APPENDIX H

Air Quality

DES 1800035, 1800037, 1900340, 1900341, 2002284

INDIANA DEPARTMENT OF TRANSPORTATION

100 North Senate Avenue
Room N758-Executive Office
Indianapolis, Indiana 46204

PHONE: (855) 463-6848

Eric Holcomb, Governor
Michael Smith, Commissioner

August 28, 2023

Mr. Jermaine R. Hannon, Division Administrator
FHWA Indiana Division
575 North Pennsylvania St., Room 254
Indianapolis, IN 46204

Ms. Kelley Brookins, Regional Administrator
FTA Region 5
200 West Adams St.
Suite 320
Chicago, IL 60606-5253

Dear Mr. Hannon /Ms. Brookins:

The Indiana Department of Transportation is pleased to submit its FY 2024-2028 Statewide Transportation Improvement Program (STIP) for review and approval by your offices.

Included in the final submitted document is a listing of the state's expansion/preservation and local small urban and rural and rural transit projects. The following Metropolitan Planning Organization TIPs will be included in the FY 2024-2028 STIP by reference.

Area Plan Commission of Tippecanoe County (APCTC) FY 2024-2028
- https://www.tippecanoe.in.gov/DocumentCenter/View/40728/FY-2024-2028-TIP-including-0-amendments

Bloomington-Monroe County Metropolitan Planning Organization (BMCMPO) FY 2024-2028
- https://bloomington.in.gov/sites/default/files/2023-08/BMCMPO%20FY%202024%20-%202028%20TIP%20-%2006-30-23%20-%20ADOPTED%20FINAL.pdf

Columbus Area Metropolitan Planning Organization (CAMPO) FY 2024-2028
- https://www.columbus.in.gov/planning/tip/

Delaware-Muncie Metropolitan Plan Commission (DMMPC) FY 2022-2025
- *Including Amendments/modifications through 2/14/23*
- https://www.co.delaware.in.us/egov/documents/1692987897_47263.pdf

Evansville Metropolitan Planning Organization (EMPO) FY 2024-2028
- http://www.evansvillempo.com/Docs/TIP/TIP_2024-2028/TIP_2024-2028.pdf

Kokomo-Howard County Governmental Coordinating Council (KHCGCC) FY 2022-2026
- *Including Amendments/modification through 7/28/23*
- https://www.kokomompo.com/project/tip-2020-2024/

Kentuckiana Regional Planning and Development Agency (KIPDA) FY 2023-2026
- https://www.kipda.org/wp-content/uploads/2023/05/FY2023-TIP-FINAL-5-25.pdf

Indianapolis Metropolitan Planning Organization (IMPO) FY 2024-2027
- https://www.indympo.org/whats-underway/irtip

Michiana Area Council of Governments (MACOG) FY 2024-2028
- http://www.macog.com/docs/transportation/tip/approved/fy2028tip_projects.pdf

Madison County Council of Governments (MCCOG) FY 2022-2026
- *Including Amendments/modifications through 7/28/23*
- https://irp.cdn-website.com/65a760a0/files/uploaded/TIP%202022-2026%20-%20updated%205-1-23.pdf

Northeastern Indiana Regional Coordinating Council (NIRCC) FY 2024-2028
- https://www.nircc.com/uploads/1/2/9/8/129837621/final_2024-2028_tip_5-25-23.pdf

Northwestern Indiana Regional Planning Commission (NIRPC) FY 2022-2026
- *Including Amendments/modifications through 7/25/23*
- https://nirpc.org/2040-plan/mobility/transportation-improvement-program/

Ohio-Kentucky-Indiana Regional Council of Governments (OKI) FY 2024-2027
- https://www.oki.org/transportation-planning/transportation-improvement-program-tip/

Terre Haute Area Metropolitan Planning Organization (THAMPO) FY 2024-2028
- https://www.terrehautempo.com/images/THAMPO_2024_2028_AdoptionTIP.pdf

In addition, INDOT has expanded our public involvement process by taking advantage of virtual meeting techniques and allowing accessibility to online documents, materials, virtual meeting registration, recorded virtual meetings, and comment forms. INDOT also leveraged our planning partner contacts (MPOs, RPOs, LTAP), social media, and notifications sent to local libraries, housing authorities, senior aging centers, and local newspapers across the state.

We greatly appreciate FHWA/FTA support in the development of the STIP 2024-2028 and look forward to working together to achieve our mutual goals. Should you have any questions pertaining to this amendment, please contact April Leckie, STIP Administration at 317-232-5466 or at aleckie@indot.in.gov.

Sincerely,

Michael Smith, Commissioner
Indiana Department of Transportation

cc: (w/enclosure): Angelica Salgado, FTA
Cecilia Crenshaw, FTA
Erica Tait, FHWA
Lyndsay Quist, INDOT
Kristin Brier, INDOT
Kathy Eaton-McKalip, INDOT
Louis Feagans, INDOT
April Leckie, INDOT
Roy Nunnally, INDOT
Larry Buckel, INDOT
Jay Mitchell, INDOT
Jason Casteel, INDOT
Michael McNeil, INDOT

Federal Transit Administration
Region V
200 West Adams St., Suite 320
Chicago, IL 60606-5253

U.S. Department of Transportation

Federal Highway Administration
Indiana Division
575 N. Pennsylvania St., Rm 254
Indianapolis, IN 46204-1576

September 1, 2023

Mr. Michael Smith
Commissioner
Indiana Department of Transportation
100 N Senate Ave. N955
Indianapolis, IN 46204

SUBJECT: Indiana FY2024-2028 STIP Approval and Associated Federal Planning Finding

Dear Mr. Smith:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have completed our review of the FY2024-2028 Indiana Statewide Transportation Improvement Program (INSTIP), which was submitted by the Indiana Department of Transportation (INDOT) request letter dated August 23, 2023.

Based on our review of the information provided, certifications of the Statewide and Metropolitan transportation planning processes for and within the state of Indiana, and our participation in those transportation planning processes (including planning certification reviews conducted in Transportation Management Areas), FHWA and FTA are jointly approving the FY2024-2028 STIP, including the Metropolitan Planning Organization (MPO) Transportation Improvement Programs (TIPs) incorporated into the STIP by reference, subject to the corrective actions identified in the attached Federal Planning Finding (FPF) report. FHWA and FTA consider the projects in the 5th year for informational purposes only, and our approval does not exceed four years per 23 CFR 450.220(c).

FHWA and FTA are required under 23 CFR 450.220(b) to document and issue an FPF in conjunction with the approval of the FY2024-2028 STIP. At a minimum, the FPF verifies that the development of the STIP is consistent with the provisions of both the Statewide and Metropolitan transportation planning requirements. FHWA and FTA find that the Indiana FY2024-2028 STIP substantially meets the transportation planning requirements and are approving the STIP subject to the corrective actions outlined in the FPF. This approval is effective September 1, 2023 and is given with the understanding that an eligibility determination of individual projects for funding must be met, and INDOT must ensure the satisfaction of all administrative and statutory requirements, as well as address the corrective actions outlined in the attached report.

If you have questions or need additional information concerning our approval and the FPF, please contact Ms. Erica Tait of the FHWA Indiana Division at (317) 226-7481, or by email at erica.tait@dot.gov, or Mr. Tony Greep of the FTA Region 5 Office at (312) 353-1646, or by email at anthony.greep@dot.gov.

Sincerely,

KELLEY BROOKINS
Digitally signed by KELLEY BROOKINS
Date: 2023.08.31 17:33:15 -05'00'

Kelley Brookins
Regional Administrator
FTA Region V

Sincerely,

JERMAINE R HANNON
Digitally signed by JERMAINE R HANNON
Date: 2023.09.01 11:46:31 -04'00'

Jermaine R. Hannon
Division Administrator
FHWA Indiana Division

Attachments have been removed for the purposes of this NEPA document.

INDOT	300382	Greenfield, Seymour	Johnson Co., Marion Co., Morgan Co.	I- 69	The I-69 from Evanville to Indianapolis will be completed with the construction of the final section from Indian Creek south of SR 39 to I-465. This final section converts existing SR 37 to I-69 between Indian Creek in Martinsville and I-465 in Indianapolis. Interchanges along I-69 will be constructed at SR 39, Ohio Street, SR 252/SR 44, Henderson Ford Road, SR 144, Smith Valley Road, County Line Road, Southport Road, Epler Avenue, and I-465. I-69 will have two lanes in each direction between Indian Creek south of SR 39 and Olive Branch Road, three lanes in each direction between Olive Branch Road and Southport Road, and four lanes in each direction between Southport Road and I-465. I-465 will be improved between Mann Road and US 31 by adding one through lane in each direction as well as auxiliary lanes where needed. Dist:26	New Road Construction	N	CE	FY 2019	NHPP	$1,829,000	$1,463,200	80%	$0	0%	$365,800	20%	$2,033,149,334	$2,033,149,334
								CE	FY 2025	NHPP	$156,000	$124,800	80%	$0	0%	$31,200	20%	$2,033,149,334	$2,033,149,334
								CE	FY 2023	NHPP	$45,827,366	$36,661,893	80%	$0	0%	$9,165,473	20%	$2,033,149,334	$2,033,149,334
								CE	FY 2022	NHPP	$23,450,756	$18,760,605	80%	$0	0%	$4,690,151	20%	$2,033,149,334	$2,033,149,334
								CE	FY 2021	NHPP	$6,723,361	$5,378,689	80%	$0	0%	$1,344,672	20%	$2,033,149,334	$2,033,149,334
								CE	FY 2020	NHPP	$8,551,134	$6,840,907	80%	$0	0%	$1,710,227	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2018	NHPP	$146,598	$117,278	80%	$0	0%	$29,320	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2025	NHPP	$1,950,000	$1,560,000	80%	$0	0%	$390,000	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2023	NHPP	$457,562,546	$366,050,037	80%	$0	0%	$91,512,509	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2022	NHPP	$492,921,501	$394,337,201	80%	$0	0%	$98,584,300	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2021	NHPP	$237,738,889	$190,191,111	80%	$0	0%	$47,547,778	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2020	NHPP	$293,745,140	$234,996,112	80%	$0	0%	$58,749,028	20%	$2,033,149,334	$2,033,149,334
								CON	FY 2019	NHPP	$29,423,975	$23,539,180	80%	$0	0%	$5,884,795	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2018	NHPP	$30,050,212	$24,040,170	80%	$0	0%	$6,010,042	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2028	NHPP	$125,000	$100,000	80%	$0	0%	$25,000	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2027	NHPP	$450,000	$360,000	80%	$0	0%	$90,000	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2026	NHPP	$140,000	$112,000	80%	$0	0%	$28,000	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2025	NHPP	$460,000	$368,000	80%	$0	0%	$92,000	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2024	NHPP	$280,000	$224,000	80%	$0	0%	$56,000	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2023	NHPP	$22,602,510	$18,082,008	80%	$0	0%	$4,520,502	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2022	NHPP	$8,575,175	$6,860,140	80%	$0	0%	$1,715,035	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2021	NHPP	$30,312,206	$24,249,765	80%	$0	0%	$6,062,441	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2020	NHPP	$66,947,294	$53,557,835	80%	$0	0%	$13,389,459	20%	$2,033,149,334	$2,033,149,334
								PE/PL	FY 2019	NHPP	$27,323,134	$21,858,507	80%	$0	0%	$5,464,627	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2018	NHPP	$28,861,073	$23,088,858	80%	$0	0%	$5,772,215	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2023	NHPP	$7,050,841	$5,640,673	80%	$0	0%	$1,410,168	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2022	NHPP	$21,396,838	$17,117,470	80%	$0	0%	$4,279,368	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2021	NHPP	$73,671,813	$58,937,450	80%	$0	0%	$14,734,363	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2020	NHPP	$62,560,156	$50,048,125	80%	$0	0%	$12,512,031	20%	$2,033,149,334	$2,033,149,334
								ROW	FY 2019	NHPP	$52,316,816	$41,853,453	80%	$0	0%	$10,463,363	20%	$2,033,149,334	$2,033,149,334
INDOT	1700108	Seymour	Johnson Co.	SR 252	Small Town replacement of pavement in Edinburgh with bike/ped enhancements Dist:2.36	Pavement Replacement, Small Town	Y	CON	FY 2025	STATE TAP	$2,325,786	$563,591	7%	$282,796	3%	$1,479,399	18%	$10,847,962	$10,847,962
								CON	FY 2025	STPSM	$7,679,792	$5,917,597	72%	$282,796	3%	$1,479,399	18%	$10,847,962	$10,847,962
								PE/PL	FY 2018	STPSM	$232,327	$185,862	80%	$0	0%	$46,465	20%	$10,847,962	$10,847,962
								PE/PL	FY 2021	STPSM	$15,000	$0	0%	$15,000	100%	$0	0%	$10,847,962	$10,847,962
								ROW	FY 2021	STPSM	$1,424,000	$1,424,000	100%	$0	0%	$0	0%	$10,847,962	$10,847,962
								ROW	FY 2023	STPSM	$933,252	$746,602	80%	$0	0%	$186,650	20%	$10,847,962	$10,847,962
INDOT	1800725	Seymour	Morgan Co.	SR 144	Bridge Deck Overlay on SR 144, 00.48 miles W of SR 37 over White River Dist:N/A	Bridge Deck Overlay	Y	CE	FY 2024	NHPP	$50,000	$40,000	80%	$0	0%	$10,000	20%	$2,666,000	$2,984,426
								CON	FY 2024	NHPP	$2,496,000	$1,996,800	80%	$0	0%	$499,200	20%	$2,666,000	$2,984,426
								PE/PL	FY 2019	NHPP	$120,000	$96,000	80%	$0	0%	$24,000	20%	$2,666,000	$2,984,426
INDOT	1801417	Crawfordsville	Hendricks Co.	I- 74	CCTV Cameras/Detection from SR 63 to Pittsboro (Exit 61) Dist:N/A	Its Traffic Management Systems	Y	CON	FY 2024	IM	$1,846,442	$1,661,798	90%	$0	0%	$184,644	10%	$1,860,822	$1,860,822
INDOT	1600854	Greenfield	Boone Co., Hamilton Co., Marion Co.	I- 465	ATL on I 465 from 1.33 mi S of I-865 (86th Street) to College Ave.; Interchange Modification at I-865 and I-465 & US 31. ATL on US 31 & Interchange modifications at 106th & 116th. Dist:8.5	Added Travel Lanes	N	CE	FY 2025	STPSM	$8,250,976	$7,425,878	90%	$0	0%	$825,098	10%	$402,183,650	$402,183,650
								CE	FY 2026	STPSM	$6,000,000	$5,400,000	90%	$0	0%	$600,000	10%	$402,183,650	$402,183,650
								CON	FY 2023	STPSM	$261,000	$0	0%	$0	0%	$261,000	100%	$402,183,650	$402,183,650
								CON	FY 2027	STPSM	$26,200,000	$23,580,000	90%	$0	0%	$2,620,000	10%	$402,183,650	$402,183,650
								CON	FY 2026	STPSM	$281,998,789	$253,798,910	90%	$0	0%	$28,199,879	10%	$402,183,650	$402,183,650
								CON	FY 2025	STPSM	$48,870,311	$43,983,280	90%	$0	0%	$4,887,031	10%	$402,183,650	$402,183,650
								PE/PL	FY 2023	STPSM	$9,601,323	$0	0%	$0	0%	$9,601,323	100%	$402,183,650	$402,183,650
								ROW	FY 2023	STPSM	$2,560,000	$2,304,000	90%	$0	0%	$256,000	10%	$402,183,650	$402,183,650
INDOT	1801041	Seymour	Morgan Co.	SR 67	Small structure replacement on SR 67, 5.08 miles N of SR 39 Dist:N/A	Small Structure Replacement	Y	CE	FY 2024	NHPP	$18,700	$14,960	80%	$0	0%	$3,740	20%	$784,191	$784,191
								CON	FY 2024	NHPP	$745,491	$596,393	80%	$0	0%	$149,098	20%	$784,191	$784,191
								ROW	FY 2021	NHPP	$20,000	$16,000	80%	$0	0%	$4,000	20%	$784,191	$784,191
INDOT	1801028	Seymour	Johnson Co.	SR 135	Small structure replacement on SR 135 in Johnson County, 3.43 miles N of SR 144 Dist:N/A	Small Structure Replacement	Y	CE	FY 2025	NHPP	$17,700	$14,160	80%	$0	0%	$3,540	20%	$2,719,606	$2,719,606
								CON	FY 2025	NHPP	$2,468,742	$1,974,994	80%	$0	0%	$493,748	20%	$2,719,606	$2,719,606
								PE/PL	FY 2020	NHPP	$223,164	$178,531	80%	$0	0%	$44,633	20%	$2,719,606	$2,719,606
								ROW	FY 2022	NHPP	$10,000	$8,000	80%	$0	0%	$2,000	20%	$2,719,606	$2,719,606
INDOT	1800035	Greenfield	Marion Co.	US 36	Add 1 lane each from approx. 3 miles west of I465 to I 465 . Will include intersection improvements and Bridge Widening. Des numbers 1800035, 1800037, 1900340, 1900341, 2002284 Dist:1.5	Added Travel Lanes	N	CON	FY 2025	STPSM	$11,295,967	$9,036,773	80%	$0	0%	$2,259,194	20%	$22,495,967	$22,495,967
								ROW	FY 2024	STPSM	$10,000,000	$8,000,000	80%	$0	0%	$2,000,000	20%	$22,495,967	$22,495,967
								ROW	FY 2025	STPSM	$1,200,000	$960,000	80%	$0	0%	$240,000	20%	$22,495,967	$22,495,967
INDOT	1801040	Seymour	Morgan Co.	SR 67	District small structure replacement on SR 67 in Morgan County, 5.88 miles N of SR 39. Dist:N/A	Small Structure Replacement	Y	CE	FY 2024	NHPP	$13,900	$11,120	80%	$0	0%	$2,780	20%	$750,164	$750,164
								CON	FY 2024	NHPP	$570,864	$456,691	80%	$0	0%	$114,173	20%	$750,164	$750,164

APPENDIX I

Additional Information

DES 1800035, 1800037, 1900340, 1900341, 2002284

US 36 (Rockville Road), 800 feet east of Raceway Road to I-465 Southbound Ramps
Marion County, Indiana
Designation Numbers: 1800035, 1800037, 19000340, 1900341

1. Project Description

This 3.0-mile project is intended to add capacity along US 36 from east of Raceway Road to the western side of the I-465 interchange with US 36. The project also includes a pair of twin, abutting US 36 bridges over East Fork of White Lick Creek (036-49-03898 AEBL and 036-49-03898 AWBL). The project is located within Wayne Township, Marion County, in Sections 1, 2, 3, 4, 9, 10 11, 12 of Township 15 North, Range 2 East.

The Preferred Alternative will be an Added Travel Lanes (ATL) project which will be constructed without substantially widening the existing pavement. Full-depth reconstruction of the existing outside shoulder will convert it to a third travel lane in each direction with adjacent new curb and gutter and a closed drainage system. The new total cross-section width from the back-of-curb to back-of-curb will be 87 foot, as compared to the existing total pavement width of 84 foot. The new US 36 pavement section will consist of two 11 foot inside lanes and a 12 foot outside lane with a 2 foot curb and gutter in each direction, separated by a 15 foot raised (curbed) center median. The center median will help control access along the corridor and will also be used to provide dedicated left turn lanes along US 36 at major intersections, as well as significant commercial developments and neighborhood entrances. A 6 foot wide sidewalk, integral with the new outside curb, will be constructed along the south side of US 36. A 10 foot wide multi-use path, separated by a 5 foot wide buffer, will be constructed along the north side of US 36. All pedestrian and non-motorized improvements will be Americans with Disabilities Act (ADA) compliant. Additional proposed improvements of note include:

- Eastbound US 36 to southbound Richie Avenue/Bridgeport Road right turn lane.
- Second (dual) eastbound US 36 to northbound Country Club Road left turn lane.
- Westbound US 36 to northbound Country Club Road right turn lane.
- Southbound Country Club Road to westbound US 36 right turn lane.
- Westbound US 36 to northbound Transfer Drive right turn lane.
- Eastbound and westbound US 36 to Girls School Road right turn lanes.
- Eastbound US 36 to southbound High School Road right turn lane.

Roadway drainage will be conveyed by curb and gutter, storm sewer, and roadside ditches.

The eastbound and westbound US 36 bridges over the East Fork of White Lick Creek will be widened to the outside to accommodate the 3rd added travel lane in each direction and the pedestrian/non-motorized facilities. The proposed rehabilitation would consist of bridge widening, replacing bridge railings, existing deck patching and overlay of the existing deck.

2. Environmental Justice

2.1 Analysis

Under FHWA Order 6640.23A, FHWA and the project sponsor, as a recipient of funding from FHWA, are responsible to ensure that their programs, policies, and activities do not have a disproportionately high and adverse effect on minority or low-income populations. Per the current INDOT Categorical Exclusion Manual, an Environmental Justice (EJ) Analysis is required for any project that has two or more relocations or 0.5 acre of additional permanent right-of-way. The project will require no relocations and up to 0.71 acre of additional permanent right-of-way. Therefore, an EJ Analysis is required.

Potential EJ impacts are detected by locating minority and low-income populations relative to a reference population to determine if populations of EJ concern exists and whether there could be disproportionately high and adverse impacts to them. The reference population may be a county, city, township, or town and is called the community of comparison (COC). In this project, the COC is Wayne Township in Marion County. The community that overlaps the project area is called the affected community (AC). In this project, the AC is comprised of Census Tracts 3401.01, 3401.02, and 3419.02. An AC has a population of concern for EJ if the population is more than 50% minority or low-income or if the low-income or minority population is 125% of the COC. The data collected for minority and low-income populations within the AC are summarized in the below table.

Table 1 – Census Data Summary

	COC – Wayne Township, Marion County	AC – Census Tract 3401.01	AC – Census Tract 3401.02	AC – Census Tract 3419.02
Percent Minority	57.01%	26.40%	**54.08%**	30.31%
125% of COC	71.26%	AC < 125% COC	AC < 125% COC	AC < 125% COC
EJ Population of Concern		No	Yes	No
Percent Low-Income	23.12%	9.93%	16.85%	4.55%
125% of COC	28.90%	AC < 125% COC	AC < 125% COC	AC < 125% COC
EJ Population of Concern		No	No	No

The AC Census Tract 3401.01 has a percent minority of 26.40% which is below 50% and is below the 125% COC threshold. The AC Census Tract 3419.02 has a percent minority of 30.31% which is below 50% and is below the 125% COC threshold. The AC Census Tract 3401.02 has a percent minority of 54.08% which is above 50%. Therefore, only AC Census Tract 3401.02 has a minority population of EJ concern.

The AC Census Tract 3401.01 has a percent low-income of 9.93% which is below 50% and is below the 125% COC threshold. The AC Census Tract 3401.02 has a percent low-income of 16.85% which is below 50% and is below the 125% COC threshold. The AC Census Tract 3419.02 has a percent low-income of

4.55% which is below 50% and is below the 125% COC threshold. Therefore, none of the three AC Census Tracts contain low income populations of EJ concern.

2.2 Effect on EJ Population

The population of EJ concern with this project is AC Census Tract 3401.02, due to a percent minority population above 50%. It is notable that the minority population in this census tract is 54.08% which is both lower than 125% of the COC (71.26%) and lower than the minority population in Wayne Township (57.01%) into which the census tract falls.

Within the project area, Census Tract 3401.02 extends along US 36 from the CSX railway to Girls School Road. The project requires no permanent right-of-way within Census Tract 3401.02. This area is comprised primarily of commercial properties, with 23 of the 25 properties along this tract being businesses. Temporary right-of-way for grading will be required from the Vanmieghan Group INC (Onyx Event Center) and Malkiat Singh (Plastic Recyling) properties, comprising a total of 0.0057 acre. There are only two residential properties within this section of the project: Rockwood Apartments and a house at 7505 Rockville Road. It is unknown whether minority populations reside at these properties; however, the project requires no right-of-way from either property. Access to all properties will be maintained during construction.

No relocations of people, businesses, or farms will take place as a result of this project.

Maintenance of traffic will be completed through phased construction. Travel lanes will be reduced to 11 feet wide, two-way-left-turn-lanes will be reduced to 12 feet wide and traffic will be pushed to the middle to construct the outside lanes and drainage system. Traffic will be shifted to the outside lane to construct the median and the entire project would be resurfaced under traffic. No detours will be used. There are three bus stops along the route within Census Tract 3401.02. Initial coordination has begun with IndyGo, which manages the bus stops. A paved area between the sidewalk/path and back of curb will be provided at each bus stop location. This area will provide riders a location outside of the walking path to wait for the bus and to access the busses as they arrive. Bus stop access will be maintained throughout the project, in accordance with ADA guidance. The bus stop locations may shift slightly due to construction phasing, but each will be available continuously. Traffic congestion may provide a temporary impact for motorists during construction such as added travel time; however, no significant delays are anticipated, and all inconveniences such as travel delays will cease upon project completion.

Within Census Tract 3401.02, the existing condition includes a sidewalk on the north side of US 36 for a 1,300 feet segment and no pedestrian facilities on the south side. As a result of this project, a sidewalk will be constructed on the south side of US 36 and a multi-use path will be constructed on the north side.

The need for this project is based on the existing congestion, delay, and high crash rates experienced by motorists within the project area, including Census Tract 3401.02. The improvements are expected to result in a net benefit for local citizens. Direct benefits should include reduced congestion and traffic delay, improved safety, and increased pedestrian access. Indirect benefits may include reduced crash potential and air pollution.

3. CONCLUSIONS

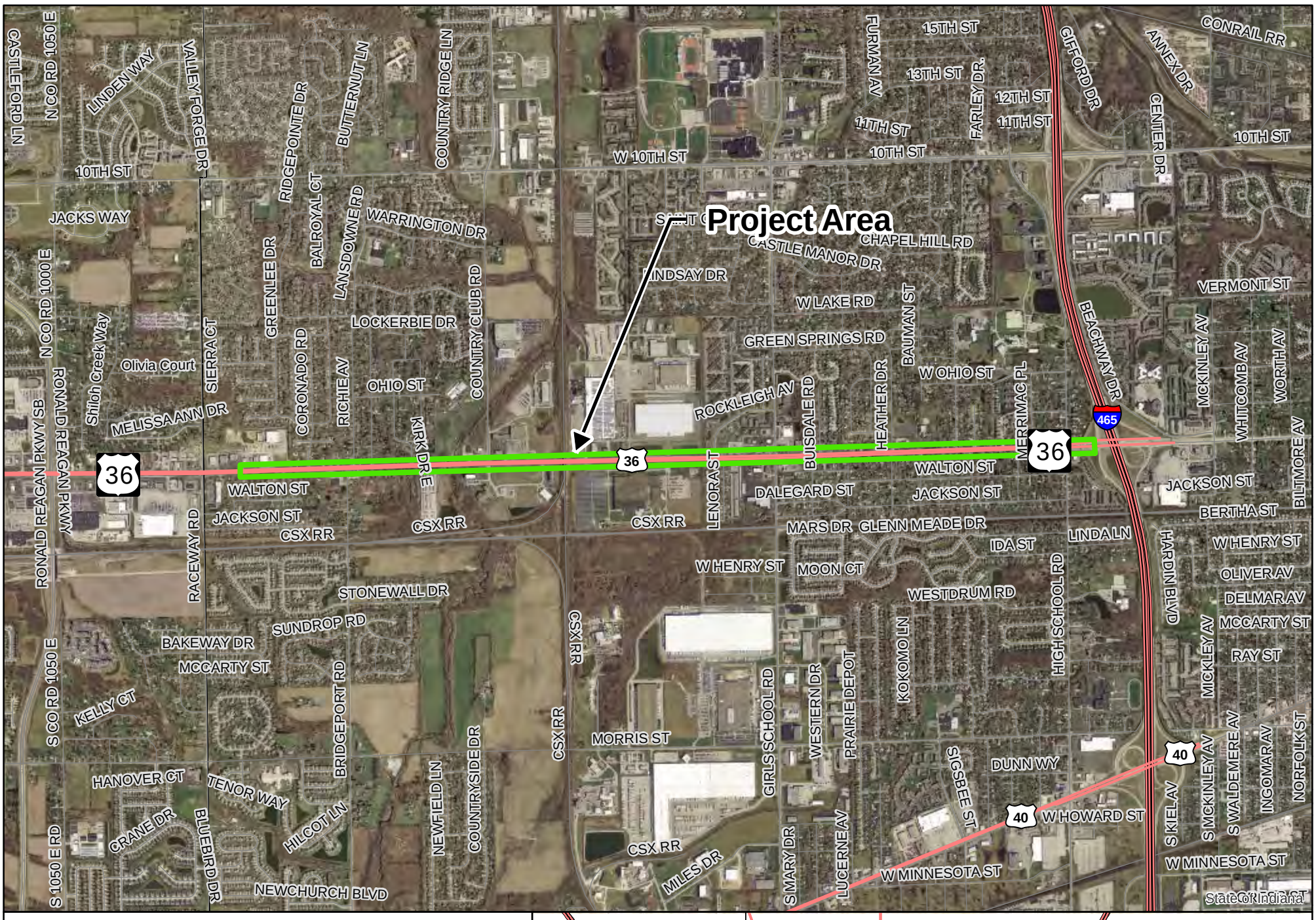
Because the AC Census Tracts Census Tracts 3401.01 and 3419.02 within the project area do not contain populations of EJ Concern, there will not be a disproportionately high and adverse effect on minority or low-income populations in these areas of the project.

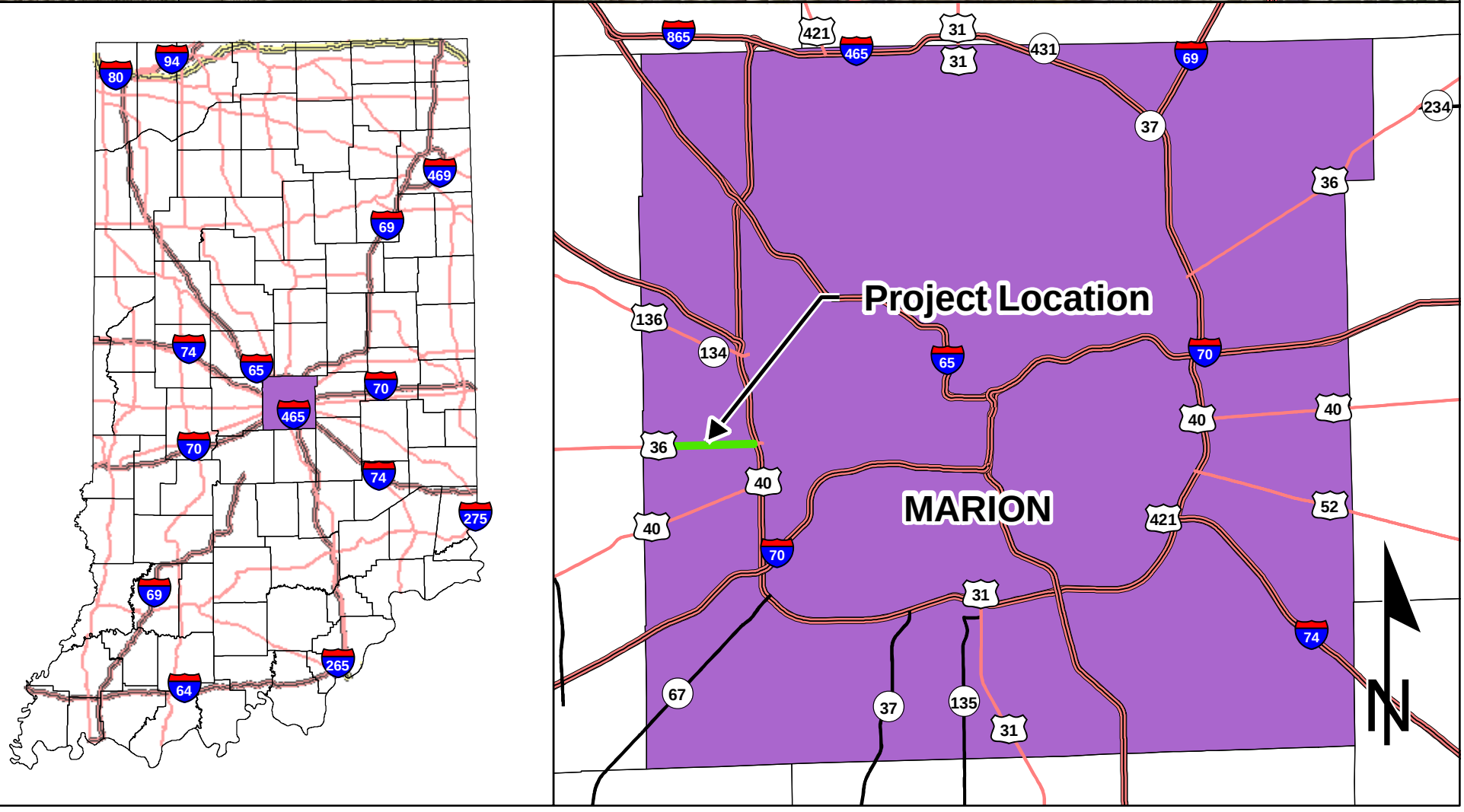
AC Census Tract 3401.02 has a population of EJ Concern for minority populations. It is believed that impact to this population will be low or negligible because this section of the project has only two residential properties and no permanent right-of-way will be acquired from this section. It is believed that impact to this population will not be adverse because the project should provide local benefits such as reduced congestion and traffic delay, improved safety, pedestrian access, and increased air quality. The only negative impact identified would be traffic delays during construction, which will cease upon project completion and which are mitigated by phased maintenance of traffic rather than a detour. Therefore, there will not be a disproportionately high and adverse effect on minority populations in AC Census Tract 3401.02.

