Belleayre Mountain Ski Center UMP-DEIS

Appendix AG
Noise Technical Report & Data

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Prepared for:

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Existing Noise Survey Reports

NOISE TECHNICAL REPORT
BELLEAYRE MOUNTAIN SKI CENTER
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INTRODUCTION

Two projects are proposed for Belleayre Mountain in the Town of Shandaken in Ulster County, NY. The first project is the expansion of the Belleayre Mountain Ski Center; the second is the modified Belleayre Resort at Catskill Park. The DEIS for the Ski Center is designated Part A. Under the proposed action for the Ski Center (Part A), NYSDEC would acquire portions of the former Highmount Ski Center plus a permanent easement over other lands on the Highmount Spa facility in close proximity to Crossroads' proposed resort facilities. These lands would be used for new ski trails and would therefore need snowmaking capacity to provide ski- ski-out public access to the resorts. The new ski trails would be west of the existing Deer Run ski trail and in the Town of Shandaken. The Ski Center would be close at 4 pm.

The DEIS for Belleayre Resort is designated Part B. Under the proposed action for the Belleayre Resort (Part B), two resort complexes would be developed west of the Ski Center along Ulster County Route 49A and south of NYS Route 28. The lodging units closest to the new ski trails may be affected by the Ski Center equipment used to maintain the ski trails.

Part C is the analysis for the combined impacts of the two projects. This report summarizes the work completed on the potential noise impacts associated with Parts A and C.

NOISE FUNDAMENTALS

Noise is defined as any unwanted sound, and sound is defined as any pressure variation that the human ear can detect. Human beings can detect a large range of sound pressures ranging from 20 to 20 million micropascals, but only those air pressure variations occurring within a particular set of frequencies are experienced as sound. Air pressure changes that occur between 20 and 20,000 times a second, stated as units of Hertz (Hz), are registered as sound. In terms of hearing, humans are most sensitive to frequencies in the 1,000 to 5,000 Hz range. Since ambient noise contains many different frequencies all mixed together, measures of human response to noise assign more weight to frequencies in this range. This is known as the A-weighted sound level.

Because the human ear can detect such a wide range of sound pressures, sound pressure is converted to sound pressure level (SPL), which is measured in decibels. The decibel is a relative measure of the sound pressure with respect to a standardized reference quantity. Decibels on the A-weighted scale are termed "dBA." Because the scale is logarithmic, a relative increase of 10 decibels represents an SPL that is 10 times higher. However, humans don't perceive a 10 dBA increase as 10 times louder; they perceive it as twice as loud. The following is typical of human response to relative changes in noise level:

- a 3-dBA change is the threshold of change detectable by the human ear,
- a 5-dBA change is readily noticeable, and
- a 10-dBA increase is perceived as a doubling of noise level.

The SPL that humans experience typically varies from moment to moment. Therefore, a variety of descriptors are used to evaluate noise levels over a period of time. Some typical descriptors are defined below:

- L_{eq} is the continuous equivalent sound level. The sound energy from the fluctuating sound pressure levels is averaged over time to create a single number to describe the mean energy

or intensity level. High noise levels during a monitoring period will have greater effect on the L_{eq} than low noise levels. The L_{eq} has an advantage over other descriptors because L_{eq} values from different noise sources can be added and subtracted to determine cumulative noise levels.

- Lmax is the highest SPL measured during a given period of time.

- L_{10} is the SPL exceeded 10% of the time. Similar descriptors are the L_{50}, L_{01}, and L_{90}.

- L_{dn} is the day-night equivalent sound level. It is similar to a 24-hour Leq, but with 10 dBA added to SPL measurements between 10 pm and 7 am to reflect the greater intrusiveness of noise experienced during these hours. Ldn is also termed DNL.

Although the SPL heard in the environment typically is composed of many different frequencies, it can be broken down into the numerous individual frequencies. These frequencies are grouped into octave bands. An octave band is a group of frequencies in the interval between a given frequency (such as 350 Hz) and twice that frequency (e.g., 710 Hz). The standard octave bands are each named by their center frequencies. Thus, each octave band will be represented by a single SPL. When the representative SPLs from the individual octave bands are added together, they are weighted so that the resulting total SPL will represent dBA. Octave bands are used in some noise models because the different components of a noise source will have different frequencies. For example, a truck traveling downhill will have a different set of frequencies than a truck traveling uphill

EVALUATION STANDARDS AND CRITERIA

SEA reviewed the following federal, state and local noise regulations and guidelines to determine appropriate impact criteria. At the federal level, the EPA has no requirements.

FHWA. The Federal Highway Administration (FHWA) has standards that govern the analysis and definition of impacts for traffic noise for those highway projects using Federal-aid funds. They are described in FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* contained in 23 CFR 772. FHWA established Noise Abatement Criteria (NAC), shown in Table 1, to be used in defining traffic noise impacts. An impact is defined when projected traffic noise levels: 1) approach or exceed the NAC, or 2) substantially exceed existing noise levels. FHWA did not intend the NAC to be used as federal standards, desirable noise levels, or design goals for noise barriers. They are only to be used as absolute values that, when approached or exceeded, require consideration of traffic noise mitigation measures.

The FHWA regulations do not specify noise levels that approach or exceed the NAC; state DOTs develop their own definitions. However, FHWA guidelines require state DOTs to use a definition of "approach" that is at least 1 dBA less than the applicable NAC.

NYSDOT. For residential property lines, NYSDOT typically defines a traffic noise impact when one of the following conditions is projected to occur:

- Exterior L_{eq} (h) of 67 dBA or L_{10} (h) of 70 dBA for NAC Category B (see Table 1),
- Exterior noise levels approach (i.e., are within 1 dBA of) the above standards, and
- Substantial incremental increase of 6 dBA compared to Existing Conditions.

A noise level that exceeds the NAC under Build Conditions is defined as an impact, *even if the noise exceeded the NAC under Existing or No Build Conditions*.

Table 1
FHWA Noise Abatement Criteria

Activity Category	Hourly Sound Level dBA)*		Description of Activity Category
	L_{eq}(h)	L_{10}(h)	
A	57 (Exterior)	60 (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 it
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, sports arenas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above
D	--	--	Undeveloped lands
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums

**Either L_{10} (h) or L_{eq} (h) (not both) may be used on a project. Hourly sound levels are expressed in dBA (decibels on the A-weighted scale), which correlate with human perception of loudness.*
Source: 23 CFR 772

NYSDEC. NYSDEC provides noise evaluation guidelines in "Assessing and Mitigating Noise Impacts" (Department ID DEP-00-1, June 3, 2003). The document does not identify a specific threshold for determining impacts. However, the following human reactions to increases in noise level are listed in the document:

- Under 5 dBA — Unnoticed to tolerable
- 5 – 10 dBA — Intrusive
- 10 – 15 dBA — Very noticeable
- 15 to 20 dBA — Objectionable
- Over 20 dBA — Very objectionable to intolerable

The NYSDEC document further states that "[in] non-industrial settings, the SPL should probably not exceed ambient noise by more than 6 dBA at the receptor."

Shandaken. Chapter 116 of the Shandaken Zoning Code lists maximum exterior noise levels. Table 2 shows the allowable maximum sound levels as described in the Town's Code. In addition, for any source of sound that emits a pure tone, a discrete tone, or impulsive sound, the maximum sound limits in Table 2 are reduced by 5 dBA.

Table 2
Maximum Permissible Continuous Sound Levels at Specified Times Measured in dBA

Receiving Property	Sound Level Limits
Residential zones (R5, R3, R1.5, HR)	53 dBA between 7:00 p.m. and 7:00 a.m. 57 dBA between 7:00 a.m. and 7:00 p.m.
Commercial zones (HC, HB, and CLI)	60 dBA between 9:00 p.m. and 7:00 a.m. 64 dBA between 7:00 a.m. and 9:00 p.m.
Residential occupancy or public place	50 dBA between 9:00 p.m. and 7:00 a.m. 65 dBA between 7:00 a.m. and 10:00 p.m.

Source: Code of the Town of Shandaken, New York, (12-9-802)

Evaluation Criteria. The criteria to be used in evaluating noise impacts will be the standards specified in of the Code for Shandaken for non-transportation sources such as operational equipment and blasting. These sources of noise would generally occur outside of the peak traffic periods. However, this code does not address relative increases in noise level. Therefore, for the purposes of this study, an impact also is defined as an increase of 6 dBA when comparing No Build and Build Conditions for the Leq and for estimates of continuous noise as defined in the Shandaken noise ordinance. The 6 dBA impact criterion is based on the levels defined by NYSDEC as intrusive, and it also matches the 6 dBA criterion used by NYSDOT to define a substantial increase in noise. The Leq was included because it represents a sustained increase in noise levels for the duration of the event.

For traffic noise, the NYSDOT guidelines will be used. They include both absolute noise levels and relative increases in noise. The Ski Center closes at 4 pm. Since the peak traffic period, from 4 to 5 pm, is not a period when operational noise would occur, the use of different evaluation criteria for different sources will not overlap. In a state or federally funded traffic study, impacts are determined by comparing Build Conditions with Existing Conditions. This is different from impact criteria established by other agencies, wherein the comparison is between No Build and Build Conditions.

For noise blasting, the criteria would be based on federal guidelines, such as those developed by the Office of Surface Mining, as well as any criteria developed by NYSDEC for determining noise impacts.

NOISE MONITORING PROGRAM

Identify Future Noise Sources and Times Periods

The purpose of the noise monitoring program was to establish baseline noise levels without the proposed action and to determine noise levels associated with equipment that would be used for the Ski Center. SEA contacted the operators of the Belleayre Ski Center to identify pertinent sources of noise. Potential sources of noise from the Ski Center may include snow-making equipment (snow guns), snow grooming equipment, snow removal, parking lot activities, traffic, and portable diesel generators. However, operation of the snow guns and other equipment may occur primarily at night. Construction of the Ski Center also would be a source of noise to existing and future lodgings or dwelling units due to stationary equipment, mobile equipment, and blasting.

Noise Monitoring Locations

In coordination with the operators of the Belleayre Ski Center, SEA toured the project area to identify the local land uses and sensitive noise receptor locations within one mile of the new ski trails and snow making equipment, observe existing noise sources, and select potential locations for the noise monitoring program. Based on the scope of work, noise monitoring locations were intended to represent:

- residential locations sensitive to equipment noise, construction noise, and/or blasting noise,
- locations representative of the Wilderness and Wild Forest, and
- locations adjacent to roadways that would experience noise from additional traffic (both from the Ski Center and from construction operations).

The primary purpose of the noise monitoring program was to identify sites representative of sensitive receptors locations within a 1-mile radius of the proposed ski center, which would be focused on the former Highmount Ski Center location. SEA also reviewed Appendix 22, "Sound Impact Study" from the DEIS previously prepared by Crossroads Ventures in January 2002 for the proposed Belleayre Resort at Catskill Park—a project that was subsequently discontinued. Most of the sites that were monitored by Crossroads Ventures fall outside of the Part A area that is the focus of the document herein.

As requested by NYSDEC, the monitoring locations were limited primarily to sites on Belleayre property or public property. Figure 1 shows the selected sites, as well as the location of the new parking lot for the proposed ski center and a residential area on Kelly Road that was not included among the sites because it is on the other side of the ridge and therefore not likely to experience noise from ski guns. Table 1 describes the selected sites in more detail. Seven of the sites are within a 1-mile radius of the proposed ski center construction near Highmount Ski Center. Sites 7 and 8 were selected because they would experience increased noise levels due to higher traffic volumes, as well as construction of the parking lot for the ski center. Site 9 was selected solely for its proximity to potential construction activities for the future parking lot. The distances between the noise monitor and the edge of the road ranged from 10 feet along a dirt road in a heavily wooded area to 25 feet in an area relatively free of obstructions. In some cases, the locations represent the distances of local homes or property lines from the roadway; in others they were constrained by site conditions such as vegetation, topography, or visual obstructions to the line of site.

Noise Monitoring Procedures

Noise monitoring was carried out according to NYSDOT field procedures and the DEIS scope of work. The NYSDOT Environmental Procedures Manual (EPM) references the Department's manual, "Field Measurement of Existing Noise Levels." However, the field measurement manual is obsolete and no longer available from NYSDOT. Therefore, Mr. Bill McColl at NYSDOT was contacted for updated field procedures. The updated procedures require field personnel to write down the Leq and Lmax at 5-, 10-, and 15-minute intervals (using whole numbers for the decibels) while the sound level meter is running continuously. If the measurements are the same for the 10- and 15-minute periods, then no further monitoring is required. Otherwise, monitoring continues, and the noise Leq and Lmax for the 20-minute period are compared with the 15 minute period. If they match, then no further monitoring is required. Otherwise, monitoring continues to the 25-minute period. Twenty-five minutes is the maximum time period that would be required. Since the scope of work specified 20-minute noise monitoring periods, all monitoring periods for characterizing traffic noise and background noise were at least 20 minutes long. Although the field measurement manual called for calibrating the noise monitor before and after each measurement, this is no longer required because the newer sound level meters hold their calibration better.

