3.5 Noise

Noise is unwanted sound. The Federal Highway Administration (FHWA) developed general highway traffic noise assessment procedures, which were adopted by the Illinois Department of Transportation (IDOT) to regulate noise.

How is noise evaluated for highway projects?

Highway noise depends upon four main factors: the number of vehicles present, traffic speed, the number of large trucks present, and the distance from the highway. Traffic noise is predicted for existing, future No Build, and future Build conditions. If IDOT determines that traffic noise impacts will occur in the proposed project, then methods to reduce noise at the receiver, called noise abatement, are considered.

What is noise abatement?

Noise abatement reduces traffic noise impacts. At a minimum, IDOT requires that noise barriers be considered for abatement where impacts are identified.

There are six steps in highway traffic noise analysis:

1. *Identify Places with Similar Noise and Land Use:* Common Noise Environments (*CNEs)* are receptors grouped by similar land use, noise exposure, topography, and traffic characteristics. There is one representative worst-case receptor per CNE.

2. *Select Noise Receptors.* Noise receptors are outdoor human activity areas of noise sensitive land uses, and are typically within 500 feet of the roadway edge.

3. *Monitor Existing Noise Levels at Selected Noise Receptors.* Existing noise levels are measured at selected locations. These locations are shown in Volume II as "monitored noise receptors." Typically, not all noise receptors are monitored; 25% to 50% of receptors are monitored to ensure the accuracy of the noise models and to collect ambient noise levels in locations where road noise is not currently a major noise source.

4. *Noise Modeling*. Existing, future No Build, and future Build conditions for roadway, traffic, receptors, and topography are modeled using the FHWA Traffic Noise Model 2.5 (TNM 2.5). Noise monitoring results are used to represent the existing and future No Build scenarios where traffic noise is not a major noise source.

5. *Compare Noise Levels to Noise Abatement Criteria.* The predicted Build noise levels are compared to the existing noise levels and to FHWA Noise Abatement Criteria (NAC) to determine if noise impacts will occur. Table 3.5-1 summarizes the acceptable noise levels for each

What is a noise receptor?

A noise receptor is a location analyzed for noise impacts.

- Typically exterior areas of frequent human use (bench, patio)
- Represents worst-case noise for that CNE.

How are Noise Levels Measured?

Highway traffic noise is projected for an "hourly equivalent," or the noise level for the steady-state period of one hour. The hourly equivalent combines all noise levels over the time period rather than only reporting the peak noise level.

Hourly equivalent sound level = $L_{eq}(h)$

type of land use in the study area. See Figure 3.5-1 for some common indoor and outdoor sound levels.

6. *Complete Noise Abatement Analysis for Impacted Receptors*. Noise abatement is assessed where noise impacts occur to determine if noise abatement would be feasible to construct and reasonable with respect to cost and noise-reduction effectiveness.

What are the FHWA Noise Abatement Criteria (NAC)?

The NAC establish noise levels (L(eq)) at which noise barriers need to be studied. The NAC classify impacts where noise levels interfere with human speech, and differ by land use.

Table 3.5-1: NAC Categories in US 51 Study Area

Category	Noise Level Where Impact Occurs, If Approached (hourly equivalent sound level in decibels)	Example Land Uses
B	67	Residential
C	67	Recreational areas, cemeteries, hospitals, medical facilities, parks, places of worship, schools, trails
E	72	Hotels, motels, restaurants, bars, offices
F	None	Agriculture, airports, emergency services, industrial, manufacturing, retail facilities, utilities, warehousing
G	None	Undeveloped lands that are not permitted for development

Is noise abatement considered for all land use types?

Noise abatement is not considered for the following land uses: Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities, and warehousing.

