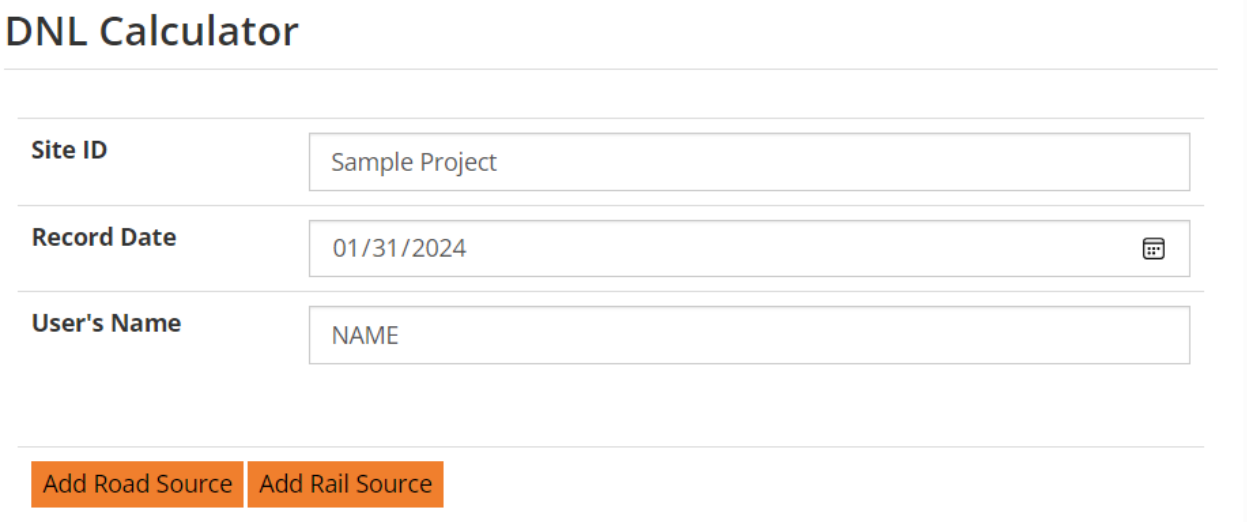
Steps to Calculate Noise Levels

Compliance with this regulation, 24 CFR Part 51, Subpart B, is triggered with new construction, substantial rehabilitation of an existing residential property, or if the project qualifies as a noise sensitive use. If your project involves these activities, you will have to calculate the noise levels of your project area to achieve compliance.

Road Source

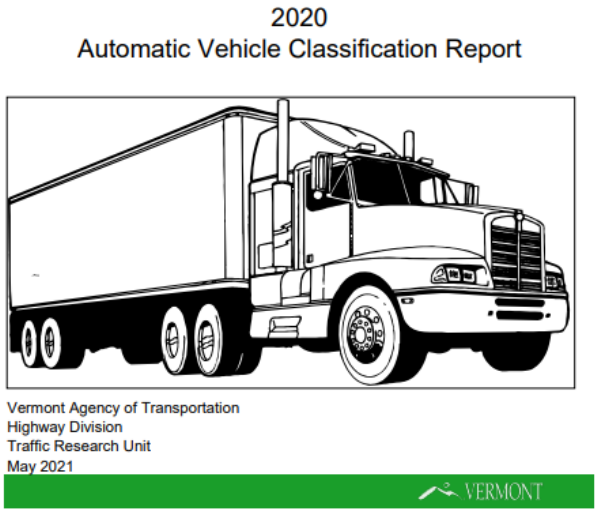
STEP 1: Go to the HUD's Day/Night Noise Levels (DNL) calculator. Enter in the Project Name, the date, and your name as requested.



What Needs to be Considered:

- Major roadways within 1,00 feet of the project location (Road Sources).
- Railways within 3,000 feet of the project location (Rail Sources).
- Civilian or Military airports within 15 miles of the project location (Airport Sources).

STEP 2: Go to the most recent Automatic Vehicle Classification Report (Currently 2020).