Mr. McColl also recommended that traffic noise sites be monitored on two separate occasions to ensure that the readings do not represent anomalous circumstances. However, the second noise monitoring period can be at any time of the day; it does not have to be a peak traffic period. Ideally, the Leq and Lmax for one period should be within 3 dBA of the measurements for the second period.

Figure 1

Belleayre noise sites

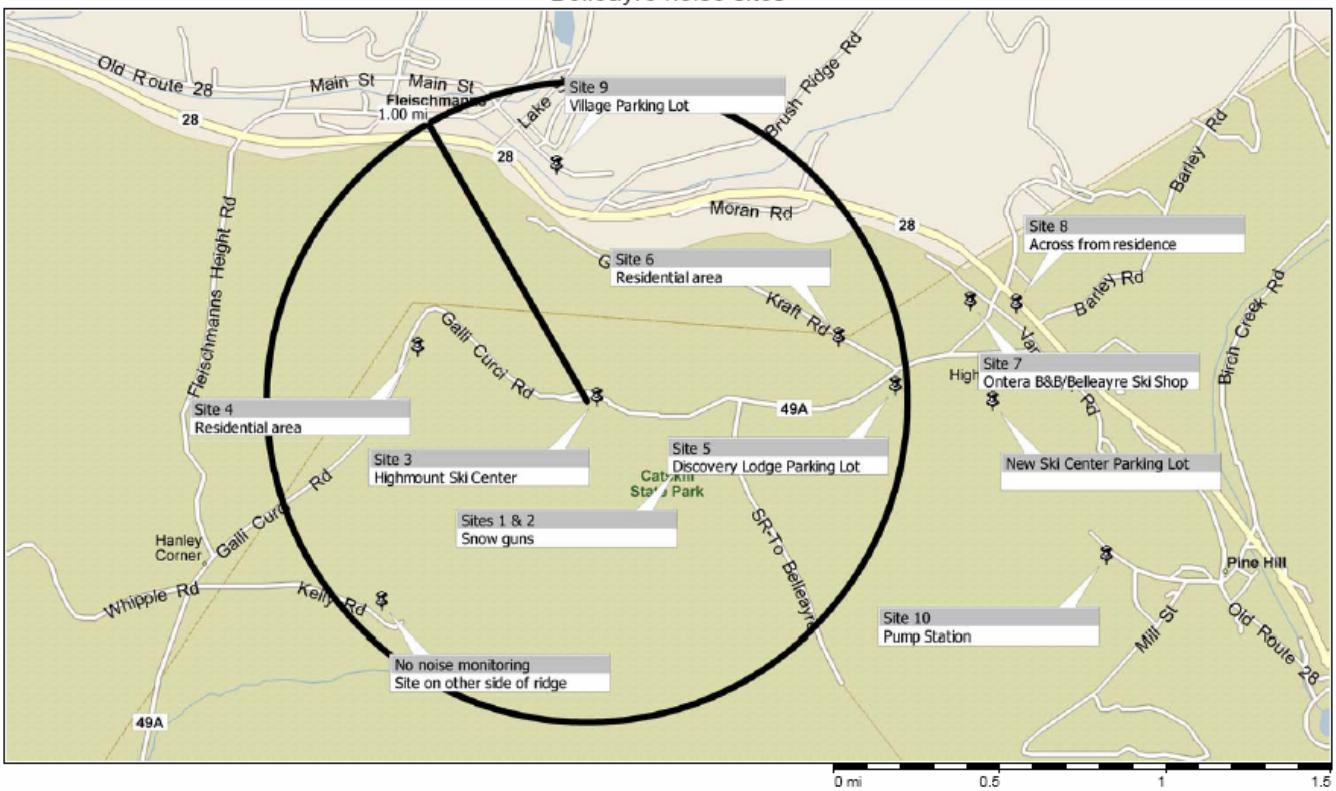

Table 1
Noise Monitoring Locations

ID	Location	Reason for Selection				Site Represents:
		Back-ground Noise	Potentially Affected by:			
			Snow Guns	Traffic Volumes	Cons-truction	
1	Belleayre Mountain high energy snow guns		X			Snow gun noise
2	Belleayre Mountain low energy snow guns		X			Snow gun noise
3	Highmount Ski Center	X	X	X	X	Nearby residences
4	Galli Curci Road, north hairpin curve	X	X	X	X	Nearby residences
5	Galli Curci Road, Discovery Lodge parking lot	X	X	X		Nearby residences
6	Green Hill Road, residential neighborhood	X	X			Nearby residences
7	Galli Curci Road, Belleayre Ski Center parking lot	X		X	X	Nearby bed & breakfast
8	Route 28 southbound, grassy area	X		X	X	Nearby residences
9	Main Street near village parking, Fleishmann's	X	X			Nearby residences
10	Bonnieview Avenue, pump station	X			X	Nearby residences

Source: Sandstone Environmental Associates, Inc.

Noise levels were monitored with either a B&K 2236 sound level meter or a B&K 2250 sound level meter, both of which are ANSI Type 1 instruments. They were mounted on tripods at heights of approximately 5 feet. No monitoring was carried out during periods of precipitation or winds over 12 mph. A wind screen was used at all times except during calibration. The B&K 2236 was calibrated before each monitoring period. The B&K 2250, a newer sound level meter, was calibrated once per hour or before the monitoring period if more than an hour had passed since the last one.

Noise Monitoring Periods

With the exception of the pump station on Bonnieview Road, the selected sites were monitored two to three times, with one of the periods occurring during the evening (7 to 9 pm) or nighttime (after 9 pm). Monitoring during the evening and nighttime periods complied with NYSDOT's request for two periods for traffic noise sites and also established baseline noise levels in residential and commercial zones for the periods referenced in Shandaken's noise code. Sites 1 through 9 were monitored on April 20, 2008, and Site 10 was monitored on April 21, 2008.

NOISE MONITORING RESULTS

Site 1 and 2, Snow Guns

NYSDEC desired to monitor noise from the snow guns after the Belleayre Ski Center had closed for the season. This avoided avoid washing out a ski run during the ski center's season, and the electricity costs of running the equipment were lower due to the off-peak season. Due to the spring temperatures, the snow guns produced a heavy spray of water rather than snow. Because the air compressors for the snow guns will shut off at 70° F, and because the forecast called for warm weather, the work had to be completed as quickly as possible after the compressors were charged. Therefore some monitoring periods had to be shortened in order to obtain information for all of the desired scenarios, and there was insufficient time to carry out a full range of both broad spectrum and octave band monitoring.

High-Energy Snow Guns. High-energy snow guns are needed to bring water for snow-making up to the higher elevations on the ski slopes. They are noisier than the low-energy snow guns. The noise monitoring site for the high energy guns was near the northernmost point on the Deer Run ski slope. This is 3,725 feet from monitoring Site 3 at the lodge of the former Highmount Ski Center. Six high-energy snow guns, spaced 100 feet apart on the eastern side of the slope, were running. The noise monitor was at an inactive snow gun, 100 feet from the northernmost snow gun. The next active snow gun was 100 feet south of the monitor. The other four were south of the monitor at subsequent intervals of 100 feet. However, due to the way the ski slope curves, their distances from the noise monitor were somewhat shorter. The overall sound was constant and comparable to the sound of rushing water or a waterfall.

A brief, 5-minute measurement was carried out to obtain an indication of the noise spectrum. The Leqs for selected 1/3 octave bands were as follows:

Octave Band	31.5hz	250hz	500hz	1kz	2kz	5kz
Leq	57.4	58.4	63.7	65.7	63.2	59.8

This shows that the noise is somewhat evenly distributed across the spectrum, but that the highest noise levels are in the 500hz to 2kz octave bands.

Noise levels were monitored for 20 minutes with six high energy snow guns operating, two of which were in the line of site 100 feet away. The sloping topography partially obscured the third snow gun, at the 200-foot location, and completely obscured the other three. Table 2 shows that the noise levels did not vary much over the time period. They ranged from 71.3 dBA to 78.4 dBA, with an Leq of 73.7 dBA. Two 5-minute monitoring periods were carried out to determine the noise levels with varying numbers of snow guns operating. Since the Leq and Lmax measurements at intervals of 5, 10, 15, and 20 minutes were identical for the first monitoring period, the 5-minute periods were considered sufficient for this purpose. During the second monitoring period, one snow gun located 100 feet away was turned off. This reduced the noise levels by about two decibels across all of the noise descriptors. During the third monitoring period, only one snow gun, located 100 feet away, was operating. Noise levels were nearly identical to the scenario with five snow guns operating except for the Lmax and Lmin values. No other noise sources were audible when the snow guns were operating.

Based on these results, a single high energy snow gun would have an Leq of 71.6 dBA and a Lmax of 74.6 dBA at a distance of 100 feet. Assuming an attenuation rate of 6 dBA per distance doubling, the expected noise level after adding five more snow guns at intervals of 100, 200, 300, 400, and 500 feet would be 75.5 dBA. However, noise levels from the snow guns at distances of 300 to 500 feet were largely blocked by the topography, and noise from the snow gun at the 200-foot distance was partially blocked by the topography. Therefore the two closest snow guns, each 100 feet away, dominated the noise readings during the first monitoring period. The fact that the Leq noise level from the combined snow guns, 73.7 dBA, was not at least 3 dBA higher than the noise level from the single snow gun, 71.6 dBA, suggests that some snow guns are not as loud as others.

Site 2, Low-Energy Snow Guns

Low-energy snow guns can be used on the lower elevations of the slopes. By the time the preparations for monitoring noise from the low-energy snow guns were ready, the temperature on the slopes was approaching 70 degrees, and the automatic shut-off on the air compressors was likely to be tripped. Therefore, two 10-minute monitoring periods were carried out. The Leq and Lmax noise levels noted at 5- and 10-minute intervals were identical for each of the 10-minute monitoring periods. Although noise from the snow guns was the dominant source, some noise from an aircraft flyover also was audible but did not appear to significantly affect the SPL.

First, noise levels were monitored with four snow guns operating at distances of 100, 100, 200, and 300 feet from the noise monitor. Topography blocked the line of site for the snow gun that was 300 feet away. The Leq was 65.8 dBA and the Lmax was 69.9 dBA. Only one snow gun, 100 feet away, was operating during the second monitoring period. It had an Leq of 59.7 dBA and a Lmax of 62.5 dBA. Assuming an attenuation rate of 6 dBA per distance doubling, the expected Leq noise level from the four operating snow guns would be 63.4 dBA. The higher observed level of 65.8 dBA suggests that some snow guns may be louder than others.

Table 2
Results of Noise Monitoring

Location	Road	Time	Minutes	Leq	L10	L90	L01	Lmax	Lmin
High Energy Snow Guns[a]	NA	9:40-9:45a	5	NA[b]	NA	NA	NA	NA	NA
High Energy Snow Guns[a]	NA	9:50-10:10a	20	73.7	74.8	72.4	76.2	78.4	71.3
High Energy Snow Guns[c]	NA	10:15-10:21a	6	71.7	72.4	70.8	74.1	76.5	70.1
High Energy Snow Guns[c]	NA	10:23-10:28a	5	71.6	72.6	70.4	74.0	74.6	69.1
Low Energy Snow Guns	NA	10:48-10:58a	10	65.8	67.2	41.0	69.1	69.9	63.1
Low Energy Snow Guns	NA	11:00-11:10a	10	59.7	60.9	58.3	62.5	62.7	57.3
Highmount Ski Center	Galli Curci	9:47-10:07a	20	40.2	41.0	0.0[d]	51.5	62.8	0.0[d]
Highmount Ski Center	Galli Curci	10:18-10:43a	25	39.6	36.0	28.0	49.5	63.8	25.6
Highmount Ski Center	Galli Curci	7:03-7:23p	20	38.8	39.5	28.5	49.0	60.2	26.5
North hairpin	Galli Curci	3:25-3:45p	20	42.6	45.0	33.0	53.5	62.5	28.4
North hairpin	Galli Curci	7:00-7:25p	25	43.1	40.1	28.3	51.3	69.1	26.1
Discovery Lodge parking lot	Galli Curci	2:50-3:10p	20	55.6	50.0	39.0	68.0	79.6	38.1
Discovery Lodge parking lot	Galli Curci	4:10-4:35p	25	47.3	43.9	39.0	59.3	68.1	36.3
Discovery Lodge parking lot	Galli Curci	7:38-7:58p	20	47.6	47.0	40.5	57.0	68.3	38.9
Wooded area	Green Hill	3:25-3:50p	25	46.8	47.2	34.9	55.0	70.5	32.5
Wooded area	Green Hill	3:55-4:01	6	41.8	43.9	36.6	46.7	58.5	33.1
Wooded area	Green Hill	7:40-8:00p	20	39.5	41.9	33.4	48.5	55.0	31.2
Bed & Breakfast	Galli Curci	2:15-2:40p	25	51.2	49.0	39.0	63.0	73.3	34.7
Bed & Breakfast	Galli Curci	8:20-8:45p	25	51.2	47.9	37.2	63.0	75.2	35.2
Grassy area	Route 28	1:40-2:05p	25	60.6	64.0	41.5	70.0	81.7	37.3
Grassy area	Route 28	4:07-4:32p	25	61.0	64.5	43.0	72.0	75.6	37.3
Grassy area	Route 28	8:20-8:40p	20	57.2	61.0	52.5	64.5	66.9	51.2
Fleishmann's	Main St.	12:50-1:15p	25	57.9	59.0	46.5	67.0	83.3	45.1
Fleishmann's	Main St.	9:00-9:25p	25	51.7	55.0	45.5	60.5	65.8	44.9
Pump station	Bonnieview	9:22-9:47a	25	56.3	56.5	56.0	58.0	63.1	55.7

[a] *Five snow guns operating*
[b] *NA, not applicable; octave band noise readings were obtained.*
[c] *One snow gun operating*
[d] *Noise level below range set for meter.*
Source: Sandstone Environmental Associates, Inc.

