESSIONAL EXPERIENCE

Construction Noise and Vibration Analysis

- Alaskan Way Viaduct Demolition, Seattle, Washington: developed unmitigated and mitigated noise contour maps for eight construction sites, five construction phases for both day and night activities using SoundPlan software and ARCGIS. Created tables showing noise levels at every floor of noise sensitive buildings near the construction sites. Developed vibration levels criteria and a minimum vibration monitoring plan to assesses if vibration from the demolition caused damage to nearby utilities. The modeling, criteria and mapping will be used to support technical noise variances for the removal of the Alaskan Way Viaduct.
- SR 520 Bridge Replacement and HOV Program, Seattle, Washington: developed noise contour maps and noise level tables for five construction sites phases for both day and night activities using SoundPlan software and ARCGIS. The modeling and mapping will be used to support technical noise variances for the building of the SR 520. Conducted noise and vibration measurements and modeling at NOAA Northwest Fishery campus, to address the effect of the construction on both scientific experiment on the campus. The effects were study for both NOAA staff and the animals under study.
- Purple Line Subway Extension, Los Angeles, California (2013-Present): is providing noise and vibration modeling services during construction in review of the design builders proposed compliance with Metro's noise and vibration rail design criteria.Section 3, Century City to Westwood VA Hospital.
- Alaskan Way Viaduct and Seawall Project EIS, Seattle, Washington developed unmitigated and mitigated noise contour maps for four construction sites and two construction phases for both day and night activities using SoundPlan software and ARCGIS. The modeling and mapping was used to support technical noise variances for the replacement of the Alaskan Way Viaduct.

- I-5 Repaving I-5 Interstate Bridge to Hassalo Street – K17516, Portland, Oregon, developed unmitigated and RCNM noise models and output for four sites for five construction phases, Paving, Concrete Grinding and Overlay, Sign Relocation, Placement of ADA ramps and Median Barrier Replacement. RCNM model results were used to apply for noise variance from the city of Portland.
- I-5 Bridge Deck Rehab K18564, Portland, Oregon, developed unmitigated and RCNM noise models and output for three construction phases, Rehab and Resurfacing, Median Barrier Replacement and Shoulder Pavement. RCNM model results were used to apply for noise variance from the city of Portland.

Highway Noise Analysis

- **I-25 Managed Lanes, Denver, Colorado**: Technical lead provided the noise analysis and noise barrier design for this Colorado DOT safety and mobility project on a 6-mile segment of I-25 between US 36 and 120th Avenue. The project will maximize the use of the existing highway infrastructure to expand the capacity of I-25 by adding one HOV/tolled Express Lane in each direction. Client: Colorado DOT.
- Noise Reduction Screening Program, Santa Clara Valley, California: Noise Technical Lead supervised and conducted field noise measurements at 35 locations along the Oregon Expressway, Foothill Expressway, State Route 85 and the I-280. Kevin used the field noise measurement data as input for TNM 2.5 models to evaluate if noise barrier would provide effective noise reduction to the noise sensitive land uses. The results of the TNM model were used to provide a final eligibility evaluation for a total of 17 noise barriers in the area. Client: Valley Transit Authority.
- Illiana Expressway Tier 1 and Tier II Studies, Illinois: Noise Technical Lead n provided the noise analysis and noise barrier design for this 20-mile-long new alignment highway from northwest Indiana to northeast Illinois. Kevin also attended public and stakeholder meetings to discuss the results of the noise study in more detail. Project included study possible noise impacts on grassland bird within Midewin Nation Tallgrass Prairie. Client: Illinois and Indiana Department of Transportation.
- SR-167 Extension Project, Seattle, Washington: Noise Analyze provided the noise analysis and noise barrier design for this Washington DOT extension project of the SR 167 between Puyallup to the SR509. The project studying building a new freeway for four miles to connect the SR-167 to the I-5, and a two-mile connection from the SR509 to the I-5. The new highway would provide two general purposed and an HOV lane in each direction. Client: Washington State DOT.
- SR 520 Bridge Replacement and HOB Program, Seattle, Washington: Noise Analyze provided the noise analysis and noise barrier design for this Washington DOT bridge replacement on roadway modifications on SR520 in the Montlake area, for the I-5 to the Medina project, during final design. Kevin modified the TNM files used in the environmental documents to represent the final design. Kevin also developed noise contour maps and vibration level distance for construction phases for both day and night activities using SoundPlan software and ARCGIS. The modeling and mapping will be used to support efforts to limit the impacts of the project construction to the National Oceanic and Administration's Northwest Fisheries Science Center. Client: Washington State DOT.