Kirk Roth
Environmental Scientist
Corradino, LLC
200 S. Meridian Street, Suite 330
Indianapolis, IN 46225

Attachments:
Attachment A – Project Location Map
Attachment B – Map of Census Tracts within the Project Area
Attachment C – Income Data
Attachment D –Minority Data

Project Location Map
US 36, from Raceway Rd. to I-465
Des. No's. 1800035 & 1800037, Corridor Improvements
Marion County, Indiana





0.5 0.25 0 0.5 Miles

Sources:
Non Orthophotography Data - Obtained from the State of Indiana Geographical Information Office Library
Orthophotography - Obtained from Indiana Map Framework Data (www.indianamap.org)
Map Projection: UTM Zone 16 N **Map Datum:** NAD83

This map is intended to serve as an aid in graphic representation only. This information is not warranted for accuracy or other purposes.

INDIANA
STATEWIDE
GIS DATA

Legend

- Project Area
- Affected Community (AC)
- Community of Comparison (COC)

US 36 Modern ROCKVILLE ROAD

8,200 4,100 0 8,200 Feet

Filters (4)
Results (10)

American Community Survey

B17001 POVERTY STATUS IN THE PAST 12 MONTHS BY SEX BY AGE

2019: ACS 5-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

Notes | 4 Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | Download | Print | Map

	Wayne township, Marion County, Indiana		Census Tract 3401.01, Marion County, Indiana		Census Tract 3401.02, Marion County, Indiana		Census Tract 3419.02, Marion County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	141,650	±338	3,968	±318	3,703	±501	3,649	±369
Income in the past 12 months below poverty level:	32,750	±1,969	394	±187	624	±350	166	±106
Male:	14,644	±1,239	203	±121	241	±152	37	±39
Under 5 years	2,604	±591	25	±31	34	±55	0	±12
5 years	543	±224	11	±19	0	±12	0	±12
6 to 11 years	2,400	±456	12	±19	33	±53	0	±12
12 to 14 years	732	±249	0	±12	34	±53	0	±12
15 years	211	±126	16	±23	0	±12	18	±29
16 and 17 years	263	±134	0	±12	0	±12	0	±12
18 to 24 years	1,421	±361	22	±31	71	±54	0	±12
25 to 34 years	1,785	±334	44	±49	35	±34	1	±3
35 to 44 years	1,594	±359	48	±43	8	±12	16	±24
45 to 54 years	1,571	±349	0	±12	0	±12	1	±4
55 to 64 years	919	±249	8	±12	11	±18	1	±3
65 to 74 years	502	±187	0	±12	15	±18	0	±12
75 years and over	99	±78	17	±26	0	±12	0	±12
Female:	18,106	±1,236	191	±88	383	±267	129	±92
Under 5 years	2,276	±437	4	±11	39	±66	0	±12
5 years	577	±202	4	±10	33	±54	0	±12
6 to 11 years	2,692	±458	10	±17	0	±12	12	±20
12 to 14 years	911	±241	0	±12	10	±15	25	±40
15 years	248	±122	0	±12	0	±12	2	±4
16 and 17 years	653	±194	0	±12	33	±54	0	±12
18 to 24 years	2,433	±341	54	±42	102	±95	12	±18
25 to 34 years	2,898	±391	31	±29	58	±67	0	±12
35 to 44 years	1,953	±319	40	±28	42	±48	9	±15
45 to 54 years	1,596	±280	23	±23	9	±15	0	±12
55 to 64 years	1,051	±227	9	±14	36	±45	52	±50

Experimental estimates, developed from 2020 ACS 1-year data are now available on the ACS Experimental Data webpage. These estimates will not be available on data.census.gov.

Filters (4) | Results (1)

American Community Survey

B03002 HISPANIC OR LATINO ORIGIN BY RACE

2019: ACS 5-Year Estimates Detailed Tables | Universe: Total population

Notes | 4 Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | Download | Print | Map

	Wayne township, Marion County, Indiana		Census Tract 3401.01, Marion County, Indiana		Census Tract 3401.02, Marion County, Indiana		Census Tract 3419.02, Marion County, Indiana	
Label	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	144,091	±46	4,000	±326	3,724	±500	3,649	±369
Not Hispanic or Latino:	113,167	±2,119	3,553	±317	2,963	±453	3,198	±395
White alone	61,949	±1,893	2,944	±284	1,710	±259	2,543	±365
Black or African American alone	43,421	±1,892	391	±56	1,035	±353	479	±264
American Indian and Alaska Native alone	152	±91	0	±12	0	±12	13	±25
Asian alone	2,172	±434	130	±113	46	±39	48	±37
Native Hawaiian and Other Pacific Islander alone	40	±49	0	±12	0	±12	0	±12
Some other race alone	454	±285	0	±12	112	±167	13	±21
Two or more races:	4,979	±807	88	±68	60	±59	102	±117
Two races including Some other race	124	±98	0	±12	0	±12	0	±12
Two races excluding Some other race, and three or more races	4,855	±808	88	±68	60	±59	102	±117
Hispanic or Latino:	30,924	±2,111	447	±251	761	±472	451	±171
White alone	16,380	±1,810	234	±296	642	±456	329	±146
Black or African American alone	597	±262	0	±12	0	±12	12	±20
American Indian and Alaska Native alone	284	±311	0	±12	0	±12	0	±12
Asian alone	63	±93	0	±12	0	±12	0	±12
Native Hawaiian and Other Pacific Islander alone	6	±12	0	±12	0	±12	0	±12
Some other race alone	12,131	±1,915	213	±206	59	±92	110	±83
Two or more races:	1,463	±642	0	±12	60	±102	0	±12
Two races including Some other race	614	±317	0	±12	0	±12	0	±12
Two races excluding Some other race, and three or more races	849	±536	0	±12	60	±102	0	±12

Columns | Cell/Column Notes

DES 1800035 - US 36 EJ Analysis

Fair, Terri <TFair@indot.IN.gov>

Thu 1/20/2022 4:23 PM

To: Kirk Roth <kroth@CORRADINO.com>

Cc: Bales, Ronald <rbales@indot.IN.gov>

1 attachments (5 MB)

Jan 20 22 DES 1800035_EJ Memo.pdf;

INDOT-Environmental Services Division (ESD) has reviewed the project information along with the Environmental Justice (EJ) Analysis for the above referenced project. With the information provided, the project may require minimal right-of-way, require no relocations, and would not disrupt community cohesion or create a physical barrier. With the information provided, INDOT-ESD would not consider the impacts associated with this project as causing a disproportionately high and adverse effect on minority and/or low-income populations of EJ concern relative to non EJ populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23a. No further EJ Analysis is required.

Noise Technical Report
July 2021

Prepared for:

INDIANA DEPARTMENT OF TRANSPORTATION

Prepared by:

Michael Baker International, 3815 River Crossing, Suite 20

Indianapolis, Indiana 46240

Table of Contents

1.0 INTRODUCTION

Michael Baker International (Michael Baker) was retained by INDOT to perform a Type I traffic noise study and abatement analysis as a requirement of the US 36 (Rockville Road) widening between N. Raceway Road and I-465 in Indianapolis, Indiana. Within the project corridor, the roadways that serves as the primary sources of highway noise are US 36 and I-465. Cross-streets that may contribute varying degrees of vehicular noise to the noise environment include N. Raceway Road, N. Girls School Road, and S. High School Road. There is also a CSX rail line that crosses the project alignment and contributes to the noise environment.

The major objectives of this highway traffic noise and abatement analysis are defined as follows:

- Identify areas of potential noise impacts associated with the Proposed Action.
- Evaluate measures to mitigate noise impacts, as necessary.
- Compare the various mitigation alternatives on the basis of potential noise impact and the associated mitigation costs.

The *INDOT Traffic Noise Analysis Procedure* was developed to implement the requirements of 23 Code of Federal Regulations (CFR) Part 772 *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (August 11, 1997), Federal Highway Administration's (FHWA) *Highway Traffic Noise: Analysis and Abatement Guidance* (June 2010), and the noise related requirements of the *National Environmental Policy Act of 1969.* The INDOT *Traffic Noise Analysis Procedure* received FHWA approval and is effective as of July 1st, 2017.

2.0 LEGISLATION AND NOISE FUNDAMENTALS

2.1 Regulatory Requirements

Effective control of undesirable traffic noise focuses upon three areas of responsibility. These are the control of land uses adjacent to a highway, regulation of vehicle noise emission levels, and mitigating noise impacts resulting from certain types of highway improvement projects.

The authority to implement planning and land use control in the State of Indiana is under the jurisdiction of local governments. Both FHWA and INDOT encourage local governments to regulate land uses in such a manner that noise sensitive developments are either prohibited from being located adjacent to major transportation facilities, or that developments are planned, designed, and built in such a manner that potential noise impacts can be avoided or minimized.

The *Noise Control Act of 1972* gives the U.S. Environmental Protection Agency (USEPA) the authority to establish noise regulations to control major noise sources, including motor vehicles and construction equipment. Furthermore, the USEPA is required to set noise emission standards for motor vehicles used for interstate commerce and the FHWA is required to enforce the USEPA noise emission standards through the Office of Motor Carrier Safety.

The *National Environmental Policy Act of 1969* (NEPA) gives broad authority and responsibility to Federal agencies to evaluate and mitigate adverse environmental impacts caused by Federal actions. FHWA is required to comply with NEPA including mitigating adverse highway traffic noise effects. *The Federal-Aid Highway Act of 1970* mandates FHWA to develop standards for

mitigating highway traffic noise. It also requires FHWA to establish traffic noise level criteria for various types of land uses. The Act prohibits FHWA approval of federal-aid highway projects unless adequate consideration has been made for noise abatement measures to comply with the standards.

FHWA regulations for highway traffic noise for federal-aid highway projects are contained in 23 CFR Part 772. The regulations contain noise abatement criteria, which represent the maximum acceptable level of highway traffic noise for specific types of land uses. The regulations do not mandate that the abatement criteria be met in all situations, but rather require that reasonable and feasible efforts be made to provide noise mitigation when the abatement criteria are approached or exceeded.

The traffic noise standards and the description of highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials are found in 23 CFR Part 772. FHWA policy also requires each state Department of Transportation to adopt a state-specific noise policy, approved by FHWA, which defines specific terms and describes how the state implements the noise standard.

The effective date of the most recent FHWA-approved *INDOT Traffic Noise Analysis Procedure* is July 1st, 2017. This policy is applicable to Type I federal-aid highway projects which involve the construction of a highway on a new location, or which involves the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through traffic lanes. The policy is not applicable to Type II federal-aid highway projects for the abatement of noise on existing highways. The structure of the policy focuses on the following principal elements:

1. Identification of Noise-Sensitive Land Uses
2. Determination of Existing Noise Levels
3. Prediction of Future Noise Levels
4. Identification of Traffic Noise Impacts.
5. Identification and Consideration of Abatement
6. Consideration of Construction Noise
7. Coordination with Local Government Officials

2.2 Traffic Noise Descriptors

Noise is generally defined as unwanted or annoying sound. Airborne sound occurs by a rapid fluctuation of air pressure above and below atmospheric pressure. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level.

Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. It has been found that the A-weighted filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear. The A-weighted sound level in decibels is identified as dBA.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources, creating a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of traffic noise, a statistical noise descriptor called the equivalent hourly sound level, or $L_{eq}(h)$, is commonly used. $L_{eq}(h)$ describes a noise sensitive receptor's cumulative exposure from all noise-producing events over a one-hour period.

Because decibels are logarithmic units, sound levels cannot be added by ordinary arithmetic means. The following general relationships provide a basic understanding of sound generation and propagation:

- An increase, or decrease, of 10 dB will be perceived by a receptor to be a doubling, or halving, of the sound level.
- Doubling the distance between a highway and receptor will produce a 3 dB sound level decrease.
- A 3 dB sound level increase is barely detectable by the human ear.

3.0 IMPACT CRITERIA

3.1 Noise Abatement Criteria

The *INDOT Traffic Noise Analysis Procedure* has adopted the noise abatement criteria (NAC) that have been established by FHWA (23 CFR Part 772) for determining noise impacts for a variety of land uses. The land-use Activity Categories along with the criteria are presented in Table 1. The NAC sound levels are only to be used to determine a roadway noise impact. These are the absolute values where abatement must be considered. Based on NAC shown in Table 1, where applicable interior noise levels have been calculated for places of worship within the study area. Consistent with guidance provided in the *FHWA Noise Measurement Handbook – Final Report*, building noise reduction factors have been applied to Rockville Road Church of Christ (20 dB for a light frame structure) and Westlake Community Church of God (25 dB for a masonry frame structure).

3.2 INDOT Definition of Noise Impacts

Traffic noise impacts occur if either of the following two conditions is met:

- The predicted traffic noise levels approach or exceed the NAC, as shown in Table 1. The *INDOT Traffic Noise Analysis Procedure* defines "approach or exceed" as meaning that future levels are higher than 1 dBA below the appropriate NAC activity category. For example, for a category B receptor, 66.0 dBA would be approaching 67.0 dBA and would be considered an impact.
- The predicted traffic noise levels substantially exceed the existing noise level. The INDOT *Traffic Noise Analysis Procedure* defines "substantially exceed" as meaning when predicted traffic noise levels exceed existing noise levels by 15.0 dBA or more. For example, if a receptor's existing noise level is 50.0 dBA, and if the future noise level is 65.0 dBA, then it would be considered an impact.

Table 1 FHWA Noise Abatement Criteria (NAC) Hourly A-Weighted Sound Levels in Decibels (dBA)			
Activity Category	Activity $L_{eq}(h)$	Evaluation Location	Description of Activity Category
A	57	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	67	Exterior	Residential
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-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.

Source: Federal Highway Administration (23 CFR Part 772)

Note: These sound levels are only to be used to determine impact. These are the absolute levels above which abatement must be considered. Noise abatement is designed to achieve a substantial noise reduction. Noise abatement is not designed to achieve the noise abatement criteria.

4.0 NOISE STUDY METHODOLOGY

4.1 Determination of Existing Noise Levels

Existing noise levels are defined in 23 CFR Part 772 as the noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area during the period of the noise analysis. In accordance with the INDOT *Traffic Noise Analysis Procedure* Traffic Noise Prediction, the existing noise levels are to be determined by the measurements taken at a time of the day that reflects the worst (noisiest) traffic hour. This period is generally the design hourly volume (DHV).

Existing measurements were collected at representative sets of receptors. These representative sets were developed based on an evaluation of the topography, the highway traffic volumes and highways, and the density and proximity of the receptors to the local roadways and highways.

The existing noise level measurement locations were approved by INDOT. The receptors and the land-use activity categories being represented by those locations are shown in Appendix A and/or described in Table 2.

Measurement of the existing noise levels at the representative sites were collected on May 11, 2021, using a Norsonics 132 Sound Level Meter and EXTECH 407744 calibrator. Copies of the Calibration Certificates for the sound level meter, microphone and acoustic calibrator are included in Appendix B. In addition, field sheets depicting the before and after sound level calibration levels for each site is included in Appendix B. All of the existing noise level measurements were recorded at approximately 4.92 feet above the surface of the ground and at locations representing outdoor activities nearest the dominant ambient noise source. The operation of the calibrator was utilized according to manufacturer's specifications and there was no drift in the measurements.

Existing noise measurements were conducted under meteorologically acceptable conditions when the pavement was dry and winds were calm or light. Ambient measurements were conducted for a period of 20 minutes at each location in accordance with the FHWA Report FHWA-PD-96-46, "Measurement of Highway Related Noise." A summary of the existing noise level measurements used as part of this analysis are included in Table 2 and copies of the Ambient Noise Measurement Logs are included in Appendix C.

Traffic data was simultaneously recorded during the noise measurements and classified into three vehicle types: automobiles (including sport utility vehicles, pick-up trucks and motorcycles), medium trucks (two-axles with six wheels) and heavy trucks (three or more axles, plus buses) for subsequent entry into the TNM 2.5 noise prediction computer model for validation purposes.

Table 2 Existing Noise Level Measurement Locations				
Site No.	Site Description and Land Use Classification	Time		Noise Meter Reading (L_{eq}, in dBA)
		Start	Stop	
M-1	8853 Rockville Road. Mixed use residential/dental office. Measurement taken in north end of the parcel. This site is classified as land use category B and C with mixed residential and commercial/retail land uses.	16:25	16:45	71.6
M-2	4 East Kirk Drive. Northwest corner intersection with Rockville Road. Residential land use. Measurement taken along East Kirk Road near Rockville Road, east of the residence. This site is classified as land use category B with other residences nearby as the primary land use with some commercial/industrial land uses.	15:51	16:13	65.3
M-3	8201 Rockville Road. Exterior seating area at Culver's restaurant. Measurement taken in north end of the parking lot. This site is classified as land use category E surrounded by commercial land uses.	15:20	15:40	69.9
M-4	7498 Rockleigh Avenue. Rockwood Apartments, northwest corner intersection of Rockville Road. Four 1st floor patios and 4 2nd floor balconies. Measurement taken in south end of the parcel. This site is classified as land use category B with mixed residential/commercial/retail land uses.	14:48	15:08	69.5
M-5	7505 Rockville Road. Residential land use. Measurement taken in north end of the parcel. This site is classified as land use category B with commercial/retail and residential land uses around it.	14:17	14:37	74.7
M-6	7045 Rockville Road. Rockville Road Church of Christ. Measurement taken in north end of the parking lot. This site is classified as land use category D since there are no exterior people activity areas. Surrounding land uses are primarily residential land uses.	13:40	14:00	66.0
M-7	7022 Rockville Road. Residential land use. Measurement taken in south end of the parcel. This site is classified as land use category B, primarily surrounded by other residential land uses.	11:47	12:07	71.1
M-8	6420 Rockville Road. Northwest corner intersection with Mission Drive. Residential land use. Measurement taken along Mission Drive, even with the approximate house distance from Rockville Road, east of the residence. This site is classified as land use category B with other residences nearby as the primary land use with some commercial land uses.	11:08	11:28	66.7
M-9	6405 Rockville Road. Southwest corner intersection with Mission Drive. Residential land use. Measurement taken along Mission Drive, northeast of the house. This site is classified as land use category B with other residences nearby as the primary land use with some commercial land uses.	10:25	10:45	68.2

NOTE: Measurements were taken on May 11, 2021.

4.2 Traffic Noise Model

The traffic noise analysis for this study was performed using the FHWA Traffic Noise Model (TNM), Version 2.5. The FHWA TNM was first released in March 1998. Version 2.5 of the model was released in April 2004 and is the latest approved version.

The FHWA TNM estimates vehicle noise emissions based on mean (average) noise emission levels for three classes of vehicles used for this analysis: automobiles, medium trucks, and heavy trucks. The TNM computer model has capabilities for additional vehicular classes but only three were provided as part of the traffic analysis. The predicted noise levels for the Design Year No-Build and Build Alternative conditions were based on Design Hourly Volumes (DHV) and vehicular fleet mixes for the year 2045.

Terrain and other roadway features were input into TNM. These inputs include roadway widths (including inner and outer shoulders) and elevations, receptor elevations and intervening terrain. Tree zones were not included in the modeling. In accordance with INDOT's *Traffic Noise Analysis Procedure* all receptors located within 500 feet of the edge of pavement of all reasonable build alternatives were assessed for traffic noise impacts. Based on all this input data, TNM uses its acoustic algorithms to predict noise levels at receptor locations by considering sound propagation variables such as atmospheric absorption, divergence, intervening ground, barriers, building rows, and vegetation.

4.2.1 Traffic Data

Traffic that was input into the existing condition runs used to validate the model came from the traffic observed during the ambient measurements.

Appendix D shows the traffic inputs that were used for the TNM runs. Traffic data used as TNM inputs were developed by the Corradino Group, based on the INDOT Traffic Count Database System (TCDS). Some local roads and center turn lanes were entered into the model as a zero input.

Posted traffic speeds were used in the analysis because DHVs were provided as traffic input for the analysis. Flow control devices were applied as applicable. All other local roads were modeled using speeds based on posted limits.

4.2.2 Alignment

The proposed project will follow and widen the existing alignment. Twin bridges will be constructed over Little White Creek for additional travel lanes and sidewalks and the CSX Railroad bridge will be replaced and extended. Roads were input manually from Baker CAD design files used for this study. Elevations were input manually through available existing survey elevation data. US 36 was modeled using single lanes, plus the added and outside paved shoulders. Cross-streets with notable and available traffic volumes were modeled as one lane in each direction. Minor collector streets with little or no available traffic volumes were modeled with a single link to account for the pavement surface.

4.2.3 Receptors

The project study area was divided into three Common Noise Environments (CNEs) based on a combination of land use, traffic volumes and development density. In accordance with INDOT's *Traffic Noise Analysis Procedure,* all receptors located within 500 feet of the edge of pavement of the Build Alternative were assessed for traffic noise impacts. A total of 323 sites were modeled to represent 428 receptors.

The location of all the receptors modeled can be found in Appendix A. Most of the 428 receptors are residential land uses. Other study area land use types include a retirement home (Summit Place West) that contains 58 receptors, one interior receptor each was representative of places of worship at Westlake Community Church God and Rockville Road Church of Christ. Exterior restaurant dining locations represented by one receptor are located at Dairy Queen, City Barbeque and Catering, Culver's and the GetGo Market and Café. Hotels were initially modeled with one

receptor for Hotel Woodspring Suites and Best Western Hotel to determine impacts. (Note: had they been impacted, then one receptor unit would have been assigned to each room.) Additionally, there is a receptor modeled for an apartment complex swimming pool at the Rockwood Apartments.

Retail land uses, industrial land uses, storage facilities and outbuildings were not modeled. The TNM default height of 4.92 feet above the base ground elevation was used for all receptors. Specific receptor placement in the model is generally based on exterior areas where normal human occupation is expected to occur on the property. The TNM computer model input data is included separately provided to INDOT.

4.2.4 Tree Zones and Surface Objects

Tree zones were not modeled since most of the project area is not forested land use. Buildings were modeled as barrier inputs (shielding) where applicable.

4.2.5 Terrain lines

Terrain lines were used sensibly in the model to represent the existing topography and intervening terrain features. Terrain lines input into the model were selectively chosen to optimize their effectiveness in the model and to minimize the extensive model run times.

4.2.6 Barriers

Barriers were used in the noise abatement evaluation. A maximum height of 30 feet was used in this analysis for modeling purposes as a baseline limit to avoid inordinately tall barriers. Barriers were also input as building shielding objects.

4.3 TNM 2.5 Validation

Model validation is a process for testing a model to ensure that it produces reliable results and to confirm that traffic noise is the predominant noise source at the receptor locations. In general, validation involves comparing actual noise measurements with the noise levels predicted by the model for existing conditions at the same location. The model is considered to be verified if the model results are within ±3.0 dBA of the field measurements recorded at the site for the same conditions.

5.0 PROPOSED ACTION

5.1 Project Description

The proposed project includes the construction of an additional lane in each direction along US 36 (on the outside of the existing lanes), a raised median where two-way left turn lanes are present, sidewalks along both sides of US 36, and the replacement of curb and gutter along both sides of US 36. The additional lanes will require the construction of twin bridges over Little White Lick Creek to be widened to allow for the additional travel lanes and sidewalks. In addition, work will be performed at the High School Road intersection to increase capacity for some movements. A northbound dedicated right turn lane and westbound dual left turn lanes will be constructed to

improve operations. The project corridor primarily traverses a relatively flat area with mixed residential, commercial, retail, and office land uses areas in a suburban setting.

5.2 Existing Roadways

US 36 and I-465 are existing transportation facilities within the corridor that are primary noise sources. Cross-streets that may contribute varying degrees of vehicular noise to the total sound level environment include N. Raceway Road, Country Club Road, Girls School Road, and High School Road. Other local streets have existing DHVs of 100 or less vehicles.

5.3 Receptors

The project corridor generally consists of suburban residential development, mixed with commercial retail land uses. No displacements are anticipated with the Build Alternative. Receptors located within 500 feet of the edge of pavement of the Build Alternative were assessed for potential noise impacts per the INDOT *Traffic Noise Analysis Procedure*.

5.4 Planned Development

23 CFR §772.9(b)(1) requires that a noise analysis be performed for undeveloped lands for which development is "planned, designed, and programmed. In accordance with the INDOT *Traffic Noise Analysis Procedure*, an undeveloped lot is considered to be planned, designed, and programmed if a building permit has been issued by the local authorities prior to the Date of Public Knowledge for the relevant project. If no zoning or building permit process is in place, then land is considered undeveloped unless foundations for new buildings are in place. INDOT considers the Date of Public Knowledge as the date that the final NEPA approval is made. INDOT has no obligation to provide noise mitigation for any undeveloped land that is planned, designed, or programmed after this date. There were no planned developments with building permits found.

Subdivisions result from the division of land into two or more lots that are recorded and then made available for sale. Traditional, or modern, residential subdivisions are typically developed in accordance with a local zoning ordinance that implements a community's land use or comprehensive plan. Subdivisions often include areas dedicated for public roads and utilities in addition to the platted lots.

6.0 EXISTING NOISE LEVELS

6.1 TNM Validation

Receptors representing the 9 noise measurement locations were modeled using the TNM with the same traffic observed during the noise measurements to confirm that the model accurately replicates the sound environment at each particular location and to confirm that traffic noise is the predominant source of noise at each location.

Model validation is a process for testing a model to ensure that it produces reliable results and to confirm that traffic noise is the predominant noise source at the receptor locations. In general, validation involves comparing actual noise measurements with the noise levels predicted by the model for existing conditions at the same location. The model is considered to be verified if the model results are within ±3.0 dBA of the field measurements recorded at the site for the same

conditions. A comparison of the existing ambient measured sound levels to the predicted sound level for each site is summarized in Table 3. Based on the results, the TNM noise models constructed for the modeled existing, design year no-build and build alternatives are valid.

Based on field observations collected during the existing noise level measurements, US 36 traffic noise were considered to be the dominant source of noise at the noise measurement locations, though train noise could be heard in the background, depending on the distance from the track. The existing measured L_{eq} within the project corridor ranged from 65.3 dBA to 74.7 dBA.

Table 3
TNM Validation Results

Site No.	Activity Category	CNE	Existing Measured L_{eq} (dBA)	Existing Modeled L_{eq} (dBA)	Measured Minus Modeled L_{eq} (dBA)	Dominant Noise Source at Site
M-1	B, C	1	71.6	70.1	+1.5	Traffic noise from US 36 (Rockville Rd.)
M-2	B	2	65.3	68.2	-2.9	Traffic noise from US 36 (Rockville Rd.)
M-3	E	2	69.9	69.7	+0.2	Traffic noise from US 36 (Rockville Rd.)
M-4	B	2	69.5	72.0	-2.5	Traffic noise from US 36 (Rockville Rd.)
M-5	B	2	74.7	74.9	-0.2	Traffic noise from US 36 (Rockville Rd.)
M-6	D	2	66.0	68.3	-2.3	Traffic noise from US 36 (Rockville Rd.)
M-7	B	2	71.1	71.8	-0.7	Traffic noise from US 36 (Rockville Rd.)
M-8	B	3	66.7	69.1	-2.4	Traffic noise from US 36 (Rockville Rd.)
M-9	B	3	68.2	70.8	-2.6	Traffic noise from US 36 (Rockville Rd.)

6.2 Existing Traffic Noise Results

The project study area was divided into 3 CNEs based on land use, traffic volumes and density. Traffic data used as TNM inputs were developed by the Corradino Group, based on the INDOT Traffic Count Database System (TCDS). Some local roads and center turn lanes were entered into the model as a zero input. These values were used to determine the existing noise levels for the 323 modeled receptor sites within the 3 CNEs throughout the study corridor. For the Existing condition, exterior Leq levels are predicted to range from 48.1 dBA to 72.4 dBA. The results of the noise analysis conducted for the modeled existing condition resulted in 95 receptors that approach or exceed the applicable NAC criteria as defined in the INDOT *Traffic Noise Analysis Procedure*. All of these 95 receptors represent residential land uses. There were no interior sound levels that approached or exceeded the NAC criteria. Appendix E includes the existing sound level results for each modeled site.

7.0 PREDICTED YEAR 2045 NOISE RESULTS COMPARATIVE ANALYSIS

7.1 Design Year No Build Alternative Noise Results

The results of the noise analysis conducted for the Design Year No-Build Alternative indicate that design year 2045 predicted noise levels would increase by approximately 0.7 dBA (on average) over the existing condition. For the No-Build condition, exterior Leq levels are predicted to range from 48.7 dBA to 73.1 dBA. This increase results from the predicted growth in traffic volumes if the proposed project is not constructed. The predicted number of receptors that approach or exceed the appropriate NAC criteria is 95. These locations are comprised of residences. There were no interior sound levels that approached or exceeded the NAC criteria. (see Appendix E).

7.2 Design Year Build Alternative Noise Results

Noise analysis was performed to determine the predicted design year 2045 noise levels for the receptors located within the modeling limits for the proposed alternative. The results indicate that the year 2045 predicted exterior noise levels for the Design Year Build condition would range from 48.8 dBA to 74.0 dBA for the 323 modeled locations. The predicted number of receptors that approach or exceed the appropriate NAC criteria is 96. Impacted locations are comprised of all residences. Predicted noise levels represent a 0.7 Leq difference in average noise level increase over the existing condition. There are no impacts due to substantial noise increase. There were no interior sound levels that approached or exceeded the NAC criteria. Appendix E includes the Future No Build L_{eq} sound level results for each modeled site.

7.3 Comparison of Predicted Year 2045 Traffic Noise Impacts by Alternative

The noise level impacts are summarized in Table 4 and described below. The values in the table are for all the receptors represented by the modeled location sites. A summary of the type of impacts for the predicted design year 2045 traffic associated with the design year conditions is contained in Table 5.

Table 4 Noise Level Impacts by Land Use - 2045 Design Year Alternatives		
Receptor (or Land Use) Type	2045 Exterior Noise Level Impacts	
	No-Build Alternative	Build Alternative
Residences	95	96
Places of Worship	0	0
Hotels	0	0
Recreation	0	0
Schools	0	0
Multi-Use Trail	0	0
Commercial (non-retail)	0	0
Total	**95**	**96**

Table 5 Noise Level Impact Summary	
Type of Impact	2045 Exterior Noise Level Impacts
	Build Alternative
NAC Only Impact	96
Substantial Increase Only Impact (≥15.0 dBA)	0
NAC and Substantial Increase Impact	0
Total	**96**

8.0 NOISE ABATEMENT EVALUATION

8.1 INDOT Noise Abatement Policy

Traffic noise abatement measures can be in many forms and may include traffic control measures (TCM), alteration of vertical or horizontal alignment, acquisition of buffering land, noise insulation of public use or non-profit institutional structures, and/or construction of traffic noise barriers. Due to limitations on INDOT's ability to acquire property for mitigation or to mitigate sites off of State Right-of-Way, the most common form of abatement is the construction of noise barriers. Other forms of abatement will be evaluated on a case-by-case basis. INDOT will choose the most feasible and reasonable form of abatement.

8.2 Abatement Measures Evaluation

The following strategies were considered for the predicted highway traffic noise impacts.

Traffic Management Measures: Traffic management measures were not considered reasonable and feasible for abating noise impacts for any receptor. Measures such as installation of additional traffic control devices, prohibition of vehicle types, time-use restrictions, speed limit reductions,

and exclusive lane designations would be detrimental to the proposed project's ability to function as a main east-west travel route.

Alteration of Horizontal and Vertical Alignments: This abatement measure typically involves shifting the alternative both vertically and horizontally to minimize noise impacts where other factors are not prohibitive. However, since the build alternative was chosen to be the most efficient alignment while minimizing impacts, it is anticipated that substantial horizontal and/or vertical changes would be prohibitive.

Acquisition of Property Rights or Acquisition of Property: The purchase of property and/or buildings for noise barrier construction or the creation of a "buffer zone" to reduce noise impacts was considered. The amount of property required for this option to be effective would create significant additional impacts (e.g., in terms of displacements), which were determined to outweigh the benefits of land acquisition.

Noise Insulation of Public Use or Nonprofit Institutional Structures: This noise abatement measure option applies only to NAC D land uses. Since no NAC D land uses are anticipated to have interior noise levels exceeding FHWA's interior NAC, this noise abatement option will not be applied.

