Noise Impact Assessment

Nevele Resort, Casino, & Spa Development Project

Town of Wawarsing, New York

CME Project #112-068

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CHAPTER I
INTRODUCTION

This report summarizes the results of the noise evaluation completed for the proposed *Nevele Resort, Casino & Spa (Nevele Resort)* development project located in the Town of Wawarsing, Ulster County, New York. The purpose of the study is to assess the potential environmental noise impacts resulting from the proposed development. The project involves the construction of a casino that will provide a total of 2,000 slots and 80 gaming tables with various amenities such as a 446-room hotel, a multipurpose event center/ice arena, spas, restaurants, and golf course. Access to the site is proposed via US Route 209 at an intersection that relocates and reconstructs the existing southern intersection of US Route 209 and Nevele Road. The proposed project is a re-development of the former Nevele Grande Resort and Country Club site, an active site and generator of traffic along the US Route 209 corridor until 2009.

This noise study compares the potential changes in the noise environment (if any) due to the project using the procedures set forth by the New York State Department of Transportation *The Environmental Manual* and compares them to the New York State Department of Environmental Conservation Program Policy; "Assessing and Mitigating Noise Impacts" (February 2001, NYSDEC Noise Policy).

CHAPTER II
NOISE FUDAMENTALS

Noise can be generally defined as unwanted sound in and around our environment. When speaking of noise in relation to sound, any activity may be referred to as noisy. Aircraft, neighbors playing loud music, a conversation, a child crying, or traffic can also be considered noise if the receptor (person) does not want to hear the sound. Sound waves contain energy in the form of pressure and are measured along a scale in units called decibels. On this scale, the normal range of human hearing extends from about 0 dB (roughly the sound of a mosquito flying approximately 10 feet away) to about 140 dB. Zero (0) dB is not an absence of sound, and it is possible for people with exceptionally good hearing to hear sounds at -10 dB, however, this is rare and the 0 to 140 dB range is what is used in acoustical (or noise) studies related to human hearing.

A. Human Response to Sound

Experimentation has determined that the frequency response of the human ear results in a perceived doubling of loudness with every 10 dB increase; whereas a 5 dB increase is a noticeable change and a 3 dB increase is barely noticeable to most people. Sound levels above 85 dB are considered harmful, 120 dB is unsafe, and 150 dB causes physical damage to the human body. Windows break at approximately 163 dB. Jet airplanes create sound levels at approximately 133 dB at 100 feet, or 100 dB at approximately 500 feet. The following table is from the NYSDEC Noise Policy and summarizes the general human reaction to increased sound pressure.

Table 2.1 – Human Reaction to Increases in Sound Pressure Level

Increase in Sound Pressure (dB)	Human Reaction
Under 5	Unnoticed to tolerable
5-10	Intrusive
10-15	Very noticeable
15-20	Objectionable
Over 20	Very objectionable to intolerable

NYSDEC Program Policy “Assessing and Mitigating Noise Impacts”.

The frequency of a sound wave is the number of complete waves or cycles occurring in a unit of time, most commonly seconds. Frequency, when measured in terms of "cycles per second", is expressed in hertz (Hz) with the lower, deeper sounds such as a bass drum having a lower frequency, and higher pitched sounds having a higher frequency. The human ear is sensitive to a large range of frequencies, with the typical frequency range being 20 Hz to 10,000 Hz, however, in some cases it can reach as high as 20,000 Hz.

Important to understand is that human hearing is not equally sensitive along the 20 Hz to 20,000 Hz range of frequencies. It is more sensitive to sound in the higher frequencies than to sounds in the lower frequencies. The A-scale weighting network was devised to measure noise in a way that closely resembles human hearing and its response to different frequencies. Through the A-scale network, a noise level meter with A-weighting capabilities electronically adjusts the lower, middle and higher frequencies when noise is measured. Greater emphasis is placed on the middle to high frequencies where humans are most “noise” sensitive. This is important since the overall sound we hear is not composed of just one single mono-tone sound wave, but a summation of a number of separate sound waves, each with a different frequency. These overall sound waves, or “frequency distribution”, are what is measured in most environmental noise studies. The summation of these frequencies and their weighted sound pressure levels are often expressed as dB(A) (or dBA). The A-scale weighting is used in this study consistent with the NYSDEC Noise Policy.

Another property of noise is the time varying pattern of the intensity of the noise. Since sound levels (and pressures) fluctuate, the equivalent sound level, Leq, was developed to quantify the time varying pattern of noise by providing a single sound pressure level that represents hundreds and many times 1000’s of samples taken over a specified period of time. From this sampling data, a single value of sound for the period measured is developed. This is useful in establishing ambient (background) sound levels and to develop the equivalent sound pressure exposure over a period of time. For example: a one (1) second exposure to an 80 dBA sound will not likely result in hearing damage, but exposure to 80 dBA over a continuous 8 hour period may result in permanent hearing damage. In studying traffic noise, the equivalent exposure time that may constitute a noise impact is 1-hour and is represented by the one-hour equivalent noise level or Leq(1). Other methods of quantification in relation to time are also available to help describe the noise environment. For instance, the $L_{(90)}$ descriptor is used to represent the existing background (ambient) sound levels by providing a single sound pressure level that is exceeded 90% of the time (NYSDEC Noise Policy). What this simply means is that this level is the typical background noise level present in the existing area and does not depend on a distance from any source, since the noise level will be relatively constant at any point in the area.

For this study, the one-hour L_{eq} descriptor was used for traffic noise and the L_{max} was used to represent maximum noise levels present in the existing environment.

B. Multiple Noise Sources

The total sound pressure created by multiple sound sources does not create a mathematical additive effect. For instance, two proximal noise sources that are 65 dBA each do not have a combined noise level of 130 dBA. In this case the combined noise level is 68 dBA. A mathematical formula was used in this study to precisely calculate the additive effect.

Where L_T = combined noise level and $L_{1,2,...n}$ = noise level in decibels the formula is:

$$L_T = 10*\log_{10}(10\verb|^|(L_1/10) + 10\verb|^|(L_2/10) + 10\verb|^|(L_3/10) + \ldots 10\verb|^|(L_n/10))$$

The following table provides the guidelines that summarize the mathematical equation.

Table 2.2 – Approximate Addition of Sound Levels

Difference Between Two Sound Levels	Add to the Higher of the Two Sound Levels
1 dBA or less	3 dBA
2 to 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or more	0 dBA

NYSDEC Program Policy “Assessing and Mitigating Noise Impacts”.