Site 3, Highmount Ski Center

This site is on Galli Curci Road at the lodge for the vacant Highmount Ski Center, which is the location for the proposed ski center expansion. It is representative of a residence in this area. Noise levels were monitored during a 20-minute morning period when the high-energy snow guns were running on Deer Run about 3,725 feet away. During this period, no noise from the snow guns was audible. (This would be expected because a snow gun with a noise level of 71.6 dBA would attenuate to 41.5 dBA at a distance of 3,200 feet.) The presence of heavy woods between the snow gun and the observer would cause noise levels to fall off even faster. No traffic passed by the site. Dominant sources of noise were birdcalls and a woodpecker. The noise monitor registered an Leq of 40.2 dBA and an Lmax of 62.8 dBA. No Lmin or L90 descriptors are available because they were below the range of the noise monitor. Since decibels are on a logarithmic scale, the absence of the lowest readings is not likely to significantly affect the overall calculations for Leq. However, the reading was not used to establish a background noise level.

To obtain a valid background reading, the noise monitor was reset to accommodate the observed range of noise levels, and the site was monitored for a second time for the purpose of obtaining a background reading. No traffic passed by on Galli Curci Road. The Leq was 39.6 dBA, and the Lmax was 63.8 dBA. This is substantially similar to the first reading, and verifies the fact that the high-energy snow guns did not affect noise levels. The L10 for t his period is lower than the Leq.

Because this site is representative of residences along this portion of Galli Curci Road, it also was monitored for 20 minutes after 7 pm. No traffic passed by. The noise descriptors were similar to, but slightly lower than, the daytime readings. The resulting Leq was 38.8 dBA, and the Lmax was 60.2 dBA.

Site 4, Galli Curci Road Hairpin

West of the former Highmount Ski Center and just south of the hairpin turn on Galli Curci Road is a residence. Across from the residence is a field that is part of the Catskill State Park. A sign in the field is lettered "Highmount Resort and Spa." The noise monitor was set up in this field about 18 feet from the road, which appeared to be similar to the distance between the road and the home across the street. A daytime background noise level monitored in the afternoon had an Leq of 42.6 dBA and an Lmax of 62.5 dBA No traffic passed by. Noise levels included trees rustling, birdcalls, woodpeckers, distant traffic noise from Route 28, and a jet aircraft flyover at about 35,000 feet. Birds were the dominant source of noise. Evening noise levels from 7:00 to 7:25 pm were similar, but included noise from a passing motorcycle. The Leq was 43.1 dBA and the Lmax was 69.1 dBA. This background reading was unusual because the L10 was lower than the Leq. This was due to the brief burst of higher noise levels from the motorcycle, which were more influential in calculating the Leq than the greater number of lower noise levels.

Site 5, Discovery Lodge Parking Lot

Site 5, on the grassy area of the parking lot at Discovery Lodge on Galli Curci Road, is representative of residences along this segment of the road. Audible background noise included the sound of running water in a nearby brook, bird calls, and distant noise from an occasional motorcycle on Route 28. Due to the overall low traffic volumes on Galli Curci Road, a few additional vehicles will have a significant effect on the monitored noise levels. During the mid-afternoon, when nine autos and one motorcycle passed by, the Leq was 55.6 dBA and the Lmax was 79.6. However, from 4:10 to 4:35 pm, which would be a peak traffic period for the proposed action, only two autos passed by. The noise levels for this second monitoring period were lower, with an Leq of 47.3 dBA and an Lmax of 68.3 dBA. A third noise monitoring period after 7 pm had similar noise levels and traffic volume. These background readings were unusual because the L10s were lower than the Leqs. This was due to the brief burst of higher noise levels from the motor vehicles, which were more influential in calculating the Leq than the greater number of lower noise levels.

Site 6, Wooded Area on Green Hill Road

Green Hill Road, aka Gunnison Road, is a narrow dirt and gravel roadway with little traffic. The noise monitor was set up 10 feet from the road, across from a stone fence and driveway into a private residence labeled West Road 2. Background noise levels included trees rustling, bird calls, and occasional noise from Route 28 in the distance. Two autos drove by during the mid-afternoon monitoring period, and the resulting Leq was 46.8 dBA and the Lmax was 70.5 dBA. Although the auto passbys were relatively quiet due to the low speed and dirt roadway surface, a subsequent 6-minute monitoring period was carried out to identify noise levels without any passing traffic, and the lower noise levels included an Leq of 41.8 dBA and an Lmax of 58.5 dBA. At night, between 7 and 8

pm, a 20-minute monitoring period showed similar noise levels, with an Leq of 39.5 dBA and an Lmax of 55.0 dBA.

Site 7, Belleayre Ski Shop Parking Lot

This site was on a grassy area between the driveway into the ski shop parking lot and the property line for the Alpine Osteria Bed & Breakfast. It was 25 feet from Galli Curci Road. Vehicles traveling away from Route 28 on Galli Curci Road are traveling uphill as they pass the monitoring site. Noise levels were nearly identical for the afternoon and evening periods. Background noise during the afternoon period included traffic from Route 28, trees rustling, birds chirping, a woodpecker, and an aircraft flyover. Four cars passed by on Galli Curci Road, and traffic on Route 28 included 89 autos, 3 medium trucks, and 1 motorcycle. The resulting Leq was 51.2 dBA and the Lmax was 73.3 dBA. In the evening, noise from spring peepers dominated the background noise, which would not be typical of a winter time period. Passing traffic during the evening period included 40 autos on Route 28 and 7 autos on Galli Curci Road. Results included an Leq of 51.2 and an Lmax of 75.2. For both readings, the L10 was lower than the Leq, which may be due to the brief bursts of higher noise from the low number of passing vehicles on Galli Curci Road.

Site 8, Grassy Area on Route 28

Homes along Route 28 could be affected by project-generated noise from both higher traffic volumes and construction activities for the ski center's new parking lot. A potential monitoring site across from the post office on Galli Curci Road was dismissed because of noise from metal slips banging against the flag poles in the wind and because the site would have been affected by noise from Galli Curci Road. The selected location was about 315 feet southeast of the post office, 15 feet from the railroad tracks, and 60 feet from Route 28. Background noise levels included wind in the trees and birds chirping.

Noise levels monitored in the early afternoon had an Leq of 60.6 and an Lmax of 81.7. Although traffic on Route 28 was light, it dominated the noise levels when it passed by. A total of 94 autos, 1 medium truck, 2 heavy trucks, and 7 motorcycles passed by on Route 28. One of the motorcycles was especially loud. Noise levels were somewhat similar during a 25-minute monitoring period between 4 and 5 pm, which would be a worst case for traffic under the proposed action. This monitoring period produced an Leq of 61.0 dBA and an Lmax of 81.7 dBA. Traffic volumes during this period included 76 autos, 4 medium trucks, 1 bus, and 8 motorcycles. At night, the volume on route 28 was only 46 autos. This resulted in lower noise levels, an Leq of 57.2 dBA and an Lmax of 75.2 dBA, but dominant background noise levels at night included spring peepers and the gobbling of wild turkeys at a stream in a wooded area behind the monitoring location. This would not be typical of a winter time period.

Site 9, Main Street in Fleischmann's

This site was located on Main Street, just above a village parking lot and just east of Fleischmann's Realty. It has a clear line of site to Route 28 and to the mountain. It was selected to represent a residential and commercial area within one mile of the proposed action that could experience noise from ski guns. It also could be sensitive to heavier traffic volumes on Route 28.At this location, the westbound traffic is moving uphill while the eastbound traffic is moving downhill.

During the early afternoon monitoring period, traffic from Main Street and Route 28 was the predominant source of noise, although birdcalls were a secondary source of noise. This monitoring period an Leq of 57.9 dBA and an Lmax of 83.3 dBA. Traffic volumes on Route 28 included 75

autos, 2 heavy trucks, and 2 motorcycles. Volumes on Main Street included 27 autos and 1 loud motorcycle. During the nighttime noise monitoring period, traffic volumes included 24 autos on Route 28 and 13 autos on Main Street. When no traffic was passing by, the dominant noise source was the running water in a nearby stream. Wind blowing through the trees on the mountain also was clearly audible during this period. The resulting noise levels were an Leq of 51.7 dBA and an Lmax of 65.8 dBA.

Site 10, Pump Station, Bonnieview Road

This site represents a residential neighborhood that potentially could experience construction noise for the new parking lot associated with the ski center. It is located on an unpaved segment of the roadway on public property at a pump station. Noise levels at this site, and at residences along the road, were heavily dominated by the noise from running water in nearby streams. Birds chirping in the background were a secondary source of noise. This site was monitored only once, for the purpose of establishing background noise levels, during the morning of April 21, 2008. Despite the relatively isolated location, two auto passby occurred. They were relatively quiet due to the dirt roadway surface and the low speed. Resulting noise levels included an Leq of 56.3 dBA and an Lmax of 63.1 dBA. At this site, with the rushing water in the streams dominating the background sounds, the noise levels show little variation among the descriptors. The Lmin was Leq of 56.3 dBA was accompanied by an Lmin of 55.7, and L90 of 56.0, an L10 of 56.5, and an L01 of 58.0. These noise levels would be expected to show little variation at night.

c r o s s r o a d s v e n t u r e s l l c

DRAFT
Environmental Impact Statement

Appendix 22

Sound Impact Study

The Belleayre Resort at Catskill Park

ENSR INTERNATIONAL

ENSR International
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August 5, 2003

Ken Graham
Crossroads Ventures, LLC
72 Andrew Lane Road
PO Box 267
Mt. Temper, New York 12457

Re: Construction Noise Due to Revised Cut and Fill
Belleayre Project Construction
ENSR Project No. 8736-132

Dear Mr. Graham:

Based on you fax to me on May 23, 2003, construction cut and fills for the Belleayre Project have been balanced, and there is no longer a need to transport 90,000 cubic yards of cut/fill from Wild Acres to Big Indian during the first two years of construction. Noise from trucking of this cut/fill was assumed in Section 4.2.1 of our initial assessment of construction noise for the Project (January 2002).

Since trucking of the 90,000 cubic yards of cut/fill will no longer be required, the noise associated with transporting that material would be eliminated. Therefore, overall construction noise from the Project would be reduced and ENSR's initial construction noise assessment for the Project would present an even more conservative prediction of Project construction noise.

If you have any further questions regarding this issue, please do not hesitate to contact me.

Sincerely,
ENSR International

Scott Manchester
Project Manager
New York Operations

Belleayre Resort at Catskill Park

Community Sound Survey and Construction Noise Impact Assessment

ENSR Corporation
January 2002
Project Number 08736132

Community Sound Survey
and
Construction Noise Impact Assessment

for the Proposed

Belleayre Resort at Catskill Park

January 23, 2002

Prepared by:

ENSR
6601 Kirkville Road
East Syracuse, New York 13057

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1.0 INTRODUCTION

ENSR was retained to evaluate existing (ambient) and potential sound levels in the community surrounding the proposed Belleayre Resort at Catskill Park Project (Project) in the vicinity of the Village of Fleishmanns, and the hamlets of Pine Hill, and Big Indian, New York. Ambient sound levels were determined by conducting a sound level survey in the community surrounding the Project. Potential sound levels due to the construction of the Project were predicted based on acoustical modeling of the Project's major construction noise sources. The predicted Project construction sound levels in the community were used to assess the expected community impact of the Project construction noise. Please note that any potential Project construction noise impacts on the community will be temporary and will end once the Project construction is complete. This report presents details the ambient sound survey methodologies, measurement results, acoustic modeling and noise impact evaluation.

2.0 PROJECT DESCRIPTION

2.1 Project Overview

The proposed Project will be located in the vicinity of the Village of Fleishmanns, and the hamlets of Pine Hill and Big Indian, New York. As shown in Figure 2-1, the project is comprised of two main land parcels, Wildacres Resort and Big Indian Plateau, located on either side of the Belleayre Mountain Ski Center, southwest of New York Route 28 (NY 28).

The Project will consist of the the Wildacres Resort and the Big Indian Plateau developments which will consist of the following construction activities:

- Access roadways
- 18-hole golf courses and associated facilities
- Buildings construction and renovation (hotels, detached lodging units, and activity buildings)

Noise due to outdoor construction of these facilities is expected to occur during the construction season of April to November, six days per week, 10 hours per day (daytime hours only). Noise emissions during construction are expected to fluctuate due to variations in construction equipment operation, and, except for construction vehicle backup safety beepers, are expected to be broadband in nature (i.e., no prominent discrete tones).