Coordination Among Local Planning Authorities: Since most of the proposed project would be located near to or along on an existing facility, the potential for local officials and developers to help minimize adverse noise impacts through the use of careful land use planning exists only in the undeveloped areas. With regard to currently undeveloped land, the creation of a "buffer zone" or locating noise sensitive developments a reasonable distance away from the project would help minimize future noise impacts. Local planning authorities will be provided with information that identifies the limits of where 66.0 dBA and 71.0 dBA noise levels are predicted relative to the proposed facility which can be utilized to direct noise compatible land use development outside the 66.0 dBA and 71.0 dBA buffer zones along the highway. This information is provided in this report, as part of the larger environmental document for this project. Copies of the noise report will be provided to or made available to local officials.

Construction of Noise Barriers: The construction of noise barriers between the shoulder and the right-of-way limits is generally one of the most feasible and/or reasonable abatement measures available. Noise barriers can be wall structures, earthen berms, or a combination of the two. The effectiveness of a noise barrier depends on the distance and elevation difference between the roadway and receptor and the available placement location for a barrier. For those receptors experiencing a noise impact, the feasibility and reasonableness of noise abatement were evaluated using INDOT's feasible and reasonableness assessment criteria.

Possible mitigation measures were considered for sites where noise impacts were predicted to occur. Mitigation was assessed in terms of its feasibility and reasonableness.

Feasibility means that INDOT believes traffic noise impact abatement is prudent based on all of the following:

- Acoustic Feasibility. INDOT requires that noise barriers achieve a 5.0 dBA reduction at a majority (greater than 50%) of the impacted receptors. If a barrier cannot achieve this acoustic goal, abatement is considered to not be acoustically feasible.

- Engineering Feasibility. INDOT requires noise abatement to be based on sound engineering and evaluated at the optimum location. For instances in which the roadway is located on fill and is at a higher location than nearby receptors, a barrier will be evaluated near the shoulder. For instances in which the roadway is located below the nearby receptors, a barrier will be evaluated near the edge of the right-of-way near the receptors. In addition, noise barriers require long, uninterrupted segments of barrier to be feasible. As such, if there are existing access points and/or driveways, it is not feasible to construct effective noise barriers for the roadway.

  Engineering feasibility also takes into account topography, drainage, safety, barrier height, utilities, and access/maintenance needs (which may include right-of-way considerations). In situations where engineering considerations make noise barriers not feasible, the noise analysis will explicitly state the reasons (topography, drainage, safety, etc.).

Reasonableness means that INDOT believes abatement of traffic noise impacts is prudent based on all of the following factors:

- Cost effectiveness. A barrier is determined to be cost-effective if a five decibel (5.0 dBA) reduction can be achieved at a cost of no more than $25,000 per benefited receptor if a majority of the nearby receptors in a common noise environment were not constructed prior to the roadway. Using current bid prices, this corresponds to approximately 833 square feet of noise barrier per receptor. The allowed cost is $30,000 per benefited receptor if a majority of the nearby receptors in a common noise environment were constructed prior to the roadway being constructed. This corresponds to approximately 1,000 square feet of noise barrier per receptor using recent bid prices.

  Placing noise barriers on structures creates additional challenges, since reinforcement of the structure may be necessary to support the increased load. In these situations, other options are assessed to determine whether cost-effective abatement can be provided without requiring complicated and expensive structural changes. These could include lighter-weight barriers, shorter barriers, or other considerations. Any variations will be worked out in coordination between the FHWA division office and INDOT's Offices of Structural Services, Environmental Services and Construction Management.

- INDOT Design Goal for Noise Abatement. FHWA requires that traffic noise abatement achieve a substantial noise reduction. INDOT's goal for substantial noise reduction is to provide at least a 7.0 dBA reduction for impacted first row receptors in the design year. However, conflicts with adjacent lands may make it impossible to achieve substantial noise reduction at all impacted first row receptors. Therefore, the noise reduction design goal for Indiana is 7.0 dBA for a majority (greater than 50%) of the impacted first row receptors.

- Consideration and obtaining views of residents and property owners. The viewpoints of the affected property owners and residents are important to FHWA and INDOT. All communication with the public regarding the potential for noise abatement must be

coordinated with INDOT's Communications Division. This public involvement requirement can be handled either through a public hearing or via a mailed survey as outlined in the INDOT *Traffic Noise Analysis Procedure*.

8.3 Noise Barrier Evaluation

Using INDOT's *Traffic Noise Analysis Procedure*, receptors that were categorized as having design year (2045) traffic noise impacts for the build alternative was assessed to determine if the construction of noise barriers would be a feasible and reasonable form of noise abatement. As part of the barrier analysis, the most current available data was used.

During the NEPA process, there is normally insufficient design information to fully commit to construction of noise abatement. This analysis report identifies locations where noise impacts are predicted to occur, where noise abatement is likely to be feasible and reasonable, and locations with impacts that are likely to have no feasible or reasonable noise abatement alternatives. The information within this report is completed to the extent that design information on the alternatives under study is available at the time the environmental document is completed. Projects may eventually have a narrower scope, updated survey information, or another change that affects the future noise environment. As such, noise abatement recommendations during the NEPA stage do not constitute commitments by INDOT. All Type I projects will undertake a reevaluation of the noise analysis and noise models once design of the roadway project has progressed to a near final stage to determine if noise abatement still meets the feasibility and reasonability standards set forth in this policy. Additional public involvement will be completed as necessary or if the decision is changed.

A majority of impacted receptors have direct access driveway access to US 36 and/or are located on a corner of an intersecting road with US 36 and therefore are not feasible for barrier placement. On roadways with direct access for driveways, noise walls are typically not feasible because they require long interrupted sections to be able to meet the minimum dBA reduction. Gaps in the barrier will render it ineffective. As a result, noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and/or adjacent properties, and thus not meet the minimum dBA insertion loss. A noise barrier (Barrier 1) was modeled at the Rockwood Apartments for the apartment building at the northwest corner of US 36 and Rockleigh Avenue (CNE 2) with eight impacted units in the front row (four on each of the two floors). The results of the barrier analysis are shown in Table 6.

Table 6
Build Alternative Noise Barrier Abatement Analysis

Proposed Barrier Location	Total Barrier Length (feet)	Average Height (feet)	No. of Impacted Receptors	Number of Benefited Receptors	CNE Area	Feasibility Criteria Met?	Cost of Barrier ($30/sq ft)	Cost per Benefited Receptor	Reasonableness Criteria Met?
Barrier 1	169	30	8	4	2	No	N/A	N/A	N/A

Note: The 30-foot barrier height was considered to be conservative. The minimum 5.0 insertion loss was not reached for the majority of the impacted receptors (greater than 50%). The barrier dimensions and placement are restricted by the adjacent Rockleigh Avenue cross-street, the overhead utility lines paralleling US 36 in front of the apartment building, the overhead utility lines perpendicular to US 36 and approximately 25 feet west of the apartment building. Additionally, there is a drainage ditch which also runs perpendicular to US 36 along the latter utility lines.

Feasibility - The one barrier analyzed for the Build Alternative does not meet INDOT's criteria for "feasibility" for being structurally and acoustically capable of providing a 5.0 dBA reduction

in noise levels at a majority of the impacted receptors. Therefore, no barriers are proposed to be carried forward as a result of this preliminary analysis.

As a result, noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and/or adjacent properties, and thus not meet the 5.0 dBA minimum insertion loss (IL) and/or subsequent 7.0 dBA IL design goal (reasonableness).

Reasonableness - As a result of not achieving the minimum sound level reduction at a majority of the impacted receptors, the reasonable analysis criteria is not applicable.

8.4 Statement of Likelihood

The Statement of Likelihood is applicable to the preliminary barrier area locations that are deemed to be feasible and reasonable. Currently, there are no proposed barriers that are predicted to be both reasonable and feasible.

A reevaluation 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 feasible and reasonable, then abatement measures may 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 any subsequent public involvement processes.

9.0 CONSTRUCTION NOISE

Construction of the proposed project will result in a temporary increase in the ambient noise level in the vicinity of the roadway. Equipment associated with construction generally includes backhoes, graders, pavers, concrete trucks, compressors, and other miscellaneous heavy equipment. Construction noise on this project should be controlled by measures including but not limited to the following:

- The construction contract specifications should require that the contractor adhere with all Federal, state, and local noise abatement and control requirements.
- Construction activity in the vicinity of residences should be limited to the hours between 7:00 am and 7:00 pm or as specified by local requirements.
- A responsive communication process should be established with local residents. A telephone number should be posted at the construction site for inquiries concerning project activity.
- Equipment such as generators, which may be used during the nighttime hours, should be enclosed.
- Construction equipment should be in good repair and fitted with "manufacturer recommended" mufflers.

10.0 NOISE COMPATIBLE PLANNING

While there is no NAC Category G land, as described in Table 1 in the project corridor, INDOT *Traffic Noise Analysis Procedure* requires noise contours to be developed for undeveloped lands to aid with future land use planning. As part of the requirements of the INDOT *Traffic Noise Analysis Procedure*, estimated future noise levels associated with the Proposed Build scenario for

undeveloped lands that are not planned, designed, and programmed will be provided to local governments so that the appropriate land-use planning can be performed.

Since most of the proposed project would be constructed near to or along an existing facility, the potential for local officials and developers to help minimize adverse noise impacts through the use of careful land use planning exists only in the undeveloped areas. With regard to currently undeveloped land, the creation of a "buffer zone" or the location of noise sensitive developments a reasonable distance away from the project would help minimize future noise impacts. Local planning authorities will be provided with information that identifies the limits of where the 71.0 dBA (non-retail commercial business) and 66.0 dBA (residences, schools, churches, hospitals, parks) noise levels are predicted relative to the proposed facility and can be utilized to direct noise compatible land uses outside the 71.0 and 66.0 dBA buffer zones along the highway. The estimated distance from the edge of the nearest US 36 travel lane for such buffers are approximately 101 feet for the 66.0 dBA contour and 30 feet for the 71.0 dBA contour.

This information is only intended to be used as a guide to assist the local government agencies. Any future land use planning should consider developments so that they are planned, designed, and constructed in such a way that noise impacts are minimized for the areas developed.

11.0 SUMMARY

A Type I noise analysis was performed for the Build Alternative of the US 36 widening to determine predicted traffic noise impacts. Nine existing ambient measurements were recorded. Eight of the ambient levels approached or exceeded the NAC criteria. A total of 323 location sites representing 428 receptors were modeled for the existing, design year build and no-build alternatives. There were 96 impacted receptors as defined in the INDOT *Traffic Noise Analysis Procedure* for the Build Alternative (96 NAC and zero substantial increase impacts). All impacts were residential land uses.

Due to the presence of numerous cross-streets and direct-access driveways, modeled barriers for the impacted receptors would not be feasible. A noise barrier (Barrier 1) was modeled at the Rockwood Apartments. Barrier 1 did not result in a 5.0 dB noise reduction for the majority of the impacted receptors which did not meet the INDOT criteria for feasibility. Therefore, no barriers are proposed to be carried forward as a result of this preliminary analysis.

A final determination on noise abatement for the Build Alternative will be made during the final design phase of the project. At such time, additional noise analysis will be performed as applicable to more accurately determine barrier performance, barrier characteristics (length and height), and the optimal barrier location for any potential noise barriers that may be recommended for noise abatement.

12.0 REFERENCES

23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise,* July 2010.

Environmental Protection Agency Publication EPAP 206717, December 1971, *Noise from Construction Equipment and Operations.*

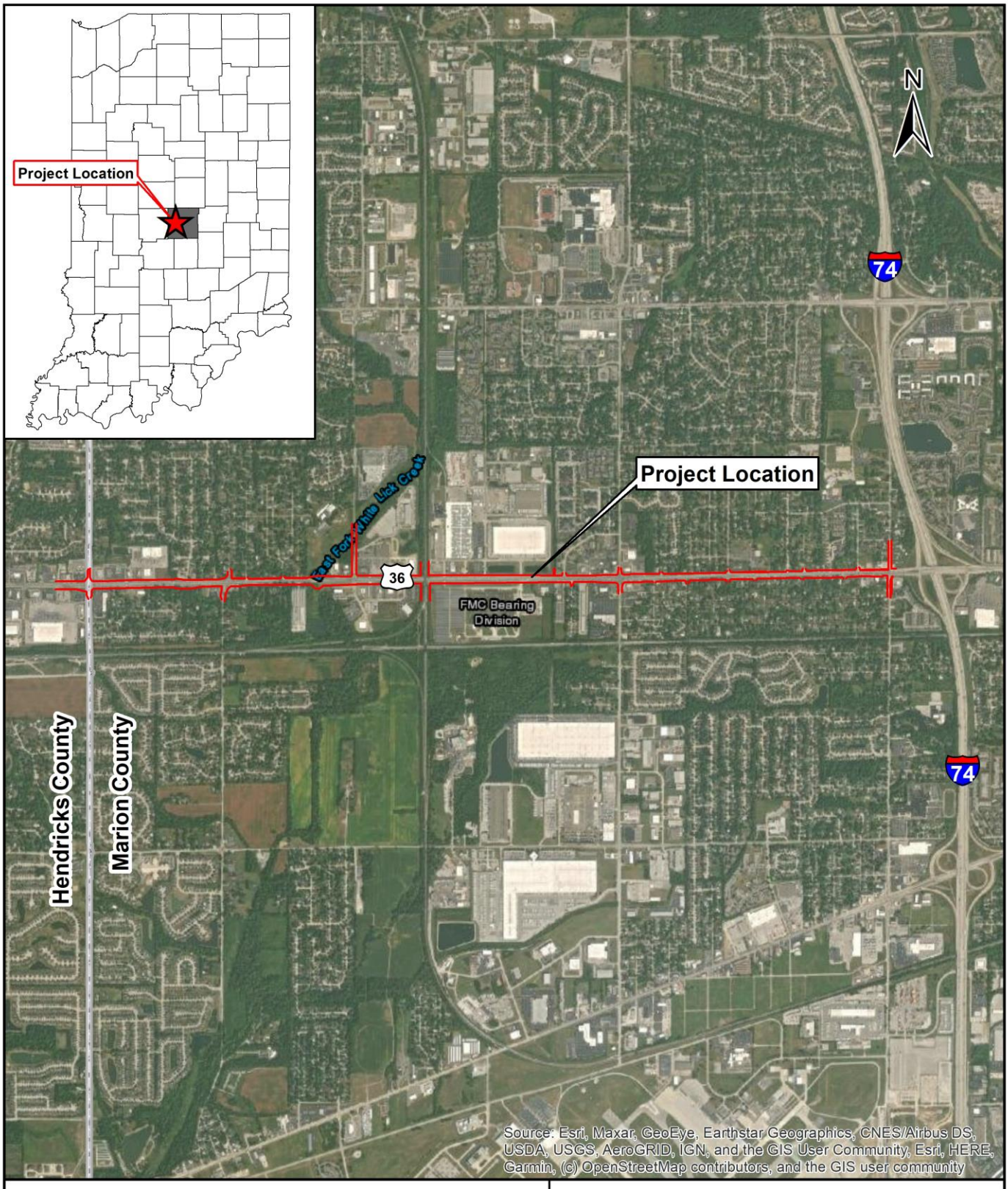
Federal Highway Program Manual, Volume 7, Section 3, August 9, 1982.

FHWA *Highway Traffic Noise Analysis and Abatement Guidance,* August 2010.

FHWA *Noise Measurement Handbook – Final Report,* June 1, 2018.

Indiana Department of *Transportation Traffic Noise Analysis Procedure,* Effective 7/1/17.

Lee, Cynthia S.Y., Gregg G. Fleming. "Measurement of Highway-Related Noise", U.S. Department of Transportation Federal Highway Administration Office of Environment and Planning, May, 1996.



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Project Location

Project Location Map

US 36, Rockville Road
Marion County, Indiana

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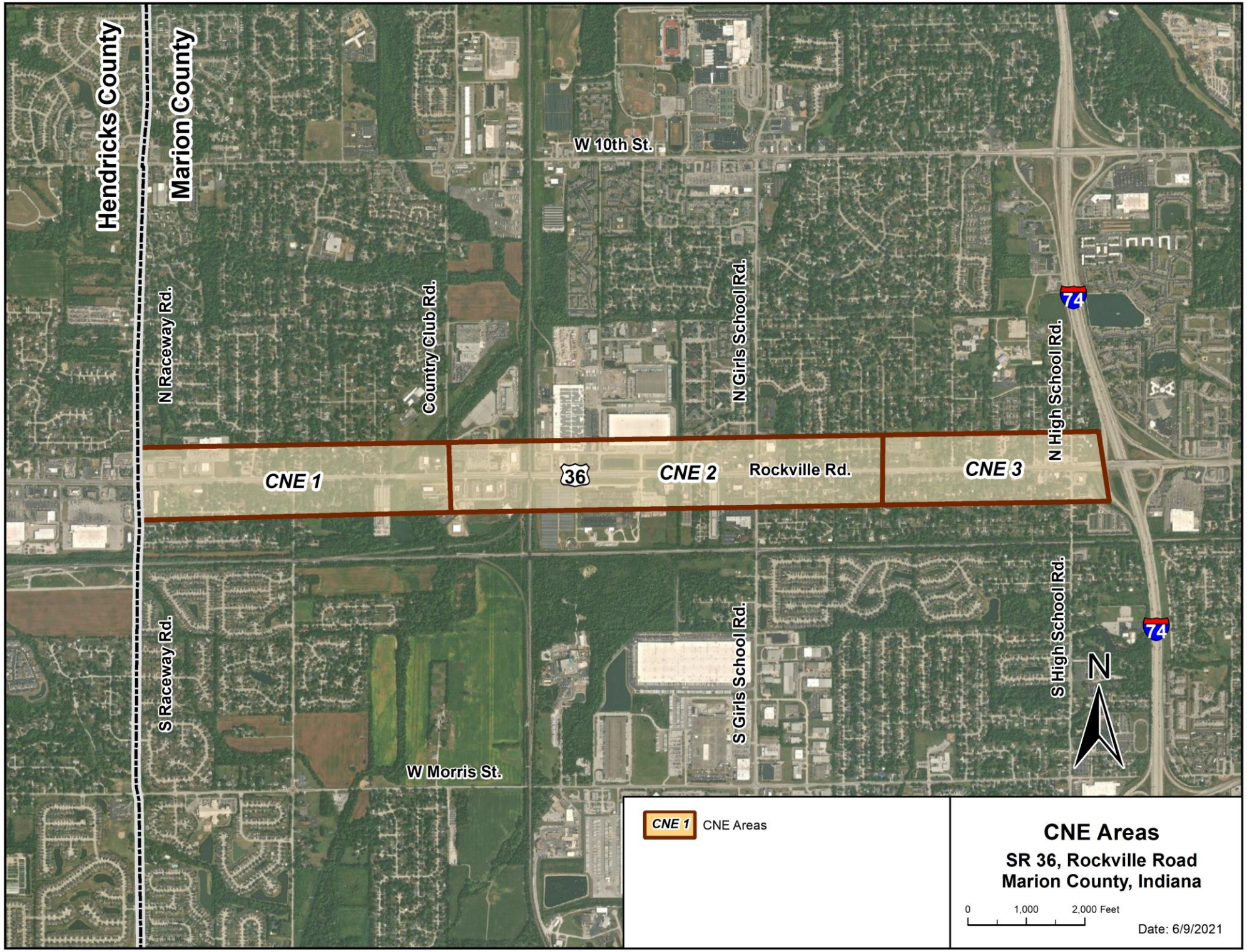
Date: 6/9/2021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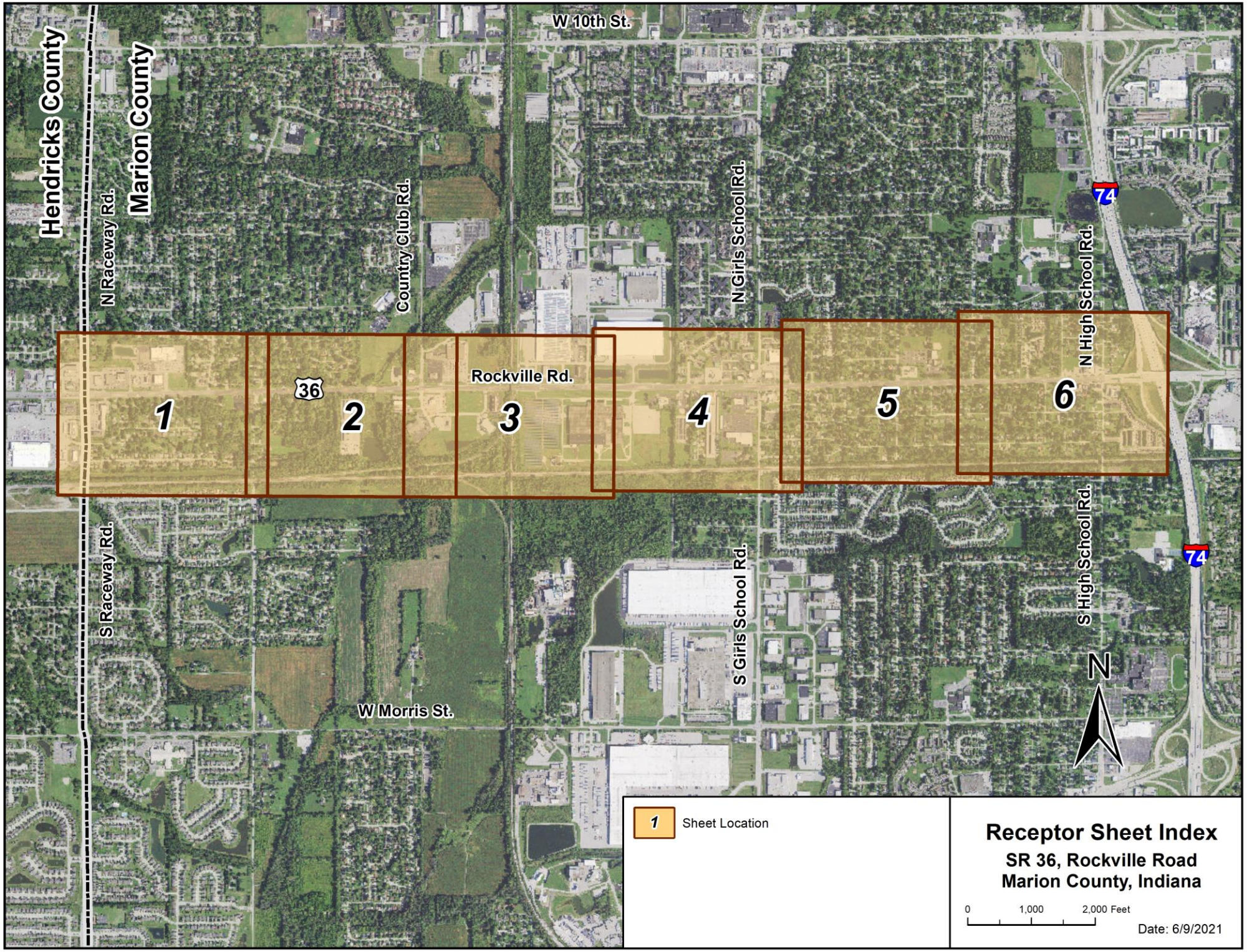
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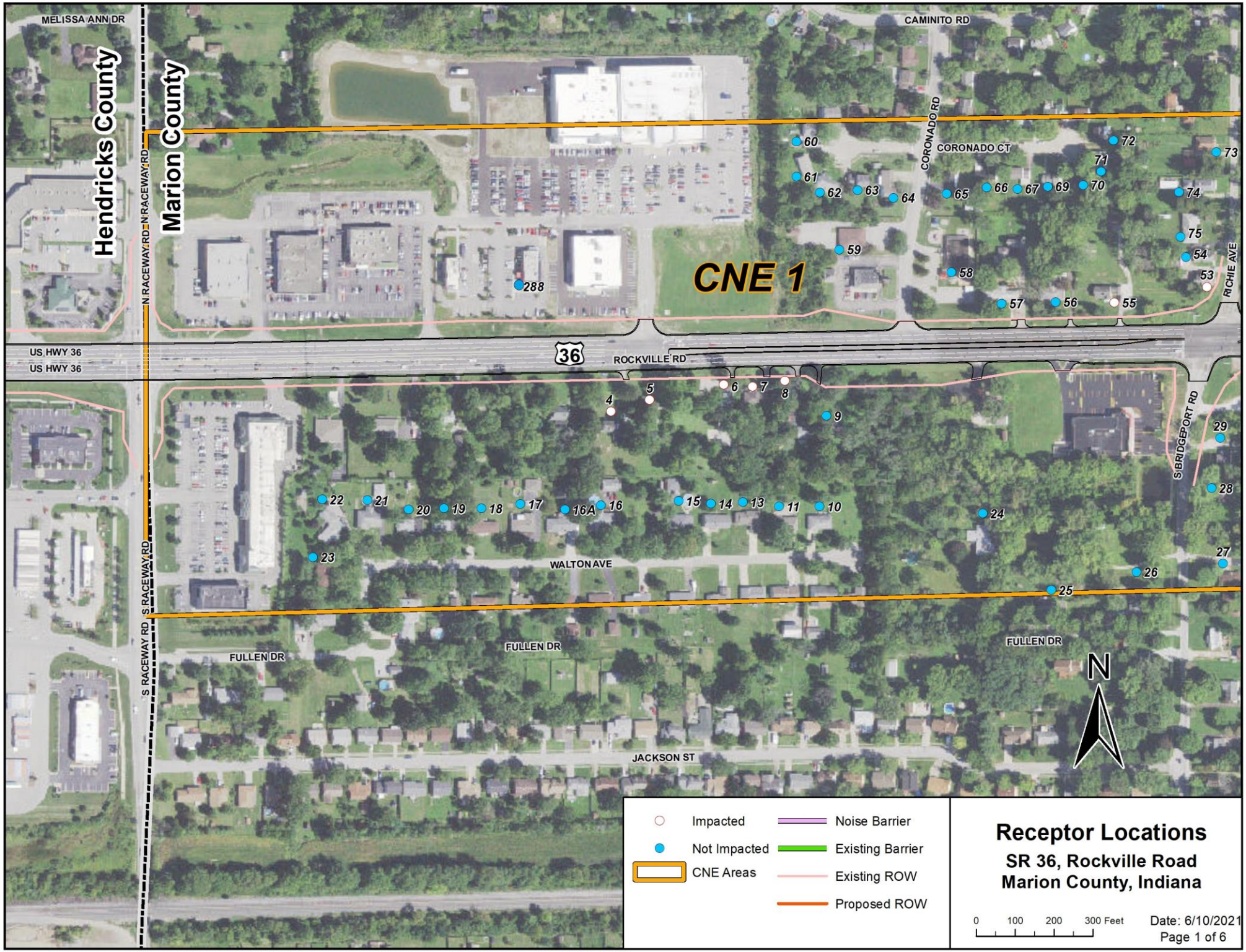
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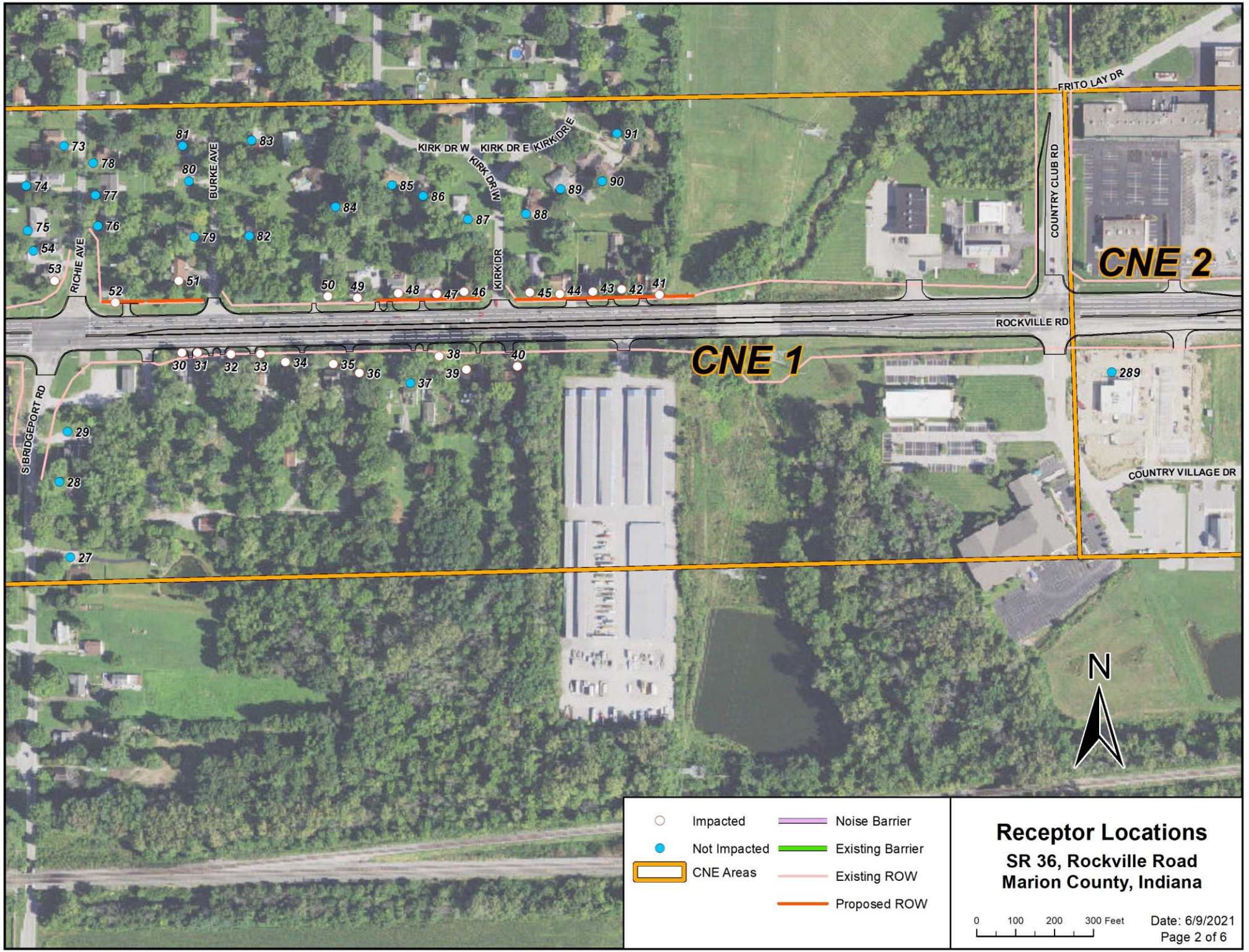
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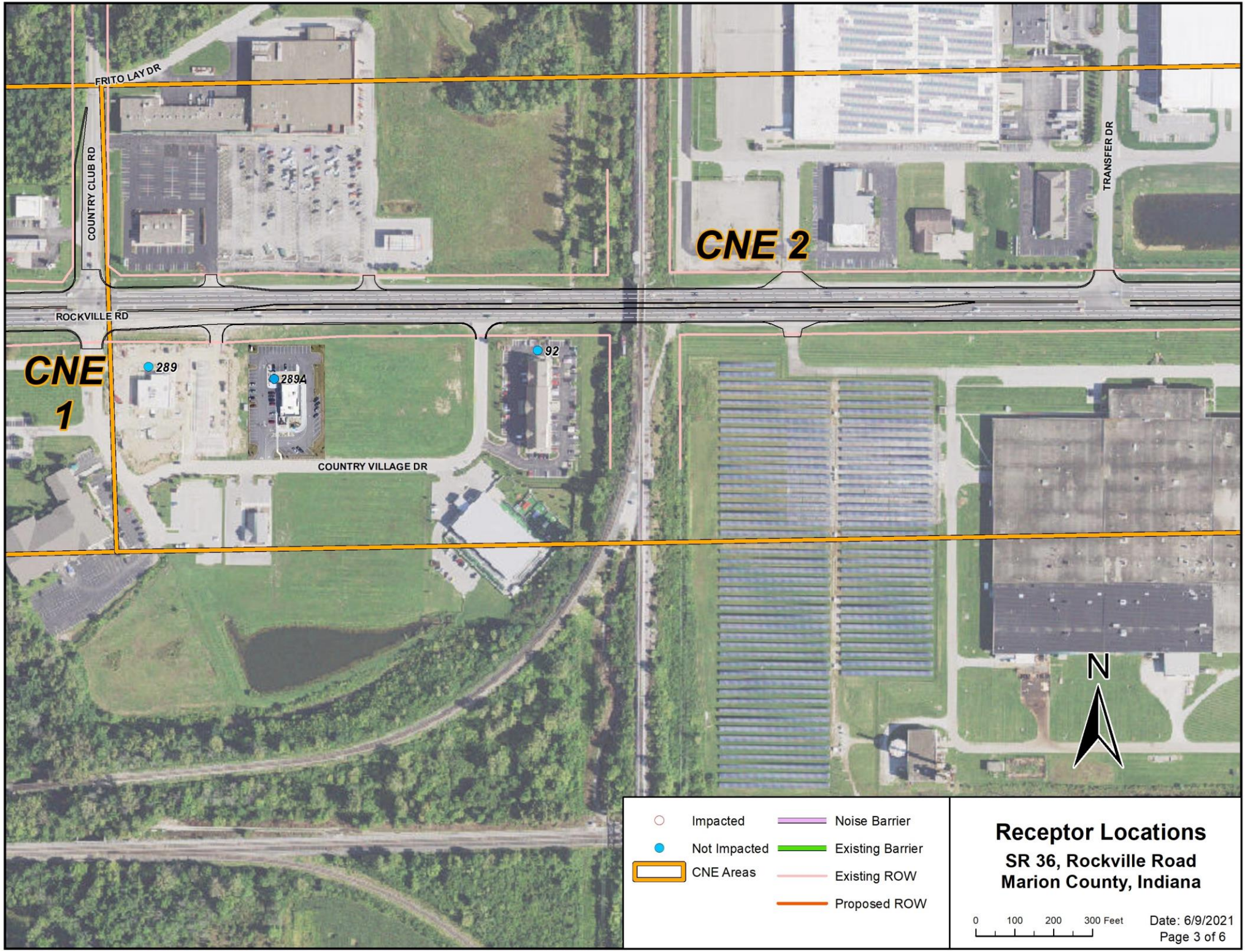
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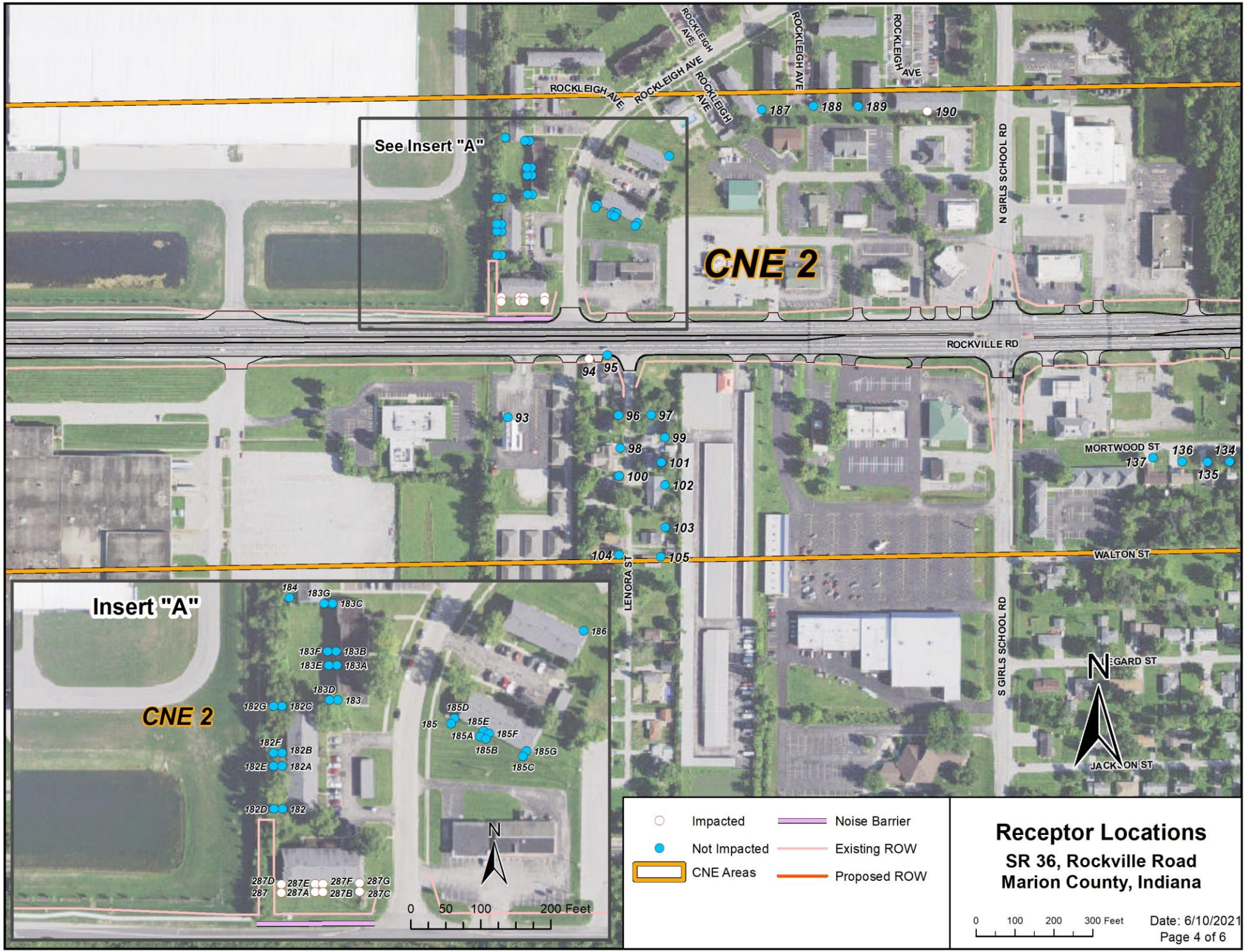
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Date: 6/10/2021
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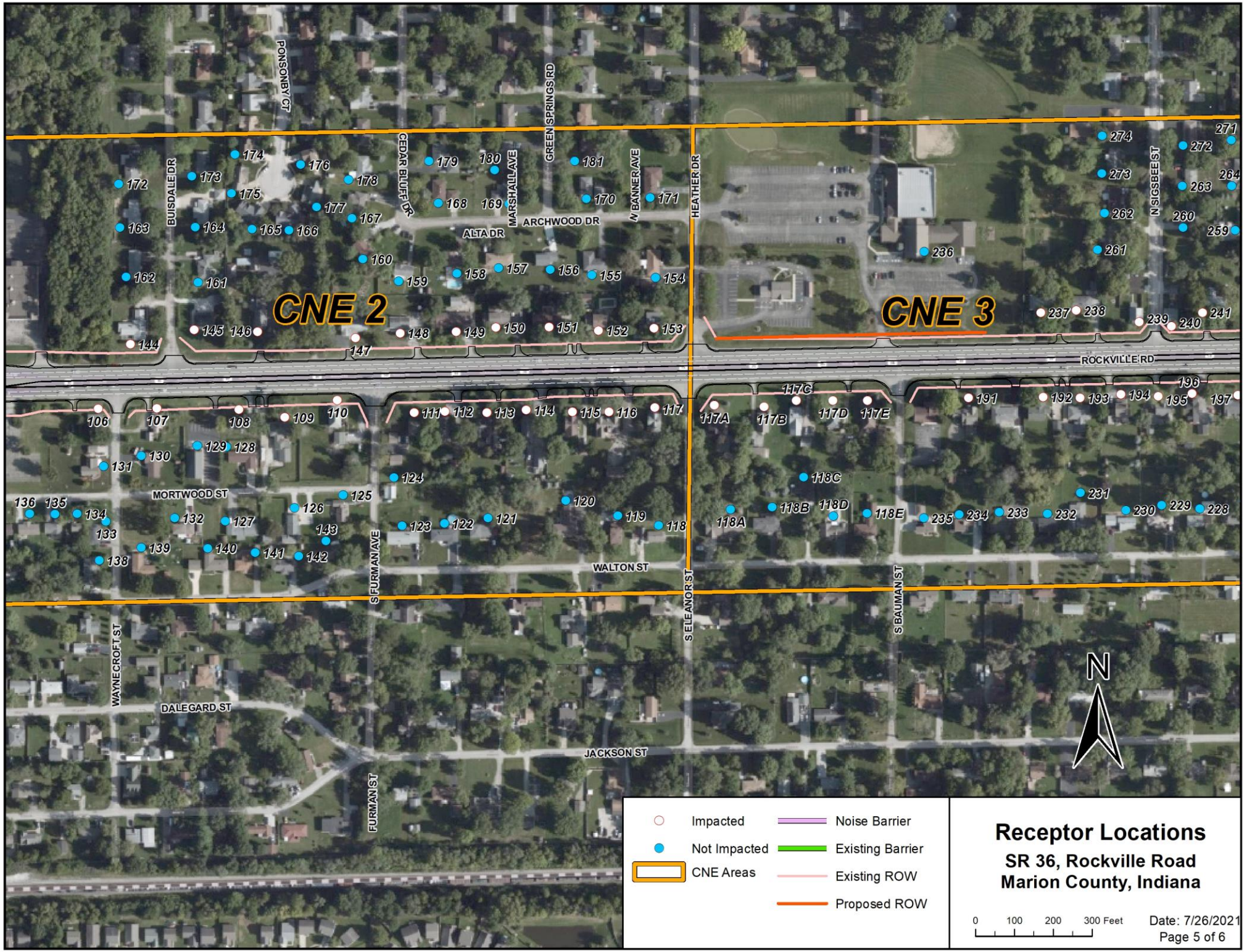
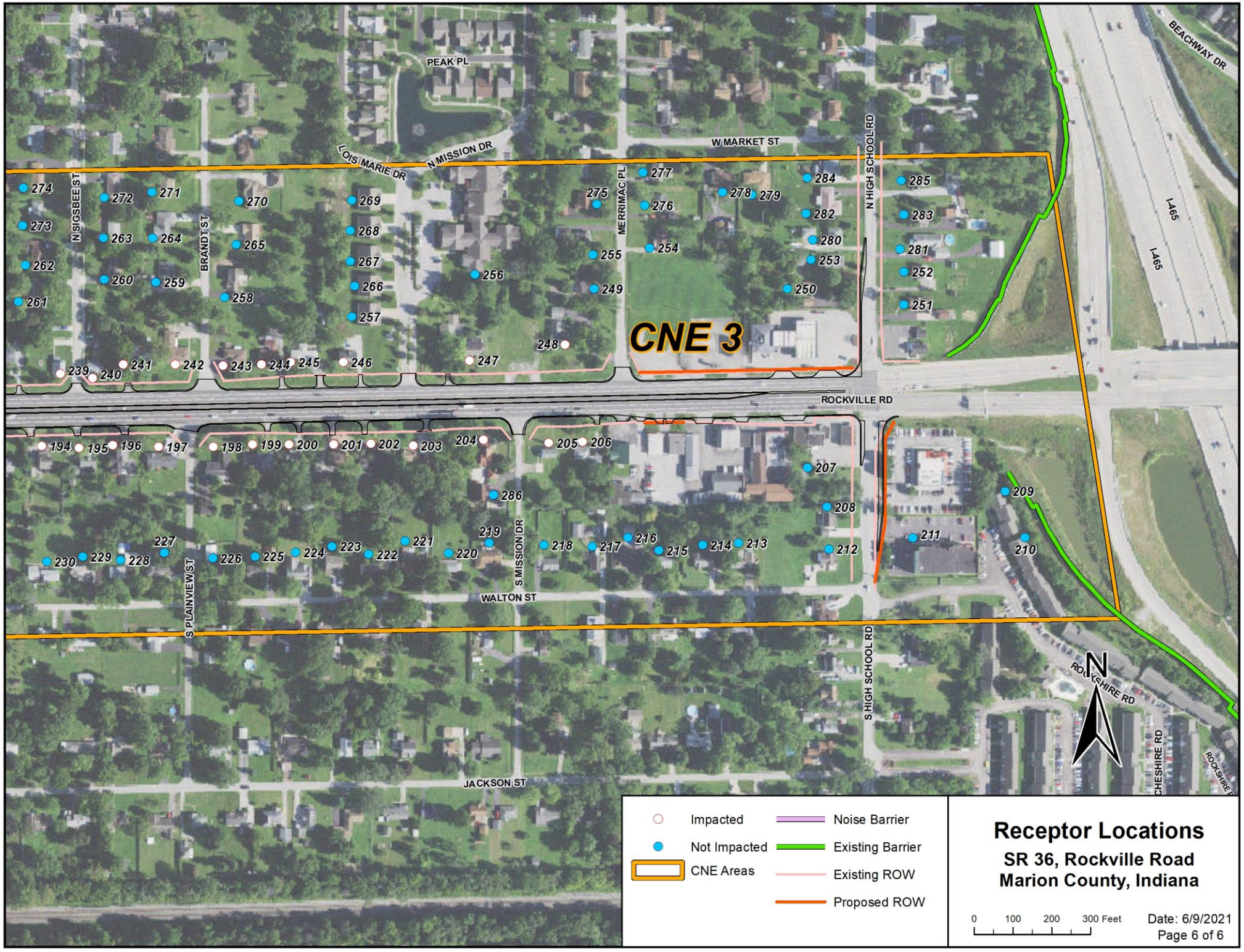