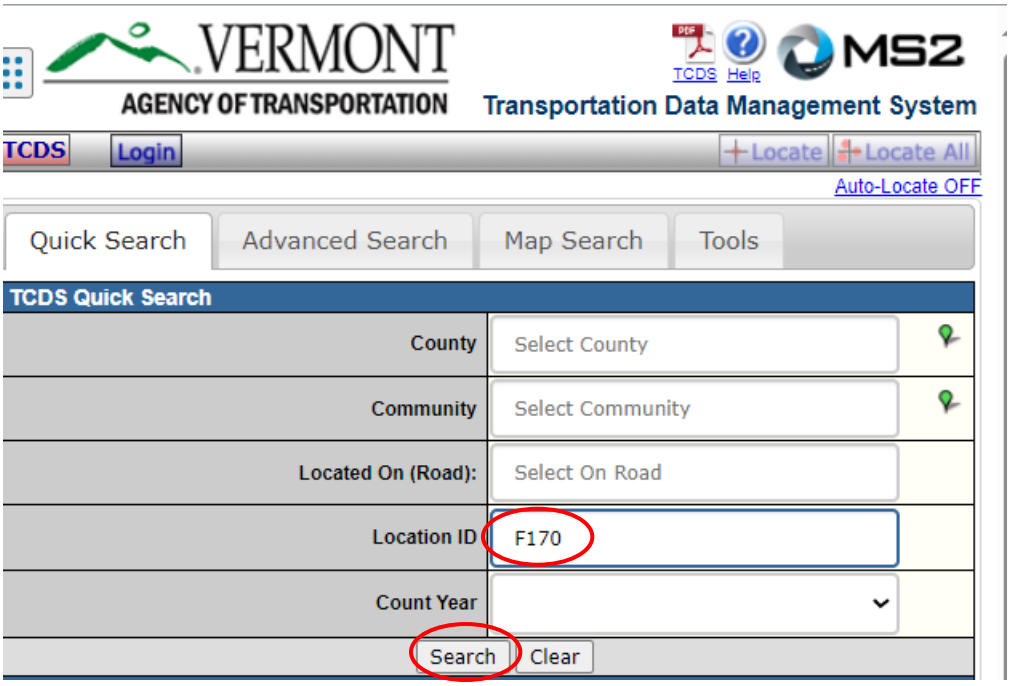
STEP 3: Use the Find feature (Control F) and search for the major road(s) that is/are closest to the project location. If there are too many hits, search for the Town/City instead. If there is no major roadway within 1,000 feet of the project location, a road source does not need to be considered in the DNL calculation.

STEP 4: Scroll through all hits for the major street you are searching for until you find the one in the correct Town/City that represents a similar location as the project. See below for steps to identify the location of the traffic counts.

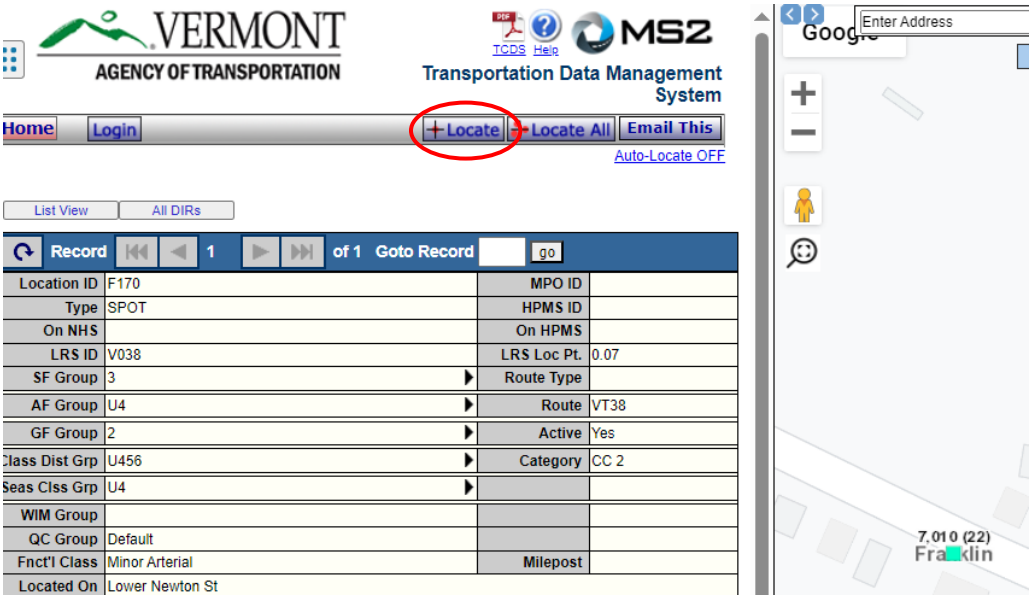
VTRANS AUTOMATIC VEHICLE CLASSIFICATION REPORT 2020