Since the difference between the two sound levels noted in the example above is

0 dBA, the table tells us to add 3 dBA to the higher of the two sound levels to compensate for the additive effects of the sound. For several sources of noise, present at the same time, the difference between the two lowest sound pressure levels (SPLs) is calculated first and that result is added to the next highest source. Follow this process until all the sound levels are accounted for. As an example, if noise sources of 65 dBA, 67 dBA, 72 dBA and 74 dBA were to be added, the resultant sound level would be:

65 dBA + 67 dBA = 69 dBA ⇨ 69 dBA + 72 dBA = 74 dBA ⇨ 74 dBA + 74 dBA = 77 dBA

or

65 + 67 + 72 + 74 = 77 dBA

C. Sound Level Reduction Over Distance

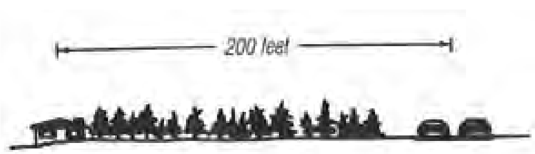
It is important to have an understanding of the way noise decreases with distance. The decrease in sound pressure changes with the 1/r of the distance (inverse distance law). That is, the sound pressure changes in inverse proportion to the distance from the sound source. At distances greater than 50 feet from a sound source, every doubling of the distance produces a 6 dBA reduction in the sound pressure for point sources such as air conditioners, compressors, a rock concert, slow moving vehicle, or a rock crusher. Therefore, a sound level of 70 dBA at 50 feet would have a sound level of approximately 64 dBA at 100 feet. At 200 feet, sound from the same source would have a sound level of approximately 58 dBA. When dealing with a “line source”, such as a moving traffic stream along a major highway, the sound levels will decrease approximately 3 dBA every time the distance is doubled over hard surfaces such as water, asphalt, or concrete and between 5 and 6 dBA per distance doubled over grass or other soft surfaces.

D. Temperature and Humidity

Sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dBA over 1,000 feet. Such attenuation is short term and, since it occurs over a great distance, is not considered in calculations. Higher temperatures tend to increase sound velocity but do not have an effect on the SPL and sound waves bend towards cooler temperatures. Temperature inversions may cause temporary problems when cooler air is next to the earth allowing for more distant propagation of sound. Similarly, sound waves will bend towards water when it is cooler than the air and bounce along the highly reflective surface. Consequently large water bodies between the sound source and the receptor typically reduce the effect of noise attenuation over distances when compared to grass surfaces.

E. Vegetation

If high enough, wide enough, and dense enough (cannot see through it), vegetation can decrease highway traffic noise. A 200-foot width of dense vegetation can reduce noise by 10 decibels, which cuts the loudness of traffic noise in half. However, it is often impractical to plant enough vegetation to achieve such reductions. Even though relatively narrow strips of vegetation cannot provide any (noise) shielding effects, it can provide at least some psychological relief. For example:



Loudness Cut in Half

No Noise Reduction
(Potential Psychological Benefit)

F. Traffic Volume Increases

Traffic Noise studies have shown that a 20-25% increase in traffic volumes will result in a 1 dBA increase of noise levels while a 50% increase in traffic results in a 2 dBA increase. This correlation holds true when the vehicle distribution remains the same such as the number of medium and heavy trucks increase at the same rate as passenger cars. Table 2.3 quantifies increases in traffic volumes as they relate to traffic noise levels.

Table 2.3 – Potential Increase in Traffic Noise with Increase in Traffic Volumes

Traffic Volume Increase	Increase in Traffic Noise Level (dBA)
0 – 25%	0 to 1
26 – 50%	1 to 2
51 – 100%	2 to 3
100 – 200%	3 to 4
200 – 300%	4 to 5

G. Common Noise Levels

Table 2.4 presents examples of typical noise levels in our environment.

Table 2.4 – Common Noise Levels

Common Outdoor Noise Levels	Noise Level (dBA)			Common Indoor Noise Levels
	--	110	--	Rock Band
Jet Fly over at 1,000 ft.				
	--	100	--	
				Inside Subway Train (New York)
Gas Lawn Mower at 3 ft.				
	--	90	--	Food Blender at 3 ft.
Heavy Truck at 50 ft. (50 mph)				
				Garbage Disposal at 3 ft. Shouting at 3 ft.
Noisy Urban (Daytime)	--	80	--	
Gas Lawn Mower at 100 ft.	--	70	--	Vacuum Cleaner at 10 ft.
Commercial Area Heavy Traffic at 300 ft.				Normal Speech at 3 ft.
	--	60	--	
				Large Business Office
Quiet Urban (Daytime)	--	50	--	Dishwasher Next Room
Quite Urban (Nighttime)	--	40	--	
				Small Theater (Background) Library
Quiet Suburban (Nighttime)				
	--	30	--	
				Bedroom at Night Concert Hall (Background)
Quite Rural (Nighttime)	--	20	--	
				Broadcast and Recording Studio
	--	10	--	
				Threshold of Hearing
	--	0	--	

CHAPTER III
CODES AND GUIDANCE

A. Town Code and Related Guidance

The criteria used in determining the potential for traffic related noise impacts for this project are in accordance with the Code of the Town of Wawarsing which regulates noise under Chapter 78 – Noise Control of the Town Code and states the following:

> "*A. No person shall cause, suffer, allow or permit the operation of any source of sound on a particular category of property or any public space or right-of-way in such a manner as to create a sound level that exceeds the particular sound level limits set forth as follows: between 6:00 a.m. and 10:00 p.m., 73 dBA's, and between 10:00 p.m. and 6:00 a.m., 63 dBA's, when determined by a sound-level measure at the adjoining property line nearest to the sound source.*
>
> *B. No person shall cause, suffer, allow, or permit the existence of unnecessary sound which tends to injure, alarm, annoy, harass or disturb the peak or enjoyment of property of another."*

The application of these criteria pertains to site developments since they are stating a maximum instantaneous sound level as it impacts adjoining properties to a site and not to noise levels associated with traffic which is calculated over 1-hour equivalent time periods. Therefore, the above noted noise codes are not applicable to noise related to traffic on public roadways.

B. Other SEQR Considerations

As a result of the proposed project, traffic volumes will increase along the roadways in and adjacent to the project area. As traffic volumes increase, traffic related noise may increase at residences and businesses along these roadways. Since traffic related noise impacts have the potential for environmental impacts, they need to be considered and documented as part of the SEQR review process. When the municipal code does not provide criteria in determining what changes in traffic noise levels may constitute a noise impact, the NYSDEC Noise Policy can provide the appropriate guidance. The NYSDEC Noise Policy states that increases in 0 to 3 dBA are not noticeable while increases in 3 to 5 dBA have the potential for an impact in only the most sensitive of locations. The Policy goes on to state that sound pressure increases of more than 6 dBA may require a closer analysis of impact potential depending on existing traffic noise levels and the character of surrounding land use. For comparison purposes, the Federal Highway Administration (FHWA) and the New York State Department of Transportation (NYSDOT) consider an increase in traffic noise of 6 dBA a substantial increase and the level where noise impacts may occur.

Traffic related noise is typically described using a time weighted average (usually one hour) also known as the one-hour equivalent noise level abbreviated as $L_{eq(1)}$ (Source: NYSDOT, FHWA). To determine the $L_{eq(1)}$ for traffic noise, measurements are typically conducted continuously in 15 to 20 minute intervals by a noise meter capable of data logging (such as the meter used in this analysis). This one-hour weighted average equivalent noise level ($L_{eq(1)}$) can be used to determine the noise exposure one would experience over a one-hour period.