CNE 2
CNE 3
PONSONBY CT
BUISDALE DR
CEDAR BLUFF DR
GREEN SPRINGS RD
MARSHALL AVE
N BANNER AVE
HEATHER DR
N SIGSBEE ST
ARCHWOOD DR
ALTA DR
ROCKVILLE RD
MORTWOOD ST
WALTON ST
S FURMAN AVE
S ELEANOR ST
S BAUMAN ST
WAYNECROFT ST
DALEGARD ST
JACKSON ST
FURMAN ST
N
Impacted
Not Impacted
CNE Areas
Noise Barrier
Existing Barrier
Existing ROW
Proposed ROW
Receptor Locations
SR 36, Rockville Road
Marion County, Indiana
0 100 200 300 Feet
Date: 7/26/2021
Page 5 of 6



Receptor Locations

SR 36, Rockville Road
Marion County, Indiana

Date: 6/9/2021
Page 6 of 6

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.44810

Instrument: **Sound Level Meter**
Model: **132**
Manufacturer: **Norsonic**
Serial number: **1322870**
Tested with: **Microphone 1229 s/n 00529**
Preamplifier n/a
Type (class): **2**
Customer: **Michael Baker International**
Tel/Fax: **412-269-4644 / 412-375-3988**

Date Calibrated: **5/20/2020** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No
Calibration service: __ Basic _X_ Standard
Address: **Airside Business Park, 100 Airside Drive, Moon Township, PA 15108**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 31, 2019	Scantek, Inc./ NVLAP	Oct 31, 2020
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Oct 22, 2019	ACR Env. / A2LA	Oct 22, 2020
HM30-Thommen	Meteo Station	1040170/39633	Oct 24, 2019	ACR Env./ A2LA	Oct 24, 2020
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Oct 23, 2019	Scantek, Inc./ NVLAP	Oct 23, 2020
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 25, 2019	B&K / DANAK	Sep 25, 2020

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.7	101.10	36.9

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D Gallagher
Date	5/20/2020	Date	5/21/20

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.44811

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **5/20/2020** *Cal Due:*			
Model:	**407744**	*Status:*	**Received**	**Sent**
Manufacturer:	**Extech**	*In tolerance:*	X	X
Serial number:	**Z206457**	*Out of tolerance:*		
Class (IEC 60942):	**2**	*See comments:*		
Barometer type:		*Contains non-accredited tests:* __Yes _X_ No		
Barometer s/n:				
Customer:	**Michael Baker International**	*Address:*	**Airside Business Park, 100 Airside Drive, Moon Township, PA 15108**	
Tel/Fax:	**412-269-4644 / 412-375-3988**			

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
4838-Norsonic	SME Cal Unit	31052	Oct 31, 2019	Scantek, Inc./ NVLAP	Oct 31, 2020
DS-360-SRS	Function Generator	33584	Oct 23, 2019	ACR Env./ A2LA	Oct 23, 2021
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Oct 22, 2019	ACR Env. / A2LA	Oct 22, 2020
HM30-Thommen	Meteo Station	1040170/39633	Oct 24, 2019	ACR Env./ A2LA	Oct 24, 2020
140-Norsonic	Real Time Analyzer	1406423	Oct 31, 2019	Scantek / NVLAP	Oct 31, 2020
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Oct 23, 2019	Scantek, Inc. / NVLAP	Oct 23, 2020
1203-Norsonic	Preamplifier	14059	March 3, 2020	Scantek, Inc./ NVLAP	March 3, 2021

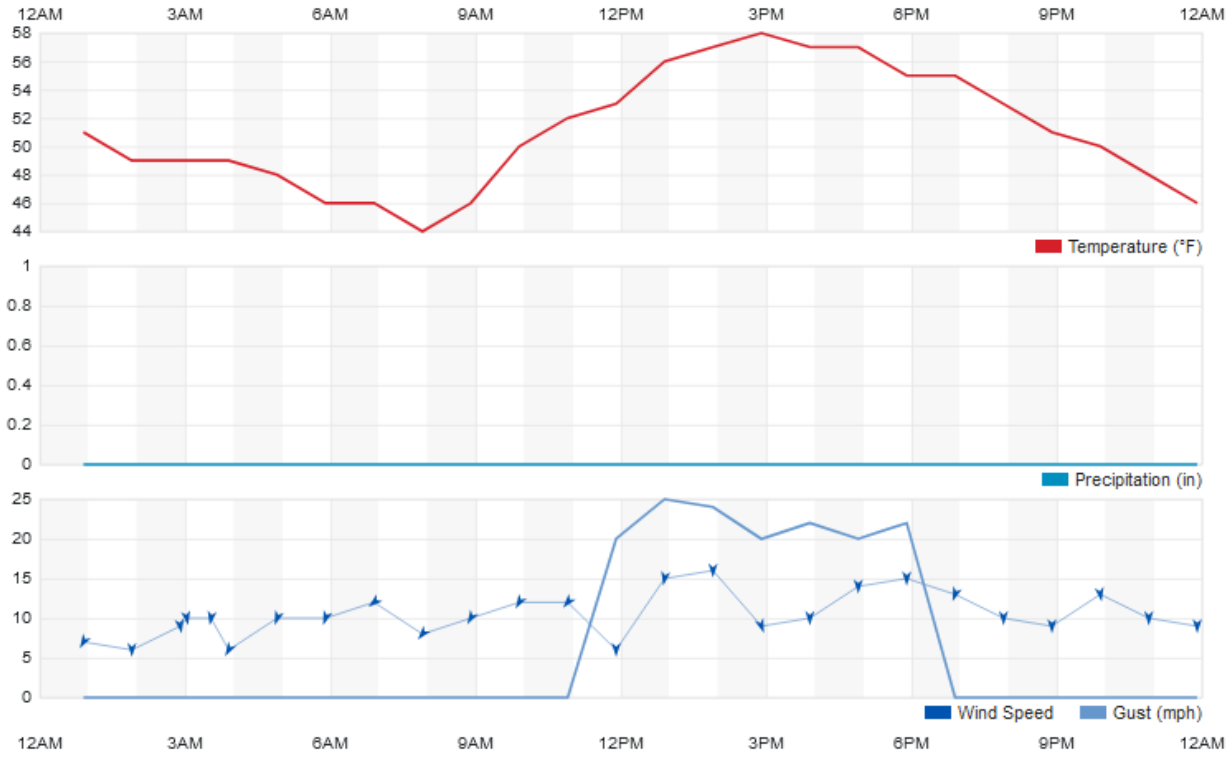
Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D Gallagher
Date	5/20/2020	Date	5/21/2020

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.
Document stored as: Y:\Calibration Lab\Cal 2020\Ex407744_Z206457_M1.doc

Summary

Temperature (° F)	Actual	Historic Avg.	Record
High Temp	58	71	89
Low Temp	44	51	31
Day Average Temp	50.92	61	-
Precipitation (Inches)	**Actual**	**Historic Avg.**	**Record**
Precipitation (past 24 hours from 04:54:00)	0.00	0.17	-
Dew Point (° F)	**Actual**	**Historic Avg.**	**Record**
Dew Point	35.46	-	-
High	45	-	-
Low	30	-	-
Average	35.46	-	-
Wind (MPH)	**Actual**	**Historic Avg.**	**Record**
Max Wind Speed	16	-	-



Source: Weather Underground. Indianapolis International Airport Station
https://www.wunderground.com/history/daily/us/in/indianapolis/KIND/date/2021-5-11

EQUIPMENT:	METER	Norsonics 132		CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	94.3	dB	END		dB			
RESPONSE:	FAST		SLOW	X	A-WEIGHTING	X	BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 12 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	818	539
MED TRKS	16	4
HVY TRKS	10	1
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	1
START:	16:25
END:	16:45
LEQ:	71.6
SPEED:	45mph

SITE SKETCH

N

Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	0.18 mile west Construction site, Lawn Mower across the street Starts 4:27 Mins
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	Sirens from 7:37-9:29. Firetruck passes at 9:16. Airplane flew over at 11:50 Min,
OTHER NOTES	Planned Site one exhibited a large amount of construction noise, Therefore site 1 was moved east.

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 17:2:24.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 17:02:24.000)		64.1
1	(2021-05-11 17:03:24.000)		60
2	(2021-05-11 17:04:24.000)		65.6
3	(2021-05-11 17:05:24.000)		60.9
4	(2021-05-11 17:06:24.000)		66.3
5	(2021-05-11 17:07:24.000)		64.4
6	(2021-05-11 17:08:24.000)		68
7	(2021-05-11 17:09:24.000)		64.8
8	(2021-05-11 17:10:24.000)		73.4
9	(2021-05-11 17:11:24.000)		83.4
10	(2021-05-11 17:12:24.000)		62.2
11	(2021-05-11 17:13:24.000)		64.5
12	(2021-05-11 17:14:24.000)		67.2
13	(2021-05-11 17:15:24.000)		61.3
14	(2021-05-11 17:16:24.000)		66.1
15	(2021-05-11 17:17:24.000)		60.9
16	(2021-05-11 17:18:24.000)		66.5
17	(2021-05-11 17:19:24.000)		59.7
18	(2021-05-11 17:20:24.000)		65.5
19	(2021-05-11 17:21:24.000)		60.7

EQUIPMENT:	METER	Norsonics 132			CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	94.3	dB		END	94.3	dB			
RESPONSE:	FAST		SLOW	X	A-WEIGHTING	X		BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 11 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	735	553
MED TRKS	22	11
HVY TRKS	5	14
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	2
START:	15:51
END:	16:13
LEQ:	61.6
SPEED:	45

SITE SKETCH

N

Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Birds chirping
MAJOR SOURCES	Traffic from Kirk Drive and Rockville Road
UNUSUAL EVENTS	Train Whistle at 15:51, Honking around 13:54
OTHER NOTES	Pause in time at 5:57 for questions from homeowner

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 16:28:19.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
1	(2021-05-11 16:31:19.000)		58.7
2	(2021-05-11 16:32:19.000)		61.4
3	(2021-05-11 16:33:19.000)		64.5
4	(2021-05-11 16:34:19.000)		70.5
5	(2021-05-11 16:35:19.000)		74.2
6	(2021-05-11 16:36:19.000)		60.9
7	(2021-05-11 16:37:19.000)		59.2
8	(2021-05-11 16:38:19.000)		59.2
9	(2021-05-11 16:39:19.000)		57.4
10	(2021-05-11 16:40:19.000)		63.9
11	(2021-05-11 16:41:19.000)		65.6
12	(2021-05-11 16:42:19.000)		64.2
13	(2021-05-11 16:43:19.000)		61.1
14	(2021-05-11 16:44:19.000)		61.5
15	(2021-05-11 16:45:19.000)		60.1
16	(2021-05-11 16:46:19.000)		60.8
17	(2021-05-11 16:47:19.000)		58.5
18	(2021-05-11 16:48:19.000)		63.2
19	(2021-05-11 16:49:19.000)		61.1
20	(2021-05-11 16:50:19.000)		65.3

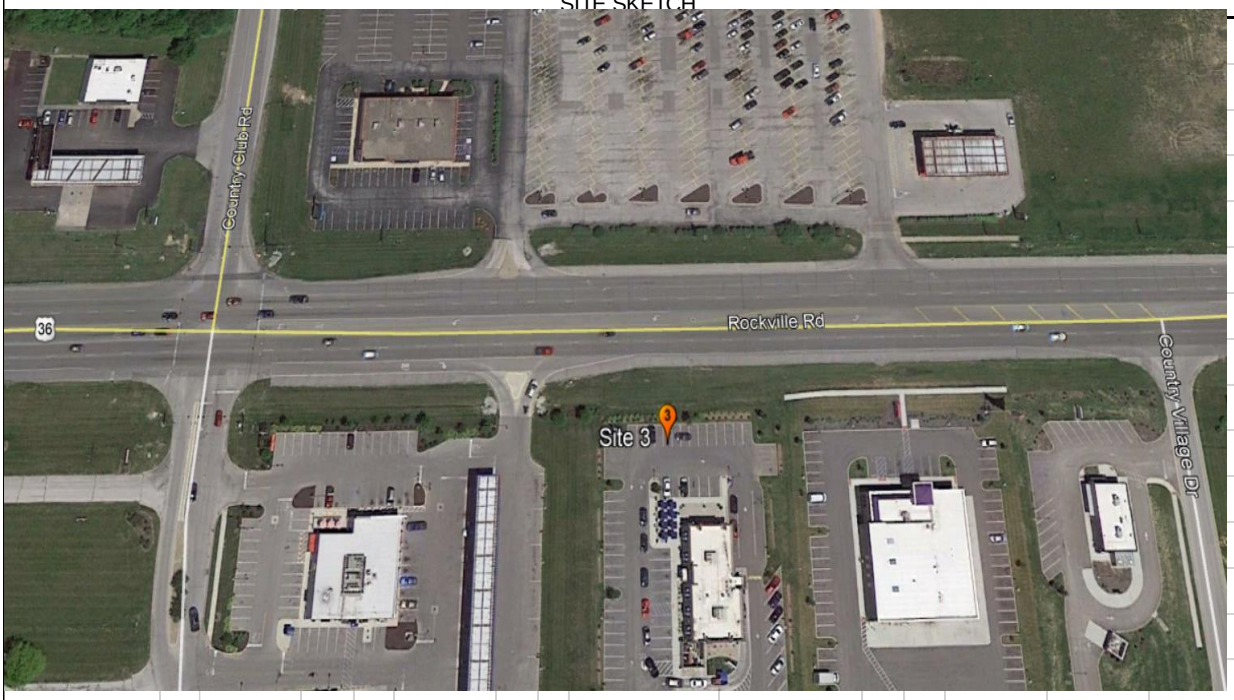
EQUIPMENT:	METER	Norsonics 132		CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	94.3	dB	END	94.3	dB			
RESPONSE:	FAST		SLOW X	A-WEIGHTING	X		BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Upper 50's , Approximately 11 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	855	563
MED TRKS	48	10
HVY TRKS	18	8
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	3
START:	15:20
END:	15:40
LEQ:	69.9
SPEED:	45

SITE SKETCH



N

Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Possible noise from Cars at Resturant
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 15:58:16.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 15:58:16.000)		69.2
1	(2021-05-11 15:59:16.000)		69.7
2	(2021-05-11 16:00:16.000)		67.5
3	(2021-05-11 16:01:16.000)		71.3
4	(2021-05-11 16:02:16.000)		68.2
5	(2021-05-11 16:03:16.000)		71.2
6	(2021-05-11 16:04:16.000)		67
7	(2021-05-11 16:05:16.000)		71.1
8	(2021-05-11 16:06:16.000)		67.4
9	(2021-05-11 16:07:16.000)		72.5
10	(2021-05-11 16:08:16.000)		68.1
11	(2021-05-11 16:09:16.000)		68.6
12	(2021-05-11 16:10:16.000)		68.7
13	(2021-05-11 16:11:16.000)		71.9
14	(2021-05-11 16:12:16.000)		68.6
15	(2021-05-11 16:13:16.000)		70.8
16	(2021-05-11 16:14:16.000)		67.8
17	(2021-05-11 16:15:16.000)		72.3
18	(2021-05-11 16:16:16.000)		67.1
19	(2021-05-11 16:17:16.000)		71.8

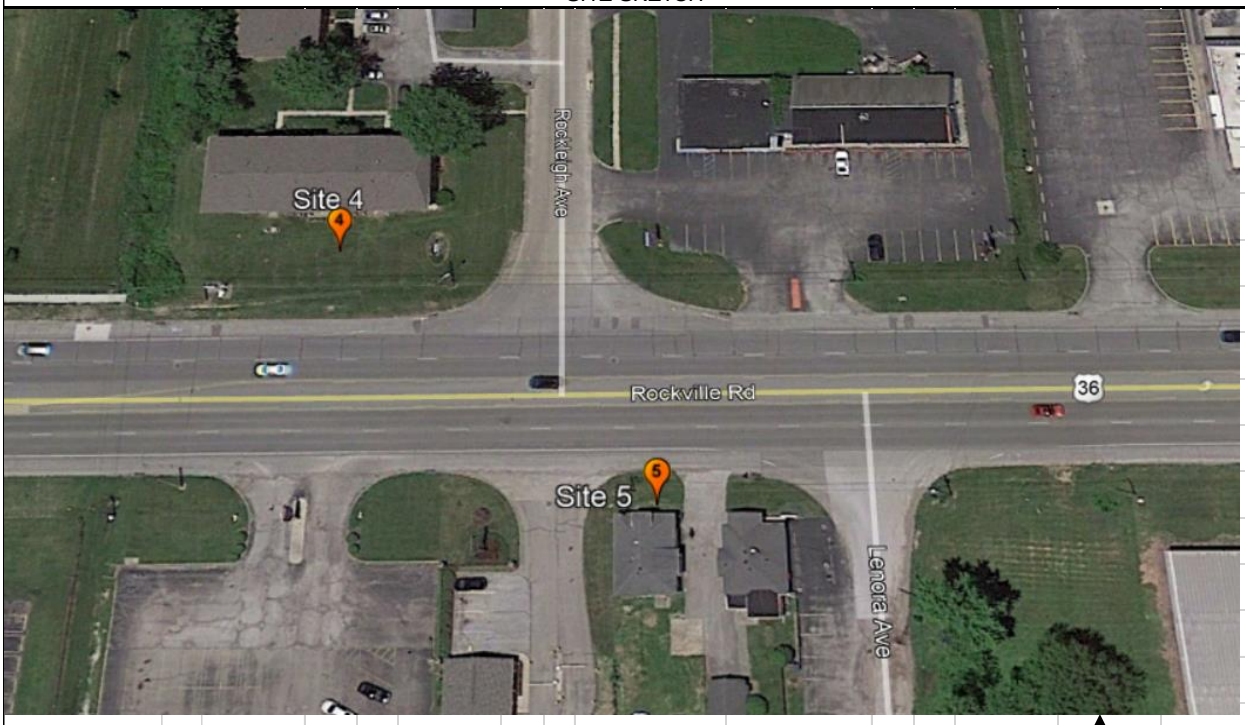
EQUIPMENT:	METER	Norsonics 132			CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL	
CALIBRATION:	START	94.3	dB		END	94.3	dB		
RESPONSE:	FAST		SLOW	X	A-WEIGHTING	X	BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 12 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	860	471
MED TRKS	52	17
HVY TRKS	37	15
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	4
START:	14:48
END:	15:08
LEQ:	69.5
SPEED:	45

SITE SKETCH



Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	Bus stopped in front of monitor at 2 minutes

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 15:25:22.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 15:25:22.000)		72.9
1	(2021-05-11 15:26:22.000)		71.5
2	(2021-05-11 15:27:22.000)		67.8
3	(2021-05-11 15:28:22.000)		69.6
4	(2021-05-11 15:29:22.000)		66.8
5	(2021-05-11 15:30:22.000)		71.7
6	(2021-05-11 15:31:22.000)		67
7	(2021-05-11 15:32:22.000)		73.1
8	(2021-05-11 15:33:22.000)		67.2
9	(2021-05-11 15:34:22.000)		72.3
10	(2021-05-11 15:35:22.000)		68.4
11	(2021-05-11 15:36:22.000)		70.6
12	(2021-05-11 15:37:22.000)		64.7
13	(2021-05-11 15:38:22.000)		70.7
14	(2021-05-11 15:39:22.000)		66.8
15	(2021-05-11 15:40:22.000)		70.2
16	(2021-05-11 15:41:22.000)		66
17	(2021-05-11 15:42:22.000)		71
18	(2021-05-11 15:43:22.000)		66.9
19	(2021-05-11 15:44:22.000)		69

EQUIPMENT:	METER	Norsonics 132			CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL	
CALIBRATION:	START	94.3	dB		END	94.3	dB		
RESPONSE:	FAST		SLOW	X	A-WEIGHTING	X		BATTERY CHECK	X

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 11 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	649	460
MED TRKS	48	13
HVY TRKS	29	18
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	5
START:	14:17
END:	14:37
LEQ:	74.7
SPEED:	45

SITE SKETCH

N

Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Birds chirping
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	sirens at 19:37 minutes
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 14:54:20.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 14:54:20.000)		73.4
1	(2021-05-11 14:55:20.000)		74.5
2	(2021-05-11 14:56:20.000)		74.7
3	(2021-05-11 14:57:20.000)		75.5
4	(2021-05-11 14:58:20.000)		75.3
5	(2021-05-11 14:59:20.000)		75.6
6	(2021-05-11 15:00:20.000)		75.2
7	(2021-05-11 15:01:20.000)		74.5
8	(2021-05-11 15:02:20.000)		74
9	(2021-05-11 15:03:20.000)		74
10	(2021-05-11 15:04:20.000)		74.3
11	(2021-05-11 15:05:20.000)		75.6
12	(2021-05-11 15:06:20.000)		74.2
13	(2021-05-11 15:07:20.000)		74.6
14	(2021-05-11 15:08:20.000)		74.8
15	(2021-05-11 15:09:20.000)		75.4
16	(2021-05-11 15:10:20.000)		72.7
17	(2021-05-11 15:11:20.000)		74.9
18	(2021-05-11 15:12:20.000)		75.5
19	(2021-05-11 15:13:20.000)		74.8