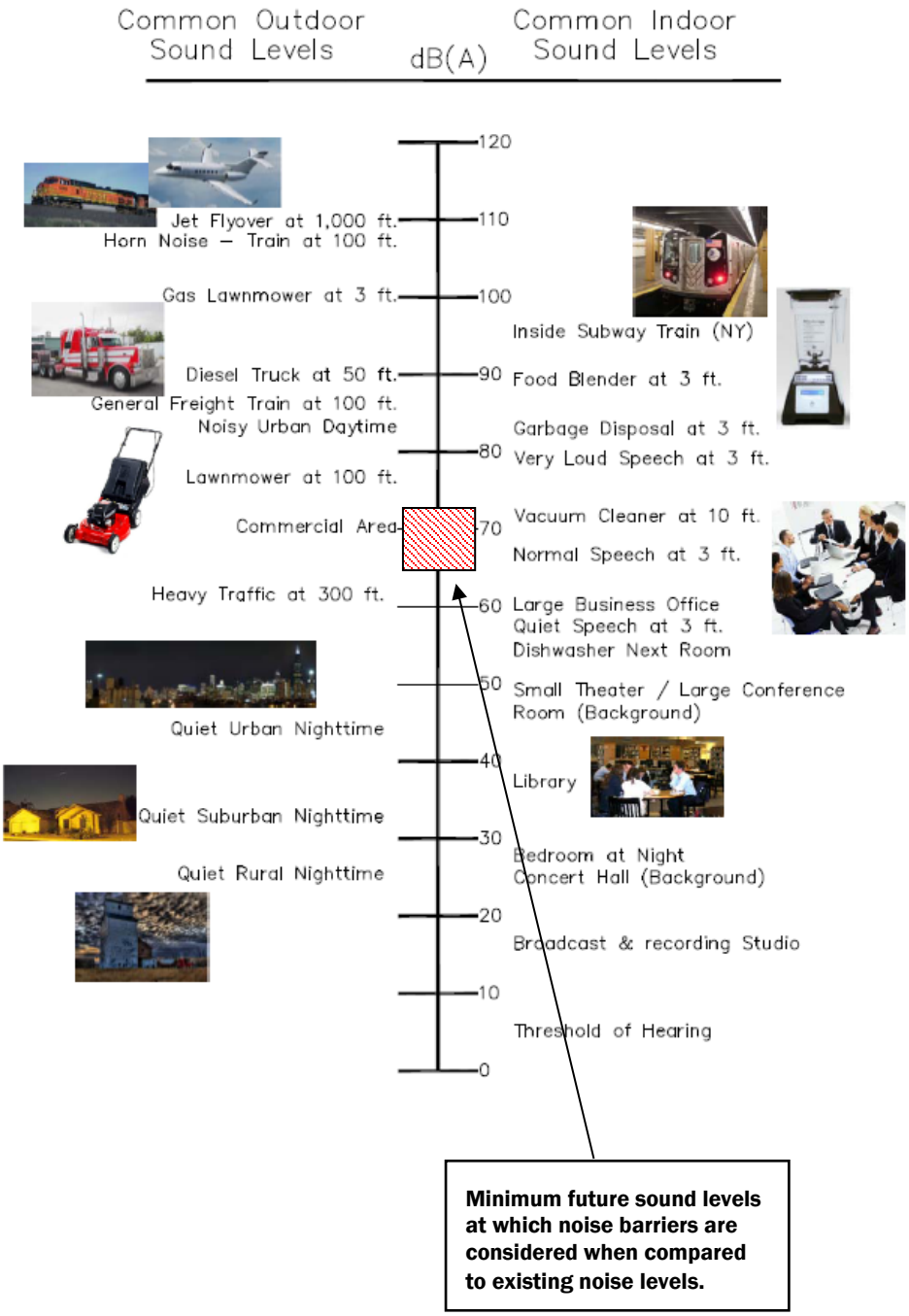
How much noise is in the study area currently?

Noise monitoring was completed in the study area during 2010 and 2011 to determine existing noise levels. Noise monitoring was conducted at project receptors throughout the corridor to validate model accuracy. Additionally, noise levels recorded in areas away from major roads were measured to define existing noise conditions.

A noise level of 67 is comparable to outdoor commercial areas; 72 dB(A) is comparable to a vacuum cleaner.

The study area was divided into 11 sections based on land use type (urban or rural). Noise modeling results were reported geographically, by community. See Figure 3.5-2 for noise receptor locations.

Figure 3.5-1: Common Indoor and Outdoor Sound Levels



How does the human ear perceive sound changes?

- A **3 dB(A)** change is barely perceptible.
- A **5 dB(A)** change is readily perceptible.
- A **10 dB(A)** change is perceived as a doubling or halving of sound.

Figure 3.5-2: Noise Receptor Locations (Page 1 of 2)