2.2 Community Noise Receptors

Receptors that may be sensitive to unwanted sound (noise) typically include residences, schools, houses of worship, and hospitals. Recreational areas are also considered noise-sensitive receptors, but usually only during daytime hours when areas are occupied. Commercial and industrial properties are not considered noise-sensitive receptors.

Residences lie near the Project within a half-mile of Project boundaries to the northwest, northeast and southeast. These residences may be affected by noise from the Project construction and are classified as potential noise-sensitive receptors. Individual residences were selected as specific receptors at which Project construction sound levels were determined and potential impacts were assessed. Each receptor was selected to represent the nearest residences to each construction area of the Project. Receptors are discussed in further detail in Section 3.1.

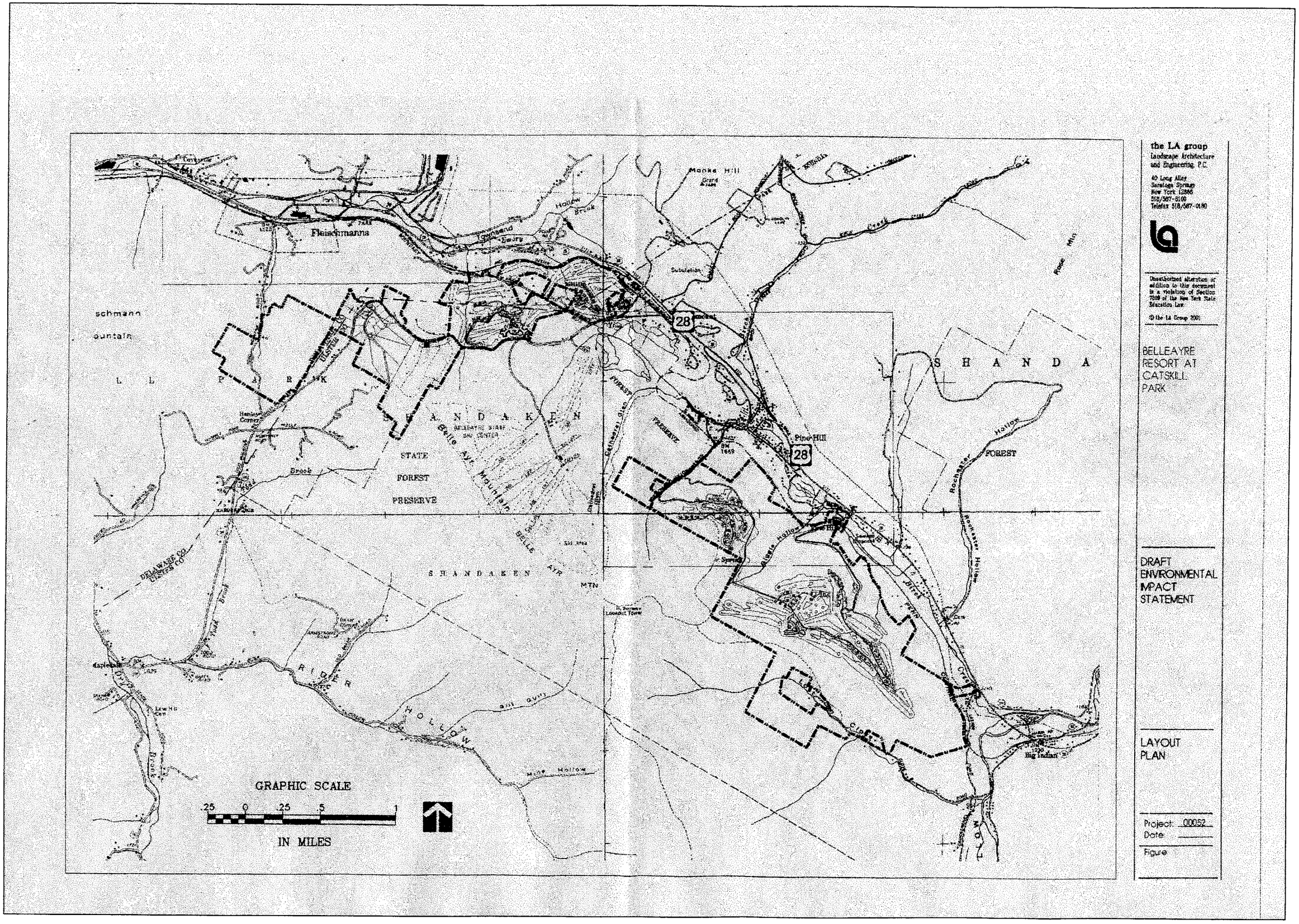

Figure 2-1
Belleayre Resort Project Area

3.0 AMBIENT SOUND LEVEL MEASURMENT

Sound levels in the community surrounding the proposed Project were measured to determine the background (ambient) sound levels and to characterize the existing acoustical environment. This section describes the locations where sound measurements were taken, the methods used to measure ambient sound levels, and a summary of measurement results. Enclosure 1 provides copies of field data forms and the calibration certification of the sound level meter calibrator.

3.1 Measurement Locations

Ambient sound levels were measured at five locations (sites) in the community surrounding the Project. These locations are summarized below and depicted in Figures 3-1 and 3-2.

Site ID	Location and Description
ML-1	County Road 49A (CR 49A) approximately 1 mile northeast of Hanley Corner. Characterizes residences west and northwest of Wildacres Resort on CR 49A.
ML-2	Gunnison Road approximately 1500 yards west of the intersection of Gunnison Road and CR 49A. Characterizes the residences along Gunnison Road north and northeast of Wildacres Resort.
ML-3	Corner of Station Road and Woodchuck Hollow Road. Characterizes residences in Pine Hill community.
ML-4	At east end of Lake Street. Characterizes residences and recreational area near Belleayre Beach at Pine Hill Lake.
ML-5	Lasher Road approximately 30 yards from single lane bridge. Characterizes residences on Lasher Road.

Each site was chosen to characterize the acoustical environment of the noise-sensitive receptors near the Project site. The remainder of this subsection discusses the rationale for the site selection and the specific receptors that each site represents.

Site ML-1 represents residences on CR 49A to the west and residences to the northwest of the Wildacres Resort land parcel. Ambient noise sources were comprised primarily of vehicular traffic from NY 28, occasional traffic on CR 49A, and northwest winds blowing through the valley.

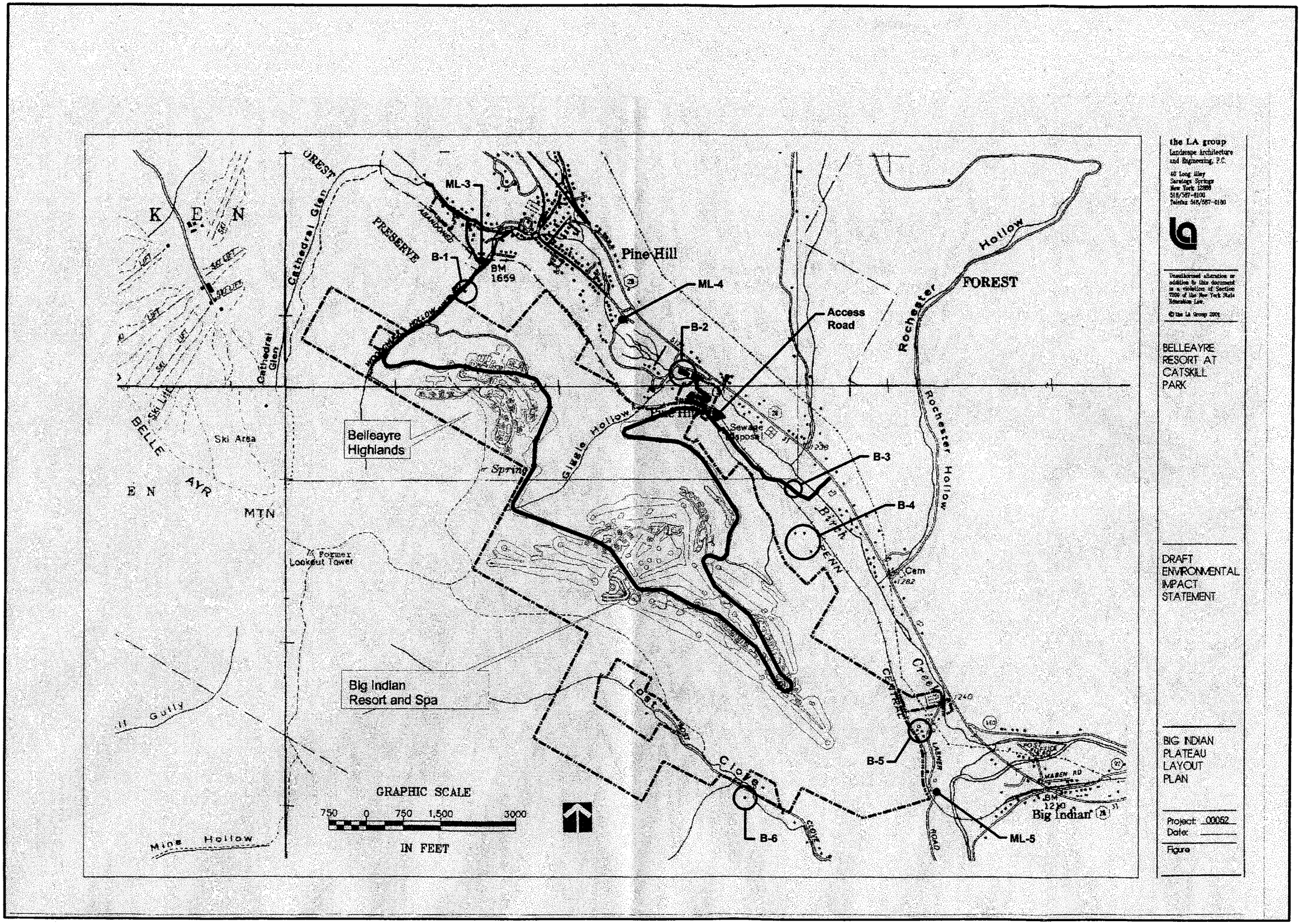

Figure 3-1
Big Indian Project Area

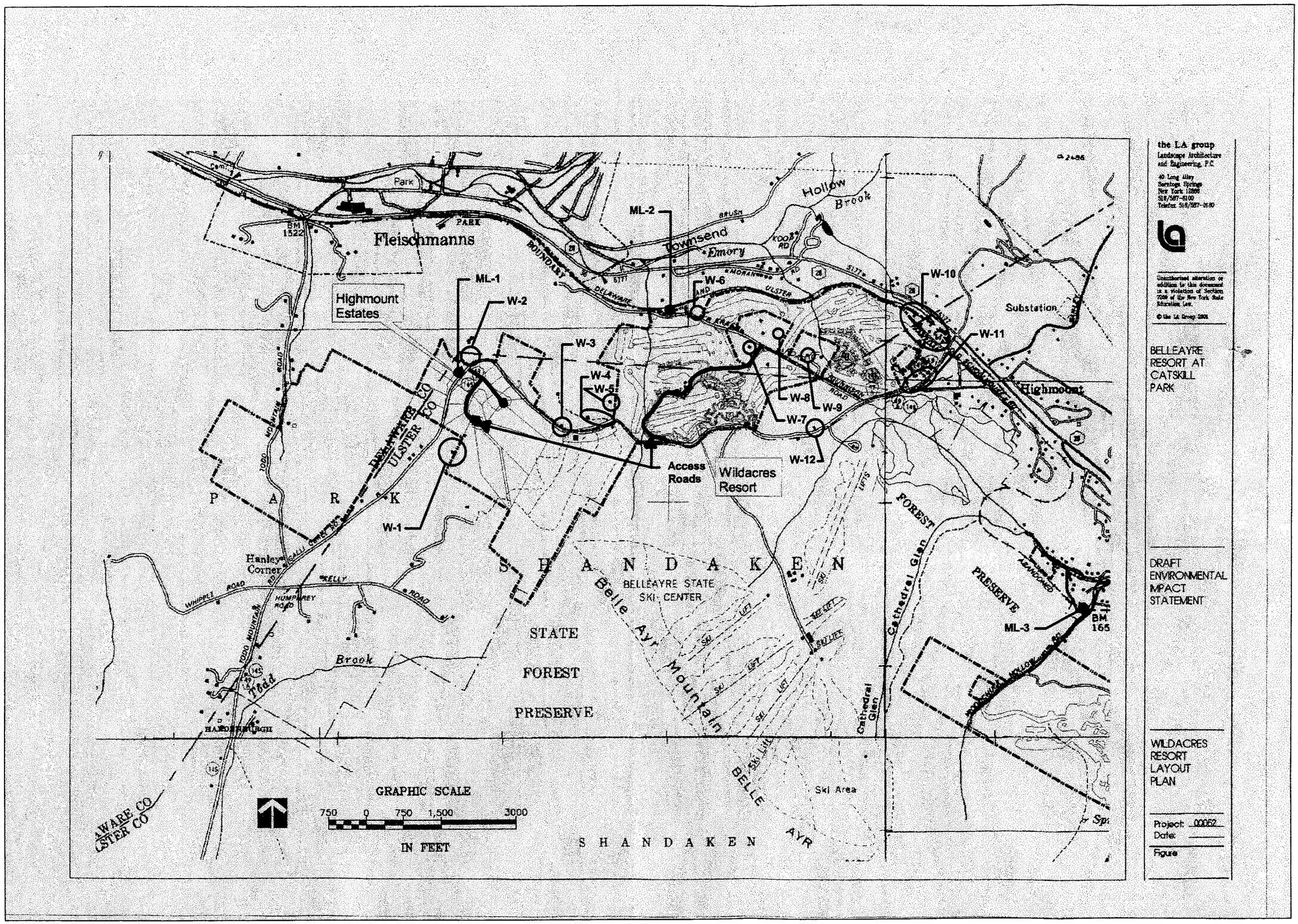

Figure 3-2
Wildacres Project Area

Site ML-2 represents residences near the Wildacres Resort land parcel, and characterizes the nearby sensitive receptors along Gunnison Road to north and east of Wildacres Resort. Ambient noise sources were comprised primarily of vehicular traffic from NY 28, occasional traffic of Gunnison Road, and wind noise in the trees.

