WesPac Pittsburg Energy Infrastructure Project

Noise Assessment Report

Prepared for

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And
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1.0 Introduction

WesPac Energy–Pittsburg LLC (WesPac) and Oiltanking North America, LLC are proposing to construct the WesPac Pittsburg Energy Infrastructure Project (Project) which will consist of modernizing and reactivating the existing oil storage and transfer facilities located at the GenOn Delta, LLC (GenOn) Pittsburg Generating Station (Figure 1). The proposed Project would modernize an existing facility designed to receive crude oil or partially refined crude oil (anticipated to receive a range of lighter crude to heavier crudes including fuel oil) from marine vessels and transfer the oil to existing tank farm facilities via existing and new pipelines to nearby refineries. The proposed Project would consist of the installation of numerous pumps, motors, transformers, and other ancillary noise generating equipment. Computer modeling of the proposed equipment for the site was conducted to determine project related noise levels at adjacent residential communities and to identify appropriate engineering controls to reduce noise levels. Project noise levels were evaluated against the City of Pittsburg Noise Element and the California Energy Commission (CEC) siting regulations as they pertain to the proposed GenOn Willow Pass Generating Station (WPGS) project to be licensed under the CEC.

1.1 General Information on Noise

Noise is defined as unwanted sound resulting from vibrations in the air. The range of pressures that cause the vibrations that create noise is large. Noise is therefore measured on a logarithmic scale, expressed in decibels (dB). The frequency of a sound is the pitch (high or low). The unit for frequency is hertz (Hz). Most sounds are composed of a composite of frequencies. The normal human ear can usually distinguish frequencies from 20 Hz (low frequency) to about 20,000 Hz (high frequency), although people are most sensitive to frequencies between 500 Hz and 4,000 Hz. The individual frequency bands can be combined into one overall dB level. Noise is typically measured on the A-weighted scale (dBA). The A-weighting scale was developed and has been shown to provide a good correlation with the human response to sound and is the most widely used descriptor for community noise assessments (Harris, 1991). The faintest sound that can be heard by a healthy ear is about 0 dBA, while an uncomfortably loud sound is about 120 dBA. In order to provide a frame of reference, some common sound levels are listed below.

- Chainsaw at 30 feet 90 dBA
- Truck at 100 feet 85 dBA
- Noisy Urban Environment 75 dBA
- Lawn Mower at 100 feet 65 dBA
- Average Speech 60 dBA
- Typical Suburban Daytime 50 dBA
- Quiet Office 40 dBA
- Quiet Suburban nighttime 35 dBA
- Soft Whisper at 15 feet 30 dBA

Common terms used in this noise analysis are defined below.

L_{max} is the maximum noise level generated by a source at a specified distance, usually taken to be 50 feet.

L_{eq} is the equivalent noise level over a specified period of time (i.e., 1-hour). It is a single value of sound that includes all of the varying sound energy in a given duration.

L_{90}, **L_{50}** and **L_{10}** are the A-weighted sound levels that are exceeded at the specified percentage of time. For example, L_{90} is the sound level exceeded 90 percent of the time and is often considered the background, or residual, noise level. Similarly, L_{10} is the sound level exceeded 10 percent of the time and is a commonly used as a measurement of intrusive sounds, such as aircraft overflights.

L_{dn}, or day-night noise level is the A-weighted sound level over a 24-hour period with an additional 10 db penalty imposed on sounds that occur between 10 p.m. and 7 a.m.

Community Noise Equivalent Level, or **CNEL**, is similar to L_{dn} and is the A-weighted sound level over a 24-hour period with an additional 10 db penalty imposed on sounds that occur between 10 p.m. and 7 am and 5 dB penalty imposed on sounds that occur between 7 p.m. and 10 p.m. CNEL was developed in California for evaluating noise levels in residential communities.

