APPENDIX L

Navcon Engineering Noise Reports: Pier 400

APPENDIX L1

Navcon Engineering Report No. 51513-1: Pier 400 Noise Study (August 2005)

Pacific Energy Pier 400 Project
Noise Study - August 2005

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I. Administrative Information

- Project Name: Pacific Energy Pier 400 Project

- End Client: Pacific Energy Partners, L.P. (Pacific)
  Project Manager: Nestor Taura

- Project Location: Port of Los Angeles
  Project Manager: Robel Afewerki

- Project Engineering: SPEC Services, Inc.
  Project Manager: Ed Gienger

- This project was conducted under SPEC Services Inc. Sub-Contract Agreement with Navcon Engineering dated June 14th, 2005

II. Pier 400 Project Description

- Pacific Energy Partners, L.P. (Pacific) proposes to develop a deep-water petroleum bulk liquids marine offloading facility at Berth 408, Pier 400 in the Port of Los Angeles (POLA). In addition, storage and distribution facilities are proposed on Pier 400 and Terminal Island, with pipelines connecting to local refineries and existing distribution systems.

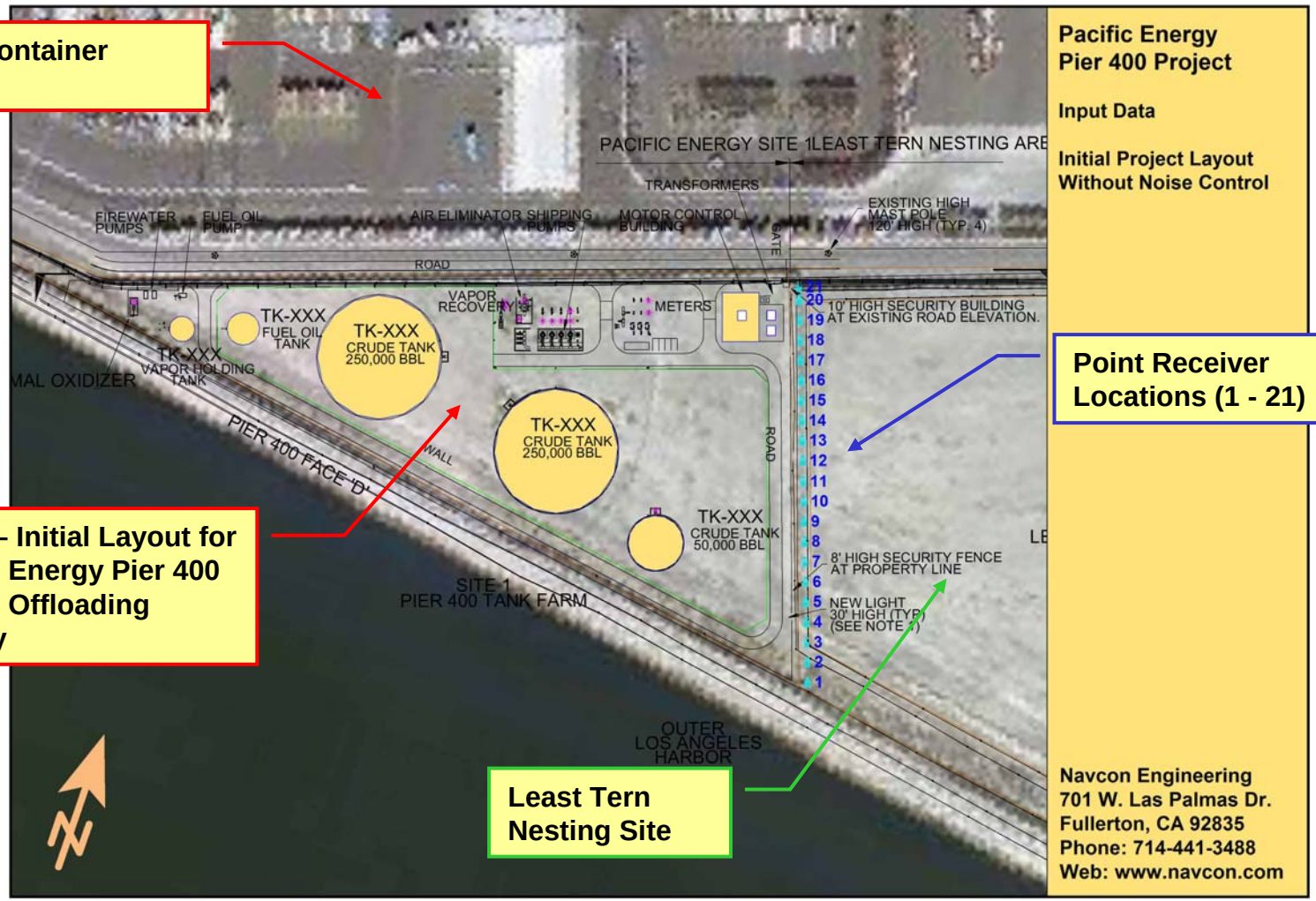
- The pumping and terminal facility on Pier 400 is referred to as Site 1 (see ***Aerial Photo 1***) . It encompasses approximately 10 acres. Site 1 is bounded by the south face (Face D) of Pier 400, the Pier 400 access road and the Least Tern nesting area. The facility will contain two (2) 250,000 barrel and one (1) 50,000 barrel internal floating roof storage tanks, one (1) 15,000 barrel MGO fixed roof fuel tank, receiving and discharge manifolds, metering, shoreside cargo offload assist pumps (Shore-side Pumps), pipeline pigging facilities, electrical substation, and other related equipment. The facility will operate predominately when crude oil tankers are discharging their cargos at the new Berth 408.

Aerial Photo 1, Site Plan

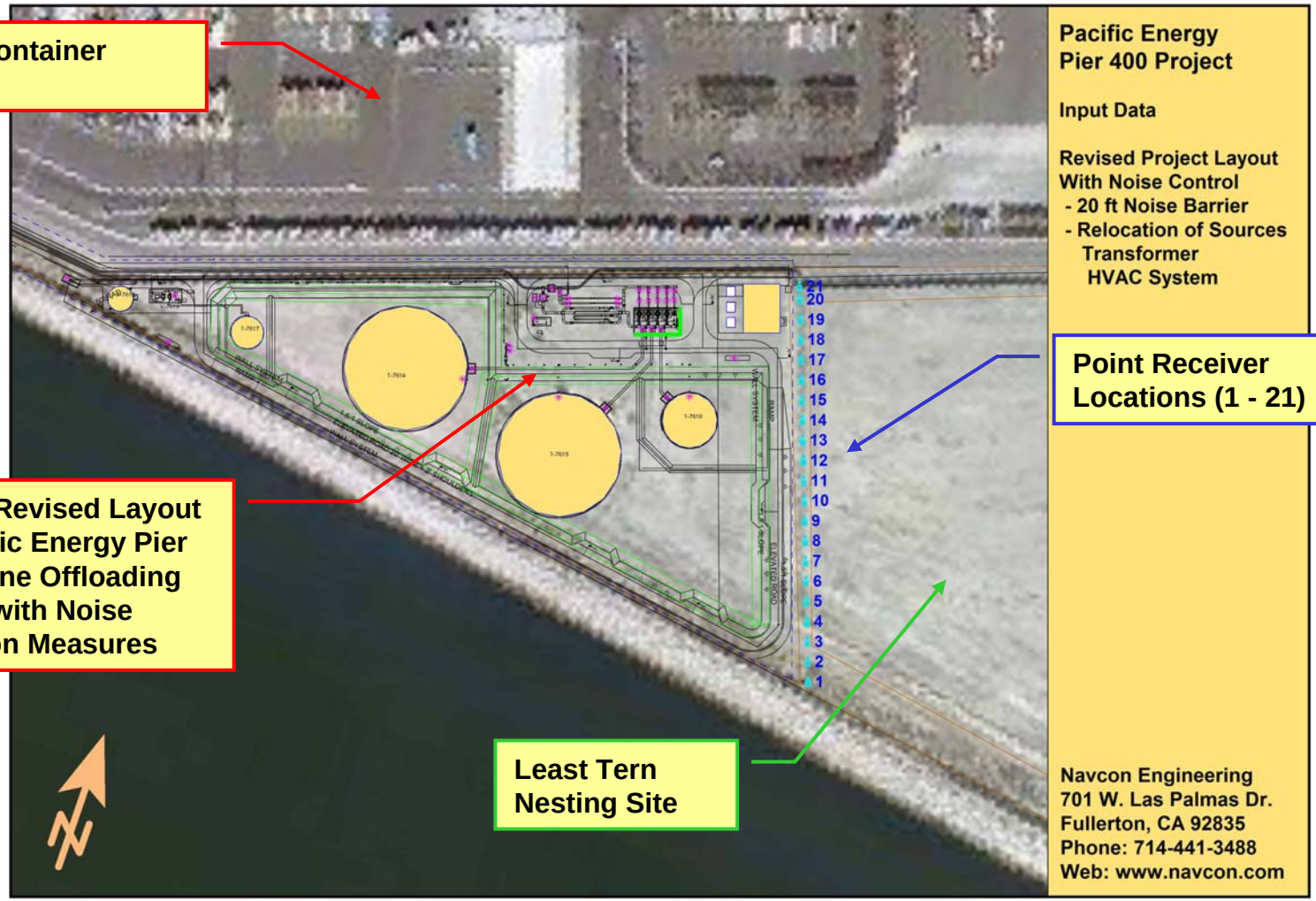
III. Introduction

- This document summarizes the results of the Pacific Energy Pier 400 Project **Noise Study**.
- The ***principal objectives*** were (**1**) to predict the noise impact from the Pacific Energy Pier 400 Project into the Least Tern Nesting Site and (**2**) to develop mitigation measures to reduce the noise impact (if required).
- The technical approach included (**1**) the development of a three dimensional (3D) noise model of the project area and (**2**) the calculation of noise contours and noise levels at discrete locations.
- This report summarizes the results from two noise analyses:
  - Original Project Layout (refer to ***Graphic 1***)
  - Revised Project Layout with noise mitigation measures (refer to ***Graphic 2***)
- The project was conducted by Hans Forschner and Jim Steedman of Navcon Engineering under the guidance of Ed Gienger, Project Manager, Spec Services.

Graphic 1, Site Plan – Original Site Layout



Graphic 2, Site Plan – Revised Site Layout with Noise Control



IV. Noise Model

The two noise models were created using the noise modeling software, SoundPLAN. The original facility configuration is shown in ***Graphic 3***.

The revised facility configuration is shown in ***Graphic 4***. The mitigation measures included:

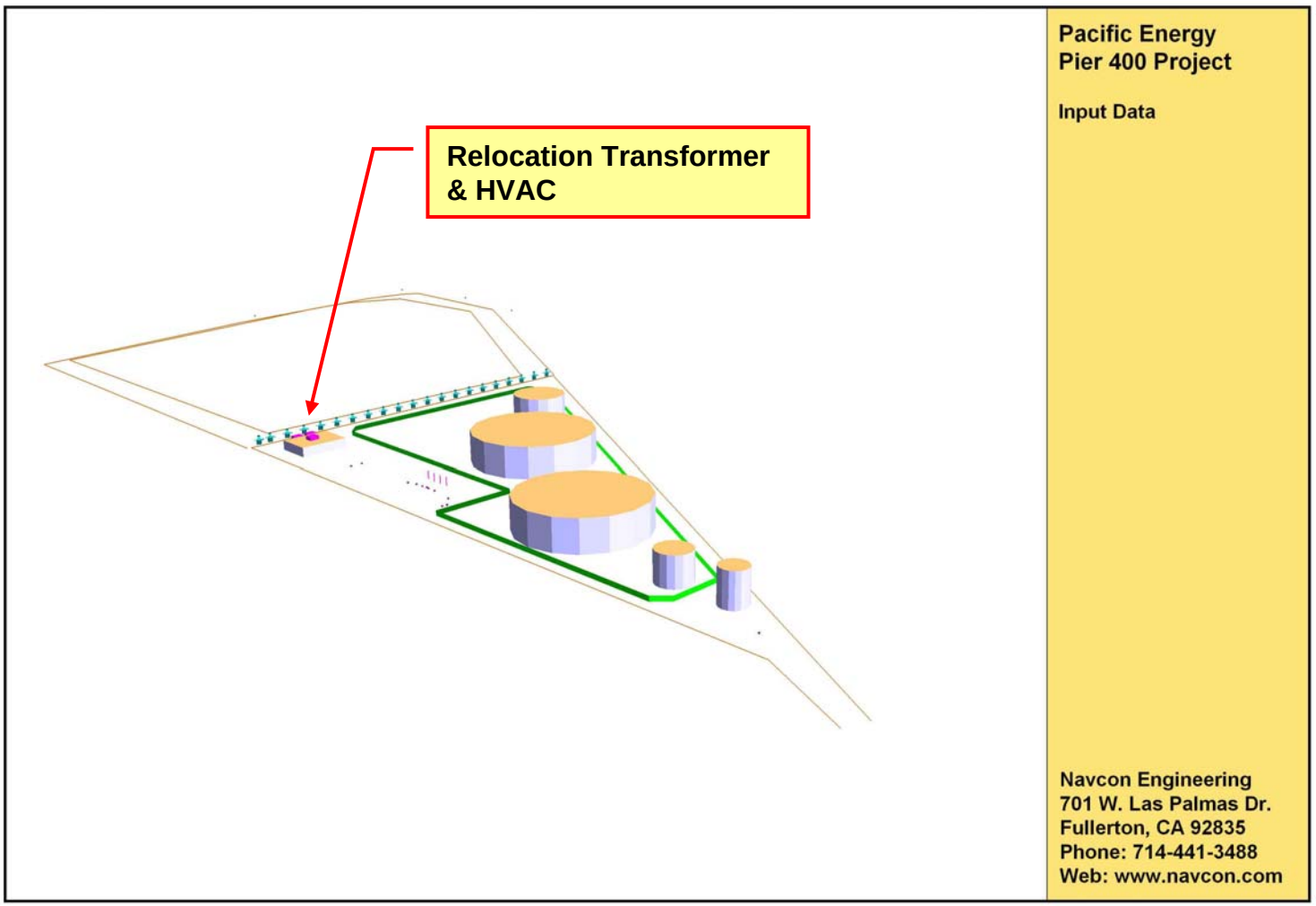
- a noise barrier (20' High by 120' Long) on the South and East Side of the shipping pumps (WPII)
- the Relocation of the two Transformers to the West of the Control Building
- the relocation of the HVAC System to the West of the Control Building

The model parameters were as follows:

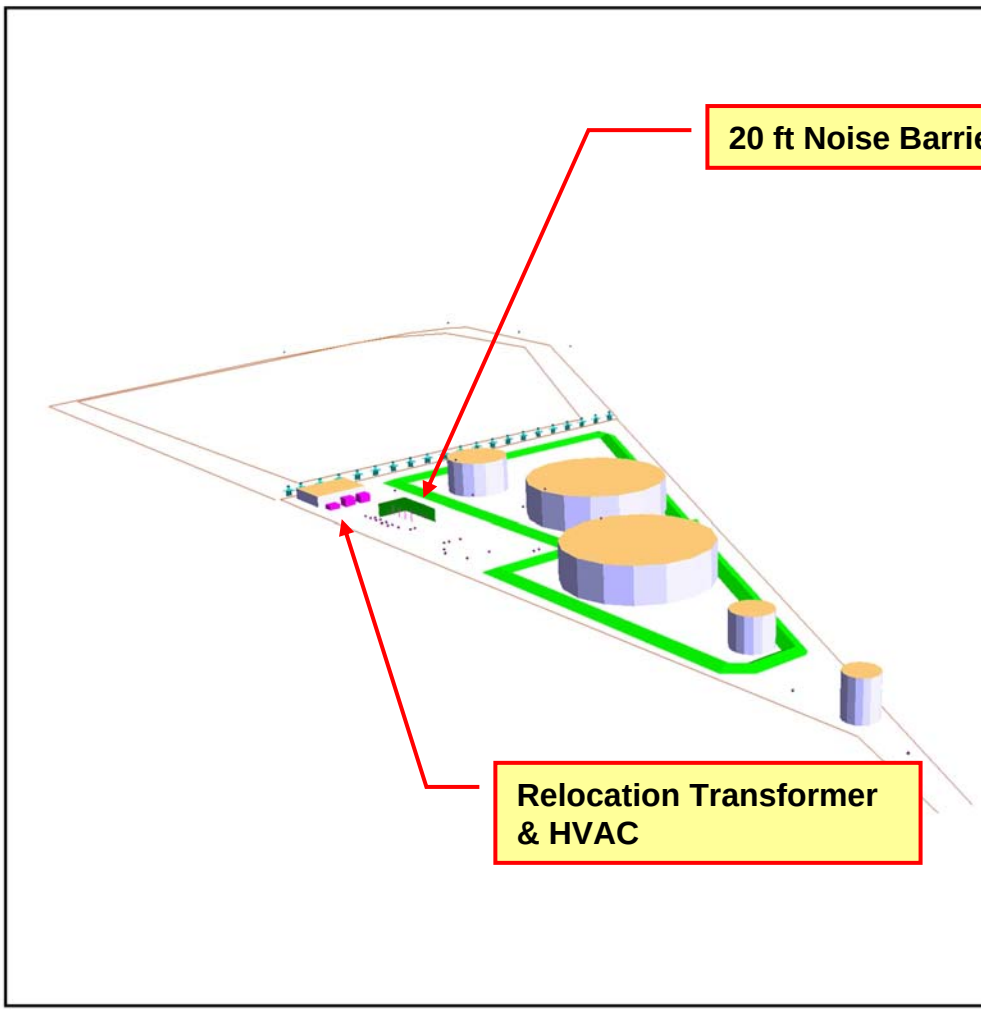
- the ground was modeled with an absorption coefficient of 0.2.
- the sides of the tanks, buildings, etc. were modeled as reflective surfaces and also as diffractive bodies (see the blue shaded areas).
- the noise producing equipment were modeled as point, line & area sources (see the red shaded objects).

