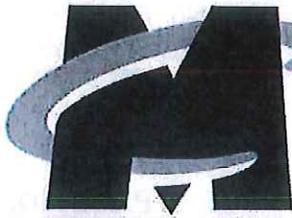


APPENDIX H

NOISE IMPACT EVALUATION





**MASER**  
CONSULTING P. A.

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## Noise Impact Evaluation

LEGOLAND New York  
Harriman Drive  
Town of Goshen, Orange County, NY

September 15, 2016

*Prepared For*  
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MC Project No. 16000699A





<u>TABLE OF CONTENTS</u>	<u>PAGE NO.</u>
A. PROJECT DESCRIPTION AND LOCATION .....	1
B. SCOPE OF STUDY .....	1
C. CHARACTERISTICS OF ENVIRONMENTAL NOISE .....	2
D. EXISTING NOISE LEVELS.....	3
E. NOISE ANALYSIS METHODOLOGY AND DISCUSSION OF POTENTIAL IMPACTS.....	5
F. SOUND LEVEL DATA COLLECTED AT LEGOLAND PARK IN CARLSBAD, CALIFORNIA.....	7
G. FUTURE SOUND LEVELS.....	7
H. CONSTRUCTION EQUIPMENT AND ACTIVITY NOISE.....	8
I. RECOMMENDED MITIGATION MEASURES .....	9
J. SUMMARY AND CONCLUSION .....	9

APPENDICES

APPENDIX A .....	FIGURES
APPENDIX B.....	TABLES
APPENDIX C.....	NOISE RECEPTOR LOCATION DESCRIPTIONS AND FIELD MEASUREMENT CONDITIONS
APPENDIX D .....	OPERATIONAL SOUND MONITORING REPORT FROM LEGOLAND PARK IN CARLSBAD, CA



**A. PROJECT DESCRIPTION AND LOCATION**

*(Figure No. 1)*

The Project applicant is proposing to construct a combined theme park and resort on approximately 153 acres of a 523 acre site with frontage along Harriman Drive within the Town of Goshen (see Figure No. 1). The LEGOLAND New York Project (Project) is expected to be similar to the existing LEGOLAND facility in Carlsbad, California. The Project will include rides and attractions, an aquarium, theaters, restaurants, a 250 room hotel and other various facilities associated with the operation and management of the Project. The Project will include approximately 5,200 parking spaces with an additional 70 bus parking spaces.

Under current conditions, the primary noise sources in the area are associated with the traffic along the NYS Route 17 corridor and secondarily from the other area roadways including NYS Route 17M, Harriman Drive and South Street. More remotely, another significant sound source in the area is from the Tilcon New York Goshen Quarry and Asphalt facility located to the southwest of the project site, at the intersection of NYS Route 17A and Quarry Road. Figure No. 1 indicates the receptor locations which were evaluated in this study.

**B. SCOPE OF STUDY**

This evaluation has been prepared to identify the existing noise levels in the area and project potential noise levels under the future conditions anticipated at the site.

Existing noise levels were measured to obtain the ambient (background) noise levels at eight (8) area receptor locations on the site and at the perimeter of the site as well as at certain offsite receptors as identified in the LEGOLAND Scoping Document, dated August 18, 2016, as adopted by the Town of Goshen Planning Board. At the time of the noise measurements, traffic counts were also conducted to allow the development of a relationship between the existing traffic volumes and the actual measured noise levels. The existing and future noise levels were then compared to Town requirements as well as recommended noise level guidelines as per the NYSDEC publication entitled, *Assessing and Mitigating, Noise Impacts*, revised February, 2001 to determine whether there will be any significant impact on the various receptors in the area. Recommendations for improvements to mitigate any potential noise impacts were then made.



A description of noise receptors, noise guidelines, and the analysis methodology utilized in evaluating the noise levels is described in the following sections.

**C. CHARACTERISTICS OF ENVIRONMENTAL NOISE**

*(Tables No. 1 and 2)*

A single value of broad band noise levels is established using a frequency weighting that simulates human perception and is used to characterize the noise environment and to assess any impact on noise sensitive areas. Governmental noise criteria generally specify noise level guidelines in the units of A-weighted noise or decibels (dBA). The A-weighted noise measurement has been found to correlate well with the response of the human ear which is relatively insensitive to low frequencies. Table No. 1 provides a summary of some typical A-weighted noise levels. Governmental Guidelines typically stipulate that noise impacts be evaluated in terms of noise levels designated  $L_{eq}$ . The  $L_{eq}$  (equivalent Sound Level) is an equivalent level "energy average" over a specified period of time. This measure is useful for characterizing environmental noise including highway noise since it specifically accounts for both the duration and magnitude of sound. Other descriptors include  $L_{10}$ ,  $L_{max}$  and  $L_{90}$ . The  $L_{10}$  represents the noise level which is exceeded 10% of the time,  $L_{max}$  represents the maximum level observed for a specific time period of observation while the  $L_{90}$  represents the noise level which is exceeded 90% of the time.

Community noise guidelines are specified by several agencies including the Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA), and the Department of Housing and Urban Development (HUD). These agencies have established certain criteria for acceptable noise levels for various land uses and development types. The FHWA guidelines, are summarized in Table No. 2, recommend an exterior noise level of 57 dBA expressed in terms of  $L_{eq}$  for activity Category A, and for activity Category B, the FHWA recommends an exterior noise level of 67 dBA and for Category C a level of 72 dBA.

The NYSDEC publication, *Assessing and Mitigating Noise Impacts*, revised February 2, 2001, provides guidance for evaluating noise impact assessments. It identifies typical thresholds for establishing significant impacts, and discusses potential methods of avoidance and measures to reduce or mitigate noise impacts.

NYSDEC's publication sets forth thresholds that are recommended to be used in determining whether a noise increase due to a project may constitute a significant adverse impact.

The guidelines summarize the following:

- Increases in noise of under 3 dBA should have no appreciable effect on receptors;
- Increases of between 3 to 6 dBA may have the potential for impacts where the sensitive receptors such as hospitals or schools are present;
- Increases of more than 6 dBA may require a more detailed analysis of potential impacts depending on the ambient noise levels under existing conditions and the character of surrounding receptors; and
- Increases of 10 dBA are very significant and mitigation measures should be implemented to avoid impacts in such cases.

The document also suggests that the addition of a noise source should not result in the noise level exceeding 65 dBA near residential receptors.