Location	Community	Route	Alt Route	MM	FC	R/U	Year	AADT
F167	ST. ALBANS CITY	VT36		1.1	4	U	2015	5685
F170	ST. ALBANS CITY	VT38		0.1	4	U	2018	7591
F171	ST. ALBANS CITY	FAU8024	TH6	0.8	5	U	2016	1812
F174	ST. ALBANS CITY	FAU8008	TH9	0.1	5	U	2019	1984
F183	SWANTON	VT78		7.3	3	R	2017	10320
F189	ST. ALBANS TOWN	VT104		2.4	5	U	2015	7036

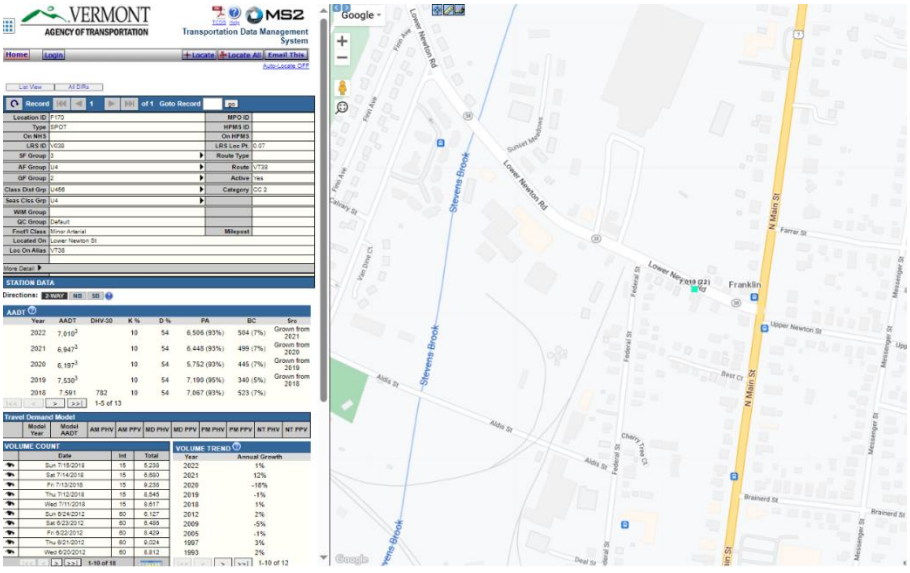
STEP 5: To verify the location of the traffic counts, search for the Location ID (circled above) in the VTRANS Data Management System.



STEP 6: The following screen will load in the sidebar, select locate to see the geographic location of the traffic count.



STEP 7: Repeat steps 4-6 for all Location ID's that are applicable to the project location to determine which traffic count point is the closest to the project location.



STEP 8: Once the closest Location ID has been identified, take a screen shot of the VTRANS Data Management System location map to include as a supporting document for the DNL Calculation.

STEP 9: Go back to the Automatic Vehicle Classification Report and take a screen shot of the full row of the location being used in the DNL Calculation to include as supporting documentation. It helps to highlight the entire row so that you can accurately collect the data.