The noise source data is presented in **Table 1**.

Graphic 3, 3D Site Plan – Original Facility Layout (without Noise Control)



Graphic 4, 3D Site Plan – Revised Facility Layout (with Noise Control)



Pacific Energy
Pier 400 Project

Input Data

Revised Project Layout
With Noise Control
- 20 ft Noise Barrier
- Relocation of Sources
  Transformer
  HVAC System

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Table 1, Marine Offloading Facility Noise Source Data

Source Number	Source Description	Source Type	Number of Sources	Number of Active Sources	Sound Power Level [dBA]
1	Thermal Oxidizer Air Blower	Point	1	1	97.9
2	Fuel Oil Pump, Motor Driver	Point	1	- - -	105.4
3	Valve Actuator	Point	8	1	92.8
4	Air Eliminator Air Release Valve	Point	1	1	93.5
5	Shipping Pump WPII - Load	Line	4	4	107.0
6	Stripping Pump Motor Driver	Line	1	- - -	89.2
7	Motor Control Bldg, Air Handler	Area	1	1	93.5
8	Transformer	Area	2	2	88.1
9	Air Blower Motor	Point	2	2	103.8
10	Valve Actuator	Point	12	1	91.8
11	Control Valve	Point	5	4	93.8
12	Sampler Motor Driver	Point	1	1	103.9
13	Separator Pump Motor Driver	Point	2	- - -	103.2

Note: The noise model represents a Worst Case Scenario (i.e., the highest predicted noise levels). Number of Active Sources are those sources which were included in the Worst Case Scenario calculation.

V. Single Point Receiver - Noise Level Predictions

Noise level predictions were made along the common property line between the Marine Offloading Facility and the Least Tern Nesting Site at the 21 receiver locations shown in ***Graphics 1 & 2***.

The predicted noise levels for both the original facility configuration (i.e., without noise control) and the revised facility configuration (i.e., with noise control) are summarized in ***Table 2***.

The last column shows the predicted noise level reductions range from 8.1 dBA to 19.6 dBA with the implementation of the mitigation measures.

Table 2, Predicted Overall A-Weighted Sound Pressure Levels

Receiver	Sound Pressure Level [dBA]		
	Original Facility Layout	Revised Facility Layout	Noise Reduction
East Property 1	54.0	40.7	13.3
East Property 2	55.5	40.4	15.1
East Property 3	55.9	41.5	14.4
East Property 4	56.4	42.1	14.3
East Property 5	56.9	43.1	13.8
East Property 6	57.3	43.0	14.3
East Property 7	57.7	42.5	15.2
East Property 8	58.1	45.6	12.5
East Property 9	58.6	47.8	10.8
East Property 10	59.0	48.3	10.7
East Property 11	59.4	49.0	10.4
East Property 12	59.8	49.8	10.0
East Property 13	60.3	51.0	9.3
East Property 14	61.6	52.0	9.6
East Property 15	61.9	53.8	8.1
East Property 16	65.4	55.3	10.1
East Property 17	71.4	56.9	14.5
East Property 18	65.3	55.2	10.1
East Property 19	64.5	44.9	19.6
East Property 20	62.8	45.1	17.7
East Property 21	63.0	47.2	15.8

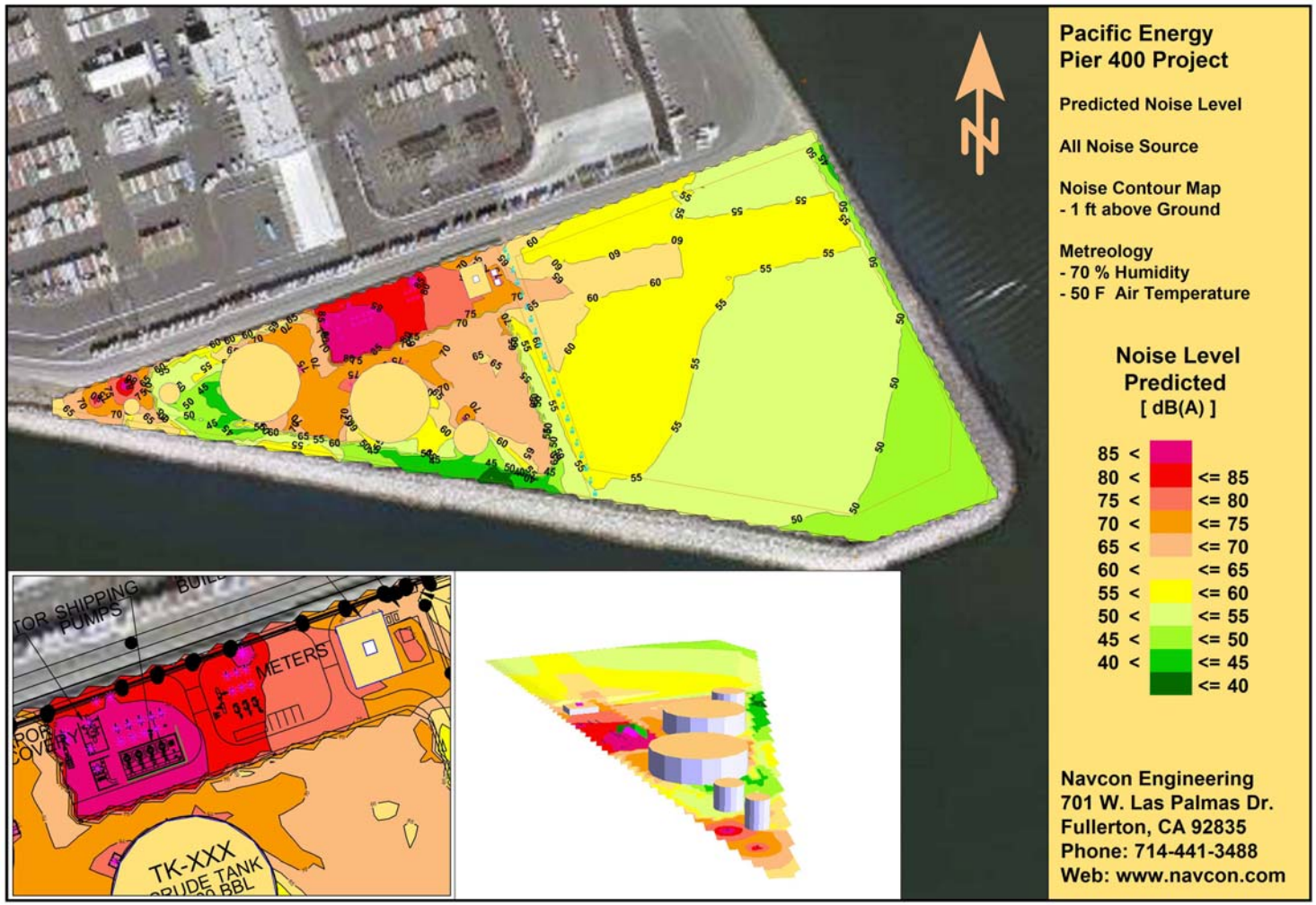
VI. Noise Contour Maps

To visualize the noise impact throughout the Least Tern nesting site, noise contour maps were computed with a receiver height of 1 ft. above the ground.

- **Graphic 5**, Noise Contour Map (Original Facility Layout without Noise Control)
  - 49% of the nesting area is impacted between 50 dBA & 55 dBA
  - 34% of the nesting area is impacted between 55 dBA & 60 dBA
  - 7% of the nesting area is impacted between 60 dBA & 65 dBA
  - 1% of the nesting area is impacted over 65 dBA
- **Graphic 6**, Noise Contour Map (Revised Facility Layout with Noise Control)
  - 65% of the nesting area is impacted between 40 dBA & 45 dBA
  - 31% of the nesting area is impacted between 45 dBA & 50 dBA
  - 3.5% of the nesting area is impacted between 50 dBA & 55 dBA
  - .5% of the nesting area is impacted over 55 dBA

Figure 1 shows the noise impact distribution for the Least Tern nesting area.

Graphic 5, Noise Contour Map – Original Layout without Noise Control



Graphic 6, Noise Contour Map – Revised Layout with Noise Control

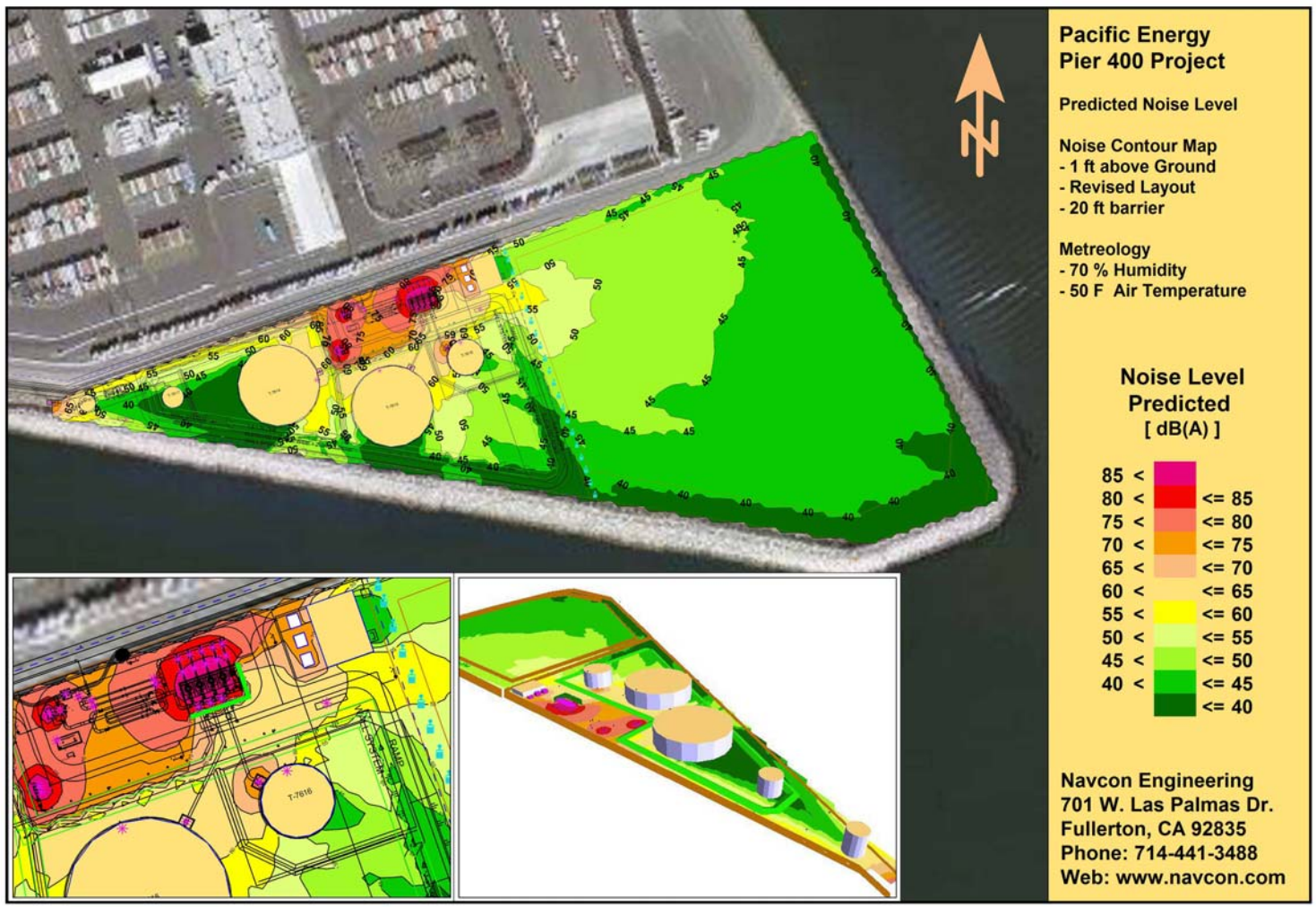
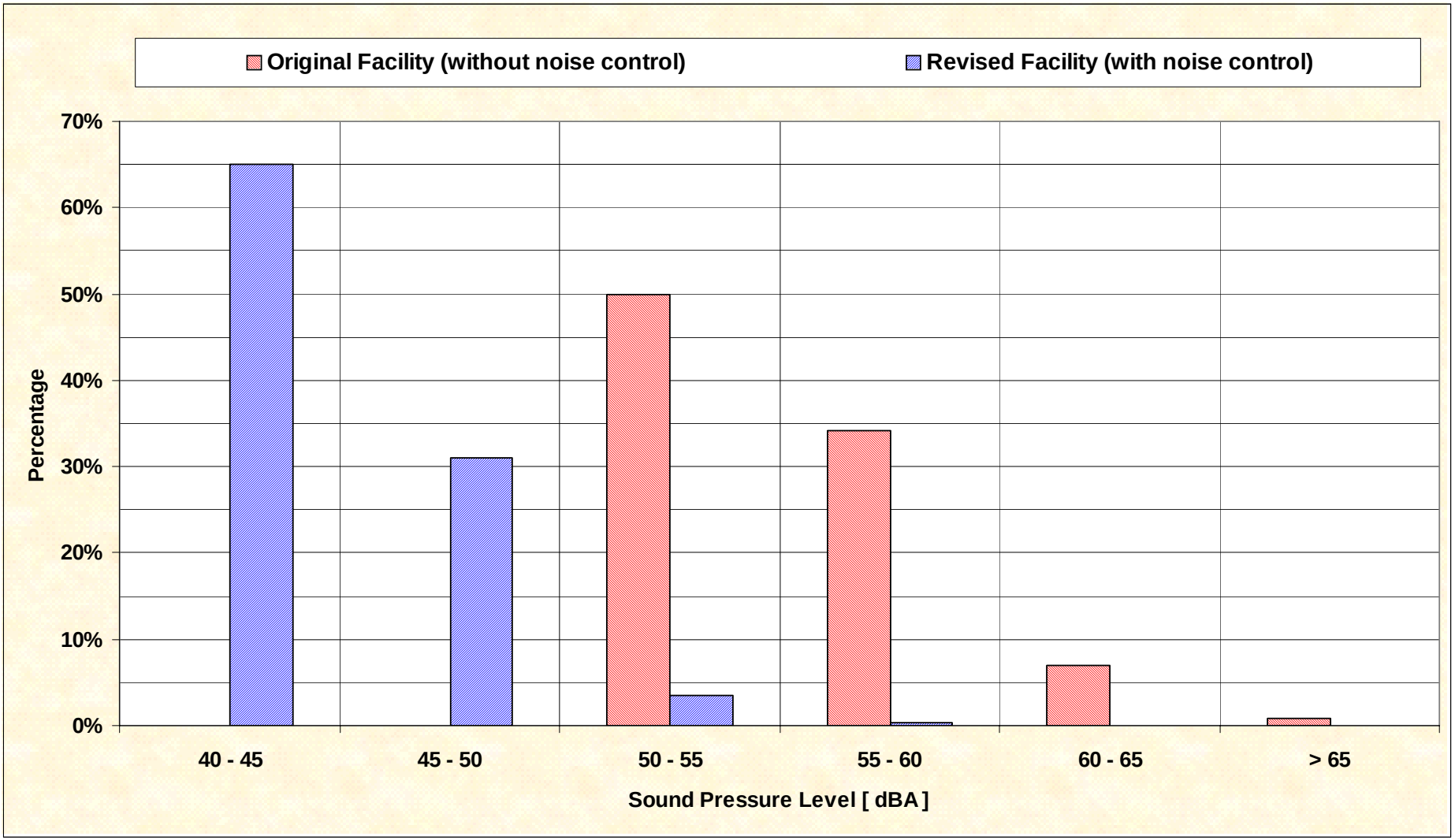


Figure 1, Noise Contour Map Assessment



VII. Summary of Results

- The noise study indicates that original facility layout would represent a significant noise impact to the Least Tern Nesting Area.
- Noise control measures were developed and incorporated into the noise model (Revised Facility Layout). The noise control measures included a 20 ft. high noise barrier and the relocation of two transformers and one HVAC system.
- The noise control measures reduced the predicted noise impact along the East property line of the Marine Offloading Facility by 8.1 to 19.6 dBA.
- The control measures will significantly reduce the noise impact throughout the Least Tern Nesting Area. With the revised facility layout and noise control measures, the noise impact to 96% of the nesting area will be below 50 dBA. The noise impact to 65% of the nesting will be below 45 dBA.