In addition to the NYSDEC guidance, the Town of Goshen Town Code in Chapter 70, "Noise," at §70-2 Item O, "Prohibited noise," prohibits any noise exceeding 75 dBA at the adjoining property line and also describes loud, disturbing and unnecessary noises that would be considered a violation of the ordinance.

#### **D. EXISTING NOISE LEVELS**

*(Figure No. 1 and Tables No. 3 and 3S)*

Noise measurement surveys were conducted at several locations (receptors) on and off the site to provide a representative sampling and to identify ambient noise levels in the area. At those locations closer to NYS Route 17, traffic volumes were also observed to determine the relationship between noise levels and existing traffic volumes. The noise measurements were collected by representatives of Maser Consulting P.A. The noise measurements were taken with a Bruel and Kjaer Type 1-Precision integrating Sound Level Meter – Type 2236. The meter was calibrated prior to actual measurements using a Bruel and Kjaer Acoustical Calibrator Model No. 4231. The actual measurements and calibration procedures followed were completed in conformance with American National Standards Institute (ANSI) criteria.

The microphones used in the measurements were located, without obstruction from stationary objects at a height of five feet above a ground surface. Measurements taken included a  $L_{eq}$  level, and  $L_{90}$  and an  $L_{max}$  for each location. The measurements were collected on 10 and 15 minute intervals to identify the noise character at each receptor. The existing sound levels measurements were generally taken on various dates in August and September 2016.



The sound level measurements were taken at the various receptor locations in the area. The receptors evaluated are identified on Figure No. 1 and described below:

- R1 - Near the west site property line boundary just east of the Glen Arden Upper Parking Lot
- R2 - Near the east site property line boundary past the gate and turn on Gumwood Drive terminus
- R3 - Near the east site property line boundary in the vicinity of the Wedgewood Drive terminus
- R4 - On the south site property line boundary north of Conklingtown Road
- R5 - North of the site on Orange County Heritage Trail (approximately 150' west of Duck Farm Road)
- R6 - South of Harriman Drive on the site, at the western site boundary, southeast of Glen Arden
- R7 - Near the east site property line boundary south of Wedgewood Drive and Peachwood Lane (Paper Street)
- R8 - To the west of the site at Lower Reservoir Road intersection with South Street

Photographs of these measurement locations are attached.

Copies of the measurement particulars including detailed descriptions of the receptors are contained in Appendix C.

#### **Summary of Existing Noise Levels**

Tables No. 3 and 3S summarizes the existing noise levels measured at each receptor location in terms of  $L_{eq}$  (dBA). As indicated in Tables No. 3 and 3S, the  $L_{eq}$  sound levels observed at the various receptors ranged in the low 40's to a high in the mid 60's dBA. The observations of each of the receptors are described in more detail below.

Receptor 1: This receptor is characterized by background noise levels primarily associated with traffic along NYS Route 17. Its location relative to the Glen Arden facility has some sound levels associated with the normal operations on that property including movement of visitor traffic and other activities. As with any of the receptor locations, there is sound from the occasional plane flyover.



- Receptors 2, 3 & 7: These receptors are similar in nature in terms of being adjacent to existing residential areas in Arcadia Hills. The sound levels at these locations vary. The effect of the Route 17 traffic is present at all three locations and at R3, there was recognizable evidence of sound emanating from the Goshen Quarry operation during measurements. Note that at the time of the sound level measurements at all receptors, the Goshen Quarry was operational.
- Receptor 4: This receptor, which was located at the southwesterly portion of the site, had more influence from localized traffic on Conklingtown Road.
- Receptor 5: This receptor was located on the Heritage Trail, west of Duck Farm Road, had sound levels primarily related to the background traffic noise on Route 17 and Route 17M.
- Receptor 8: This receptor was located at the intersection of Reservoir Road and Lower Reservoir Road and South Street in an area referenced as Echo Ridge. The sound levels at this location are primarily due to localized traffic at the intersection as well as background traffic from the residential neighborhoods and more remotely, from the Goshen Quarry. In this vicinity, background traffic sound levels from Route 17 were also noticeable.

#### **E. NOISE ANALYSIS METHODOLOGY AND DISCUSSION OF POTENTIAL IMPACTS**

Existing and future levels were then modeled for the above receptor locations. In order to evaluate the potential noise impacts, two criteria are generally utilized:

- 1) Will the predicted noise levels exceed the recommended guidelines for a particular area?
- 2) Will there be a significant increase above the existing levels (i.e., 3dBA or greater)?

As indicated previously, community noise guidelines are published by several Federal Agencies including the NYSDEC, the Environmental Protection Agency (EPA), the Federal Highway Administration (FHWA) and the Department of Housing and Urban

Development (HUD). These guidelines establish recommended design noise levels for specific land uses. With respect to roadway and traffic noise, FHWA has established certain guidelines for various land use categories.

The FHWA recommends a  $L_{eq}$  design level of 72 dBA for commercial areas, 67 dBA for residential areas; and 57 dBA for other more noise sensitive areas. Table No. 2 summarizes the design level/land use relationships for various land use categories. Additional discussion of how the existing and future noise levels compare to the various noise guidelines is presented in the next section.

As can be seen from measurements summarized in Tables No. 3 and 3S, the receptors located closer to NYS Route 17 and NYS Route 17M corridors are influenced primarily by the existing traffic levels while receptors R4, R6 and R8 are more heavily influenced by local or neighborhood noise levels. At various receptors such as R2 and R3, background levels from the operations at the Tilcon Quarry were also noticeable at various times during measurements

Table No. 4 summarizes the relationship between noise increases and significance of impacts. It is important to note that in order to produce a 3-dBA increase in the sound pressure level, which represents a perceptible change relative to human response, a doubling of the noise source (i.e., a doubling of the traffic volume) must occur. For example, if a highway has an hourly volume of 2000 vehicles and a  $L_{eq}$  of 62 dBA and the volume increases to 4000 vehicles with similar speeds and vehicle mix, the  $L_{eq}$  would increase to approximately 65 dBA. Thus, a sound level of 60 dBA measured at 100 feet from the sound source (point source) would drop to approximately 54 dBA at 200 feet away.

Furthermore, with regard to sound propagation in the air, as distance doubles from the sound source, the amplitude drops by half. This is a drop of approximately 6 dBA for a point source. For a line source such as mobile sources, reductions of 3 dBA for doubling distances are encountered under typical field conditions.