The criteria used in determining the potential for traffic noise impacts for this project is based on guidance from the NYSDEC Noise Policy, The New York State Department of Transportation (NYSDOT) *The Environmental Manual* (TEM) and the Federal Highway Administration (FHWA) Federal-Aid Policy Guide, Subchapter H, Part 772 (23 CFR 772), *Procedures for the Abatement of Highway Traffic Noise and Construction Noise*. The following bullets provide guidance on the procedures of noise analysis:

- Existing land uses are determined for the project corridor.
- Noise measurements are taken at various sites along the existing highway system to determine existing noise levels.
- The existing and proposed highway alignments are modeled utilizing the FHWA Traffic Noise Modeling software (TNM 2.5).
- Predicted design year noise levels are compared to the existing and null alternative noise levels and the guidance from the municipalities (as applicable), NYSDEC, NYSDOT, and FHWA to determine if noise impacts may occur.
- Where an impact is expected to occur, noise abatement measures are examined and evaluated.

CHAPTER IV

LAND USE

Figures 1 through 8 depict the location of six noise measurement sites along US Route 209 in the study corridor. The measurement locations are near residential areas that are representative of the receptors in the project area. Existing land uses along US Route 209 include residential, commercial, and agriculture. In order to classify existing land uses, the following table (adapted from the FHWA) was used to assign a letter designation that generally describes the land and its associated use. The project area is made up of land uses with Activity Categories B, C, E, and F. Since Activity Category F does not have any criteria, all of the receivers were placed in areas which fall under Activity Category B, C, or E.

Table 4.1 – Noise Abatement Criteria Hourly A-Weighted Sound Level (dBA)

Activity Category	L_{eq}(h)	Description of Activity Category
A	57 dBA (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 dBA (Exterior)	Residential
C	67 dBA (Exterior)	Active sport areas, amphitheatres, 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 dBA (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 dBA (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.

CHAPTER V
MEASURED NOISE LEVELS

Existing noise level measurements were conducted during the PM peak hour on Wednesday, January 8, 2014 and during the AM peak hour on Thursday, January 9, 2014 at the six locations shown on Figures 1 through 8. These sites (M1 through M6) are a representation of the study area. The results of the field measurements are shown in Table 5.1.

Noise levels at each of the noise measurement sites were determined in accordance with the procedures outlined in the NYSDOT TEM and in accordance with NYSDEC guidelines. Field measurements were obtained using a Quest Technologies Model 2900 (ANSI Type II) noise level meter. The meter is a battery-powered instrument, which was field tested for proper calibration before and after each measurement. The instrument was set up approximately five (5) feet above the ground. The weather during the PM peak hour was clear with temperatures around 19 degrees Fahrenheit and during the AM peak hour was clear with temperatures varying between 9 and 14 degrees Fahrenheit. The wind speeds varied between 0 - 3 mph and a wind screen was utilized. Humidity levels were approximately 58% during the PM peak hour and 82% during the AM peak hour. These meteorological conditions are within the parameters for accurate operation, as recommended by the manufacturer.

Existing traffic related noise levels on US Route 209 were determined using the time weighted average ($Leq_{(1)}$) method based on measurements conducted continuously for 15 minute intervals. The $Leq_{(1)}$ noise levels, date, time and individually loud noise sources are summarized in Table 5.1.

Table 5.1 – Noise Measurement Data

Measurement Site		Individual Loud Source(s) of Noise	Time	Date	Leq
M1	AM	Loud trucks/plane	9:06 a.m.	1/9/14	67 dBA
	PM	Loud trucks	3:47 p.m.	1/8/14	68 dBA
M2	AM	Loud trucks/birds/plane	8:26 a.m.	1/9/14	62 dBA
	PM	Loud truck/muffler/plane	4:26 p.m.	1/8/14	62 dBA
M3	AM	Loud truck/bus	7:59 a.m.	1/9/14	66 dBA
	PM	Loud truck	4:54 p.m.	1/8/14	65 dBA
M4	AM	Loud truck/car door/idling car	7:30 a.m.	1/9/14	67 dBA
	PM	none	5:21 p.m.	1/8/14	65 dBA
M5	AM	Loud truck/car/idling car	7:00 a.m.	1/9/14	68 dBA
	PM	Loud trucks	5:56 p.m.	1/8/14	69 dBA
M6	AM	Loud truck/jet	6:30 a.m.	1/9/14	71 dBA
	PM	Loud truck	6:29 p.m.	1/8/14	66 dBA

The TNM 2.5 model is a state-of-the art, comprehensive noise prediction software accepted and used nationwide by transportation authorities for traffic noise prediction. Inputs to the TNM model include highway alignment and grade, traffic volumes and vehicle types, operating speeds, physical features such as existing ground surfaces embankment slopes, earth cut sections, retaining walls, and earth berms. An existing model was created using traffic volumes that were measured during the noise measurements. A noise model is considered validated per the NYSDOT TEM if the modeled noise levels at each measurement site is within +/-3 dB(A) of the measured values. All of the modeled sites were within the measured values by +/-3 dB(A) except for the AM peak hour measurement at site M6 which was skewed due to an extremely loud truck and jet that produced a Lmax of 81.6 dB(A). Since the remaining eleven measurements in the model were within +/-3 dB(A) of the measured values, the model was considered validated.

CHAPTER VI
PREDICTED FUTURE NOISE LEVELS

A. Traffic Volume Increases and Speed

The Traffic Impact Study for the project has determined what traffic volume changes will occur due to the proposed project. Expected traffic volume increases and potential noise level increases along effected roadways are shown in Table 6.1. The correlation of traffic increase-to-noise level increase shown in Table 6.1 assumes the vehicle type distribution, such as the number of medium and heavy trucks, increase at the same rate as passenger cars. Table 6.1 outlines the approximate traffic volume increases on the study area roadways expected between the existing and no-build; and existing and build condition volumes. The percentage of trucks used in the TNM model as determined from the Traffic Impact Study along most of US Route 209 for the existing, no-build, and build models are 2% Medium Trucks and 2% Heavy Trucks. On US Route 209 south of an existing distribution center located at McDonald Road, the percentage of trucks was modeled at a higher rate with 4% Medium Trucks and 2% Heavy Trucks. Based on the existing traffic counts and an analysis on the future uses of the site, it was assumed that Nevele Road and Arrowhead Road would have 3% Medium Trucks and 2% Heavy Trucks.

Table 6.1 – Expected Noise Increases Based on Traffic Increases

Roadway	Approximate Increase in Traffic		Approximate Noise Level Increase due to Project (dBA)
	No-Build Condition	Build Condition	
US Route 209			
North of Wawarsing Village (Receivers 1 and M1)	10-20%	30-50%	1-3 dBA
Near NY Route 55 Intersection (Receiver 2)	10-20%	30-50%	1-3 dBA
North of Ellenville Village (Receiver 3)	10-20%	30-50%	1-3 dBA
In Ellenville Village (Receivers 4 and M2)	10-20%	60-80%	2-3 dBA
Near Nevele Rd Intersection (Receivers 5)	10-20%	60-80%	2-3 dBA
Nevele Rd to McDole Rd (Receivers 6, 7, M3, and M4)	10-20%	90-125%	3-4 dBA
McDole Rd to Wurtsboro Village (Receivers 8, 9, 10, 11, 12, and M5)	10-20%	90-125%	3-4 dBA
In Wurtsboro Village (Receivers 13, 14, 15, and M6)	10-20%	70-125%	2-4 dBA

The operating speeds used in the analysis for roadways within the project area represent typical operating speeds during peak traffic noise periods. These speeds were determined by driving in the traffic stream during the peak periods and by the data obtained by the Automatic Traffic Recorders (ATRs) used in the Traffic Analysis. The speeds are shown in Table 6.2.

Table 6.2 – Peak Traffic Noise Period Vehicle Operating Speeds

Roadway	Typical Operating Speed (mph)	Regulatory Speed Limit (mph)
US Route 209		
North of Wawarsing Village (Receivers 1 and M1)	48	45
Near NY Route 55 Intersection (Receiver 2)	41	35
North of Ellenville Village (Receiver 3)	41	35
In Ellenville Village (Receivers 4 and M2)	30	30
Near Nevele Rd Intersection (Receivers 5 and 6)	59	55
Oakridge Rd to McDole Rd (Receivers 7, M3, and M4)	50	45
McDole Rd to Wurtsboro Village (Receivers 8, 9, 10, 11, 12, and M5)	60	55
In Wurtsboro Village (Receivers 13, 14, 15, and M6)	40	40
Nevele Road		
North of Arrowhead Rd	29	25
South of Arrowhead Rd	35	35
Arrowhead Road	35	35

B. Noise Modeling

To provide a “picture” of the expected noise environment along the effected roadways, TNM 2.5 was utilized to analyze the expected change in noise levels from the existing conditions to the No-Build and Build Conditions. The Build Conditions include geometric improvements at the US Route 209/Nevele Road intersection which involves realigning Nevele Road to create a typical T-intersection with US Route 209 and widening to provide turn lanes. Other proposed geometric improvements includes symmetrically widened to construct left turn lanes on the northbound and southbound intersection approaches at the US Route 209/Sullivan Street intersection in Wurtsboro.

The future condition models were run for the Weekday PM peak hour and Weekend PM peak hour conditions, which are the worst case conditions evaluated in the traffic impact study. Fifteen receiver locations were also chosen along the project corridor to represent sensitive area for noise and are shown in Figures 1 through 8. The results of the noise models are shown in Tables 6.3 and 6.4.

Table 6.3 – Weekday PM Peak Traffic Noise Levels

Receiver	Land Use Activity Category	Weekday PM Peak Noise Level L_{eq} (dBA)			
		Existing	Design Year (2017)		Increase in dBA (over Existing)
		Modeled Existing	No-Build	Build	
1	B	60	61	62	2
2	C	47	48	48	1
3	C	38	39	39	1
4	C	52	53	55	3
5	B	52	52	54	2
6	C	50	50	53	3
7	B	59	60	62	3
8	C	52	52	55	3
9	C	57	57	60	3
10	C	50	51	53	3
11	B	59	59	62	3
12	C	61	61	64	3
13	E	62	63	65	3
14	B	61	62	63	2
15	C	57	58	61	4

Table 6.4 – Weekend PM Peak Traffic Noise Levels

Receiver	Land Use Activity Category	Weekend PM Peak Noise Level L_{eq} (dBA)			
		Existing	Design Year (2017)		Increase in dBA (over Existing)
		Modeled Existing	No-Build	Build	
1	B	60	61	61	1
2	C	46	47	48	2
3	C	38	38	39	1
4	C	52	52	54	2
5	B	52	52	54	2
6	C	50	50	53	3
7	B	59	60	63	4
8	C	52	53	55	3
9	C	57	57	60	3
10	C	50	51	54	4
11	B	59	59	62	3
12	C	61	61	64	3
13	E	63	63	65	2
14	B	61	62	64	3
15	C	58	59	61	3

The NYSDOT TEM states that noise impacts occur when one or both of the following occurs:

1) Predicted future traffic noise levels substantially (by 6 dBA or more) exceed the existing levels.

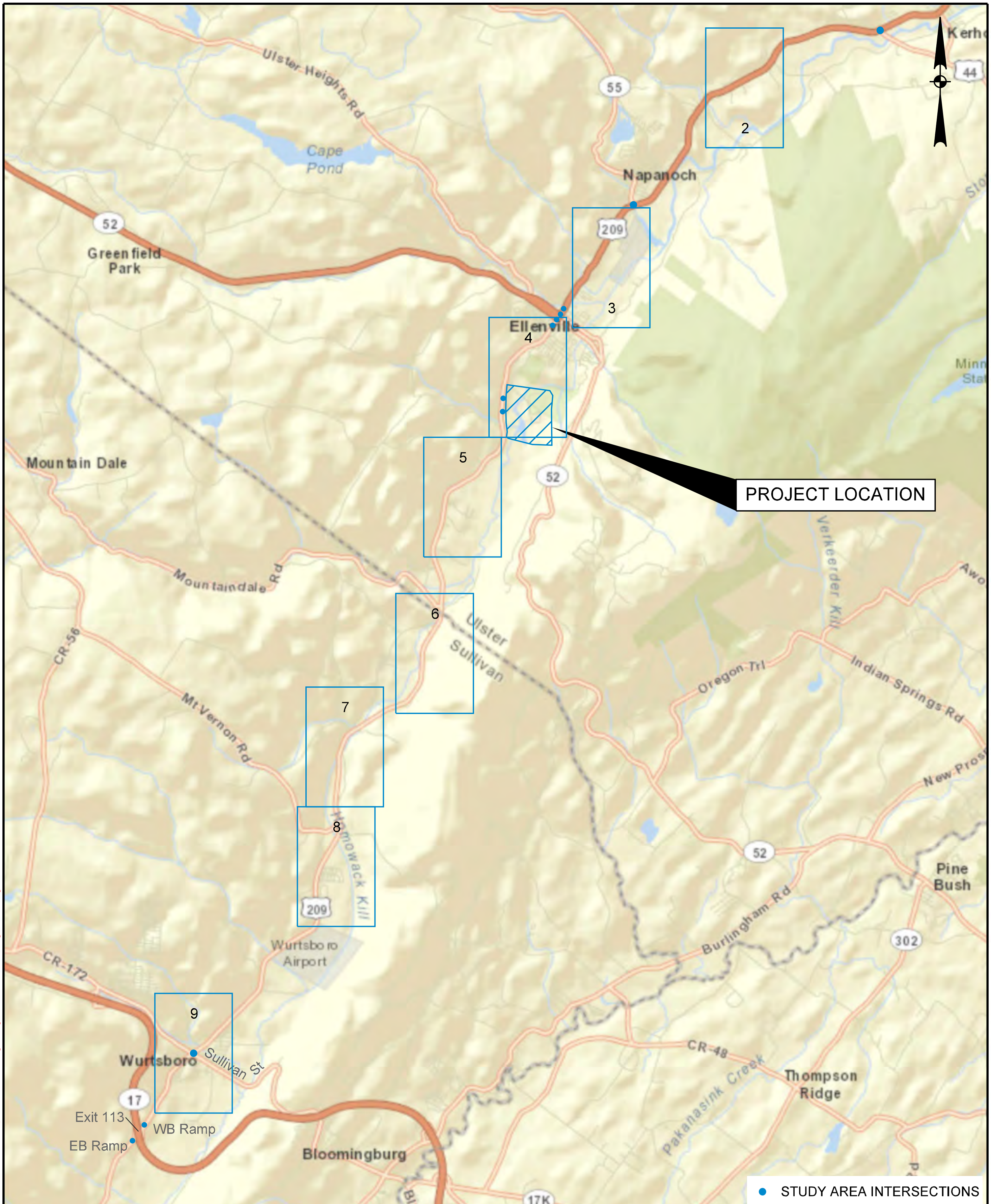
For the Build Alternative, traffic related noise levels are expected to increase to a maximum of 4 dBA over existing noise levels along US Route 209 at one receiver location during the Weekday PM peak traffic period and at two receiver locations during the Weekend PM peak traffic period. The remaining receivers will experience traffic noise increases of less than 4 dBA. According to NYSDOT and NYSDEC Noise Policy, the human reaction to this increase is considered unnoticed to tolerable, and does not define an impact.

2) The predicted future traffic noise levels approach within 1 dBA or exceed the Noise Abatement Criteria (NAC).

No traffic related noise levels are expected to approach or exceed the NAC for the Weekday PM peak hour or the Weekend PM peak hour. Refer to Table 4.1 for definition of the NAC for each of the land use categories shown in Tables 6.3 and 6.4.

Overall it is noted that the development of the project will result in noise level increases in the project area that may be noticeable but are not increased by a level that requires mitigation. The greatest increases are expected on US Route 209 south of the project site due to the larger increase in traffic in this area with the development of the site. As US Route 209 provides direct access to NY Route 17, the character of the roadway is to provide regional accessibility in and out of the study area including travel to and from the existing Kohl's distribution center located on US Route 209 north of Sullivan Street which is a high generator of heavy vehicle traffic at the southern end of the study area.

Based on the results of the noise analysis, a noise abatement assessment for noise associated with traffic is not necessary.



NOISE MEASUREMENT/RECEIVER
FIGURE INDEX

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 1

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NOISE MEASUREMENT/RECEIVER 1
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 2

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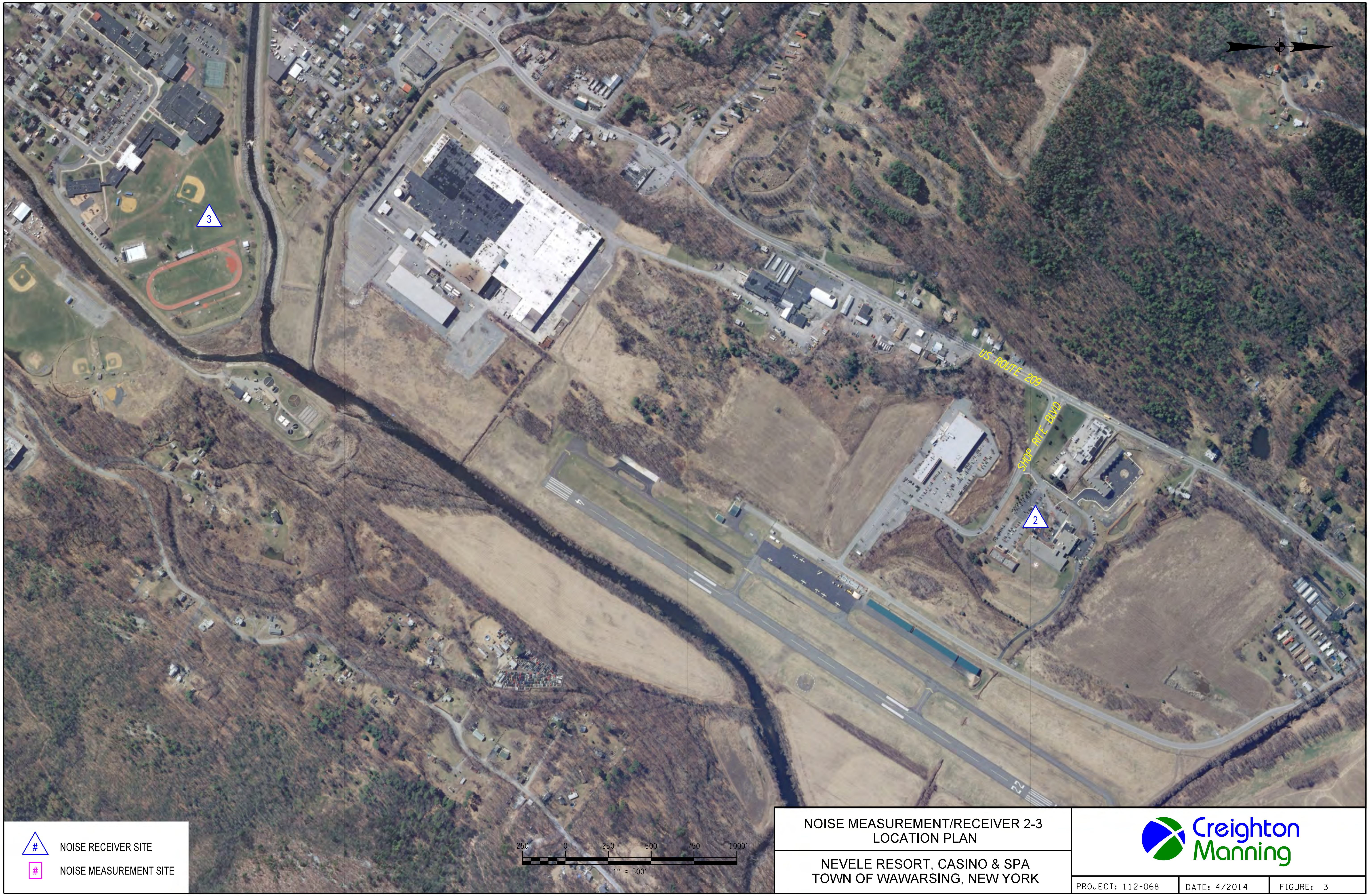

NOISE RECEIVER SITE

NOISE MEASUREMENT SITE

NOISE MEASUREMENT/RECEIVER 2-3
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 3

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DATE/TIME = 4/8/2014
USER = dborjas

NOISE RECEIVER SITE

NOISE MEASUREMENT SITE

NOISE MEASUREMENT/RECEIVER 4-6
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 4