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APPENDIX L2

Navcon Engineering Report No. 51513:
Pier 400 Noise Monitoring Survey

Navcon Engineering Report No. 51513

Pacific Energy Pier 400 Project
Noise Monitoring Survey - August 2005

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Aerial Photo 1, Noise Monitoring Location Plan View

III. Introduction

- This document summarizes the results of the Pacific Energy Pier 400 Project **Noise Monitoring Survey**.
- The ***principal objective*** was to document the current ambient noise environment along the East perimeter of the proposed Pacific Energy Pier 400 Project (adjacent to the Least Tern Nesting Site) prior to construction of the offloading facility. The ambient environment was to be characterized in terms of the statistical noise descriptors.
- The project was conducted by Hans Forschner and Jim Steedman of Navcon Engineering under the guidance of Ed Gienger, Project Manager, Spec Services.

IV. Test Instrumentation

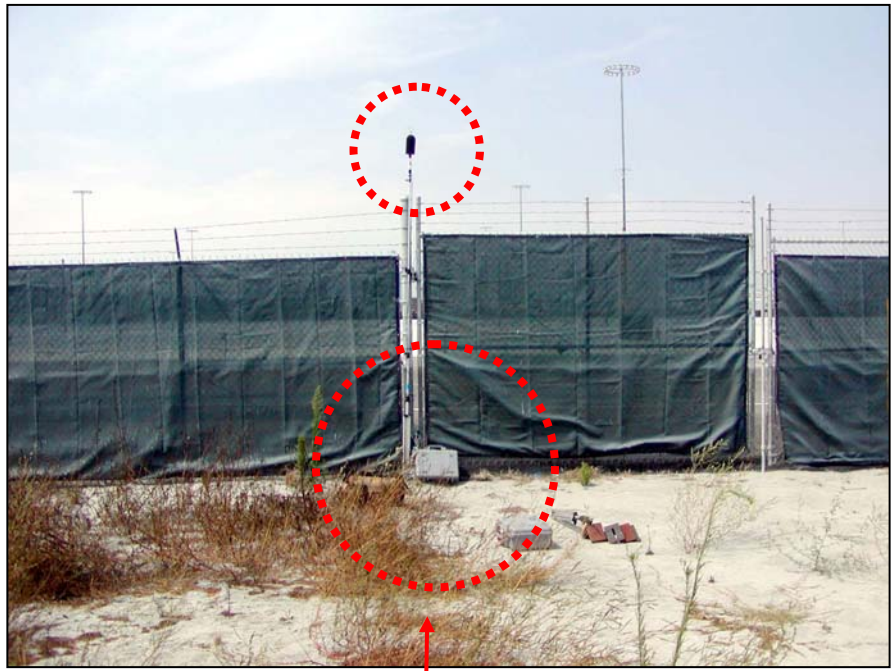
- The noise monitoring survey was conducted using two outdoor noise monitoring stations (NMS). Each NMS was based upon a Larson-Davis Model 824 sound level analyzer housed in an environmental enclosure, a Larson-Davis Model PRM902 preamplifier, a Larson-Davis Model 2541 outdoor microphone, a wind screen and bird spikes.
- The test instrumentation systems meet the American National Standards Institute (ANSI) S1.4, 1983 specification for Type I (Precision) sound level meters. An end-to-end system calibration measurement was made immediately prior to and following the measurement session using a National Institute of Standards Technology (NIST) traceable Bruel & Kjaer Model 4228 pistonphone.

V. Environmental Noise Monitoring Survey

- The noise monitoring survey was conducted August 15th – August 22nd, 2005.
- NMS #1 was located on the North-East corner of the proposed offloading facility as shown in ***Aerial Photo 2*** and ***Photo Set 3***.
- NMS #2 was located on the South-East of the proposed offloading facility as shown in ***Aerial Photo 2*** and ***Photo 4***.
- The two NMS analyzers recorded the hourly statistical noise levels over the 7 day, 168 hour period. The statistical noise descriptors are defined in ***Table 1***.
- The hourly sound pressure level time histories are presented in ***Figure 1*** (L_{eq}, L_{max}, L_{min}) and ***Figure 2*** ($L_{1.66}$, L_{50}, L_{90}).
- The high-low distribution of the hourly data is summarized in ***Table 2***.
- The complete data set is documented in ***Table 3 - Table 10***.

Aerial Photo 2, Noise Monitoring Location Plan View

Photo Set 3, NMS #1, North-East Property Line Location

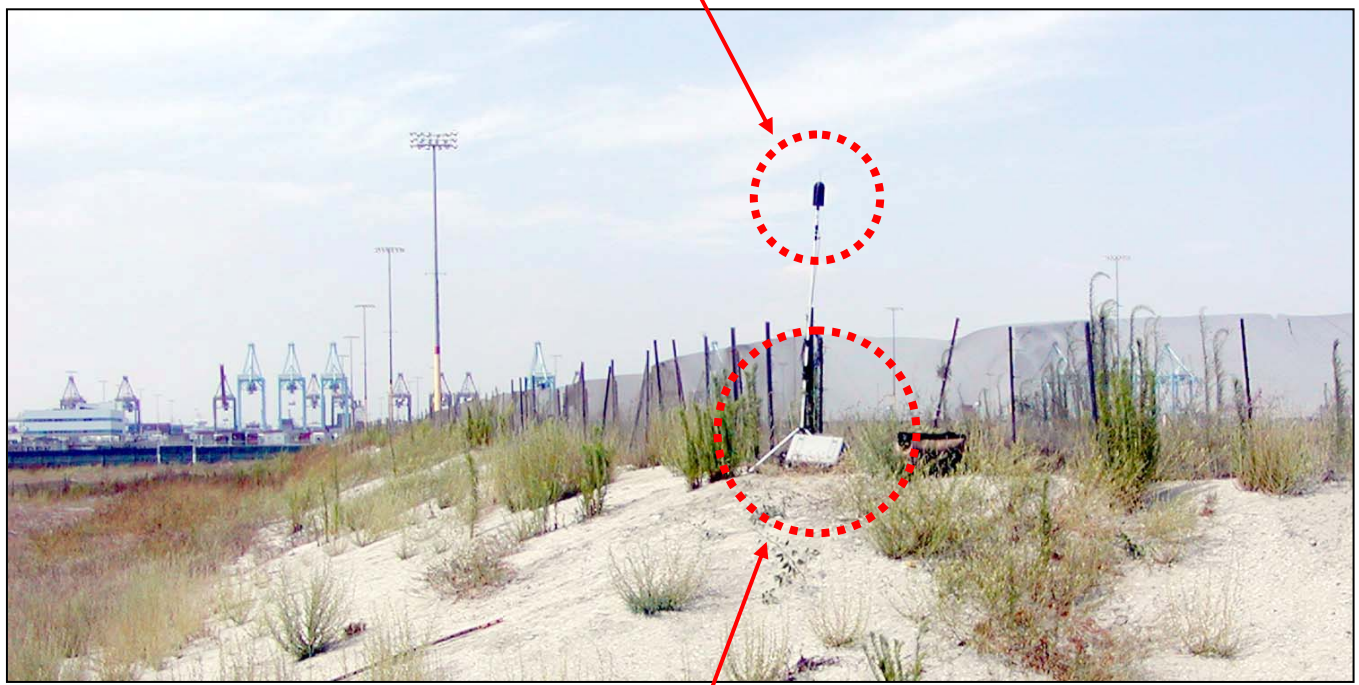


NMS #1 - Outdoor Microphone, Windscreen & Bird Spikes

NMS #1 – Environmental Enclosure with Sound Level Analyzer & Tripod

Photo 4, NMS #2, South-East Property Line Location

NMS #2 - Outdoor Microphone, Windscreen & Bird Spikes



NMS #2 – Environmental Enclosure with Sound Level Analyzer & Tripod

Table 1: Statistical Noise Descriptors

Statistical Descriptor	Discussion
Leq	The steady state sound pressure level which contains the same amount of acoustical energy as the fluctuating level over the sample period. It is the time weighted, mean square sound pressure level.
Lmax	The steady state sound pressure level which is exceeded 0% of the time during the sample period . The **Lmax Level** can be attributed to a single event such as a car passing by or an aircraft fly over.
L1.6	The steady state sound pressure level which is exceeded 1.6% of the time during the sample period (**equivalent to 1 minute per hour**). The L1.6 Level is often used as a measure in community noise regulations.
L8.3	The steady state sound pressure level which is exceeded 8.3% of the time during the sample period (**equivalent to 5 minutes per hour**). The L8.3 Level is often used as a measure in community noise regulations.
L25	The steady state sound pressure level which is exceeded 25% of the time during the sample period (**equivalent to 15 minutes per hour**). The L25 Level is often used as a measure in community noise regulations.
L50	The steady state sound pressure level which is exceeded 50% of the time during the sample period (**equivalent to 30 minutes per hour**). The L50 Level is often used as the base measure in community noise regulations.
L90	The steady state sound pressure level which is exceeded 90% of the time during the sample period (**equivalent to 54 minutes per hour**). L90 Level is often used as a measure of the true “ambient” noise level.
L99	The steady state sound pressure level which is exceeded 99% of the time during the sample period (**equivalent to 59 minutes and 55 seconds per hour**).
Lmin	The steady state sound pressure level which is exceeded 100% of the time during the sample period (**equivalent to 60 minutes per hour**). Lmin is the lowest level measured during the sample period.

Figure 1, Hourly Sound Pressure Level Time Histories (L_{eq}, L_{max}, L_{min})

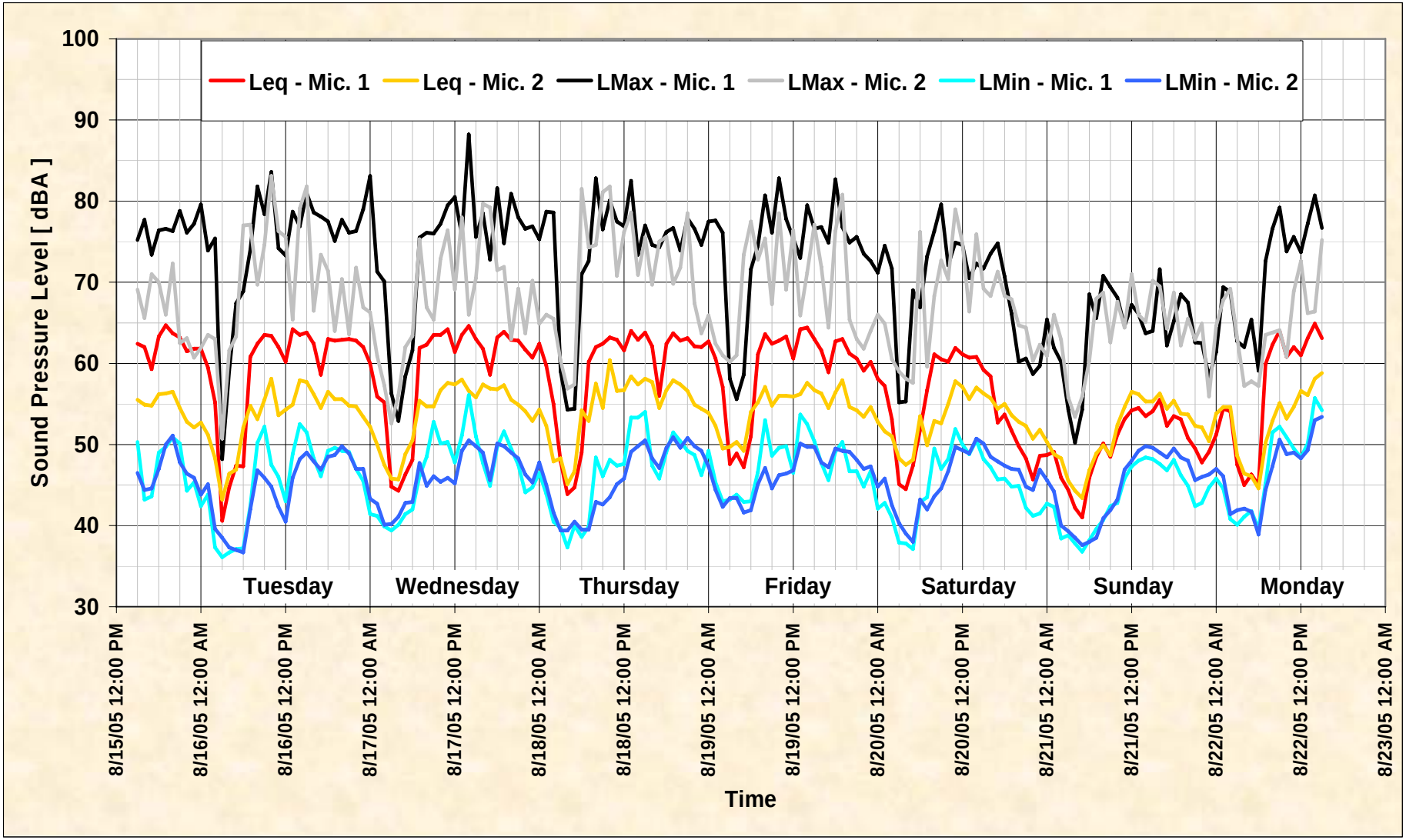


Figure 2, Hourly Sound Pressure Level Time Histories ($L_{1.66}$, L_{50}, L_{90})

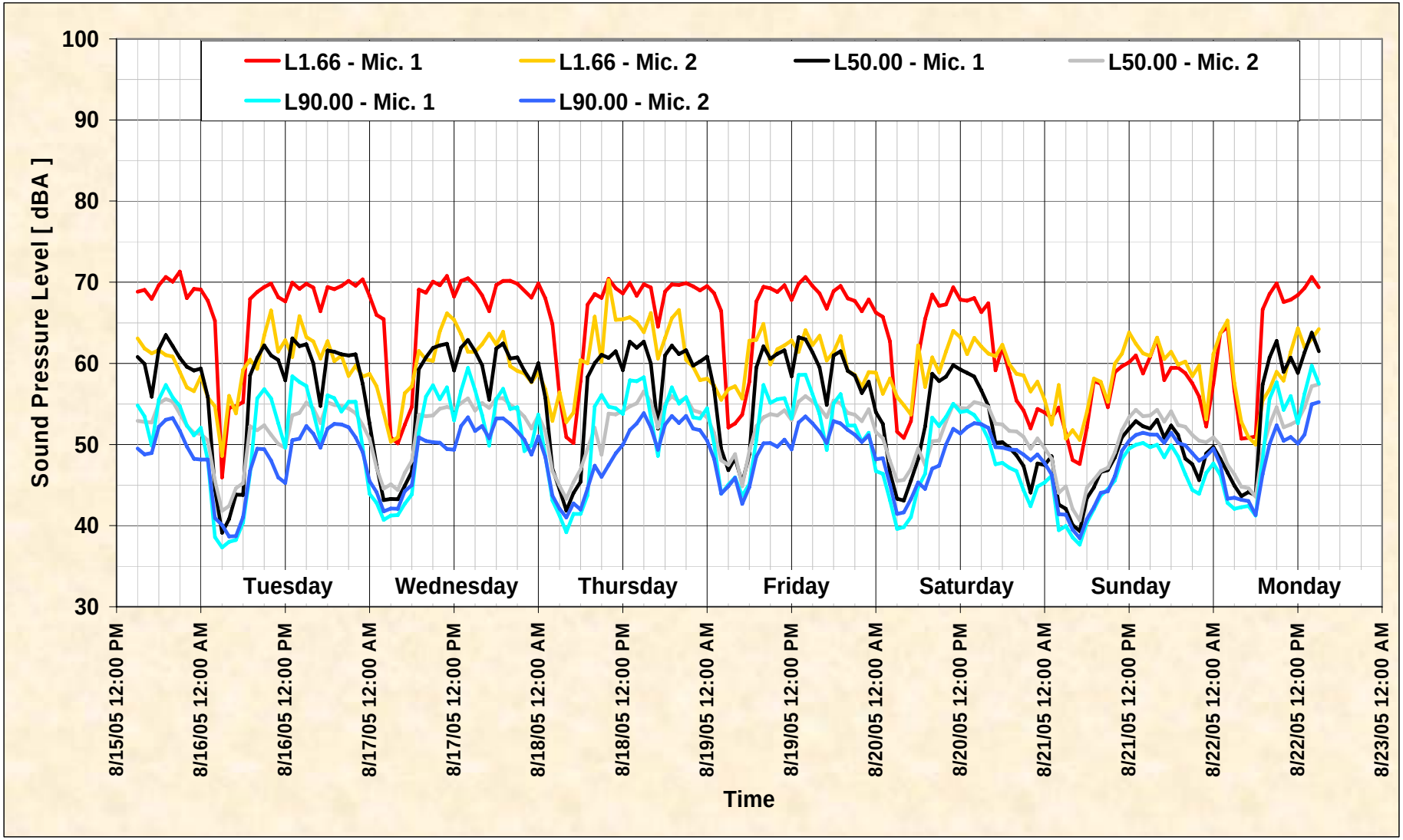


Table 2, Current Ambient Noise Level Summary

	Noise Monitoring Station # 1								
	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
Average	57.1	45.9	71.8	64.0	60.6	57.5	54.7	49.9	47.2
Max	64.9	56.1	88.2	71.3	68.1	65.8	63.8	59.7	57.3
Min	40.6	36.1	48.2	45.9	43.8	41.3	39.1	37.3	36.3
Max- Min	24.3	20.0	40.0	25.4	24.3	24.6	24.6	22.4	21.0

	Noise Monitoring Station # 2								
	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
Average	53.5	45.6	67.7	59.7	56.4	53.6	51.4	48.5	46.7
Max	60.4	53.4	83.1	70.3	64.7	59.0	57.4	55.2	54.1
Min	43.2	36.7	50.7	48.6	46.5	43.9	40.6	38.5	37.2
Max- Min	17.2	16.7	32.4	21.7	18.2	15.1	16.8	16.8	16.9

- ***Table 2*** summarizes the maximum, minimum and average noise levels recorded during the 7 day noise survey. The data is presented graphically in ***Figure 3 & 4***.
- The results indicate that the noise environment is strongly dependant on the activities in the Pier 400 Terminal.
- The background noise level (L_{90}) fluctuated by approximately 22 dBA at NMS #1 and 17 dBA at NMS #2. The average noise level (L_{50}) fluctuated by approximately 24 dBA at NMS #1 and 17 dBA at NMS #2.