- SR-91 Corridor Improvement Services PR/ED, Traffic Noise Impact Technical Report for Improvement of the SR-91, SR-71 and I-15 freeways from SR-241 in the city of Anaheim to Pierce Street in the city of Corona, along the SR-19 from Hidden Valley Parkway to Cajalco Road in the city of Corona, California: Technical lead responsible for a technical noise study analyzing the impacts of two Alternative to improve traffic flow thru the city of Corona on the SR-91. He is supervising the modeling of existing and future conditions for 21 miles (33 kilometers) of freeway and the model noise barriers using FHWA TNM 2.5. He will prepare the noise study report using Caltrans' annotated noise study report outline. He is also responsible for determining the acoustical feasibility of each modeled barrier and developing the Noise Abatement Decision Report to identify the barriers that meet Caltrans reasonable criteria and that will be proposed as part of the project. He also planned and supervised the noise field work for the project. Client: Riverside County Transportation Council.

- Oregon Department of Transportation Statewide Planning and Environmental: Noise analyze provided the noise analysis and noise barrier design for on-call noise analysis for the state DOT, including work for US97 and J Street in Madras, I-84 Freeway Ramp in Portland and the O'Neil Highway Project. Client: Oregon State DOT.

- Utah Department of Transportation Pavement Grinding Noise Study, I-215, Murray, Utah: Noise Technical Lead conducted before and after noise measurements along a 300-foot-long (91-meter-long) section of I-215. The measurements were used to study the changes in noise levels by diamond-grinding the surface from a transverse grove to smooth surface. He conducted follow-up measurements two years later to document the changes due to time and weathering of the surface. Client: Utah DOT.

- SANTAN Freeway, Noise Barrier Final Design, Dodson Road to Arizona Avenue, Maricopa County, Arizona: Noise Technical Lead responsible for the final design of noise mitigation between Dodson Road and Arizona Avenue. The project also included the study of a noise reducing pavement overlay. The noise analysis was prepared using FHWA and Arizona Department of Transportation guidelines. Client: Arizona DOT.

- I-40 Crosstown Expressway Traffic Noise Abatement Study, Oklahoma City, Oklahoma: Noise Technical lead responsible for modeled future noise levels and identified mitigation measures for two freeway/boulevard Alternative using the FHWA TNM. He developed noise contours to the show areas affected by the 66-dBA and 71-dBA noise levels. The noise analysis was prepared using FHWA and Oklahoma Department of Transportation guidelines. He was also responsible for integrating the noise contours with GIS analysis and mapping. Client: Oklahoma DOT.

- Revised Draft EA for North-South Road and Kapolei Parkway Project, Ewa, Oahu, Hawaii: Noise technical lead responsible for modeling future noise levels and noise contours. The noise analysis was prepared using FHWA and SDOT guidelines. SDOT, the city and county of Honolulu Department of Transportation Services (DTS), and the FHWA proposed a federally-aided, limited-access, principal arterial roadway that would connect the H-1 Freeway to the proposed Kapolei Parkway, a distance of approximately 2.2 miles (3.5 kilometers). The proposed North-South Road includes an interchange with the H-1 Freeway. Kapolei Parkway is proposed as a 0.7-mile (1.1-kilometer) federally-aided, arterial roadway that would connect the proposed North-South Road with the existing Renton Road. Client: Oregon State DOT. Project Value: $1,000,000. Client: County and City of Honolulu.

- Washington DOT On-call Noise and Air Quality Services: Assist the department in meeting environmental obligations required to complete A&E projects. Noise analyze assisted in noise analysis as required by federal guidelines. Kevin also assisted in special studies on the Hood Canal Bridge to look at how the noise level changed due to changes in weather and if changes in the bridge were needed to reduce noise level at homes out to one mile away from the bridge. Client: Washington State DOT.

- Traffic Noise Impact Technical Report, Southbound I-5 Soundwall, San Clemente, California: Noise technical lead responsible for a technical noise study for a retrofit soundwall. He modeled the existing and future conditions, and proposed noise barriers using Caltrans' SOUND 2000. He also planned and supervised the noise field work for the project. Client: Orange County Transportation Authority.

- Traffic Noise Impact Technical Report Southbound Route 91 Soundwall, Anaheim, California: Noise technical lead responsible for a technical noise study for a retrofit soundwall. He also planned and supervised the noise field work for the project. He modeled existing and future conditions, and proposed noise barriers using Caltrans' SOUND 2000. Client: Orange County Transportation Authority.