Site ML-3 represents residences to the north of the Big Indian Plateau land parcel along Woodchuck Hollow Road. It characterizes residences just outside the Pine Hill community that may be more sensitive to construction noise since they have lower background sound levels due to shielding from NY 28 traffic noise. A nearby stream was the dominant ambient noise source.

Site ML-4 also represents residences north of the Big Indian Plateau land parcel, as well as the recreational areas near the Belleayre Beach at Pine Hill Lake. Although this site is located near ML-3, the acoustical environment is different due to its close proximity to NY 28. A nearby stream (Birch Creek) was the dominant ambient noise source.

Site ML-5 characterizes residences in along Lasher Road east of the Big Indian Plateau land parcel. A nearby stream (Birch Creek) was the dominant ambient noise source.

Table 3-1 presents the noise-sensitive receptors for the Project, the nearest Project construction area to the receptor, and distances to the nearest Project construction area(s). Receptors are also presented in Figures 3-1 and 3-2. Distances from the receptors to the nearest construction noise sources were determined from 4800:1 Project site plans showing Project landmarks overlaid on topographic maps.

3.2 Methodology

A-weighted and one-third octave band sound levels were measured in general accordance with ANSI S1.13 at approximately five feet above grade using an ANSI S1.4 Type 1 portable real-time sound level meter and one-third octave band filter set equipped with an omnidirectional vertically-oriented microphone. In order to minimize extraneous weather-related noise, the sound level meter microphone was equipped with a windscreen, and measurements were conducted only during periods when the measured wind speeds were less than 13 mph and there was no measurable precipitation. Wind speed, wind direction, temperature and humidity was continuously recorded during each measurement period.

To assure accuracy of the measurements, field calibration checks of the sound level meter were conducted using a certified sound level calibrator immediately following each measurement period. In addition, the sound level meter and filter set were factory calibrated within 12 months of the measurements. Calibration certificates are presented in Enclosure 1.

In general, sound levels were measured for eight 30-minute periods at each monitoring site. Monitoring periods were distributed during the daytime and nighttime, and during weekdays (beginning Sunday 10 PM) and weekends (beginning Friday 10 PM) as follows:

- 2 weekday days (7 AM to 10 PM)
- 2 weekday nights (10 PM to 7 AM)
- 2 weekend days (7 AM to 10 PM)
- 2 weekend nights (10 PM to 7 AM)

The specific measurement schedule was determined prior to measurements, and then adjusted as necessary while conducting the measurements. Measurements at each location were non-replicating, and spaced out over the daytime and nighttime hours of several days in order to achieve results that include normal diurnal and day-to-day fluctuations in community sound.

A-weighted measurements were made at a rate of 32 samples per second. A-weighted sound level descriptors, including the energy equivalent sound level (L_{eq}) and the residual sound level (L_{90}) were statistically calculated from automatically recorded and integrated samples (the residual sound level is the continuous sound level that is exceeded during 90 percent of the measurement period). The results were downloaded to a PC computer and later printed. Data reports and summary tables of these results are presented in Enclosure 1.

One-third octave band sound levels from 31.5 to 8,000 hertz (Hz) were measured concurrently with the A-weighted measurements. One-third octave band L_{90} and L_{eq} responses were statistically calculated from automatically recorded and integrated one-third octave band samples collected at a rate of 32 samples per second. Results of sound levels were downloaded to a PC computer and printed. Octave band sound levels were calculated from the decibel sum of the one-third octaves bands results, and are presented in Enclosure 1.

Field information was documented on pre-printed sound survey field forms for each monitoring period and included the following:

- Project information and field technicians
- Instrumentation model and serial numbers
- Field calibration results
- Observations of wind speed, temperature, relative humidity and precipitation

- Site location, test ID and time period
- A sketch of the site location
- Audibly intrusive noises significantly above the perceived residual sound level
- Presence and one-third octave band sound level of any tonal ambient noise
- Traffic information including type and either density or count
- Perceived ranking of most dominant sound sources
- General comments by the field technician including any instrument down time

3.3 Results and Discussion

Table 3-2 presents a summary of the results of the ambient sound level measurements. Supporting documentation for these measurements, and monitoring data summary tables are provided in Enclosure 1.

Results indicate that ML-1 had the lowest average residual sound levels, while the highest residual sound levels were recorded at ML-4. This is consistent with their relative distances from traffic. Average sound levels, which indicate the influence of intrusive noise sources (vehicle pass-bys), were always lower during the night (L_n) than during the day (L_d), as is typical for community settings. ML-1 and ML-2 had slightly higher daytime average sound levels, due to higher wind noise as a result of their elevation and exposure to prevailing westerly winds. ML-3 had the lowest daytime average sound level due to its protected location within a ravine and isolation from traffic noise from NY 28. ML-4 had the highest average nighttime sound level due to its proximity to a brook and traffic on NY 28.

The day-night sound level descriptor (L_{dn}) was used to compare the acoustical environments at each location with typical environmental settings. According to USEPA, the following are typical L_{dn} levels for different environments (USEPA, 1974):

L_{dn} (dBA)	Typical Environment
40 – 50	Rural
50	Small Town or Quiet Suburban Residential
55	Normal Suburban Residential
60	Urban Residential

Based on these descriptions, all sites except ML-4 have acoustical environments typical of rural settings. Site ML-4 has an acoustical environment typical with a small town or quiet suburban residential area.

Tables 3-3 and 3-4 summarize the major sound sources and traffic density at each monitoring site during the daytime and nighttime measurements, respectively. Though sources of continuous residual ambient sound were varied amongst the sites, vehicular noise was consistently responsible for the most significant intrusive increases in the residual ambient sound levels at every site.

Table 3-1

Noise Receptors

Site ID	Receptor ID	Location	Nearest Construction Area	Distance to Nearest Construction Area (feet)
ML-3	B-1	Residence on Woodchuck Hollow Road northwest of Brisbane Mansion	Brisbane Mansion	1400
			Lodging Units	1720
ML-4	B-2	Apartment house south of Friendship Manor	Access Bridge	160
	B-3	Residence on Winding Mountain Road east of intersection with railroad tracks	Access Road	90
ML-3	B-4	Residences on road off of Winding Mountain Road southeast of intersection with railroad tracks	Golf Maint. Facility	1000
			Golf Course Hole 6	1200
			Lodging Units	1520
			Big Indian Plateau	3380
ML-5	B-5	Residence on Lasher Road northeast of hole 4	Golf Course Hole 4	1960
	B-6	Residences on Lost Clove Road south of hole 3	Golf Course Hole 3	1940
ML-1	W-1	Residence southwest of Highmount Estates	Access Road	220
	W-2	Residence north of Highmount Estates	Highmount Estates	120
	W-3	Residence east of Highmount Estates	Highmount Estates	1160
	W-4	Residences west of Wilderness Center	Wilderness Center	240
	W-5	Residence north of Wilderness Center	Golf Course Hole 11	640
			Lodging Units	960
			Marlow Mansion	1400
ML-2	W-6	Residence west of hole 14	Golf Course Hole 14	180
			Satellite Golf Maint.	560
	W-7	Residence east of practice range	Access Road	200
			Clubhouse	920
			Children's Center	940
			Wildacres Resort	1280
	W-8	Residence west of hole 2	Golf Course Hole 2	160
	W-9	Residence west of Clubhouse and Facilities	Golf Course Hole 1	400
			Clubhouse & Facilities	580
			Lodging Units	680
ML-4	W-10	Residences on Van Loan Road north of Museum Parcel	Golf Course Hole 5	300
			Sewage Facility	960
ML-2	W-11	Residences on CR 49A southeast of Museum Parcel	Golf Course Hole 7	360
			Golf Maint. Facility	280
			Lodging Units	680
	W-12	Residence on CR 49A east of Resort	Wildacres Resort	1280

Note: Distances to golf course holes measured from midpoint of nearest part of the fairway, tee-box or green.
Distance to buildings based on site of nearest building.
Distance to access roadways based on nearest point from center of roadway.

Table 3-2

Ambient Sound Level Results

Measurement Location (Site ID)	Average Daytime Sound Level (L_d dBA)	Average Nighttime Sound Level (L_n dBA)	Day-night Sound Level (L_{dn} dBA)	Daytime Residual Sound Level (L_{90} dBA)	Nighttime Residual Sound Level (L_{90} dBA)
ML-1	50	39	49	35	27
ML-2	50	37	49	41	30
ML-3	41	37	44	37	34
ML-4	48	45	52	43	41
ML-5	44	39	47	39	36

Note: L_d and L_n based on time-weighted average L_{eq}

$L_{dn} = 10LOG\{15*(10^{Ld/10})+9*(10^{Ln+10})\}/24$

L_{90} = sound level exceeded for 90 percent of measurement period

Table 3-3

Daytime Sound Sources and Notes

Location	Sound Increase of Major Sound Sources[a]	Traffic Density	Notes
CR 49A (ML1)	Vehicle traffic: 6-39 dBA Van window: 17dBA Aircraft: 14 dBA Crows: 8-11 dBA	CR 49A: Cars: 7/40 minutes NY 28: Moderate	Dominant noise source is from the wind rustling through the trees. Northwest winds mainly at 4 to 6 mph with some gusts to 10 mph.
Gunnison Road (ML2)	Car traffic: 4-23 dBA Police Siren:17-22 dBA Aircraft: 5 dBA	Gunnison Road: Cars: 1/40 minutes NY 28: Moderate	Dominant noise source is from the wind rustling through the trees. North and northwest winds at 0 to 6 mph.
Station Road (ML3)	Car traffic: 3-12 dBA Aircraft (2): 3-19 dBA	Downtown Pine Hill: Cars: light and sporadic	Dominant noise source is from a nearby creek. North and northwest winds at 2 to 4 mph.
Lake Street (ML4)	Car traffic: 3-19 dBA Snow Shovel: 3-4 dBA	Main Street: Cars: light and sporadic	Dominant noise source is from a nearby creek. West and northwest winds at 2 to 6 mph.
Lasher Road (ML5)	Car traffic: 3-25 dBA Children: 4-14 dBA Crows: 3-5 dBA Aircraft: 6 dBA	Lasher Road: Car: 1/40 minutes NY 28: Moderate	Dominant noise source is from a nearby creek. West and northwest winds at 2 to 6 mph.

[a] Sound levels listed indicate dBA above the continuous ambient sound level (L_{90})

Table 3-4

Nighttime Sound Sources and Notes

Location	Sound Increase of Major Sound Sources[a]	Traffic Density	Notes
CR 49A (ML1)	Car traffic: 3-42 dBA Wind gusts: 5-20 dBA Sound meter bumped: 43 dBA Noise from van: 29 dBA	CR 49A: Cars: 7/40 minutes NY 28: Moderate	Dominant noise sources are from the wind rustling through the trees. Wind gusts are audible in the valley to the north, especially during the first and last 5 minutes of testing on 2/25. Northwest and west winds at 4 to 8 mph.
Gunnison Road (ML2)	Car traffic: 7-28 dBA Aircraft: 15 dBA Van window: 7 dBA Unknown noise: 15 dBA	Gunnison Road: Cars: 1/40 minutes NY 28: Moderate	Dominant noise sources were: an unknown rumbling and wind rustling through the trees. North and northwest winds at 2 to 4 mph.
Station Road (ML3)	Car traffic: 5-9 dBA Airplanes (2): 9-17 dBA Unknown noise: 9 dBA	Downtown Pine Hill: Cars: light and sporadic	Dominant noise source is from a nearby creek. Northerly winds at 2 to 4 mph.
Lake Street (ML4)	Car traffic: 4-24 dBA Aircraft: 6 dBA	Main Street: Cars: light and sporadic	Dominant noise sources are from a nearby creek and winds from the SW. West and northwest winds at 1 to 6 mph.
Lasher Road (ML5)	Car traffic: 3-14 dBA Dogs barking: 7-13 dBA Aircraft: 14 dBA Car window: 7 dBA Van door locks: 13 dBA	Lasher Road: Car: 1/40 minutes NY 28: Moderate	Dominant noise sources are from a nearby creek and winds from the SW. West and northwest winds at 1 to 6 mph.

[a] Sound levels listed indicate dBA above the continuous ambient sound level (L_{90})

4.0 NOISE PREDICTION

Construction noise expected to be generated by the proposed Project's construction equipment (noise sources) were estimated and extrapolated to the nearest potential noise-sensitive receptor locations. The sources' sound levels at the receptors were used to predict Project construction sound levels and potential noise impacts at each location. The following subsections discuss:

- Noise guidelines and regulations
- Construction noise sources
- Construction sound levels

4.1 Guidelines and Regulations

There are no federal or state regulations that apply to this project's construction noise. In addition, there are no local ordinances that limit construction noise for this project. However, the NYSDEC has guidelines that require an estimation and evaluation of construction noise impacts as part of their review and approval. The NYSDEC provides guidance on evaluating the impact from project noise in the their program policy document "Assessing and Mitigating Noise Impacts". These guidelines were used in this project to assist in assessing construction noise impacts.

The NYSDEC policy document recommends that project noise impacts be assessed based on the increase that the project noise causes to the existing ambient sound level. Generally, noise from continuous steady-state sound sources are added to the ambient residual (L_{90}) sound level. However, since construction sound has significant temporal variations, construction sound levels for the Project were added to with the ambient average energy-equivalent sound level (L_{eq}).

To determine noise impacts, the total sound level resulting from the decibel sum of the Project construction L_{eq} sound level and the ambient L_{eq} sound level was compared to the ambient L_{eq} sound level sound level. Human responses to increases in the ambient sound level are presented below (NYSDEC, 2000):

Human Reaction to Increases in Sound Pressure Level

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

A limit for noise impacts is not specifically defined in the NYSDEC policy document. However, according to the NYDEC policy document, sound sources increasing the ambient sound level by 6 dBA may cause complaints, but that in some instances increases of greater than 6 dBA may be acceptable. The NYSDEC Policy document specifies that "an increase in 10 dBA deserves consideration of avoidance and mitigation" (NYSDEC, 2000). Therefore, the Project construction noise assessment assumes that increases in ambient sound level due to the Project construction of 10 dBA or more (very noticeable) indicate a potentially significant temporary noise impact that requires further consideration and possible mitigation. Therefore, noise impacts from temporary Project construction will be evaluated for significance as follows:

- Estimated Project construction sound levels at the nearest residential receptors will be compared to the existing daytime energy-equivalent A-weighted sound levels (L_d);

- Increases in existing L_d at the nearest residential receptor due to construction of 9 dBA or less will indicate an insignificant temporary construction noise impact and will not require mitigation;

- Increases in existing L_d at the nearest residential receptor due to construction of 10 dBA or greater will indicate a potential significant construction noise impact requiring further discussion and/or possible mitigative steps to reduce or eliminate the impact; and

- Project construction tonal sound levels (prominent discrete tones) will also be identified and discussed.

4.2 Construction Noise Sources

Noise will be emitted from the construction of the Project during daytime hours only approximately 10 hours per day, six days per week. Construction activities that may generate noise emissions at Big Indian Plateau and Wildacres Resort will consist of the following:

- Off-site Construction Traffic
- Access Road Construction and Improvement
- Golf Course Construction
- Buildings Construction and Renovation (hotels, detached lodging units, and activity buildings)

Most Project construction activities except for the detached lodging units will be conducted in the first three years. Construction of detached lodging units and some limited construction of other facilities will be conducted during construction Years 4 though 8, or at a later date, according to demand.

Project construction noise will consist of on-site activities as well as off-site noise created by the transportation of construction materials. Each activity will consist of one or more aspects, which will be assessed separately or together depending upon whether the aspects will coincide. In addition, cumulative noise impacts will also be assessed where the potential exists for noise from one or more construction activities concurrently impact a receptor.

4.2.1 Off-site Construction Traffic

Construction of the Project will result in some temporary increase in construction vehicle traffic along NY 28, CR 49A, and the access roads to the Wildacres Resort and Big Indian Plateau parcels. Commuter automobile traffic to the construction sites is assumed to be minor in comparison, and an insignificant source of construction traffic noise. Big Indian Plateau construction traffic is expected to arrive via NY 28 to Friendship Road to the Big Indian Plateau access road. Wildacres Resort construction traffic is expected to arrive via NY 28 to CR 49A to the Wildacres Resort access roads.

Maximum noise impacts due to construction traffic are expected to occur along CR 49A and the site access roads, due to the proximity of residences and relatively low volumes of traffic. Construction vehicles are expected during construction season and during daytime construction periods only. Most construction traffic will occur during the first three years of construction. In comparison with the first three years, construction traffic for construction Years 4 through 8 will be significantly less.

Construction traffic for the first three years at Big Indian Plateau and Wildacres Resort will be comprised of vehicles needed for the following:

- Trucking out cut from Wildacres Resort to Big Indian Plateau – Years 1 and 2
- Trucking in fill for Big Indian Plateau access road sub-base – Year 1
- Trucking in golf course topsoil to Big Indian Plateau and Wildacres Resort – Big Indian Plateau – Years 2 and 3, Wildacres Resort – Years 1 and 2
- Trucking in golf course material (rootzone, pea stone and sand) – Years 2 and 3
- Trucking in topsoil for resort buildings – Years 2 and 3 (and 4 through 8)
- Trucking in construction equipment and miscellaneous deliveries – Years 1 to 3

Estimated construction traffic trips for Big Indian Plateau and Wildacres Resort are summarized in Table 4-1. Except where noted, traffic was estimated based on engineering data of the quantity of material, assuming 18 cubic yards of material per trip.

As indicated in Table 4-1, most traffic during the first construction season of April through late November will be from moving fill from Wildacres Resort to Big Indian Plateau. Most construction during the second and third construction years will be from topsoil fill for the golf courses. Estimates assume material is moved six days per week, and assume all other additional construction vehicle trips and miscellaneous material delivery's to be three trucks per day.

4.2.2 Access Roads

Access road construction for the Wildacres Resort and Big Indian Plateau parcels will be conducted and substantively completed during the first year of Project construction. An estimate of the aspects of construction was estimated by the applicant's engineer, and consists of the following aspects:

- Clearing
- Earth Excavation
- Rock Excavation
- Bridgework (Big Indian Plateau only – 3 Bridges)
- Drainage Pipework (Big Indian Plateau only)
- Subgrade Subbase

- Trim/Clean-up/Topsoil/Grade
- Asphalt Pavement
- Rock Crushing

Rock crushing will be the only aspect of the access road construction that is not conducted along the roadway. Rock crushing will be conducted at a single location for each project parcel. Big Indian Plateau rock crushing will be located at the Big Indian Resort and Spa, and the Wildacres rock crushing wil be located at the Wildacres Resort.

Aspects are assumed to be performed sequentially along the roadway. Therefore, construction sound levels were calculated for each aspect. The estimated types and quantities of construction equipment to be used during each aspect of the access road construction are presented in Enclosure 2. The sound level from each individual piece of equipment was determined from literature based on the equipment type, size and/or horsepower expected to be used.

4.2.3 Golf Courses

Noise from the Project golf course construction is expected to occur over the first three years of construction. During the first two years of construction, all 18 holes of Highmount Golf Club at Wildacres Resort and nine holes of the Big Indian Country Club Golf Course will be completed. The final nine holes of the Big Indian Country Club will be competed during the third year. An estimate of the construction to be completed each year was provided by the applicant's engineer and the applicant, and consists of the following:

- Big Indian Plateau - Year 1: Blasting, crushing, pond excavation, clearing, grubbing and filling
- Big Indian Plateau - Year 2 and 3: Grubbing, golf course construction and stabilization
- Wildacres Resort - Years 1 and 2: Blasting (Year 1 only), clearing, grubbing, pond excavation and golf course construction

These aspects of construction within each year are expected to overlap each year (some aspects will take place concurrent with others). Therefore, sound levels were calculated by conservatively assuming that all construction aspects during the given year occur at the same time (worst-case scenario).

The types and quantities of noise-generating equipment used in the Project construction are generally similar for each of the golf courses, and are presented in Enclosure 2. The sound level from each

individual piece of equipment was determined from literature based on the equipment type, size and/or horsepower expected to be used.

4.2.4 Buildings Construction and Renovation

Specific information on the equipment for the construction and upgrades for Project buildings (resorts, facilities, buildings and lodging units) are not available in this preliminary design stage of the Project. However, noise will be emitted from a variety of construction equipment that generally include the following (BBN, 1971):

- Earth moving equipment (compactors, loaders, backhoes, graders, pavers, and trucks)
- Material handling equipment (cranes, concrete mixers and concrete pumps)
- Stationary diesel equipment (pumps, compressors and generators)
- Impact equipment (jack hammers, pneumatic tools, and pile drivers)
- Other equipment such as welders, vibrators and saws

Such equipment will be operated simultaneously, individually or in various combinations. Since details on the types, quantities and sizes of the major construction noise sources are not available, single descriptors of sound levels were used as an estimate of typical construction noise from the various construction sites. Table 4-2 presents typical energy-average (L_{eq} at 50 feet) construction noise estimates that are provided in literature for five types of construction (BBN, 1971).

4.3 Construction Sound Levels

4.3.1 Off-site Construction Traffic

Noise increases due to construction traffic were calculated based on the average increase in sound level at the nearest noise-sensitive receptors. Estimates were based on the expected number of vehicle pass-bys per hour using the following equation (adapted from ESEERCO, 1974):

Equation 1. Sound Level from Construction Traffic

Sound Level (L_{eq} in dBA) = $SPL_a - A - B - 15Log[D] - C - E$

where: $SPL_a = L_{50}$ sound level (50 feet) for given vehicle trips/hr at given mph

$A = L_{50}$ to L_{10} sound level correction

B = L_{10} to L_{eq} sound level correction

D = distance to receptor in feet

C = 3 dB/100 ft correction for insertion loss of woods (NYSDEC, 2000)

E = -6 dBA reduction for terrain barrier to line-of sight (Hoover and Keith, 1981)

As indicated in Equation 1, estimated sound levels were calculated assuming a reduction of 4.5 dBA per doubling of the distance that occurs over the distance between the source and receptor. When woods were located between the construction source and the receptor, estimated sound levels also include a conservative insertion loss of 3 dBA per 100 feet of woods up to a maximum insertion loss of 25 dBA. Actual insertion loss by vegetated areas may be up to 7 dBA per 100 feet depending on vegetation type and density (NYSDEC,2000). Reductions due to barriers caused by topography between the construction source and the receptor were also conservatively assumed to reduce sound levels by 6 dBA. Actual reductions due to topography barriers can range from 6 to over 20 dBA (Hoover and Keith, 1981).

Estimated sound levels from access road construction are presented in Table 4-4. Predicted construction traffic sound levels are presented in Table 4-3. Estimates are based on the average number of vehicle pass-bys per hour assuming two vehicle pass-bys per trip and trips are made over a 10-hour day. Big Indian Plateau traffic is assumed to enter the Big Indian Plateau via the northeast access road entrance (Winding Mountain Road) mainly during the first six months of the first construction year, and then mainly via the northwest main access road entrance for years two and three. All Wildacres Resort traffic is assumed to enter via CR 49A and the Wildacres Resort access roads.

4.3.2 Access Road Construction

Sound levels estimates for the Wildacres Resort and Big Indian Plateau access road construction were calculated based on the expected construction sound level (L_{eq}) for each construction aspect at the nearest sensitive receptor to the roadway. Estimates reflect the worst-case scenario in that they are calculated based on the closest point of roadway construction to the receptor.

In order to compare the construction sound level with existing sound level, the maximum instantaneous construction sound pressure level (SPL) of each piece of equipment at its rated peak output was converted to its L_{eq} sound levels based on the following equation (adapted from ESEERCO, 1974):

Equation 2. Equipment Reference Sound Level

Equipment Reference L_{eq} (dBA) = $SPL_a - A - B$

where: SPL_a = Equipment maximum sound level (50 feet) at peak load

A = Usage Factor. Correction for percent time of actual use (BBN, 1971).

B = Acoustical Max Factor. Correction for operation at less than peak load.

The reference L_{eq}'s for each piece of equipment were then summed using decibel addition to yield the total construction reference L_{eq} for each aspect as follows:

Equation 3. Decibel Addition

Total Sound Level (dBA) = $10\text{Log}\{(10^{L1/10} + 10^{L2/10} + \ldots + 10^{Ln/10}\}$

where: Ln = nth sound level

Total construction reference L_{eq} for each construction aspect was then used to estimate the construction sound level at the nearest receptor based on the following equation (adapted from NYSDEC, 2000):

Equation 4. Total Construction L_{eq} at Receptor

Total Construction L_{eq} at Receptor (dBA) = $SPL_a - 20\text{Log}[D_{rec}/D_{ref}] - A - B$

where: SPL_a = Construction Reference L_{eq}

$20\text{Log}[D_{rec}/D_{ref}]$ = attenuation of sound due to distance (6 dBA per doubling)

D_{rec} = distance to nearest receptor in feet

D_{ref} = construction reference L_{eq} distance = 50 feet

A = 3 dB/100 ft insertion loss for woods between source and receptor

B = -6 dBA reduction for terrain barrier to line-of sight

As indicated in Equation 4, estimated sound levels were calculated assuming a reduction of 6 dBA per doubling of the reference L_{eq} distance of 50 feet that occurs over the distance between the source and

receptor. When woods were located between the construction source and the receptor, estimated sound levels also include a conservative insertion loss of 3 dBA per 100 feet of woods up to a maximum insertion loss of 25 dBA. Reductions due to barriers caused by topography between the construction source and the receptor were also conservatively assumed to reduce sound levels by 6 dBA. Distances from the nearest receptor were conservatively determined by choosing the closest point in the road construction to the receptor. Estimated sound levels from access road construction are presented in Table 4-4.

