

APPENDIX M

SOUND INVESTIGATION

October 1, 2002

Analytical Environmental Services
2021 "N" Street
Suite 200
Sacramento, CA 95814

Attn: Mr. David Zweig

**RE: SOUND INVESTIGATION
PROPOSED GUN LAKE CASINO
WAYLAND TOWNSHIP**

Dear Mr. Zweig:

Pursuant to your request, we have completed the following tasks for the referenced project:

- Performed a field investigation on September 24, 2002 to measure existing sound levels on and around the proposed site.
- Researched published sound levels for locations along U.S. Highway 131.
- Reviewed Wayland Township ordinances regarding sound levels.

Following is a brief summary of our efforts.

Sound can be described by amplitude (perceived as loudness), frequency (perceived as pitch) and time pattern. Amplitude is measured in decibels (dB). The decibel scale is a logarithmic scale, therefore sound pressure levels of two separate sounds are not directly additive. If a sound of 70 dB is added to another sound of 70 dB, the total is only a 3 dB increase, to 73 dB, not a doubling to 140 dB. If two sounds are at different levels, the lower level adds less to the higher as the difference increases (i.e. adding a 60 dB sound to a 70 dB sound only increases the total sound pressure level less than one half on one decibel).

One of the major contributors to outdoor sound levels is from transportation. The proposed development is located at the intersection of U.S. Highway 131 and 129th Street in Allegan County. Highway 131 is a major north-south artery between the cities of Kalamazoo and Grand Rapids, and 129th Street is a major east-west artery through Allegan and Barry Counties.

No recent sound investigations have been performed by the Michigan Department of Transportation (MDOT) for this area. The most recent data MDOT had was collected south of the project site, near the intersection of M-89 and U.S. 131 (near the town of Plainwell) in 1993. A sound measurement of 72 dB was recorded in a residential area at the right of way. North of the project site, at the 68th Street intersection (near Grand Rapids) a sound level of 64 dB was recorded at a condominium in 1989. This measurement was recorded at a distance of 63 feet from the U.S. 131 right of way line with an earthen berm located between the location of the sound recording and the right of way of U.S. 131. Traffic counts for U.S. 131 in 2002 show that the traffic count (average daily traffic count during a 24 hour period in both directions) of 28,200 south of Wayland, and a count of 35,500 north of Wayland. Both counts indicated that 4,000 commercial vehicles (trucks) were included in the counts. One truck can generate as much sound as 32 cars.

Sound level measurements were collected on September 24, 2002. The sound levels were collected utilizing a CEL-254 Digital Impulse Sound Level Meter. Calibration of the meter was performed according to the manufacturer's directions before and after the measurements were collected. No significant calibration problems were noted. The locations of the sound level measurements are shown on the attached Figure 1, and Table 1 shows the recorded levels. Table 2 illustrates the sound levels of typical noise sources. Following is a brief discussion of the field measurements.

Locations R-1 through R-5 were collected along the northeast perimeter of the project site, and show this to be the quietest area of the site. These locations correspond to locations farthest from U.S. 131 and 129th Avenue. Locations R-6 through R-9 were collected along 129th Avenue. The deep ditches and heavy vegetation necessitated that these sound level measurements be collected along the side of the road. This road contains a significant amount of truck traffic, which explains the significant variations in the sound readings, ranging from 55 dB to 95 dB. Location R-10 was representative of most of the "internal" area away from U.S. 131 and 129th Avenue (except for the northeastern corner near locations R-1 through R-5). Locations R-10a through R-14 were collected near the U.S. 131 right of way line. It should be noted near R-10a and R-11 a significant grade difference exists, with the driving area of U.S. 131 and the on/off ramps several feet above the elevation of the right of way area where the measurements were collected. Locations R-15 through R-18 were approximately 250 feet back from the U.S. 131 right of way, and show the reduction in sound levels due to distance and vegetation.

Short-term sound impacts during the construction of the project would be the most significant sound impact from the proposed project. During construction, sound levels will be minimized as much as possible through the use of mufflers and utilization of the appropriate construction equipment. Construction would be limited to daylight hours when most occupants of residential dwellings are not home.

The proposed development will have a significant vegetative buffer zone that surrounds the development, especially the parking and vehicle access area. The additional vehicular traffic to the development will be the only activity that would generate significant sound readings. The additional vehicular traffic to the development will produce sound levels in a range of 50-60 dB at the entrance. Dense vegetation that is 200 feet thick has been found to reduce the sound level by 10 dB. Because the additional noise is substantially less than the existing noise created by U.S. 131 and 129th Avenue, the resulting increase in sound levels is insignificant.

Wayland Township has no ordinances regarding noise levels, other than the general type of ordinances regarding disturbing the peace.

Based on the close proximity of the site to 129th Avenue and U.S. 131, and the significant volume of truck traffic on both roads, it is our opinion that the additional sound generated by the short term construction of the development or the ongoing primarily passenger car traffic to the proposed facility will have no significant noise impact on the area.

We hope this information meets with your present needs. Please call if you have any questions or comments regarding this matter.