Figure 3, Current Ambient High-Low Average Distribution – NMS #1

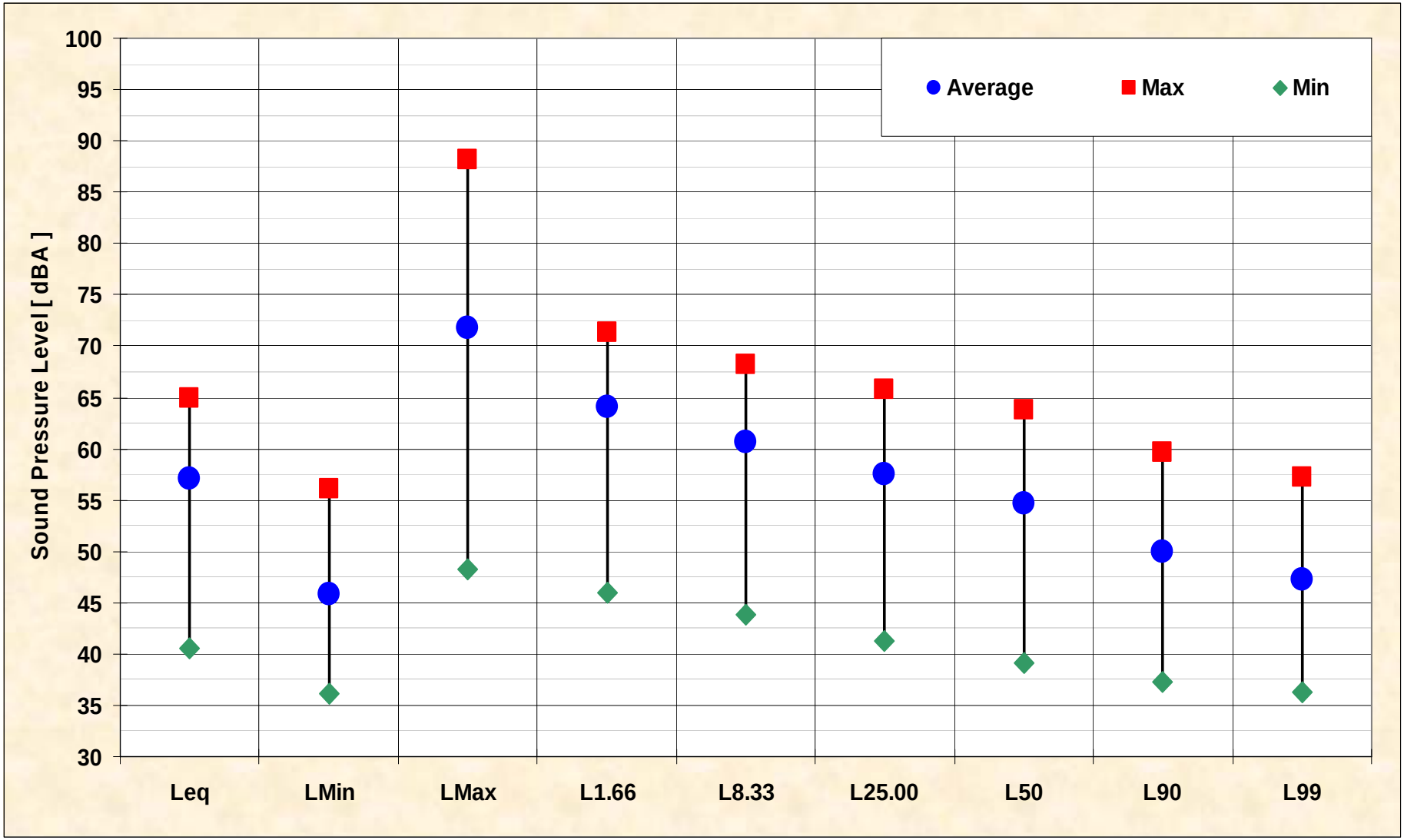


Figure 4, Current Ambient High-Low Average Distribution – NMS #2

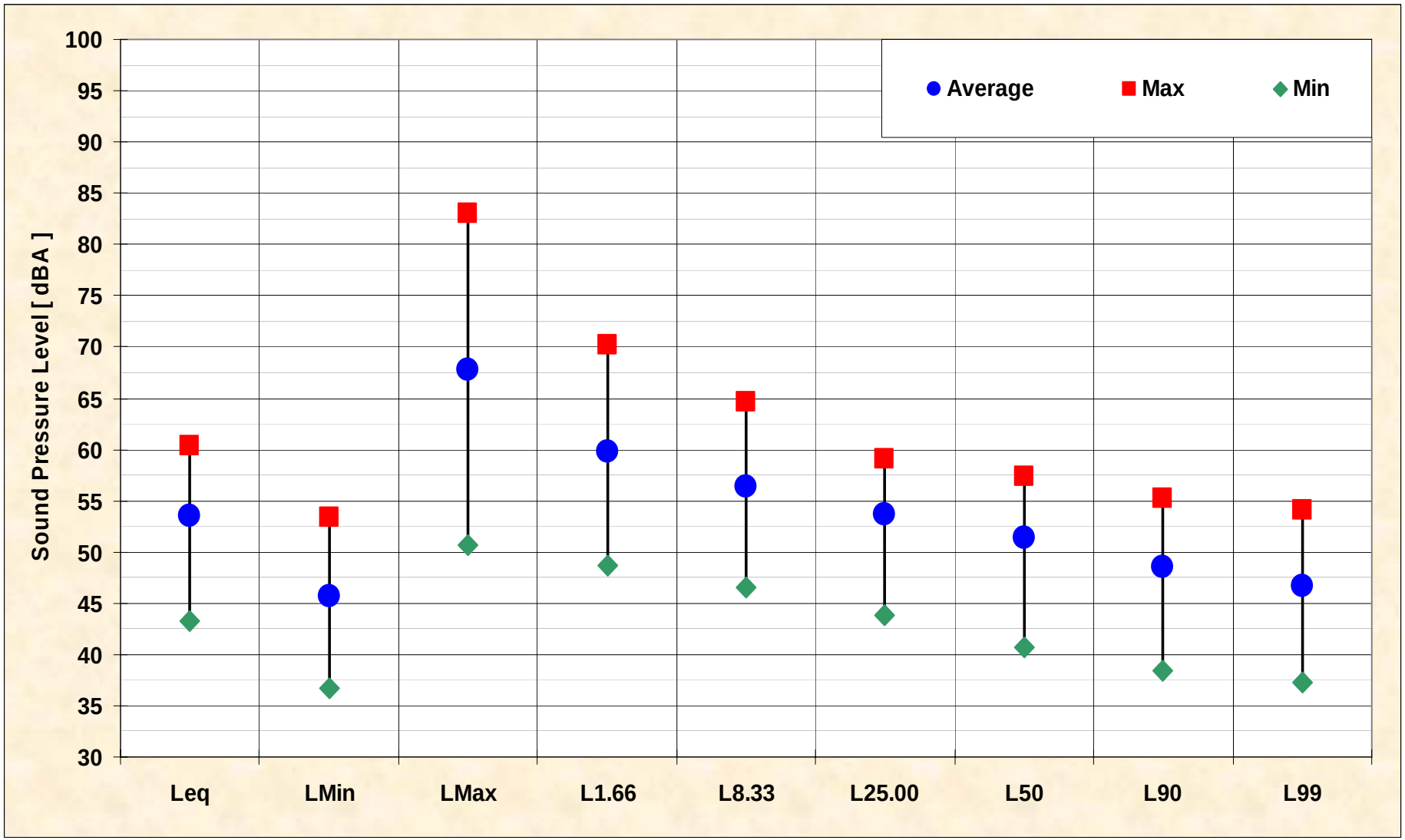


Table 3: Statistical Noise Data August 15th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**
8/15/05 3:00 PM	62.4	50.3	75.2	68.8	66.1	63.4	60.8	54.8	51.6	55.5	46.5	69.1	63.1	59.2	55.7	52.9	49.5	47.7
8/15/05 4:00 PM	62.0	43.2	77.7	69.1	65.7	62.9	59.9	53.5	45.5	54.9	44.4	65.6	61.8	58.9	55.6	52.8	48.8	45.9
8/15/05 5:00 PM	59.3	43.6	73.4	67.9	63.2	59.6	55.9	49.8	46.0	54.8	44.6	71.0	61.2	58.3	55.3	52.7	48.9	46.3
8/15/05 6:00 PM	63.3	49.0	76.4	69.6	66.9	64.3	61.7	55.5	51.7	56.2	47.0	70.0	61.6	59.3	56.9	55.1	52.2	50.0
8/15/05 7:00 PM	64.7	49.7	76.6	70.6	68.1	65.8	63.5	57.3	51.0	56.3	50.0	66.0	61.0	58.9	57.0	55.6	53.1	51.1
8/15/05 8:00 PM	63.7	50.9	76.3	70.1	67.4	64.8	62.1	55.8	51.6	56.5	51.1	72.3	60.8	58.4	56.6	55.3	53.2	51.8
8/15/05 9:00 PM	63.2	50.1	78.8	71.3	66.7	63.7	60.7	54.7	51.3	54.5	47.8	62.5	58.9	56.9	55.0	53.8	51.7	49.6
8/15/05 10:00 PM	61.5	44.3	76.1	68.1	65.2	62.6	59.6	52.3	46.4	52.8	46.4	63.1	57.1	54.9	53.5	52.3	49.8	47.4
8/15/05 11:00 PM	61.8	45.3	77.2	69.2	65.8	62.7	59.1	51.1	47.3	52.1	45.9	60.7	56.6	54.8	53.1	51.4	48.2	46.4
8/16/05 12:00 AM	61.8	42.4	79.6	69.1	65.5	62.6	59.4	52.0	46.2	52.7	43.8	61.9	58.4	56.1	53.5	51.3	48.1	45.1

Table 4: Statistical Noise Data August 16th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
8/16/05 1:00 AM	59.5	43.8	73.9	67.7	63.9	60.2	55.9	48.1	45.1	51.2	45.1	63.5	55.8	53.6	52.1	50.5	48.1	46.1
8/16/05 2:00 AM	55.2	37.3	75.4	65.2	60.4	52.4	44.5	38.6	37.4	48.3	39.6	63.0	54.7	52.3	50.1	45.5	40.9	39.8
8/16/05 3:00 AM	40.6	36.1	48.2	45.9	43.8	41.3	39.1	37.3	36.3	43.2	38.5	50.7	48.6	46.5	43.9	41.8	40.1	39.1
8/16/05 4:00 AM	44.7	36.7	59.1	54.5	47.9	43.2	40.8	38.0	37.1	46.4	37.3	61.6	56.0	50.0	45.4	42.4	38.7	37.5
8/16/05 5:00 AM	47.4	37.1	67.4	54.7	49.5	46.8	43.8	38.2	37.1	46.9	37.0	63.3	53.8	50.7	47.7	44.6	38.7	37.2
8/16/05 6:00 AM	47.3	37.2	68.9	55.2	50.8	46.3	43.8	40.4	37.6	52.1	36.7	77.0	59.2	54.8	49.4	45.2	41.1	38.2
8/16/05 7:00 AM	60.8	42.4	74.0	67.9	65.0	62.2	58.5	46.4	43.5	54.8	42.0	77.1	60.5	56.3	54.2	52.3	46.8	43.5
8/16/05 8:00 AM	62.4	50.2	81.8	68.8	65.7	63.3	60.7	55.7	52.5	53.1	46.8	69.7	59.3	55.3	53.1	51.8	49.5	48.1
8/16/05 9:00 AM	63.5	52.2	78.4	69.4	66.8	64.6	62.2	56.8	53.7	55.5	45.9	74.6	63.4	57.6	54.5	52.4	49.4	47.5
8/16/05 10:00 AM	63.4	47.5	83.6	69.8	66.4	63.5	61.0	55.7	51.6	58.1	44.8	83.1	66.5	59.5	54.4	51.2	48.0	46.0
8/16/05 11:00 AM	62.0	46.0	74.2	68.2	65.9	63.2	60.4	52.6	47.6	53.6	42.3	76.3	61.5	55.6	52.2	50.1	45.9	43.3
8/16/05 12:00 PM	60.2	43.0	73.3	67.6	64.2	61.5	57.9	49.6	45.2	54.3	40.5	75.6	62.9	56.7	53.0	49.6	45.3	42.4
8/16/05 1:00 PM	64.2	48.8	78.7	70.0	67.3	65.2	63.1	58.4	52.0	54.9	45.9	65.4	60.8	57.9	55.6	53.6	50.5	48.1
8/16/05 2:00 PM	63.5	52.5	76.9	69.2	66.8	64.4	62.1	57.7	54.5	57.9	48.2	79.1	65.8	59.9	56.7	53.9	50.7	49.1
8/16/05 3:00 PM	63.8	51.5	81.0	69.8	67.1	65.0	62.4	57.2	53.5	57.7	49.0	81.8	63.3	60.3	57.5	55.2	52.3	50.3
8/16/05 4:00 PM	62.4	48.3	78.6	69.3	66.3	63.4	60.0	53.9	50.8	56.2	47.9	66.5	62.7	59.8	56.9	54.5	51.3	49.1
8/16/05 5:00 PM	58.6	46.1	78.1	66.4	62.5	58.6	54.8	50.4	47.7	54.5	46.9	73.4	60.6	57.6	54.9	52.6	49.6	48.1
8/16/05 6:00 PM	63.0	49.2	77.5	69.4	66.5	64.0	61.6	56.1	52.0	56.5	48.5	71.4	62.7	59.0	56.8	55.2	52.0	50.2
8/16/05 7:00 PM	62.8	49.6	75.1	69.1	66.5	63.8	61.4	55.7	52.2	55.6	48.7	64.0	60.3	58.0	56.2	54.9	52.5	50.8
8/16/05 8:00 PM	62.9	49.2	77.7	69.6	66.4	64.0	61.1	54.1	50.6	55.6	49.8	70.4	60.9	58.0	56.1	54.8	52.5	51.0
8/16/05 9:00 PM	63.0	49.1	76.1	70.2	66.8	63.8	61.0	55.2	50.6	54.8	48.9	63.6	58.5	56.9	55.7	54.4	52.1	50.2
8/16/05 10:00 PM	62.8	47.0	76.3	69.6	66.4	63.8	61.1	55.3	51.0	54.7	47.0	71.8	59.7	57.3	55.4	53.9	50.9	49.0
8/16/05 11:00 PM	62.0	45.5	79.0	70.4	66.6	62.6	57.5	49.6	47.0	53.4	47.0	66.9	58.4	56.4	54.5	52.4	49.1	47.4
8/17/05 12:00 AM	60.0	41.4	83.1	68.3	64.5	60.5	52.6	43.9	42.1	52.2	43.3	66.3	58.7	55.7	53.1	50.7	45.5	44.1