4.3.3 Golf Course Construction

Sound level estimates for the Big Indian Country Club and Highmount Golf Course at Wildacres Resort construction were calculated based on the expected construction sound level (L_{eq}) for each construction aspect at the nearest sensitive receptor to the course. Estimates present the worst-case scenario in that they are calculated for the golf course hole closest to the receptor, at the tee-box, nearest fairway section or green nearest the receptor.

Estimated sound levels from golf course construction are presented in Table 4-5. Methodologies and equations for estimating the golf course construction levels at each receptor are the same as used for estimating the access road construction sound level. Sound levels were estimated for each year of construction, assuming aspects of construction would overlap within each year.

4.3.4 Building Construction

Sound levels estimates for building construction at Big Indian Plateau and Wildacres Resort were calculated based on the typical ranges of sound levels at building construction sites (see Section 4.2.4). Building construction consist of construction or renovation of hotels, resorts, facilities, support buildings, and detached lodging units. For typical construction, the highest construction sound levels generally occur during the excavation and finishing, where energy-average sound levels (L_{eq}) are 88 dBA for housing and smaller building construction and 89 dBA at 50 feet for hotels, large buildings and public works (BBN, 1971).

Most building construction except for the detached lodging units and houses in the subdivision is planned for the first two years of Project construction. Though a few lodging units are planned for the first two construction years, most will be constructed as needed over construction Years 3 through 8.

Estimated sound levels for building construction are presented in Table 4-6. Methodologies and equations for estimating the reduction in construction level to each receptor were the same as used for estimating sound reductions for the access road and golf course constructions. Distances to the receptor were assumed to be from building site to the receptor, or in the cases of multiple buildings, distances were measured from the worst-case scenario of the nearest proposed building site to the

receptor. Estimates were also conservatively estimated based on the worst-case scenario of the loudest construction type, and, except where noted, assumed that all pertinent equipment would be present at the site rather than minimum required equipment. Due to the relatively large size of the overall Project construction area compared with the distances to receptors, construction sound levels for each building were estimated separately, and assume that sound from construction of one building will not increase sound levels in the construction of other buildings.

Table 4-1

Construction Traffic

Activity	Fill (cubic yards^3)	Estimated Number of Weeks per Year	Big Indian Plateau Roundtrips per day			Wildacres Resort Roundtrips per day		
			Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Move Fill – Wildacres Resort to Big Indian Plateau	90,000/ 2 years	35 weeks	12.3	12.3	0	12.3	12.3	0
Big Indian Plateau Access Road Sub-base	17,000	35 weeks	4.5	0	0	0	0	0
Topsoil	2,760 – 3,480	21 weeks	0	27.6	20	25.7	21.9	0
Golf Course Material	8,200 / 2 years[a]	21 weeks	0	1.4	1.4	0	1.4	1.4
Resort Topsoil	11,000 / 8 years	35 weeks	0.1	0.9	0.9	0.1	0.9	0.9
Construction Equipment and Miscellaneous Trips (3 to 4 per day)	-	35 weeks	3.5	3.5	3.5	3.5	3.5	3.5
Total	-	-	**20**	**46**	**26**	**42**	**40**	**6**

[a] Assumes 280 trips per season.

Table 4-2

Construction Sound Levels[a]

Construction Aspect	Hotel and Major Facilities		Residences and Small Buildings	
	Minimum Equipment On-site (dBA)	All Pertinent Equipment On-site (dBA)	Minimum Equipment On-site (dBA)	All Pertinent Equipment On-site (dBA)
Clearing	84	84	83	83
Excavation	79	89	75	88
Foundations	78	78	81	81
Erection	75	87	65	81
Finishing	75	89	72	88

[a] L_{eq} at 50 feet

Table 4-3

Predicted Off-site Construction Traffic Sound Levels

Location	Year	Average Vehicle Pass-bys per hour	Traffic Sound Level (50 feet) (dBA)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Traffic Sound Level at Receptor (dBA)
Big Indian Plateau Access Rd	1	9	60	B-3	90	-4	70	-2	54
	2	9	60	B-2	160	-8	0	0	52
	3	5	53	B-2	160	-8	0	0	45
Wildacres Resort Rt. 49A	1	8	59	W-11	80	-3	0	0	56
	2	8	59	W-11	80	-3	0	0	56
	3	1	39	W-11	80	-3	0	0	33

Table 4-4

Access Road Construction Sound Levels

Location	Aspect	Construction Sound Level (dBA at 50 ft)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
Big Indian Plateau	Clearing	85	B-3	90	-5	70	-2	77
	Earth Excavation	90	B-3	90	-5	70	-2	82
	Rock Excavation	86	B-3	90	-5	70	-2	78
	Bridgework	83	B-2	160	-10	0	0	73
	Drainage Pipework	80	B-3	90	-5	70	-2	72
	Subgrade Subbase	81	B-3	90	-5	70	-2	73
	Trim/Clean-up/Topsoil/ Grade	84	B-3	90	-5	70	-2	76
	Asphalt Pavement	81	B-3	90	-5	70	-2	73
	Rock Crushing[a]	89 (at 100 ft)	B-4	3380	-31	1600	-25	33
	Typical[b]	**84**	**-**	**3700**	**-37**	**3500**	**-25**	**22**
Wildacres Resort (includes Highmount Estates)	Clearing	85	W-7	200	-12	200	-6	67
	Earth Excavation	90	W-7	200	-12	200	-6	72
	Rock Excavation	85	W-7	200	-12	200	-6	67
	Subgrade Subbase	81	W-7	200	-12	200	-6	63
	Trim/Clean-up/Topsoil/ Grade	84	W-7	200	-12	200	-6	66
	Asphalt Pavement	79	W-7	200	-12	200	-6	61
	Rock Crushing[c]	89 (at 100 ft)	W-7	1000	-20	500 feet plus terrain barrier	-15 -6	48
	Typical[b]	**84**	**-**	**1000**	**-26**	**3500**	**-12**	**46**

[a] Rock crusher to be permanently located during construction near parking lot of Big Indian Resort and Spa.
[b] Based on average construction sound level at 50 feet, and average distance from receptor.
[c] Rock crusher to be permanently located during construction at northwest parking lot of Wildacres Resort Hotel.

Table 4-5

Golf Course Construction Sound Levels

Location	Years	Construction Sound Level (dBA at 50 ft)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
Big Indian Plateau –	1	90	B-4	1200	-28	1200	-25	37
	2	89	B-4	1200	-28	1200	-25	36
	3	90	B-4	1200	-28	1200	-25	37
Wildacres Resort	1 and 2	91	W-8	160	-10	80	-2	79

Table 4-6

Building Construction and Upgrade Construction Sound Levels

Location	Aspect	Construction Sound Level (dBA at 50 ft)	Nearest Receptor	Receptor Distance (feet)	Distance Attenuation (dBA)	Wooded Distance (feet)	Woods Insertion Loss (dBA)	Construction Sound Level (dBA)
Big Indian Plateau	Resort, Spa and Country Club	89	B-4	3380	-37	1600	-25	27
	Golf Maint. and Satellite Maint. Facilities	88	B-4	1000	-26	800	-24	38
	Lodging Units	88	B-4	1520	-30	1400	-25	33
	Belleayre Highlands Brisbane Mansion and Facilities	89	B-1	1400	-29	1200	-25	35
	Belleayre Highlands Lodging Units	88	B-1	1720	-31	1400	-25	32
Wildacres Resort	Resort and Facilities	89	W-7	1280	-28	400	-12	49
	Clubhouse and Facilities	88	W-9	580	-21	440	-13	54
	Lodging Units (21 Octoplexes)	88	W-9	680	-23	0	0	65
	Golf Maintenance Facility	88	W-11	460	-19	0	0	69
	Golf Maintenance Satellite Facility	88	W-6	280	-15	100	-2	71
	Marlow Mansion	88	W-5	1400	-29	400	-12	47
	Children's Center	88	W-7	940	-25	440	-13	50
	Clubhouse	88	W-7	920	-25	440	-13	50
	Sewage Treatment Facility	89	W-10	960	-26	960	-25	38
	Wilderness Activities Center Renovation[a]	81	W-4	240	-14	240 plus terrain barrier	-7 -6	54
	Highmount Estates Lodging Units	88	W-2	240	-14	200	-6	68

[a] Sound level assumes no significant ground clearing and minimum construction equipment on-site.

5.0 NOISE IMPACT ASSESSMENT AND MITIGATION

5.1 Assessment Criteria

Noise impacts were assessed in comparison with criteria presented in Section 4. In general, temporary noise impacts were predicted where Project construction was estimated to increase the ambient sound levels by 10 dBA or more. Increases in sound level at receptors of 9 dBA or less were assesses as insignificant temporary noise impacts, assuming the character of the sound was not dominated by tonal noise (prominent discrete tones).

5.2 Tonal Noise Impacts

Project construction will mainly consist of diesel engine noise that is broadband in nature without predominant tonal noise. Though some minor tonal noise may be emitted by some individual pieces of equipment, these tones would be masked by sound from other sources, and are predicted to result in no audible prominent discrete tones at any receptor. The only major tonal noise expected from Project construction will be due to back-up beepers, which are a law-required safety feature that cannot practically be avoided on temporary construction sites. However, since most construction will be conducted at considerable distance from receptors, and through large distances of wooded areas, impacts from back-up beeper tonal noise on any specific receptor are expected to be minimal and short term.

5.3 Blasting Noise Impacts

Excavation for the Wildacres Resort, the Big Indian Resort and Spa, and the Big Indian Country Club ponds will include some explosive blasting of bedrock. The size of the explosive charges to be used is not yet determined. However, instantaneous sound levels from typical construction blasting has been documented as approximately 93 to 94 dBA at a distance of 50 feet (Hoover and Keith, 1981), which is only a few decibels higher than the expected reference sound level from several of the Project construction activities. In comparison with other construction sound, the sound from blasting will be brief and relatively infrequent. Furthermore, previous blasting has been conducted on Belleayre Mountain by New York State without noise impact on the community (Crossroads, 2001).

The nearest blasting to receptors is expected to occur for the underground parking area of the Wildacres Resort, approximately 1500 feet south of the R7. R7 will be shielded from the blast by terrain and woods, and the brief sound level of the blast at R7 is estimated to be only 46 dBA, which is 4 dBA below the existing ambient daytime average sound level. Therefore, blasting for this project is not expected to significantly contribute to overall Project construction noise.

5.4 Big Indian Plateau Noise Impacts and Mitigation

The change in sound levels resulting from Project construction at Big Indian Plateau is presented in Table 5-1. Temporary construction noise impacts are predicted to occur during portions of the access

road construction. All other construction is estimated to result in temporary increases in sound level of 9 dBA or less, which indicates insignificant noise impacts that do not require mitigation.

Noise from access road construction will occur during the first construction year, and will, for a brief time, be expected to impact receptor B-2, and to a lesser degree residences at receptors B-3 and B-4. Impacts will be transient, and are predicted to occur only when construction is conducted within 500 feet of a receptor. Since only approximately 5 percent of any access roadway are within 500 feet of any given receptor, access road construction impacts are expected to be short term, and noise impacts on any specific receptor are expected to be limited to less than 2 weeks in duration (assuming a 35-week construction completion schedule). Access road construction more than 500 feet from a receptor is not expected to result in significant noise impacts (9 dBA increase or less). In addition, at typical distances, access road construction will generally result in no increase in ambient sound levels at any receptor along the access roadway.

Access road construction sound can be partially mitigated when near receptors by using the minimum required construction equipment necessary for each task, and by shutting down equipment when not in use. A reduction of approximately 3 dBA can be expected by reducing on-site equipment usage by 50%. Additional mitigation of access road construction, such as the construction of barriers is not deemed practical for reducing the access road construction noise due to the local topography and significance of the additional noise associated with the barrier construction effort compared with the limited duration of the noise impacts.

5.5 Wildacres Resort Noise Impacts and Mitigation

The change in sound levels resulting from Project construction at Wildacres Resort is presented in Table 5-2. Temporary construction noise impacts are predicted to occur during portions of the following construction activities:

- Access Roads
- Highmount Golf Club
- Highmount Estates Lodging Units
- Golf Maintenance Facility and Golf Maintenance Satellite Facility

All other construction is estimated to result in temporary increases in sound level of 9 dBA or less, which indicates an acceptable level of temporary noise impacts that do not require mitigation.

Access Roads. Noise from the Wildacres Resort access roads and Highmount Estates access roads construction will occur during construction Year 1 and is, for a very limited period of time, expected to impact the residence at receptor W-7, and to a lesser degree residences at receptors W-1, W-2 and W-8. Noise impacts are expected to be transient and limited to portions of the access road within 500

feet of the receptors. Access road construction more than 500 feet from a receptor is not expected to result in significant noise impacts (9 dBA increase or less). Since only approximately 20 percent of any access roadways are within 500 feet of a receptor, access road construction impacts are expected to be short term, and noise impacts on any specific receptor are expected to be limited to approximately a month and a half in duration.

Mitigation of the Wildacres access roads would be similar to the mitigation recommended for the Big Indian access road by minimizing on-site equipment usage when within 500 feet of residences. A reduction of approximately 3 dBA can be expected by reducing on-site equipment usage by 50%. Additional mitigation of Wildacres access road construction, such as the construction of barriers, is not deemed practical due to the local topography and the additional construction sound that would result during barrier construction compared with the limited duration of the noise impacts.

Highmount Golf Club. Noise from construction of the Highmount Golf Club will occur during construction Years 1 and 2, and is, at times, expected to impact residences at receptors W-8, W-6, and to a lesser degree other nearby Wildacres Resort receptors with a line-of-sight view of construction. As a result, mitigation is recommended in order to reduce the noise impacts to an insignificant level.

Mitigation of the Highmount Golf Club construction noise impacts is recommended in two steps. Mitigation of noise at distances of greater than 500 feet from the line-of-sight to a receptor may be accomplished by maintaining a 500 foot vegetative barrier between the construction and the receptor. This would mean that the clearing, grading and preparation of holes within 500 feet of receptors should be conducted later in the construction schedule. Please note that where line-of-sight from the construction area to the receptor is blocked by a natural or man-made barrier, then the vegetatively buffered distance may be reduced to 300 feet. Sound level reductions due to distance attenuation and vegetative insertion loss over the 500 feet are expected to be -23 dBA and sufficient to decrease noise impacts at all receptors to below significance.

For distances within 500 feet of a residence, a mitigative barrier and reduced equipment usage is recommended. To provide satisfactory sound reduction, the barrier should be located within 150 feet of either the receptor or the construction area, and it should extend at least 10 feet above the line-of-sight between the construction noise sources and the receptor. In addition to the barrier, further sound reduction can be achieved by using the minimal required construction equipment. In addition, construction equipment not in active use at the site should be shut off. Additional sound attenuation due to the barrier (approximately -20 dBA) and reduced equipment usage of 50% (approximately -3 dBA) are estimated to decrease noise impacts of the golf course construction at all receptors below significance. Please note that barrier is expected to consist of an earthen berm, which will require approximately 2 weeks to construct and one week to remove. During this time period, construction noise at the receptor may temporarily exceed significance criteria.

Highmount Estates Lodging Units. Sound from construction of the Highmount Estates lodging units will occur during the eight-year construction period. Sound from construction of most of the units (18 of the 21) is predicted to result in noise impacts below significance at any receptor. However, construction noise temporarily increasing ambient sound by more than the 10 dBA significance level is possible

during some of the construction at three lodging units (1, 16, and 20) nearest receptor W-2. However, such temporary construction sound levels would be typical of normal residential construction, for this type of large lot residential development. Therefore, no noise mitigative measures are deemed necessary.

Golf Maintenance Facility and Satellite Maintenance Facility. Noise from construction of Wildacres Resort Golf Maintenance Facility and the Wildacres Resort Golf Maintenance Satellite Facility will occur during construction Years 1 and 2, and are, at times, estimated to impact nearby receptors. Construction noise from the Golf Maintenance Facility is estimated to impact receptor W-11, and construction noise from the Satellite Facility is estimated to impact receptor W-6. As a result, mitigation is recommended to reduce the noise impacts from both of these facilities to below significance.

Mitigation of noise impacts from the two golf maintenance facilities can be accomplished by minimizing on-site equipment usage and by constructing barriers between their construction sound sources and respective receptors. A reduction of approximately 3 dBA can be expected by reducing on-site equipment usage by 50%. Barriers should be located in the direction of the receptors, and within 100 feet of the respective construction areas. The barrier for the Golf Maintenance Facility should extend at least eight feet above the line-of-sight between the construction noise sources and the receptor. The barrier for the Satellite Facility should extend at least four feet above the line-of-sight between the construction noise sources and the receptor. The actual height of these barriers above grade will depend upon their siting and local topography. The total sound attenuation for the Golf Maintenance Facility and Satellite Facility due to the mitigation (-18 dBA and –12 dBA, respectively) is estimated to decrease noise impacts at both W-11 and W-6 to below significance. Please note that barriers may likely consist of earthen berms, which will each require approximately 2 weeks to construct and one week to remove. During that time period, construction noise at each receptor may temporarily exceed significance criteria.

5.6 Cumulative Noise Impacts

Cumulative noise impacts from two or more activities of similar sound level may occur if the sum of their sound causes a significant increase in the ambient sound level at a receptor. Potential cumulative impacts are summarized in Table 5-3. Cumulative impacts from activities not listed in Table 5-3 are not expected due to their low sound level at their closest receptor. In addition, please note that the Highmount Estates lodging units are estimated to have no significant cumulative impact due to their distance from Project construction activities in Year 3.

Potential cumulative impacts for Big Indian are limited to the off-site construction traffic and the access road construction. All other activities have are substantially lower sound levels at the nearest receptor, and are assumed to result in no cumulative impacts. Cumulative sound levels for Big Indian Plateau construction activities may occur briefly at receptor B-3 when access road construction coincides with off-site construction traffic trips. Due to the transient nature of the access road construction impacts, however, significant cumulative impacts of both activities will occur for only very brief period of a few days, and will, at most, result in a imperceptible 3 dBA cumulative change in sound during that period.

Potential cumulative impacts for construction at Wildacres Resort would most likely occur at the receptors most impacted by individual activities: W-4, W-6, W-7, W-8, and W-11. However, at W-4, no cumulative sound levels are expected due its the distance from the other simultaneous activities at Wildacres. Also, no cumulative noise impacts are expected at W-8, since the simultaneous construction of the Highmount Golf Club's Hole 2 and east-most edge of the access road (within 500 feet of W-8) are not likely.

At W-6, cumulative sound levels may occur from the simultaneous construction of the Golf Maintenance Satellite Facility and the Highmount Golf Club's Hole 14. Maximum cumulative sound levels from the two activities, assuming the mitigation previously specified, is estimated to be within noise significance limits.

At W-7, cumulative sound levels may occur from the simultaneous construction of Children's Center, Clubhouse, Rock Crushing and Highmount Golf Club's (part of Hole 1 or Practice Range). Maximum cumulative sound levels, assuming the mitigation previously specified, is estimated to be within noise significance limits.

At W-11, cumulative sound levels may occur from the simultaneous construction of the Golf Maintenance Facility, Highmount Golf Club, and off-site construction traffic. This scenario excludes construction sound from the lodging units, since sound from lodging unit construction would be reduced to no affect by the Highmount Golf Club mitigation (Section 5.5). Maximum sound levels, if all activities are conducted simultaneously and assuming the mitigation previously specified, is estimated to increase ambient sound levels by 10 dBA which slightly exceeds noise significance limits. However, such cumulative impacts at W-11 would only result if the Golf Maintenance Facility were constructed during Year 2, concurrent with the Highmount Golf Club Hole 7 and 8 construction. Furthermore, cumulative noise impacts would occur only for only a short time during the construction of approximately half of the Holes 7 and 8 (estimated to require approximately four weeks of construction based on nine holes of construction over 35 construction weeks). Therefore, no additional mitigation is recommended as a result of the cumulative impacts at W-11.

Table 5-1

Big Indian Plateau Construction Noise Impacts and Mitigation

Construction Activities	Years	Nearest Receptor	Project Sound Level (dBA)	Ambient Sound Level (L_d – dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigative Action/ Estimated Reduction (dBA)	Mitigated Ambient Sound Level Change (dBA)
Off-site Traffic	1-3	B-3	54	48	55	7	None Required	
Access Road – within 500 feet of a receptor (est. <2 weeks/receptor)	1	B-3	45 to 83	48	50 to 83	2 to 35	Use minimum Equipment On-site: -3 dBA	1 to 32
Access Road – Typical	1	B-3	22	48	48	0	None Required	
Access Roads – Rock Crushing	1	B-4	33	48	48	0	None Required	
Golf Course	1-3	B-4	38	41	43	2	None Required	
Golf Maintenance Facility and Satellite Facility	1,2	B-4						
Resort Spa and Country Club	1,2	B-4	27	41	41	0	None Required	
Lodging Units	1-8	B-4	33	41	42	1	None Required	
Belleayre Highlands Lodging Units		B-1	32	41	42	1	None Required	
Brisbane Mansion and Facilities	1,2	B-1	35	41	42	1	None Required	

[a] Average daytime sound level (L_d).

Table 5-2
Wildacres Resort Construction Noise Impacts and Mitigation

Construction	Years	Nearest Receptor	Project Sound Level (dBA)	Ambient Sound Level (L_d - dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigative Action/ Estimated Reduction (dBA)	Mitigated Ambient Sound Level Change (dBA)
Off-site Traffic	1-3	W-11	56	50	57	7	None Required	
Access Roads – within 500 ft. of a receptor (est. 1.5 months/receptor)	1	W-7	47 to 72	50	52 to 72	2 to 22	Use minimum Equipment On-site: -3 dBA	1 to 19
Access Roads – Typical	1	W-7	46	50	51	1	None Required	
Access Roads. – Rock Crushing	1	W-7	48	50	52	2	None Required	
Highmount Golf Club – Worst Case: Closest part of nearest hole	1,2	W-8	79	50	79	29	Under 500 feet: Use minimum equipment On-site: -3 dBA Barrier[a]: -20 dBA Over 500 feet 500-foot vegetative receptor buffer: -23 dBA	7
Highmount Estates Residential Units	3-8	W-2	68	50	68	18	None. Zoned for residential construction.	-
Resort and Facilities	1,2	W-7	49	50	53	3	None Required	
Lodging Units	1-8	W-11	58	50	59	9	None Required	
Golf Maintenance Facility	1, 2	W-11	71	50	71	21	Use minimum equipment On-site: -3 dBA Barrier[b]: -15 dBA	4
Golf Maint. Satellite Facilty	1, 2	W-6	65	50	65	15	Use minimum equipment On-site: -3 dBA Barrier[c]: -9 dBA	4
Clubhouse and Facilities	1, 2	W-9	36	50	50	0	None Required	
Marlow Mansion	1, 2	W-5	47	50	52	2	None Required	
Children's Center	1, 2	W-7	52	50	54	4	None Required	
Clubhouse	1, 2	W-7	52	50	54	4	None Required	
Sewage Treatment Fac.	1, 2	W-10	38	48	48	0	None Required	
Wilderness Act. Center	1, 2	W-4	54	50	55	5	None Required	

[a] Barrier: Assumption: within 150 feet of residence, extending 10 feet above receptor/noise source line-of-sight (See Enclosure 2, Barrier W1 and Barrier W2).
[b] Barrier: Assumption: within 100 feet of construction noise sources, extending 9 feet above receptor/noise source line-of-sight (See Enclosure 2, Barrier W3)
[c] Barrier: Assumption: within 100 feet of construction noise sources, extending 6 feet above receptor/noise source line-of-sight (See Enclosure 2, Barrier W4)

Table 5-3
Cumulative Construction Noise Impacts and Mitigation

Location	Receptor	Potential Cumulative Construction	Years	Total Mitigated Project Sound Level (dBA)	Ambient Sound Level (L_d - dBA)	Total Sound Level (dBA)	Ambient Sound Level Change (dBA)	Mitigative Action/ Estimated Reduction (dBA)
Big Indian Plateau	B-3	Offsite-traffic and Access Road Construction	1	54 to 83	48	54 to 83	6 to 35	None. Impact cumulative duration estimated at <2 weeks
Wildacres Resort	W-6	Golf Maint. Satellite Fac.and Highmount Golf Club	1-2	53 + 56 = 57	50	58	8	None Required
	W-7	Highmount Golf Club, Rock Crushing, Children's Center, and Clubhouse	1-2	56+48+50+50 = 60	50	59	9	None Required
	W-11	Golf Maintenance Facility, Highmount Golf Club, and Off-site traffic	2	53+56+56 = 60	50	61	10	None. Maximum cumulative impact duration estimated to be 4 weeks.

[a] Barrier: Assumption: within 150 feet of residence, extending 10 feet above receptor/noise source line-of-sight (See Enclosure 2, Barrier W1 and Barrier W2).
[b] Barrier: Assumption: within 100 feet of construction noise sources, extending 6 feet above receptor/noise source line-of-sight (See Enclosure 2, Barrier W3)

6.0 REFERENCES

BBN, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, Bolt, Beranek and Newman Inc., December 31, 1971.

Crossroads, 2001. Ken Graham of Crossroads Ventures Telephone conversation with Scott Manchester of ENSR, January 14, 2001.

ESEERCO, 1977. Empire State Electric Energy Research Corporation. Power Plant Construction Noise Guide. Bolt Beranek and Newman, Inc. Report No. 3321. May 1977.

Hoover & Keith, 1981. Noise Control for Buildings, Manufacturing Plants, Equipment, and Products. Hoover & Keith, Inc. 1981.

NYSDEC, 2000. New York State Department of Environmental Conservation Program Policy; Assessing and Mitigating Noise Impacts, October 6, 2000.

USEPA 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Document No. 550/9-74-004. United States Environmental Protection Agency. March 1974.