

Technical Memorandum Brent Spence Bridge



Additional Traffic Noise Assessment Kentucky Southern Section

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Technical Memorandum

Brent Spence Bridge



To: KYTC Brent Spence Bridge Corridor Team

From: Zach Reichert
Palmer Engineering

Date: February 28, 2023

RE: Brent Spence Bridge Corridor Project
Additional Traffic Noise Assessment
Kentucky Southern Section

Introduction: Traffic Noise Assessment of Alternative I-W for the Brent Spence Bridge Corridor was completed in February 2023. The analysis of the southern section of the corridor, extending from just north of the Buttermilk Pike Interchange to just north of the Kyle's Lane interchange, was conducted by Palmer Engineering. The results of the analysis are documented in *Traffic Noise Assessment, Brent Spence Bridge Corridor Project, Kentucky Southern Section, Kenton County, KYTC Item No. 6-17.00, February 2023 (2023 Noise Update)*. KYTC has requested this Technical Memorandum to document additional analysis of areas along the corridor that did not previously meet feasibility, reasonableness, and/or CBR criteria established in the 2020 KYTC Noise Policy (Noise Policy). The additional analysis provides a discussion of the possibility of constructing additional barriers or lengthening and/or increasing the height of proposed barriers to provide additional noise mitigation along the corridor.

Between Buttermilk Pk & Dixie Hwy: Northbound: Barrier B18, recommended for inclusion in the project in the 2023 Noise Update, extends from the southern limit of the Study Area to the Dixie Highway interchange, providing mitigation to all impacted receptors located south of the corridor. No additional analysis was conducted in this section.

Southbound MP 186.8-187.2: All receptors above the NAC in this section are commercial office building space. The only noted areas of frequent human use are at receptors R727 and R736, both of which have outdoor patios. In accordance with the Noise Policy, equivalent receptors were calculated for these outdoor uses. At 224 Grandview Drive (R727) 0.9 equivalent receptors were identified; at 250 Grandview Drive (R736) 0.6 equivalent receptors were identified. This location does not reach the minimum of three equivalent receptors within 115' for analysis of abatement and a barrier is not considered acoustically feasible. Extending wall B17B by approximately 1,100' would provide mitigation for these properties. Assuming a height of 20', the wall would cost an additional \$704,000 with a total cost of \$1,440,360, and result in a CBR of approximately \$82,306. This is more than double the CBR established in the Noise Policy, therefore, no further analysis was conducted.

Southbound MP 187.2-187.5: This area was analyzed as Barrier B17A & B in the 2023 Noise Update. Both options are above the CBR threshold of \$40,000; B17B was developed in an effort to lower the CBR. By shortening the wall by ~300' on the north end, the CBR was lowered from ~\$58,000 to ~\$46,000, still above the acceptable range. This was done by utilizing the existing berm on the north end of this location between W Maple Ave and I-75. This berm would be identified as "Not to be Disturbed" during construction of this project. No additional modification of height or location was found to significantly improve the viability of this proposed barrier.

Properties lying south of the Dixie Highway interchange and beyond the western end of the proposed barrier (Grandview Drive) are primarily commercial and not predicted to experience a noise impact. On the northern end of the barrier, we spoke with the general manager at the Mercedes dealership and they made it clear that they do not want a noise barrier in this location, even if it would reduce the noise at their property, as it would obscure the visibility of their car lot from I-75. Residential areas just north of the area (ex. R786, R782) are also not predicted to experience a noise impact. No further analysis was conducted for these areas.

**Between
Dixie Hwy &
Kyle's Ln:**

Northbound: Barrier B19 was recommend along the south side of the roadway adjacent to the northbound lanes. There are no impacted receptors identified beyond its eastern or western terminus so no lengthening of the wall was considered.

Southbound: Barrier B16 was recommended in this area. This is designed as a rebuild of the existing wall between MP 187.9 and MP 188.1 at a height of 24'. During analysis in September 2022, this barrier was considered to extend to MP 188.3, just past the Days Inn on the east side of I-75. The lengthened barrier was not considered acoustically feasible because of the lack of impacted receptors. The only locations with areas of frequent human use between the end of proposed barrier B16 and the Kyle's Lane interchange are at the Infinity car dealership and the Days Inn outdoor pool area.

Representatives from the Infinity dealership, indicated that customers walk the lot to shop for vehicles in the front of the building (closer to US 25) rather than behind the building (closer to I-75). With that information it was concluded that within the area of frequent human use, noise levels are predicted to be below the NAC criteria.

Information provided by representatives from the Days Inn, was used to determine that use within the pool area is represented by two equivalent receptors. Since there are no other impacted receptors within a 115' radius, this barrier would not be considered acoustically feasible in accordance with the Noise Policy. To provide mitigation for this location, would require a noise barrier approximately 400' long and 16' high, which would be expected to cost an additional \$250,986 and result in a CBR of \$45,140. This is well over the recommended CBR and, therefore, no further analysis was conducted.

During the public meetings for this area, concerns were raised regarding noise levels on Summit Lane. Summit Lane was not analyzed in the 2023 Noise Update as all houses lie beyond the 500' buffer for noise assessment established in FHWA guidelines and the KYTC

Noise Policy. Due to the concern, an extension of barrier B16 was analyzed. Extending the 24' proposed barrier northward ~2300' to the on ramp from Kyle's lane would provide benefit for 13 additional receptors along Summit Lane, Fortside Drive, and the Days Inn. The CBR for the modified barrier would be ~\$75,500.

While analyzing this area for the 2023 Noise Update, extending the length of the existing wall southward to provide benefit for the Youthland Academy day care was preliminarily considered. With the additional length, the CBR exceeded the \$40,000 established in the KYTC Noise Policy; therefore, the barrier was not recommended.

By extending the existing southern end point southward 276' at a height of 12', the day care would receive a reduction of 6.7 dB to 64.8 dB. Based upon information provided by the owner, the use of the day care represents one equivalent receptor. No other additional receptors in the area would be benefited by extension of the barrier. The modified barrier would benefit 22 receptors and result in a CBR of \$41,348.

One last option was considered in this area. By extending the existing southern end point 405' to the south at a height of 12', the day care would receive an even greater reduction of 7.6 dB to 63.7 dB, and Central Bank would receive a reduction of 6.3 dB to 65 dB. Due to KYTC's definition in the noise policy, since there are no areas of frequent human use for the bank, it would not be considered a benefitted receptor. Therefore, the number of benefitted receptors is 22 with a slightly higher CBR of \$43,395. Attempts to contact the bank manager to determine whether they would want a barrier that obscured visibility from the interstate were unsuccessful.

**Between
Kyle's Ln &
12th St:**

Northbound: Barrier B20/NSA D, recommended for inclusion in the project in the 2023 Noise Update, extends from the Kyle's Lane interchange into the Northern Section of the project analysis area just south of the 12th Street interchange, providing mitigation to 132 receptors with a CRB of \$23,860. No additional analysis was conducted in this section.

Southbound: Barrier B23 was recommended for construction north of the corridor between the northern end of the Kyle's Lane southbound off ramp to north of the Notre Dame Academy and St. Joseph Lane. The barrier provides abatement for all impacted receptors adjacent to the proposed southbound lanes in this section. No additional analysis was conducted.

Table 1: B16 Receptor Values - Northern Options

Receptors	Noise Level w/ B16 dB(A)*	Days Inn Extension Level dB(A)	Days Inn Reduction dB(A)	Summit Lane Extension Level dB(A)	Summit Lane Reduction dB(A)
R716	68.4	68.2	0.2	62.9	5.5
R718	66.5	66.3	0.2	60.4	6.1
R719	62.6	62.4	0.2	58.0	4.6
R730	70.6	69.8	0.8	60.8	9.8
R733	75.1	68.1	7.0	62.4	12.7
R735	70.2	60.5	9.7	57.5	12.7
R737	77.1	73.6	3.5	63.8	13.3
R741	66.1	64.9	1.2	59.2	6.9
R759	63.0	62.9	0.1	62.1	0.9
R1000	61.4**	61.4	0.0	57.8	3.6
R1001	62.7**	62.6	0.1	58.4	4.3
R1002	63.3**	63.2	0.1	57.7	5.6
R1003	62.2**	62.1	0.1	56.7	5.5
R1004	63.4**	63.3	0.1	57.7	5.7
R1005	63.2**	63.0	0.2	57.7	5.5
R1006	56.6**	56.6	0.0	55.5	1.1
R1007	56.7**	56.7	0.0	54.7	2.0
R1008	61.6**	61.1	0.5	56.5	5.1
R1009	63.1**	62.7	0.4	58.5	4.6
R1010	65.4**	65.1	0.3	59.7	5.7
R1011	66.4**	66.2	0.2	60.3	6.1
R1012	66.0**	65.9	0.1	60.7	5.3
R1013	69.3**	69.1	0.2	63.8	5.5
R1015	65.9**	65.7	0.2	60.6	5.3

* Noise level reported in February 2023 Traffic Noise Assessment

** Receptor not assessed in February 2023 Traffic Noise Assessment. Noise level calculated from updated TNM run

Table 2: B16 Receptor Values - Southern Options

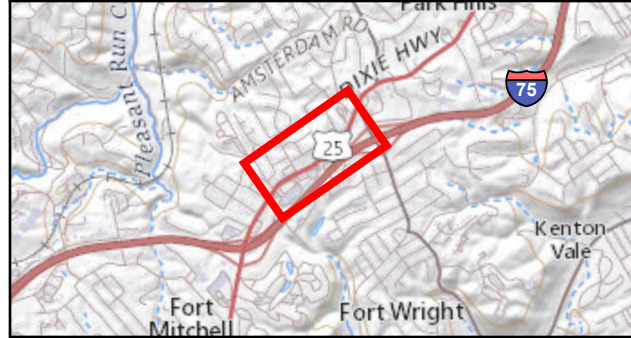
Receptors	Noise Level w/ B16* dB(A)	Youthland Academy Extension Level dB(A)	Youthland Academy Reduction dB(A)	Central Bank Extension Level dB(A)	Central Bank Reduction dB(A)
R722	60.8	59.2	1.6	58.3	2.5
R723	60.8	58.6	2.2	57.8	3.0
R724	56.0	55.8	0.2	55.0	1.0
R728	60.2	57.4	2.8	57.2	3.0
R729	60.4	58.2	2.2	57.9	2.5
R731	60.8	58.5	2.3	58.4	2.4
R732	61.1	58.2	2.9	58.0	3.1
R738	62.8	60.0	2.8	60.1	2.7
R739	60.7	58.4	2.3	57.6	3.1
R740	62.6	59.0	3.6	58.9	3.7
R742	61.0	57.7	3.3	57.6	3.4
R746	65.0	60.3	4.7	60.2	4.8
R750	61.8	59.3	2.5	59.1	2.7
R751	63.1	60.4	2.7	59.9	3.2
R752	62.0	59.8	2.2	59.5	2.5
R753	64.7	60.6	4.1	60.5	4.2
R758	64.4	60.9	3.5	60.4	4.0
R759	63.0	62.9	0.1	62.1	0.9
R760	62.9	60.7	2.2	60.3	2.6
R762	64.0	61.7	2.3	61.7	2.3
R765	64.6	62.2	2.4	62.0	2.6
R768	63.2	61.2	2.0	61.0	2.2
R773	64.7	62.3	2.4	62.3	2.4
R781	62.5	61.7	0.8	61.6	0.9
R865	71.3	65.0	6.3	64.9	6.4
R905	71.5**	64.8	6.7	63.9	7.6

* Noise level reported in February 2023 Traffic Noise Assessment

** Receptor not assessed in February 2023 Traffic Noise Assessment. Noise level calculated from updated TNM run


Table 3: Barrier Summary

Location	Barrier #	Percentage of Benefited Receptors which Receive 7 dB(A) or Greater Noise Reduction (%)	Percentage of Impacted Receptors which Receive 7 dB(A) or Greater Noise Reduction (%)	Barrier Description					Number of Benefited Properties	Estimated Cost Per Benefiting Receptor (CBR) (\$)	Noise Barrier Effectiveness			KYTC Noise Abatement Criteria Satisfied (Yes/No)
				Length (feet)	Beginning Point and Highway Direction	Ending Point and Highway Direction	Noise Barrier Height (feet)	Estimated Cost (\$)			Design Goal Achieved	Acoustic Feasibility Achieved (Yes/No)	Cost Effective Achieved (Yes/No)	
SB between Kyle's Lane and Dixie	B16	57	60	1041	SB 413+81	SB 403+29	24	\$799,187	21	\$38,057	Yes	Yes	Yes	Yes
	B16 –Days Inn	60	64	1445	SB 417+85	SB 403+29	16-24	\$1,038,226	23	\$45,140	Yes	No	No	No
	B16 – Summit Lane	35	38	3345	SB 436+74	SB 403+29	24	\$2,565,587	34	\$75,458	No	Yes	No	No
	B16 – Youthland Academy	84	86	1317	SB 413+81	SB 390+00	12-24	\$905,472	22	\$41,158	Yes	Yes	No	No
	B16 – Central Bank	89	89	1446	SB 413+81	SB 399+24	12-24	\$954,707	22	\$43,395	Yes	Yes	No	No





Legend

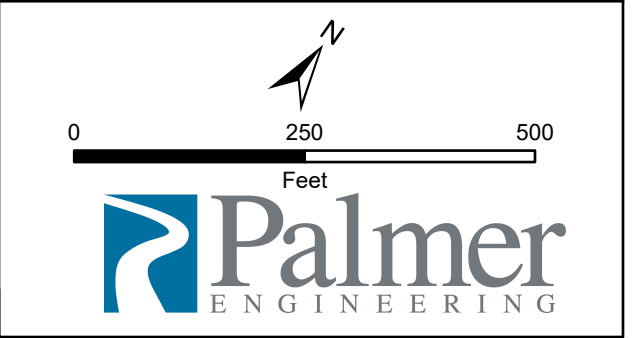
- Receptor #
- Predicted Abated Noise Level (Base Condition Noise Level)
- Base Condition=
- Feb. 2023 Report
- Recommended Noise Barrier
- 500' Noise Buffer
- Additional Considered Barrier

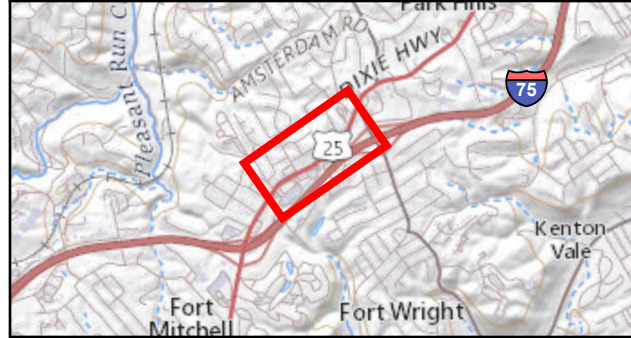


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Concept I-W Barrier B16 (16 to 24 feet)
Exhibit 1: B16 North Extension Receptor Values (Days Inn Extension)







Credit: KYFromAbove Partners; Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet







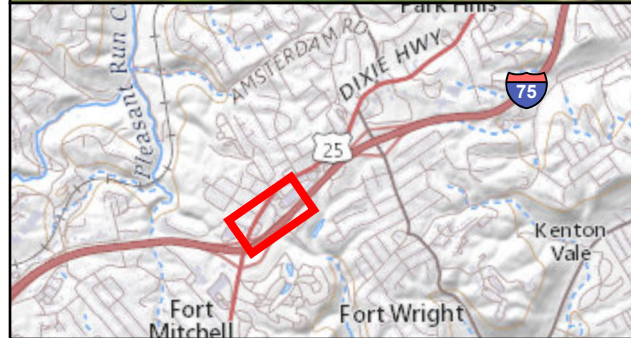
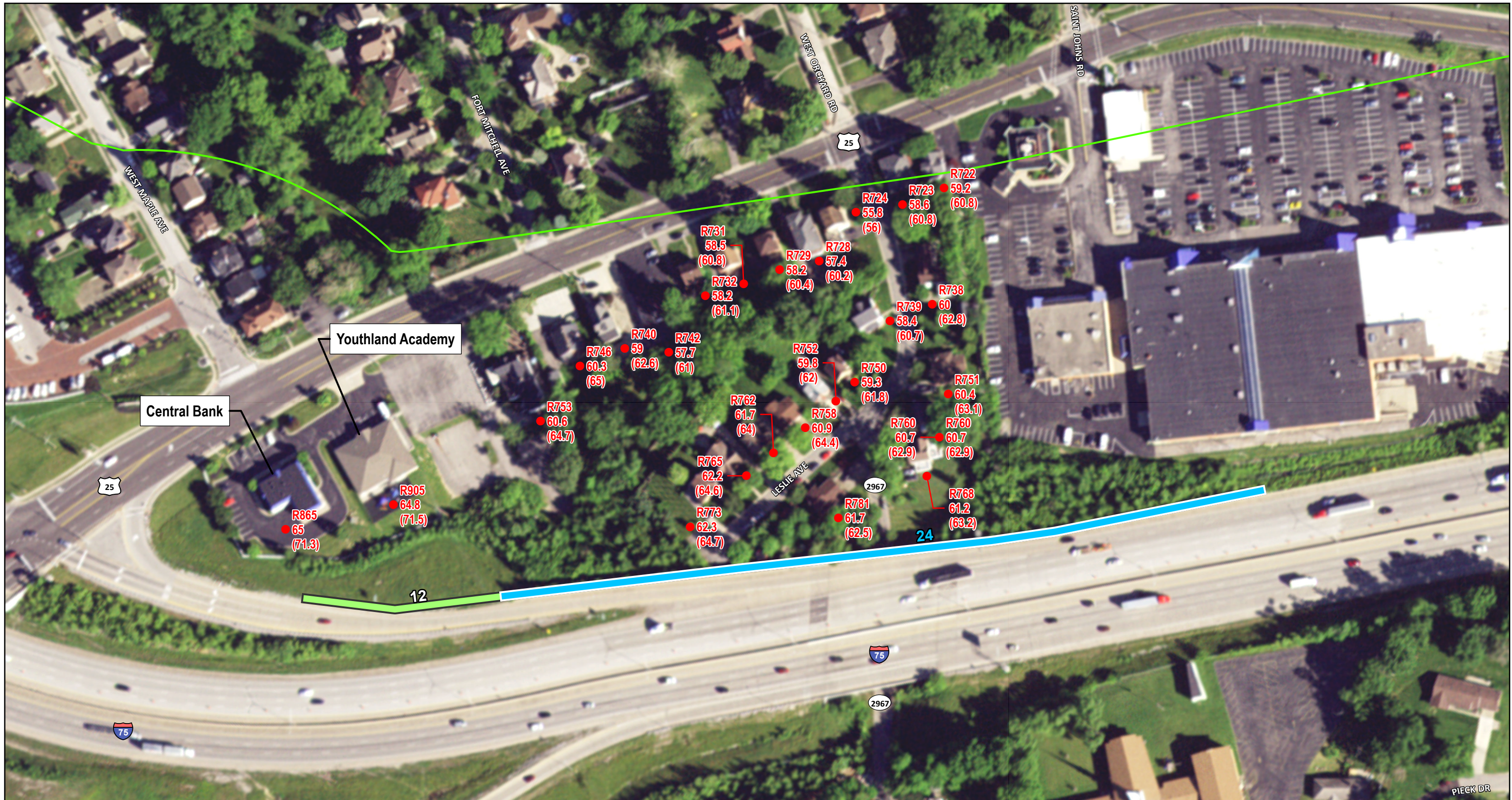
- Legend**
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Concept I-W Barrier B16 (24 feet)
Exhibit 2: B16 North Extension Receptor Values (Summit Lane)


 0 250 500
 Feet


Credit: KYFromAbove Partners; Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet



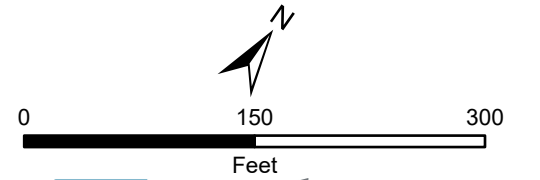
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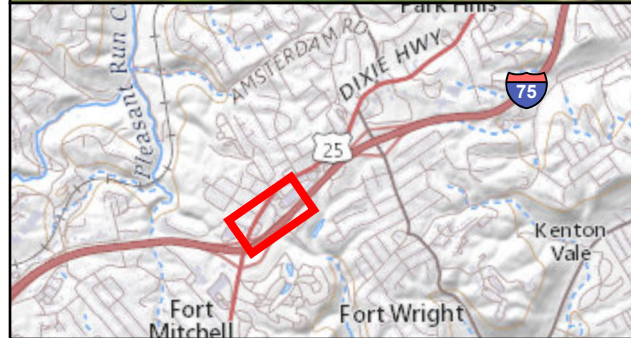
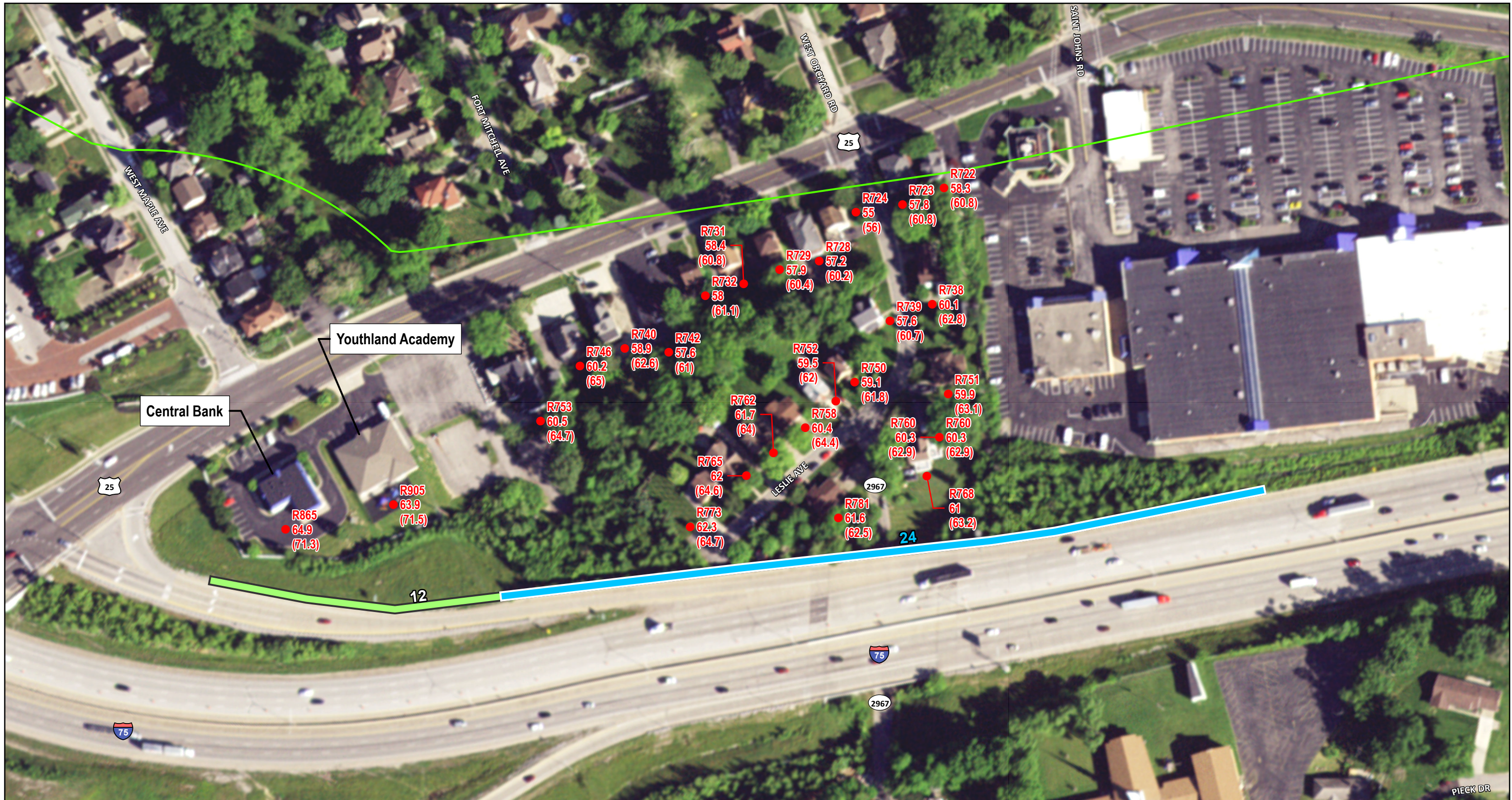
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**Concept I-W Barrier B16 (12 to 24 feet)
Exhibit 3: B16 North Extension Receptor Values (Youthland Academy)**



Credit: KYFromAbove Partners; Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet



- Legend**
- Receptor #
 - Predicted Abated Noise Level (Base Condition Noise Level)
 - Base Condition=
 - Feb. 2023 Report
 - Recommended Noise Barrier
 - 500' Noise Buffer
 - Additional Considered Barrier



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Concept I-W Barrier B16 (12 to 24 feet)
Exhibit 4: B16 North Extension Receptor Values (Central Bank)

Credit: KYFromAbove Partners; Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet