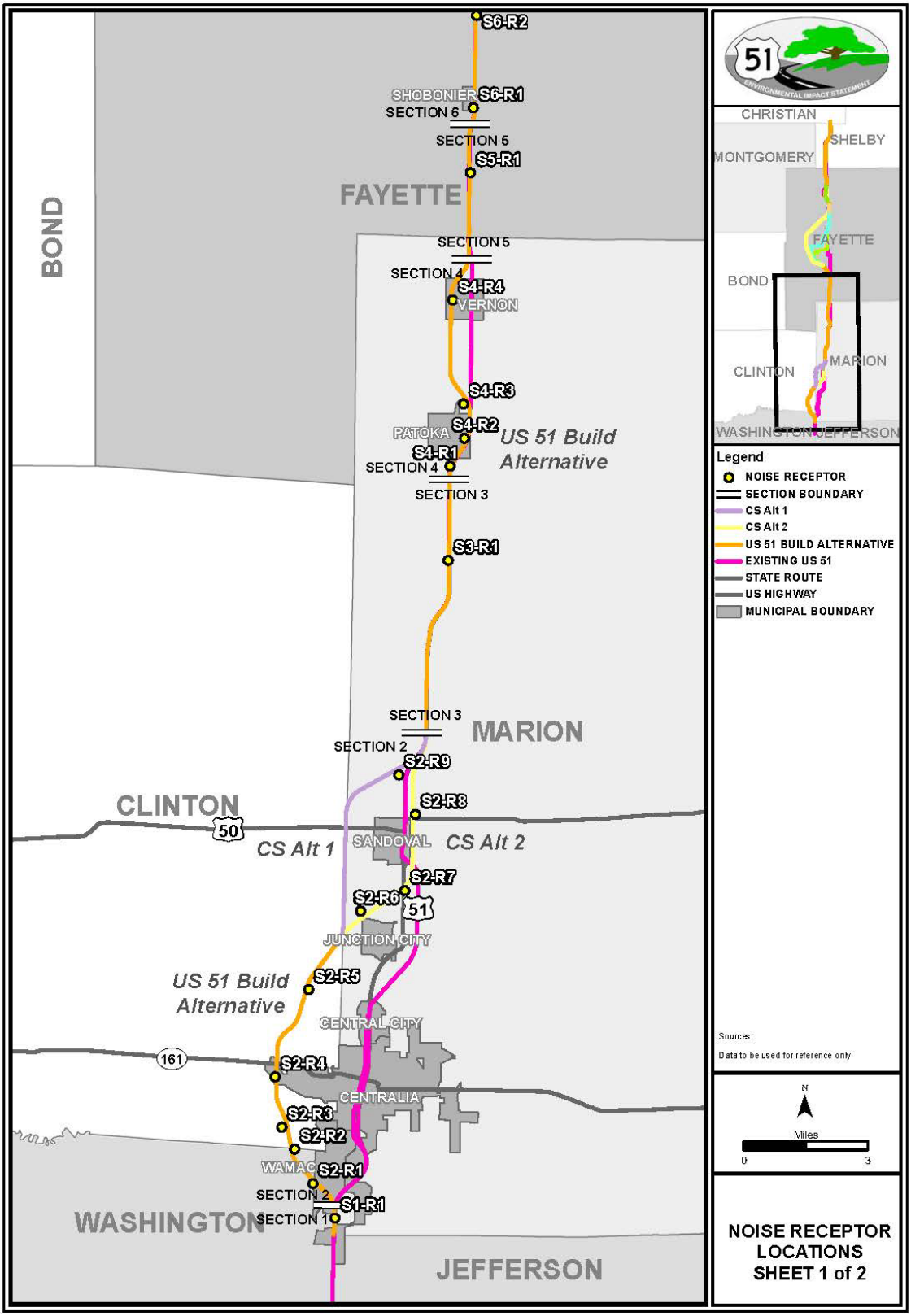
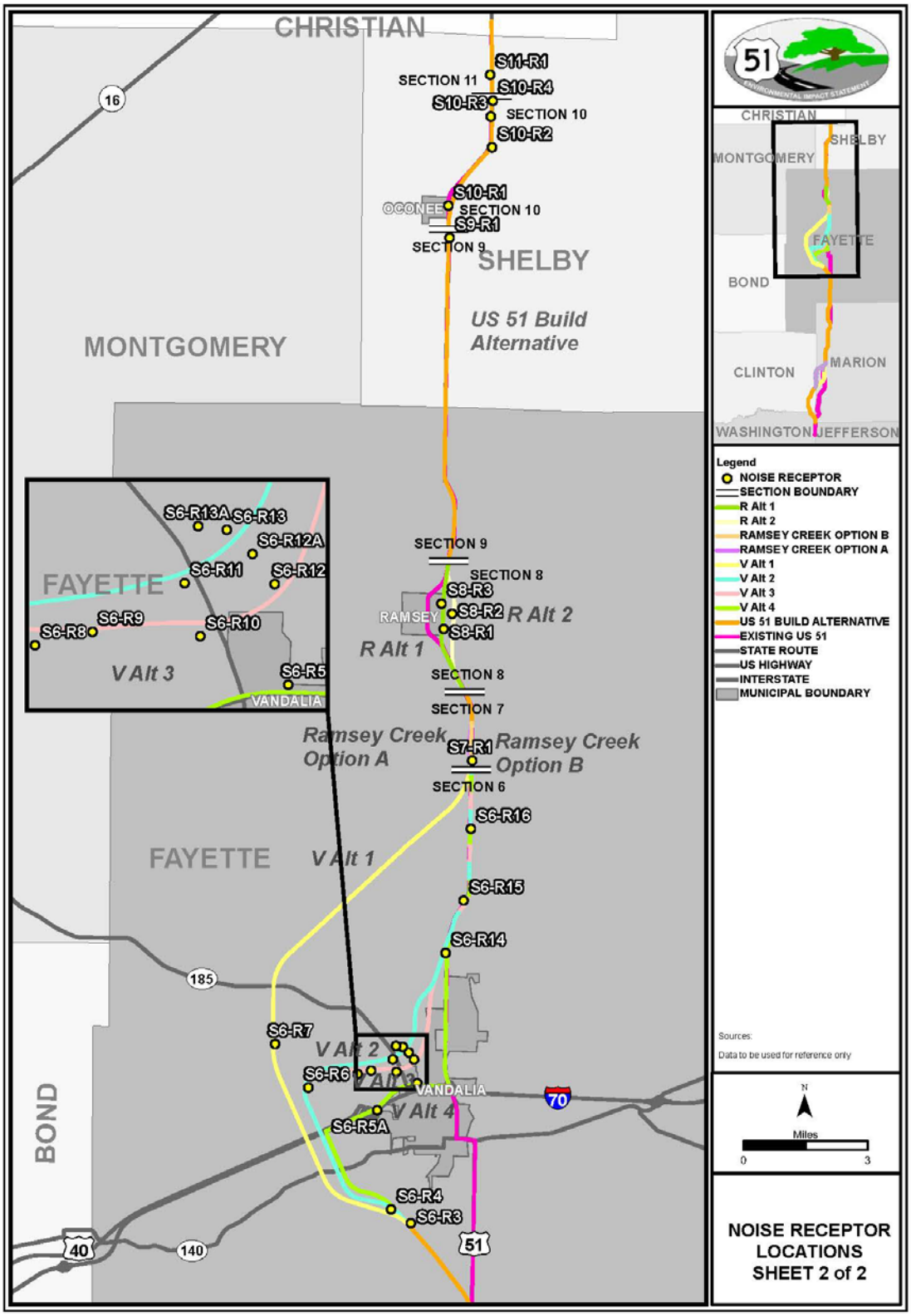