Table 5: Statistical Noise Data August 17th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**
8/17/05 1:00 AM	55.9	41.2	71.3	66.0	61.1	53.4	47.4	42.8	41.5	50.0	42.7	60.9	57.2	54.0	50.6	47.1	44.1	43.1
8/17/05 2:00 AM	55.2	39.9	70.1	65.4	61.3	48.5	43.1	40.7	40.1	47.5	40.1	57.3	53.9	51.9	48.5	44.5	41.8	41.0
8/17/05 3:00 AM	44.8	39.4	56.3	50.9	48.8	44.7	43.3	41.2	40.1	45.8	40.2	52.6	50.3	48.7	46.8	45.1	42.1	40.5
8/17/05 4:00 AM	44.3	40.1	52.9	50.1	46.9	44.6	43.3	41.3	40.3	45.7	41.1	56.1	50.9	48.9	46.2	44.4	42.1	41.1
8/17/05 5:00 AM	46.3	41.4	58.4	52.4	49.0	47.0	44.9	42.7	41.6	48.8	42.8	62.0	56.3	52.2	48.6	46.5	44.2	43.2
8/17/05 6:00 AM	48.1	42.0	61.6	54.6	51.3	48.3	46.6	43.8	42.5	50.5	42.9	63.4	57.2	54.5	51.2	48.0	45.0	43.4
8/17/05 7:00 AM	61.9	46.1	75.5	69.1	65.7	63.1	59.3	51.4	47.3	55.4	47.7	75.3	61.5	57.8	55.5	53.7	50.9	49.0
8/17/05 8:00 AM	62.3	48.5	76.1	68.7	65.7	63.1	60.7	55.9	51.3	54.7	44.9	66.9	60.5	57.8	55.4	53.5	50.4	47.8
8/17/05 9:00 AM	63.5	52.8	76.0	70.1	67.0	64.3	61.9	57.3	54.5	54.7	46.1	65.4	60.3	57.8	55.6	53.6	50.3	48.0
8/17/05 10:00 AM	63.5	50.1	77.2	69.6	66.8	64.5	62.2	55.6	51.4	56.7	45.4	72.9	64.0	60.0	57.0	54.4	50.2	47.3
8/17/05 11:00 AM	64.2	50.3	79.5	70.8	67.7	65.1	62.4	57.0	53.2	57.6	45.9	76.4	66.2	60.2	57.3	54.6	49.4	47.0
8/17/05 12:00 PM	61.4	47.8	80.5	68.2	65.0	62.2	59.1	53.0	49.6	57.4	45.2	69.1	65.4	61.4	57.9	54.4	49.4	46.8
8/17/05 1:00 PM	63.5	51.1	75.8	70.2	66.9	64.3	62.0	56.6	53.2	58.0	49.2	78.0	63.6	60.3	57.6	55.1	52.3	50.4
8/17/05 2:00 PM	64.6	56.1	88.2	70.5	67.4	64.9	62.9	59.4	57.2	56.6	50.5	66.0	61.4	59.6	57.4	55.7	53.3	51.9
8/17/05 3:00 PM	63.0	51.0	75.6	69.6	66.4	63.8	61.5	56.7	53.6	55.8	49.8	70.5	61.4	58.6	56.2	54.2	51.7	50.3
8/17/05 4:00 PM	61.8	47.7	78.5	68.4	65.7	62.8	59.8	53.6	49.5	57.4	49.0	79.7	62.4	58.9	56.8	55.1	52.3	50.1
8/17/05 5:00 PM	58.6	44.9	72.8	66.4	62.6	59.0	55.5	49.8	47.0	56.9	45.6	79.2	63.7	59.7	56.9	54.5	50.8	48.2
8/17/05 6:00 PM	63.2	49.7	81.6	69.7	66.5	64.2	61.8	55.6	52.2	56.8	50.1	71.5	62.3	59.3	57.3	55.7	53.2	51.4
8/17/05 7:00 PM	63.9	51.6	74.8	70.2	67.6	65.1	62.4	56.9	53.4	57.3	49.8	71.9	63.9	60.3	57.3	55.7	53.2	51.3
8/17/05 8:00 PM	62.9	49.5	80.9	70.2	66.7	63.7	60.6	54.4	51.3	55.5	49.0	63.0	59.6	57.9	56.4	54.9	52.5	50.8
8/17/05 9:00 PM	62.8	47.5	78.0	69.8	66.6	63.7	60.7	54.6	49.5	54.9	48.3	69.2	59.1	57.3	55.7	54.3	51.6	49.5
8/17/05 10:00 PM	61.7	44.1	76.6	69.0	66.0	62.9	59.1	49.2	45.2	54.1	46.3	63.7	58.8	56.8	55.0	53.4	50.6	48.5
8/17/05 11:00 PM	60.7	44.7	76.9	68.1	65.0	61.5	57.7	49.9	46.2	52.9	45.3	70.2	57.7	55.5	53.9	52.0	48.8	46.4
8/18/05 12:00 AM	62.4	46.5	75.3	69.8	66.2	63.1	60.0	53.7	49.1	54.3	47.8	64.9	58.9	57.0	55.2	53.5	51.0	49.3

Table 6: Statistical Noise Data August 18th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
8/18/05 1:00 AM	59.7	43.9	78.7	68.0	63.7	60.2	55.7	48.6	44.5	52.3	45.0	66.0	56.8	54.9	53.4	51.7	48.4	46.3
8/18/05 2:00 AM	55.0	40.5	78.6	64.8	58.3	51.5	47.0	43.1	41.2	47.9	41.6	65.5	52.9	50.8	48.6	46.7	43.7	42.2
8/18/05 3:00 AM	47.9	39.7	59.0	55.9	52.3	48.0	44.5	41.2	40.1	48.3	39.4	60.3	56.4	53.1	47.8	44.9	42.1	40.5
8/18/05 4:00 AM	43.9	37.3	54.3	50.9	47.7	43.9	41.8	39.2	38.0	45.1	39.4	56.9	52.8	48.0	45.2	43.3	41.0	39.8
8/18/05 5:00 AM	44.7	40.0	54.4	50.2	46.9	45.5	44.0	41.5	40.2	46.7	40.5	57.4	53.9	49.3	47.0	45.4	42.8	41.3
8/18/05 6:00 AM	49.0	38.6	71.0	57.8	50.5	47.6	45.4	41.5	39.2	54.2	39.5	81.5	60.4	53.6	49.7	46.9	42.0	40.1
8/18/05 7:00 AM	60.2	39.9	72.6	67.2	64.3	61.6	58.3	43.7	40.5	52.9	39.5	74.3	60.1	54.6	51.8	49.5	44.6	40.9
8/18/05 8:00 AM	62.0	48.4	82.8	68.6	65.6	62.9	60.0	54.7	51.1	57.5	42.9	74.6	65.8	62.7	56.5	52.0	47.4	45.1
8/18/05 9:00 AM	62.4	46.1	76.5	68.1	65.6	63.2	61.1	56.1	51.4	54.5	42.6	81.1	60.2	54.7	51.1	48.8	46.0	43.9
8/18/05 10:00 AM	63.2	48.1	80.1	70.4	67.0	63.8	60.7	54.7	50.1	60.4	43.5	81.8	70.3	64.7	58.8	53.8	47.5	44.6
8/18/05 11:00 AM	62.9	47.4	77.5	69.3	66.5	64.0	61.5	54.5	49.1	56.6	45.1	70.8	65.4	59.8	56.5	53.7	48.9	46.4
8/18/05 12:00 PM	61.6	47.6	76.9	68.6	65.6	62.3	59.2	53.8	49.2	56.7	45.8	76.2	65.5	59.6	56.8	54.1	50.0	47.2
8/18/05 1:00 PM	64.0	53.3	82.5	69.9	67.0	64.7	62.7	57.9	55.1	58.4	49.1	78.6	65.7	61.0	57.5	54.7	51.8	50.2
8/18/05 2:00 PM	62.9	53.3	73.4	68.3	66.0	63.9	61.9	57.8	55.0	57.4	49.8	70.9	65.1	60.7	57.5	55.1	52.6	51.1
8/18/05 3:00 PM	63.8	54.0	77.0	69.7	67.1	64.6	62.7	58.3	55.3	58.1	50.5	75.5	63.9	60.6	58.3	56.6	53.9	52.1
8/18/05 4:00 PM	62.1	47.4	74.6	69.3	65.9	62.8	60.0	53.4	49.4	57.7	48.3	69.7	66.2	61.0	57.6	55.3	52.1	49.6
8/18/05 5:00 PM	56.0	45.8	74.3	64.5	59.7	55.0	52.0	48.6	47.1	54.5	47.1	75.0	60.6	57.2	54.4	52.1	49.4	47.9
8/18/05 6:00 PM	62.4	49.1	76.2	68.9	66.0	63.4	61.0	54.6	50.6	56.7	49.6	75.6	63.1	59.1	56.7	55.0	52.4	50.5
8/18/05 7:00 PM	63.7	51.5	76.7	69.7	67.1	64.7	62.2	57.1	52.3	57.9	50.9	69.8	65.6	60.9	57.7	55.9	53.5	52.1
8/18/05 8:00 PM	62.8	50.4	73.9	69.7	66.4	63.7	61.1	55.1	51.6	57.4	49.6	71.8	66.6	58.9	56.8	55.3	52.6	51.0
8/18/05 9:00 PM	63.1	49.2	77.9	69.9	66.4	64.0	61.6	55.8	52.0	56.6	50.8	78.5	60.4	58.3	56.9	55.8	53.5	51.5
8/18/05 10:00 PM	62.1	48.7	76.6	69.5	65.9	62.8	59.7	53.4	50.4	54.9	49.8	67.4	59.6	57.0	55.5	54.2	52.0	50.5
8/18/05 11:00 PM	62.0	46.2	74.6	69.0	65.7	63.1	60.2	53.2	47.2	54.4	49.2	63.7	57.9	56.5	55.1	54.0	51.8	50.0
8/19/05 12:00 AM	62.7	49.2	77.5	69.5	66.3	63.8	60.8	54.5	50.8	53.9	47.3	65.9	58.1	56.1	54.7	53.3	50.5	48.1

Table 7: Statistical Noise Data August 19th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
8/19/05 1:00 AM	60.6	45.3	77.6	68.7	64.4	61.1	56.9	50.1	46.1	52.3	44.4	62.4	57.3	55.0	53.2	51.4	48.2	46.0
8/19/05 2:00 AM	57.1	43.0	76.1	66.5	62.1	56.7	49.4	43.9	43.1	49.5	42.3	61.0	55.5	52.9	50.7	48.0	43.9	42.5
8/19/05 3:00 AM	47.6	43.2	58.1	52.1	49.9	48.3	46.8	45.1	43.6	49.7	43.4	60.2	56.8	53.5	49.9	47.5	44.8	43.5
8/19/05 4:00 AM	48.9	43.8	55.6	52.6	51.4	50.1	48.3	45.9	44.5	50.3	43.4	61.0	57.2	53.6	50.6	48.8	45.9	44.2
8/19/05 5:00 AM	47.2	42.9	58.6	53.7	50.5	47.2	45.3	43.7	43.1	49.2	41.6	73.4	55.7	51.6	47.9	44.8	42.7	42.0
8/19/05 6:00 AM	51.0	43.0	71.6	57.7	54.2	51.2	48.8	45.1	43.3	54.0	41.9	77.5	62.8	56.5	52.6	49.2	44.7	42.5
8/19/05 7:00 AM	61.1	46.6	74.5	67.6	64.6	62.2	59.5	50.5	47.3	55.2	45.1	72.8	62.9	58.8	55.6	52.3	48.5	46.3
8/19/05 8:00 AM	63.6	53.0	80.7	69.4	66.7	64.4	62.1	57.3	54.6	57.1	47.1	75.4	64.9	60.0	56.2	53.3	50.1	48.4
8/19/05 9:00 AM	62.4	48.6	76.1	69.2	66.1	63.2	60.6	55.1	50.8	54.8	44.6	67.3	59.9	58.0	55.9	53.7	50.2	47.1
8/19/05 10:00 AM	62.8	49.6	82.8	68.8	66.2	63.7	61.2	55.6	52.2	56.0	46.2	78.5	61.8	59.2	56.3	53.6	49.7	47.3
8/19/05 11:00 AM	63.3	49.8	77.8	69.6	67.0	64.4	61.6	55.7	51.8	56.0	46.4	69.1	62.2	59.5	56.5	54.2	50.6	47.5
8/19/05 12:00 PM	60.6	46.5	75.4	67.8	64.3	61.5	58.4	53.2	49.2	55.9	46.8	76.4	62.8	58.9	55.7	53.0	49.4	47.6
8/19/05 1:00 PM	64.2	53.7	73.0	69.8	67.4	65.3	63.2	58.6	55.1	56.2	50.1	65.9	61.4	59.0	56.8	55.3	52.7	51.1
8/19/05 2:00 PM	64.4	52.5	79.5	70.6	67.8	65.2	63.0	58.6	55.1	57.6	49.7	71.2	64.1	60.4	57.9	56.0	53.5	51.6
8/19/05 3:00 PM	63.0	50.4	76.6	69.5	66.7	63.9	61.3	56.2	53.0	56.7	49.7	77.1	62.3	59.6	57.3	55.3	52.6	51.1
8/19/05 4:00 PM	61.6	47.7	76.8	68.6	65.4	62.7	59.5	53.7	50.3	56.3	47.8	71.9	63.4	59.1	56.6	54.5	51.6	49.8
8/19/05 5:00 PM	58.9	45.6	74.9	66.8	63.2	59.6	54.9	49.3	46.9	54.5	47.2	64.4	60.4	57.6	55.2	53.4	50.2	48.1
8/19/05 6:00 PM	62.7	49.1	82.7	68.9	66.0	63.6	61.0	55.1	51.1	56.4	49.5	76.3	61.4	58.7	56.8	55.4	52.9	51.0
8/19/05 7:00 PM	63.0	50.3	76.8	69.6	66.3	63.7	61.5	56.2	53.2	57.9	49.2	80.8	63.4	59.2	56.7	55.1	52.6	51.0
8/19/05 8:00 PM	61.2	46.7	74.9	68.0	65.0	62.3	59.1	52.3	48.4	54.6	49.1	65.4	59.1	56.8	55.2	53.9	51.8	50.4
8/19/05 9:00 PM	60.6	46.7	75.6	67.7	64.4	61.7	58.5	52.3	48.1	54.2	48.1	63.0	58.6	56.4	54.9	53.7	51.2	49.3
8/19/05 10:00 PM	59.1	44.8	73.5	66.4	63.3	60.1	56.4	50.3	46.3	53.4	47.0	61.8	57.1	55.8	54.5	52.9	50.3	48.5
8/19/05 11:00 PM	60.2	46.7	72.6	67.9	63.9	61.2	57.7	51.5	48.3	54.6	47.3	64.0	58.9	56.8	55.5	54.4	51.1	48.3
8/20/05 12:00 AM	58.1	42.1	71.2	66.3	62.7	58.8	54.0	46.7	43.9	52.8	44.8	66.0	58.9	55.5	53.2	51.5	48.2	46.1