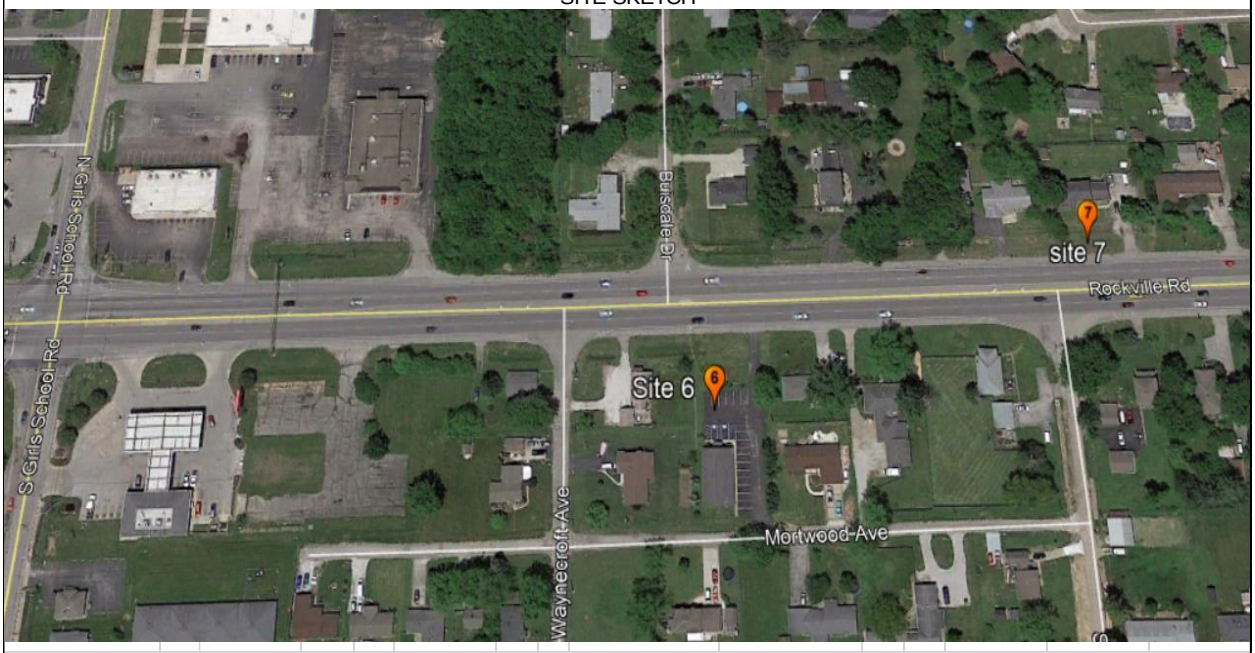
EQUIPMENT:	METER	Norsonics 132		CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	93.8	dB	END	93.8	dB			
RESPONSE:	FAST		SLOW X	A-WEIGHTING	X		BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 11 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	565	441
MED TRKS	83	21
HVY TRKS	18	20
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	6
START:	1:40
END:	2:00
LEQ:	66
SPEED:	45

SITE SKETCH



Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Birds chirping
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 14:17:18.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 14:17:18.000)		66.4
1	(2021-05-11 14:18:18.000)		65.5
2	(2021-05-11 14:19:18.000)		67
3	(2021-05-11 14:20:18.000)		64.6
4	(2021-05-11 14:21:18.000)		66.1
5	(2021-05-11 14:22:18.000)		64.9
6	(2021-05-11 14:23:18.000)		66.3
7	(2021-05-11 14:24:18.000)		62.6
8	(2021-05-11 14:25:18.000)		67.3
9	(2021-05-11 14:26:18.000)		63.4
10	(2021-05-11 14:27:18.000)		68.3
11	(2021-05-11 14:28:18.000)		64
12	(2021-05-11 14:29:18.000)		66
13	(2021-05-11 14:30:18.000)		65.3
14	(2021-05-11 14:31:18.000)		67.4
15	(2021-05-11 14:32:18.000)		62.3
16	(2021-05-11 14:33:18.000)		68.1
17	(2021-05-11 14:34:18.000)		66.2
18	(2021-05-11 14:35:18.000)		67.6
19	(2021-05-11 14:36:18.000)		65.5

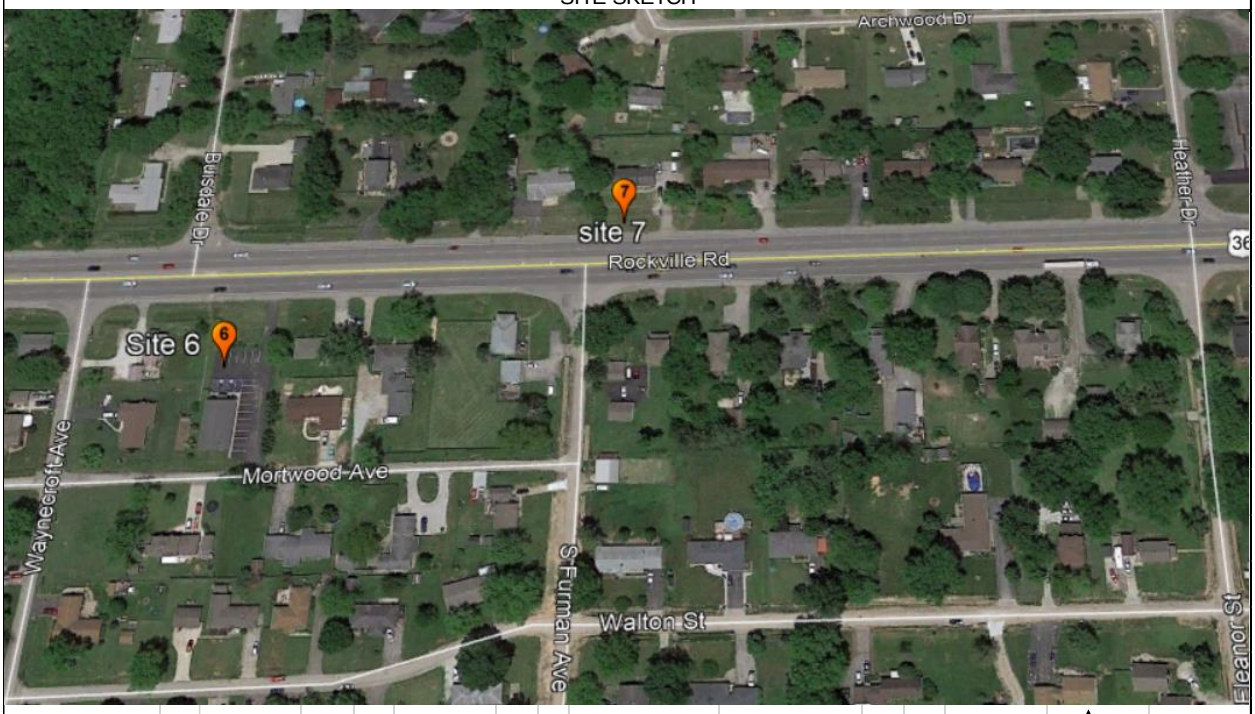
EQUIPMENT:	METER	Norsonics 132		CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	94.7	dB	END	94.7	dB			
RESPONSE:	FAST		SLOW X	A-WEIGHTING	X		BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 12 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	554	408
MED TRKS	54	19
HVY TRKS	38	23
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	7
START:	11:47
END:	12:07
LEQ:	68.2
SPEED:	45

SITE SKETCH



Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Birds Chirping
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 12:24:18.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 12:24:18.000)		66.4
1	(2021-05-11 12:25:18.000)		74.3
2	(2021-05-11 12:26:18.000)		68.7
3	(2021-05-11 12:27:18.000)		70
4	(2021-05-11 12:28:18.000)		70.1
5	(2021-05-11 12:29:18.000)		69
6	(2021-05-11 12:30:18.000)		70
7	(2021-05-11 12:31:18.000)		71.4
8	(2021-05-11 12:32:18.000)		70
9	(2021-05-11 12:33:18.000)		71.8
10	(2021-05-11 12:34:18.000)		67.9
11	(2021-05-11 12:35:18.000)		71.1
12	(2021-05-11 12:36:18.000)		70.5
13	(2021-05-11 12:37:18.000)		71.8
14	(2021-05-11 12:38:18.000)		70.1
15	(2021-05-11 12:39:18.000)		67.3
16	(2021-05-11 12:40:18.000)		69.5
17	(2021-05-11 12:41:18.000)		69.3
18	(2021-05-11 12:42:18.000)		67.9
19	(2021-05-11 12:43:18.000)		77.8

EQUIPMENT:	METER	Norsonics 132			CALIBRATOR	EXTECH 407744			
CALIBRATION:	START	94.0	dB		END	94..0	dB		
RESPONSE:	FAST		SLOW	X	A-WEIGHTING	X		BATTERY CHECK	X

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 11 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	448	344
MED TRKS	47	15
HVY TRKS	26	26
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	8
START:	11:08
END:	11:28
LEQ:	67.3
SPEED:	45

SITE SKETCH

Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 11:40:23.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 11:45:23.000)		65.5
1	(2021-05-11 11:46:23.000)		67.1
2	(2021-05-11 11:47:23.000)		66.6
3	(2021-05-11 11:48:23.000)		64.3
4	(2021-05-11 11:49:23.000)		68.3
5	(2021-05-11 11:50:23.000)		64.4
6	(2021-05-11 11:51:23.000)		70.7
7	(2021-05-11 11:52:23.000)		72.2
8	(2021-05-11 11:53:23.000)		63.9
9	(2021-05-11 11:54:23.000)		66
10	(2021-05-11 11:55:23.000)		65.8
11	(2021-05-11 11:56:23.000)		62.4
12	(2021-05-11 11:57:23.000)		66.4
13	(2021-05-11 11:58:23.000)		61.1
14	(2021-05-11 11:59:23.000)		66.2
15	(2021-05-11 12:00:23.000)		64.8
16	(2021-05-11 12:01:23.000)		65.1
17	(2021-05-11 12:02:23.000)		65.7
18	(2021-05-11 12:03:23.000)		62.6
19	(2021-05-11 12:04:23.000)		67.8

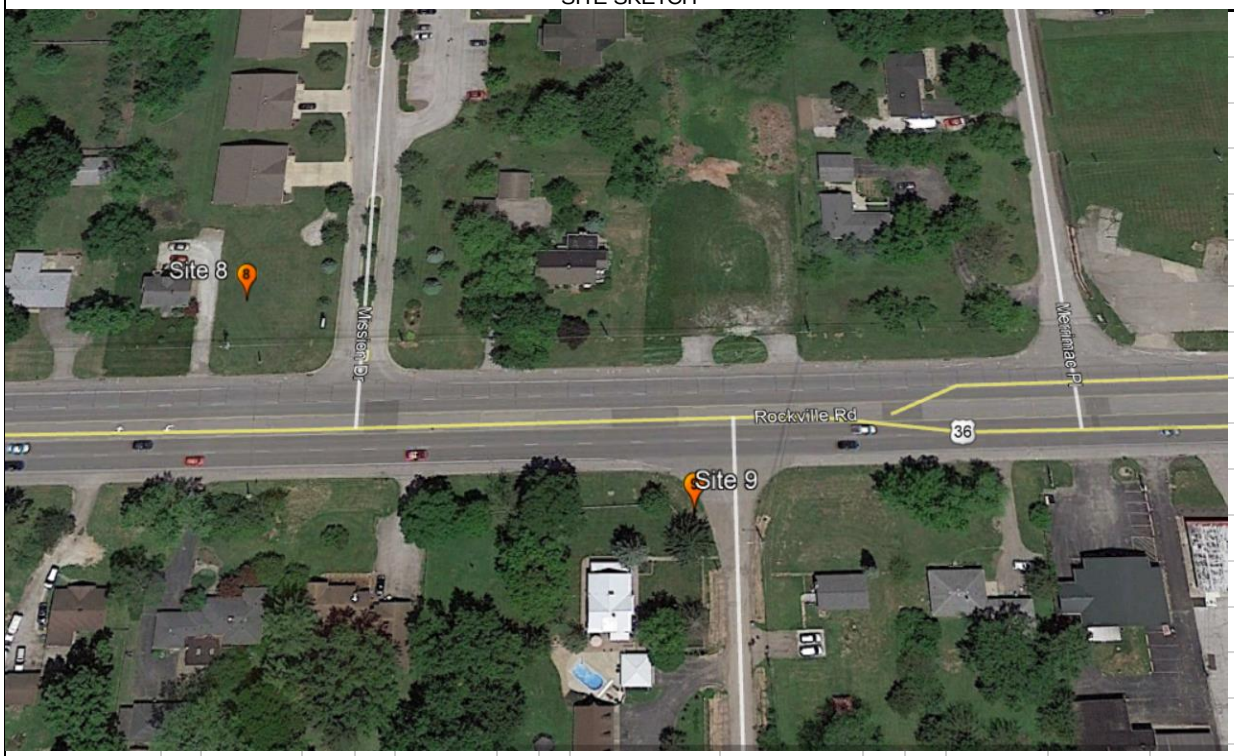
EQUIPMENT:	METER	Norsonics 132		CALIBRATOR	EXTECH 407744		Michael Baker INTERNATIONAL		
CALIBRATION:	START	94.0	dB	END	94.0	dB			
RESPONSE:	FAST		SLOW X	A-WEIGHTING	X		BATTERY CHECK	X	

WEATHER DATA: Partly Sunny, Mid 50's , Approximately 12 mph wind

TRAFFIC DATA		
ROAD	US 36 EB	US 36 WB
AUTOS	492	344
MED TRKS	64	25
HVY TRKS	30	25
DURATION	20 Minutes	20 Minutes

DATE:	5/11/2021
SITE #:	9
START:	10:25
END:	10:45
LEQ:	68.1
SPEED:	45

SITE SKETCH



Field Measurements and Field Data performed/collected by: Mary Pusti and Laura Jack

BACKGROUND NOISE	Birds chirping
MAJOR SOURCES	Rockville Road
UNUSUAL EVENTS	
OTHER NOTES	

Period length	(0:1:0.0)	H:M:S.mS	
Total number of periods	20		
Number of periods before trigger	0		
Number of periods after trigger	20		
Trig time	(2021/5/11 11:2:55.0)	Y-Mo-D H:M:S.mS	
Measurement effective duration	(0:20:0.0)	H:M:S.mS	
Period:	Time:		LAeq
0	(2021-05-11 11:02:55.000)		65.8
1	(2021-05-11 11:03:55.000)		68.3
2	(2021-05-11 11:04:55.000)		64.3
3	(2021-05-11 11:05:55.000)		67.1
4	(2021-05-11 11:06:55.000)		67.6
5	(2021-05-11 11:07:55.000)		68.8
6	(2021-05-11 11:08:55.000)		71
7	(2021-05-11 11:09:55.000)		71.3
8	(2021-05-11 11:10:55.000)		68.2
9	(2021-05-11 11:11:55.000)		66.9
10	(2021-05-11 11:12:55.000)		68.5
11	(2021-05-11 11:13:55.000)		68.9
12	(2021-05-11 11:14:55.000)		66.3
13	(2021-05-11 11:15:55.000)		68.5
14	(2021-05-11 11:16:55.000)		68.3
15	(2021-05-11 11:17:55.000)		70.3
16	(2021-05-11 11:18:55.000)		68.4
17	(2021-05-11 11:19:55.000)		67.3
18	(2021-05-11 11:20:55.000)		69.4
19	(2021-05-11 11:21:55.000)		68.1

Appendix D – Traffic Volumes

Scenario	Year	Peak Hour	Intersection	Approach	Lane Group	**Total Volumes**	Total Autos	Total Medium Trucks	Total Heavy Trucks	Posted Speeds
No-Build	2019	PM	Bridgeport/Richie Ave	EB	Approach	**1287**	1250	0	37	45
No-Build	2019	PM	Bridgeport/Richie Ave	WB	Approach	**1960**	1924	0	36	45
No-Build	2019	PM	Bridgeport/Richie Ave	NB	Approach	**323**	320	2	2	30
No-Build	2019	PM	Bridgeport/Richie Ave	SB	Approach	**46**	46	0	0	30
No-Build	2019	PM	Country Club Rd	EB	Approach	**1416**	1379	12	25	45
No-Build	2019	PM	Country Club Rd	WB	Approach	**1672**	1626	0	46	45
No-Build	2019	PM	Country Club Rd	NB	Approach	**97**	97	0	0	30
No-Build	2019	PM	Country Club Rd	SB	Approach	**613**	605	4	4	40
No-Build	2019	PM	Transfer Dr	EB	Approach	**1394**	1349	15	30	45
No-Build	2019	PM	Transfer Dr	WB	Approach	**1788**	1744	11	33	45
No-Build	2019	PM	Transfer Dr	SB	Approach	**203**	194	4	4	30
No-Build	2019	PM	Girls School Rd	EB	Approach	**1524**	1470	0	54	45
No-Build	2019	PM	Girls School Rd	WB	Approach	**1655**	1598	0	57	45
No-Build	2019	PM	Girls School Rd	NB	Approach	**525**	512	0	13	40
No-Build	2019	PM	Girls School Rd	SB	Approach	**518**	499	9	9	40
No-Build	2019	PM	High School Rd	EB	Approach	**1520**	1476	0	44	45
No-Build	2019	PM	High School Rd	WB	Approach	**1997**	1945	0	52	45
No-Build	2019	PM	High School Rd	NB	Approach	**619**	613	3	3	35
No-Build	2019	PM	High School Rd	SB	Approach	**283**	279	0	4	35

Source: Traffic Volume Report-Design 1800035, US 36 Rockville Road, The Corradino Group , 2021.

Scenario	Year	Peak Hour	Intersection	Approach	Lane Group	**Total Volumes**	Total Autos	Total Medium Trucks	Total Heavy Trucks	Posted Speeds
No-Build/Build	2045	PM	Bridgeport/Richie Ave	EB	Approach	**1464**	1421	0	43	45
No-Build/Build	2045	PM	Bridgeport/Richie Ave	WB	Approach	**2229**	2188	0	41	45
No-Build/Build	2045	PM	Bridgeport/Richie Ave	NB	Approach	**368**	364	2	2	30
No-Build/Build	2045	PM	Bridgeport/Richie Ave	SB	Approach	**53**	53	0	0	30
No-Build/Build	2045	PM	Country Club Rd	EB	Approach	**1624**	1582	14	28	45
No-Build/Build	2045	PM	Country Club Rd	WB	Approach	**1918**	1865	0	53	45
No-Build/Build	2045	PM	Country Club Rd	NB	Approach	**112**	112	0	0	30
No-Build/Build	2045	PM	Country Club Rd	SB	Approach	**703**	694	5	5	40
No-Build/Build	2045	PM	Transfer Dr	EB	Approach	**1640**	1587	18	35	45
No-Build/Build	2045	PM	Transfer Dr	WB	Approach	**2103**	2051	13	39	45
No-Build/Build	2045	PM	Transfer Dr	SB	Approach	**239**	229	5	5	30
No-Build/Build	2045	PM	Girls School Rd	EB	Approach	**1777**	1714	0	63	45
No-Build/Build	2045	PM	Girls School Rd	WB	Approach	**1930**	1864	0	66	45
No-Build/Build	2045	PM	Girls School Rd	NB	Approach	**612**	596	0	16	40
No-Build/Build	2045	PM	Girls School Rd	SB	Approach	**604**	582	11	11	40
No-Build/Build	2045	PM	High School Rd	EB	Approach	**1610**	1563	0	47	45
No-Build/Build	2045	PM	High School Rd	WB	Approach	**2117**	2062	0	55	45
No-Build/Build	2045	PM	High School Rd	NB	Approach	**655**	648	3	3	35
No-Build/Build	2045	PM	High School Rd	SB	Approach	**299**	295	0	4	35

Source: Traffic Volume Report-Design 1800035, US 36 Rockville Road, The Corradino Group , 2021.

Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
3	Residential	CNE1	B	1	66	66.6	67.2	0.6	67.5	0.9
4	Residential	CNE1	B	1	66	64.6	65.2	0.6	65.7	1.1
5	Residential	CNE1	B	1	66	66.4	67.0	0.6	67.3	0.9
6	Residential	CNE1	B	1	66	68.7	69.3	0.6	69.6	0.9
7	Residential	CNE1	B	1	66	68.3	68.8	0.5	69.1	0.8
8	Residential	CNE1	B	1	66	69.1	69.7	0.6	70.0	0.9
9	Residential	CNE1	B	1	66	63.8	64.4	0.6	64.1	0.3
10	Residential	CNE1	B	1	66	55.2	55.7	0.5	56.3	1.1
11	Residential	CNE1	B	1	66	54.7	55.3	0.6	56.0	1.3
13	Residential	CNE1	B	1	66	54.8	55.4	0.6	56.1	1.3
14	Residential	CNE1	B	1	66	54.6	55.1	0.5	56.0	1.4
15	Residential	CNE1	B	1	66	54.3	54.9	0.6	55.8	1.5
16	Residential	CNE1	B	1	66	54.1	54.6	0.5	55.4	1.3
16A	Residential	CNE1	B	1	66	54.2	54.7	0.5	55.4	1.2
17	Residential	CNE1	B	1	66	54.9	55.5	0.6	56.1	1.2
18	Residential	CNE1	B	1	66	54.9	55.4	0.5	55.8	0.9
19	Residential	CNE1	B	1	66	54.7	55.2	0.5	55.7	1.0
20	Residential	CNE1	B	1	66	54.1	54.7	0.6	55.2	1.1
21	Residential	CNE1	B	1	66	54.1	54.6	0.5	55.1	1.0
22	Residential	CNE1	B	1	66	53.5	54.0	0.5	54.7	1.2
23	Residential	CNE1	B	1	66	48.5	49.0	0.5	49.6	1.1
24	Residential	CNE1	B	1	66	55.7	56.3	0.6	56.7	1.0
25	Residential	CNE1	B	1	66	51.5	52.0	0.5	52.5	1.0
26	Residential	CNE1	B	1	66	55.5	56.1	0.6	56.3	0.8
27	Residential	CNE1	B	1	66	55.8	56.3	0.5	56.6	0.8
28	Residential	CNE1	B	1	66	60.0	60.5	0.5	60.5	0.5
29	Residential	CNE1	B	1	66	62.1	62.6	0.5	62.7	0.6
30	Residential	CNE1	B	1	66	71.6	72.2	0.6	73.0	1.4
31	Residential	CNE1	B	1	66	71.5	72.1	0.6	72.8	1.3
32	Residential	CNE1	B	1	66	70.8	71.4	0.6	72.0	1.2
33	Residential	CNE1	B	1	66	70.8	71.4	0.6	72.0	1.2
34	Residential	CNE1	B	1	66	68.5	69.0	0.5	69.5	1.0
35	Residential	CNE1	B	1	66	68.0	68.6	0.6	69.1	1.1
36	Residential	CNE1	B	1	66	66.4	67.0	0.6	67.2	0.8
37	Residential	CNE1	B	1	66	63.9	64.4	0.5	64.2	0.3
38	Residential	CNE1	B	1	66	69.1	69.7	0.6	70.4	1.3
39	Residential	CNE1	B	1	66	66.3	66.9	0.6	66.6	0.3
40	Residential	CNE1	B	1	66	67.2	67.7	0.5	67.9	0.7
41	Residential	CNE1	B	1	66	71.4	71.9	0.5	71.9	0.5
42	Residential	CNE1	B	1	66	69.8	70.4	0.6	70.4	0.6
43	Residential	CNE1	B	1	66	70.3	70.8	0.5	70.9	0.6
44	Residential	CNE1	B	1	66	70.7	71.3	0.6	71.3	0.6
45	Residential	CNE1	B	1	66	70.1	70.7	0.6	70.7	0.6
46	Residential	CNE1	B	1	66	69.2	69.8	0.6	69.7	0.5
47	Residential	CNE1	B	1	66	69.7	70.3	0.6	70.4	0.7
48	Residential	CNE1	B	1	66	69.4	69.9	0.5	70.0	0.6
49	Residential	CNE1	B	1	66	70.3	70.9	0.6	71.0	0.7
50	Residential	CNE1	B	1	66	69.7	70.3	0.6	70.4	0.7
51	Residential	CNE1	B	3	66	65.8	66.4	0.6	66.4	0.6
52	Residential	CNE1	B	1	66	70.7	71.3	0.6	71.2	0.5
53	Residential	CNE1	B	1	66	66.5	67.1	0.6	66.7	0.2
54	Residential	CNE1	B	1	66	60.5	61.1	0.6	60.6	0.1
55	Residential	CNE1	B	1	66	68.5	69.0	0.5	68.9	0.4
56	Residential	CNE1	B	1	66	59.4	59.9	0.5	60.0	0.6
57	Residential	CNE1	B	1	66	60.2	60.7	0.5	61.1	0.9
58	Day Care (Exterior)	CNE1	C	---	66	61.0	61.6	0.6	61.3	0.3
59	Day Care (Interior)	CNE1	D	---	51	34.4	35.0	0.6	34.7	0.3

Notes:

1. Gaps in receptor numbering are due to receptors initially identified but removed from consideration due to field verification and/or additional information collected.
2. Red cells represent noise levels that approach or exceed FHWA Noise Abatement Criteria.

Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
288	Outdoor Restaurant	CNE1	E	---	71	64.4	65.0	0.6	65.1	0.7
60	Residential	CNE1	B	1	66	51.6	52.1	0.5	52.7	1.1
61	Residential	CNE1	B	1	66	54.6	55.2	0.6	55.7	1.1
62	Residential	CNE1	B	1	66	54.6	55.2	0.6	55.8	1.2
63	Residential	CNE1	B	1	66	53.9	54.5	0.6	55.0	1.1
64	Residential	CNE1	B	1	66	54.6	55.2	0.6	55.3	0.7
65	Residential	CNE1	B	1	66	53.6	54.1	0.5	54.5	0.9
66	Residential	CNE1	B	1	66	52.3	52.9	0.6	52.9	0.6
67	Residential	CNE1	B	1	66	52.3	52.8	0.5	53.1	0.8
69	Residential	CNE1	B	1	66	53.2	53.8	0.6	54.1	0.9
70	Residential	CNE1	B	1	66	53.8	54.4	0.6	54.6	0.8
71	Residential	CNE1	B	1	66	52.3	52.9	0.6	52.9	0.6
72	Residential	CNE1	B	1	66	50.4	51.0	0.6	50.9	0.5
73	Residential	CNE1	B	1	66	54.3	54.7	0.4	54.5	0.2
74	Residential	CNE1	B	1	66	54.3	54.8	0.5	54.8	0.5
75	Residential	CNE1	B	1	66	58.1	58.7	0.6	58.3	0.2
76	Residential	CNE1	B	1	66	59.0	59.5	0.5	59.1	0.1
77	Residential	CNE1	B	1	66	57.3	57.7	0.4	57.4	0.1
78	Residential	CNE1	B	1	66	57.0	57.3	0.3	57.0	0.0
79	Residential	CNE1	B	1	66	59.2	59.8	0.6	59.4	0.2
80	Residential	CNE1	B	1	66	54.3	54.9	0.6	54.6	0.3
81	Residential	CNE1	B	1	66	49.5	50.1	0.6	50.0	0.5
82	Residential	CNE1	B	1	66	60.3	60.9	0.6	60.4	0.1
83	Residential	CNE1	B	1	66	51.6	52.2	0.6	52.3	0.7
84	Residential	CNE1	B	1	66	56.3	56.9	0.6	56.7	0.4
85	Residential	CNE1	B	1	66	53.4	54.0	0.6	54.0	0.6
86	Residential	CNE1	B	1	66	53.9	54.5	0.6	54.5	0.6
87	Residential	CNE1	B	1	66	56.0	56.6	0.6	56.5	0.5
88	Residential	CNE1	B	1	66	55.8	56.4	0.6	56.3	0.5
89	Residential	CNE1	B	1	66	54.1	54.7	0.6	54.7	0.6
90	Residential	CNE1	B	1	66	54.9	55.5	0.6	55.4	0.5
91	Residential	CNE1	B	1	66	51.9	52.5	0.6	52.9	1.0
92	Hotel WoodSpring Suites	CNE2	E	---	71	67.3	67.9	0.6	68.2	0.9
93	Outdoor Restaurant Seating	CNE2	E	---	71	63.2	63.9	0.7	64.2	1.0
94	Residential	CNE2	B	1	66	**72.4**	**73.1**	0.7	**74.0**	1.6
289	Outdoor Restaurant	CNE2	E	---	71	64.6	65.3	0.7	65.1	0.5
96	Residential	CNE2	B	1	66	61.5	62.2	0.7	62.5	1.0
97	Residential	CNE2	B	1	66	61.7	62.4	0.7	62.7	1.0
98	Residential	CNE2	B	1	66	56.6	57.3	0.7	57.8	1.2
99	Residential	CNE2	B	1	66	55.9	56.6	0.7	56.9	1.0
100	Residential	CNE2	B	1	66	53.2	53.9	0.7	54.7	1.5
101	Residential	CNE2	B	1	66	51.9	52.6	0.7	53.1	1.2
102	Residential	CNE2	B	1	66	50.8	51.5	0.7	52.3	1.5
103	Residential	CNE2	B	1	66	49.3	50.0	0.7	50.7	1.4
104	Residential	CNE2	B	1	66	49.1	49.8	0.7	50.4	1.3
105	Residential	CNE2	B	1	66	48.1	48.7	0.6	48.8	0.7
106	Residential	CNE2	B	1	66	**70.8**	**71.3**	0.5	**72.1**	1.3
107	Residential	CNE2	B	1	66	**70.8**	**71.3**	0.5	**71.9**	1.1
108	Residential	CNE2	B	1	66	**69.8**	**70.3**	0.5	**70.9**	1.1
109	Residential	CNE2	B	1	66	**68.0**	**68.4**	0.4	**68.9**	0.9
110	Residential	CNE2	B	1	66	**71.4**	**71.8**	0.4	**72.8**	1.4