Figure 3.5-2: Noise Receptor Locations (Page 2 of 2)

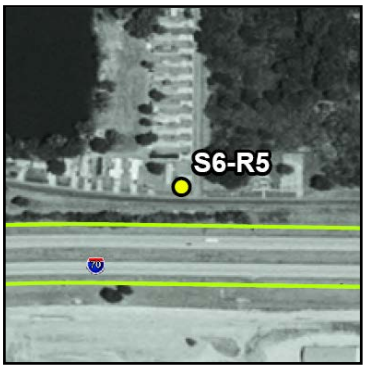


Existing (year 2012) noise levels were defined by monitoring data for 30 receptor locations. The existing noise levels at the receptors ranged from 44 dB(A) to 68 dB(A). The quietest locations monitored (44 dB(A) to 48 dB(A)) are in urban sections in areas of the bypasses, and include a home west of Junction City, a home west of Vernon, S4-R4, and a home northeast of Ramsey, S8-R1. A noise level of 44 dB(A) is comparable to noise levels during a quiet urban nighttime. A noise level of 66 dB(A), conversely, is comparable to normal speech at a distance of three feet away.

The only receptor with an existing noise level of 68 dB(A) is Receptor S6-R5, a mobile home park on the north side of I-70 in Vandalia.

When is noise abatement proposed for a project?

Per the IDOT noise policy, there are three criteria that must be met for noise abatement to be implemented:



Location of Receptor S6-R5, north of I-70 in Vandalia. V Alt 4 shown in green.

1. *A noise "impact" must be determined:* A noise impact occurs when the NAC (the noise level at which a barrier must be considered) is approached, met, or exceeded. The NAC is approached at a level of 66 dB(A) for residential locations, which is comparable to normal speech at a distance of three feet. A noise impact can also occur if there is a "substantial" increase (the noise levels increase by greater than 14 dB(A)) from the existing condition to the future Build condition. For example, if noise outside a residence (NAC B) is currently at 40 dB(A), and noise is projected to be 55 dB(A) at that location after the project is built, then noise abatement will be considered although 55 is below 66 dB(A), where the NAC is approached for NAC B and C. Noise abatement is not considered for farmland, airports, mining or undeveloped land.

2. *A noise barrier must be constructible and reduce noise to be "feasible":* A noise barrier is "feasible" if it achieves at least a 5 dB(A) traffic noise reduction for at least one impacted receptor. Any reduction in noise less than 5 dB(A) may not be noticed by the receptor.

3. *A noise barrier must be cost effective, achieve noise reduction goals, and be supported by the benefitted properties to be "reasonable":*

    - Cost Effective: To be "reasonable," the estimated cost to build the barrier must be less than or equal to $24,000 per benefited receptor. The noise barrier is analyzed based on a ratio of the

cost of the barrier to the number of receptors that are benefited by the barrier. For example, if a noise barrier will benefit 10 homes, and the total cost of the noise barrier is $240,000, then the cost per benefited receptor would be $24,000 and the noise barrier would be considered economically reasonable. This can be raised up to $37,000 depending on certain circumstances.