VTRANS AUTOMATIC VEHICLE CLASSIFICATION REPORT 2020

									PEAK HOUR PERCENT OF TRAFFIC STREAM																	
Location	Community	Route	Alt Route	MM	FC	R/U	Year	AADT	WEEKDAY PK HOUR	CLASS1 MC2	CLASS2 Car3	CLASS3 Pick up	CLASS4 Bus4	CLASS5 2A SU5	CLASS6 3A SU6	CLASS7 >3A SU7	CLASS8 <5A 2U8	CLASS9 5A 2U9	CLASS10 >5A 2U10	CLASS11 <6A >2U1	CLASS12 6A >2U12	CLASS13 >6A >2U13	%T	TRUCKS %MED	%HEAVY
F170	ST. ALBANS CITY	VT38		0.1	4	U	2018	7591	4-5pm	0.79%	76.38%	18.35%	0.13%	3.07%	0.31%	0.00%	0.53%	0.44%	0.00%	0.00%	0.00%	0.00%	4.48%	3.51%	0.97%
F171	ST. ALBANS CITY	FAU8024	TH6	0.8	5	U	2016	1812	3-4pm	1.27%	79.24%	14.79%	0.59%	3.13%	0.49%	0.00%	0.39%	0.10%	0.00%	0.00%	0.00%	0.00%	4.70%	4.21%	0.49%
F174	ST. ALBANS CITY	FAU8008	TH9	0.1	5	U	2019	1984	4-5pm	0.00%	80.58%	15.47%	0.00%	3.06%	0.54%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	3.96%	3.60%	0.36%
F183	SWANTON	VT78		7.3	3	R	2017	10320	4-5pm	3.38%	71.88%	17.27%	0.54%	3.38%	1.01%	0.29%	0.56%	1.48%	0.07%	0.00%	0.00%	0.16%	7.47%	5.21%	2.26%
F189	ST. ALBANS TOWN	VT104		2.4	5	U	2015	7036	4-5pm	1.83%	77.07%	16.78%	0.16%	2.72%	0.66%	0.19%	0.35%	0.23%	0.00%	0.00%	0.00%	0.00%	4.32%	3.74%	0.58%

STEP 10: Identify the Annual Average Daily Traffic (AADT). In this example, it is 7,591.

VTRANS AUTOMATIC VEHICLE CLASSIFICATION REPORT 2020

Location	Community	Route	Alt Route	MM	FC	R/U	Year	AADT	WE PK
F167	ST. ALBANS CITY	VT36		1.1	4	U	2015	5685	3-
F170	ST. ALBANS CITY	VT38		0.1	4	U	2018	7591	4-
F171	ST. ALBANS CITY	FAU8024	TH6	0.8	5	U	2016	1812	3-
F174	ST. ALBANS CITY	FAU8008	TH9	0.1	5	U	2019	1984	4-

STEP 11: Identify the percentage of passenger cars (Class 2). In this example, it is 76.38%.

VTRANS AUTOMATIC VEHICLE CLASSIFICATION REPORT 2020

Location	Community	Route	Alt Route	MM	FC	R/U	Year	AADT	WEEKDAY PK HOUR	CLASS1 MC2	CLASS2 Car3	CLASS3 Pick up	CLASS4 Bus4	CLASS5 2A SU5	PEAK CLAS 3A SU
F167	ST. ALBANS CITY	VT36		1.1	4	U	2015	5685	3-4pm	1.33%	79.04%	15.59%	0.91%	2.51%	0.3
F170	ST. ALBANS CITY	VT38		0.1	4	U	2018	7591	4-5pm	0.79%	76.38%	18.35%	0.13%	3.07%	0.3
F171	ST. ALBANS CITY	FAU8024	TH6	0.8	5	U	2016	1812	3-4pm	1.27%	79.24%	14.79%	0.59%	3.13%	0.4
F174	ST. ALBANS CITY	FAU8008	TH9	0.1	5	U	2019	1984	4-5pm	0.00%	80.58%	15.47%	0.00%	3.06%	0.5
F183	SWANTON	VT78		7.3	3	R	2017	10320	4-5pm	3.38%	71.88%	17.27%	0.54%	3.38%	1.0
F189	ST. ALBANS TOWN	VT104		2.4	5	U	2015	7036	4-5pm	1.83%	77.07%	16.78%	0.16%	2.72%	0.6
F195	ST. ALBANS TOWN	NSH9720	NSH-SASH	0.3	2	U	2017	7185	7-8am	0.58%	77.73%	13.86%	1.71%	3.24%	0.9
F196	ST. ALBANS TOWN	VT36		2.5	4	U	2018	3853	4-5pm	0.26%	73.66%	22.89%	0.13%	2.69%	0.2

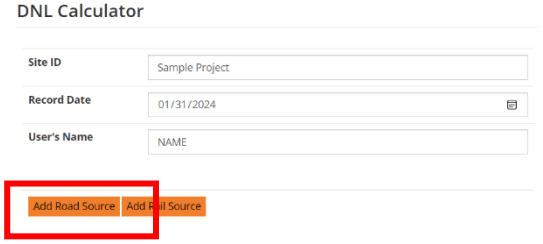
STEP 12: Identify the percentage of medium and heavy trucks (found in the most-right columns of the table). In this example, the percentage for medium trucks is 3.51% and heavy trucks is 0.97%.

	TRUCKS		
	%T	%MED	%HEAVY
	4.05%	3.80%	0.24%
	4.48%	3.51%	0.97%
	4.70%	4.21%	0.49%
	3.96%	3.60%	0.36%
	7.47%	5.21%	2.26%
	4.32%	3.74%	0.58%

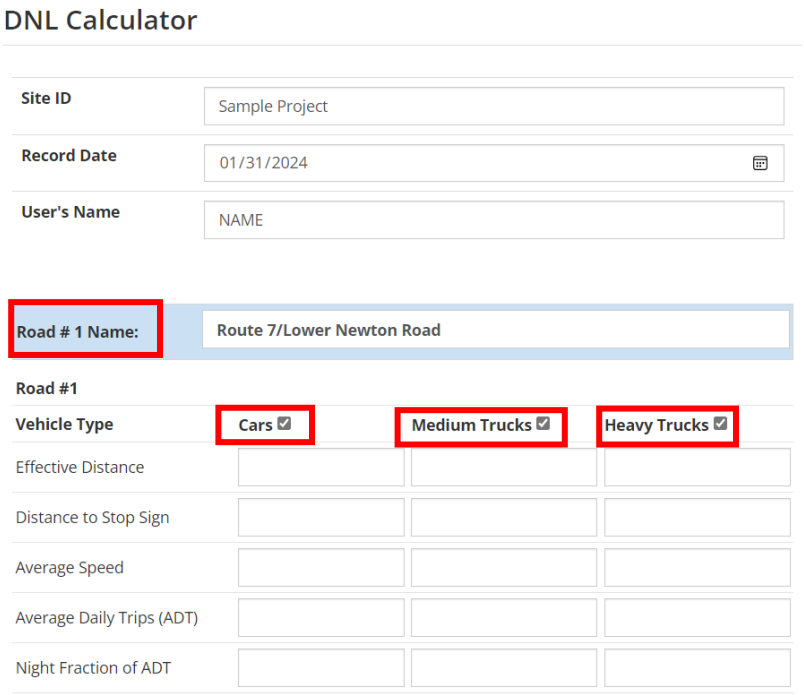
STEP 13: Calculate the Average Daily Trips (ADT) for cars. For this example, the AADT is 7,591 and the percentage of cars is 76.38%. Multiply 0.7638 by 7,591, which is 5,798. This number will be used to calculate the DNL.

STEP 14: Calculate the ADT for medium and heavy trucks. 7,591 multiplied by 0.0351 for medium trucks= 266. 7,591 multiplied by 0.0097 for heavy trucks =74.

STEP 15: Return to HUD's DNL Calculator and select Add Road Source.



STEP 16: Type in the street name and select cars, medium trucks, & heavy trucks, as indicated below.



STEP 17: Fill out the Effective Distance. When measuring distance, the Noise Assessment Location (NAL) should be used. The NAL is 6.5 feet or 2 meters in front of the façade of the existing or proposed building, to the road.

To Calculate Effective Distance from the NAL:

- Measure to the near edge of the nearest lane.
- Measure to the far edge of the farthest lane.
- Add the two distances and divide by two.
- These measurements can be made using the Measure function in Google Maps. For this example, we will use an Effective Distance of 100 feet.
    - Note: If Google Maps is used for the measurements, take a screenshot of the map showing the measurement to include as supporting documentation for the DNL calculation.

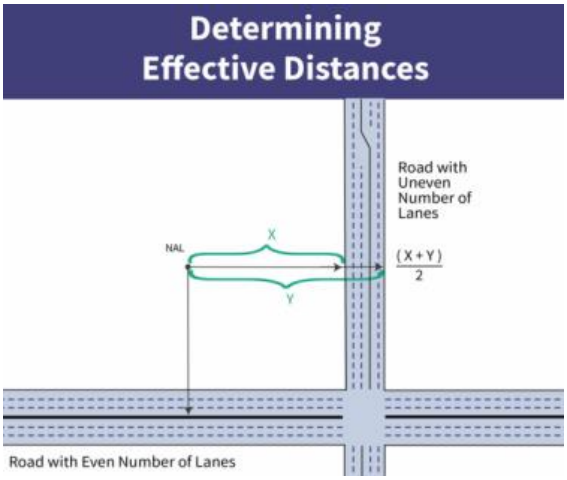


Photo Source: HUD WISER

STEP 18: Fill out the Distance to Stop Sign (Note: Stoplights are not applicable). Only stop signs within 600 feet need to be considered. The distance should be measured from the NAL to the nearest stop sign. For this example, we will use 150 feet.