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Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
111	Residential	CNE2	B	1	66	68.5	69.0	0.5	69.4	0.9
112	Residential	CNE2	B	1	66	68.7	69.1	0.4	69.6	0.9
113	Residential	CNE2	B	1	66	68.4	68.8	0.4	69.2	0.8
114	Residential	CNE2	B	1	66	68.6	69.1	0.5	69.5	0.9
115	Residential	CNE2	B	1	66	68.1	68.6	0.5	69.0	0.9
116	Residential	CNE2	B	1	66	67.9	68.4	0.5	68.9	1.0
117	Residential	CNE2	B	1	66	68.1	68.6	0.5	69.2	1.1
117A	Residential	CNE2	B	1	66	68.1	68.6	0.5	69.1	1.0
117B	Residential	CNE2	B	1	66	67.4	67.8	0.4	68.4	1.0
117C	Residential	CNE2	B	1	66	68.4	68.8	0.4	69.4	1.0
117D	Residential	CNE2	B	1	66	68.2	68.6	0.4	69.2	1.0
117E	Residential	CNE2	B	1	66	68.0	68.5	0.5	69.1	1.1
118	Residential	CNE2	B	1	66	53.1	53.6	0.5	54.2	1.1
118A	Residential	CNE2	B	1	66	54.7	55.2	0.5	55.9	1.2
118B	Residential	CNE2	B	1	66	54.5	55.0	0.5	55.3	0.8
118C	Residential	CNE2	B	1	66	56.1	56.6	0.5	56.8	0.7
118D	Residential	CNE2	B	1	66	53.3	53.7	0.4	54.0	0.7
118E	Residential	CNE2	B	1	66	53.8	54.2	0.4	54.5	0.7
119	Residential	CNE2	B	1	66	53.8	54.3	0.5	54.9	1.1
120	Residential	CNE2	B	1	66	54.9	55.5	0.6	55.9	1.0
121	Residential	CNE2	B	1	66	54.3	54.9	0.6	55.5	1.2
122	Residential	CNE2	B	1	66	54.2	54.8	0.6	55.3	1.1
123	Residential	CNE2	B	1	66	53.1	53.6	0.5	54.0	0.9
124	Residential	CNE2	B	1	66	58.0	58.5	0.5	58.6	0.6
125	Residential	CNE2	B	1	66	58.4	59.0	0.6	58.9	0.5
126	Residential	CNE2	B	1	66	56.5	57.0	0.5	57.0	0.5
127	Residential	CNE2	B	1	66	56.2	56.7	0.5	56.6	0.4
128	Residential	CNE2	B	1	66	62.2	62.7	0.5	62.6	0.4
129	Place of Worship (Interior) Rockville Rd Church of Christ	CNE2	D	---	51	43.1	43.6	0.5	43.5	0.4
130	Residential	CNE2	B	1	66	60.9	61.4	0.5	61.5	0.6
131	Residential	CNE2	B	1	66	58.9	59.4	0.5	59.4	0.5
132	Residential	CNE2	B	1	66	55.5	56.0	0.5	56.3	0.8
133	Residential	CNE2	B	1	66	55.8	56.4	0.6	56.8	1.0
134	Residential	CNE2	B	1	66	56.1	56.6	0.5	57.2	1.1
135	Residential	CNE2	B	1	66	56.6	57.1	0.5	57.6	1.0
136	Residential	CNE2	B	1	66	56.9	57.4	0.5	57.9	1.0
137	Residential	CNE2	B	1	66	57.7	58.2	0.5	58.5	0.8
138	Residential	CNE2	B	1	66	50.8	51.3	0.5	51.7	0.9
139	Residential	CNE2	B	1	66	54.5	55.0	0.5	55.2	0.7
140	Residential	CNE2	B	1	66	53.5	54.0	0.5	54.1	0.6
141	Residential	CNE2	B	1	66	51.1	51.6	0.5	51.6	0.5
142	Residential	CNE2	B	1	66	52.0	52.5	0.5	52.7	0.7
143	Residential	CNE2	B	1	66	53.8	54.3	0.5	54.2	0.4
144	Residential	CNE2	B	1	66	69.2	69.7	0.5	69.7	0.5
145	Residential	CNE2	B	1	66	67.2	67.7	0.5	67.4	0.2
146	Residential	CNE2	B	1	66	67.7	68.2	0.5	68.1	0.4
147	Residential	CNE2	B	1	66	69.0	69.5	0.5	69.5	0.5
148	Residential	CNE2	B	1	66	68.4	68.9	0.5	68.9	0.5
149	Residential	CNE2	B	1	66	68.4	68.9	0.5	68.9	0.5
150	Residential	CNE2	B	1	66	67.9	68.4	0.5	68.3	0.4
151	Residential	CNE2	B	1	66	68.0	68.5	0.5	68.4	0.4
152	Residential	CNE2	B	1	66	68.6	69.1	0.5	69.2	0.6
153	Residential	CNE2	B	1	66	68.3	68.8	0.5	69.0	0.7
154	Residential	CNE2	B	1	66	58.6	59.1	0.5	59.3	0.7
155	Residential	CNE2	B	1	66	58.1	58.6	0.5	58.5	0.4
156	Residential	CNE2	B	1	66	57.1	57.6	0.5	57.5	0.4
157	Residential	CNE2	B	1	66	56.2	56.7	0.5	56.6	0.4
158	Residential	CNE2	B	1	66	56.8	57.3	0.5	57.3	0.5
159	Residential	CNE2	B	1	66	58.7	59.2	0.5	59.0	0.3
160	Residential	CNE2	B	1	66	57.7	58.2	0.5	58.3	0.6
161	Residential	CNE2	B	1	66	58.9	59.4	0.5	59.1	0.2
162	Residential	CNE2	B	1	66	59.0	59.5	0.5	59.3	0.3
163	Residential	CNE2	B	1	66	55.0	55.5	0.5	55.8	0.8

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Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
164	Residential	CNE2	B	1	66	54.1	54.6	0.5	54.8	0.7
165	Residential	CNE2	B	1	66	55.1	55.6	0.5	56.1	1.0
166	Residential	CNE2	B	1	66	55.6	56.1	0.5	56.6	1.0
167	Residential	CNE2	B	1	66	53.5	54.0	0.5	54.4	0.9
168	Residential	CNE2	B	1	66	51.1	51.7	0.6	51.9	0.8
169	Residential	CNE2	B	1	66	50.6	51.2	0.6	51.1	0.5
170	Residential	CNE2	B	1	66	50.4	50.9	0.5	51.1	0.7
171	Residential	CNE2	B	1	66	52.4	52.9	0.5	53.0	0.6
172	Residential	CNE2	B	1	66	53.0	53.6	0.6	53.7	0.7
173	Residential	CNE2	B	1	66	51.1	51.7	0.6	52.0	0.9
174	Residential	CNE2	B	1	66	48.5	49.1	0.6	49.2	0.7
175	Residential	CNE2	B	1	66	50.4	50.9	0.5	51.3	0.9
176	Residential	CNE2	B	1	66	48.8	49.4	0.6	49.4	0.6
177	Residential	CNE2	B	1	66	53.4	53.9	0.5	54.4	1.0
178	Residential	CNE2	B	1	66	50.5	51.0	0.5	51.5	1.0
179	Residential	CNE2	B	1	66	49.1	49.6	0.5	49.8	0.7
180	Residential	CNE2	B	1	66	49.6	50.1	0.5	50.2	0.6
181	Residential	CNE2	B	1	66	48.6	49.2	0.6	49.3	0.7
182	Residential	CNE2	B	1	66	60.4	61.0	0.6	60.7	0.3
182A	Residential	CNE2	B	1	66	58.3	59.0	0.7	58.8	0.5
182B	Residential	CNE2	B	1	66	57.7	58.4	0.7	58.3	0.6
182C	Residential	CNE2	B	1	66	56.0	56.7	0.7	56.8	0.8
182D	Residential	CNE2	B	1	66	62.2	62.9	0.7	63.1	0.9
182E	Residential	CNE2	B	1	66	60.5	61.2	0.7	61.2	0.7
182F	Residential	CNE2	B	1	66	60.0	60.7	0.7	60.7	0.7
182G	Residential	CNE2	B	1	66	58.8	59.5	0.7	59.2	0.4
183	Residential	CNE2	B	1	66	52.7	53.3	0.6	53.6	0.9
183A	Residential	CNE2	B	1	66	50.5	51.2	0.7	50.9	0.4
183B	Residential	CNE2	B	1	66	51.2	51.8	0.6	51.6	0.4
183C	Residential	CNE2	B	1	66	51.2	51.9	0.7	51.9	0.7
183D	Residential	CNE2	B	1	66	55.2	55.9	0.7	55.6	0.4
183E	Residential	CNE2	B	1	66	52.8	53.4	0.6	53.1	0.3
183F	Residential	CNE2	B	1	66	53.6	54.3	0.7	53.9	0.3
183G	Residential	CNE2	B	1	66	54.3	55.0	0.7	54.5	0.2
184	Residential	CNE2	B	8	66	53.2	53.8	0.6	54.2	1.0
185	Residential	CNE2	B	1	66	55.1	55.8	0.7	55.8	0.7
185A	Residential	CNE2	B	1	66	55.1	55.8	0.7	55.7	0.6
185B	Residential	CNE2	B	1	66	55.1	55.7	0.6	55.7	0.6
185C	Residential	CNE2	B	1	66	55.2	55.9	0.7	55.9	0.7
185D	Residential	CNE2	B	1	66	57.5	58.1	0.6	57.9	0.4
185E	Residential	CNE2	B	1	66	57.3	58.0	0.7	57.8	0.5
185F	Residential	CNE2	B	1	66	57.3	57.9	0.6	57.8	0.5
185G	Residential	CNE2	B	1	66	57.8	58.4	0.6	58.4	0.6
186	Apartment Swimming Pool	CNE2	C	---	66	51.0	51.7	0.7	52.4	1.4
187	Residential	CNE2	B	4	66	49.1	49.8	0.7	50.2	1.1
188	Residential	CNE2	B	4	66	48.7	49.3	0.6	49.5	0.8
189	Residential	CNE2	B	4	66	50.2	50.9	0.7	50.9	0.7
190	Residential	CNE2	B	6	66	54.6	55.3	0.7	55.4	0.8
287	Residential	CNE2	B	1	66	68.6	69.3	0.7	69.5	0.9
287A	Residential	CNE2	B	1	66	68.7	69.4	0.7	69.4	0.7
287B	Residential	CNE2	B	1	66	68.7	69.4	0.7	69.4	0.7
287C	Residential	CNE2	B	1	66	68.6	69.3	0.7	69.4	0.8
287D	Residential	CNE2	B	1	66	69.5	70.2	0.7	70.3	0.8
287E	Residential	CNE2	B	1	66	69.5	70.2	0.7	70.3	0.8

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Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
287F	Residential	CNE2	B	1	66	69.5	70.2	0.7	70.3	0.8
287G	Residential	CNE2	B	1	66	69.5	70.2	0.7	70.2	0.7
191	Residential	CNE3	B	1	66	69.1	70.6	1.5	69.9	0.8
192	Residential	CNE3	B	1	66	69.1	70.5	1.4	69.9	0.8
193	Residential	CNE3	B	1	66	68.8	70.3	1.5	69.6	0.8
194	Residential	CNE3	B	1	66	69.3	70.7	1.4	70.1	0.8
195	Residential	CNE3	B	1	66	68.9	70.3	1.4	69.6	0.7
196	Residential	CNE3	B	1	66	69.1	70.6	1.5	69.9	0.8
197	Residential	CNE3	B	1	66	68.8	70.2	1.4	69.5	0.7
198	Residential	CNE3	B	1	66	68.6	70.0	1.4	69.3	0.7
199	Residential	CNE3	B	1	66	68.7	70.1	1.4	69.5	0.8
200	Residential	CNE3	B	1	66	68.3	69.7	1.4	69.1	0.8
201	Residential	CNE3	B	1	66	67.1	68.1	1.0	67.9	0.8
202	Residential	CNE3	B	1	66	67.0	67.9	0.9	68.0	1.0
203	Residential	CNE3	B	1	66	66.5	67.4	0.9	67.5	1.0
204	Residential	CNE3	B	1	66	67.7	68.7	1.0	68.4	0.7
205	Residential	CNE3	B	1	66	66.7	67.6	0.9	67.3	0.6
206	Residential	CNE3	B	1	66	66.7	67.6	0.9	67.3	0.6
207	Residential	CNE3	B	1	66	60.6	61.0	0.4	60.9	0.3
208	Residential	CNE3	B	1	66	61.6	61.9	0.3	61.9	0.3
209	Residential	CNE3	B	4	66	59.6	60.0	0.4	59.9	0.3
210	Residential	CNE3	B	18	66	57.8	58.5	0.7	58.3	0.5
211	Best Western Hotel	CNE3	E	---	71	62.0	62.3	0.3	62.4	0.4
212	Residential	CNE3	B	1	66	60.1	60.5	0.4	60.5	0.4
213	Residential	CNE3	B	1	66	55.5	56.1	0.6	56.1	0.6
214	Residential	CNE3	B	1	66	54.2	55.0	0.8	54.8	0.6
215	Residential	CNE3	B	1	66	53.3	54.0	0.7	54.1	0.8
216	Residential	CNE3	B	1	66	52.6	53.4	0.8	53.3	0.7
217	Residential	CNE3	B	1	66	53.3	54.1	0.8	54.1	0.8
218	Residential	CNE3	B	1	66	53.8	54.7	0.9	54.8	1.0
219	Residential	CNE3	B	1	66	53.8	54.6	0.8	54.7	0.9
220	Residential	CNE3	B	1	66	52.8	53.6	0.8	53.6	0.8
221	Residential	CNE3	B	1	66	53.1	54.0	0.9	53.9	0.8
222	Residential	CNE3	B	1	66	52.6	53.4	0.8	53.3	0.7
223	Residential	CNE3	B	1	66	53.0	53.8	0.8	53.8	0.8
224	Residential	CNE3	B	1	66	53.5	54.4	0.9	54.6	1.1
225	Residential	CNE3	B	1	66	53.7	54.6	0.9	54.8	1.1
226	Residential	CNE3	B	1	66	54.1	55.1	1.0	55.2	1.1
227	Residential	CNE3	B	1	66	54.2	55.1	0.9	55.2	1.0
228	Residential	CNE3	B	1	66	53.9	54.8	0.9	55.2	1.3
229	Residential	CNE3	B	1	66	54.0	54.9	0.9	55.3	1.3
230	Residential	CNE3	B	1	66	53.6	54.6	1.0	54.9	1.3
231	Residential	CNE3	B	1	66	54.6	55.6	1.0	55.6	1.0
232	Residential	CNE3	B	1	66	53.6	54.5	0.9	54.6	1.0
233	Residential	CNE3	B	1	66	53.7	54.6	0.9	54.6	0.9
234	Residential	CNE3	B	1	66	53.7	54.7	1.0	54.6	0.9
235	Residential	CNE3	B	1	66	53.4	54.4	1.0	54.7	1.3
236	Place of Worship (Interior) Westlake Community Church of God	CNE3	D	---	51	35.4	36.7	1.3	35.8	0.4
237	Residential	CNE3	B	1	66	67.6	68.6	1.0	67.9	0.3
238	Residential	CNE3	B	1	66	67.3	68.4	1.1	67.6	0.3
239	Residential	CNE3	B	1	66	69.4	70.4	1.0	70.0	0.6
240	Residential	CNE3	B	1	66	70.2	71.3	1.1	71.1	0.9

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Receptor Number	Land Use	CNE	NAC	Number of DU's	NAC Impact dBA	Existing Year	Design Year No-Build	DYNB Increase Over Existing	Design Year Build Alt.	DYBLD Subst Incr
241	Residential	CNE3	B	1	66	67.6	68.7	1.1	68.2	0.6
242	Residential	CNE3	B	1	66	68.1	69.1	1.0	68.7	0.6
243	Residential	CNE3	B	1	66	68.6	69.6	1.0	69.1	0.5
244	Residential	CNE3	B	1	66	68.5	69.5	1.0	69.0	0.5
245	Residential	CNE3	B	1	66	68.3	69.3	1.0	68.7	0.4
246	Residential	CNE3	B	1	66	68.5	69.5	1.0	68.9	0.4
247	Residential	CNE3	B	1	66	68.8	69.8	1.0	69.1	0.3
248	Residential	CNE3	B	1	66	66.8	67.7	0.9	66.9	0.1
249	Residential	CNE3	B	1	66	60.5	61.5	1.0	60.7	0.2
250	Residential	CNE3	B	1	66	60.4	61.1	0.7	60.8	0.4
251	Residential	CNE3	B	1	66	63.0	63.6	0.6	63.5	0.5
252	Residential	CNE3	B	1	66	62.4	63.0	0.6	63.0	0.6
253	Residential	CNE3	B	1	66	59.2	59.9	0.7	59.7	0.5
254	Residential	CNE3	B	1	66	57.8	58.9	1.1	58.6	0.8
255	Residential	CNE3	B	1	66	57.5	58.6	1.1	58.1	0.6
256	Retirement Home	CNE3	B	58	66	58.5	59.7	1.2	59.0	0.5
257	Residential	CNE3	B	2	66	57.6	58.7	1.1	57.6	0.0
258	Residential	CNE3	B	1	66	56.6	57.8	1.2	57.0	0.4
259	Residential	CNE3	B	1	66	54.9	56.0	1.1	55.7	0.8
260	Residential	CNE3	B	1	66	55.8	57.0	1.2	56.5	0.7
261	Residential	CNE3	B	1	66	57.7	58.9	1.2	58.1	0.4
262	Residential	CNE3	B	1	66	54.1	55.2	1.1	54.9	0.8
263	Residential	CNE3	B	1	66	52.5	53.7	1.2	53.6	1.1
264	Residential	CNE3	B	1	66	51.3	52.3	1.0	52.2	0.9
265	Residential	CNE3	B	1	66	52.6	53.6	1.0	53.4	0.8
266	Residential	CNE3	B	2	66	53.2	54.3	1.1	53.6	0.4
267	Residential	CNE3	B	2	66	53.2	54.2	1.0	53.9	0.7
268	Residential	CNE3	B	2	66	52.0	53.0	1.0	52.8	0.8
269	Residential	CNE3	B	2	66	51.8	52.7	0.9	52.6	0.8
270	Residential	CNE3	B	1	66	51.7	52.6	0.9	52.5	0.8
271	Residential	CNE3	B	1	66	51.0	51.9	0.9	51.8	0.8
272	Residential	CNE3	B	1	66	51.4	52.3	0.9	52.3	0.9
273	Residential	CNE3	B	1	66	52.5	53.5	1.0	53.4	0.9
274	Residential	CNE3	B	1	66	51.5	52.4	0.9	52.3	0.8
275	Residential	CNE3	B	1	66	55.2	56.2	1.0	56.2	1.0
276	Residential	CNE3	B	1	66	55.1	56.1	1.0	56.0	0.9
277	Residential	CNE3	B	1	66	53.4	54.4	1.0	54.3	0.9
278	Residential	CNE3	B	1	66	55.4	56.3	0.9	56.4	1.0
279	Residential	CNE3	B	1	66	55.7	56.5	0.8	56.6	0.9
280	Residential	CNE3	B	1	66	56.7	57.5	0.8	57.4	0.7
281	Residential	CNE3	B	1	66	62.5	63.2	0.7	63.2	0.7
282	Residential	CNE3	B	1	66	56.5	57.3	0.8	57.4	0.9
283	Residential	CNE3	B	1	66	61.5	62.2	0.7	62.2	0.7
284	Residential	CNE3	B	1	66	55.6	56.5	0.9	56.5	0.9
285	Residential	CNE3	B	1	66	62.1	62.9	0.8	62.9	0.8
286	Residential	CNE3	B	1	66	57.4	58.4	1.0	58.3	0.9

Notes:

1. Gaps in receptor numbering are due to receptors initially identified but removed from consideration due to field verification and/or additional information collected.
2. Red cells represent noise levels that approach or exceed FHWA Noise Abatement Criteria.

From:	Bales, Ronald
To:	Pusti, Mary
Cc:	Miller, Brandon; Vachet, Wendy; Curtis, William; Gilyeat, Richard; Kuchta, Andrew
Subject:	EXTERNAL: US 36: Rockville Road, Lead Des.#1800037, Noise Analysis
Date:	Friday, July 30, 2021 11:03:17 AM
Attachments:	image001.png image002.png image003.png image004.png

A traffic noise analysis report was completed by Michael Baker International in July 2021 to evaluate potential traffic noise impacts for the US 36 Project from N. Raceway Road to I-465 in Indianapolis, Indiana. Traffic noise was evaluated at all receptors within 500 feet of edge of pavement. Traffic noise levels were evaluated for the existing (2019) and projected (2045) traffic volumes for the build alternative.

This report evaluated potential noise impacts for the proposed improvements in compliance with the Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise as presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772) and the INDOT *Traffic Noise Analysis Procedure* (2017).

Existing modeled (2019) peak hour noise levels ranged from 48.1 to 72.4 dBA. Predicted design year (2045) noise levels would approach or exceed the Noise Abatement Criteria (NAC) at 96 receptors. A majority of impacted receptors have direct access driveway access to US 36 and/or located on a corner of an intersecting road with US 36 and are not feasible for barrier placement. On roadways with direct access for driveways, noise walls are typically not feasible because they require long interrupted sections to be able to meet the minimum dBA reduction. A noise barrier was modeled at the Rockwood Apartments for the apartment building at the northwest corner of US 36 and Rockleigh Avenue with eight impacted units. The noise barrier was unable to meet acoustic feasibility (5.0 dBA reduction) for a majority of impacted receptors as established in the INDOT *Traffic Noise Analysis Procedure* (2017).

Based on the studies thus far accomplished, the State of Indiana has not identified any locations where noise abatement is likely. A reevaluation 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 feasible and reasonable, the abatement measures might 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 process.

This email will serve as INDOT's approval of this traffic noise analysis report.

Ron Bales
Environmental Policy Manager
Indiana Department of Transportation - Environmental Services Division
100 North Senate Ave., N758-ES
Indianapolis, IN 46204
Office: (317) 515-7908
Email: rbales@indot.in.gov

Land and Water Conservation Fund (LWCF) County Property List for Indiana (Last Updated March 2022)

ProjectNumber	SubProjectCode	County	Property
1800048	1800048	Marion	Eagle Creek Park, Nature Preserve, and Peace Learning Center
1800072	1800072	Marion	Martin Luther King Park
1800088	1800088	Marion	Eagle Creek Park, Nature Preserve, and Peace Learning Center
1800114	1800114	Marion	Eagle Creek Golf Course
1800167	1800167	Marion	Eagle Creek Park, Nature Preserve, and Peace Learning Center
1800185	1800185	Marion	German Church & 30th St Park
1800222	1800222	Marion	Southwestway Park
1800245	1800245	Marion	Lawrence Community Park
1800245.1	1800245.1	Marion	Richard T Park
1800247	1800247	Marion	Ft. Harrison S.P. Dog Park (old--Fall Creek Park)
1800307	1800307	Marion	Washington Park
1800307.1	1800307.1	Marion	16th and Franklin Park (Greene Park)
1800330	1800330	Marion	Riverside Park
1800369	1800369M	Marion	Ft. Harrison S.P. Dog Park (old--Fall Creek Park)
1800384	1800384	Marion	Sarah T. Bolton Park
1800401	1800401B	Marion	Eagles Crest
1800401.2	1800401.2A	Marion	Starling Nature Sanctuary at Eagle Creek
1800401.2	1800401.2B	Marion	Wish Park
1800401.3	1800401.3	Marion	Cancer Park
1800401.4	1800401.4	Marion	Krannert Park
1800404	1800404	Marion	Major Taylor Velodrome & Lake Sullivan
1800459	1800459	Marion	Fall Creek Parkway, Fall Creek Corridor Ph.III
1800467	1800467	Marion	Hartman Park/Beech Grove Little League
1800478	1800478	Marion	Oaklandon Play Park
1800505	1800505	Marion	Fall Creek Parkway, Fall Creek Corridor Ph.III
1800541	1800541	Marion	Southwestway Park
1800600	1800600	Marion	Southport Park
1800617	1800617	Marion	Fort Benjamin Harrison Civic Plaza
1800635	1800635	Marion	Leonard Park

*Park names may have changed. If acquisition of publically owned land or impacts to publically owned land is anticipated, coordination with IDNR, Division of Outdoor Recreation, should occur.

Source: https://www.in.gov/indot/2523.htm

Engineering Assessment Report

US 36

Des. No. 1800035/1800037

Marion County

June 1, 2021

Prepared for:

Indiana Department of Transportation
Greenfield District

Prepared by:

Michael Baker International, Inc.

Table of Contents

Appendices

Note: Engineering Assessment Appendices are excluded from this CE document, with the exception of *Appendix G-2 Traffic Summary.*

Purpose of Report

The purpose of this report is to document the engineering assessment phase of project development, including all coordination that has been completed in preparation for US 36 in Marion County, under Des. No. 1800035/1800037. This document outlines the proposal and is intended to serve as a guide for subsequent survey, design, environmental, right of way and other project activities leading to construction. The recommended alternative identified in this document is considered preliminary, pending the outcome of environmental studies. An extensive public outreach campaign which included two separate questionnaires to gather public input and multiple public information meetings was performed as part of this project development. The results of these questionnaires have been used as a guide in the development of this Engineering Assessment Report.

Project Location

The project is located along US 36 from approximately 800 ft east of Raceway Road to I-465 in Marion County. The US 36 project limits extend from the Hendricks/Marion County Line (RP 65+37) east to I-465 (RP 68+59). The project is in the Indiana Department of Transportation's Greenfield District, Indianapolis Sub-District. A location map for the proposed project area can be found in ***Appendix A, Project Location Maps***. Roadway improvements from 800 ft east of Raceway Road to Transfer Drive will be included under Des. No. 1800035, while improvements from Transfer Drive to I-465 will be included under Des No. 180037. Improvements to the existing bridge over the East Fork of White Lick Creek will be included under Des. Nos. 1900340 (EBL) and 1900341 (WBL).

Figure 1: US 36 Project Location

Project Purpose and Need

The need for this project is evident from the congestion and delay experienced by motorists especially at the signalized intersections. Commercial development along US 36 has made this corridor a destination for motorists and has created capacity and congestion issues. In addition, portions of this project have a crash history greater than what is expected for a facility of this type with this level of traffic volume. The purpose of this project is to improve traffic operations and increase safety throughout the corridor. A

secondary purpose for this project is to make US 36 a multimodal corridor in order to improve pedestrian access and safety.

Project History

A Project Intent Report was developed by INDOT for this project in February of 2018. The Project Intent Report identifies the deficiencies within the existing corridor and provides a traffic analysis of the various intersections. See ***Appendix B, Project Intent Report*** for additional information. A similar project was proposed over 10 years ago but was suspended due to public opposition.

Existing Conditions

US 36 is a well-travelled urban corridor. It serves a combination of commercial and residential traffic within Marion County and operates as a major east-west route between I-465 and the City of Avon.

The intersections of US 36 with High School Road, Girls School Road, Country Club Road and Richie Avenue/Bridgeport Road are all four-way signalized intersections. The intersections of US 36 with Transfer Drive and the L.A. Fitness Drive, the shopping center in the northeast quadrant of US 36 and Raceway Road, are three-way signalized intersections.

There are numerous side roads, commercial driveways and residential drives throughout the corridor as well. An existing two-way left-turn lane services these drives.

US 36 has an existing posted speed limit of 45 mph throughout the corridor.

Design Criteria

US 36 is functionally classified as a principal arterial. US 36 is a part of the National Highway System and the National Truck Network.

Table 1: Existing Roadway Information

Existing Roadway Information			
Geometric Criteria			
Design Speed	*45 mph*	*Functional Class*	*Principal Arterial*
Design Criteria	*Reconstruction (Non-Freeway)*	*Rural/Urban*	*Urban (Intermediate)*
Terrain	*Level*	*Access Control*	*None*
Approach Cross Section			
IDM Figure Reference	*Figure 53-6*	*Travel Lane Width*	*12'*
Travel Lane Count	*4*	*Shoulder Width (Paved)*	*10'*
Shoulder Width (Usable)	*10'*	*Shoulder Pavement*	*HMA*
Mainline Pavement	*HMA*		
Alignment			
Horizontal	*Tangent*	*Vertical*	

Roadway Cross Section & Alignment

The typical cross section varies throughout the project but primarily consists of two 12-ft lanes in each direction separated by a central two-way left-turn lane. Outside paved shoulders which vary in width but are typically 10-ft wide are located on either side of US 36.

The section is crowned at the center of the roadway, and lane cross slopes are generally 2% in most instances. A shallow existing curb has been identified throughout much of the project along with existing storm sewer inlets. There are also shallow side ditches located at the west end of the project. Drainage is conveyed by flowing off the roadway to the shoulder and into existing inlets or adjacent side ditches.

The horizontal alignment of US 36 is a generally tangent through the project limits. Large horizontal curves are present on US 36 at the intersections of High School Road, Girls School Road and Country Club Road. A minor deflection in the alignment of less than 1 degree is located on US 36 near the intersection with Bauman Street.

The vertical alignment through the project limits is relatively level. There is a low point at the existing bridges over the East Fork of White Lick Creek.

Drainage and Structures

Existing roadside drainage is conveyed by a combination of storm sewers, roadside ditches and driveway culverts. A general grade break is located near Bauman Street. The area to the east of Bauman Street drains toward the US 36 / I-465 interchange at the east end of the project. The project, west of Bauman Street, eventually outlets to the roadside ditches with the ultimate receiving water being the East Fork of White Lick Creek. An existing corrugated metal pipe culvert crosses US 36 west of Coronado Road and an existing reinforced concrete pipe culvert is located east of Bridgeport Road/Richie Avenue.

An adjacent Indianapolis Department of Public Works project has been developed to improve drainage issues in the Furman Stout neighborhood (Project No. SD-22-052).

Pedestrian Facilities

The only existing pedestrian facility is a 1,300 ft long sidewalk located in front of an industrial complex on the north side of US 36 east of transfer drive.

Public Utilities

An Initial Notice of Proposed Improvements letter was sent to utilities which have been identified as having facilities on or near the project limits. A summary of utilities which have facilities within the project site is provided below:

- AT&T Indiana (Distribution)
- CEG (Gas, Sanitary and Water)
- Centurylink
- Comcast
- Crown Castle
- Enterprise
- Indianapolis DPW
- IPL
- South Central Indiana REMC (Fiber)
- Spectrum
- TCS Communications
- Windstream
- Zayo

Subsurface Utility Engineering (SUE) is recommended for this project due to its urban setting.

Land Usage

The land use adjacent to US 36 varies throughout this corridor. A residential area is located on the north and south sides of US 36 between High School Road and Girls School Road. The land use is most accurately described as industrial between Girls School Road and the CSX Railroad Overpass, commercial between the CSX Railroad Overpass and Country Club Road, residential between Country Club Road and Bridgeport Road/Richie Avenue, and commercial for the remainder of the corridor. The commercial developments generate a notable volume of pedestrian traffic.

Adjacent INDOT Projects

US 36 – Des. No. 1601072

Road reconstruction and added travel lanes are scheduled to be completed along US 36 from the intersection with Shiloh Park Drive to the east approximately 1.08 miles to 800 ft east of Raceway Road. The project under Des. No. 1601072 includes replacement of curb and gutter and drainage structures. This project will extend to the west end of Des. No. 1800035. US 36 under Des. No. 1601072 and US 36 under Des. No. 1800035 will not be constructed concurrently. Following the construction of Des. No. 1601072, as-built survey will be collected to ensure a seamless transition between the two projects.

US 36 – Des. No. 1600627

Drainage improvements and added travel lanes are scheduled to be completed along eastbound US 36 from the intersection with Bauman Street to the east, approximately 0.5 miles, to High School Road. The project under Des. No. 1600627 includes replacement of curb and gutter and drainage structures. This project will be within the project limits of Des. No. 1800037. US 36 under Des. No. 1600627 and US 36 under Des. No. 1800037 will not be constructed concurrently. Following the construction of Des. No. 1601072, as-built survey will be collected to ensure a seamless transition between the two projects.

Traffic Data

Traffic counts along the US 36 corridor were not collected in 2020 for this project due to the COVID 19 pandemic and the associated general reduction in traffic as travel patterns changed. Instead, turning movement traffic counts, collected in 2016 for the same corridor were grown by an annual growth rate of 0.6% and used for this study. The 0.6% annual growth rate was determined by comparing the 2045 future year and the current year versions of the Indianapolis Metropolitan Planning Organization's regional travel demand models and focusing on the US 36 corridor. See ***Appendix B, Project Intent Report*** for 2016 traffic counts.

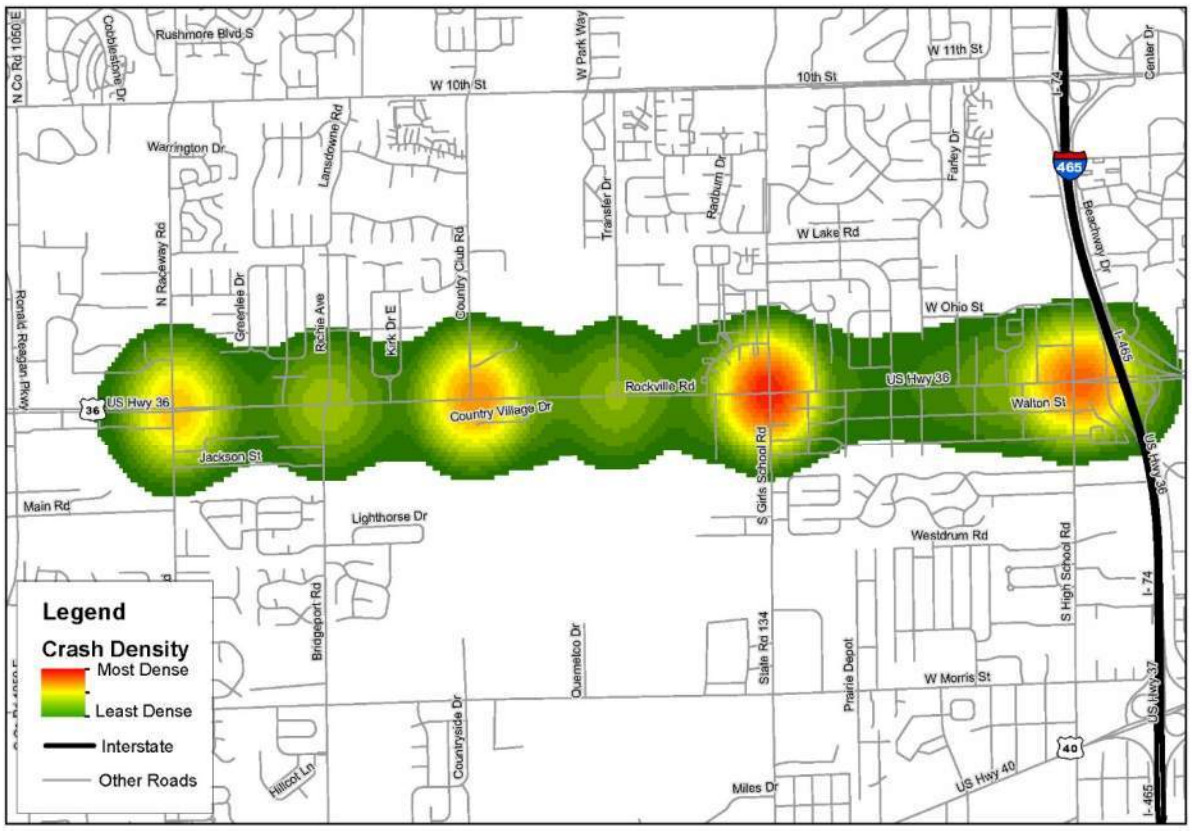
Crash Data

Existing crash data was downloaded from the Automated Reporting Information Exchange System (Aries) for the 3-year period from 2016 to 2018 for this section of US 36. See ***Appendix C, Crash Location Map***. There was a total of 699 crashes reported consisting of 530 property damage only crashes, 156 non-incapacitating injury crashes, 12 incapacitating injury crashes, and 1 fatal crash. Approximately 46% of all crashes were rear-end crashes, and no other crash type accounted for more than 12% of the total. Rear-

end crashes are common for corridors with a high level of congestion where vehicles are densely packed. Intersections with insufficient capacity also tend to produce a high percentage of rear-end crashes as motorists try to proceed through the current traffic signal cycle and rear-end the preceding vehicle when they stop for a red signal phase. Motorists also tend to run into the back of the queue at a congested intersection approach that has a red signal phase.

An Index of Crash Cost (Icc) and an Index of Crash Frequency (Icf) value is calculated by the Hazard Analysis Tool (HAT) as a metric to determine whether a corridor or an intersection has a higher than normal or lower than normal crash history when compared to the statewide average for the same facility type. Icf focuses on the overall number of crashes. Icc captures the cost associated with the crashes, with property damage only crashes having the lowest cost and fatal crashes having the highest cost. The Icf and the Icc would be 0.0 for a facility that has an equal number of crashes with equal severity when compared to the statewide average for the same facility type. A negative Icf or Icc means the facility is below the statewide average while a positive Icf or Icc means that it is greater than the statewide average.

Figure 2: Crash Density Map



Density of Crashes for US 36 Corridor (Years 2016 - 2018)

The Icc and Icf for the roadway segment and intersection in the study area from 2016 to 2018 is summarized in **Table 2** below. A negative Icc and Icf value was determined for many of the segments between 500 ft east of Raceway Road and Richie Ave/Bridgeport Road; therefore, they are experiencing

crash histories lower than the statewide average for this type of facility. Positive Icc and Icf values, indicating a higher crash history than would be expected for a corridor of this type, were determined for the remainder of the corridor. For instance, the Icc of 3.60 at the Girls School Road intersection can be interpreted to mean that the total number of crashes at this intersection have a standard deviation greater than 3 which theoretically puts this intersection in the top 1% of highest crash intersections statewide for a facility of this type.

Table 2: Icc and Icf Values for Roadway segments and Intersections

Location	Icf	Icc
Segment - 500' east of Raceway Road to 250' west of L.A. Fitness Drive	N.A.	N.A.
Intersection - L.A. Fitness Drive and US 36	-1.10	-1.20
Segment - 250' east of L.A. Fitness Drive to 250' west of Richie Ave/Bridgeport Road	N.A.	N.A.
Intersection – Richie Ave/Bridgeport Road and US 36	0.47	1.07
Segment - 250' east of Bridgeport Road to 500' west of Country Club Road	0.34	-0.11
Intersection - Country Club Road and US 36	2.78	2.39
Segment - 500' east of Country Club Road to 250' west of Transfer Drive	1.36	1.18
Intersection - Transfer Drive and US 36	1.38	1.42
Segment - 250' east of Transfer Drive to 500' west of Girls School Road	0.52	0.92
Intersection - Girls School Road and US 36	4.06	3.60
Segment - 500' east of Girls School Road to 500' west of High School Road	0.74	0.54
Intersection - High School Road and US 36	2.75	2.71

Alternatives

Design Criteria

The roadway reconstruction project will be designed to the 4R project type geometric design criteria for urban arterials (suburban) per IDM Fig 53-6. See ***Appendix D, IDM Figures*** for Figure 53-6 Geometric Design Criteria for Urban Arterial. **Table 3** below summarizes the proposed design roadway standards.

Table 3: Proposed Roadway Design Standards

Proposed Design Standards	
Design Criteria	*Reconstruction (Non-Freeway)*
Functional Class	*Principal Arterial*
Rural/Urban	*Urban (Intermediate)*
IDM Figure Reference	*Figure 53-6*
Design Speed	*Posted, 45 mph*
Lane Width	*11' (Minimum); 1 - 12' Req'd. for National Truck Network Route*
Curb Offset	*2'; 1' (Minimum Along Median Island)*
Clear Zone	*10'*

Discussion of Alternatives/Recommendations

- Alternative 1: Reconstruct with Added Travel Lanes
- Alternative 2: Reconstruct with Displaced Left Intersections
- Alternative 3: No-Build Option

Alternative 1 – Reconstruct with Added Travel Lanes

This alternative proposes that the existing pavement be widened to accommodate an added travel lane in each direction. The existing two-way left-turn lane will be converted to a pervious median separated from the mainline by curb. The center median will be reduced to allow for left-turn lanes at major intersections, as well as, significant commercials developments and residential neighborhoods.

The existing shoulder will be eliminated and replaced with an added travel lane. A curb and gutter section will be added on both sides of US 36 to allow for the accumulation and transportation of stormwater runoff. In addition, curb and gutter acts as a traffic calming device, encouraging lower speeds throughout the project. Right-turn lanes will be added at major intersections. See ***Appendix E-1, Alternative 1 Layout*** for typical cross sections and plan view layout. A pedestrian facility on the north and south sides of US 36 is shown on the displays provided.

Improvements to Country Club Road and High School Road will be required to improve capacity per traffic analysis.

Widening of the existing bridges over the East Fork of White Lick Creek will be required for this alternative.

The resulting additional net impervious area due to the proposed improvements in Alternative 1 is approximately 1.2 acres. The watershed delineation for Alternative 1 can be found in **Appendix F, Watershed Map**. Per the Indiana Design Manual, the runoff from the project area must be detained such that the total runoff in a 100-year storm in proposed conditions does not exceed the total runoff in 10-year storm in existing conditions. US 36 is a heavily urbanized corridor with residential and commercial land use on either side of the roadway. Inline storm sewer detention is a feasible option to mitigate the runoff due to the improvements in Alternative 1. The inline detention will be located within the right-of-way on either side of the street.

Proposed curb inlets on either side of the street will be required due to the proposed improvements in Alternative 1. The curb inlets will drain into a proposed storm trunkline, a portion of which will be oversized to provide inline detention storage. Adequate horizontal and vertical separation of the proposed storm sewer infrastructure will be required with existing sub-surface utilities such as sanitary and water. A future neighborhood storm improvement project undertaken by the City of Indianapolis Department of Public Works (DPW) is located south of the US 36 project. The proposed stormsewer from the US 36 project can potentially connect and drain into the proposed DPW stormsewer system. Coordination will be required with the DWP staff pertaining to the drainage design.

It is anticipated that Alternative 1 will reduce crashes and improve safety by reducing overall congestion. By reducing the high density of vehicles such that there will be greater distance between vehicles, there will be more time for motorists to react to downstream congestion and intersection queues. Rear-end type crashes, as well as other crash types, will likely be reduced by this alternative. Another safety benefit of Alternative 1 would result from the removal of the existing two-way left-turn lane. Installing a raised

median in place of the existing two-way left-turn lane will create more access control along the corridor, therefore reducing the amount of potential crash occurrences.

This alternative meets the purpose and need of the project.

Alternative 2 – Reconstruct with Displaced Left Intersections

This alternative proposes that the existing pavement would remain in place and displaced left-turn intersections would be installed at the existing signals for the intersections of US 36 with Country Club Road, Girls School Road, and the west side of High School Road. The existing two-way left-turn lane will be converted to a pervious median separated from the mainline by curb. The existing signals at the intersections of Richie Avenue/Bridgeport Road and Transfer Drive will remain in the same configuration.

The existing shoulder would be removed, and a curb and gutter section will be added on both sides of US 36 to allow for the accumulation and transportation of stormwater runoff. See ***Appendix E-2, Alternative 2 Layout*** for typical cross sections and plan view layout. A pedestrian facility on the north and south sides of US 36 is shown on the displays provided.

Improvements to Country Club Road and High School Road will be required to improve capacity.

Widening of the existing bridges over the East Fork of White Lick Creek will be required for this alternative.

No additional impervious area is anticipated due to the proposed improvements.

It is anticipated that Alternative 2 will likely improve corridor capacity, reduce vehicle density, and decrease the total number of rear-end crashes, as well as other crash types. The Federal Highway Administration's (FHWA's) Displaced Left Turn Intersection Informational Guide, published in August 2014, comments that while this type of intersection is relatively new without a lot of empirical safety data, it does… "offer several potential safety advantages compared to the conventional intersection by reducing conflict points and channelizing turning movements." There is no overwhelming industry evidence at this point of any significant safety advantage of a displaced lefts intersection over a traditional intersection, but there is also no indication of a safety concern with displaced lefts intersections. The 2014 FHWA document also comments that the potential safety improvement of the displaced lefts intersection must be balanced with the potential for wrong-way movements. Proper design is critical for minimizing this potential.

This alternative meets the purpose and need of the project.

Alternative 3 – No-Build Option

This alternate would allow the existing roadway and structures to remain in place with no improvements, which will result in the corridor not being able to accommodate additional traffic volumes. This alternative does not meet the need nor achieves the purpose of the project and will not be considered.

Discussion of Pedestrian Facility Alternatives/Recommendations

The results of a public outreach campaign have shown a strong desire for pedestrian facilities throughout this corridor. As a result, five alternatives for pedestrian facilities have been considered in order to provide appropriate facilities while minimizing the need for right-of-way and satisfying the secondary purpose of the project.

- Alternative P1: Shared use path along the north side of US 36 with a 5 ft buffer; Sidewalk with 5 ft buffer constructed along the south side of US 36

- Alternative P2: Shared use path along the north side of US 36 with no buffer; Sidewalk with no buffer constructed along the south side of US 36
- Alternative P3: Sidewalk with no buffer constructed along the north and south sides of US 36
- Alternative P4: Sidewalk with no buffer on north side only
- Alternative P5: No pedestrian facilities

The Pedestrian Alternative P1 and the associate right-of-way requirements are shown in ***Appendix E-1, Alternative 1 Layout*** and ***Appendix E-2, Alternative 2 Layout***. Impacts related to the other alternatives can be found in **Table 9** and **Table 11**.

Traffic Analysis

A traffic capacity analysis was performed for the AM and PM peak periods, for the base year (2019), open to traffic year (2025) and the future year (2045), for the following three alternatives:

- Alternative 1: Reconstruct with Added Travel Lanes
- Alternative 2: Reconstruct with Displaced Left Intersections
- Alternative 3: No-Build Option

The traffic capacity of an existing or a proposed roadway or intersection is commonly reported as a level of service (LOS) from A to F, with LOS A being the best performing and LOS F being the worst performing.

- **LOS A (Free Flow):** Traffic flow and lane changing unimpeded, at or above the posted speed limit
- **LOS B (Reasonably Free Flow):** Slight restrictions to maneuverability and lane changing but traffic flow still at or above the posted speed limit
- **LOS C (Stable Flow):** Noticeable restrictions to maneuverability and lane changing but traffic flow still maintaining the posted speed limit
- **LOS D (Approaching Unstable Flow):** Maneuverability much more restricted; traffic flow falling below the posted speed limit
- **LOS E (Unstable Flow):** Roadway operating at capacity; traffic flow becoming irregular and subject to backups
- **LOS F (Breakdown Flow):** Very slow traffic flow, at or approaching gridlock

The signalized intersections, as well as the corridor in general was the primary focus of the analysis. *Synchro* software was used to analyze the signalized intersections. The result of the *Synchro* analysis is a LOS from A to F. LOS for a signalized intersection is based on the average delay in seconds for the vehicles travelling through the intersection, realizing that some vehicles will travel through on a green signal phase while others must wait for a red signal phase to turn green before traveling through the intersection. The average delay is calculated for the entire group of vehicles travelling through the intersection in the peak hour. **Table 4** below lists the average delay thresholds for LOS A through LOS F.

Table 4: Signalized Intersection LOS Thresholds

LOS	Average Signalized Intersection Delay
A	≤ 10 seconds
B	10-20 seconds
C	20-35 seconds
D	35-55 seconds
E	55-80 seconds
F	>80 seconds

The corridor was analyzed using the *SimTraffic* microsimulation software. The microsimulation for this project is a model that places vehicles on a roadway network that represents the US 36 corridor, i.e. speed limit, number of mainline lanes, turn lanes at intersections, and the same traffic signal phasing at intersections as is used in the *Synchro* analysis. The corridor analysis is important because it captures the progression of traffic through the corridor. The microsimulation model tracks each individual vehicle within the network during the peak hour and can report information such as average travel time for vehicles travelling between Raceway Road and the southbound I-465 exit ramp. This analysis takes into consideration the delay at the signalized intersections but doesn't focus as much on the actual operation of the traffic signal as the *Synchro* analysis does.

From a traffic operations standpoint, Alternative 1, the added travel lanes alternative, is anticipated to perform the best of the three alternatives. Alternative 3, the no-build alternative, is anticipated to perform the worst of the three alternatives at an unacceptable level. Alternative 2, the displaced left-turn intersections alternative, is anticipated to perform better than the no-build alternative but not as well as the added travel lanes.

Much of the delay and congestion along the US 36 corridor is caused by the signalized intersections due to the fact that traffic must come to a complete stop on US 36 during the red signal phase which creates a queue. The added travel lanes alternative not only provides an additional lane for mainline thru traffic, it also provides additional storage on US 36 at the signalized intersections such that less green signal phase time is needed to move the large amount of US 36 traffic and more green time can be shared among all the signal phases. This shared green time results in an overall reduction in the average delay at the signalized intersections.

Alternative 2 increases capacity and reduces delay by pulling the US 36 left-turns at the intersection with the cross street out of the main signal control, allowing these left-turns to occur simultaneously with the opposing mainline US 36 through movements. However, there are potential issues with the displaced left-turn intersections alternative that cause it to be less desirable than the added travel lanes alternative. The heavy directional volume during peak hours creates challenges at the signal with the two mainline thru lanes at the intersection called for with Alternative 2. The overall anticipated intersection LOS may appear to be adequate, but the mainline US 36 approach to the intersection carrying the peak directional flow, eastbound in the AM peak and westbound in the PM peak, are high and in some cases have a volume to capacity (V/C) ration greater than 1.0. A volume to capacity ratio greater than 1.0 can mean there is more anticipated traffic volume than the capacity of the proposed roadway can comfortably handle. It is anticipated that Alternative 2 (Displaced Left Intersections) will have V/C ratios greater than 1.0 for mainline thru movements in the peak hours beginning in 2026 which would necessitate the need for

additional thru lanes on US 36. Having V/C ratios at are above 1.0, especially for a mainline thru movement introduces volatility that queuing could occur instantaneously if there were a slight peak in traffic. The displaced left-turn intersections alternative is anticipated to have queuing from the main signal to the minor adjacent signal (part of the 3 signals system working as one) at some of the intersections. This volatility could significantly hinder traffic operations. Furthermore, the US 36 intersections with Transfer Drive and Bridgeport Road/Richie Avenue do not have a high enough volume of left-turns from mainline US 36 that would warrant the consideration for a displaced left-turn intersection as a potential solution. If a displaced left-turn intersection solution were chosen for this project, it would be desirable to provide them at every intersection for continuity and improved driver expectancy even though it may not be warranted at these two intersections. Therefore, displaced left-turn intersection would only be placed at the three signalized intersections noted above.

Table 5 summarizes the LOS anticipated LOS and average delay per vehicle for the three alternatives.

Table 5: Signalized Intersections LOS and Delay

US 36 at	2019 AM		2019 PM		2025 AM		2025 PM		2045 AM		2045 PM	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Richie Ave/Bridgeport Rd												
Added Travel Lanes	B	17.1	B	16.7	B	17.4	B	16.8	C	22.6	B	17.6
Displaced Lefts	C	26.3	C	22.7	C	29.4	C	22.7	D	44.9	C	24.2
No-Build	C	30.4	C	25.8	C	34.2	C	20.9	D	52.9	C	25.2
County Club Rd												
Added Travel Lanes	B	12.7	B	11.6	B	12.9	B	12.5	B	16.0	B	17.6
Displaced Lefts	C	21.6	C	20.6	B	19.9	C	24.2	C	31.4	D	40.8
No-Build	C	20.3	D	37.8	B	16.7	D	52.8	B	17.3	D	43.7
Transfer Dr												
Added Travel Lanes	A	2.8	A	7.1	A	2.7	A	7.1	A	2.2	A	6.3
Displaced Lefts	A	4.6	A	5.1	A	2.3	A	5.4	A	4.8	A	6.7
No-Build	A	2.7	A	6.1	A	3.5	A	6.6	A	5.7	A	9.3
Girls School Rd												
Added Travel Lanes	B	18.8	C	27.3	C	21.8	C	29.0	C	25.9	C	34.7
Displaced Lefts	C	27.0	C	23.4	C	26.4	C	24.6	D	36.5	C	32.0
No-Build	C	32.0	D	39.2	D	35.6	D	41.8	E	57.1	E	60.7
High School Rd												
Added Travel Lanes	C	23.4	C	28.4	B	19.8	C	25.8	C	25.2	C	27.4
Displaced Lefts	C	27.9	C	29.7	C	29.7	C	30.4	C	30.0	C	31.9
No-Build	C	31.8	E	56.9	C	32.9	E	57.5	D	41.7	E	64.9

It is important to note a displaced left intersection is comprised of three signals connected together and working as a single signal. **Table 5** only captures the delay for the main signal at the intersection of US 36 and the cross street. **Table 6** reports that value and reports the LOS and delay for the minor signals on each side of the main signal. There is small delay at each of the minor signals, and it is important to look

at the delay at all three signals that comprise a displaced lefts signalized intersection when comparing it to other alternatives. **Table 5** skews the results for the Alternative 2 in a slightly more favorable direction.

Table 6: Displaced Lefts Minor Signals LOS and Delay

US 36 at	2019 AM		2019 PM		2025 AM		2025 PM		2045 AM		2045 PM	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Country Club Rd												
West Signal	A	4.2	A	7.1	A	5.5	A	7.5	A	5.9	B	10.4
Main Intersection	C	21.6	C	20.6	B	19.9	C	24.2	C	31.4	D	40.8
East Signal	A	0.9	A	0.5	A	1.3	A	0.5	A	2.2	A	0.7
Girls School Rd												
West Signal	A	2	A	4.1	A	3.5	A	4.5	A	3.6	A	5
Main Intersection	C	27	C	23.4	C	26.4	C	24.6	D	36.5	C	32
East Signal	A	3.7	A	3.2	A	4.9	A	3.3	A	6.6	A	4.2
High School Rd												
West Signal	A	0.8	A	1.1	A	0.8	A	1.1	A	0.9	A	1.2
Main Intersection	C	27.9	C	29.7	C	29.7	C	30.4	C	30	C	31.9

Table 7 summarizes the SimTraffic corridor microsimulation results for the three alternatives. Alternative 1 (Added Travel Lanes) and the Alternative 2 (Displaced Left Intersections) perform significantly better than the Alternative 3 (No-Build Option), reducing the overall time for the US 36 corridor between Raceway Road and the southbound I-465 exit ramp up to 25%. This travel time includes the anticipated delays at the signalized intersections, as well as the travel time between signalized intersections.

Table 7: Corridor Average Travel Time

Average Travel Time per Vehicle (minutes)	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Eastbound						
Added Travel Lanes	5.8	5.3	5.6	5.4	6.2	5.2
Displaced Lefts	6.8	5.5	6.8	5.5	6.4	5.7
No-Build	6.4	6.1	7.5	6.3	8.2	7.0
Westbound						
Added Travel Lanes	5.0	5.5	5.1	5.6	5.2	5.6
Displaced Lefts	5.4	5.7	5.7	5.8	5.5	6.0
No-Build	5.8	6.5	6.6	6.9	6.8	7.7

See ***Appendix G-1, Traffic Analysis*** for additional information regarding traffic modeling and ***Appendix G-2, Traffic Summary*** for a more detail breakdown of traffic information.

Based on feedback from the public information meetings, it was determined that dual left-turn lanes in place of the displaced left-turn intersection at the US 36 intersections with Country Club Road, Girls School Road and High School Road should be evaluated. The corridor was evaluated using *Simtraffic* software,

and the individual signalized intersections were modeled with *Sychro* software. The displaced left-turn option performed better in the corridor progression analysis and the results varied for the individual signalized intersections. Additionally, any dual left option would require additional receiving lanes on the side streets. For these reasons, adding dual left-turn lanes at intersection in place of the displaced left-turn intersections was eliminated from consideration.

Cost Estimate

The cost of each alternative is summarized in **Table 8**. The cost provided in this table does not include the proposed pedestrian facilities. The cost of each pedestrian facility alternative can be found in **Table 9**. See ***Appendix H, Cost Estimates*** for additional information.

Table 8: Alternative Cost Estimate Summary

	Roadway Alternative	
	Alternative	**Cost**
Reconstruct with Added Travel Lanes	**1**	$21,088,500
Reconstruct with Displaced Left Intersections	**2**	$17,261,815
No Build Option	**3**	N/A

Table 9: Pedestrian Facility Cost Estimate Summary

	Pedestrian Alternatives	
	Alternative	**Cost**
10’ Multi-Use Path w/Buffer; 6’ Sidewalk	**P1**	$1,401,890
10’ Multi-Use Path w/No Buffer; 6’ Sidewalk	**P2**	$1,317,200
6’ Sidewalk; 6’ Sidewalk	**P3**	$1,541,495
6’ Sidewalk on North Side Only	**P4**	$919, 195
No Pedestrian Facility	**P5**	-

Environmental Impacts and Issues

Project development will include the preparation of an environmental document conforming to National Environmental Policy Act (NEPA) standards and guidance as well INDOT and Federal Highway Administration (FHWA) procedures for preparing environmental studies. While there are numerous environmental resources, natural and human, that could be impacted by this project, at this preliminary stage, there does not appear to be any environmental issues that would delay the project.

The extensive public outreach effort will continue with the NEPA phase. Section 106 historic properties investigation will commence to determine if there are any existing, or eligible-to-be-listed, National Register of Historic Places (NRHP) properties or districts within the area of potential effect (APE). If there are, additional analysis will determine if these resources will be adversely affected by this project. Similarly, Section 4(F) analysis will be undertaken if it is anticipated that this project will “use” a historic property or a publicly available recreational area, such as the Cloverleaf Conservation Area south of US 36 at the crossing of the East Fork of White Lick Creek. Noise analysis will be performed as part of this project. Waters of the U.S., including jurisdictional wetlands and streams, will be field delineated so that any potential impacts can be assessed and mitigated through a permitting process. The previously mentioned East Fork of White Lick Creek is the largest stream in the project area. Any floodplain and/or

floodway will be investigated as part of this project. There are numerous other ditches and drainage facilities in the project area. Threatened and endangered species will also be investigated as part of the NEPA process. Endangered bats could be present on the underside of the US 36 bridge over the East Fork of White Lick Creek. Hazardous materials sites will also be researched as part of the Red Flag Investigation (RFI) effort early in the NEPA process.

Survey Requirements

Topographical survey has been obtained within the project limits. It is anticipated that additional survey may be required near the intersection of US 36 and the I-465 ramps.

Right-of-Way Impact

The existing right-of-way width varies throughout the project but is typically located between 65 ft to 85 ft on either side of the centerline. Right of way acquisition is anticipated for all alternatives based on the pedestrian facility and improvements to side streets.

The various pedestrian alternatives will require different amounts of right-of-way as shown in **Table 10** below. The right-of-way areas shown below for the pedestrian alternatives are associated with the added travel lanes alternative. Pedestrian Alternative P5 represents the required right-of-way for side street improvements.

Right of way price per acre have been approximated as noted. Temporary right-of-way acquisition is expected for construction operations. The anticipated cost for proposed right-of-way has been estimated in **Table 11**.

Table 10: Right of Way Acquisition Acreage Summary – Pedestrian Alternatives

Pedestrian Facility	Permanent Right of Way Acquisition Area			
	Residential	Commercial	Industrial	Total (Acres)
P1	0.11	0.30	0.00	0.41
P2	0.00	0.13	0.00	0.13
P3	0.00	0.063	0.00	0.063
P4	0.00	0.057	0.00	0.057
P5	0.00	0.057	0.00	0.057

Table 11: Right of Way Acquisition Cost Summary – Pedestrian Alternatives

Pedestrian Facility	Permanent Right of Way Acquisition Cost			
	Residential ($60,000/acre)	Commercial ($150,000/acre)	Industrial ($30,000/acre)	Total Cost (Dollars)
P1	$6,800	$45,540	$0	$52,340
P2	$0	$19,490	$0	$19,490
P3	$0	$9,480	$0	$9,480
P4	$0	$8,550	$0	$8,550
P5	$0	$8,550	$0	$8,550

Due to the addition of turn lanes along Country Club Road and High School Road for Alternative 1 an additional 0.3 acres of commercial right-of-way would be required estimated at $45,000.

Due to the urban nature of the corridor, Alternative 2 would require major impacts to businesses and residences adjacent to US 36 at the signalized intersections. It is likely that businesses located in the northwest and southeast quadrants of the intersection with High School Road and Girls School Road would lose access adjacent to US 36 because of the raised curb required for the separation of opposing traffic for the displaced left-turn. Additionally, a complete right-of-way acquisition of a parcel in the following location may be required:

- Northwest quadrant of the intersection of US 36 and Country Club Road – **2.43 acres**

The total cost of right-of-way acquisition for Alternative 2 is estimated to be $163,000.

Maintenance of Traffic

Two lanes of traffic in each direction should be maintained during construction operations to provide accessibility to residents and businesses and to limit the amount of traffic detoured to other roadways. Extensive coordination between all shareholders will be required.

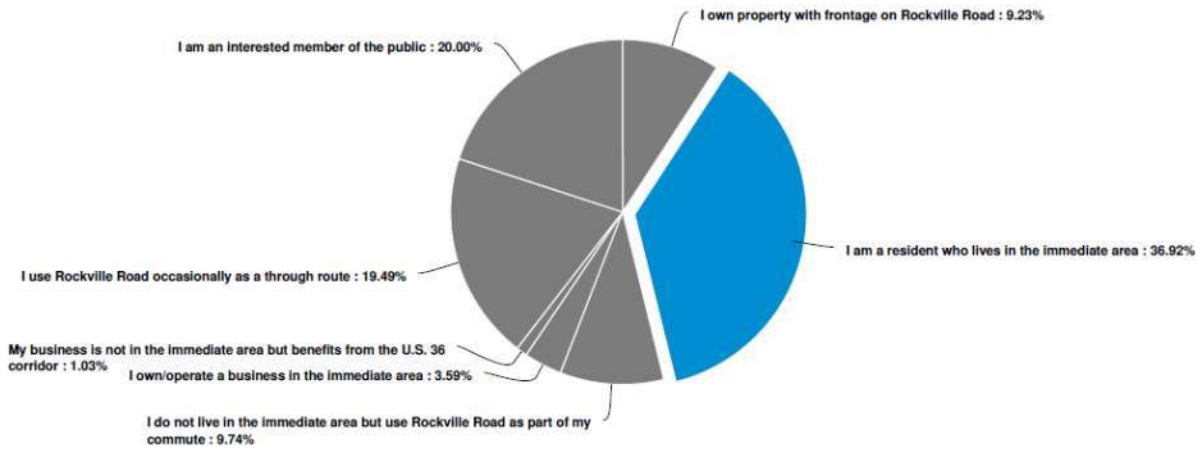
A four-phase maintenance of traffic scheme is recommended. The first phase would require that all lanes of traffic be shifted to the north while the southern portion is constructed. Traffic would then be shifted to the south while the northern section is constructed. The third phase would require that eastbound and westbound lanes be split for the construction of the raised median. The final phase would include the resurfacing work on the existing travel lanes. See ***Appendix I, Maintenance of Traffic***. A two-season construction schedule is anticipated.

Since this project is deemed significant based on traffic volume, a written Traffic Management Plan (TMP) will be developed. This TMP will include a Temporary Traffic Control Plan (TTCP), a Transportation Operations Plan (TOP), and a Public Information Plan (PIP).

Public Engagement

An extensive public outreach campaign which included two separate questionnaires to gather public input as well as multiple public information meetings was performed as part of the project development. The results of these questionnaires were tabulated and analyzed by the project team. This information was then utilized to determine the recommended alternative as public input was a major consideration for this project. Most participants own property or businesses or live in the immediate area of US 36.

Figure 3: Public Engagement Survey Participation



The results and evaluation of these questionnaires and public meetings is summarized is the section below.

Left Turn Locations

An open-ended question was asked on the public engagement questionnaire at which locations gaps should be place in the median for left turns. Many responses requested that gaps in the median only be placed at the signalized intersections. While limiting the number of left-turns helps with safety and mobility, the intent of the project is to make reasonable accommodations for residential and commercial interests along the corridor.

Some of the public comments requested the raised median be removed from the project. One of the goals of the project is to increase safety throughout the corridor. The addition of the raised median will eliminate uncontrolled left-turns across oncoming traffic which will decrease the number of potential conflict points. A concern with the raised median is that emergency vehicles will have a delayed response time. For this reason, the distance between median will be limited to ensure adequate access for emergency vehicles.

Based on the responses from the questionnaire, efforts will be made to provide cross traffic access to the majority of side streets within this corridor as well as major businesses along US 36. Median openings will be reviewed following the Stage 1 design.

Sidewalk

A 10 ft wide multi-use path with a 5 ft wide grass buffer was indicated to be the recommended option as noted in the results of the public outreach. This option will be considered on the north side of US 36 in the recommended alternative. A multi-use path was considered on the south side of US 36 as well, but due to the additional cost of right-of-way, was eliminated from consideration. Instead, a sidewalk with 5 ft buffer will be the recommended option on the south side of US 36.

Public comments were also received that expressed the desire for no sidewalk or minimal sidewalk. Many of these comments were concerned with the proposed sidewalk impeding onto adjacent property while others were made from concerns for pedestrian safety. The purpose of this project is to increase safety as well as make US 36 a multimodal corridor to accommodate pedestrian traffic. The purpose of the project would not be met if sidewalk were not included in the project. Other areas of improvement will increase safety along the corridor. The need for right-of-way acquisition from adjacent landowners will be minimized.

Alternatives

The Added Travel Lane was indicated to be the recommended option as noted in the results of the public outreach. The major concern with this option was that an added travel lane would make the corridor feel like a highway rather than a residential area. The addition of curb and gutter adjacent to the travel lanes as well as the raised median is designed to act as a traffic calming measure to reduce travel speeds. Due to the elimination of the existing shoulder, the width of the existing roadway will not increase substantially.

The public was strongly opposed to the Displaced Left-Turn option. This alternative was presented because it satisfies the purpose and need of the project by alleviating congestion along US 36 while avoiding an additional travel lane throughout the corridor and impacting adjacent landowners.

Many comments were received that stated no work should be performed or that other corridors should be improved in place of US 36. The Do Nothing alternative does not meet the purpose and need of the project which is to improve traffic operation and improve safety.

It was suggested by several respondents that roundabouts should be utilized at the Country Club, Girls School Road and High School Road intersections. Based on the existing traffic volumes and an anticipated growth factor of 0.6% for this segment of US-36, the east/west movements would require a three-lane roundabout. The typical diameter for a roundabout of this configuration, which is also be able to accommodate the tractor trailers common to the area, would be approximately 250 ft. In addition to the significant impacts associated with the circular roadway, impacts would also be realized several hundred feet upstream and downstream as the lanes transition from the existing roadway to and from the roundabout. Finally, in order to achieve proper lane utilization, the third lane would need to extend roughly 700 ft either side of the intersection. Due to the significant impacts with this alternative, it was removed from consideration.

Many comments were received that suggested a complete corridor reconstruction similar to Keystone Parkway or US 31. While grade separated intersection are a very effective solution to relieving congestion, a corridor reconstruction of this magnitude would require limiting access to US 36 from adjacent properties. The loss of property and access is a concern for many of the stakeholders along this project. For this reason, along with an increased cost of construction, this option has been eliminated from consideration.

Conclusion

The recommended alternative is Alternative 1, Reconstruct with Added Travel Lanes. The recommended alternative was decided based on an evaluation by INDOT and feedback from multiple public information meetings which occurred in January and February of 2021. Although Alternative 1 has a higher

construction cost, there will be less property and right-of-way impacts. Additionally, Alternative 1 would be more consistent with driver expectancy. As part of the recommended alternative, a multi-use path will be located on the north side of US 36 and a sidewalk will be placed on the south side. The total anticipated cost of the project is as follow:

Estimated Project Costs – Alternative 1 (assume P1)	
Construction (CN)	$ 22,490,390
Right of Way[1]	$ 97,340
Utility	$ 100,000
TOTAL COST	**$ 22,687,730**

Estimated Project Costs – Alternative 2 (assume P1)	
Construction (CN)	$ 18,663,705
Right of Way[1]	$ 499,000
Utility	$ 500,000
TOTAL COST	**$ 19,662,705**

1- Based on assumed cost per acre.