An analysis of future noise level conditions for the various receptor locations assumed that the increase in traffic under future conditions would increase noise levels. The increases due to traffic were predicted referencing the procedures from the FHWA Traffic Noise Model (TNM 1.0). These were added together with the other point services within the Project site to obtain the future total noise levels for each receptor as discussed in Section G.

**F. SOUND LEVEL DATA COLLECTED AT LEGOLAND PARK IN CARLSBAD, CALIFORNIA**

A separate independent sound level survey was completed at the Carlsbad, California facility in order to identify the range of sound levels associated with the operations at that existing LEGOLAND Park. The measurements at that facility were collected by ABC Acoustics Inc. and the results are summarized in their August 24, 2016 report. As can be seen from a review of their report, the  $L_{eq}$  levels inside the park ranged from 52.5 to 63.7 dBA with levels at a 500' separation ranging from 39.0 to 43.9 dBA. Based on their observations, their conclusions were as follows:

- 1) *“Operational sounds at LEGOLAND Carlsbad are barely audible beyond the property line (PL), except at one point. Noisy activities are concentrated towards center of the park and surrounded by park buildings, landscaping, and a park utility road which runs just inside the PL (this further separates everything from property line).*
- 2) *The only noise location is where a roller coaster (i.e., The Dragon) is located at close proximity of the property line. At this point, noise levels are 57-58 decibels (dBA) at 100 feet of the property line (measured at a point where a direct line-of-sight exists to the coaster). In the line-of-sight is not obstructed, noise levels would be approximately 45 dBA at 500' and 39 dBA at 1,000'. Operational sounds are masked by ambient sounds and not audible beyond 1,000' of PL.*
- 3) *Vehicular traffic-related noise level at the entrance (during peak morning hours) and the exit (during peak afternoon hours) is approximately 60 dBA at 50 feet from the curb.”*

A copy of their report is contained in Appendix D of this document.

**G. FUTURE SOUND LEVELS**

*(Tables 3 and 3S)*

The future sound levels in the area will be the result of existing sound levels (primarily from existing traffic), sound levels from equipment operating on the site, sounds emitting from the activities on site as well as from increased traffic generation from the Project. In order to assess the future sound levels, the noise from various sources including HVAC equipment, other onsite fixed position equipment, that due to traffic added to the adjoining network, traveling on site and accessing the parking areas was added to the

existing ambient levels. It should be noted that several of the receptors will be between 1,000 and 2,000 feet away from the noise sources resulting from the Project. This distance separation will help minimize any sound level increases at those particular locations. Other receptors will be primarily affected by increased sound levels due to the increased traffic, however, it is important to note that, as previously indicated, a doubling of a traffic volume is required in order to result in 3 dBA increase in sound levels which would be typically noticeable.

The one receptor which is expected to experience a significant increase in sound level is the Receptor 1 (Glen Arden), which will have increases due primarily to the vehicular traffic entering and exiting the site at a location which is the closest proximity to an adjacent property. Tables No. 3 and 3S summarize the results for Existing, No-Build and Build conditions. Based on the projected sound pressure levels under Future Conditions, all noise levels will still be in compliance with the Town of Goshen code.

#### **H. CONSTRUCTION EQUIPMENT AND ACTIVITY NOISE**

During construction of the site, as with any construction project, there will be temporary increases in sound levels due to construction equipment, associated with moving of earth, installation of utilities and other site related conditions. In addition, during the construction of the building and facilities, sound levels will also be associated with those construction activities including building equipment.

In order to identify noise impacts during this phase, a review of the types of construction equipment which will be used on the job site during construction of the Project was completed. It can be anticipated that the types of equipment used on the site will be for the following purposes:

- Earth work and excavation
- Removing of existing vegetation
- Paving and construction of the internal roadway network

For these activities, the types of construction equipment generally utilized would include bulldozers, compressors, front end loaders, dump trucks and pavers. At a reference distance of 50 feet, the above equipment generally have sound levels ranging from 70 to 95 dBA (A-weighted dBA). Due to the significant distance separation from where these activities will occur to the majority of the offsite receptors, there will be significant attenuation resulting from this distance separation and the extensive vegetative buffers

between them. The hours of these activities will occur during normal daytime hours, which is coincident with the period of highest background existing ambient noise levels.

Construction activity related noise levels will be in conformance with the Town of Goshen requirements, as set forth in the Code §70-2. All construction equipment will be inspected periodically to ensure that proper mufflers and other equipment is functioning properly.

#### **I. RECOMMENDED MITIGATION MEASURES**

As can be seen from a review of the sound level tables, the increases in noise levels at the receptors as a result of the project traffic are expected to be 3dBA or less at most receptors. The following recommendations should be implemented as part of the development.

- 1) In the vicinity of the access road closest to Glen Arden, the majority of the road is at a depressed elevation which creates an acoustic barrier from this adjoining property. However, based on the final elevations, the installation of a sound wall along a portion of the access road with additional plantings is recommended in any required sections to eliminate any line of sight from the Glen Arden property to the access road.
- 2) All rooftop HVAC equipment should be positioned away from adjacent receptors and as necessary, should include potential acoustic screening to limit any increased noise levels.
- 3) The construction equipment used on-site will have to be inspected periodically to ensure that properly functioning muffler systems are used on all equipment. While on the site, all equipment should not idle unnecessarily.
- 4) Normal building construction techniques should provide adequate attenuation to provide acceptable interior noise levels.

#### **J. SUMMARY AND CONCLUSION**

Based on the results of the field measurements and projections of the future noise levels, the Project will not result in a significant increase in noise levels over those that are currently being experienced at the area receptors following the completion of the mitigation measures identified above.