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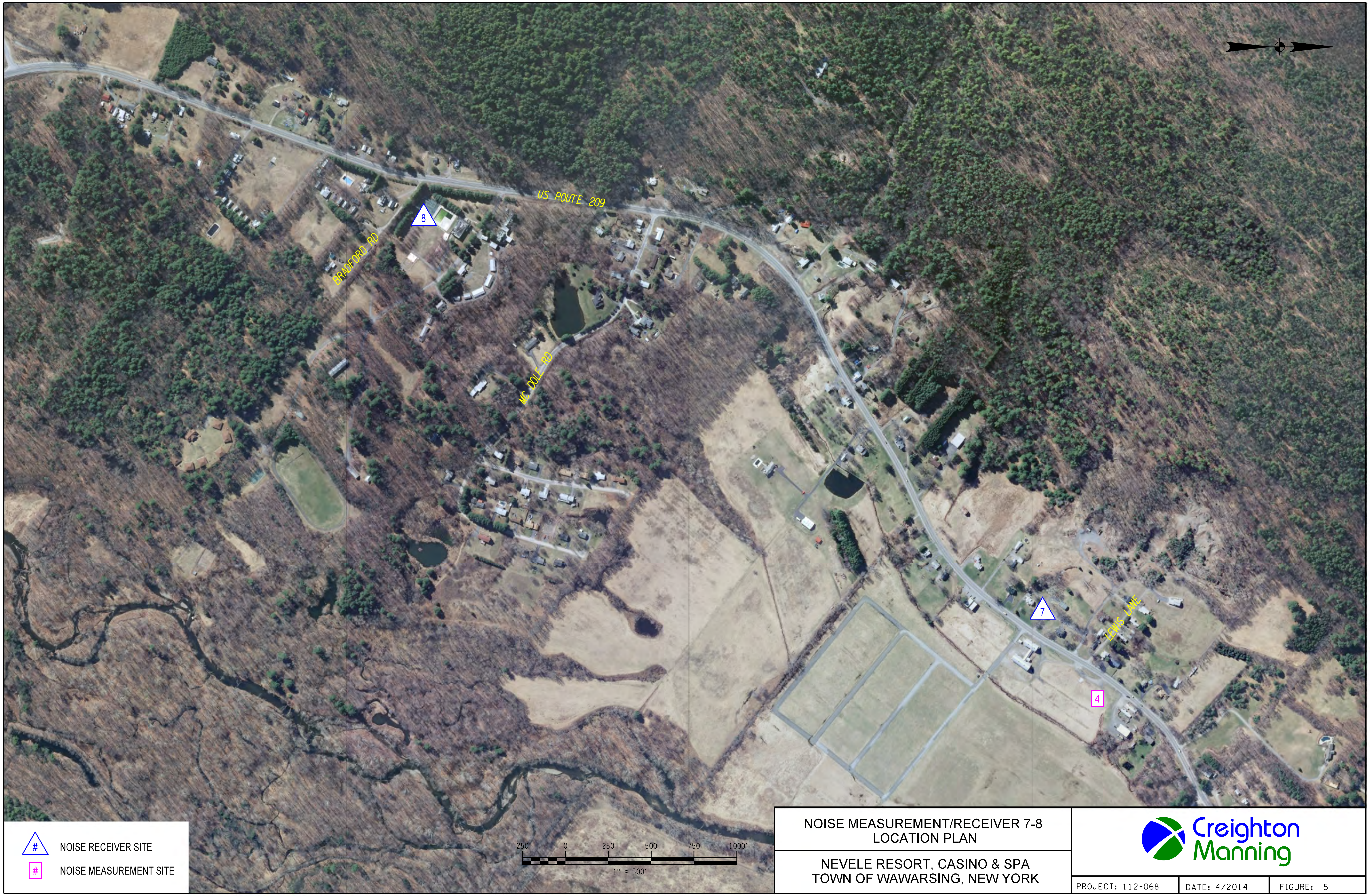

NOISE MEASUREMENT/RECEIVER 7-8
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 5

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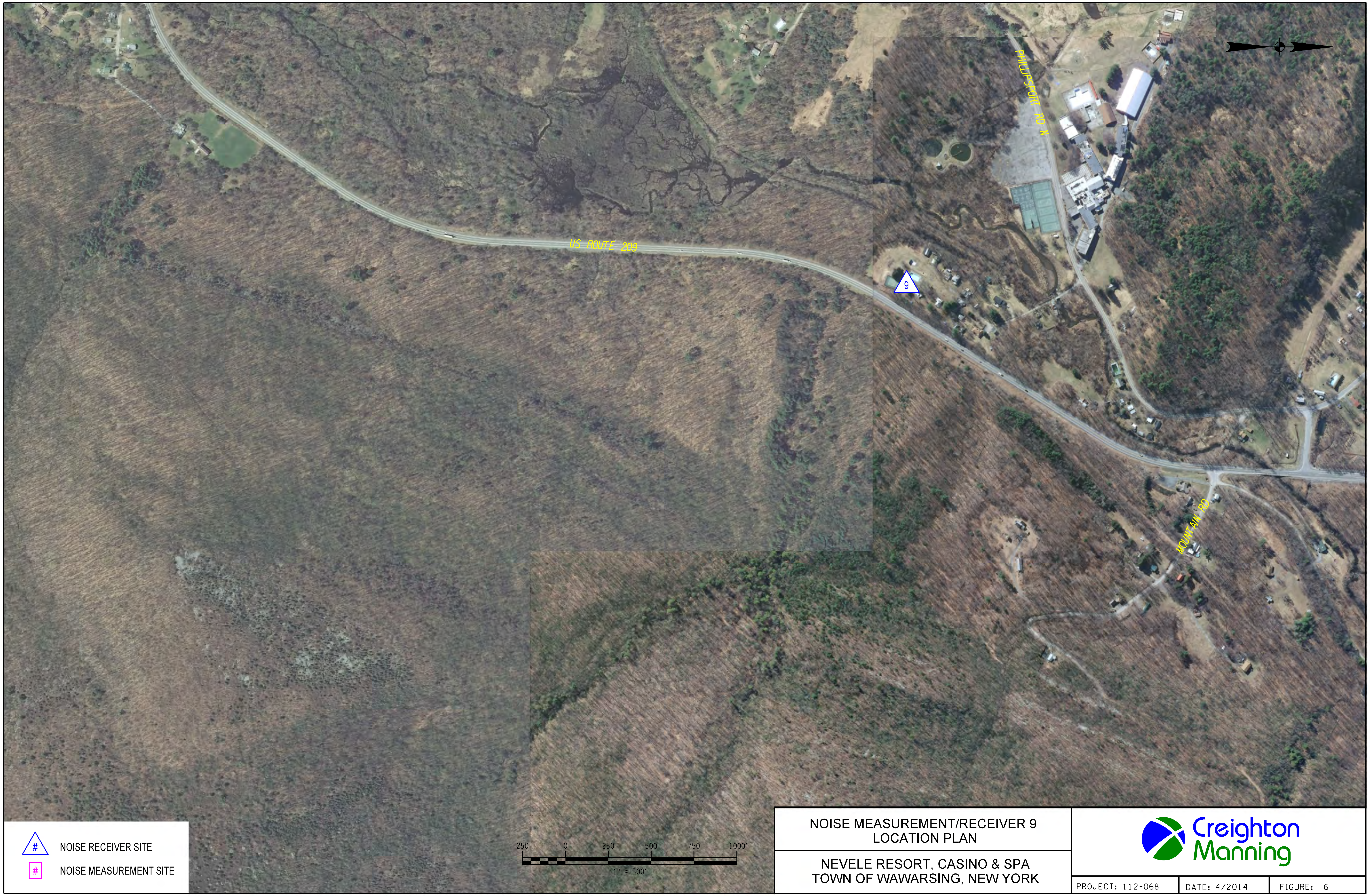