- Noise Reduction Goals: To be "reasonable," the barrier must achieve at least an 8 dB(A) traffic noise reduction for at least one benefitted receptor
- Community Support: To be "reasonable," community viewpoints are collected to determine if the barrier is supported by those benefitted by it. This occurs only after a barrier is found to be feasible, achieves noise reduction goals, and economically reasonable.

If a noise barrier is not considered "feasible" or "reasonable" for an area, the noise barrier will not be built as part of the project.

Noise Wall
(photo courtesy of IDOT)

How noisy could the study area be in the future?

Year 2040 noise levels were estimated at the noise receptors for the No Build condition. The No Build analysis was completed using year 2040 traffic projections assuming that the US 51 project would not be completed and the existing US 51 roadway design is maintained. No Build noise levels at the studied receptors ranged from 44 dB(A) to 67 dB(A).

The loudest modeled noise level of 67 dB(A) occurred at Receptor S6-R5, the same receptor with high existing noise levels due to proximity to I-70.

How will the alternatives change noise levels, and are noise barriers proposed?

The location of the US 51 alternatives with respect to the noise receptors is an important part of how noise levels will change with the proposed project. The project will move US 51 closer to some receptors and increase noise in those locations. Where US 51 is relocated away from receptors, traffic noise will decrease. When traffic volumes increase, traffic noise is projected to increase as well.

Year 2040 noise levels were projected at the noise receptors for the alternatives. Tables 3.5-2 through 3.5-11 identify and compare existing, future No Build, and future Build noise levels at each of the studied noise receptors. See Volume II for receptor locations. Traffic noise impacts are shown in bold in the tables.

The alternatives are compared within their respective sections so the effects of each alternative can be compared.

Section 1: South Limit to Wamac

The 2040 Build noise levels from the south limit to Wamac are projected to increase slightly over existing conditions but will remain within acceptable limits as shown in Table 3.5-2. For this reason, noise barriers did not need to be considered for Section 1 (south limit to Wamac).

Table 3.5-2: Traffic Noise Modeling Results
S1: South Limit to Wamac (Rural Section)

Receptor Number and Description*	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S1-R1 *Church*	61	62	62	1

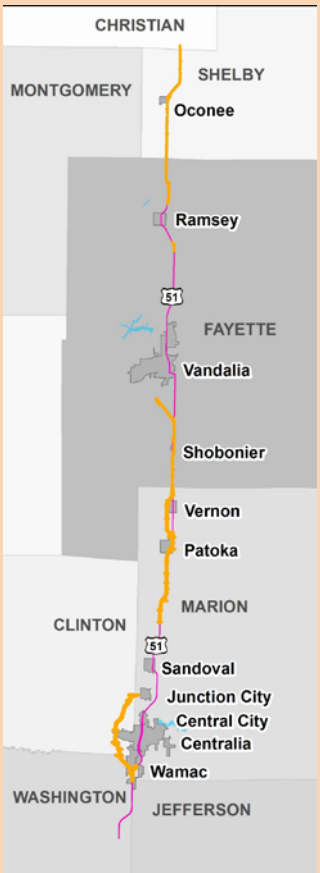
** NAC is 67 dB(A) for the receptor in Section 1.*

Section 2: Wamac, Centralia, Central City, Junction City, and Sandoval

Table 3.5-3 summarizes estimated noise levels for areas near US 51 Build, CS Alt 1, and CS Alt 2. The projected 2040 Build noise levels range from 49 dB(A) at S2-R3 to 62 dB(A) at S2-R7. The predicted traffic noise levels in the Build condition are lower than the existing ambient noise levels for receptors S2-R1, S2-R2 and S2-R4. This is because IDOT policy determines traffic noise impacts based on traffic noise only; the Build noise projections are only for traffic noise while the existing and future No Build noise levels include existing ambient noise levels. The greatest increase in noise (11 dB(A)) occurs at a residence adjacent to CS Alt 1. None of the receptors approach, meet, or exceed the FHWA NAC (the level at which noise barriers would need to be studied), and there is no "substantial" (greater than 14 dB(A)) noise increase over existing conditions. For these reasons, noise barriers did not need to be considered for Section 2 (Wamac to Sandoval).

US 51 Build Alternative

The alternative between the larger towns where there is only one remaining alternative is referred to collectively as the US 51 Build Alternative. The US 51 Build Alternative is shown in orange below. Existing US 51 is shown in pink.



The US 51 Build Alternative is compared against the No Build Alternative. The US 51 Build Alternative and the remaining alternatives near the larger towns are described in Chapter 2.3.

Table 3.5-3: Traffic Noise Modeling Results
S2: Wamac, Centralia, Central City, Junction City, and Sandoval (Urban)

Receptor Number and Description*	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future Build Noise Level (2040) (dB(A))			Noise Level Change (Existing to Build) (dB(A))
			US 51 Build Alternative	CS Alt 1	CS Alt 2	
S2-R1 *Residence*	58	58	55	N/A	N/A	-3
S2-R2 *Residence*	58	58	53	N/A	N/A	-5
S2-R3 *Residence*	49	49	49	N/A	N/A	0
S2-R4 *Mobile Home*	59	59	54	N/A	N/A	-5
S2-R5 *Residence*	54	54	56	N/A	N/A	2
S2-R6 *Residence*	47	47	N/A	53	N/A	6
S2-R7 *Residence*	51	51	N/A	62	N/A	11
S2-R8 *Residence*	50	50	N/A	52	N/A	2
S2-R9 *Residence*	50	50	N/A	N/A	57	7

** NAC is 67 dB(A) for all receptors in Section 2.*

N/A Noise impacts typically do not occur beyond 500' from the edge of the roadway, and this receptor is beyond that distance. This receptor is not anticipated to experience perceptible noise changes.

Section 3: Sandoval to Patoka

Receptor S3-R1 represents all homes between Sandoval and Patoka for the US 51 Build alignment. S3-R1 does not approach, meet or exceed the FHWA noise abatement criteria (the noise level at which barriers need to be considered). The receptor is not considered impacted due to a substantial noise increase because the noise increase is 5 dB(A), which is a perceptible change but not a "substantial" impact (greater than 14 dB(A)). For these reasons, noise barriers did not need to be considered in Section 3 (Sandoval to Patoka).

Table 3.5-4: Traffic Noise Modeling Results
S3: Sandoval to Patoka (Rural)

Receptor Number and Description*	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S3-R1 *Residence*	59	60	64	5

** NAC is 67 dB(A) for the receptor in Section 3.*

Sections 4 and 5: Patoka and Vernon / Vernon to Shobonier

Table 3.5-5 summarizes noise levels from Patoka to Shobonier. The area includes sparsely populated areas as well as residential areas. The noise level changes are small and would not be perceptible for three areas. The increase in noise level of 12 dB(A) at Receptor S4-R4 is because the receptor is currently in a remote location with low existing noise levels and the US 51 Build Alternative would be near the receptor. The change is not, however, considered a substantial change in noise level per the IDOT noise policy, because it is not greater than 14 dB(A). For these reasons, noise barriers did not need to be considered in Sections 4 and 5 (Patoka to Shobonier).

Table 3.5-5: Traffic Noise Modeling Results
S4: Patoka and Vernon (Urban)
S5: Vernon to Shobonier (Rural)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S4-R1 *Residence*	56	57	57	1
S4-R2 *Residence*	52	53	55	3
S4-R3 *Residence*	49	49	50	1
S4-R4 *Residence*	44	44	56	12
S5-R1 *Residence*	60	61	65	5

**NAC is 67 dB(A) for all receptors in Sections 4 and 5.*

Section 6: Shobonier and Vandalia

The four Vandalia alternatives have variable noise level increases as shown in Table 3.5-6. The projected Build 2040 noise levels range from 45 dB(A) at S6-R8 for V Alt 2 to 70 dB(A) at S6-R5A for V Alt 4. The build condition traffic noise levels either decrease, or increase between 1 dB(A) and 11 dB(A) from the existing scenario.

- Residences along V Alt 2 and V Alt 3 will experience increases of 4 dB(A) to 12 dB(A); several residences show predicted traffic noise levels in the Build condition that are lower than the existing ambient noise levels. This is because IDOT policy determines traffic noise impacts based on traffic noise only; the Build noise projections are only for traffic noise while the existing and future No Build noise levels include existing ambient noise levels.

- One of the receptors (S6-R5) exceeds the FHWA noise abatement criteria (the noise level where barriers must be studied). Receptor S6-R5 is the only noise impact in Section 6 (there is not a substantial noise increase of greater than 14 dB(A) over existing conditions for any of the receptors). Because the future build noise level projected at Receptor S6-R5 exceeds the NAC (the noise level where barriers must be studied), noise barriers were considered at Receptor S6-R5 for the V Alt

4 alternative. Receptor S6-R5 is adjacent to I-70. See "*How could noise impacts be mitigated?*" following Table 3.5-11 for results of the noise abatement analysis.

Table 3.5-6: Traffic Noise Modeling Results
S6: Shobonier and Vandalia (Urban)

Receptor Number and Description*	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future Build Noise Level (2040) (dB(A))					Noise Level Change (Existing to Build) (dB(A))
			US 51 Build Alternative	V Alt 1	V Alt 2	V Alt 3	V Alt 4	
S6-R1 *Residence*	55	57	60	N/A	N/A	N/A	N/A	5
S6-R2 *Residence*	53	54	58	N/A	N/A	N/A	N/A	5
S6-R3 *Residence*	51	51	58	N/A	N/A	N/A	N/A	7
S6-R4 *Residence*	51	51	N/A	N/A	63	N/A	55	12 / 4
S6-R5 *Residence*	67	67	N/A	N/A	N/A	N/A	**68**	1
S6-R5A** *Hotel*	69	70	N/A	N/A	N/A	N/A	70	1
S6-R6 *Residence*	51	51	N/A	N/A	56	56	N/A	5 / 5
S6-R7 *Residence*	57	57	N/A	58	N/A	N/A	N/A	1
S6-R8 *Residence*	57	57	N/A	N/A	45	55	N/A	-12 / -2
S6-R9 *Residence*	57	57	N/A	N/A	47	Taken	N/A	-10
S6-R10 *Residence*	53	53	N/A	N/A	N/A	59	N/A	6
S6-R11 *Residence*	57	57	N/A	N/A	61	N/A	N/A	4
S6-R12 *Residence*	52	52	N/A	N/A	N/A	62	N/A	10
S6-R12A *Residence*	52	52	N/A	N/A	58	N/A	N/A	6
S6-R13 *Residence*	53	53	N/A	N/A	60	N/A	N/A	7
S6-R13A *Residence*	57	57	N/A	N/A	48	N/A	N/A	-9
S6-R14 *Residence*	62	63	N/A	N/A	61	61	64	-1 to 2
S6-R15 *Residence*	54	55	57	N/A	N/A	N/A	N/A	3
S6-R16 *Residence*	64	65	N/A	N/A	Taken	N/A	N/A	Taken

** The NAC is 67 dB(A) for all residential receptors in Section 6. ** The NAC is 72 dB(A) for the hotel at receptor S6-R5A.*
N/A Noise impacts typically do not occur beyond 500' from the edge of the roadway, and this receptor is beyond that distance. This receptor is not anticipated to experience perceptible noise changes.

Section 7: Vandalia to Ramsey

Noise levels at Receptor S7-R1 in the future build condition do not approach, meet or exceed the FHWA NAC (the noise level where barriers must be studied). Noise levels would only increase by 2 dB(A) in the build condition, which would not be a perceptible difference. For these reasons, noise barriers did not need to be considered in Section 7 (Vandalia to Ramsey).

Table 3.5-7: Traffic Noise Modeling Results
S7: Vandalia to Ramsey (Rural)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future Build Noise Level (2040) (dB(A))		Noise Level Change (Existing to Build) (dB(A))
			Ramsey Creek Option A	Ramsey Creek Option B	
S7-R1 *Residence*	62	63	64	64	2 / 2

** NAC is 67 dB(A) for the receptor in Section 7.*

Section 8: Ramsey

As shown in Table 3.5-8, the projected Build 2040 noise levels for Section 8 range are 61 dB(A) at S8-R2 and S8-R3, and 62 dB(A) at S8-R1.

- Build condition traffic noise levels increase between 6 dB(A) and 14 dB(A) from the existing conditions.
- The increase of 14 dB(A) from existing levels occurs at a home that will be adjacent to the R Alt 1 route; the outside area of the home will be perceptibly louder in the Build condition, but the noise increase from existing conditions does not cause a "substantial" noise increase impact per IDOT policy, because the increase is not greater than 14 dB(A).
- None of the receptors approach, meet, or exceed the FHWA NAC (the noise level where noise barriers would need to be considered). For these reasons, noise barriers did not need to be considered in Section 8 (Ramsey).

Table 3.5-8: Traffic Noise Modeling Results
S8: Ramsey (Urban)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future Build Noise Level (2040) (dB(A))		Noise Level Change (Existing to Build) (dB(A))
			R ALT 1	R ALT 2	
S8-R1 *Residence*	48	48	62	N/A	14
S8-R2 *Residence*	55	55	N/A	61	6
S8-R3 *Residence*	51	51	61	N/A	10

** NAC is 67 dB(A) for all receptors in Section 8.*

N/A Noise impacts typically do not occur beyond 500' from the edge of the roadway, and this receptor is beyond that distance. This receptor is not anticipated to experience perceptible noise changes.

Section 9: Ramsey to Oconee

Receptor S9-R1 represents homes adjacent to the US 51 Build Alternative from Ramsey to Oconee. Table 3.5-9 shows that the noise level for S9-R1 does not approach, meet, or exceed the FHWA NAC (noise level at which noise barriers must be considered). The noise level will only increase by 2 dB(A) in the build condition, which is not a perceptible change. For these reasons, noise barriers did not need to be considered for in Section 9 (Ramsey to Oconee).

Table 3.5-9: Traffic Noise Modeling Results
S9: Ramsey to Oconee (Rural)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S9-R1 *Residence*	60	61	62	2

** NAC is 67 dB(A) for all receptors in Section 9.*

Section 10: Oconee

As shown in Table 3.5-10, the projected noise levels for the 2040 Build condition range from 55 dB(A) at S10-R1 to 65 dB(A) at S10-R3.