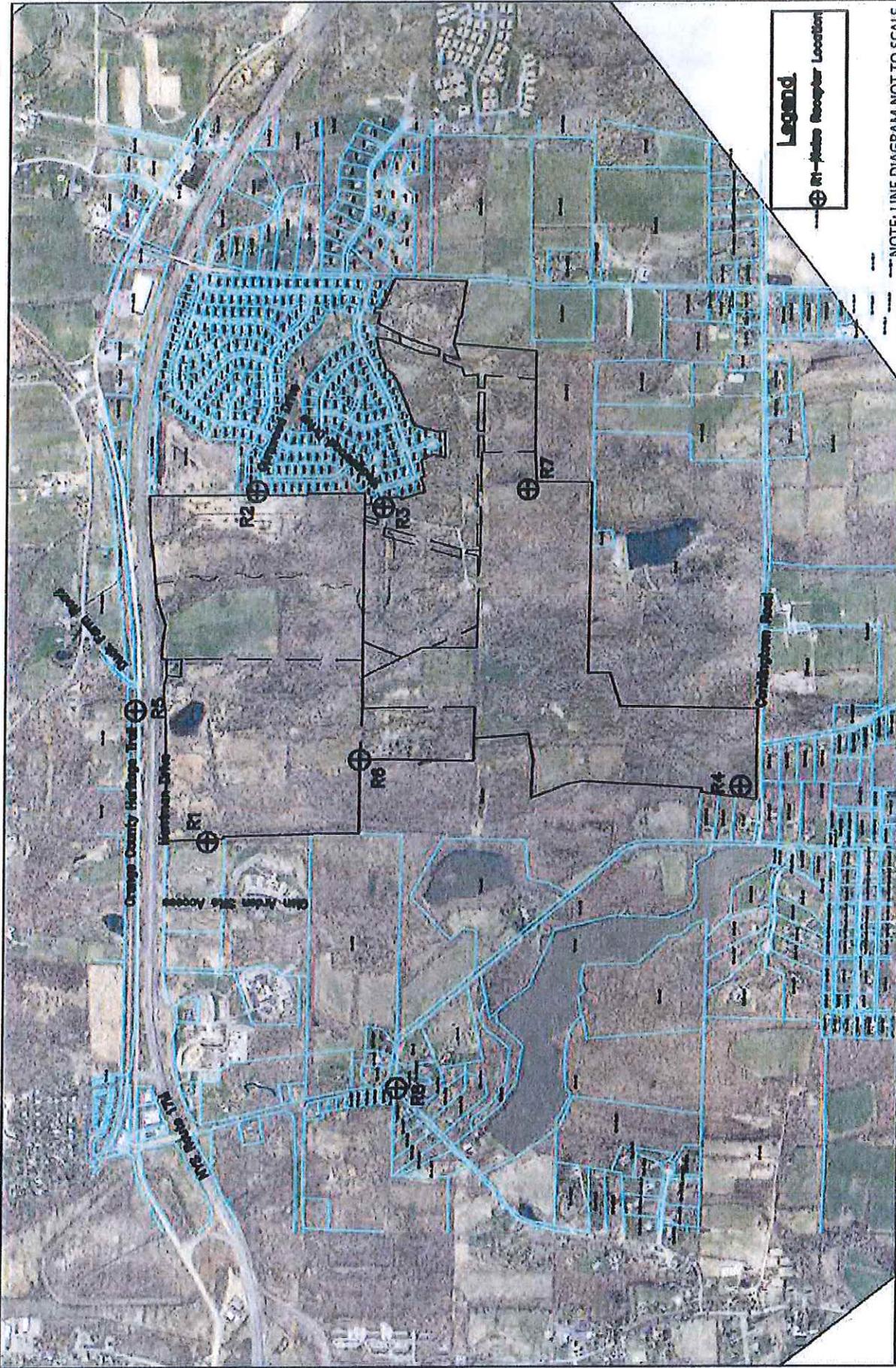


# *LEGOLAND NEW YORK*

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## **APPENDIX A**

### **Figures**



NOTE: LINE DIAGRAM NOT TO SCALE

**Legend**

⊕ Noise Receptor Location

JOB NUMBER:	DATE:
16000699A	8/12/16
FIGURE NUMBER:	
	1

LEGOLAND ORANGE COUNTY  
TOWN OF GOSHEN, NEW YORK

NOISE RECEPTOR LOCATIONS  
(Worksheet Locations)

**WESTCHESTER OFFICE**

11 Bradhurst Avenue  
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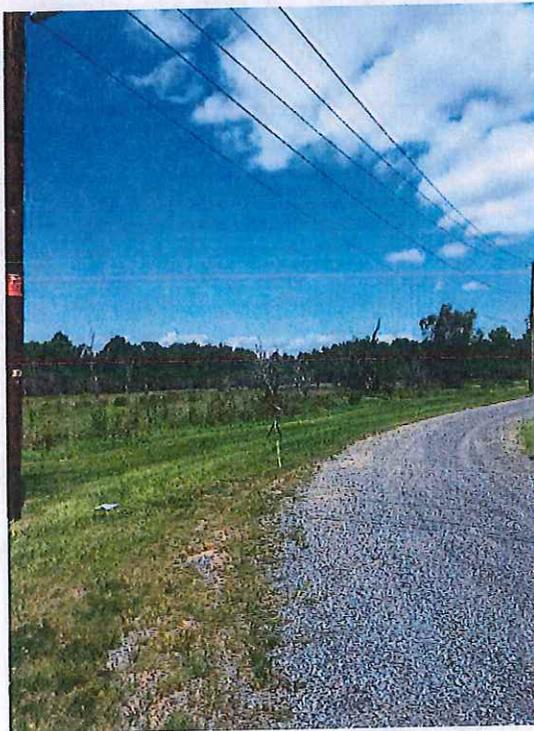


Consulting, Municipal & Environmental Engineers  
Planners • Surveyors • Landmarks Architects  
State of N.Y. Certificate of Authorization: 000887

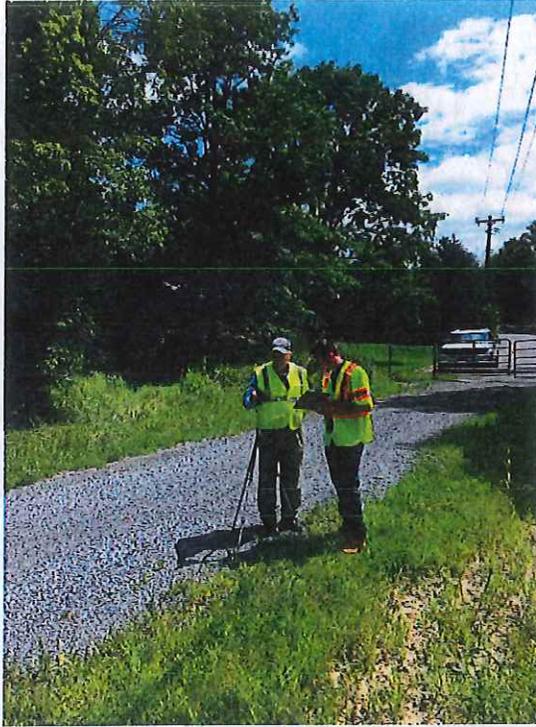
New Jersey Pennsylvania Virginia  
Customer Loyalty through Client Satisfaction



Receptor-R1 - Located along Glen Arden Easterly property.