Table 8: Statistical Noise Data August 20th, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
8/20/05 1:00 AM	57.2	42.8	74.5	65.7	62.0	57.2	52.5	46.4	43.6	51.6	45.8	64.9	56.3	54.2	52.3	50.8	48.3	46.5
8/20/05 2:00 AM	53.1	41.0	71.7	62.7	56.3	50.1	46.5	43.1	41.2	51.0	42.5	60.5	58.1	55.8	51.3	48.0	45.1	43.3
8/20/05 3:00 AM	45.1	37.9	55.2	51.6	48.9	46.1	43.3	39.6	38.2	48.3	40.3	59.0	55.8	53.0	48.5	45.5	41.4	40.4
8/20/05 4:00 AM	44.5	37.8	55.3	50.8	47.8	45.0	43.1	39.8	38.3	47.5	39.0	58.1	54.9	51.3	47.9	45.6	41.7	39.3
8/20/05 5:00 AM	47.4	37.1	69.0	52.9	51.5	47.8	45.6	41.1	37.6	48.1	38.0	57.6	53.7	51.2	49.0	47.0	43.3	38.9
8/20/05 6:00 AM	51.8	42.9	66.9	60.8	54.5	50.7	48.2	44.7	43.3	53.5	43.2	76.2	62.2	54.9	52.0	49.5	45.3	43.7
8/20/05 7:00 AM	56.7	43.5	73.2	65.5	61.5	56.4	52.2	46.4	44.4	49.9	42.0	59.6	57.1	54.1	50.4	47.5	44.5	43.1
8/20/05 8:00 AM	61.1	49.5	76.3	68.5	64.8	61.7	58.7	53.3	51.1	52.9	43.6	68.3	60.7	56.6	52.8	50.4	47.0	45.3
8/20/05 9:00 AM	60.5	47.0	79.6	67.1	64.1	61.2	57.8	52.3	49.2	52.6	44.6	72.7	58.9	55.4	52.7	50.5	47.4	45.7
8/20/05 10:00 AM	60.2	48.2	72.1	67.3	64.0	61.0	58.4	53.4	50.3	55.0	46.7	70.4	61.5	58.2	55.3	52.9	50.0	48.1
8/20/05 11:00 AM	61.9	51.9	74.9	69.4	65.4	62.6	59.8	55.0	52.9	57.8	49.7	79.0	64.0	60.5	57.3	54.9	51.9	50.2
8/20/05 12:00 PM	61.1	50.0	74.6	67.8	64.8	61.8	59.2	54.0	51.2	57.1	49.3	74.8	63.2	59.9	57.0	54.5	51.4	50.0
8/20/05 1:00 PM	60.7	48.8	70.5	67.7	64.4	61.6	58.8	54.1	51.1	55.6	48.9	66.4	61.1	58.6	56.2	54.4	52.1	50.2
8/20/05 2:00 PM	60.8	50.5	72.3	68.0	64.7	61.5	58.4	53.6	51.3	57.0	50.7	75.9	63.1	59.8	57.2	55.2	52.6	51.3
8/20/05 3:00 PM	59.2	48.2	71.7	66.3	63.2	59.8	56.7	52.4	49.3	56.3	50.1	69.2	62.1	59.1	56.9	55.0	52.5	51.1
8/20/05 4:00 PM	58.4	47.2	73.5	67.4	62.3	58.1	54.8	50.7	48.2	55.7	48.5	68.3	61.2	58.5	56.4	54.6	52.0	50.0
8/20/05 5:00 PM	52.7	45.7	74.8	59.2	54.4	51.9	50.2	47.6	46.3	54.4	47.9	71.3	60.9	58.0	54.9	52.6	49.7	48.4
8/20/05 6:00 PM	53.7	45.8	70.7	62.0	56.7	53.0	50.3	47.7	46.4	55.0	47.4	68.3	62.3	58.6	55.2	52.5	49.6	48.3
8/20/05 7:00 PM	51.7	44.8	66.1	58.8	54.9	51.7	49.6	47.1	45.5	53.6	47.0	67.9	59.9	57.3	53.9	51.7	49.4	48.1
8/20/05 8:00 PM	49.8	44.9	60.2	55.4	52.4	50.1	48.7	46.7	45.3	52.8	46.9	64.7	58.7	55.8	53.1	51.6	49.3	47.6
8/20/05 9:00 PM	48.3	42.2	60.6	54.2	51.0	49.0	47.3	44.4	42.8	52.3	44.8	64.4	58.5	55.2	52.7	50.9	48.7	46.4
8/20/05 10:00 PM	45.7	41.2	58.7	52.0	48.7	45.8	44.1	42.4	41.5	50.7	44.4	60.3	56.5	53.5	50.9	49.5	48.1	46.0
8/20/05 11:00 PM	48.6	41.5	59.7	54.4	51.2	49.2	47.6	44.8	42.3	51.8	46.9	62.3	57.7	54.5	52.0	50.7	48.8	47.5
8/21/05 12:00 AM	48.7	42.7	65.4	53.9	51.4	49.3	47.5	45.3	43.7	50.3	45.6	60.9	55.5	52.5	50.7	49.6	47.7	46.3

Table 9: Statistical Noise Data August 21st, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}	Leq	L_{Min}	L_{Max}	$L_{1.66}$	$L_{8.33}$	$L_{25.00}$	L_{50}	L_{90}	L_{99}
8/21/05 1:00 AM	49.1	42.3	61.9	53.3	51.3	49.7	48.5	46.2	43.6	48.8	44.2	66.0	52.5	50.8	49.4	48.2	46.3	45.1
8/21/05 2:00 AM	45.9	38.4	60.2	54.6	50.0	44.7	42.6	39.4	38.4	48.3	40.0	62.9	57.3	53.0	46.8	44.0	41.4	40.3
8/21/05 3:00 AM	44.4	38.8	54.3	51.4	48.6	44.4	42.1	39.9	39.1	45.5	39.3	55.8	50.7	48.5	46.3	44.8	41.3	40.1
8/21/05 4:00 AM	42.2	37.8	50.2	48.1	46.2	42.4	40.1	38.5	38.0	44.3	38.5	53.4	51.8	47.7	44.7	42.1	39.5	38.8
8/21/05 5:00 AM	41.0	36.8	54.3	47.6	44.0	41.3	39.3	37.6	37.1	43.4	37.6	55.9	50.6	47.5	44.0	40.6	38.5	38.0
8/21/05 6:00 AM	45.9	38.2	68.5	52.0	48.3	45.5	43.4	40.4	38.9	46.8	38.0	60.3	54.0	50.4	47.2	44.7	40.8	39.1
8/21/05 7:00 AM	48.5	39.6	65.6	57.8	51.4	47.1	44.7	42.0	40.5	48.9	38.5	68.0	58.1	51.4	48.3	45.7	42.3	40.5
8/21/05 8:00 AM	50.1	40.7	70.8	57.5	51.0	48.4	46.6	43.7	41.4	49.9	40.9	68.7	57.7	51.3	48.7	46.7	44.0	41.9
8/21/05 9:00 AM	48.5	42.4	69.4	54.6	50.5	48.6	46.8	44.5	43.2	48.7	41.9	62.6	55.2	51.7	49.2	47.1	44.2	43.0
8/21/05 10:00 AM	51.2	42.8	68.1	58.9	53.9	50.6	48.4	45.6	43.8	52.4	43.2	67.6	60.0	56.5	52.2	49.0	46.1	44.3
8/21/05 11:00 AM	53.1	45.8	64.6	59.6	56.9	53.8	50.9	48.2	46.4	54.6	46.9	64.4	61.2	58.8	55.4	51.8	49.2	47.4
8/21/05 12:00 PM	54.2	47.3	67.2	60.1	57.4	54.7	52.0	49.5	48.1	56.5	48.0	71.0	63.8	60.3	56.8	53.4	50.4	48.7
8/21/05 1:00 PM	54.5	48.0	66.1	61.0	57.8	55.2	52.9	50.0	48.8	56.2	49.2	66.0	62.4	59.9	57.2	54.3	51.2	50.1
8/21/05 2:00 PM	53.5	48.4	63.7	58.8	56.4	54.0	52.2	50.2	49.1	55.3	49.8	65.1	61.2	59.0	55.8	53.5	51.4	50.3
8/21/05 3:00 PM	54.1	48.2	64.0	60.8	57.8	54.7	51.9	49.7	48.7	55.3	49.6	70.2	60.9	58.9	56.1	53.6	51.2	50.1
8/21/05 4:00 PM	55.5	47.6	71.6	63.1	58.8	55.6	53.1	50.0	48.4	56.3	49.0	69.5	63.2	59.7	56.8	54.3	51.2	49.6
8/21/05 5:00 PM	52.3	46.8	62.2	57.9	55.7	52.9	50.9	48.4	47.2	54.4	48.4	64.3	60.5	57.9	55.0	52.8	50.2	49.1
8/21/05 6:00 PM	53.5	48.1	65.2	59.4	56.1	53.8	52.3	49.9	48.5	55.4	49.5	68.7	61.4	58.5	55.9	54.1	51.4	50.2
8/21/05 7:00 PM	53.1	46.2	68.5	59.5	55.3	52.7	51.2	48.5	47.0	53.8	48.4	62.2	59.8	57.2	54.1	52.4	50.2	49.1
8/21/05 8:00 PM	50.8	44.9	67.5	58.8	53.6	50.1	48.3	46.3	45.2	53.7	48.0	65.5	60.2	57.0	53.7	52.2	49.9	48.6
8/21/05 9:00 PM	49.5	42.4	62.6	57.5	52.4	49.5	47.6	44.4	43.1	52.3	45.6	62.9	58.4	55.0	52.4	51.2	48.9	46.4
8/21/05 10:00 PM	47.8	42.8	62.5	55.9	50.5	47.1	45.6	43.9	43.1	52.1	46.0	64.9	59.7	55.2	51.8	50.4	48.0	47.0
8/21/05 11:00 PM	49.1	44.7	58.3	52.2	50.8	49.8	48.9	46.5	45.2	50.4	46.3	55.9	53.1	52.0	51.0	50.3	48.6	46.6
8/22/05 12:00 AM	51.2	45.8	61.4	57.5	54.5	51.6	49.7	47.6	46.4	53.8	47.0	64.6	61.1	58.3	53.3	50.9	49.5	48.3

Table 10: Statistical Noise Data August 22nd, 2005

	Microphone Location # 1									Microphone Location # 2								
Time	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**	**Leq**	**L_{Min}**	**L_{Max}**	**$L_{1.66}$**	**$L_{8.33}$**	**$L_{25.00}$**	**L_{50}**	**L_{90}**	**L_{99}**
8/22/05 1:00 AM	54.4	44.6	69.4	63.7	59.5	52.5	48.2	46.2	45.2	54.6	46.1	67.8	63.7	59.5	52.9	49.9	47.5	46.3
8/22/05 2:00 AM	54.1	40.8	68.8	64.5	59.0	50.6	46.5	42.8	41.4	54.6	41.4	69.2	65.3	59.2	51.6	47.5	43.3	42.1
8/22/05 3:00 AM	47.5	40.1	62.7	56.6	49.9	47.2	44.9	42.1	40.4	48.6	41.9	63.1	57.5	50.7	48.1	46.3	43.4	42.2
8/22/05 4:00 AM	45.0	41.1	62.0	50.7	48.1	44.7	43.6	42.3	41.3	46.4	42.1	57.2	52.8	49.4	46.8	44.8	43.2	42.2
8/22/05 5:00 AM	46.3	41.8	65.4	50.8	49.5	47.8	44.1	42.4	42.0	46.1	41.7	57.8	50.9	48.9	47.2	44.6	43.0	42.1
8/22/05 6:00 AM	45.0	39.6	59.1	51.0	47.9	45.6	43.7	41.2	40.1	44.6	38.9	57.2	50.0	47.4	45.2	43.6	41.3	39.9
8/22/05 7:00 AM	59.9	45.2	72.6	66.6	64.3	61.3	57.4	48.2	46.1	50.2	44.4	63.5	55.4	52.5	50.8	49.3	46.3	45.1
8/22/05 8:00 AM	62.3	51.5	76.6	68.5	65.7	63.3	60.7	55.6	53.1	52.9	47.3	63.8	56.8	55.1	53.8	52.4	50.0	48.3
8/22/05 9:00 AM	64.0	52.2	79.2	69.9	67.2	65.0	62.7	57.7	53.6	55.1	50.6	64.1	59.0	57.5	56.0	54.6	52.4	51.2
8/22/05 10:00 AM	60.8	50.9	73.8	67.6	64.4	61.7	58.9	54.3	51.6	53.2	48.8	60.8	57.9	56.0	53.8	52.1	50.4	49.4
8/22/05 11:00 AM	62.0	49.5	75.6	67.8	65.4	63.1	60.7	56.0	51.5	54.6	49.0	68.9	61.4	57.6	54.4	52.5	50.9	49.4
8/22/05 12:00 PM	61.0	48.4	73.7	68.4	64.6	61.9	58.8	52.6	49.4	56.6	48.3	72.6	64.3	60.3	56.5	52.9	50.1	49.1
8/22/05 1:00 PM	63.1	50.1	77.2	69.3	66.9	64.1	61.4	56.3	52.8	56.1	49.3	66.2	62.0	59.6	56.8	54.6	51.2	49.7
8/22/05 2:00 PM	64.9	55.7	80.7	70.7	68.1	65.8	63.8	59.7	57.3	58.1	53.0	66.4	63.0	60.8	58.7	57.2	55.0	53.8
8/22/05 3:00 PM	63.1	54.2	76.7	69.4	66.5	63.8	61.5	57.5	55.2	58.8	53.4	75.2	64.2	61.1	59.0	57.4	55.2	54.1

VI. Summary of Results

- The current ambient noise environment along the common property line running between the proposed offloading facility and the Tern Nesting Site, was documented during this survey.
- The test data indicates:
  - that the noise level along the property line is directly related to the activities at the Pier 400 Terminal,
  - that the average ambient/background noise level on the North end of the common property line (i.e., NMS #1) was approximately 50 dBA with maximum levels exceeding 88 dBA.
  - that the average ambient/background noise level on the South end of the common property line (i.e., NMS #2) was approximately 48.5 dBA with maximum levels exceeding 83 dBA.

APPENDIX L3

Navcon Engineering Report No. 51513-2: Pier 400 Noise Study (September 2006)

Pacific Energy Pier 400 Project
Noise Study - September 2006

Prepared for:
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Prepared by:
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Table of Contents

I. Administrative Information

- Project Name: Pacific Energy Pier 400 Project
- Navcon Project No.: 61635
- End Client: Pacific Energy Partners, L.P. (Pacific)
  Project Manager: Nestor Taura
- Project Location: Port of Los Angeles
  Project Manager: Robel Afewerki
- Project Engineering: SPEC Services, Inc.
  Project Manager: Ed Gienger
- This project was conducted under SPEC Services Inc. Sub-Contract Agreement with Navcon Engineering dated June 14th, 2005 and authorization email by Ed Gienger dated August 8th, 2006.
- Navcon Report 51513, Pacific Energy Pier 400 Project
  Noise Monitoring Survey - August 2005
- Navcon Report 51513-1, Pacific Energy Pier 400 Project
  Noise Study – August 2005

II. Pier 400 Project Description

- Pacific Energy Partners, L.P. (Pacific) proposes to develop a deep-water petroleum bulk liquids marine offloading facility at Berth 408, Pier 400 in the Port of Los Angeles (POLA). In addition, storage and distribution facilities are proposed on Pier 400 and Terminal Island, with pipelines connecting to local refineries and existing distribution systems.
- The pumping and terminal facility on Pier 400 is referred to as Site 1 (see ***Graphic 1***) . It encompasses approximately 10 acres. Site 1 is bounded by the south face (Face D) of Pier 400, the Pier 400 access road and the Least Tern nesting area. The facility will contain two (2) 250,000 barrel and one (1) 50,000 barrel internal floating roof storage tanks, one (1) 15,000 barrel MGO fixed roof fuel tank, receiving and discharge manifolds, metering, shoreside cargo offload assist pumps (Shore-side Pumps), pipeline pigging facilities, electrical substation, and other related equipment. The facility will operate predominately when crude oil tankers are discharging their cargos at the new Berth 408.

Graphic 1, Site Plan

III. Introduction

- This report summarizes the results of the Pacific Energy Pier 400 Project Noise Study. It is the third such report generated by Navcon Engineering. The two preceding reports were:
  - ***Navcon Report 51513***, dated September 2005 summarizes the results of the Pacific Energy Pier 400 Project ***Noise Monitoring Survey*** conducted August 15 – 22, 2005.
  - ***Navcon Report 51513-1***, dated August 2005 summarizes the results of the Pacific Energy Pier 400 Project ***Preliminary Noise Study***.
- The Preliminary Noise Study (***Navcon Report 51513-1***) revealed that without additional noise mitigation measures, the Pacific Energy Pier 400 Project would adversely impact the Least Tern Nesting Site. It was therefore recommended (**1**) that a 20 ft. high noise barrier be constructed and (**2**) that two transformers and one HVAC system be relocated. The noise analysis indicated that the impact to the nesting area would be significantly reduced with the mitigation measures (96% of the nesting area < 50 dBA and 65% of the nesting area < 45 dBA).

III. Introduction (cont'd)

- Following submittal of ***Navcon Report 51513-1***, several changes were made to the facility equipment layout and the detailed noise mitigation design. These changes were integrated into the noise model and are evaluated in this report.
- In addition to the model changes, a different noise assessment methodology was used in this noise study. The assessment presented in ***Navcon Report 51513-1, Preliminary Noise Study*** was based upon the equivalent sound pressure level (Leq). In this study, we assess the noise impact based upon the Draft Los Angeles CEQA Thresholds Guidelines.
- The principal objectives of this study were therefore (**1**) to incorporate the final equipment layout and mitigation measures into the analytical noise model, (**2**) to make noise level predictions over the Pacific Energy Pier 400 Project Facility and the Least Tern Nesting Site and (**3**) to assess the noise impact based upon the Draft Los Angeles CEQA Thresholds Guidelines.
- The project was conducted by Hans Forschner and Jim Steedman of Navcon Engineering under the guidance of Ed Gienger, Project Manager, Spec Services.

IV. Noise Impact Assessment Methodology

- The Pacific Energy Pier 400 Project noise assessment was made in accordance with the Los Angeles Draft CEQA Guideline, where the noise impact is based upon net changes in the Community Noise Exposure Level (CNEL) due to the proposed project.
- The CEQA Guideline groups noise-sensitive land uses and sets ambient noise level limits according to the land use compatibility (see ***Table 1***). For each land use group the Guideline defines ambient levels that are either normally acceptable, conditionally acceptable, normally unacceptable, or clearly unacceptable.
- A project is considered to pose a significant impact on the community noise, if the operations cause the ambient noise level at the property line to either:
  - increase the CNEL by 5 dBA or more; or
  - increase the CNEL by 3 dBA and rise into either the normally unacceptable or clearly unacceptable category
- The noise sensitivity of the Least Tern Nesting Site does not fall into any of the Land Use Categories. Therefore, it was decided to use a worst case (most stringent) noise impact assessment (i.e., that the net change in the CNEL should be less than 3 dBA).

Table 1: Land Use Compatibility Categories & Noise Levels

Land Use	Ambient Community Noise Exposure Level (dBA CNEL)		
	Normally/Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Single-family, duplex, mobile homes, multi-family homes	50 - 70	70 - 75	Above 70
Schools, libraries, churches, hospitals, nursing homes, motels, hotels	50 - 70	70 - 80	Above 80
Auditoriums, concert halls, amphitheatres	50 - 70	(1)	Above 65
Sports arenas, outdoor spectator sports	50 - 75	(1)	Above 70
Playgrounds, neighborhood parks	50 - 70	67 - 75	Above 72
Golf courses, riding stables, water recreation, cemeteries	50 - 75	70 - 80	Above 80
Office buildings, business and professional commercial	50 - 77	Above 75	(1)
Industrial, manufacturing, utilities, and agriculture	50 - 80	Above 75	(1)

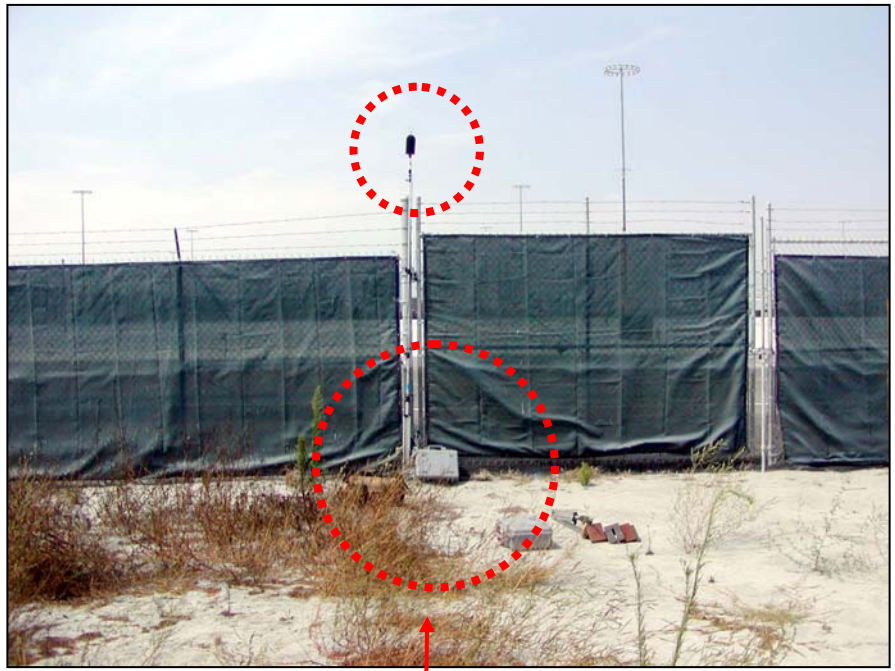
(**1**) No *values given in Thresholds Guide (Draft L.A. CEQA Thresholds Guide, Section I.2.A.*)

V. *Current Ambient Noise Level Summary*

- An ambient noise monitoring survey was conducted August 15 - 22, 2005 and documented in ***Navcon Report 51513, Pacific Energy Pier 400 Project, Noise Study***.
- One Noise Monitoring Station, *NMS #1* was located on the North-East corner of the proposed offloading facility as shown in ***Graphic 2*** & ***Photo Set 1***.
- A second Noise Monitoring Station, *NMS #2* was located on the South-East of the proposed offloading facility as shown in ***Graphic 2*** and ***Photo Set 2***.
- The measured noise levels were assessed in terms of the CNEL. The CNEL is the averaged daily noise level with a 5 dB weighting factor applied to the level measured between 7 PM and 10 PM and a 10 dB weighting factor applied to the level measured between 10 PM and 7 AM.
- The current (as of August 2005) CNEL values are summarized in ***Table 2***.

Graphic 2, Noise Monitoring Location Plan View

Photo Set 1, NMS #1, North-East Property Line

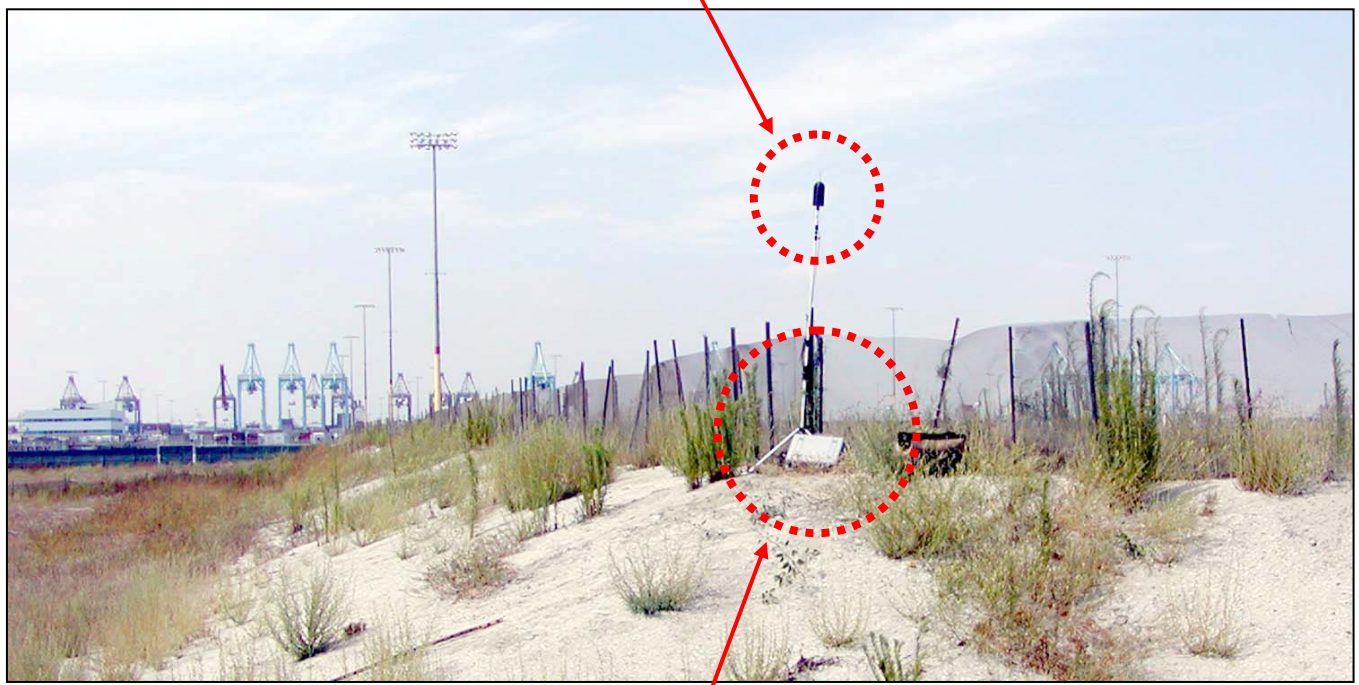


NMS #1 - Outdoor Microphone, Windscreen & Bird Spikes

NMS #1 – Environmental Enclosure with Sound Level Analyzer & Tripod

Photo 2, NMS #2, South-East Property Line

NMS #2 - Outdoor Microphone, Windscreen & Bird Spikes



NMS #2 – Environmental Enclosure with Sound Level Analyzer & Tripod

Table 2, CNEL – Current Ambient Noise Level

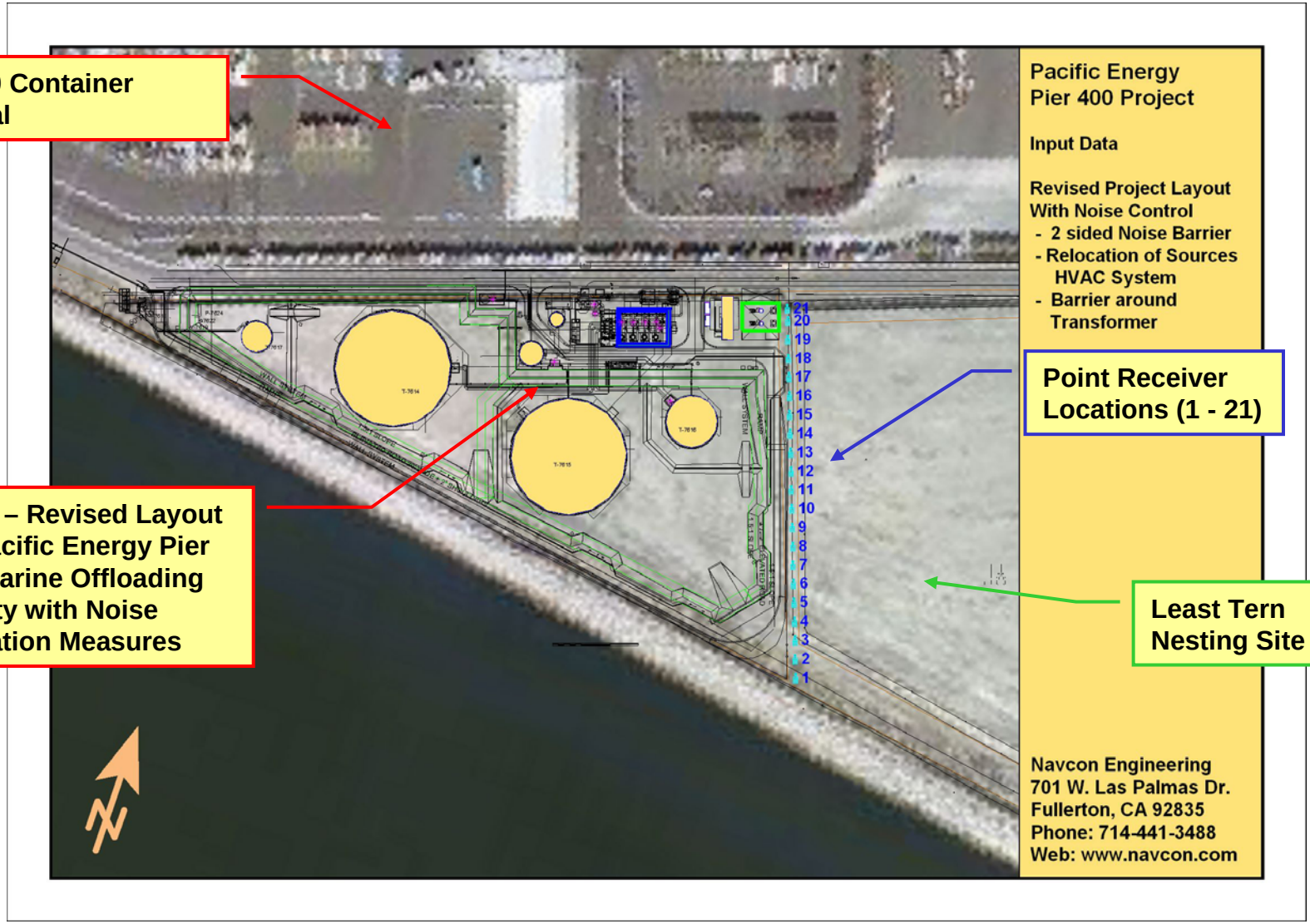
Day of Week	Current Ambient CNEL [dBA]	
	NMS #1 (NE Property Line)	NMS #2 (SE Property Line)
Tuesday	66.3	58.8
Wednesday	66.0	59.1
Thursday	66.2	59.9
Friday	66.7	60.5
Saturday	64.3	59.6
Sunday	55.4	56.9
Monday	60.4	58.9
Average	**63.6**	**59.1**
Standard Deviation	**4.2**	**1.1**

The ambient background CNEL ranges between 59 dBA and 64 dBA. The CNEL at Location 1 fluctuates by +/- 4 dBA due to the close proximity to the Pier 400 Marine Offloading facility.

VI. Acoustical Model

- The 3 dimensional noise model was created using the noise modeling software, SoundPLAN. The site plan & facility layout are shown in ***Graphics 3 & 4***.
- The noise mitigation measures include:
  - a two sided noise barrier (26' High) on the South and East sides of the shipping pumps (WPII) with a roof,
  - a 6 ft block wall surrounding the two transformers on the east side of the control building and
  - relocating the HVAC system to the West side of the control building.
- The acoustical model parameters were as follows:
  - the ground was modeled with an absorption coefficient of 0.2.
  - the sides of the tanks, buildings, etc. were modeled as reflective surfaces and also as diffractive bodies (see the blue shaded areas).
  - the noise producing equipment were modeled as point, line & area sources (see the red shaded objects).
- The noise source sound power emission levels are presented in ***Table 3***.

Graphic 3, 2D Site Plan – Site Layout with Noise Mitigation



Graphic 4, 3D Site Plan – Facility Layout with Noise Mitigation

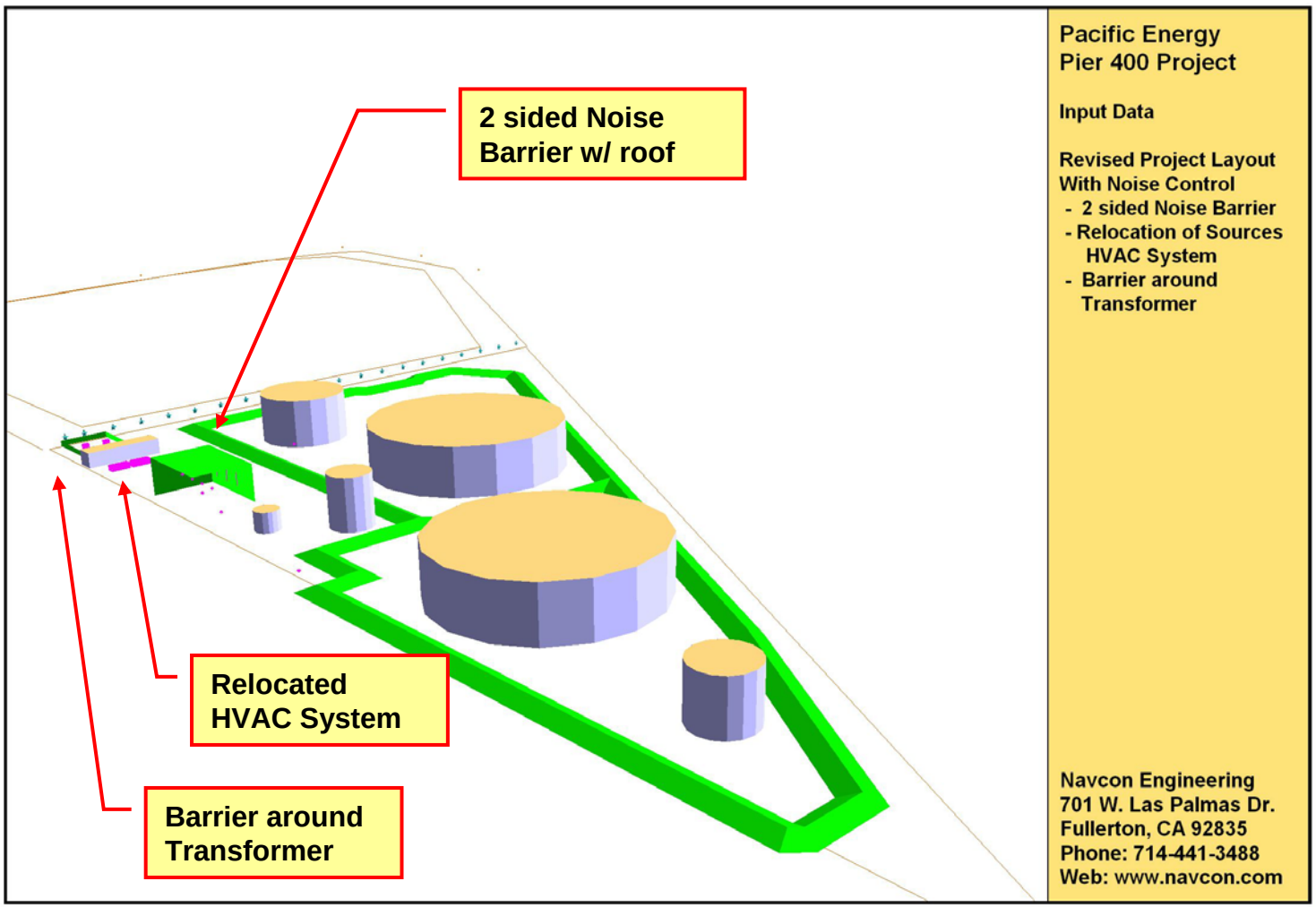


Table 3, Marine Offloading Facility Noise Source Data

Source Number	Source Description	Source Type	Number of Sources	Number of Active Sources	Sound Power Level [dBA]
1	Thermal Oxidizer Air Blower	Point	1	1	97.9
2	Air Blower Motor	Point	1	1	98.8
3	Fuel Oil Pump, Motor Driver	Point	1	1	100.4
4	Air Eliminator Air Release Valve	Point	1	1	93.5
5	Shipping Pump WPII - Load	Line	4	4	103.0
6	Stripping Pump Motor Driver	Line	1	- - -	99.2
7	Motor Control Bldg, Air Handler	Area	1	1	98.5
8	Transformer	Area	2	2	86.1
9	Valve Actuator	Point	5	1	92.8
10	Valve Actuator	Point	11	4	92.8
11	Separator Pump Motor Driver	Point	2	1	98.2

Note: The noise model represents a worst case scenario (i.e., the highest predicted noise levels). Only the acoustically significant sources were included in the assessment.