- Noise Abatement Decision Report, Eastbound SR-91 and SR-55 from Santa Ana River to East Santa Ana Canyon Road, Anaheim, California: Noise technical lead summarized the Noise Study Report, related the findings to the engineers and developed a cost estimate for noise abatement found acoustical feasible by the Noise Study Report. Client: Orange County Transportation Authority.

- Noise Abatement Decision Report – Westbound SR-91 from Station 122+40 to Station 125+84, Canyon RV Park, Anaheim, California: Noise technical lead summarized the Noise Study Report, related the findings to the engineers and developed of a cost estimate for noise abatement found acoustically feasible by the Noise Study Report. Client: Orange County Transportation Authority.

- SANTAN Freeway, Noise Barrier Final Design, Dodson Road to Arizona Avenue, Maricopa County, Arizona: Noise technical lead responsible for the final design of noise mitigation between Dodson Road and Arizona Avenue. The project also included the study of a noise reducing pavement overlay. The noise analysis was prepared using FHWA and Arizona Department of Transportation guidelines. Client: Arizona DOT.

- State Highway (SH)-31 Relief Route Traffic Noise Assessment, Navarro County, Texas: Noise technical lead responsible for the traffic noise assessment for a proposed new alignment. The noise analysis was prepared using FHWA and Texas Department of Transportation (TXDOT) guidelines. He was responsible for the modeling future 71 and 66 dBA contour lines using FHWA's TNM version 2.1. Client: Texas DOT.

- SR-95 Widening, Lake Havasu City, Arizona: Noise technical lead conducted the noise analysis to assess the potential impacts of widening a section of SR-95 through Lake Havasu City. He was responsible for field noise measurements and traffic counts along the project corridor. He conducted modeling of both existing and future conditions using FHWA's STAMINA noise model. He also presented the recommend noise mitigation to the public. Client: Arizona DOT.

- SR-30 Final Engineering Design, Line Segments 5 and 11, San Bernardino County, California: Noise technical lead responsible for the final design of noise mitigation along Line Segment 11, which includes the SR-30/I-215 interchange. Client: California DOT.
- 64th Street Extension, Scottsdale, Arizona: Noise technical lead assisted with the noise analysis to assess the impacts of the extension of a portion of 64th Street in the city of Scottsdale. The project required noise measurements to be taken before the opening of the roadway and one year later to document the change in noise level to nearby residences. Client: City of Phoenix.
- I-15/Galena Street Interchange Initial Study (IS)/EA, Riverside County, California: responsible for taking noise level measurements and modeling peak existing and future noise levels. PB provided preliminary and final engineering and preparing environmental documentation for a new interchange in western Riverside County. He was also the GIS analyst for the project and developed graphical user interfaces for staff conducting other environmental analyses. As the GIS analyst, he developed programs for conducting impact analyses.
- Caltrans District 11, SR-56 EIR, San Diego County, California: Noise technical lead analyzed existing noise levels in the field, performed computer-modeling of future noise levels and provided noise contour maps for the construction of an approximately 5-mile (8-kilometer) freeway segment to complete the west-east connection between I-5 and I-15 in northern San Diego County. The noise study addressed four alternative alignments and two possible roadway configurations: (1) an eight-lane freeway (six general-purpose and two HOV lanes) and (2) a four-lane expressway. The noise analysis was prepared using guidelines from the city of San Diego and the objectives and methods promulgated by Caltrans and the California Environmental Quality Act. Client: City of San Diego..
- SR- 56 Post Construction Noise Report, San Diego County, California: Noise technical lead reanalyzed noise levels in the field along SR-56 one year after the roadway was open to traffic. The report compared the current measured levels with the projected levels form the EIS to ensure that the noise levels were in compliance with both the EIS and the City of San Diego noise standards. Client: City of San Diego.
- SR-15/40th Street Noise Abatement Demonstration Project, San Diego, California: Noise technical lead responsible for the traffic noise modeling of the southern segment. He also conducted the traffic noise measurements and supervised the sound insulation testing of each of the 135 residences. The study included taking 24-hour measurements at each home, monitoring weather conditions with meteorological equipment, conducting sound insulation tests at each home, determining interior noise levels at each home, and recommending potential sound insulation measures at each home. Client: California DOT.
- I-15, Utah and Salt Lake Counties, Utah: Noise technical lead responsible for the technical noise studies to assess potential impacts of adding lanes to the I-15 between the towns of Payson and Draper, Utah. He was responsible for field noise measurements and traffic counts along the project corridor. He supervised the modeling of existing and future conditions, proposed noise barriers using FHWA TNM Version 2.5, and reporting the findings. Client: Utah DOT.