Receptor-R2 – Located at site easterly property boundary in vicinity of Gumwood Drive.



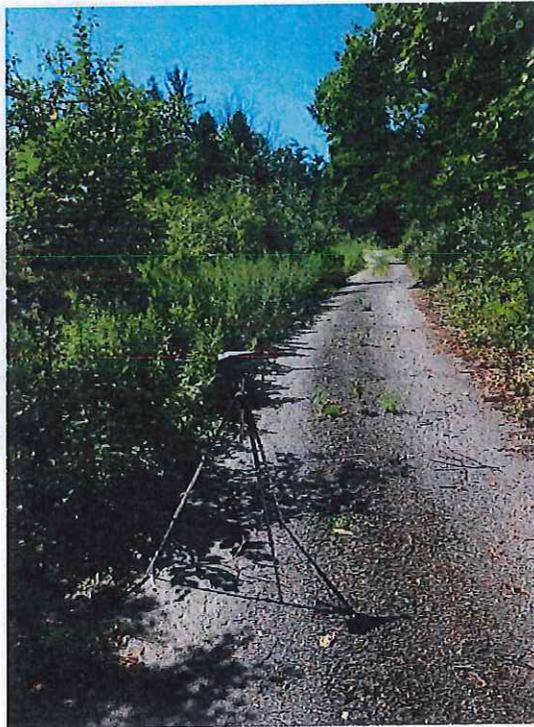
Receptor-R3 – Located at site easterly property boundary in vicinity of Wedgewood Drive.



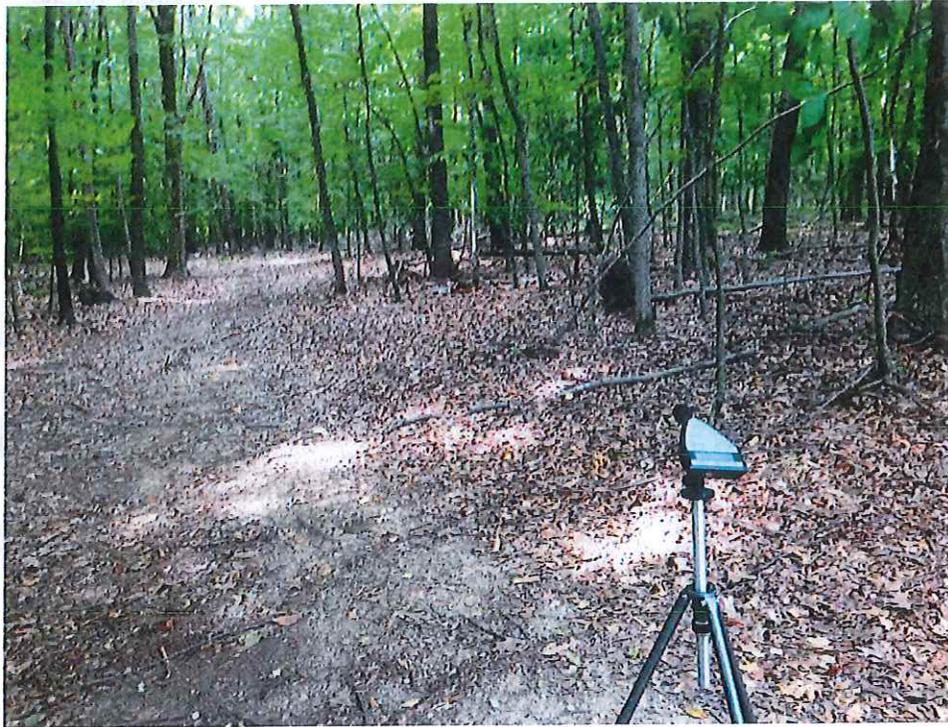
Receptor-R4 - Near site southwestern boundary near Conklingtown Road.



Receptor-R5 – Heritage Trail west of Duck Farm Road.



Receptor-R6 – Midsite western boundary.



Receptor-R7 – Southeast portion of site south of Redwood Drive and Walnut Court.



Receptor-R8 – Lower Reservoir Road and Reservoir Road.



***LEGOLAND NEW YORK***

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**APPENDIX B**

**Tables**

TABLE NO. 1

RANGE OF TYPICAL ENVIRONMENTAL A-WEIGHTED NOISE LEVELS

<u>SITUATION</u>	<u>NOISE LEVEL (dBA) (1,2)</u>
Discotheque/Rock Band at 5m	110
Jet Flyover at 1000 ft.	105
Gas Lawn Mower at 3 ft.	98
Inside Subway Train	95
Shouting at 3 ft.	78
Gas Lawn Mower at 100 ft.	70
Normal Speech at 3 ft.	65
Background Office Noise	50
Library	35 - 40
Optimum Sleeping Level	35 or Less
Threshold of Hearing	5

Sources:

- 1) *The Audible Landscape: Manual for Highway Noise and Land Use*, Table A-16, Page 91, USDOT, 1974.
- 2) *Transportation Planning Handbook*, Institute of Transportation Engineers, Figure 8-2, 2<sup>nd</sup> Edition, 1999.

TABLE NO. 2

FHWA DESIGN LEVELS

Activity Category	Design Noise Level (dBA)		Description of Activity Category (2)
	$L_{eq}$	$L_{10}$	
A	57 (EXTERIOR)	60 (EXTERIOR)	Tracts where serenity and quiet are especially important.
B	67 (EXTERIOR)	70 (EXTERIOR)	Residences, motels, schools, churches, hospital, etc.
C	72 (EXTERIOR)	75 (EXTERIOR)	Developed lands other than those above.
E	52 (INTERIOR)	55 (INTERIOR)	Building interiors.

- (1) - Source: Federal Highway Administration, *Procedures for the Abatement of Highway Traffic Noise and Construction Noise*, Federal Register 41 (80), Washington, D.C.
- (2) - Either  $L_{eq}$  or  $L_{10}$  can be used - not both - and an hourly measure applies. The land-use descriptions are further qualified in the reference, and a category D is also reserved for undeveloped land. The interior noise levels may be established by subtracting from outdoor levels the attenuation expected of the particular wall and window constructions involved.