VII. Noise Level Predictions

- Noise level predictions were made at 21 locations along the common property line between the Marine Offloading Facility and the Least Tern Nesting Site (refer to ***Graphic 3, Slide 16***).
- The CNEL values are summarized in ***Table 4***.
  - ***Pier 400 Project*** = predicted Pier 400 Project noise levels
  - ***Current Ambient*** = measured during the Aug. 2005 survey (refer to ***Navcon Report 51513***)
  - ***Future Ambient*** = predicted noise levels considering the current ambient noise and Pier 400 Project noise
  - ***Net Change*** = predicted *Future Ambient – Current Ambient* noise level.

Table 4, Predicted Overall A-Weighted Sound Pressure Levels

Receiver	CNEL [dBA] Pier 400 Project	Current Ambient	Future Ambient	Net Change
East Property 1	50.3	**59.1**	59.6	0.5
East Property 2	50.6	**59.3**	59.9	0.5
East Property 3	50.9	**59.6**	60.1	0.6
East Property 4	51.1	**59.8**	60.4	0.5
East Property 5	51.7	**60.0**	60.6	0.6
East Property 6	52.6	**60.3**	61.0	0.7
East Property 7	53.1	**60.5**	61.2	0.7
East Property 8	54.3	**60.8**	61.6	0.9
East Property 9	55.0	**61.0**	62.0	1.0
East Property 10	55.2	**61.2**	62.2	1.0
East Property 11	54.8	**61.5**	62.3	0.8

Receiver	CNEL [dBA] Pier 400 Project	Current Ambient	Future Ambient	Net Change
East Property 12	55.1	**61.7**	62.6	0.9
East Property 13	55.4	**61.9**	62.8	0.9
East Property 14	55.8	**62.2**	63.1	0.9
East Property 15	59.2	**62.4**	64.1	1.7
East Property 16	58.2	**62.7**	64.0	1.3
East Property 17	58.4	**62.9**	64.2	1.3
East Property 18	59.2	**63.1**	64.6	1.5
East Property 19	59.6	**63.4**	64.9	1.5
East Property 20	57.5	**63.6**	64.6	1.0
East Property 21	57.4	**63.6**	64.5	0.9

Legend:

59.1	Measured Ambient CNEL	50.3	Pier 400 Predicted CNEL
59.3	Interpolated from Measured CNEL	0.5	Pier 400 Predicted CNEL – Current Ambient CNEL

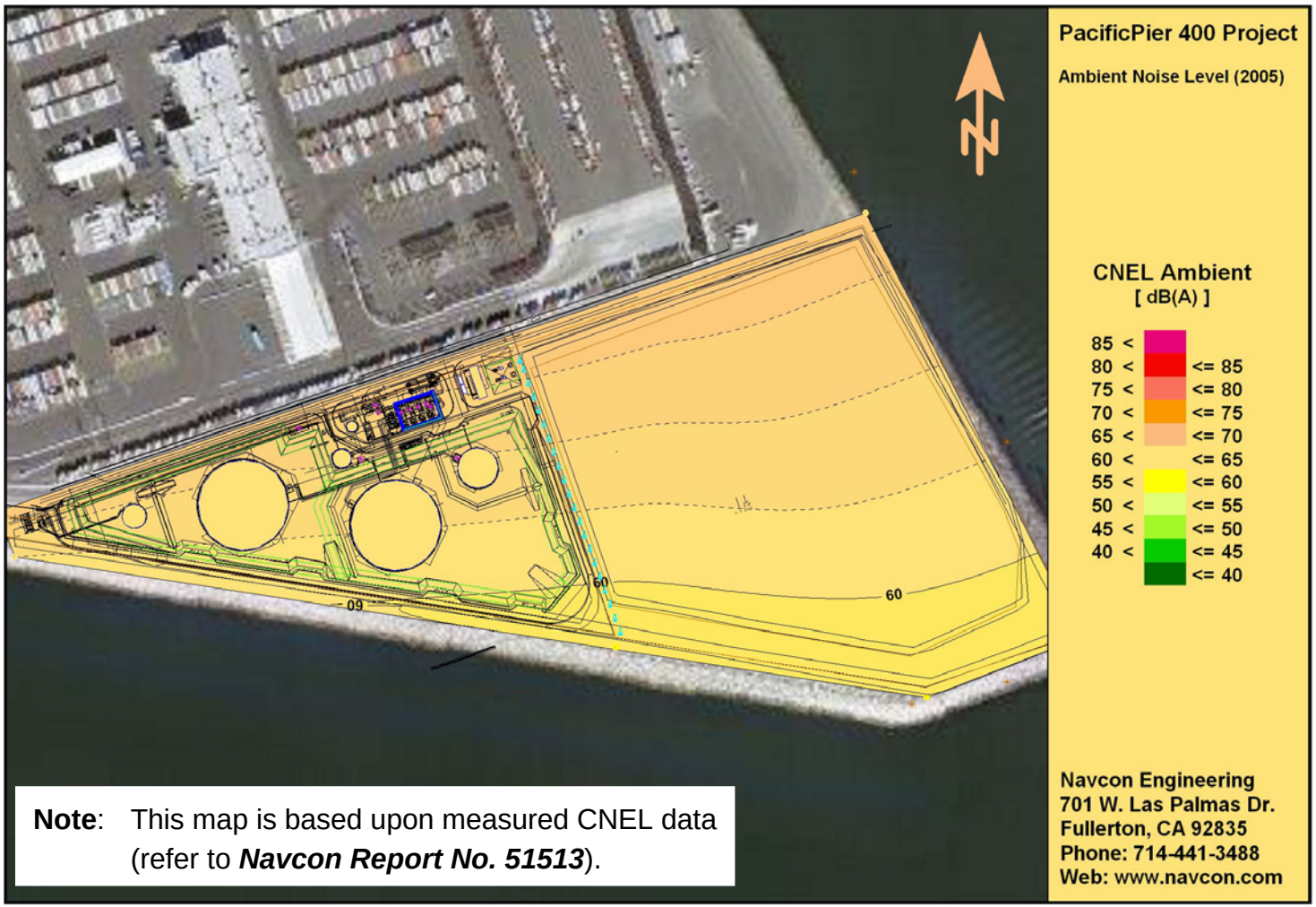
VIII. Noise Contour Maps

To visualize the noise impact throughout the Least Tern Nesting Site, CNEL noise contour maps were computed with a receiver height of 1 ft. above the ground.

- **Graphic 5**, Noise Contour Map – Ambient Noise Level (2005)

  Note: Ambient Noise Level Contour Map extrapolated from 2 measurement locations (see ***Section V. Current Ambient Noise Level Summary***)
- **Graphic 6**, Noise Contour Map – Predicted Noise Level Pier 400 Offloading Facility
- **Graphic 7**, Noise Contour Map – Predicted Noise Level Pier 400 Offloading Facility & Ambient Noise Level (2005)
- **Graphic 8**, Noise Contour Map – NET Change

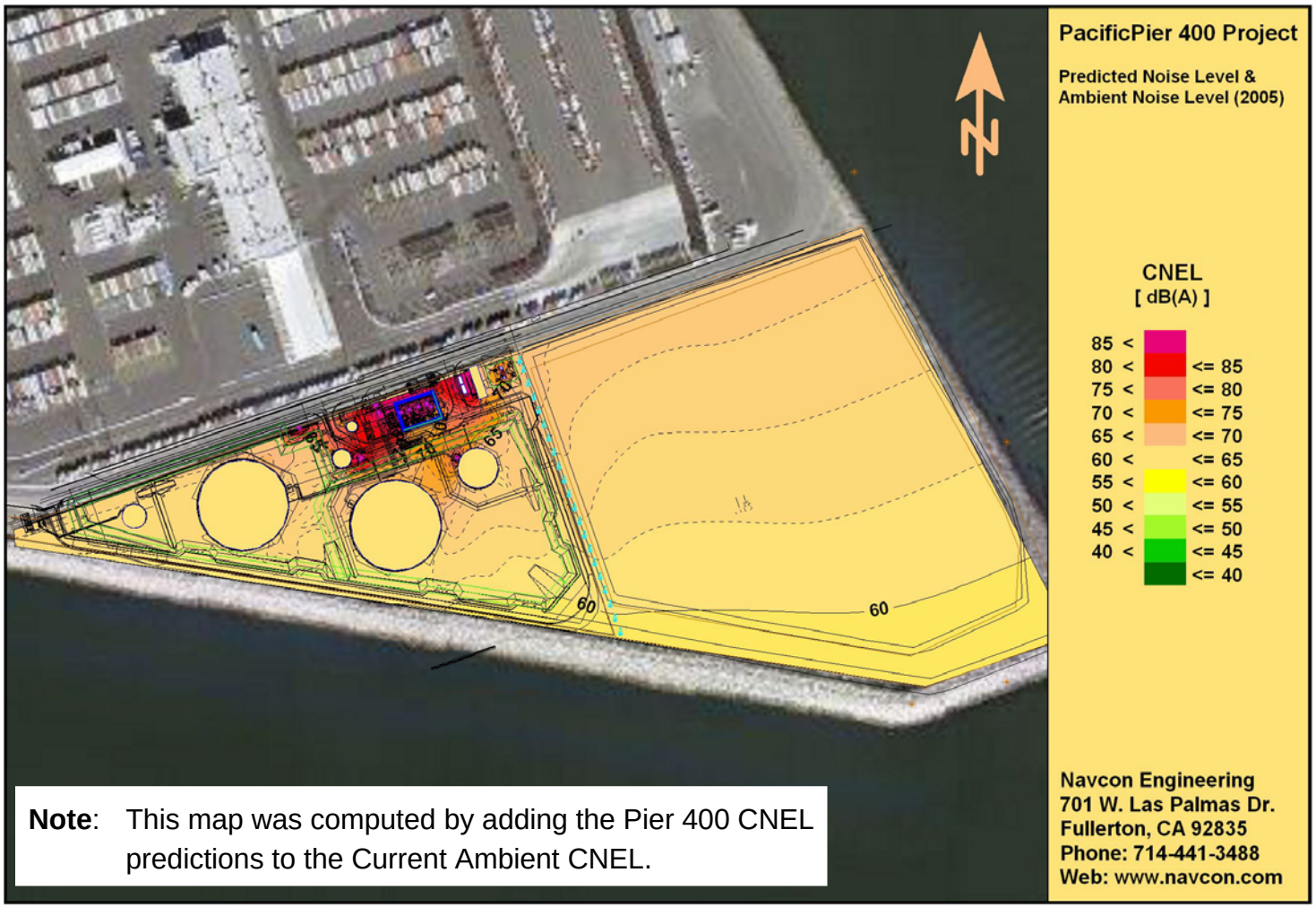
Graphic 5, CNEL Contour Map (Ambient Noise Level, Aug. 2005)



Note: This map is based upon measured CNEL data (refer to ***Navcon Report No. 51513***).

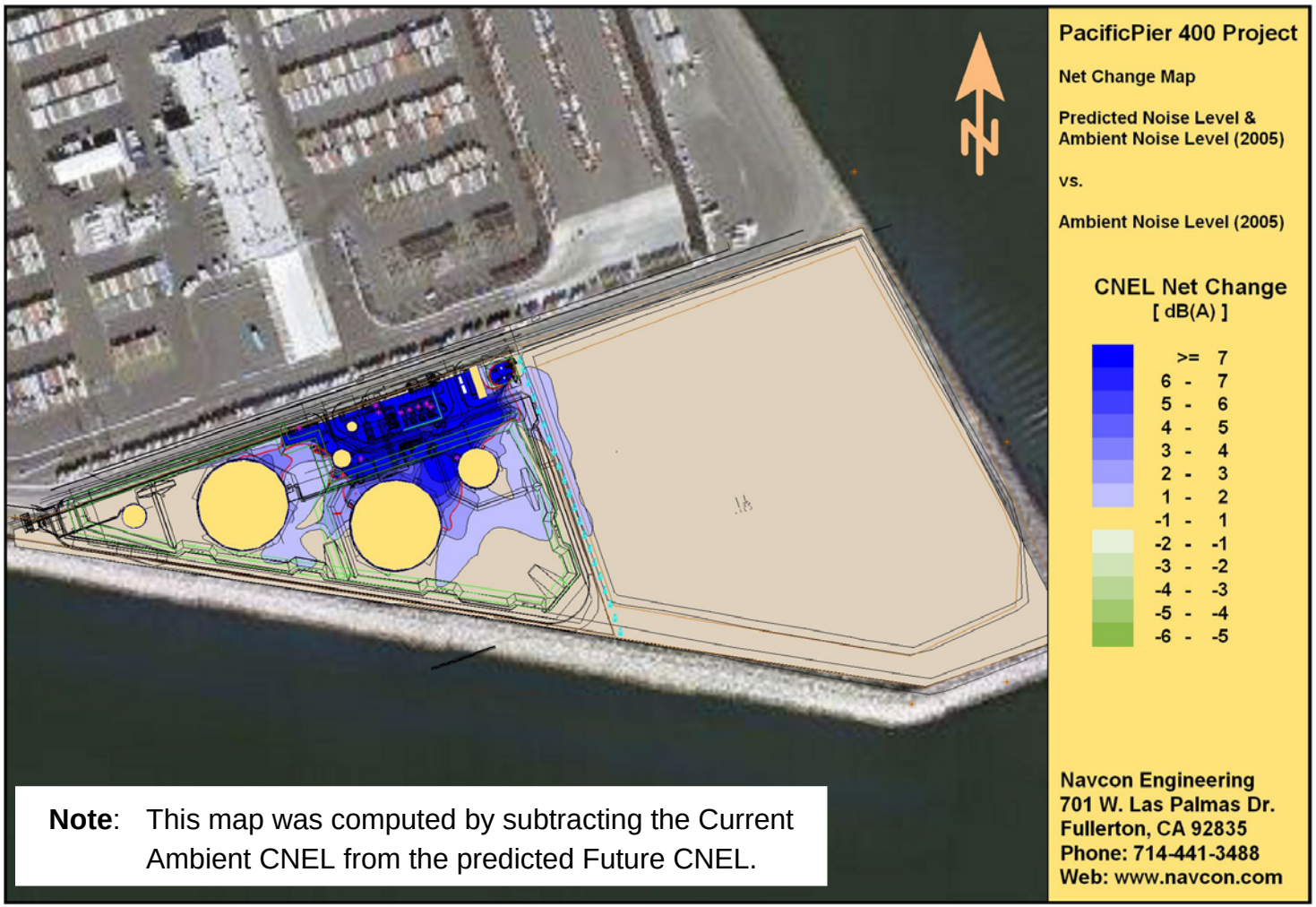
Graphic 6, CNEL Contour Map (Predicted Pier 400 Facility)

Graphic 7, CNEL Contour Map (Predicted Pier 400 + Ambient Noise)



Note: This map was computed by adding the Pier 400 CNEL predictions to the Current Ambient CNEL.

Graphic 8, CNEL Contour Map (Net Change, Future – Current Ambient)



IX. Summary of Results

- The 3D noise model of the Pier 400 Offloading Facility was updated to the final configuration.
- The CNEL was computed along the Pier 400 Offloading Facility/ Least Tern Nesting Area property line and CNEL noise contour maps generated.
- The Pacific Energy Pier 400 Project noise impact was computed in accordance with the Los Angeles Draft CEQA Guideline.
- The results of the noise study indicate that the Pacific Energy Pier 400 Project will not represent a significant noise impact to the Least Tern Nesting Area. The change in the CNEL will be less than 2 dBA.