- Interstate (I)-15, Las Vegas, Nevada: Noise technical lead performed the technical noise studies to assess the potential impacts of adding lanes to the I-15 between North Las Vegas and Apex, Nevada and SR-57. He supervised the field noise measurements and traffic counts along the project corridor. He was responsible for the modeling of existing and future conditions, as well as proposed noise barriers using FHWA TNM Version 2.5. Client: Nevada DOT.
- I-77 Traffic Noise Abatement Study, Cities of Stark and Canton, Ohio: Noise technical lead analyzed the future traffic noise impacts and proposing mitigation measures for the I-77 project from Nayarre Road to the I-62 interchange using the FHWA TNM. The noise analysis was prepared using FHWA and Ohio Department of Transportation guidelines. Client: Ohio DOT.

Fixed Guideway Noise and Vibration Analysis

- California High Speed Rail Program Management, California: Project management noise technical lead set up the noise methodology, noise and vibration mitigation guidelines and reviewed the noise technical report for each of the 10 regional, as part of the program management services that including planning, oversight of the environmental review/preliminary engineering (30% design), construction management, testing and commissioning for the line and every other phase up to revenue service for the high-speed rail connecting San Francisco and Sacramento in Northern California with Los Angeles/Anaheim and San Diego in the south. The 800-mile system will be designed to carry over 100 million people a year by 2030 and will be the first and only contemporary high-speed train operating on dedicated right-of-way in the United States. Client: California High Speed Rail Authority.
- North Metro Rail Line Project, Denver, Colorado: Noise technical lead planned and conducted short- and long-term field noise measurements at 34 sites along the project. Based on the findings in the FEIS and using FTA methodology, he reanalyzed the potential noise impacts due to changes in the track layout and operations of the project. He developed a SoundPLAN model that was calibrated to produce the same results as the FTA methodology. Kevin used the SoundPLAN model to provide the start, stop and wall heights required to provide the required noise mitigation. The findings were presented in the Noise and Vibration Technical Memorandum. Client: Denver Metro.
- Honolulu High-Capacity Transit Corridor Project, Preliminary Engineering/Environmental Impact Statement (PE/EIS), Honolulu, Hawaii: Noise technical lead responsible for the preparation of the Noise and Vibration Technical Report. Kevin planned and conducted short- and long-term field noise measurements at over 20 sites along the project. Using FTA methodology, he analyzed the potential noise and vibration impacts due to operation and construction, and possible mitigation strategies. He presented the findings in the Noise and Vibration Technical Report and at a public meeting. PB prepared an Environmental Impact Statement (DEIS) to evaluate Alternative that would provide high-capacity transit service on the island of Oahu between Kapolei and the University of Hawaii at Manoa. Client: City and County of Honolulu.

- Los Angeles County Metropolitan Transportation Authority (LA Metro) Regional Connector Transit Corridor, Draft Environmental Impact Statement/Draft Environmental Impact Review (DEIS/DEIR)/Advanced Conceptual Engineering (Phase 2), Los Angeles, California: Noise technical lead planned and conducted short- and long-term field noise measurements at over 10 sites along the project. Using FTA methodology, he analyzed the potential noise and vibration impacts due to operation and construction, and possible mitigation strategies. He presented the findings in the Noise and Vibration Technical Report and edited the noise and vibration section of the DEIS/DEIR. Client: LA Metro.
- LA Metro Westside Extension Transit Corridor Study DEIS/DEIR, Los Angeles, California: Noise technical lead planned and conducted short- and long-term field noise measurements at over 15 sites along the project. Using FTA methodology, he analyzed the potential noise and vibration impacts due to operation of the project and possible mitigation strategies. He presented the findings in the Noise and Vibration Technical Report and edited the noise and vibration section of the DEIS/DEIR. Client: LA Metro.
- Las Vegas Resort Corridor Downtown Connector, Las Vegas, Nevada: Noise technical lead prepared the Noise Technical Report which identifies potential noise sensitive areas and was incorporated into the Environmental Assessment (EA). PB conducted the EA to address the impacts and appropriateness to the corridor of various transportation service Alternative. The FTA and Regional Transportation Commission of Southern Nevada (RTC) are pursuing implementation of potentially promising alternative strategies that would accommodate increasingly greater mobility demands for the Downtown Connector. Client: City of Las Vegas.
- Railrunner Computer Train, Santa Fe to Albuquerque, Noise and Vibration Impacts Technical Report, New Mexico: Technical noise lead performed a noise and vibration analysis to assess the potential impacts of a proposed commuter rail system between the cities of Santa Fe and Albuquerque. He conducted 24-hour and 15-minute noise measurements along the project corridor. He also measured the noise and vibration levels of the existing system to use as reference for predicting future noise and vibration levels. He also calculated impacts following FTA guidelines and reporting the findings. Client: City of Albuquerque.
- Frontrunner Computer Train, Noise and Vibration Impacts Technical Report, City of Provo to Salt Lake City, Utah: Noise technical lead performed a noise and vibration analysis to assess the potential impacts of a proposed commuter rail system from the city of Provo to Salt Lake City. He was responsible for conducting 24-hour and 15-minute noise measurements along the project corridor. He also calculated impacts following FTA guidelines and reported the findings Client: Utah Transit Authority.
- North/Southeast Corridor Noise and Vibration Impacts Technical Report, Jacksonville, Florida: Noise technical lead performed a noise and vibration analysis to assess the potential impacts of a proposed commuter bus system through the city of Jacksonville. He was responsible for conducting 24-hour and 15-minute noise measurements along the project corridor. He also calculated impacts following FTA guidelines and reporting the findings. Client: City of Jacksonville.