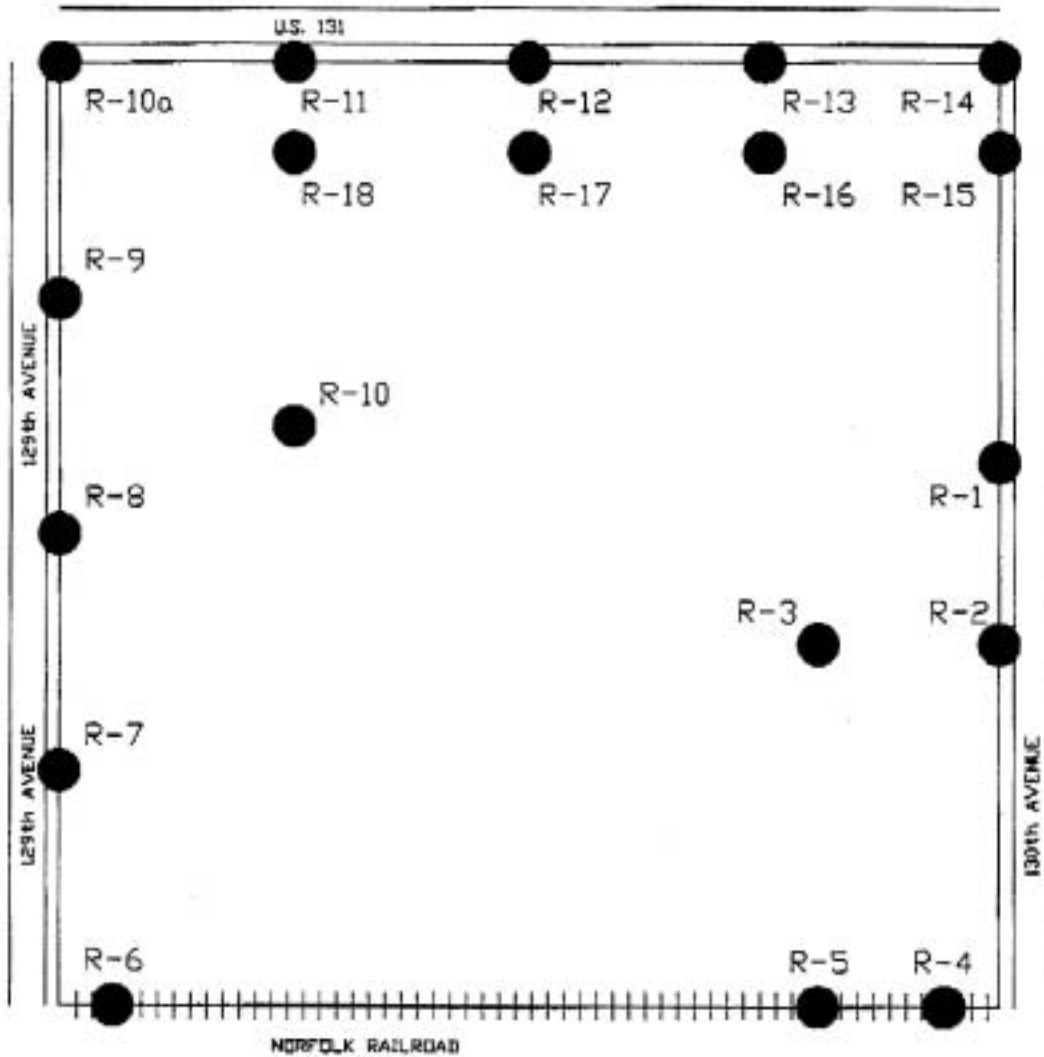
Sincerely,

WIGHTMAN ENVIRONMENTAL, INC.

Jon M. Hermann
President

JMH/djh

FIGURE 1
 SOUND READING LOCATION MAP
 WAYLAND, MICHIGAN



LEGEND

● R-1 SOUND READING LOCATION

FOR: ANALYTICAL ENVIRONMENTAL
DATE: SEPTEMBER, 2002
SCALE: 1" = 500'
DRAWN BY: AWB
JOB NUMBER: 020161

WIGHTMAN ENVIRONMENTAL, INC.
 4050 King Drive, P.O. Box 95
 Sedra, Michigan 48128
 Phone: (269) 934-7707 Fax: (269) 934-7414

Table 1
Sound Level Measurements

Location	Low (dB)	High (dB)
R-1	47.9	48.4
R-2	51.7	52.3
R-3	47	48
R-4	50	55
R-5	52	55
R-6	55	95
R-7	55	95
R-8	55	95
R-9	55	95
R-10	50	60
R-10a	50	75
R-11	53	75
R-12	55	80
R-13	55	80
R-14	55	80
R-15	55	65
R-16	55	65
R-17	55	65
R-18	55	65

Locations correspond to Figure 1, Sound Location Map

TABLE 2
SOUND LEVELS OF TYPICAL NOISE SOURCES

<u>Noise Source (at a given distance)</u>	<u>Sound Level (dbA)</u>	<u>Human Judgment of Noise Loudness</u>
Military Jet Take-Off with Afterburner (50 feet)	140	Threshold of Pain
Civil Defense Siren	130	Threshold of Pain
Commercial Jet Take-Off	120	
Pile Driver (50 feet)	110	
Ambulance Siren (100 feet)	100	Very Loud
Power Lawn Mower (3 feet)	100	Very Loud
Diesel Truck, 40 mph (50 feet)	90	
Kitchen Garbage Disposal (3 feet)	80	
Passenger Car, 65 mph (25 feet)	70	Moderately Loud
Electronic Typewriter (10 feet)	70	
Normal Conversation (5 feet)	60	
Light Traffic (100 feet)	50	
Distant Bird Calls	40	
Soft Whisper (5 feet)	30	
Threshold of Human Hearing	10	