- For receptors S10-R2, S10-R3, and S10-R4, Build condition traffic noise levels increase between 1 dB(A) and 3 dB(A) from the existing conditions.
- For receptor S10-R1, the predicted traffic noise level in the build condition is less than the existing noise levels because the US 51 Build Alternative will shift US 51 away from the receptor.
- None of the receptors approach, meet, or exceed the FHWA NAC (noise level at which noise barriers must be considered), and there is no "substantial" noise increase of greater than 14 dB(A) above existing conditions. For these reasons, noise barriers did not need to be considered for Section 10 (Oconee).

Table 3.5-10: Traffic Noise Modeling Results
S10: Oconee (Urban)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S10-R1 *Residence*	60	61	55	-5
S10-R2 *Residence*	59	60	62	3
S10-R3 *Residence*	64	65	65	1
S10-R4 *Church*	62	63	63	1

** NAC is 67 dB(A) for all receptors in Section 10.*

Section 11: Oconee to North Limit

Receptor S11-R1 represents homes adjacent to the US 51 Build Alternative. As shown in Table 3.5-11, Receptor S11-R1 does not approach, meet or exceed the FHWA NAC (noise level at which noise barriers must be considered). The noise level increase of 3 dB(A) is not a "substantial" increase of greater than 14

dB(A). For these reasons, noise barriers did not need to be studied for Section 11 (Oconee to the north limit).

How will construction noise be minimized?

- All equipment used for hauling or construction will have an adequate muffler in constant operation.
- Most Construction within 1000 feet of an occupied residence, motel, hospital, or similar receptor will occur only between 7 a.m. and 10 p.m.

Source: IDOT Standard Specifications for Road and Bridge Construction, Article 107.35

Table 3.5-11: Traffic Noise Modeling Results
S11: Oconee to North Limit (Rural)

Receptor Number and Description	Existing Noise Level (2012) (dB(A))	Future No Build Noise Level (2040) (dB(A))	Future US 51 Build Alternative Noise Level (2040) (dB(A))	Noise Level Change (Existing to Build) (dB(A))
S11-R1 *Residence*	56	57	59	3

** NAC is 67 dB(A) for all receptors in Section 11.*

How could noise impacts be mitigated?

One receptor, the mobile home park along I-70 in Vandalia (Receptor S6-R5), required an abatement analysis because its predicted future noise level exceeds the FHWA NAC (noise level at which noise barriers must be considered). A 911 feet long and 19 feet high noise wall was evaluated for this location if the V Alt 4 alternative were constructed. This wall design was the result of multiple analysis runs to maximize efficiency in terms of wall area to number of benefited receptors. The wall would be located along the proposed right of way adjacent to the mobile homes. The barrier near receptor S6-R5 is constructible and would provide sufficient traffic noise reductions to be considered feasible. The noise barrier would cost approximately $432,725 to construct and would benefit 11 receptors, resulting in an actual cost per benefited receptor of $39,339. Although the noise barrier is constructible and would decrease noise, the noise wall would not be considered economically reasonable per IDOT noise policy, as the actual cost per benefited receptor exceeds the adjusted allowable cost of $24,000 per benefited receptor. Therefore, a noise barrier adjacent to the mobile homes along I-70 for the V Alt 4 alternative is not likely to be constructed.

How will construction activities affect noise levels?

Trucks and machinery used for construction produce noise which may affect some land uses and activities during the construction period. Residents along the selected alignment will at some time experience construction noise. Measures to reduce construction noise impacts have been incorporated into the

Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction (see sidebar for examples).

How will the project affect noise levels for areas of planned development?

Vacant land that is planned for future development in local or regional plans are studied during traffic noise analysis to determine where potential noise impacts from the road could occur when the land is developed.

A review of local and regional plans in the US 51 area showed two planned growth areas.

- First, undeveloped portions of the study area west and north of Vandalia are planned for future industrial development. Because industrial uses are not measured for traffic noise impacts, no vacant land noise analysis was developed for Vandalia.
- Second, undeveloped portions of the study area west and south of Centralia and Wamac are planned for residential and commercial development. Noise impacts analysis was completed for the area west and south of Centralia and Wamac to determine at what distance from the roadway noise impacts may occur for residential development (66 db(A)) and commercial development (71 db(A)). The results of the analysis showed that the NAC (the noise level where noise barriers are considered) was reached at a distance between 50 feet and 70 feet from outside edge of the nearest proposed travel lane in these areas.

The results of the undeveloped lands analysis are shared with the cities of Centralia and Wamac, as well as with Clinton County and Washington County, so that the potential noise effects of US 51 may be taken into account (by building placement, orientation, or other site design decisions) when the lands are developed.