Concurrence

Prepared by: _____ Date 6/1/2021
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Amy Groff, PE
INDOT Greenfield District System Asset Manager

Concur: _____ Date June 3, 2021
Luis Laracuente, PE
INDOT Greenfield District Traffic Engineer

Traffic Capacity Analysis Appendix

SimTraffic Corridor Travel Time Summary

Corridor Travel Time

Average travel time per vehicle (minutes)

Rank
- 1st
- 2nd
- 3rd

Direction	Alternative	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
EB	Added Travel Lanes	5.8	5.3	5.6	5.4	6.2	5.2
	Displaced Lefts	6.8	5.5	6.8	5.5	6.4	5.7
	No-Build	6.4	6.1	7.5	6.3	8.2	7.0
WB	Added Travel Lanes	5.0	5.5	5.1	5.6	5.2	5.6
	Displaced Lefts	5.4	5.7	5.7	5.8	5.5	6.0
	No-Build	5.8	6.5	6.6	6.9	6.8	7.7

Average time (in minutes) for vehicles to traverse the entire US 36 corridor within the project limits. Alternatives are ranked in order from fastest (green) to slowest (red) for each time period and direction of travel.

Traffic Capacity Analysis Appendix

Synchro Signal Delay Summary

Delay - Signal

Average delay per vehicle (seconds)

LOS
A
B
C
D
E

Intersection	Alternative	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Bridgeport/ Richie Ave	Added Travel Lanes	17.1	16.7	17.4	16.8	22.6	17.6
	Displaced Lefts	26.3	22.7	29.4	22.7	44.9	24.2
	No-Build	30.4	25.8	34.2	20.9	52.9	25.2
Country Club Rd	Added Travel Lanes	12.7	11.6	12.9	12.5	16.0	17.6
	Displaced Lefts	21.6	20.6	19.9	24.2	31.4	40.8
	No-Build	20.3	37.8	16.7	52.8	17.3	43.7
Transfer Dr	Added Travel Lanes	2.8	7.1	2.7	7.1	2.2	6.3
	Displaced Lefts	4.6	5.1	2.3	5.4	4.8	6.7
	No-Build	2.7	6.1	3.5	6.6	5.7	9.3
Girls School Rd	Added Travel Lanes	18.8	27.3	21.8	29.0	25.9	34.7
	Displaced Lefts	27.0	23.4	26.4	24.6	36.5	32.0
	No-Build	32.0	39.2	35.6	41.8	57.1	60.7
High School Rd	Added Travel Lanes	23.4	28.4	19.8	25.8	25.2	27.4
	Displaced Lefts	27.9	29.7	29.7	30.4	30.0	31.9
	No-Build	31.8	56.9	32.9	57.5	41.7	64.9

Average delay experienced by each vehicle (in seconds) at signalized intersections along the US 36 corridor, compared by alternative.

Traffic Capacity Analysis Appendix

Synchro Signal Delay and v/c Ratio Summary by Alternative

Delay - Added Travel Lanes

Average delay per vehicle (seconds)

LOS
A
B
C
D
E
F

Intersection	Approach	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Bridgeport/ Richie Ave	Overall	17.1	16.7	17.4	16.8	22.6	17.6
	EB	23.4	30.4	23.8	30.3	27.7	31.6
	WB	4.2	8.1	4.3	8.2	11.1	8.7
	NB	17.6	14.6	18.5	14.9	26.2	15.7
	SB	21.1	19.4	21.7	19.4	24.7	19.9
Country Club Rd	Overall	12.7	11.6	12.9	12.5	16.0	17.6
	EB	11.3	8.8	11.7	9.1	13.8	11.3
	WB	11.6	11.6	11.3	13.0	15.6	20.5
	NB	23.0	20.1	24.0	20.2	27.1	20.8
	SB	29.4	16.8	29.4	17.8	36.3	23.9
Transfer Dr	Overall	2.8	7.1	2.7	7.1	2.2	6.3
	EB	1.5	6.5	1.6	6.7	1.6	6.2
	WB	3.9	5.9	3.5	5.4	2.1	3.8
	SB	22.3	22.5	23.5	24.0	28.5	29.0
Girls School Rd	Overall	18.8	27.3	21.8	29.0	25.9	34.7
	EB	13.3	18.3	17.6	21.0	21.0	21.2
	WB	23.6	35.1	26.3	36.4	28.9	43.4
	NB	23.7	29.1	23.9	30.9	32.0	43.0
	SB	25.9	27.1	25.6	26.6	35.7	37.6
High School Rd	Overall	23.4	28.4	19.8	25.8	25.2	27.4
	EB	28.3	36.0	24.0	33.3	29.8	33.1
	WB	20.1	27.3	16.4	23.7	22.0	26.3
	NB	16.1	13.5	14.7	13.8	18.2	14.7
	SB	22.2	27.5	19.4	26.7	24.2	32.7

Average delay experienced by each vehicle (in seconds) at signalized intersections along the US 36 corridor by approach.

Corridor v/c Ratios - Added Travel Lanes

v/c Ratios
0.32 1.08

Lane ..	Intersection	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
EBT	Bridgeport/Richie Ave	0.82	0.76	0.85	0.81	0.90	0.84
	Country Club Rd	0.86	0.48	0.87	0.50	0.93	0.54
	Transfer Dr	0.63	0.48	0.71	0.57	0.72	0.54
	Girls School Rd	0.90	0.79	0.94	0.86	0.97	0.86
	High School Rd	0.80	0.86	0.84	0.87	0.80	0.84
WBT	Bridgeport/Richie Ave	0.32	0.62	0.35	0.67	0.36	0.69
	Country Club Rd	0.54	0.86	0.70	0.89	0.59	0.96
	Transfer Dr	0.47	0.59	0.50	0.71	0.50	0.68
	Girls School Rd	0.56	0.88	0.60	0.91	0.66	0.97
	High School Rd	0.57	0.76	0.57	0.73	0.59	0.77

Volume to capacity (v/c) ratios for mainline thru movements at signalized intersections along US 36. A v/c ratio greater than 1.0 indicates that the roadway is operating above its intended capacity.

Delay - Displaced Lefts

Average delay per vehicle (seconds)

LOS
A
B
C
D
E
F

Intersection	Approach	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Bridgeport/ Richie Ave	Overall	26.3	22.7	29.4	22.7	44.9	24.2
	EB	31.5	37.4	36.5	36.6	58.3	40.5
	WB	8.7	14.2	7.1	14.8	8.2	14.4
	NB	45.4	16.3	51.7	15.8	72.3	18.7
	SB	33.5	17.7	40.6	18.8	51.7	25.7
Country Club Rd	Overall	21.6	20.6	19.9	24.2	31.4	40.8
	EB	19.4	5.7	17.1	5.8	36.4	8.7
	WB	26.9	25.7	23.4	33.2	26.1	64.1
	NB	36.8	19.6	49.0	19.4	49.8	22.4
	SB	34.9	36.6	44.5	37.6	47.3	48.9
Transfer Dr	Overall	4.6	5.1	2.3	5.4	4.8	6.7
	EB	3.7	2.9	1.9	2.7	4.1	2.8
	WB	4.8	4.2	1.1	4.8	4.2	6.3
	SB	36.7	27.8	49.1	28.6	50.1	36.8
Girls School Rd	Overall	27.0	23.4	26.4	24.6	36.5	32.0
	EB	33.2	18.7	18.9	19.8	34.6	27.4
	WB	18.7	26.8	22.2	28.2	22.4	32.6
	NB	31.9	27.5	56.8	29.4	64.4	40.4
	SB	33.8	30.5	61.4	31.4	79.1	44.5
High School Rd	Overall	27.9	29.7	29.7	30.4	30.0	31.9
	EB	27.2	31.4	33.3	29.9	29.2	32.1
	WB	25.8	30.5	24.8	32.5	27.1	34.7
	NB	40.5	27.7	35.8	29.8	45.7	27.4
	SB	23.9	22.5	23.1	22.5	24.1	22.2

Average delay experienced by each vehicle (in seconds) at signalized intersections along the US 36 corridor by approach.

Corridor v/c Ratios - Displaced Lefts

v/c Ratios
0.32 1.08

Lane ..	Intersection	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
EBT	Bridgeport/Richie Ave	0.95	0.95	0.96	0.95	1.05	0.97
	Country Club Rd	0.95	0.78	0.92	0.75	1.03	0.87
	Transfer Dr	0.77	0.65	0.77	0.69	0.88	0.73
	Girls School Rd	0.97	0.83	0.87	0.80	1.01	0.87
	High School Rd	0.94	0.89	0.90	0.84	0.96	0.91
WBT	Bridgeport/Richie Ave	0.39	0.87	0.40	0.88	0.44	0.89
	Country Club Rd	0.60	0.96	0.44	0.97	0.65	1.08
	Transfer Dr	0.45	0.82	0.45	0.86	0.51	0.91
	Girls School Rd	0.70	0.89	0.58	0.90	0.71	0.96
	High School Rd	0.68	0.86	0.70	0.87	0.71	0.92

Volume to capacity (v/c) ratios for mainline thru movements at signalized intersections along US 36. A v/c ratio greater than 1.0 indicates that the roadway is operating above its intended capacity.

Delay - No-Build

Average delay per vehicle (seconds)

LOS
A
B
C
D
E
F

Intersection	Approach	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Bridgeport/ Richie Ave	Overall	30.4	25.8	34.2	20.9	52.9	25.2
	EB	35.7	36.6	40.4	37.6	69.5	45.7
	WB	12.9	19.8	14.9	10.0	11.4	11.3
	NB	48.8	19.3	52.7	19.7	75.4	27.0
	SB	41.4	25.4	41.9	25.9	57.9	37.8
Country Club Rd	Overall	20.3	37.8	16.7	52.8	17.3	43.7
	EB	13.6	18.3	12.9	26.9	10.8	18.5
	WB	30.2	40.9	19.3	63.1	24.6	51.9
	NB	43.8	41.3	54.0	41.6	54.2	66.5
	SB	34.0	73.4	34.8	86.3	39.9	75.9
Transfer Dr	Overall	2.7	6.1	3.5	6.6	5.7	9.3
	EB	3.0	5.1	3.0	4.6	6.3	5.6
	WB	0.9	3.1	2.6	4.3	2.9	6.6
	SB	38.0	38.7	46.4	40.1	51.8	58.9
Girls School Rd	Overall	32.0	39.2	35.6	41.8	57.1	60.7
	EB	30.8	29.6	25.6	24.6	56.1	39.6
	WB	29.7	43.4	41.3	48.5	43.4	68.0
	NB	37.8	50.4	52.6	59.6	84.9	81.7
	SB	41.1	42.4	52.0	53.3	86.2	78.6
High School Rd	Overall	31.8	56.9	32.9	57.5	41.7	64.9
	EB	38.7	72.9	40.1	72.2	48.0	78.1
	WB	23.7	43.8	24.0	43.4	33.1	53.8
	NB	25.6	61.5	24.9	68.6	38.2	72.9
	SB	42.8	53.8	49.6	54.3	54.3	50.3

Average delay experienced by each vehicle (in seconds) at signalized intersections along the US 36 corridor by approach.

Corridor v/c Ratios - No-Build

v/c Ratios
0.32 1.08

Lane ..	Intersection	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
EBT	Bridgeport/Richie Ave	0.97	0.86	0.98	0.91	1.08	0.90
	Country Club Rd	0.92	0.56	0.93	0.59	0.96	0.61
	Transfer Dr	0.79	0.59	0.79	0.62	0.89	0.67
	Girls School Rd	0.98	0.88	0.97	0.87	1.07	0.93
	High School Rd	0.95	1.04	0.96	1.03	0.91	1.07
WBT	Bridgeport/Richie Ave	0.39	0.79	0.41	0.82	0.45	0.84
	Country Club Rd	0.71	1.03	0.83	1.08	0.79	1.06
	Transfer Dr	0.46	0.74	0.46	0.78	0.52	0.83
	Girls School Rd	0.66	0.96	0.80	0.98	0.75	1.03
	High School Rd	0.72	0.92	0.73	0.92	0.73	0.99

Volume to capacity (v/c) ratios for mainline thru movements at signalized intersections along US 36. A v/c ratio greater than 1.0 indicates that the roadway is operating above its intended capacity.

Delay - Displaced Lefts Minor Signals

Average delay per vehicle (seconds)

LOS
A
B
C
D
E

Intersection	Approach	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
Country Club Rd (West Signal)	Overall	4.2	7.1	5.5	7.5	5.9	10.4
	EB	4.4	9.2	5.7	9.2	5.2	12.9
	WB	3.6	5.5	5.0	6.2	7.5	8.5
Country Club Rd	Overall	21.6	20.6	19.9	24.2	31.4	40.8
	EB	19.4	5.7	17.1	5.8	36.4	8.7
	WB	26.9	25.7	23.4	33.2	26.1	64.1
	NB	36.8	19.6	49.0	19.4	49.8	22.4
	SB	34.9	36.6	44.5	37.6	47.3	48.9
Country Club Rd (East Signal)	Overall	0.9	0.5	1.3	0.5	2.2	0.7
	EB	1.0	0.5	1.4	0.5	2.9	0.5
	WB	0.7	0.6	0.9	0.6	1.1	0.8
Girls School Rd (West Signal)	Overall	2.0	4.1	3.5	4.5	3.6	5.0
	EB	2.6	4.1	3.4	4.4	4.5	5.5
	WB	1.0	4.1	3.7	4.6	2.2	4.7
Girls School Rd	Overall	27.0	23.4	26.4	24.6	36.5	32.0
	EB	33.2	18.7	18.9	19.8	34.6	27.4
	WB	18.7	26.8	22.2	28.2	22.4	32.6
	NB	31.9	27.5	56.8	29.4	64.4	40.4
	SB	33.8	30.5	61.4	31.4	79.1	44.5
Girls School Rd (East Signal)	Overall	3.7	3.2	4.9	3.3	6.6	4.2
	EB	3.1	2.5	2.7	2.7	5.0	3.2
	WB	4.7	3.4	8.1	3.5	8.7	4.3
High School Rd (West Signal)	Overall	0.8	1.1	0.8	1.1	0.9	1.2
	EB	1.1	1.2	1.2	1.2	1.2	1.3
	WB	0.4	0.9	0.4	1.0	0.4	1.1
High School Rd	Overall	27.9	29.7	29.7	30.4	30.0	31.9
	EB	27.2	31.4	33.3	29.9	29.2	32.1
	WB	25.8	30.5	24.8	32.5	27.1	34.7
	NB	40.5	27.7	35.8	29.8	45.7	27.4
	SB	23.9	22.5	23.1	22.5	24.1	22.2

Average delay experienced by each vehicle (in seconds) at signalized intersections along the US 36 corridor, by approach, for the Displaced Lefts intersections.

Corridor v/c Ratios - Displaced Lefts Minor Signals

v/c Ratios
0.33 1.08

Lane ..	Intersection	2019 AM	2019 PM	2025 AM	2025 PM	2045 AM	2045 PM
EBT	Country Club Rd (West Signal)	0.61	0.36	0.60	0.37	0.74	0.42
	Country Club Rd	0.95	0.78	0.92	0.75	1.03	0.87
	Country Club Rd (East Signal)	0.63	0.47	0.65	0.46	0.76	0.54
	Girls School Rd (West Signal)	0.70	0.45	0.60	0.45	0.78	0.61
	Girls School Rd	0.97	0.83	0.87	0.80	1.01	0.87
	Girls School Rd (East Signal)	0.88	0.74	0.75	0.66	0.93	0.81
	High School Rd (West Signal)	0.62	0.48	0.58	0.47	0.66	0.51
	High School Rd	0.94	0.89	0.90	0.84	0.96	0.91
WBT	Country Club Rd (West Signal)	0.59	0.88	0.44	0.89	0.70	0.97
	Country Club Rd	0.60	0.96	0.44	0.97	0.65	1.08
	Country Club Rd (East Signal)	0.33	0.55	0.34	0.53	0.38	0.69
	Girls School Rd (West Signal)	0.61	0.86	0.50	0.79	0.67	0.87
	Girls School Rd	0.70	0.89	0.58	0.90	0.71	0.96
	Girls School Rd (East Signal)	0.38	0.49	0.40	0.49	0.49	0.64
	High School Rd (West Signal)	0.49	0.70	0.46	0.59	0.51	0.66
	High School Rd	0.68	0.86	0.70	0.87	0.71	0.92

Volume to capacity (v/c) ratios for mainline thru movements at signalized intersections along US 36 for the Displaced Lefts intersections. A v/c ratio greater than 1.0 indicates that the roadway is operating above its intended capacity.

Bridge Inspection Report

036-49-03898 AWBL
US 36 WB
over
LITTLE WHITE LICK CREEK

Inspection Date: 03/03/2022

Inspected By: Travis Smith

Inspection Type(s): Routine

Inspector: Travis Smith

Inspection Date: 03/03/2022

Asset Name: 036-49-03898 AWBL

Facility Carried: US 36 WB

Bridge Inspection Report

Latitude: 39.76405

Longitude: -86.31074

Inspector: Travis Smith

Inspection Date: 03/03/2022

Asset Name: 036-49-03898 AWBL

Facility Carried: US 36 WB

Bridge Inspection Report

Latitude: 39.76405

Longitude: -86.31074

General Notes:

As of 7/1/13, the district boundary between the Crawfordsville and Greenfield districts was officially re-aligned to match the Western border of Marion County. Thus, all bridges previously inspected by Crawfordsville in Marion County became Greenfield district bridges. However, in an effort to level out the workload between districts, the State Bridge Inspection Manager had the Crawfordsville district continue to inspect these structures, even though they were technically now part of the Greenfield district. In March of 2020, the inspection of these bridges was given to Greenfield. Str. #36-49-3898 AWBL is one of these bridges.

Bent #1 is WEST.

The bridge was built in 1976, under contract B-10034.
'B' Rehab (Replaced approach slabs, longitudinal & transverse joints, New latex concrete overlay, Added concrete barrier) in 1991, B-19601.

DES. #1900341 - Programmed to be widened in 2023, under contract R-41781.

Inspector: Travis Smith
Inspection Date: 03/03/2022

Asset Name: 036-49-03898 AWBL
Facility Carried: US 36 WB

Bridge Inspection Report

IDENTIFICATION

(1) STATE CODE:	185 - Indiana
(8) STRUCTURE:	011681
(5 A-B-C-D-E) INV. ROUTE:	1 - 2 - 1 - 00036 - 0
(2) HIGHWAY AGENCY DISTRICT:	03 - Greenfield
(3) COUNTY CODE:	049 - MARION
(4) PLACE CODE:	36000 - INDIANAPOLIS
(6) FEATURES INTERSECTED:	LITTLE WHITE LICK CREEK
(7) FACILITY CARRIED:	US 36 WB
(9) LOCATION:	02.30 W I-465
(11) MILEPOINT:	0000.860

(12) BASE HIGHWAY NETWORK:	1
(13A) INVENTORY ROUTE:	0000000001
(13B) SUBROUTE NUMBER:	01
(16) LATITUDE:	39.76405
(17) LONGITUDE:	-86.31074
(98) BORDER	
A) STATE NAME:	
B) PERCENT	%
(99) BORDER BRIDGE STRUCT. NO:	

STRUCTURE TYPE AND MATERIAL

(43) STRUCTURE TYPE, MAIN:	
A) KIND OF MATERIAL/DESIGN:	2 - Concrete continuous
B) TYPE OF DESIGN/CONSTR:	01 - Slab
(44) STRUCTURE TYPE, APPROACH SPANS:	
A) KIND OF MATERIAL/DESIGN:	0 - Other
B) TYPE OF DESIGN/CONSTR:	00 - Other

(45) NUMBER OF SPANS IN MAIN UNIT:	003
(46) NUMBER OF APPROACH SPANS:	0000
(107) DECK STRUCTURE TYPE:	1 - Concrete Cast-in-Place
(108) WEARING SURFACE/PROT SYS:	
A) WEARING SURFACE:	3 - Latex Concrete or similar additive
B) DECK MEMBRANE:	0 - None
C) DECK PROTECTION:	0 - None

AGE OF SERVICE

(27) YEAR BUILT:	1976
(106) YEAR RECONSTRUCTED:	1991
(42) TYPE OF SERVICE:	
A) ON BRIDGE:	1 - Highway
B) UNDER BRIDGE:	5 - Waterway

(28) LANES:	
A) ON BRIDGE:	02
B) UNDER BRIDGE:	00
(29) AVERAGE DAILY TRAFFIC:	024998
(30) YEAR OF AVERAGE DAILY TRAFFIC:	2019
(109) AVERAGE DAILY TRUCK TRAFFIC:	05 %
(19) BYPASS DETOUR LENGTH:	001 MI

Bridge Inspection Report

GEOMETRIC DATA

(48) LENGTH OF MAX SPAN:	0048.0	FT	(35) STRUCTURE FLARED:	0 - No flare	
(49) STRUCTURE LENGTH:	00121.5	FT	(10) INV RTE, MIN VERT CLEARANCE:	99.99	FT
(50) CURB/SIDEWALK WIDTHS:			(47) TOT HORIZ CLEARANCE:	041.7	FT
A) LEFT	00.0	FT	(53) VERT CLEAR OVER BR RDWY:	99.99	FT
B) RIGHT:	00.0	FT	(54) MIN VERTICAL UNDERCLEARANCE:		
(51) BRDG RDWY WIDTH CURB-TO-CURB:	041.7	FT	A) REFERENCE FEATURE:	N	
(52) DECK WIDTH, OUT-TO-OUT:	043.2	FT	B) MIN VERT UNDERCLEAR:	00.00	FT
(32) APPROACH ROADWAY	042.0	FT	(55) LATERAL UNDERCLEARANCE RIGHT:		
(33) BRIDGE MEDIAN:	0 - No median		A) REFERENCE FEATURE:	N	
			B) MIN LATERAL UNDERCLEAR:	000.0	FT
(34) SKEW:	00	DEG	(56) MIN LATERAL UNDERCLEAR ON LEFT:	00.0	FT

INSPECTIONS

(90) INSPECTION DATE:	03/03/2022	(91) DESIGNATED INSPECTION FREQUENCY:	24 MONTHS
(92) CRITICAL FEATURE INSPECTION:		(93) CRITICAL FEATURE INSPECTION DATE:	
A) FRACTURE CRITICAL REQUIRED/FREQUENCY:	N	A) FRACTURE CRITICAL DATE:	
B) UNDERWATER INSPECTION REQUIRED/FREQUENCY:	N	B) UNDERWATER INSP DATE:	
C) OTHER SPECIAL INSPECTION REQUIRED/FREQUENCY:	N	C) OTHER SPECIAL INSP DATE:	

CONDITION

(58) DECK:	6 - Satisfactory Condition (minor deterioration)	(60) SUBSTRUCTURE:	7 - Good Condition (some minor problems)
(58.01) WEARING SURFACE:	6 - Satisfactory Condition	(61) CHANNEL/CHANNEL PROTECTION:	6 - Bank slump. widespread minor damage
(59) SUPERSTRUCTURE:	6 - Satisfactory Condition (minor deterioration)	(62) CULVERTS:	N - Not Applicable

CONDITION COMMENTS

(58) DECK: 6 - Satisfactory Condition (minor deterioration)

Comments:
See Superstructure.

(58.01) WEARING SURFACE: 6 - Satisfactory Condition

Comments:
Wearing surface: wide structure-length longitudinal reflective crack along right edgeline above construction joint (120'); fairly wide transverse cracks (~150’); small spall at edgeline at the West end.

(59) SUPERSTRUCTURE: 6 - Satisfactory Condition (minor deterioration)

Comments:
Continuous Reinforced Concrete Slab: entire North coping bottom edge repointed - some delaminations & minor spalls (120' cs2); longitudinal joint - surface sealed, some repointing & delaminations (span B - 15 SF in cs2, span C - 32 SF in cs2) - heavier delaminations in span A, deeper at West end with spalling & rebar exposure (15 SF in cs2, 25 SF in cs3);
North construction joint (10' from coping) - minor leakage, longitudinal cracks & efflorescence, rust-staining in spans B & C - fairly heavy in span B (84' in cs2);
South construction joint (8' from longitudnal joint in median) - efflorescence & minor leakage, 10' of delaminations at East end span C; Span A - minor transverse cracking ~5' from Pier #2.

(60) SUBSTRUCTURE: 7 - Good Condition (some minor problems)

Comments:
Pier stems have minor vertical cracks.

(61) CHANNEL/CHANNEL PROTECTION: 6 - Bank slump. widespread minor damage

Comments:
Channel flows from North to South below the bridge.
Large area of aggregation along West Bank at upstream side of bridge.
Rip rap at end bents.

(62) CULVERTS: N - Not Applicable

Comments:

LOAD RATING AND POSTING

(31) DESIGN LOAD:	5 - HS 20	(66) INVENTORY RATING:	0.843
(70) BRIDGE POSTING	5 - Equal to or above legal loads	(65) INVENTORY RATING METHOD:	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.
(41) STRUCTURE OPEN/POSTED/CLOSED:	A - Open		
(64) OPERATING RATING:	1.093		
(63) OPERATING RATING METHOD:	8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.	(66B) INVENTORY RATING (H):	
		(66C) TONS POSTED :	
		(66D) DATE POSTED/CLOSED:	

APPRAISAL

SUFFICIENCY RATING:	92.7	(36) TRAFFIC SAFETY FEATURE:	
STATUS:	0	36A) BRIDGE RAILINGS:	1
(67) STRUCTURAL EVALUATION:	6	36B) TRANSITIONS:	0
(68) DECK GEOMETRY:	7	36C) APPROACH GUARDRAIL:	0
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL:	N	36D) APPROACH GUARDRAIL ENDS:	1

(71) WATERWAY ADEQUACY: 9 - Bridge Above Flood Water Elevations

Comments:
Bridge above flood water elevation. HW Elevation = 768.4
Low Concrete Elevation = 770.38.

(72) APPROACH ROADWAY ALIGNMENT: 8 - Equal to present desirable criteria

Comments:

(113) SCOUR CRITICAL BRIDGES: 8 - Stable for scour conditions

Comments:
Piles, minor scour @ piers #2 & #3, in-filling under Span B.

CLASSIFICATION

(20) TOLL:	3 - On Free Road	(21) MAINT. RESPONSIBILITY:	01 - State Highway Agency
(22) OWNER:	01 - State Highway Agency	(26) FUNCTIONAL CLASS OF INVENTORY RTE:	12 - Urban - Principal Arterial - Other Freeway or Expressway
(37) HISTORICAL SIGNIFICANCE:	5 - Not eligible	(100) STRAHNET HIGHWAY:	Not a STRAHNET route
(101) PARALLEL STRUCTURE:	L - Left structure (South or West)	(102) DIRECTION OF TRAFFIC:	1-way traffic
(103) TEMPORARY STRUCTURE:		(104) HIGHWAY SYSTEM OF INVENTORY ROUTE:	1 - Structure/Route is on NHS
(105) FEDERAL LANDS HIGHWAYS:	0-Not Applicable	(110) DESIGNATED NATIONAL NETWORK:	Inventory route on National Truck Network
(112) NBIS BRIDGE LENGTH:	Yes		

NAVIGATION DATA

(38) NAVIGATION CONTROL:	0 - No navigation control on waterway (bridge permit not required)	(39) NAVIGATION VERTICAL CLEAR:	000.0 FT
(111) PIER OR ABUTMENT PROTECTION:		(116) MINIMUM NAVIGATION VERT. CLEARANCE, VERT. LIFT BRIDGE:	FT
		(40) NAV HORIZONTAL CLEARANCE:	0000.0 FT

PROPOSED IMPROVEMENTS

(75A) TYPE OF WORK:		(95) ROADWAY IMPROVEMENT COST:	$ 000000
(75B) WORK DONE BY:		(96) TOTAL PROJECT COST:	$ 000000
(76) LENGTH OF IMPROVEMENT:	000000 FT	(97) YR OF IMPROVEMENT COST EST:	
(94) BRIDGE IMPROVEMENT COST:	$ 000000	(114) FUTURE AVG DAILY TRAFFIC:	023925
		(115) YR OF FUTURE ADT:	2034

Inspector: Travis Smith
Inspection Date: 03/03/2022

Asset Name: 036-49-03898 AWBL
Facility Carried: US 36 WB

Bridge Inspection Report

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
38 - Reinforced Concrete Slab	2 - Low	5249	sq. ft.	4958	266	25	0
	Slab Area = Lo x Wo 121.50' X 43.20' = 5248.80 SF						
510 - Wearing Surfaces		5067	sq. ft.	4797	270	0	0
	Wearing Surface Area = Lo x Wc 121.50' X 41.70' = 5066.55 SF						
210 - Reinforced Concrete Pier Wall	2 - Low	86	ft.	86	0	0	0
	Tot. wall length = Np x (Wo / cos(π /180 x Sk) - 2 xLh) 2 EA X (43.200 LF/cos(π /180 x 0.00000) - 2 EA x 0.00 LF) = 86.40 LF 2 Piers X 43.20' = 86.40 LF						
215 - Reinforced Concrete Abutment	2 - Low	86	ft.	86	0	0	0
	Abuts. Length = 2 EA x Wo / cos(π /180 x Sk) 2 Abutments X 43.200 LF/cos(π /180 x 0.00000) 2 Abutments X 43.20' = 86.40 LF End bents are identified as abutments for Element Level inspections.						
302 - Compression Joint Seal	2 - Low	86	ft.	0	0	86	0
	Joints. Length = 2 EA x Wo / cos(π /180 x Sk) 2 Joints X 43.200 LF/cos(π /180 x 0.00000) 2 Joints X 43.20' = 86.40 LF						
321 - Reinforced Concrete Approach Slab	2 - Low	1710	sq. ft.	1643	67	0	0
	Total Approach Slab Area = Wc (La + Long Side) Wc X (La + (La + Wc X tan(PI/180 X Sk)) 41.70' X (20.50' + 20.50') = 1709.70 SF						
331 - Reinforced Concrete Bridge Railing	2 - Low	243	ft.	243	0	0	0
	2 barrier rails X 121.50' = 243.00 LF						

PHOTO 2

Description East approach

PHOTO 3

Description East approach slab

PHOTO 4

Description East approach slab

PHOTO 5

Description East joint

PHOTO 6

Description Deck over looking West

PHOTO 7

Description Crack right edge line

PHOTO 8

Description East approach from center

PHOTO 9

Description Looking North

PHOTO 10

Description West approach from centet

PHOTO 11

Description Deck over looking East

PHOTO 12

Description West joint

PHOTO 13

Description West approach slab

PHOTO 14

Description Cracks West approach slab

PHOTO 15

Description West approach

PHOTO 16

Description North coping

PHOTO 17

Description Bent 1, West

PHOTO 18

Description Deck under Span A

PHOTO 19

Description Construction joint repointing

PHOTO 20

Description Construction joint failed repointing and spalling

PHOTO 21

Description Pier 2

PHOTO 22

Description Deck under Span B

PHOTO 23

Description Construction joint repointing, delaminations

PHOTO 24

Description North construction joint, rust staining, delaminations, spalling

PHOTO 25

Description North coping underside repointing delaminations

PHOTO 26

Description Channel alignment Span B

PHOTO 27

Description North coping underside, repointing delaminating and spalling, Span A

PHOTO 28

Description Span A construction joint, cracks, efflorescence

PHOTO 29

Description Pier 3

PHOTO 30

Description Deck under Span C

PHOTO 31

Description Construction joint Span C, repointing delaminating

PHOTO 32

Description Bent 4, East

PHOTO 33

Description Span C, construction joint, cracks with efflorescence

PHOTO 34

Description Span C, North coping failed repointing

PHOTO 35

Description

Miscellaneous Asset Data

011681

Asset Management

Load Rating 2:

Has the dead load or the structural condition of the primary load carrying members changed since the last inspection? No - Load Rating Update Not Required

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Extended Frequency: Submittal Date:

Inspector:

INDOT Reviewer:

This bridge has been accepted into the Extended Frequency Program. Approval Date:

Joints: ** Indicate location, type, and rating of lowest rated joint.*

Transverse South/West	H	4 - Poor Condition, leaking, noising damage, areas of adhesion loss

Comments:

Transverse IA joints: glands mostly gone; minor spalling.

Terminal Joints: **Rating of lowest rated terminal joint.* 7

Comments:

Concrete Slopewall: **Rating of lowest rated slopewall.* N

Comments:

Bearings: ** Indicate type, and rating of lowest rated bearing.*

N - No Bearing(s)

Comments:

Approach Slabs: ** Indicate if present & condition rating.*

1 - Approach Slabs 7 - Good condition, minor cracking, wide spacing

Comments:

Approach slabs: West - fairly wide random cracks (50'), triangular patch at joint & right edgeline (1 SF); East - fairly wide transverse cracks in left lane (15'), minor spalls at lane lines (1 SF).

Paint: ** Indicate if paint present , year painted & condition rating.*

N - No Paint N

Comments:

Endangered Species: ** If yes, add one photo to the dropdown field*

Bats: seen or heard under structure? * N

Birds/swallows/nests seen? Empty nests present? * N

BRIDGE Culvert Geometry:

Barrel Length:

Height:

Width: