I-65/I-70 North Split Project
Indianapolis, Indiana

Des. Nos. 1592385 and 1600808

TRAFFIC NOISE TECHNICAL REPORT

ADDENDUM FOR NOISE BARRIER 3 WEST (NB3W)

December 6, 2019

CONTENTS

TABLES

1 INTRODUCTION

The Indiana Department of Transportation (INDOT) is developing a project involving the I-65/I-70 North Split Interchange (North Split) in Indianapolis, Indiana, in partnership with the Federal Highway Administration (FHWA). I-65 and I-70 are nationally significant corridors, serving the Midwest and United States in four directions. The North Split is the second-most heavily-traveled interchange in Indiana, accommodating about 214,000 vehicles per day. The purpose of the North Split Project is to rehabilitate and improve existing interstate facilities in the project area.

This addendum amends the initial Traffic Noise Technical Report in conformance with corresponding federal regulations and guidance and the National Environmental Policy Act (NEPA). This addendum incorporates a proposed multi-family residential development into the noise analysis. This proposed development bounded to the west by Lewis Street, to the south by 15th Street, to the east by Yandes Street and to the north by 16th Street within Common Noise Environment (CNE) 4. The addition of the proposed residential development necessitated a re-evaluation of the reasonable and feasible determination complete for NB3W. Information presented in this addendum supersedes information presented in the Traffic Noise Technical Report as it relates to the evaluation of NB3W and the modeled noise levels for receivers R100 through R119-3. The analysis done for the addendum presents the existing and future acoustical environment for this proposed development.

2 NOISE STUDY METHODOLOGY

2.1 Common Noise Environments (CNE) Descriptions

Land uses in the project area have been grouped into a series of numbered Common Noise Environments (CNEs) that are identified on maps in **Appendix A.**

- **CNE 4** is located north of I-70 on the east leg of the interchange from the eastern limits of the study area to Lewis Street. This area consists of a few commercial/industrial properties, residential land uses, along with several churches and the Oaks Academy School. No areas of frequent outdoor human use were identified for the commercial properties. Residential land uses include the Martindale Brightwood neighborhood and a proposed multi-family residential development at the west end of the CNE. There are no topographical shielding factors between the highway and sensitive land uses. This area contains several building rows providing shielding to sensitive land uses further from the roadway.

3 NOISE MODELING

The latest version of the FHWA Traffic Noise Model (TNM) was used to model existing (2017) and design year (2041) worst hourly traffic noise levels within the study area included in this addendum. A total of 33 TNM noise receivers representing 232 receptors, numbered R100 through R119-3, were modeled for the existing and proposed condition. These receivers were selected to model representative noise impacts at 208 Activity Category B receptors, 12 Category C receptors, and 12 Category D receptors. The location of each receiver is shown in **Appendix A**. The receivers were modeled five feet above ground for ground level receivers and an additional ten feet was added to each receiver above the second story based on floor (e.g. 25 feet for third story receivers). The modeled noise levels are presented in **Appendix D**.

Activity Category C land uses that do not have an exterior area of frequent human use are categorized as Activity Category D land uses, which are evaluated for interior impacts. The methodology for evaluating interior noise levels remained unchanged from the Draft Traffic Noise Technical Report. The results of the evaluation of interior noise levels are included in Appendix B.

4 NOISE IMPACTS AND ABATEMENT

4.1 Noise Impact Assessment

Existing (2017) worst (noisiest) traffic hour noise levels for the area covered by this addendum range from 42.4 to 71.0 dB(A) Leq(h). Worst traffic hour noise levels in the design year (2041) range from 41.6 to 69.9 dB(A) Leq(h). Existing and design year traffic worst hour noise levels are found in **Appendix D**. The locations of the receivers are shown on the traffic analysis noise maps in **Appendix A**.

Predicted future design year (2041) noise levels adjacent to the proposed project would approach or exceed the Noise Abatement Criteria (NAC) at 9 receiver locations representing 63 receptors.

Predicted future noise level changes range from a 3.1 dB(A) decrease to a 2.9 dB(A) increase. Substantial noise level increases of 15.0 dB(A) are not predicted to occur in this study area. To evaluate interior noise levels the exterior level is modeled and a reduction factor is applied[1].

4.2 Noise Abatement Measures

One noise barrier (NB3W) was modeled for this addendum. This barrier is described below:

> **NB3W —** Westbound (WB) I-70 along the north edge of shoulder from approximately 240 feet west of Lewis Street to Commerce Avenue. This noise barrier examines abatement of future noise levels at residential receivers R100 through R119-3 within CNE 4 (see **Appendix A,** Traffic Noise Analysis Maps, pages 2-4).

The results of the noise barrier analysis are summarized in **Table 1**. The table presents the proposed barrier location or identification number, the CNE area, barrier length, average height, number benefited receptors adjacent to the proposed noise barrier, and a yes or no statement as to whether or not a noise barrier meets INDOT's feasibility criteria, design goal, and cost reasonable criteria as previously defined. The table also presents the estimated cost of the noise barrier based on the TNM calculated area of the noise barrier times a cost of $30.00/square foot. Additional barrier configurations evaluated during the barrier design are shown in **Appendix F.**

Maps showing noise receptors and the proposed location of NB3W is shown in **Appendix A.**

If pertinent parameters change substantially during the continuing project design, the noise abatement decision may be changed or eliminated from the final project design.

Table 1: Noise Barrier Summary

Proposed Barrier Location	CNE Area	Length (feet)	Average Height (feet)	Benefit Recep-tors	Feasibility Criteria Met	Design Goal Met?	Cost of Barrier (@$30/sq ft)	Cost per Benefited Receptor	Cost-Effective Threshold	Cost-Reasonable Criteria Met
NB3W	4	2,463	16	171	Yes	Yes	$1,201,080	$7,024	$25,000	Yes

[1] *U.S. Department of Transportation. (1995). Highway Traffic Noise Analysis and Abatement Policy and Guidance. Washington DC: Federal Highway Administration Office of Environmental Planning Noise and Air Quality Branch*

5 RESULTS FOR HISTORIC PROPERTIES

One receiver was modeled in the TNM to support the evaluation of the project's effects on aboveground National Register-listed or National Register-eligible properties within the study area of this amendment. This resource was the John Hope School No. 26. This property would experience a reduction in noise levels as a result of a barrier if it is constructed. Results of this analysis are included in **Table 2.**

Table 2: Historic Resource Noise Results

Receiver ID	Historic Resource	Existing dB(A) (2017)	Build dB(A) (2041)	Change	Noise Level w/ Barrier
R106 A	John Hope School No. 26	67.1*	66.7*	-0.4*	59.4*

*Noise levels differ slightly from the Traffic Noise Technical Report due to the addition of the proposed apartment complex into the model.

6 STATEMENT OF LIKELIHOOD

Based on the studies completed for this addendum, the State of Indiana has identified 63 impacted receptors and has determined that noise abatement is likely, but not guaranteed, at one location. Noise abatement at this location is based on preliminary design costs and design criteria. Noise abatement at this location this time has been estimated to cost $1,201,080 and will reduce the noise level by a minimum of 7 dB(A) at a majority of the identified impacted receptors. A re-evaluation of the noise analysis will occur during final design. If during final design it has been determined that conditions have changed such that noise abatement is not feasible and reasonable, the abatement measures might not be provided.

The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes. The viewpoints of the benefited residents and property owners will be sought and considered in determining the reasonableness of highway traffic noise abatement measures for proposed highway construction projects. INDOT will incorporate highway traffic noise consideration in ongoing activities for public involvement in the highway program.

7 CONCLUSION

INDOT has identified those noise receptors that would be exposed to 2041 design year noise levels approaching or exceeding the FHWA noise abatement criteria of 67 dB(A) Leq(h). A total of 63 receptors within the study area covered in this addendum have been found to meet this criterion.

One noise barrier location was modeled in the study area. The optimized noise barrier design was 2,463 feet in length, ranged in height from 12 to 20 feet, had an average height of 16 feet, and had a cost of $1,201,080. The cost per benefited receptor for the barrier was $7,024. Noise abatement at this location is based upon preliminary estimated costs and design criteria. INDOT has determined that noise abatement is likely, but not guaranteed at this location. Additional details regarding this barrier is provided in **Appendix E**. Changes to this barrier may be necessary due to conditions encountered during final design.

REFERENCES

Anderson, G. S., C.S.Y. Lee, G.G. Fleming and C. Menge, “FHWA Traffic Noise Model®, Version 1.0 User’s Guide”, Federal Highway Administration, January 1998, p. 60.

Lau, Michael C., Cynthia S. Y. Lee, Gregg G. Judith L. Rochat, Eric R. Boeker, and Gregg C. Fleming. FHWA Traffic Noise Model® Users Guide (Version 2.5 Addendum). Federal Highway Administration, April 2004.

Taylor, Ron, City of Indianapolis Greenways Development Committee Files, email regarding “Re: Indy Greenway Trail Counts”, July 12, 2019.

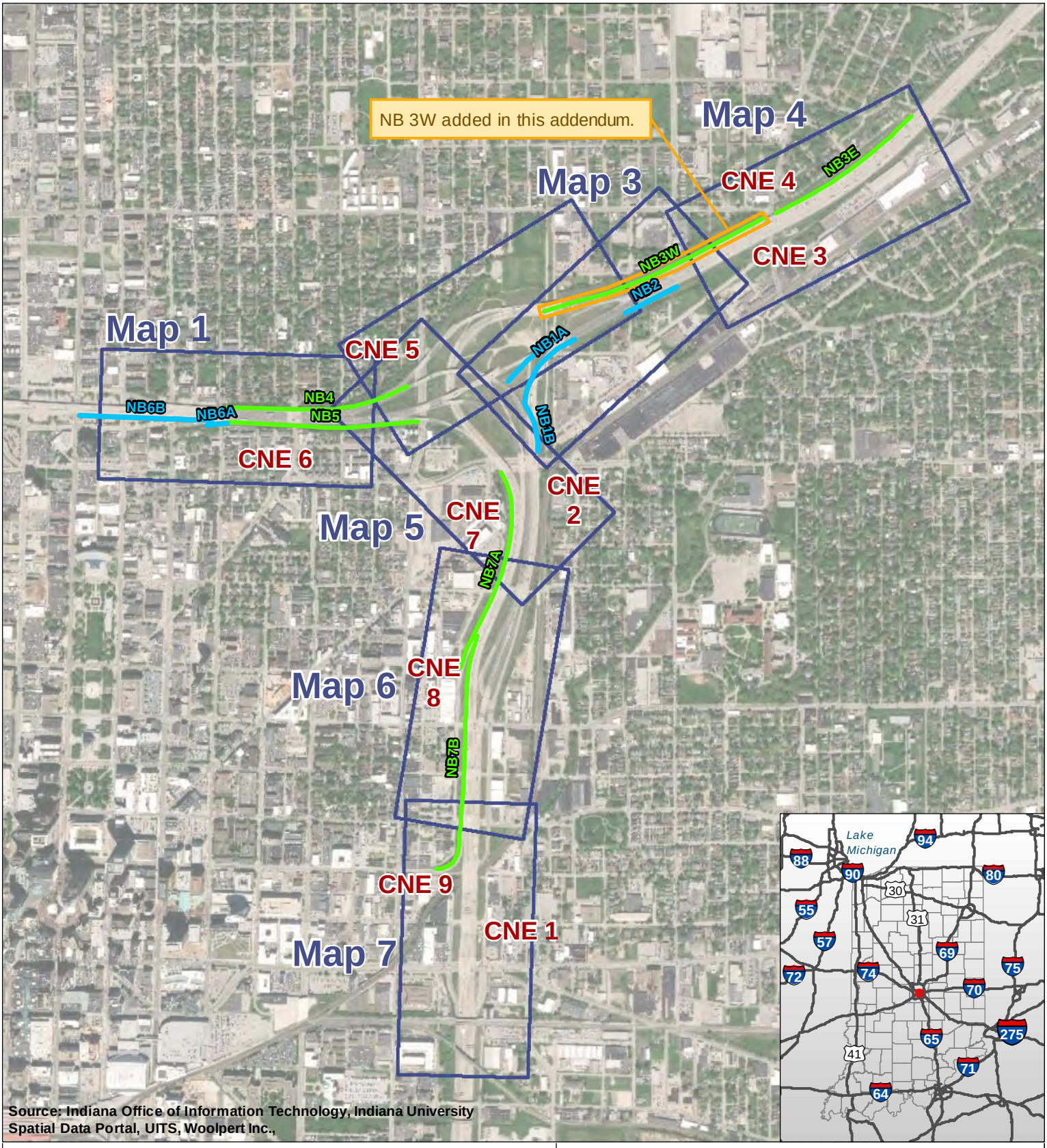
“Traffic Noise Analysis Procedure”, Indiana Department of Transportation, 2017.

23 C.F.R. § 772 (2010). “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” Accessed June, 3, 2019.

U.S. Department of Transportation. (1995). Highway Traffic Noise Analysis and Abatement Policy and Guidance. Washington DC: Federal Highway Administration Office of Environmental Planning Noise and Air Quality Branch

http://www.in.gov/indot/files/2017%20INDOT%20Noise%20Policy.pdf

APPENDIX A: TRAFFIC NOISE ANALYSIS MAPS



Source: Indiana Office of Information Technology, Indiana University Spatial Data Portal, UITS, Woolpert Inc.,

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- Map Extent
- Common Noise Environment (CNE)
- Noise Barrier Analyzed
- Feasible and Reasonable Noise Barrier

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Traffic Noise Analysis Overview Map

Des No. 1592385 and 1600808

Marion County, IN

Revised: 12/2/2019

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- Field Measurement Sites
- Noise Barriers Analyzed
- Feasible and Reasonable Noise Barrier

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Traffic Noise Analysis Maps

Des No. 1592385 and 1600808

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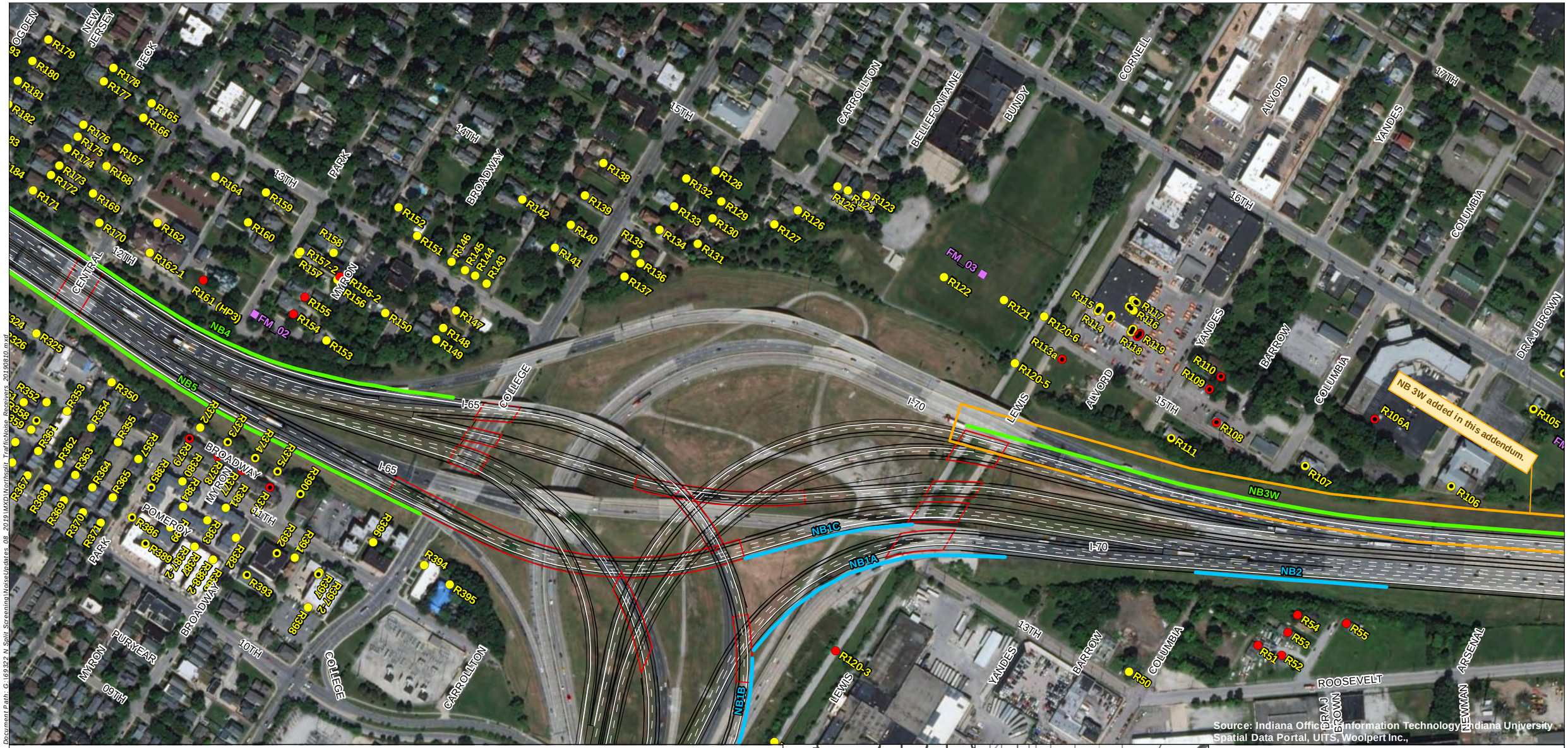

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Marion County, IN

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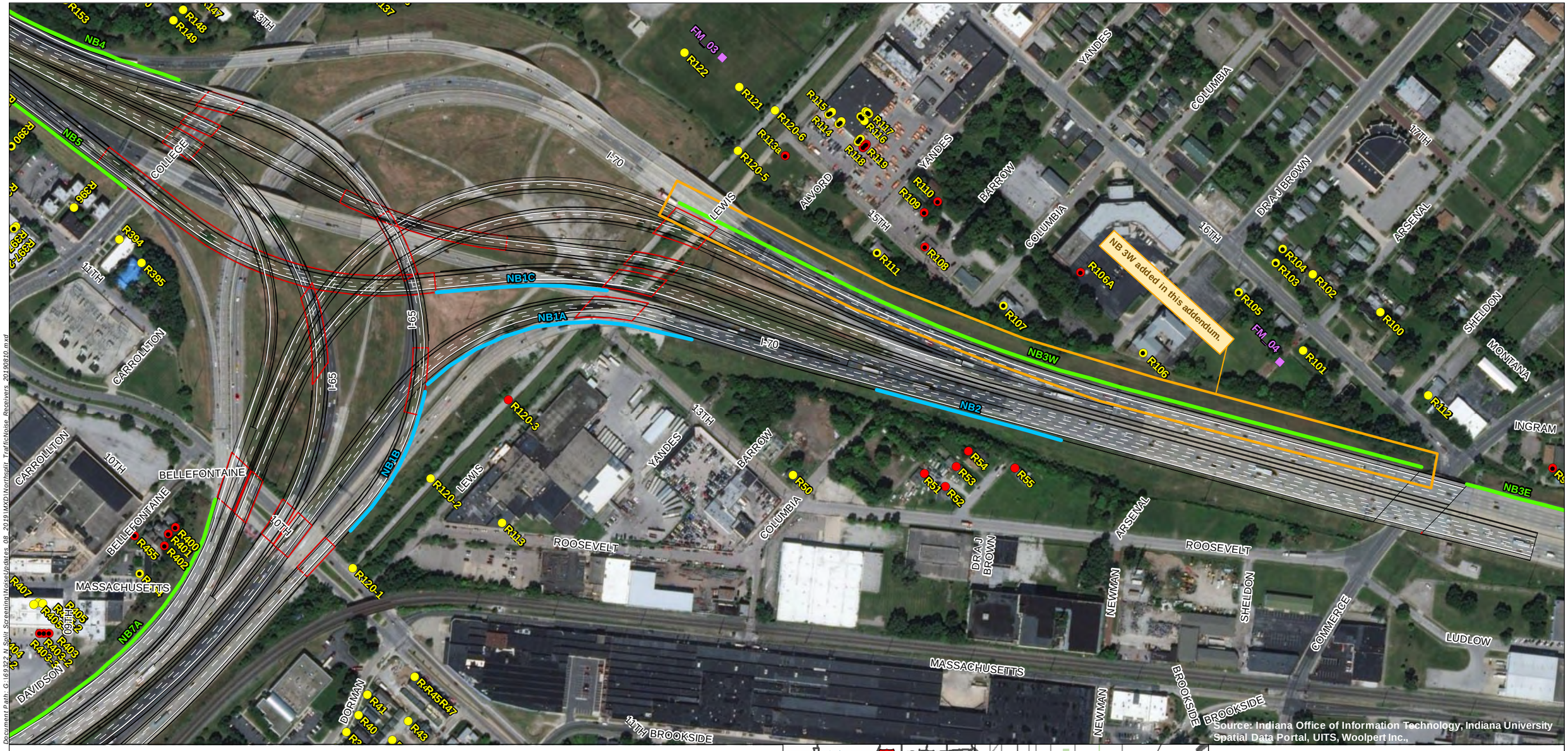

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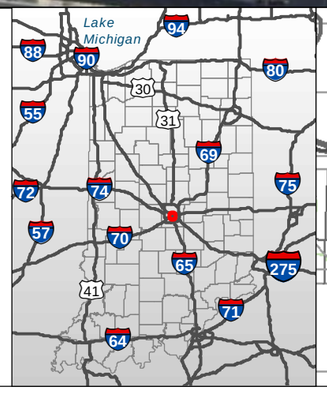

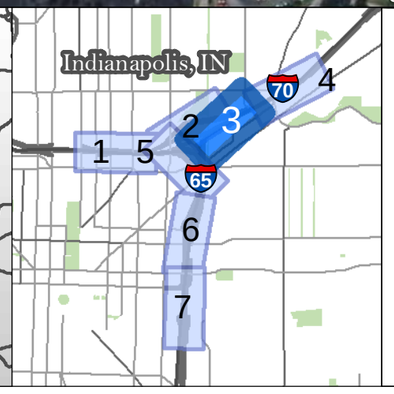

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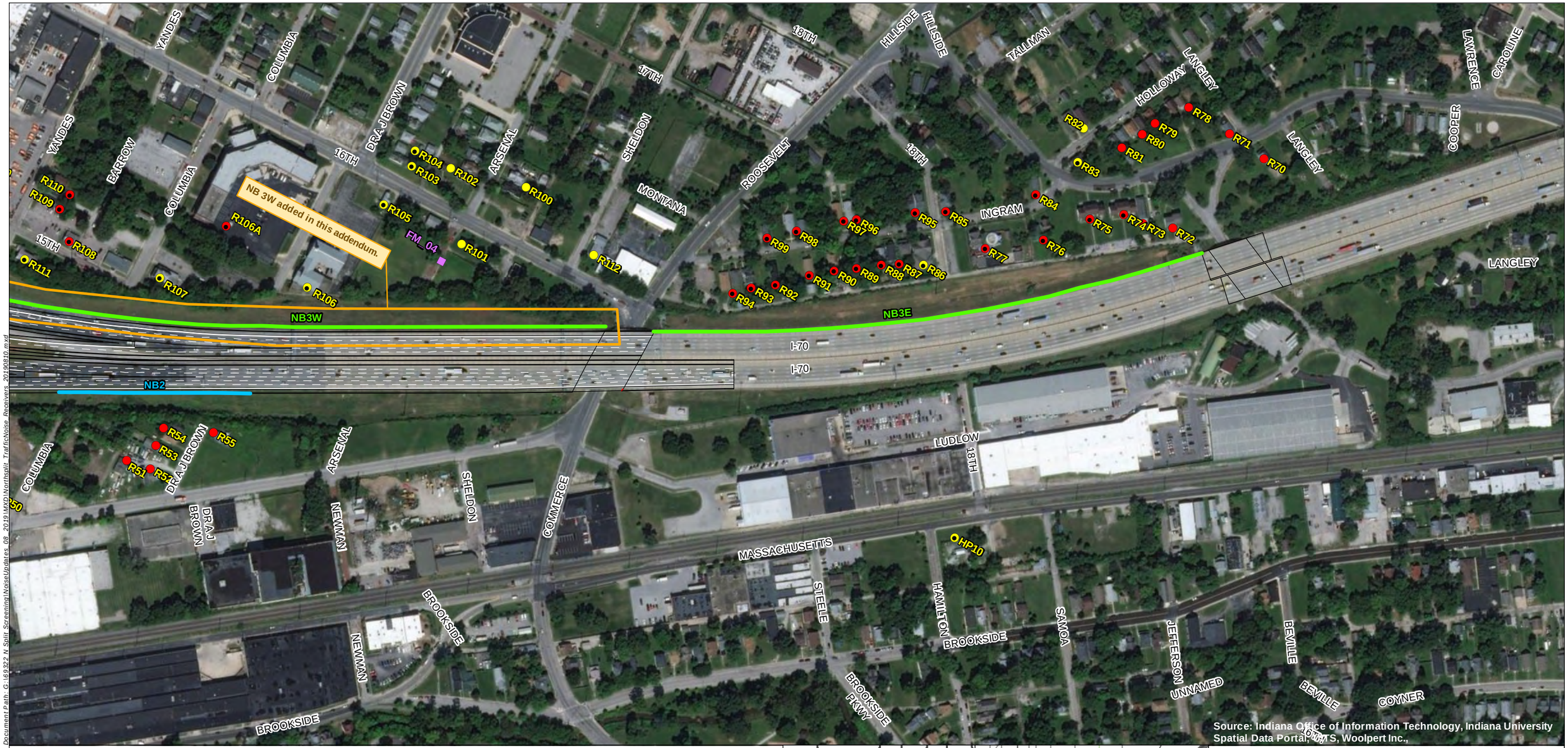

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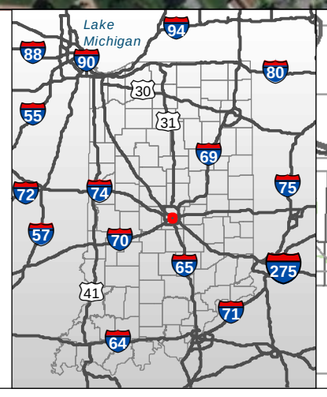

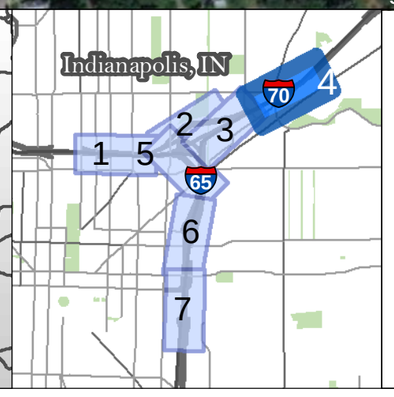

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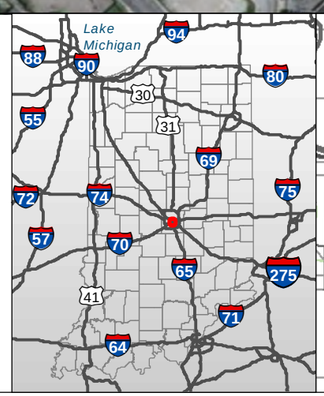

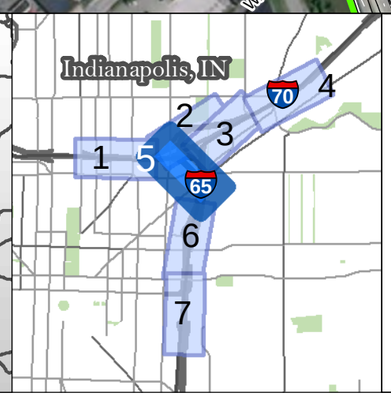

Traffic Noise Analysis Maps

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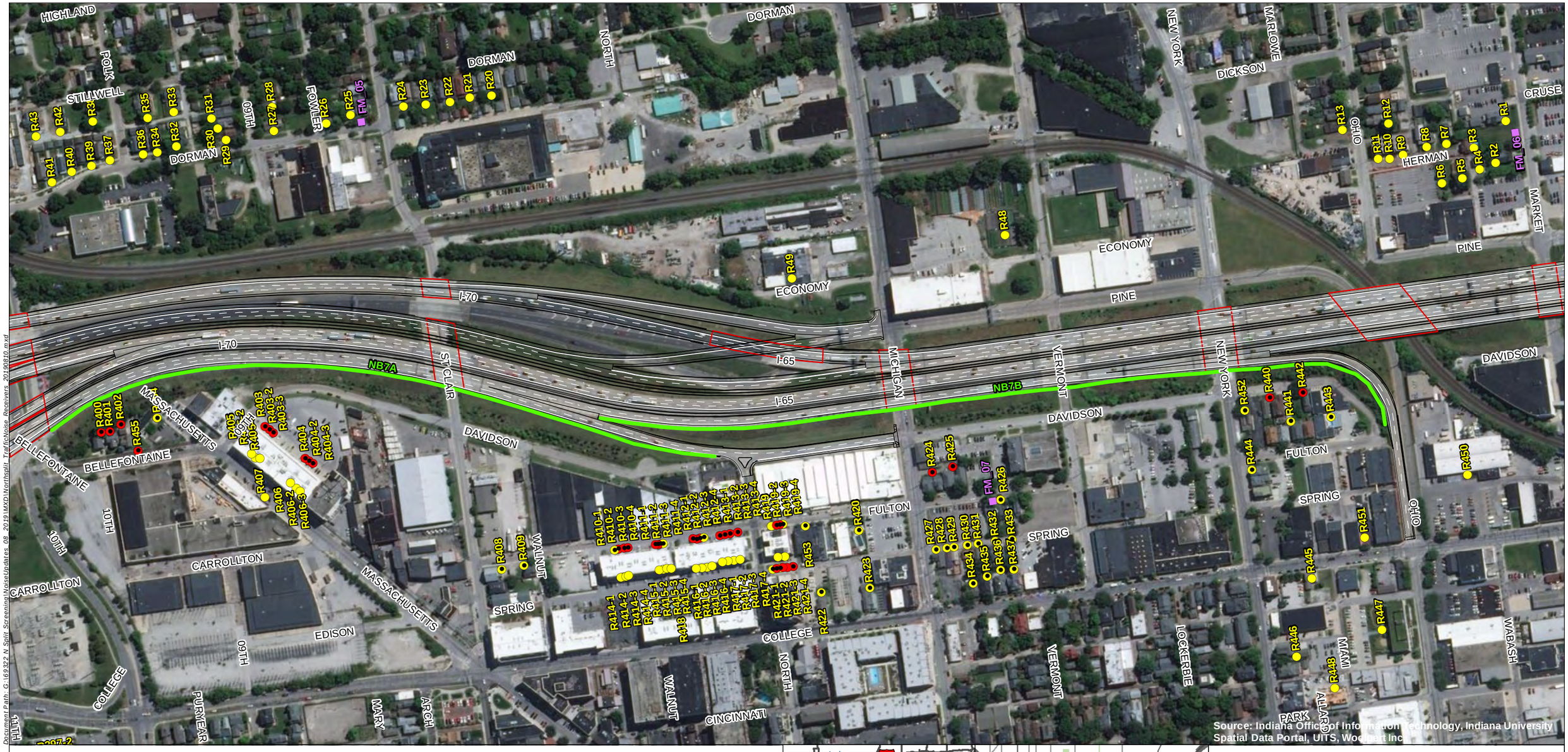

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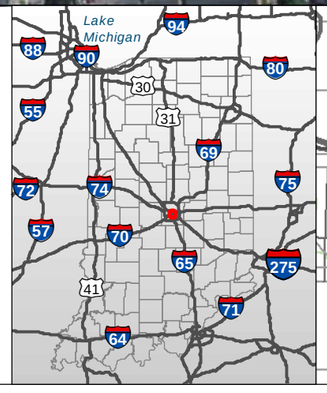

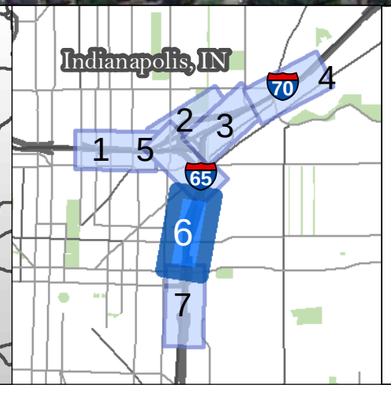

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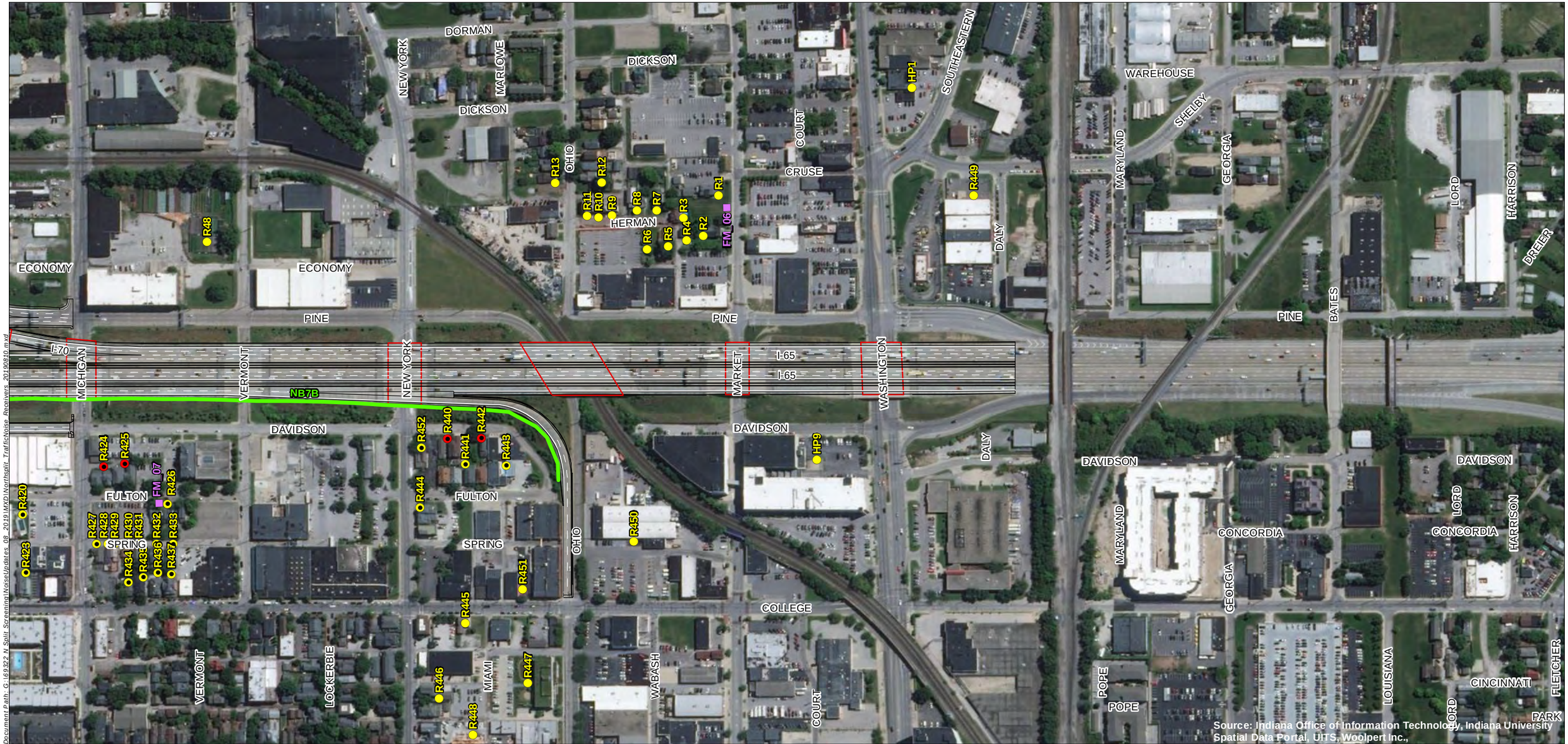

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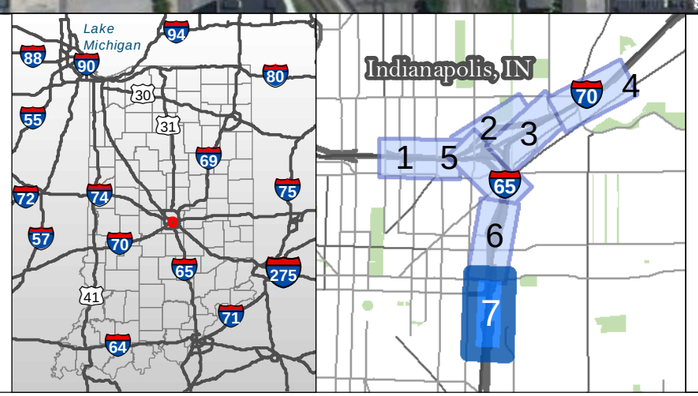

Traffic Noise Analysis Maps

Des No. 1592385 and 1600808

Marion County, IN

Revised: 12/2/2019

APPENDIX B: PREDICTED NOISE LEVELS

Appendix B - Predicted Noise Levels, dB(A) Leq(1h)

Receiver ID	Noise Level, dB(A) Leq(1h)			Receptors	Noise Level		Change	Impact
	Description	Category**	Criteria, L_{eq}(1h)		2017 Leq(1h)	2041 Leq(1h)		
R100	Residential	B	66	2	66.5	65.6	-0.9	N
R101	Residential	B	66	1	67.6	65.8	-1.8	N
R102	Residential	B	66	2	66.0	65.3	-0.7	N
R103	Residential	B	66	1	65.7	64.9	-0.8	N
R104	Residential	B	66	2	65.5	64.9	-0.6	N
R105	Residential	B	66	1	66.1	64.9	-1.2	N
R106	Church	D	51	4	43.6	41.6	-2.0	N
R106A	School Playground	C	66	12	67.1	66.7	-0.4	Y
R107	Institutional	D	51	1	43.8	43.5	-0.3	N
R108	Residential	B	66	2	67.9	67.4	-0.5	Y
R109	Residential	B	66	1	67.0	66.4	-0.6	Y
R110	Residential	B	66	2	67.2	66.2	-1.0	Y
R111	Church	D	51	3	44.1	42.8	-1.3	N
R112	Church	D	51	4	42.4	45.3	2.9	N
R113a	Residential	B	66	6	69.0	66.1	-2.9	Y
R114-1	Residential	B	66	10	66.8	64.5	-2.3	N
R114-2	Residential	B	66	10	67.9	65.1	-2.8	N
R114-3	Residential	B	66	10	68.7	65.7	-3.0	N
R115-1	Residential	B	66	10	64.4	62.2	-2.2	N
R115-2	Residential	B	66	10	65.8	63.0	-2.8	N
R115-3	Residential	B	66	10	66.7	64.0	-2.7	N
R116-1	Residential	B	66	11	65.5	63.5	-2.0	N
R116-2	Residential	B	66	11	66.7	64.2	-2.5	N
R116-3	Residential	B	66	11	67.8	65.3	-2.5	N
R117-1	Residential	B	66	11	57.4	56.1	-1.3	N

Receiver ID	Noise Level, dB(A) Leq(1h)			Receptors	Noise Level		Change	Impact
	Description	Category**	Criteria, L_{eq}(1h)		2017 Leq(1h)	2041 Leq(1h)		
R117-2	Residential	B	66	11	58.6	56.9	-1.7	N
R117-3	Residential	B	66	11	59.3	57.9	-1.4	N
R118-1	Residential	B	66	11	67.0	64.4	-2.6	N
R118-2	Residential	B	66	11	68.2	65.1	-3.1	N
R118-3	Residential	B	66	10	69.0	66.1	-2.9	Y
R119-1	Residential	B	66	10	68.6	67.8	-0.8	Y
R119-2	Residential	B	66	10	70.2	69.0	-1.2	Y
R119-3	Residential	B	66	10	71.0	69.9	-1.1	Y

APPENDIX C: NOISE BARRIER ANALYSIS RESULTS

I-65/I-70 North Split Noise Barrier Analysis

NB3W - WB I-70 along the edge of shoulder from the Commerce Ave overpass to the Lewis Street/Monon overpass. This noise barrier examines abatement of future noise levels at residential receivers R100 through R119, (see Appendix F).

Feasibility Criteria

Achieve a 5 dBA reduction at a majority (>50%) of impacted receptors

Reasonability Criteria

Design goal of 7 dBA noise reduction for >50% of benefited first row receptors.
Receptors are considered to be benefited when they receive at a minimum 5.0 dB(A) reduction in the future noise levels.
Cost of noise barrier per benefited receptor shall not exceed $25,000.

Active Receivers	Activity Category	Criteria, Leq (h)	Dwelling Units/Receptors	Row	Existing	Future w/o Barrier	Increase (Future w/o Barrier - Existing)	Future w/ Barrier	Noise Barrier Reduction	Approach or Exceed NAC (Impacted)	Benefited Receptor	Impacted, and 5 dBA reduction	Design Goal: 7 dBA reduction and first row
R100	B	66	2	2	66.5	65.6	-0.9	62.3	3.3	No	No	No	No
R101	B	66	1	1	67.6	65.8	-1.8	60.6	5.2	No	Yes	No	No
R102	B	66	2	2	66.0	65.3	-0.7	60.4	4.9	No	No	No	No
R103	B	66	1	2	65.7	64.9	-0.8	59.9	5.0	No	Yes	No	No
R104	B	66	2	2	65.5	64.9	-0.6	59.8	5.1	No	Yes	No	No
R105	B	66	1	2	66.1	64.9	-1.2	59.8	5.1	No	Yes	No	No
R106	D	51	4	1	43.6	41.6	-2.0	35.7	5.9	No	Yes	No	No
R106A	C	66	12	1	67.1	**66.7**	-0.4	59.0	7.7	Yes	Yes	Yes	Yes
R107	D	51	1	1	43.8	43.5	-0.3	35.7	7.8	No	Yes	No	Yes
R108	B	66	2	1	67.9	**67.4**	-0.5	59.3	8.1	Yes	Yes	Yes	Yes
R109	B	66	1	2	67.0	**66.4**	-0.6	59.0	7.4	Yes	Yes	Yes	No
R110	B	66	2	2	67.2	**66.2**	-1.0	58.6	7.6	Yes	Yes	Yes	No
R111	D	51	3	1	44.1	42.8	-1.3	34.4	8.4	No	Yes	No	Yes
R112	D	51	4	2	42.4	45.3	2.9	40.3	5.0	No	Yes	No	No
R113a	B	66	6	1	69.0	**66.1**	-2.9	60.5	5.6	Yes	Yes	Yes	No
R114-1	B	66	10	2	66.8	64.5	-2.3	53.9	10.6	No	Yes	No	No
R114-2	B	66	10	2	67.9	65.1	-2.8	55.0	10.1	No	Yes	No	No
R114-3	B	66	10	2	68.7	65.7	-3.0	56.9	8.8	No	Yes	No	No
R115-1	B	66	10	2	64.4	62.2	-2.2	59.5	2.7	No	No	No	No
R115-2	B	66	10	2	65.8	63.0	-2.8	60.6	2.4	No	No	No	No
R115-3	B	66	10	2	66.7	64.0	-2.7	61.9	2.1	No	No	No	No
R116-1	B	66	11	2	65.5	63.5	-2.0	54.7	8.8	No	Yes	No	No
R116-2	B	66	11	2	66.7	64.2	-2.5	56.5	7.7	No	Yes	No	No
R116-3	B	66	11	2	67.8	65.3	-2.5	59.4	5.9	No	Yes	No	No
R117-1	B	66	11	2	57.4	56.1	-1.3	51.4	4.7	No	No	No	No
R117-2	B	66	11	2	58.6	56.9	-1.7	52.2	4.7	No	No	No	No
R117-3	B	66	11	2	59.3	57.9	-1.4	53.9	4.0	No	No	No	No
R118-1	B	66	11	2	67.0	64.4	-2.6	58.0	6.4	No	Yes	No	No
R118-2	B	66	11	2	68.2	65.1	-3.1	59.2	5.9	No	Yes	No	No
R118-3	B	66	10	2	69.0	**66.1**	-2.9	61.1	5.0	Yes	Yes	Yes	No
R119-1	B	66	10	2	68.6	**67.8**	-0.8	58.2	9.6	Yes	Yes	Yes	No
R119-2	B	66	10	2	70.2	**69.0**	-1.2	59.2	9.8	Yes	Yes	Yes	No
R119-3	B	66	10	2	71.0	**69.9**	-1.1	60.5	9.4	Yes	Yes	Yes	No

Feasibility

Number of impacted receptors		Number of impacted receptors receiving a 5 dBA reduction	% of impacted receptors receiving a 5 dBA reduction	Does the noise barrier design achieve a 5 dBA reduction at a majority (>50%) of impacted receptors?	**Yes**
63		63	100%		

Reasonability

Design Goal

First row receptors		First row receptors receiving 7 dBA or more reduction	% of benefited first row receptors with a 7 dBA reduction	Design Goal: Is there a 7 dBA reduction for 50% of the benefited first row receptors?	**Yes**
29		18	62%		

I-65/I-70 North Split Noise Barrier Analysis

Cost-effectiveness			
Noise Barrier Length (feet)	2,463	Is the cost per benefited receptor less than or equal to $25,000 per benefited receptor receiving a minimum reduction of 5 dBA?	**Yes**
Noise Barrier Height (feet)	12-20		
TNM Area of Proposed Barrier, Sqft.	40,036		
Estimated Noise Barrier Cost ($30.00 x Sqft.)	$1,201,080		
Number of Benefited Receptors/Dwelling Units	165		
Cost per receptor	$7,279		

APPENDIX D: NOISE BARRIER DESIGN SUMMARY

U.S. Department of Transportation
Federal Highway Administration

Advanced Noise Barrier Optimization Tool **10/30/2019**

North Split
NB3W

	Analysis1	Analysis2	Analysis3	Analysis4	Analysis5	Analysis6	Analysis7	Analysis8	Analysis9	Analysis10	Analysis11	Analysis12	Analysis13	Analysis14	Analysis15	Units
Average Wtd I.L. (benefited)	8	7	7.7	7.6	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**dBA**
Maximum I.L.	11.1	8.6	10.5	10.6	0	0	0	0	0	0	0	0	0	0	0	**dBA**
Benefited/Impacted ≥ AFG	52	41	52	52	0	0	0	0	0	0	0	0	0	0	0	**# of dwelling units**
Benefited/Non Impact ≥ AFG	164	91	143	119	0	0	0	0	0	0	0	0	0	0	0	**# of dwelling units**
Total Benefited	216	132	195	171	0	0	0	0	0	0	0	0	0	0	0	**# of dwelling units**
Impacted Units ≥ NRDG	41	32	35	35	0	0	0	0	0	0	0	0	0	0	0	**# of dwelling units**
Benefited Units ≥ NRDG	132	76	111	100	0	0	0	0	0	0	0	0	0	0	0	**# of dwelling units**
Percent of impacts ≥ AFG	100%	79%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**%**
Percent of benefits ≥ NRDG	61%	58%	57%	58%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**%**
"Cost-Reasonable" ?	Yes	Yes	Yes	Yes	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**----**
Surface Area	56,112	39,279	50,498	40,036	-	-	5,401	24,336	8,640	29,435	10,011	-	-	-	-	**sq-feet or sq-meters**
Surface Area/Ben Rec	260	298	259	234	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**sq-ft or sq-m / ben rec**
Barrier Length	2,806	2,806	2,806	2,463	-	-	417	1,805	617	2,204	718	-	-	-	-	**ft or m**
Min Height	20	14	18	12	-	-	12	8	10	8	10	-	-	-	-	**ft or m**
Max Height	20	14	18	20	-	-	14	16	16	14	16	-	-	-	-	**ft or m**
Avg Height	20	14	18	16	#DIV/0!	#DIV/0!	13	14	14	13	14	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**ft or m**
Total Barrier Cost	1,683,360	1,178,370	1,514,940	1,201,080	-	-	162,030	730,080	259,200	883,050	300,330	-	-	-	-	**$**
Cost/Ben Rec	7,793	8,927	7,769	7,024	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	58.4	39.8	50.0	55.3	#DIV/0!	#DIV/0!	-	-	-	-	-	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	**----**

Acoustical Feasibilty Goal (dBA)	5
Acoustical Feasibilty Goal (%)	50%
Noise Reduction Design Goal (dBA)	7
Noise Reduction Design Goal (%)	50%