NOISE MEASUREMENT/RECEIVER 9
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 6

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DATE/TIME = 4/8/2014
USER = dborjas

NOISE RECEIVER SITE

NOISE MEASUREMENT SITE

NOISE MEASUREMENT/RECEIVER 10
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 7

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DATE/TIME = 4/8/2014
USER = dborjas

NOISE MEASUREMENT/RECEIVER 11-12
LOCATION PLAN

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068	DATE: 4/2014	FIGURE: 8

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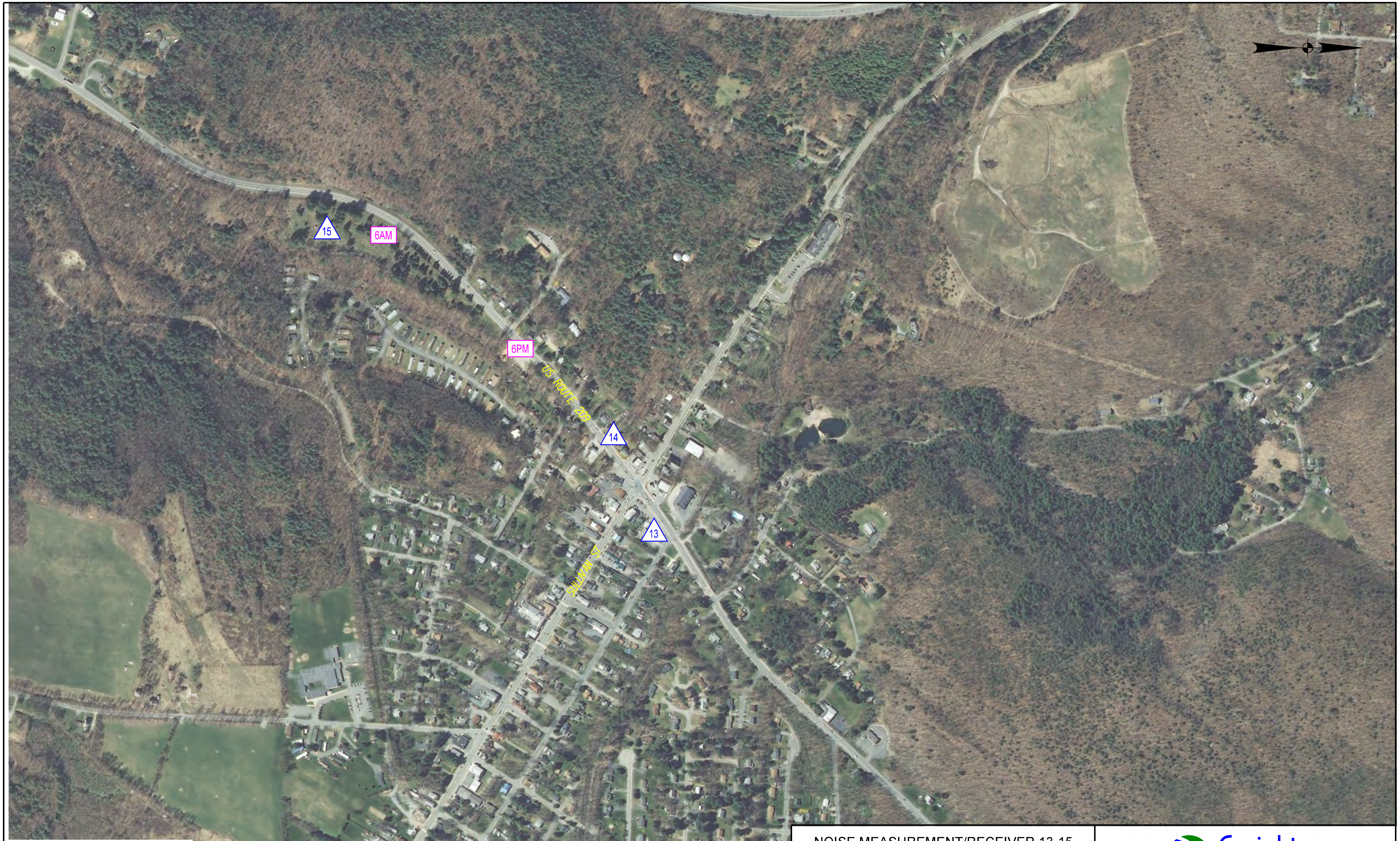

NOISE MEASUREMENT/RECEIVER 13-15 LOCATION PLAN

NOISE RECEIVER SITE

NOISE MEASUREMENT SITE

NEVELE RESORT, CASINO & SPA
TOWN OF WAWARSING, NEW YORK

Creighton Manning

PROJECT: 112-068 | DATE: 4/2014 | FIGURE: 9

FILE NAME = F:\Projects\2012\112-068 Nevele Redevelopment\cadd\dgn\figures\112-068_fig_noise.dgn
DATE/TIME = 4/8/2014
USER = dborjas

CHAPTER VII
CONCLUSIONS

Field measurements were conducted and sound levels were recorded to determine the existing ambient noise environment in the project area. Predicted peak noise levels, based on expected traffic volume increases, were considered and analyzed to determine the potential for noise impacts due to the development of the proposed project.

A traffic noise study was completed to quantify the effect of the increase in traffic volumes on traffic noise in the study area extending along US Route 209. Traffic related noise levels are expected to increase between 1 and 4 dBA during peak operating conditions. The predicted noise level increases do not exceed the 6 dBA increase or levels within 1 dBA of the noise abatement criteria that would require mitigation. For these reasons, the increase in traffic volumes along effected roadways due to the proposed project will not create a noise impact requiring mitigation.

CHAPTER VIII

GLOSSARY

1. Automobiles (A) **–** All vehicles with two axles and four wheels designed primarily for transportation of nine or fewer passengers (automobiles), or transportation of cargo (light trucks). Generally the gross vehicle weight is less than 4,500 kilograms.

2. Noise Abatement Criteria **–** The noise levels established for various activities or land uses which represent the upper limit of acceptable traffic noise level conditions.

3. Design Year **–** The future year used to estimate the probable traffic volume for which a highway is designed. A time of 10 years from the end of construction is used for this project.

4. Existing Noise Levels **–** The noise, made up of all the natural and man-made noises, considered to be usually present (unique noise events may be excluded) within a particular area's acoustical environment.

5. Heavy Trucks (HT) - All vehicles having three of more axles and designed for the transportation of cargo. Generally, the gross weight is greater than 13 tons.

6. Leq **–** The equivalent steady state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period.

7. Leq(1) **–** The one-hour value of Leq.

8. Medium Trucks (MT) **–** All vehicles having two axles and six wheels designed for the transportation of cargo. Generally, the gross vehicle weight is greater than 5 tons but less than 13 tons. For the purposes of this study, all buses and motorcycles were also classified as medium trucks because of their similar noise generating characteristics.

9. Noise Level **–** The sound level obtained through use of A-weighting characteristics specified by the American National Standards Institute (ANSI) Standard S1.4-1971. The unit of measure is the decibel (dB), commonly referred to as dBA when A-weighting is used.

10. Operating Speed **–** The highest overall speed at which a driver can travel on a given highway under favorable weather conditions and under prevailing traffic conditions, without at any time exceeding the safe speed as determined by the design speed on a section-by-section basis.

11. Traffic Noise Impacts – Impacts which occur when traffic noise levels approach or exceed noise criteria, or when the predicted traffic noise levels substantially exceed the existing noise levels.

Appendix A

TNM Model Outputs

Noise Impact Assessment
Nevele Resort, Casino, & Spa Project
Town of Wawarsing, New York

RESULTS: SOUND LEVELS

Creighton Manning
JMK

112-068 Nevele

27 March 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2014 Existing Weekday PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
Measurement 2	5	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Measurement 3	7	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Measurement 4	9	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Measurement 5	11	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Measurement 6	15	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Receiver 1	18	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
Receiver 2	19	1	0.0	47.1	66	47.1	10	----	47.1	0.0	8	-8.0
Receiver 3	20	1	0.0	38.3	66	38.3	10	----	38.3	0.0	8	-8.0
Receiver 4	21	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
Receiver 5	22	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
Receiver 6	23	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
Receiver 7	24	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Receiver 8	25	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
Receiver 9	26	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
Receiver 10	27	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
Receiver 11	28	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
Receiver 12	29	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
Receiver 13	30	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
Receiver 14	31	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
Receiver 15	32	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

RESULTS: SOUND LEVELS — 112-068 Nevele

Creighton Manning — 6 April 2014
JMK — TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2014 Existing Weekend PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
Measurement 2	5	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Measurement 3	7	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Measurement 4	9	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
Measurement 5	11	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Measurement 6	15	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
Receiver 1	18	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
Receiver 2	19	1	0.0	46.3	66	46.3	10	----	46.3	0.0	8	-8.0
Receiver 3	20	1	0.0	37.5	66	37.5	10	----	37.5	0.0	8	-8.0
Receiver 4	21	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
Receiver 5	22	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
Receiver 6	23	1	0.0	49.9	66	49.9	10	----	49.9	0.0	8	-8.0
Receiver 7	24	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
Receiver 8	25	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
Receiver 9	26	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
Receiver 10	27	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
Receiver 11	28	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
Receiver 12	29	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
Receiver 13	30	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Receiver 14	31	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Receiver 15	32	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

RESUITS: SOUND LEVELS 112-068 Nevele

Creighton Manning 27 March 2014
JMK TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2017 No Build Weekday PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Measurement 2	5	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
Measurement 3	7	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
Measurement 4	9	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
Measurement 5	11	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
Measurement 6	15	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
Receiver 1	18	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
Receiver 2	19	1	0.0	47.8	66	47.8	10	----	47.8	0.0	8	-8.0
Receiver 3	20	1	0.0	39.0	66	39.0	10	----	39.0	0.0	8	-8.0
Receiver 4	21	1	0.0	52.9	66	52.9	10	----	52.9	0.0	8	-8.0
Receiver 5	22	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
Receiver 6	23	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
Receiver 7	24	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
Receiver 8	25	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
Receiver 9	26	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
Receiver 10	27	1	0.0	50.9	66	50.9	10	----	50.9	0.0	8	-8.0
Receiver 11	28	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
Receiver 12	29	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Receiver 13	30	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Receiver 14	31	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Receiver 15	32	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

RESULTS: SOUND LEVELS

112-068 Nevele

Creighton Manning
JMK

27 March 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2017 No Build Weekend PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
Measurement 2	5	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
Measurement 3	7	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
Measurement 4	9	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
Measurement 5	11	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
Measurement 6	15	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
Receiver 1	18	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
Receiver 2	19	1	0.0	47.0	66	47.0	10	----	47.0	0.0	8	-8.0
Receiver 3	20	1	0.0	38.2	66	38.2	10	----	38.2	0.0	8	-8.0
Receiver 4	21	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
Receiver 5	22	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
Receiver 6	23	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
Receiver 7	24	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Receiver 8	25	1	0.0	52.5	66	52.5	10	----	52.5	0.0	8	-8.0
Receiver 9	26	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
Receiver 10	27	1	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
Receiver 11	28	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
Receiver 12	29	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Receiver 13	30	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
Receiver 14	31	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
Receiver 15	32	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

RESULTS: SOUND LEVELS	112-068 Nevele
Creighton Manning	27 March 2014
JMK	TNM 2.5
	Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2017 Build Weekday PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
Measurement 2	5	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
Measurement 3	7	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
Measurement 4	9	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
Measurement 5	11	1	0.0	72.1	66	72.1	10	Snd Lvl	72.1	0.0	8	-8.0
Measurement 6	15	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
Receiver 1	18	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
Receiver 2	19	1	0.0	48.4	66	48.4	10	----	48.4	0.0	8	-8.0
Receiver 3	20	1	0.0	39.4	66	39.4	10	----	39.4	0.0	8	-8.0
Receiver 4	21	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
Receiver 5	22	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
Receiver 6	23	1	0.0	52.9	66	52.9	10	----	52.9	0.0	8	-8.0
Receiver 7	24	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
Receiver 8	25	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
Receiver 9	26	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
Receiver 10	27	1	0.0	53.4	66	53.4	10	----	53.4	0.0	8	-8.0
Receiver 11	28	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
Receiver 12	29	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Receiver 13	30	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Receiver 14	31	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
Receiver 15	32	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

RESULTS: SOUND LEVELS

112-068 Nevele

Creighton Manning
JMK

27 March 2014
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 112-068 Nevele
RUN: 2017 Build Weekend PM Peak Hour
BARRIER DESIGN: INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Measurement 1	3	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
Measurement 2	5	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
Measurement 3	7	1	0.0	70.5	66	70.5	10	Snd Lvl	70.5	0.0	8	-8.0
Measurement 4	9	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
Measurement 5	11	1	0.0	72.1	66	72.1	10	Snd Lvl	72.1	0.0	8	-8.0
Measurement 6	15	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
Receiver 1	18	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
Receiver 2	19	1	0.0	47.7	66	47.7	10	----	47.7	0.0	8	-8.0
Receiver 3	20	1	0.0	39.2	66	39.2	10	----	39.2	0.0	8	-8.0
Receiver 4	21	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
Receiver 5	22	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
Receiver 6	23	1	0.0	53.1	66	53.1	10	----	53.1	0.0	8	-8.0
Receiver 7	24	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
Receiver 8	25	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
Receiver 9	26	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
Receiver 10	27	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
Receiver 11	28	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
Receiver 12	29	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
Receiver 13	30	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Receiver 14	31	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
Receiver 15	32	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max

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