**Table No. 3**  
**Summary of Existing and Projected Noise Levels (Leq-dBA)**  
Weekday Conditions

<u>Receptor Location</u>	<u>Time of Day</u>	<u>Existing</u>	<u>No Build</u>	<u>Build</u>	<u>Change from No Build to Build</u>
1	AM	54.6	56.4	59.1	2.7
	PM	56.1	57.6	59.9	2.3
2	AM	46.5	47.1	50.2	3.1
	PM	48.8	49	51.9	2.9
3	AM	51.7	52.4	53	0.6
	PM	51.8	52.2	53.8	1.6
4	AM	43.7	44.7	45.9	1.2
	PM	58	58.6	59.5	0.9
5	AM	62.3	62.9	64.1	1.2
	PM	62.9	63.8	64.7	0.9
6	AM	49.6	50.6	56.2	5.6
	PM	62.8	63.1	65.2	2.1
7	AM	51.1	51.8	53.9	2.1
	PM	50.9	51.5	54.5	3
8	AM	55.6	55.9	58.7	2.8
	PM	60.4	60.8	61.1	0.3

Notes:

- 1) See Figure No. 1 for Noise Receptor locations.
- 2) Existing Noise Level Measurements were collected on August 11 and August 23, 2016.

**Table No. 3-S**  
**Summary of Existing and Projected Noise Levels (Leq-dBA)**  
Saturday Conditions

<u>Receptor Location</u>	<u>Time of Day</u>	<u>Existing</u>	<u>No Build</u>	<u>Build</u>	<u>Change from No Build to Build</u>
1	AM	55.3	56.9	58.3	1.4
	PM	55.5	57.7	58.2	0.5
2	AM	47.2	47.9	52.9	5
	PM	48.2	48.7	54.7	6
3	AM	57.3	57.9	59.1	1.2
	PM	48.6	49.1	52.5	3.4
4	AM	55.4	55.6	56.4	0.8
	PM	57.8	58	59.2	1.2
5	AM	62.1	63.5	64.2	0.7
	PM	61.7	62.9	63.8	0.9
6	AM	47.9	48.6	54.6	6
	PM	48.3	48.9	55.7	6.8
7	AM	42.1	43.1	46.7	3.6
	PM	43.6	44.4	46.8	2.4
8	AM	55.6	55.8	56.7	0.9
	PM	59.1	59.5	59.8	0.3

Notes:

- 1) See Figure No. 1 for Noise Receptor locations.
- 2) Existing Noise Level Measurements were collected on August 13, 2016 and September 3, 2016.

TABLE NO. 4

HUMAN REACTION TO INCREASES IN SOUND PRESSURE LEVEL

<u>INCREASE IN SOUND PRESSURE (dBA)</u>	<u>HUMAN REACTION</u>
2 - 3	BARELY PERCEPTIBLE
3 - 5	NOTICEABLE
10	SOMEWHAT INSTRUSIVE - DOUBLING OF LOUDNESS
10 - 15	VERY NOTICEABLE
15 - 20	OBJECTIONABLE
OVER 20	VERY OBJECTIONABLE TO INTOLERABLE

Source: *Fundamentals and Abatement of Highway Traffic Noise*, FHWA, 1973.



Noise Impact Evaluation  
LEGOLAND New York  
MC Project No. 16000699A  
Appendix

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## *LEGOLAND NEW YORK*

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### **APPENDIX C**

#### **Noise Receptor Location Descriptions And Field Measurement Conditions**

## **Receptor Location #1 Description**

Receptor Location #1 is located at the Glen Arden Retirement Community immediately east of the Upper Parking Area at the Legoland western property boundary.

## **Field Measurement Conditions**

### **Weekday**

8/11/2016- Start time: 11:18 AM, Wind Max: 5.4 MPH, Wind Average: 1.7 MPH, 84.5 degrees Fahrenheit

8/11/2016- Start time: 2:12 PM, Wind Max: 2.0 MPH, Wind Average: 0.7 MPH, 95.3 degrees Fahrenheit

8/11/2016- Start time: 4:07 PM, Wind Max: 0.6 MPH, Wind Average: 0.3 MPH, 86.7 degrees Fahrenheit

### **Weekend**

8/13/2016- Start time: 10:18 AM, Wind Max: 2.7 MPH, Wind Average: 0.9 MPH, 90.9 degrees Fahrenheit

8/13/2016- Start time: 11:57 AM, Wind Max: 4.0 MPH, Wind Average: 2.7 MPH, 95.1 degrees Fahrenheit

8/13/2016- Start time: 1:25 PM, Wind Max: 3.9 MPH, Wind Average: 2.3 MPH, 96.1 degrees Fahrenheit

## Receptor Location #2 Description

Receptor Location #2 is located on the east side of the site property boundary near Gumwood Drive in Arcadia Hills.

## Field Measurement Conditions

### Weekday

8/11/2016- Start time: 12:25 PM, Wind Max: 3.1 MPH, Wind Average: 1.5 MPH, 88.7 degrees Fahrenheit

8/11/2016- Start time: 2:56 PM, Wind Max: 1.3 MPH, Wind Average: 0.5 MPH, 95.5 degrees Fahrenheit

8/11/2016- Start time: 4:44 PM, Wind Max: 1.7 MPH, Wind Average: 0.8 MPH, 89.8 degrees Fahrenheit

### Weekend

8/13/2016- Start time: 10:59 AM, Wind Max: 2.6 MPH, Wind Average: 1.0 MPH, 89.8 degrees Fahrenheit

8/13/2016- Start time: 12:35 PM, Wind Max: 3.4 MPH, Wind Average: 1.6 MPH, 92.3 degrees Fahrenheit

8/13/2016- Start time: 2:02 PM, Wind Max: 3.8 MPH, Wind Average: 2.2 MPH, 94.4 degrees Fahrenheit

### **Receptor Location #3 Description**

Receptor Location #3 is located adjacent to the gravel road extension from Wedgewood Drive near the site property line boundary on the east side of the site.