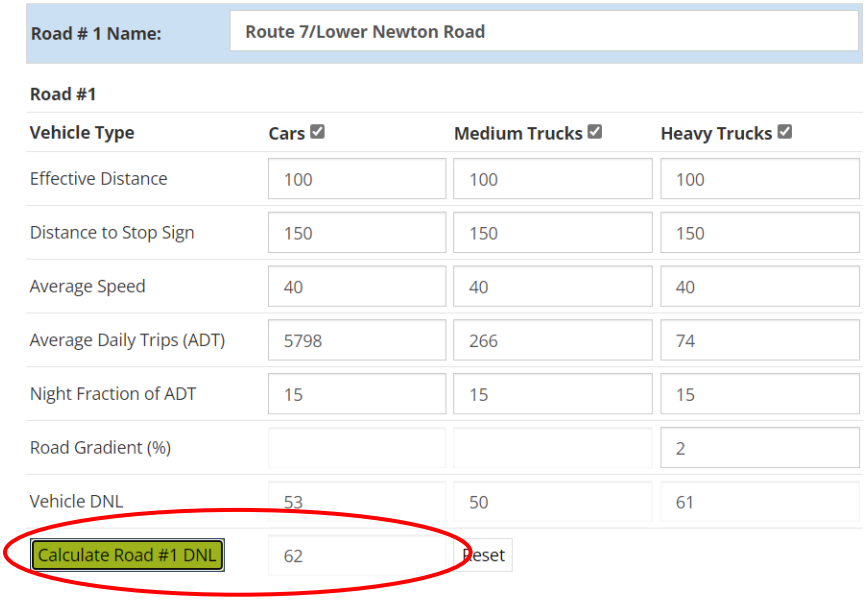
STEP 19: Fill out the Average Speed. This should be the speed limit of the road. For this example, we will use 40 mph.

STEP 20: Fill out the ADT for Cars, Medium Trucks, and Heavy Trucks. Remember, this requires computing the percentage per vehicle type of the Average Annual Daily Traffic (See steps 10-14).

STEP 21: Fill out the Night Fraction of ADT. This is typically 15.

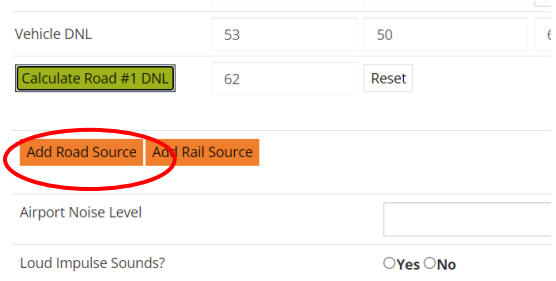
STEP 22: Fill out the Road Gradient. This is typically 2. If the road is on a slope, the grade should be calculated. Elevation data can be found on NEPAssist using the USGS National Map as a base map or on the Vermont ANR Atlas using the Slope Layer.

STEP 23: Once all information has been entered, select Calculate Road #1 DNL. The DNL will populate as shown below.



Road # 1 Name:	Route 7/Lower Newton Road		
Road #1			
Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	100	100	100
Distance to Stop Sign	150	150	150
Average Speed	40	40	40
Average Daily Trips (ADT)	5798	266	74
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	53	50	61
Calculate Road #1 DNL	62	Reset	

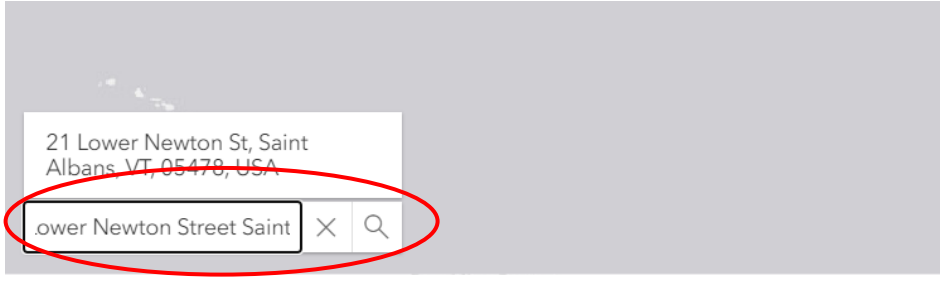
STEP 24: If there is more than one major road within 1,000 feet of the project location, select Add Road Source and repeat Steps 1-23.



Vehicle DNL	53	50	
Calculate Road #1 DNL	62	Reset	
Add Road Source	Add Rail Source		
Airport Noise Level			
Loud Impulse Sounds?	○Yes ○No		

Rail Source

STEP 24: Use the Federal Railroad Administration (FRA), Office of Safety Analysis Mapping Tool to identify railroad tracks within 3,000 feet of the project location. Type in the project address in the search bar in the lower left-hand corner and select enter.

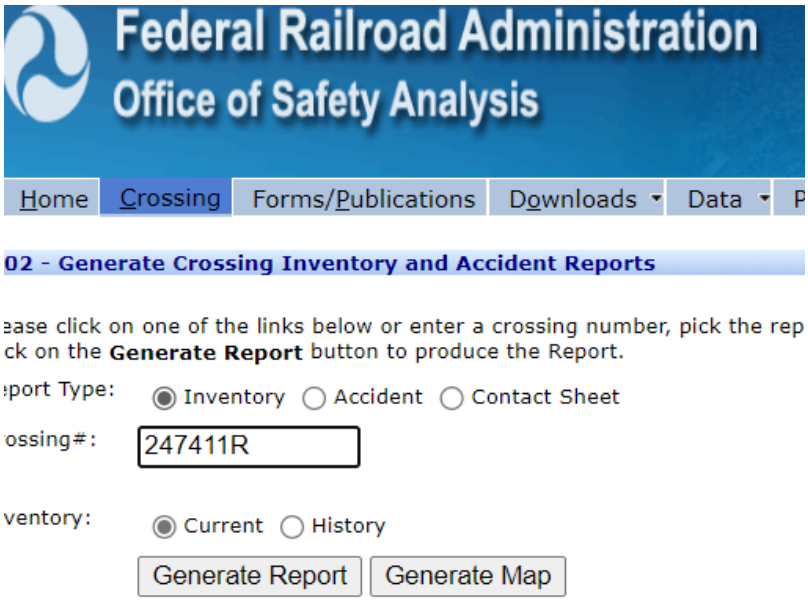


STEP 25: Zoom out to identify all railroads and crossings within 3,000 feet from the project location. You can use the measurement tool to do so.

STEP 26: For each track within 3,000 feet of the project location, determine which crossing is closest to the project location. A screenshot showing the distance between the project location and the nearest crossing on the FRA Map should be included as supporting documentation, even if there are no crossings within 3,000 feet of the project location (like in this example).

STEP 27: Even though there are no crossings within 3,000 feet for this example, we are going to proceed like there is to show the full process if there were to be a crossing within 3,000 feet.

STEP 28: Once all applicable tracks/crossings have been identified and their effective distances have been determined, go to the Crossing Report Generator of the FRA, Office of Safety Analysis website. Enter the crossing number (number in white text on the map) and select Generate Report.



STEP 29: A PDF document will be generated, save this to be included as a supporting document for the DNL calculation. Scroll down to the bottom of Page 1, Part II; Railroad Information. This information will be needed for the DNL calculation. If 1A or 1B are zero, this means the railroad is not in service. For crossings that are not in service, the Crossing Inventory Form should still be included as a supporting document for the DNL Calculation to support the crossing's inactivity.

Part II: Railroad Information

1. Estimated Number of Daily Train Movements

1.A. Total Day Thru Trains (6 AM to 6 PM)	1.B. Total Night Thru Trains (6 PM to 6 AM)	1.C. Total Switching Trains	1.D. Total Transit Trains	1.E. Check if Less Than One Movement Per Day ☐ How many trains per week?
0	2	0	0	

2. Year of Train Count Data *(YYYY)*: 2020

3. Speed of Train at Crossing
3.A. Maximum Timetable Speed *(mph)*: 20
3.B. Typical Speed Range Over Crossing *(mph)* From 0 to 20

4. Type and Count of Tracks
Main 1 Siding 0 Yard 0 Transit 0 Industry 0

5. Train Detection *(Main Track only)*
☒ Constant Warning Time ☐ Motion Detection ☐ AFO ☐ PTC ☐ DC ☐ Other ☐ None

6. Is Track Signaled?	7.A. Event Recorder	7.B. Remote Health Monitoring
☐ Yes ☒ No	☒ Yes ☐ No	☐ Yes ☒ No

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STEP 30: Go back to the HUD DNL Calculator and select Add Rail Source. The below form will populate.

Railroad #1 Track Identifier: 247411R

Rail # 1

Train Type	**Electric** ☐	**Diesel** ☐
Effective Distance		
Average Train Speed		
Engines per Train		
Railway cars per Train		
Average Train Operations (ATO)		
Night Fraction of ATO		
Railway whistles or horns?	Yes: ☐ No: ☐	Yes: ☐ No: ☐
Bolted Tracks?	Yes: ☐ No: ☐	Yes: ☐ No: ☐
Train DNL		

Calculate Rail #1 DNL | Reset

STEP 29: Resources to fill out the Rail Source information above:

- Electric or Diesel: This information is available from the railway operator (Ex: Amtrak) or supervisor of customer relations for the railway.
- Effective Distance: Railroad distances should be measured from the center of a single track or the middle of a set of tracks. Use the measurements (in feet) taken from the Federal Railroad Administration (FRA) map.
- Average Train Speed: See #3 in the Crossing Inventory Form.
- Engines per Train: This information is available from the railway operator or supervisor of customer relations for the railway. If unknown, use 2 for diesel and 1 for electric.
- Railway Cars per Train: This information is available from the railway operator or supervisor of customer relations for the railway. If unknown, use 50 for diesel and 8 for electric.
- Average Train Operations (ATO): See #1A of the Crossing Inventory Form.
- Night Fraction of ATO: See #1B of the Crossing Inventory Form.
- Railway Whistles or Horns: Whistle-stops and horns are typically used ¼ mile before a crossing in each direction, If the segment of the track is not directly across from the site's property line, don't include the whistles. See the illustration below.
- Bolted Tracks: This information is most easily gathered from a site visit or by contacting the railway operator or supervisor of customer relations for the railway.

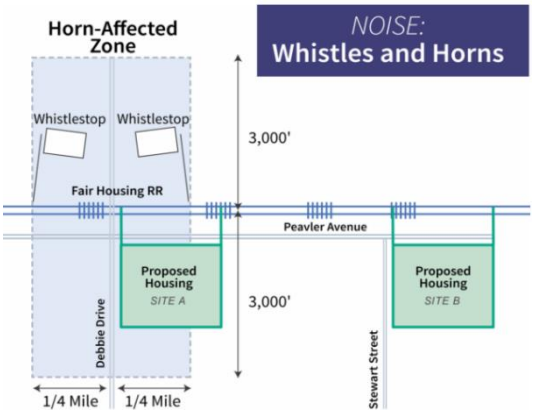


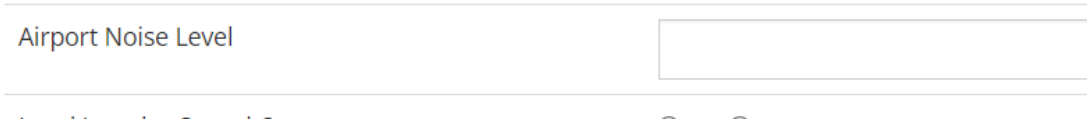
Photo Source: [HUD WISER]

STEP 30: Once all information has been entered into the HUD DNL Calculator, select Calculate Rail #1 DNL. The DNL will populate. Select Add Rail Source for each railroad track within 3,000 feet of the proposed project location.

Airport Source

STEP 31: If the project location is within 15 miles of any airports, the corresponding noise contour map should be consulted (Note: the only airport in Vermont with enough operation per year to warrant a noise contour study is Burlington International Airport). If the project is within the DNL contours indicated on the map, include it in the DNL Calculation. If applicable, include the contour map with the project location identified as a supporting document for the calculation.

(Note: If the project is not within 15 miles of an airport, no contour maps have to be included).



STEP 32: Once all applicable road sources, rail sources, and airport sources have been calculated, select Calculate at the bottom of the HUD DNL Calculator page and the Combined DNL Calculation will populate. Take a screenshot and save as a PDF. Combined all DNL Calculation supporting documents into a single PDF file and upload to the Supporting Documents page under your ER on GEARS.

Determine if the Combined DNL meets HUD's requirements and discuss the findings in the checklist.

Environmental Review Contact Information

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