Other Noise and Vibration Analysis

- Alaskan Way Viaduct and Seawall Project EIS, Seattle, Washington: Lead noise modeler developed noise contour maps for four construction sites and two construction phases for both day and night activities using SoundPlan software and ARCGIS. The modeling and mapping will be used to support technical noise variances for the replacement of the Alaskan Way Viaduct. Client: City of Seattle.

- Orange County Transportation Agency Predestine Alternative Warning System, San Clemente, California: Technical noise lead provided modeling a wayside horn system along beach trail in San Clemente. Preformed pre-and post insulation of system to verify the wayside horns were meeting the requirements. Study was need to upgrade and increase Metro link service on track. Wayside Horns will provide warning to people near the trail and railroad crossing, while lessen the noise levels to the homes located on the cliff above the rail and trail. Approved by FRA and waiver of Train Horn Rule granted to client. Client: OCTA.

- LA Metro Red Line Vibration Study, Los Angeles, California: Field measurement lead performed vibration analysis to determine if the subway train vibration levels were above the FTA Vibration Criteria level and could be perceived at surface locations. He conducted hour-long measurements at four locations along the Red Line route. He then converted the measurement data to VdB, split the data into two-minute segments and matched the segments to train pass-by times, and reported the findings. Client: LA Metro.

- Kailua High School Alternative Access EA/Finding of No Significant Impact (FONSI), Pohakapu, Oahu, Hawaii: Noise technical lead responsible for modeling existing and future noise levels and preparing the final noise analysis. The Department of Accounting and General Services (DAGS) recognizes that there is a need to alleviate traffic congestion in the Kailua neighborhood of Pohakapu in connection with the activities of Kailua High School. The intent is to provide a new access road to the high school from Kalanianaole Highway through existing state land adjacent to the school. Client: City and County of Honolulu.

Geographic Information Systems

- California High Speed Rail Corridor Evaluation and Environmental Constraints Analysis, California: GIS technician providing GIS analysis using Landsat Thematic Mapper satellite imagery and U.S.G.S. Digital Elevation Models (DEMs) on ERDAS Imagine and Arc Info GIS systems. GIS is used to identify, map, and analyze land use, environmental constraints, water and roadway crossings, slope, and other factors affecting the feasibility and cost of alternative corridors for high speed rail transportation. This project is being prepared for the California High Speed Rail Commission. Client: State of California.

- Las Vegas Resort Corridor MIS/EIS, Las Vegas, Nevada: GIS technician conducting the noise analysis and modeling and assisting with the GIS effort. He is responsible for integrating noise modeling outputs and developing noise contour overlays. PB conducted Nevada's first IS for the resort corridor, which examined future mobility solutions. The EIS is evaluating rail transit Alternative, a transportation system management alternative, and a no build alternative. Client: City of Las Vegas.

- Western Riverside County Comprehensive Transportation Plan (CTP), Riverside County, California: GIS analyst and programmer responsible for development of an automated transportation information system for western Riverside County. His responsibilities included creating, updating and maintaining a digitized Arc Info local arterial data file with 60 attributes; the creation of a geographic feature file, including lakes and mountains; and the incorporation of the county's Arc Info highway network and Southern California Association of Government's (SCAG) Tranplan travel models into a comprehensive transportation database for use in transportation planning applications. Client: RCTC.
- Los Alamos National Laboratories Sitewide EIS, Los Alamos, New Mexico: GIS analyst responsible for the development of databases related to visual quality and land use, viewshed analysis, and mapping. The Department of Energy is consolidating much of its research and development operations from around the country to the Los Alamos National Laboratory (LANL) in northwestern New Mexico. This site has been the location of intensive and state-of-the-art research in the field of nuclear power and weapons since the development of the atomic bomb during World War II. Client: Department of Energy.

PUBLICATIONS AND PRESENTATIONS

Presentations

- "Improved Methods for Predicting Elevated Transit Noise," presented at Transportation Research Board (TRB) 2009 in January 2009, Washington, D.C.
- "PB Construction Noise Modeling," presented at TRB 2008 in January 2008, Washington, D.C.
- "Construction Noise Mitigation," presented at NoiseCon 2007, October 2007, Reno, Nevada.
- "Construction Noise Modeling," presented at Internoise 2006, December 2006, Honolulu, Hawaii.
- "Traffic Noise Mitigation," presented at TRB's A1F04 Summer Meeting, July 2003, Phoenix, Arizona.
- "Simple GIS Tools for Improving Noise Modeling," presented at the Esri International Users Conference, July 2002, San Diego, California. Published on ESRI website (www.esri.com).
- "SR-15/40th Avenue Noise Mitigation Visual Database," presented at the Caltrans noise workshop, October 2001, Oxnard, California.
- "The Corridor Major Investment Study," poster exhibit at the Esri User Conference, San Diego, California. 1997. Published in Esri Map Book, Volume 13, 1998.

REEVALUATION #4 *June 25, 2018*

Kiewit meridiam
PARTNERS

Attachment #3

United States Fish and Wildlife

Concurrence

U.S. Department of Transportation
Federal Highway Administration

Colorado Division

12300 W. Dakota Ave., Ste. 180
Lakewood, Colorado 80228
720-963-3000
720-963-3001

June 15, 2018

Mr. Drue DeBerry
United States Fish and Wildlife Service
Colorado and Nebraska Field Offices Supervisor
P.O. Box 25486, DFC (65412)
Denver, Colorado 80225
Attn: Ms. Alison Michael

Subject: United States Fish and Wildlife Concurrence for I70 East Informal Consultation for "may affect, but not adversely affect" Ute Ladies'-tresses Orchid and Colorado Butterfly Plant

Dear Mr. DeBerry:

The purpose of this letter is to request your concurrence on determinations of "may affect, but not likely to adversely affect" for impacts described in the I70 East NEPA documents, and the refined impacts for the current construction project, Central 70, on the Ute Ladies'-tresses Orchid (ULTO) and the Colorado Butterfly Plant (CBP).

Project Description

The Preferred Alternative, Phase 1 (Partial Cover Lowered Alternative with Managed Lanes) selected in the January 19, 2017 Record of Decision (ROD) is the first phase of implementing the Preferred Alternative identified in the I70 East FEIS. This project removes the existing Interstate 70 (I-70) viaduct between Brighton Boulevard and Colorado Boulevard and lowers the highway below grade. The project includes placing a four-acre cover over a portion of the lowered highway (between the Clayton Street and Columbine Street bridges, adjacent to Swansea Elementary School), and adds lanes in each direction between Brighton Boulevard and the interchange at Chambers. Please see the Central 70 Project Overview below. In the area of Sand Creek, where there is riparian habitat, the construction improves the I270 flyover ramp connection with I70 and allows enough space for the future construction of the I70 East Preferred Alternative underneath.

Central 70 Project Overview

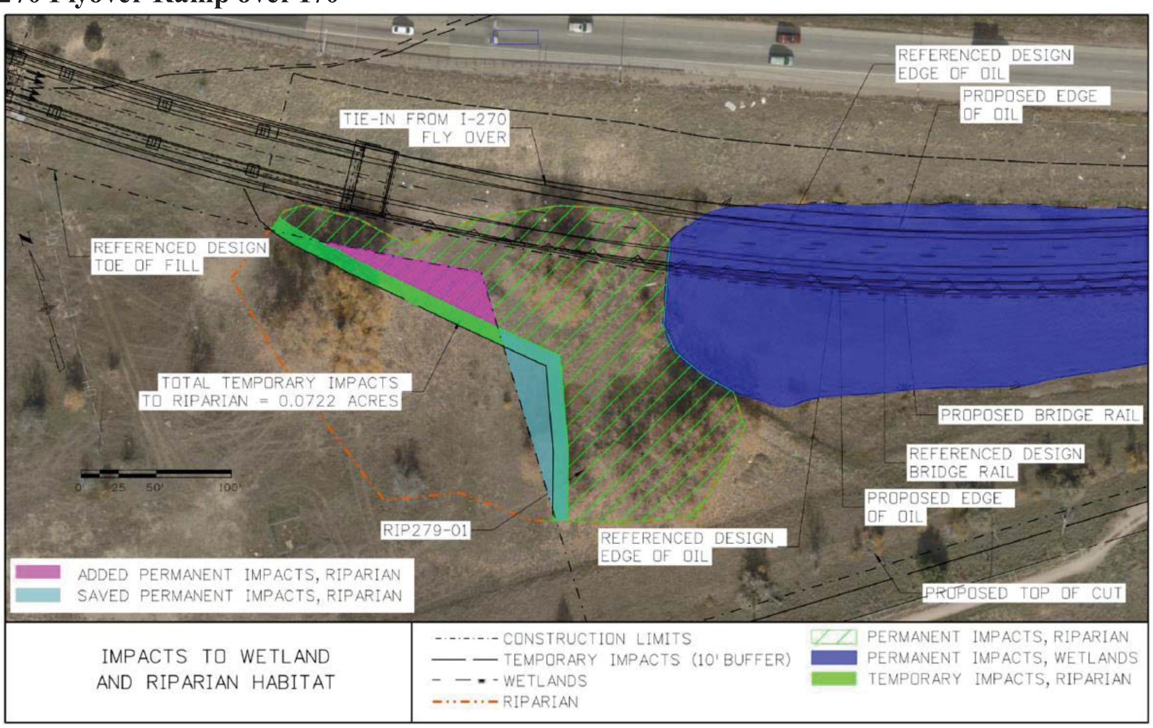
Threatened and Endangered Species

Two potential species in the project area are Ute ladies'-tresses orchid (*Spiranthes diluvialis)* and Colorado butterfly plant (*Gaura neomexicana ssp. Coloradensis).* Block clearance zones for these species exist in the Denver Metropolitan area in the South Platte River and Cherry Creek riparian habitats. The Block clearance zone does not include Sand Creek.

The Final EIS for the I70 Project reported that the most promising habitat, although unlikely, for Ute ladies'-tresses orchids (*Spiranthes diluvialis)* and Colorado butterfly plant (*Gaura neomexicana ssp. Coloradensis)* in the project area is within riparian and wetland habitats along Sand Creek. The Partial Covered Lowered Alternative (Preferred Alternative) impacts to riparian habitat in this area due to bridge widening are estimated to be 0.628 acre to 0.804 acre. Additionally, impacts to wetland habitat ranges from 0.098 acre to 0.104 acre at Sand Creek. Overall, the likelihood for ULTO or CBP to occur along Sand Creek, or any part of the project area, is low because the areas have been degraded and contain large communities of non-native and noxious species; therefore, the probability of direct or indirect impact also is low. Due to the general lack of suitable habitat and its likely absence from the project area, no effects to either species are anticipated. The determination for both of these species for the I-70 East Preferred Alternative is ***"may affect, but is not likely to adversely affect."*** This determination was applied because potentially suitable habitat for the ULTO and the CBP exist in the project area; no sightings of either plant have been reported for Denver or Adams Counties; and habitat quality in the project area is degraded.

Habitat impacts from the Central 70 Construction project, which is a portion of the I70 East Preferred Alternative, have been reduced in the Sand Creek Area as the design has progressed. The Onsite Drainage Outfall impacts to riparian habitat north of I70 have been completely avoided. The remaining impacts at the I270 ramp have been reduced compared to the impacts reported in the I70 East Record of Decision. The figure and table below summarize the impacts to ULTO and CBP related to the current Central 70 project.

I270 Flyover Ramp over I70



Riparian Area/ULTO and CBP Potential Habitat	ROD Permanent Impacts (acres)	Central 70 Current Impacts (acres)	Difference (acres)	ROD Temporary Impacts (acres)	Central 70 Current Temporary Impacts (acres)	Difference in Temporary Impacts (acres)
Onsite Drainage Outfall	.002	0	-.002	0.12	0	-.012
I270 Ramp	.568	.563	-.003	.074	.072	-.002
Total	.568	.563	-.005	.086	.072	-.014

The determination of ***"may affect, but not likely to adversely affect"*** is based on a conservative interpretation of where these species can occur. As a mitigation measure, a qualified biologist will conduct botanical surveys of this riparian and wetland habitat during the appropriate summer months when the plants are expected to be blooming, prior to the initiation of construction. If the biologist identifies either species, formal consultation will be completed with the USFWS prior to construction.

The FHWA is completing informal consultation with the USFWS. The FHWA is requesting concurrence from the USFWS for the determination for the ULTO and CBP. The water depletions for this project are address in the South Platte programmatic agreement, SPPBA. If the USFWS has any questions or concerns, please contact Ms. Monica Pavlik at 720-963-3012.

Sincerely,

John M. Cater, P.E.

Monica Pavlik

Division Administrator

By: Monica Pavlik, P.E.
Major Project Oversight Manager

Cc: Mr. Tim Buntrock (CDOT-Central 70)
Ms. Rebecca White (CDOT-Central 70)
Mr. Jeff Peterson (CDOT-EPB)
Ms. Stephanie Gibson (FHWA)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE/LAKEWOOD
P.O. BOX 25486, DENVER FEDERAL CENTER
DENVER, COLORADO 80225-0486

IN REPLY REFER TO:
TAILS: 06E24000-2018-I-1170

June 18, 2018

Monica Pavlik
Federal Highway Administration
12300 West Dakota Avenue, Suite 180
Lakewood, Colorado 80228
monica.pavlik@dot.gov

Dear Ms. Pavlik:

On June 15, 2018, the U.S. Fish and Wildlife Service (Service) received your report regarding reconstruction of I-70 from I-25 to Chambers Road in Adams and Arapahoe Counties, and the City and County of Denver, Colorado, and its potential impacts on the threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*) and Colorado butterfly plant (*Oenothera coloradensis*). No critical habitat has been designated in the project area; therefore, none will be affected. Our review was performed consistent with our authority under the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq*.).

The Preferred Alternative, Phase 1 (Partial Cover Lowered Alternative with Managed Lanes) selected in the January 19, 2017, Record of Decision (ROD) is the first phase of implementing the Preferred Alternative identified in the I-70 East FEIS. This project removes the existing I-70 viaduct between Brighton Boulevard and Colorado Boulevard and lowers the highway below grade. The project includes placing a four-acre cover over a portion of the lowered highway (between the Clayton Street and Columbine Street bridge), and adds lanes in each direction between Brighton Boulevard and the interchange at Chambers. In the area of Sand Creek, where there is riparian habitat, the construction improves the I-270 flyover ramp connection with I-70 and allows enough space for the future construction of the I-70 East Preferred Alternative underneath.

Habitat for the Ute ladies'-tresses orchid occurs below 6,500 feet in elevation and consists of wet meadows associated with perennial stream terraces, floodplains, and oxbows. The Colorado butterfly plant also occupies alluvial soils within floodplains or drainage bottoms, but at elevations between 5,000 and 6,400 feet. Although much of the Denver Metropolitan has been block-cleared for the Ute ladies'-tresses orchid and the Colorado butterfly plant, the block clearance does not include Sand Creek. Riparian and wetland habitats in the project area are degraded by human activities and contain large communities of non-native and noxious species and are unlikely to support either of these listed plant species. Further, although neither species has been detected in the project area during site reconnaissance, you have committed to conducting surveys for the Ute ladies'-tresses orchid and the Colorado butterfly plant prior to construction, and if either is detected, consultation will be reinitiated.

Neither species has been detected in the project area, and the habitat is degraded. Given that neither species is known to occur in the project corridor, the degraded condition of the habitat, and that you have committed to conducting surveys and reinitiating consultation if and individual of either species is detected, impacts to the Ute ladies'-tresses orchid and Colorado butterfly plant are expected to be discountable and insignificant.

Given your habitat and project descriptions, the Service finds the report acceptable and concurs with the determination that the impacts resulting from the proposed project will not likely adversely affect the Ute ladies'-tresses orchid or the Colorado butterfly plant. No critical habitat has been designated in the project area; therefore, none will be affected.

Please note that reinitiation of consultation will be required if:

1. New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation;
2. The action is subsequently modified in a manner that causes an adverse effect to the listed species or critical habitat that was not considered in this consultation; or
3. A new species is listed or critical habitat designated that may be affected by the action.

If the proposed project has not commenced within one year, please contact the Colorado Field Office to request an extension. We appreciate your submitting this report to our office for review and comment. If the Service can be of further assistance, please contact Alison Deans Michael of my staff at (303) 236-4758.

Sincerely,

DRUE DEBERRY Digitally signed by DRUE DEBERRY Date: 2018.06.18 07:35:36 -06'00'

Drue L. DeBerry
Colorado and Nebraska Field Offices Supervisor

ec: FHWA (Stephanie Gibson)
CDOT, Central 70 (Tim Buntrock)
CDOT, Central 70 (Rebecca White)
CDOT, HQ (Jeff Peterson)
Michael

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