### **Field Measurement Conditions**

#### **Weekday**

8/11/2016- Start time: 11:51 AM, Wind Max: 1.1 MPH, Wind Average: 0.4 MPH, 85.2 degrees Fahrenheit

8/11/2016- Start time: 3:11 PM, Wind Max: 0.9 MPH, Wind Average: 0.3 MPH, 93.4 degrees Fahrenheit

8/11/2016- Start time: 4:57 PM, Wind Max: 0.6 MPH, Wind Average: 0.3 MPH, 86.5 degrees Fahrenheit

#### **Weekend**

8/13/2016- Start time: 11:19 AM, Wind Max: 1.2 MPH, Wind Average: 1.0 MPH, 90.1 degrees Fahrenheit

8/13/2016- Start time: 12:50 PM, Wind Max: 0.6 MPH, Wind Average: 0.3 MPH, 98.5 degrees Fahrenheit

8/13/2016- Start time: 2:16 PM, Wind Max: 3.9 MPH, Wind Average: 0.8 MPH, 99.0 degrees Fahrenheit

## **Receptor Location #4 Description**

Receptor Location #4 is located on the south of Conklingtown Road near the site's southwestern property line boundary.

## **Field Measurement Conditions**

### **Weekday**

8/11/2016- Start time: 1:06 PM, Wind Max: 2.6 MPH, Wind Average: 1.3 MPH, 92.8 degrees Fahrenheit

8/11/2016- Start time: 1:17 PM, Wind Max: 2.6 MPH, Wind Average: 1.3 MPH, 92.8 degrees Fahrenheit

8/11/2016- Start time: 3:49 PM, Wind Max: 0.7 MPH, Wind Average: 0.3 MPH, 83.5 degrees Fahrenheit

8/11/2016- Start time: 5:15 PM, Wind Max: 1.2 MPH, Wind Average: 0.5 MPH, 87.8 degrees Fahrenheit

### **Weekend**

8/13/2016- Start time: 11:38 AM, Wind Max: 3.4 MPH, Wind Average: 1.6 MPH, 95.0 degrees Fahrenheit

8/13/2016- Start time: 1:08 PM, Wind Max: 1.0 MPH, Wind Average: 0.5 MPH, 95.5 degrees Fahrenheit

8/13/2016- Start time: 2:33 PM, Wind Max: 2.0 MPH, Wind Average: 1.2 MPH, 93.6 degrees Fahrenheit

## **Receptor Location #5 Description**

Receptor Location #5 is located on the Orange County Heritage Trail to the North of the site and NYS Route 17M. The meter was setup approximately 150' west of the intersection with Duck Farm Road along side of the trail.

## **Field Measurement Conditions**

### **Weekday**

8/11/2016- Start time: 10:44 AM, Wind Max: 2.1 MPH, Wind Average: 0.5 MPH, 87.8 degrees Fahrenheit

8/11/2016- Start time: 2:32 PM, Wind Max: 3.1 MPH, Wind Average: 2.0 MPH, 91.2 degrees Fahrenheit

8/11/2016- Start time: 4:26 PM, Wind Max: 0.8 MPH, Wind Average: 0.4 MPH, 93.9 degrees Fahrenheit

### **Weekend**

8/13/2016- Start time: 10:39 AM, Wind Max: 1.2 MPH, Wind Average: 0.4 MPH, 92.0 degrees Fahrenheit

8/13/2016- Start time: 12:17 PM, Wind Max: 2.3 MPH, Wind Average: 0.7 MPH, 92.9 degrees Fahrenheit

8/13/2016- Start time: 1:45 PM, Wind Max: 0.8 MPH, Wind Average: 0.3 MPH, 96.2 degrees Fahrenheit

## **Receptor Location #6 Description**

Receptor Location #6 is located on the site approximately midpoint from Harriman Drive near the Legoland property western boundary southeast of Glen Arden.

## **Field Measurement Conditions**

### **Weekday**

8/23/2016- Start time: 11:32 AM, Wind Max: 0.9 MPH, Wind Average: 0.4 MPH, 79.0 degrees Fahrenheit

8/23/2016- Start time: 1:17 PM, Wind Max: 3.5 MPH, Wind Average: 1.9 MPH, 76.1 degrees Fahrenheit

8/23/2016- Start time: 3:20 PM, Wind Max: 0.8 MPH, Wind Average: 0.3 MPH, 78.5 degrees Fahrenheit

## **Receptor Location #7 Description**

Receptor Location #7 is located South of Wedgewood Drive and the paper street designated as Peachwood Lane near the site property line boundary on the east side of the site.

## **Field Measurement Conditions**

### **Weekday**

8/23/2016- Start time: 12:24 PM, Wind Max: 5.2 MPH, Wind Average: 2.9 MPH, 75.0 degrees Fahrenheit

8/23/2016- Start time: 1:54 PM, Wind Max: 4.2 MPH, Wind Average: 2.0 MPH, 83.2 degrees Fahrenheit

8/23/2016- Start time: 3:55 PM, Wind Max: 0.7 MPH, Wind Average: 0.3 MPH, 85.8 degrees Fahrenheit

## **Receptor Location #8 Description**

Receptor Location #8 is located at the intersection between Lower Reservoir Road and South Street near the site line property boundary on the west side of the site. The meter was setup on the south side of the intersection and within the right-of-way near Utility Pole #50136-50456.

## **Field Measurement Conditions**

### **Weekday**

8/23/2016- Start time: 11:00 AM, Max Wind: 0.9 MPH, Wind Average: 0.5 MPH, 82.8 degrees Fahrenheit

8/23/2016- Start time: 12:50 PM, Max Wind: 0.9 MPH, Wind Average: 0.4 MPH, 85.1 degrees Fahrenheit

8/23/2016- Start time: 2:52 PM, Max Wind: 1.7 MPH, Wind Average: 0.8 MPH, 83.6 degrees Fahrenheit



## ***LEGOLAND NEW YORK***

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### **APPENDIX D**

#### **Operational Sound Monitoring Report from LEGOLAND Park in Carlsbad, CA**

August 24, 2016

Mr. John O'Rourke  
Lanc & Tully P.C.  
P.O. Box 687  
Goshen, NY 10924

Re: **LEGOLAND Park, Carlsbad, CA**  
**Operational Sound Monitoring (ABC Report No: 2452)**

John,

Pursuant To your request and authorization, ABC Acoustics monitored the operational sound levels at LEGOLAND Carlsbad in July 2016. The scope of project was intended to quantify operational sound levels at park perimeter and at neighboring areas beyond park boundary. LEGOLAND Carlsbad includes a "Water Park" which was not a part of this scope.

Sound surveys were conducted during sunny and warm summer days with temperatures between 75-80 degrees Fahrenheit. Units of sound are expressed as decibels (dB) and the "A"-weighted filter is used because it closely approximate perception of sound by humans. Surveys were conducted using a type 1 Sound Level Meter, per ANSI S1.4. Results of surveys are presented in Table 1. Survey locations are shown in Figure 1.

Operational sounds at LEGOLAND Carlsbad are barely audible beyond the property line (PL), except at one point. Noisy activities are concentrated towards center of the park and surrounded by park buildings, landscaping, and a park utility road which runs just inside the PL (this further separates everything from property line).

The only noisy location is where a roller coaster (i.e., The Dragon) is located at close proximity of the property line. At this point, noise levels are 57-58 decibels (dBA) at 100 feet of the property line (measured at a point where a direct line-of-sight exists to the coaster). If the line-of-sight is not obstructed, noise levels would be approximately 45 dBA at 500' and 39 dBA at 1,000'. Operational sounds are masked by ambient sounds and not audible beyond 1000' of PL.

Vehicular traffic-related noise level at the entrance (during peak morning hours) and the exit (during peak afternoon hours) is approximately 60 dBA at 50 feet from the curb (Table 1).

Please let me know if you have any questions.

Sincerely,

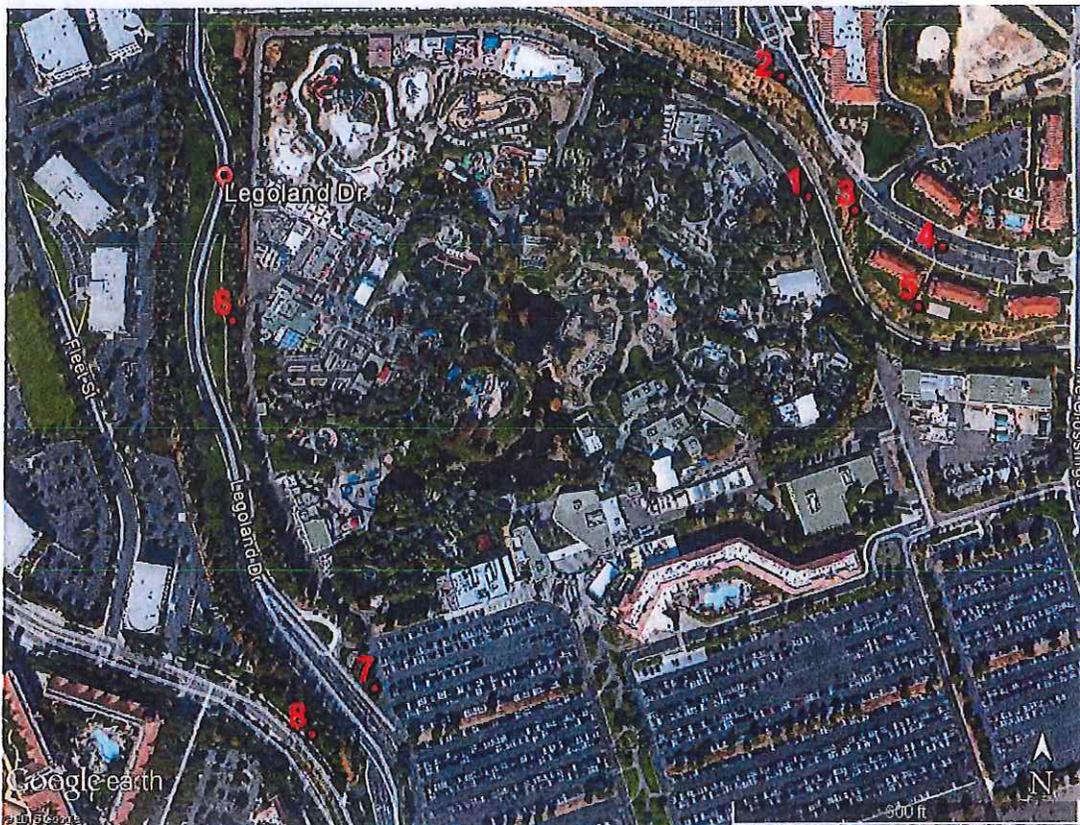
*Sharo T. Sanavi*

Sharo T. Sanavi  
Principal  
[sharo@abcacoustics.com](mailto:sharo@abcacoustics.com)  
r2452; STS: sts

TABLE 1 RESULTS OF SOUND SURVEY <sup>1,2,3</sup> LEGOLAND, CARLSBAD, CALIFORNIA						
Date	2Time		Location	Leq (dBA) <sup>4</sup>		
	Start	End		@ Loc	500'	1000'
7/19/2016	17:35	17:50	1 - Inside Park <sup>4</sup>	63.7 <sup>5,6</sup>	---	---
7/19/2016	18:06	18:21	2 - 100' of PROPERTY LINE	52.5	39.0	33.0
7/19/2016	18:25	18:40	3 - 100' of PL	57.4 <sup>5,6</sup>	43.9	37.9
7/19/2016	18:45	18:55	4 - 250' of PL	46.4 <sup>5</sup>	41.4	35.4
7/19/2016	19:20	19:50	7 – at Exit <sup>8</sup>	58.5	---	---
7/19/2016	19:50	20:20	7 - at Exit <sup>8</sup>	59.4	---	---
7/26/2016	9:31	10:31	8 – at Entrance <sup>8</sup>	58.8	---	---
7/27/2016	10:42	11:12	3 -100' of PL	57.8 <sup>5,6</sup>	44.3	38.3
7/27/2016	12:02	12:12	5 -100' of PL	55.2	41.7	35.7
7/27/2016	13:45	13:55	6 - Inside Park	56.2 <sup>7</sup>	---	---

**Notes:**

1. Climate conditions during 3 days of monitoring were typical of San Diego, sunny and calm 76-80<sup>o</sup>F.
2. Equipment used: B&K Analyzer Type 2250, a Type 1 meter, per ANSI S1.4.
3. Sound levels include park-related vehicular traffic.
4. Leq (dBA) stands for the equivalent (average) sound level using the "A"-filter.
5. Noisiest location at LEGOLAND Carlsbad, where a roller coaster (i.e., Dragon) is located close to property line.
6. Direct line-of-sight to operations
7. Includes park equipment noise.
8. At 50 feet from the curb.



**FIGURE 1: SOUND SURVEY LOCATIONS**