2.0 Applicable Standards

2.1 City of Pittsburg Noise Element

The Noise Element of the City of Pittsburg General Plan (Noise Element) generally describes a range of changes in ambient (existing) noise levels and how these changes would be perceived by the community, such as a residential receptor, in terms of significance of impact:

- A 1 dB change cannot be perceived;
- A 3 dB change is considered "just noticeable";
- A 5 dB change is noticeable and would be expected to provoke a response from the community, and would often be considered "a significant impact".

Policy 12-P-1 of the Noise Element establishes standards for land use compatibility with various noise levels, as shown in Table 1. These standards (which are for proposed residential uses) are identical to those in the Contra Costa County General Plan. The maximum noise level normally considered as acceptable is an exterior noise level is 60 dBA L_{dn} for single-family residential uses, as exist adjacent to the proposed project. Exterior noise levels of up to 70 dBA L_{dn} are considered conditionally acceptable. These standards are based upon accepted thresholds of significance and apply to noise (typically long term) from any source.

<u>Operational Noise</u>

Policy 12-P-7 of the Noise Element requires control of noise at the source through site design and other techniques for new development.

Policy 12-P-8 of the Noise Element requires development of a noise attenuation program to mitigate noise adjacent to existing residential areas.

Construction Noise

Policy 12-P-9 of the Noise Element requires that generation of loud noises on construction sites is limited to normal business hours between 8:00 a.m. and 5:00 p.m.

Policy 12-P-10 of the Noise Element requires that truck traffic is limited to appropriate truck routes and consideration of restricting truck traffic travel times in sensitive areas.

The Noise Ordinance (Title 9 - Public Peace, Safety and Morals, Chapter 9.44 - Noise, Section 9.44.010) (Noise Ordinance) prohibits the use of pile drivers, pneumatic hammers and similar equipment between the hours of 10:00 p.m. and 7:00 a.m., but does not establish noise level limits related to fixed noise sources or construction noise.

2.2 California Energy Commission

The California Energy Commission (CEC) siting regulations with respect to noise are more stringent than the local noise regulations applicable to the proposed project. The CEC requires that new power generating facilities do not increase the background noise level (L_{90}), measured during the quietest four consecutive hours of a given 25-hour period, by more than 5 dBA when operational.

During the CEC licensing for the GenOn WPGS project, it was determined that in order to remain in compliance with the criteria in the CEC siting regulations, the currently proposed Project would need to institute noise controls to reduce the operational noise to less than 42 dBA at the residential receptor locations east of the East Tank Farm (R1 and R2 in Figure 2). The CEC criteria do not apply to the remaining residential locations.

There are no federal laws, ordinances, or regulations that directly affect this Project with respect to noise or vibration.

3.0 Ambient Monitoring

The Project site is an existing tank farm located on the Sacramento River Delta, in the City of Pittsburg, California. Figure 1 provides an aerial map showing the existing tank farm and the surrounding area. The site is surrounded by a combination of commercial, industrial and residential land uses. The nearest residences are located directly east of the East Tank Farm. Other residential uses are located south and southeast of the South Tank Farm. A residential area to be known as Mariner's Walk is proposed adjacent to the southeast portion of the Project site.

Ambient noise measurements at the receptor locations were conducted during environmental permitting of the adjacent GenOn WPGS project (URS, 2009). Two monitoring locations were chosen that represent the nearest residential areas. These monitoring locations are also shown on Figure 1 as R1 and R3. Data collected at location R1 represent ambient conditions for residences (existing and proposed) adjacent to the East Tank Farm (R1, R2, and R6), while data collected at location R3 represent ambient conditions for

residences south and southeast of the South Tank Farm (R3, R4, and R5). Location R6 depicts the most proximate area of the proposed Mariner's Walk residential area to the Project site. The existing ambient noise levels are summarized in Table 2. The table shows that existing ambient levels are within the middle to upper portion of the range of "conditionally acceptable" noise levels as defined by the City of Pittsburg.

4.0 Noise Modeling

Computer modeling of the proposed Terminal was performed in order to calculate noise levels that would be generated by Project operation at the adjacent residential areas. The commercially available CadnaA model developed by Datakustik GmBH was used for the analysis. The software takes into account spreading losses, ground and atmospheric effects, shielding from barriers and buildings, and reflections from surfaces. The software is standard based and the ISO 9613 standard was used for air absorption and other noise propagation calculations (ISO, 1993). The existing topographic features of the Project site and surrounding area, and the existing storage tanks, and their reflection or barrier effects, were also considered in the modeling. The model was also configured to accept the existing ground cover as acoustically reflective. Four additional discrete receptor points, in addition to the two noise monitoring locations, were added to the model to represent additional existing or proposed residences.

The proposed Project will include a number of pumps, motors, transformers, and other noise generating equipment. Table 3 gives a list of the equipment, as well as the estimated sound emission data for each. In addition to the noise generating equipment, the existing tanks and retaining walls were incorporated into the model. Earthen berms of varying height exist between the proposed project and the residential receptor locations and are effective sound barriers.

4.1 Storage Terminal

Due to the nature of Project configuration, not all equipment would be operating simultaneously. Potential operating scenarios were evaluated and modeling was conducted for each scenario in order to determine, which would provide the worst case analysis for each residential area. The modeling results below provide the highest modeled sound level at each residential area, regardless of which operating scenario the highest sound level occurred in. This results in the most conservative analysis possible for each individual residential area.

Calculated tank farm project noise levels are provided in Tables 4 and 5. In addition to the tabular data presented, a noise contour map is presented that depicts the expected Project related noise levels in the area (Figure 2). A review of the data in Figure 2 and Tables 4 and 5 reveals that Project noise levels will meet all applicable sound standard limits. Results at R1 and R2 are less than 42 dBA, which is in compliance with the CEC siting regulations. Modeled results are below ambient L_{eq} levels at all locations, and would result in an increase over ambient of less than one decibel. This is in compliance with the City of Pittsburg Noise Element.

4.2 Marine Terminal

In addition to modeling the noise generating equipment onsite, the marine terminal scenario was analyzed. This scenario consisted of two tugboats operating at full power in order to maneuver a tanker into dock for unloading purposes. The calculated sound level for tugboat operation is provided in Table 3.

Calculated tugboat noise levels are provided in Tables 6 and 7. In addition to the tabular data presented, a noise contour map is presented that depicts the expected noise levels in the area (Figure 3). A review of the data in Figure 3 and Tables 6 and 7 reveals that tugboat noise levels will meet all applicable sound standard limits. Modeled results are below ambient L_{eq} levels at all locations, and would result in an increase over ambient of less than one decibel. Activity at the marine terminal is not subject to the CEC siting regulations.

4.3 Engineering Controls

The noise modeling analysis revealed that engineering controls would be required for several of the proposed pumps in order to meet the noise level limits, in particular at the residential area bordering the eastern tank farm. Noise barrier walls were selected as the most practical engineering control. The noise model was utilized as a design tool in order to determine the optimum locations and dimensions of barrier walls. The following noise barrier walls were included in the noise modeling study.

Pump P0001 **-** A two-sided barrier, 16.5 feet tall, 29 feet total length located six feet from the pump/motor skid, shielding the eastern tank farm residences.

Pump P0506 **-** A two-sided barrier, 12 feet tall, 29 feet total length located six feet from the pump/motor skid, shielding the eastern tank farm residences.

Pump P0800 **-** A two-sided barrier, 16.5 feet tall, 31 feet total length located between seven to eight feet from the pump/motor skid, shielding the eastern tank farm residences.

Pump P0900 **–** A two-sided barrier, 16.5 feet tall, 56 feet total length located between six feet from the pump/motor skid, shielding the eastern tank farm residences.

Pump P0304 **-** A two-sided barrier, 15 feet tall, 31 feet total length located five feet from the pump/motor skid, shielding the eastern tank farm residences.

Schematics showing the barrier walls are included in Appendix A. The barriers may be constructed from most any material including pre-cast concrete panels, or pre-fabricated acoustical walls, provided that the barrier walls have a minimum density of four pounds per square feet or provide a minimum STC rating of 30.

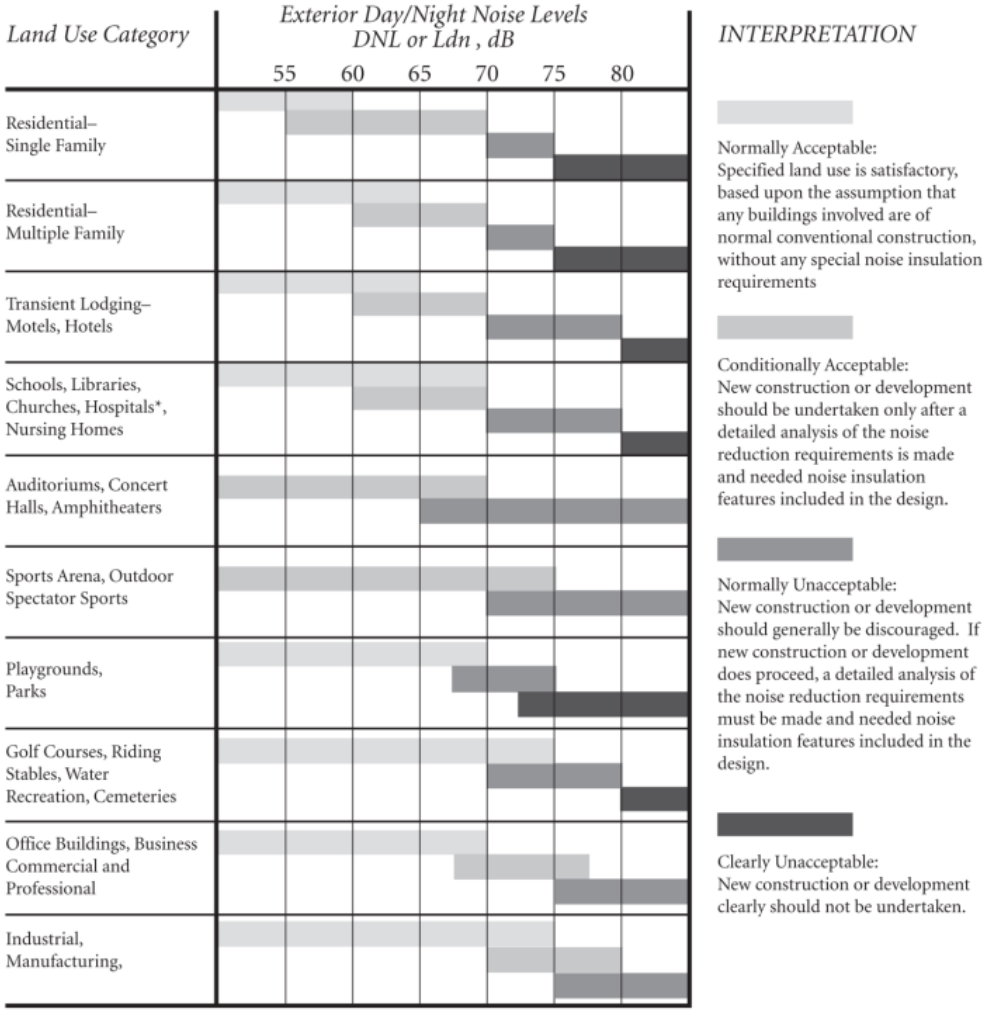
The engineering control design was predicated on the conservative vendor noise level data for each pump/motor combination and the above specifications are based on these data. It is possible that lower

noise pumps/motors may be procured and installed. In this case, the engineering controls may be reduced and still allow for compliance with the noise level limits.

5.0 Conclusion

A detailed noise modeling study of the proposed upgraded tank farm was conducted in order to calculate future noise levels due to Project operation, and to assess the Project related noise levels against the City of Pittsburg Noise Element and the California Energy Commission siting regulations as they pertain to the GenOn WPGS project to be licensed under the CEC. Operation of the Project with the equipment and engineering controls specified would result in compliance with the applicable noise limits, and result in negligible increases in noise over existing ambient conditions at existing and proposed residential locations. Project operation would result in sounds levels much lower than ambient levels for all residential locations.

Table 1: City of Pittsburg Noise Level/Land Use Compatibility



Source: Office of Planning and Research, State of California General Plan Guidelines,
Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1998.

*Because hospitals are often designed and constructed with high noise insulation properties, it is possible for them to be satisfactorily located in noisier areas.

Table 2 Measured Ambient Sound Levels			
Receptor	**L_{eq} (dBA)**	**CNEL (dBA)**	**L_{90} (dBA)**
R-1 (1)	63.1	69.5	50.3
R-2 (1)	63.1	69.5	50.3
R-3 (2)	61.8	64.7	48.1
R-4 (2)	61.8	64.7	48.1
R-5 (2)	61.8	64.7	48.1
R-6 (1)	63.1	69.5	50.3

(1) Ambient data from the URS 2009 study for LT1 was used for this location.
(2) Ambient data from the URS 2009 study for LT2 was used for this location.

Table 3 Noise Generating Equipment Sound Power Levels		
Name	**Number of Sources**	**Sound Power Level**
200 HP pump	3	96
500 HP pump	1	99
750 HP pump	9	100
1500 HP pump	2	103
3500 HP pump	4	105
Motor	19	102
Thermal Oxidizer	1	98
21 MVA transformer	1	90
1000 kVA transformer	3	81
300 kVA transformer	1	73
Tugboat	2	120

Table 4 Storage Terminal Future L_{eq} Noise Levels				
Receptor	**Pre-project L_{eq} (dBA)**	**Storage Terminal Operational L_{eq} (dBA)**	**Future Combined L_{eq} (dBA)**	**Increase in L_{eq} (dBA)**
R-1	63.1	41.0	63.1	0
R-2	63.1	41.3	63.1	0
R-3	61.8	45.7	61.9	0.1
R-4	61.8	49.1	62.0	0.2
R-5	61.8	47.7	62.0	0.2
R-6	63.1	45.2	63.2	0.1

Table 5 Storage Terminal Future CNEL Noise Levels				
Receptor	**Pre-project CNEL (dBA)**	**Storage Terminal Operational CNEL (dBA)**	**Future Combined CNEL (dBA)**	**Increase in CNEL (dBA)**
R-1	69.5	47.7	69.5	0
R-2	69.5	48.0	69.5	0
R-3	64.7	52.4	64.9	0.2
R-4	64.7	55.8	65.2	0.5
R-5	64.7	54.4	65.1	0.4
R-6	69.5	51.9	69.6	0.1

Table 6 Marine Terminal Future L_{eq} Noise Levels				
Receptor	**Pre-project L_{eq} (dBA)**	**Tugboat Operational L_{eq} (dBA)**	**Future Combined L_{eq} (dBA)**	**Increase in L_{eq} (dBA)**
R-1	63.1	53.6	63.6	0.5
R-2	63.1	52.7	63.5	0.4
R-3	61.8	47.9	62.0	0.2
R-4	61.8	46.7	61.9	0.1
R-5	61.8	44.9	61.9	0.1
R-6	63.1	50.6	63.3	0.2

Table 7 Marine Terminal Future CNEL Noise Levels				
Receptor	**Pre-project CNEL (dBA)**	**Tugboat Operational CNEL (dBA)**	**Future Combined CNEL (dBA)**	**Increase in CNEL (dBA)**
R-1	69.5	49.8	69.5	0
R-2	69.5	48.9	69.5	0
R-3	64.7	44.1	64.7	0
R-4	64.7	42.9	64.7	0
R-5	64.7	41.1	64.7	0
R-6	69.5	46.8	69.5	0

X:\WesPac\13 Noise\mxd\Figure 13-1 Noise Receptor Locations.mxd

Figure 1
WesPac Site and Surrounding Area
WesPac Pittsburg Energy Infrastructure Project

TRC

12/21/2011

Noise Receptor

Terminal Boundary

N

1:12,000

1 inch = 1,000 feet

ft
0 400 800

Figure 2: WesPac Storage Terminal Operational Noise Contour Map

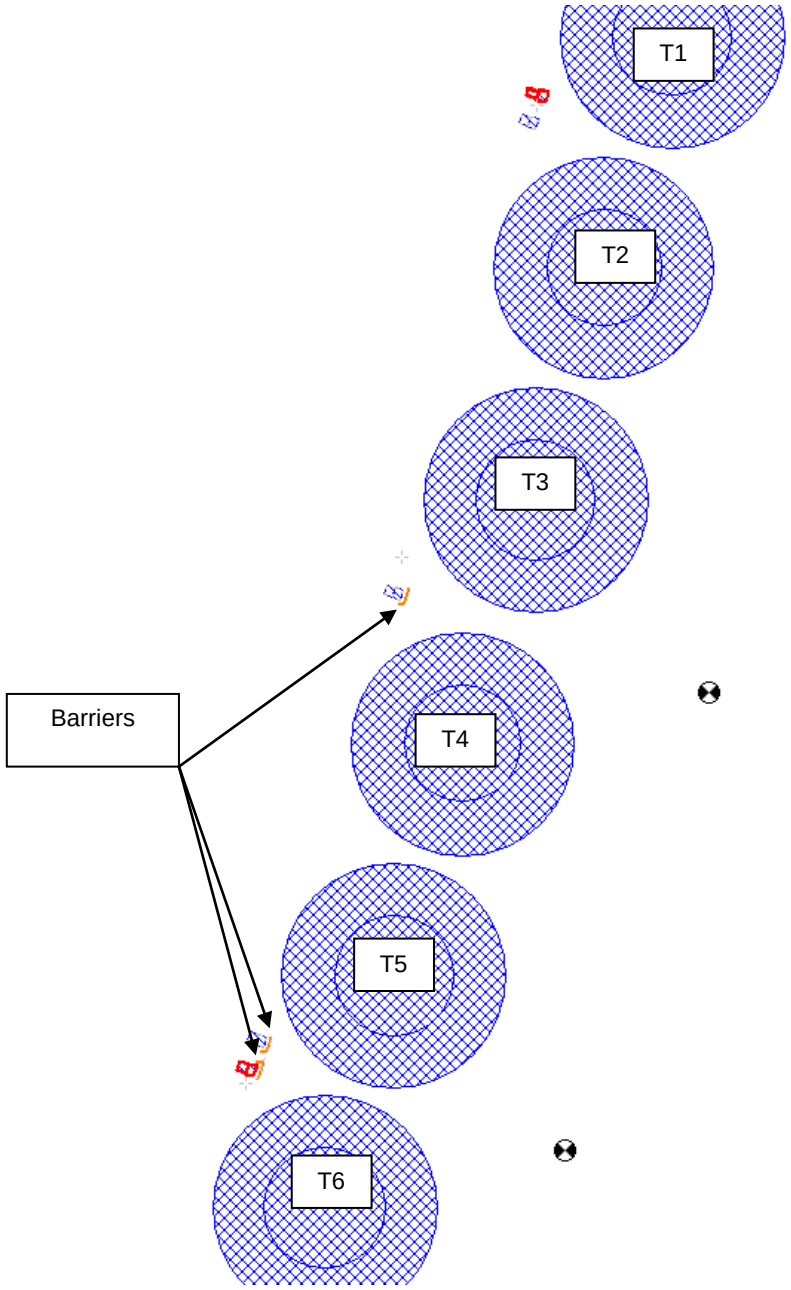
Figure 3: Marine Terminal Operational Noise Contour Map

APPENDIX A

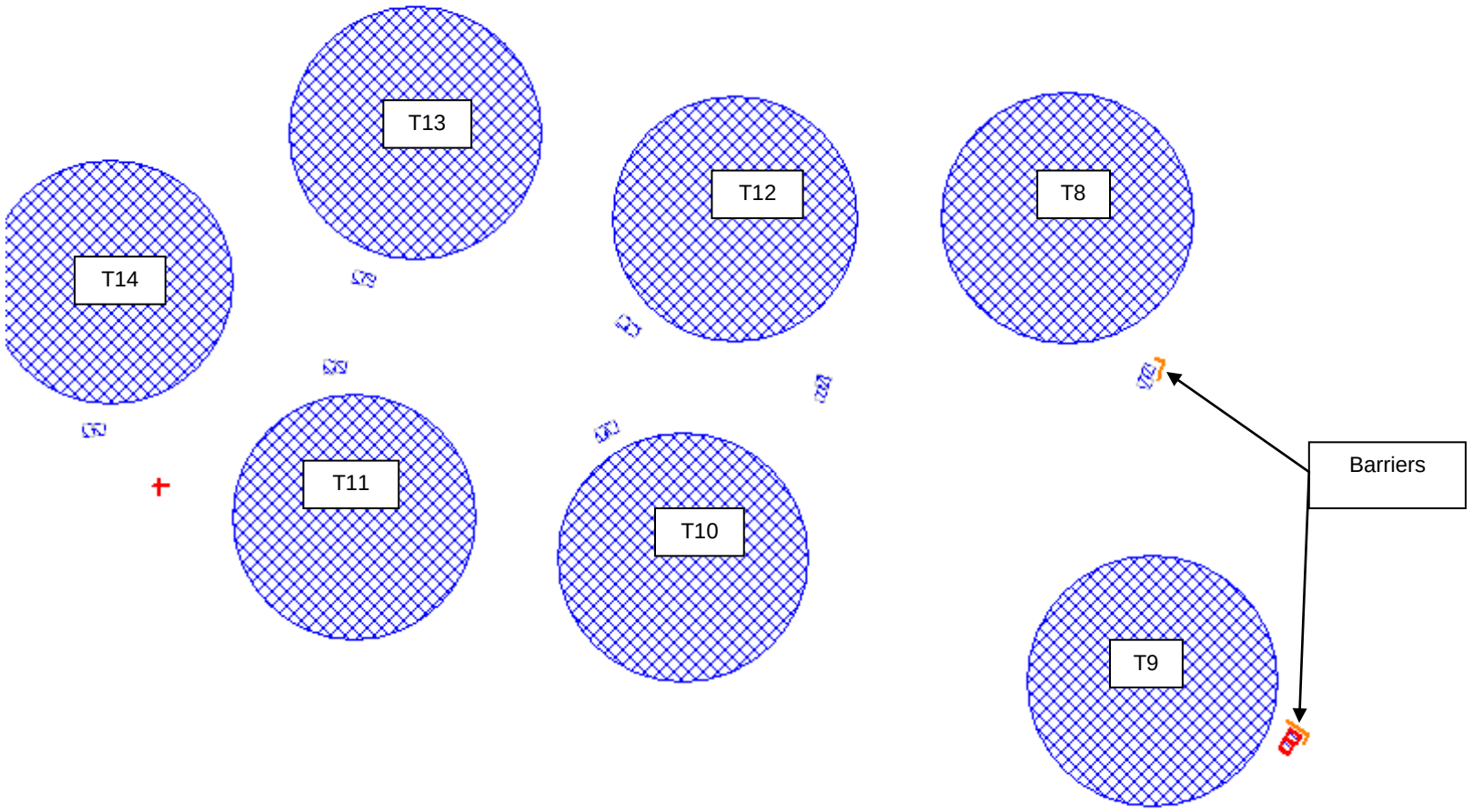
Schematics for Barrier Walls

Eastern Tank Farm

Total Barrier Surface Area = 2400 sq ft

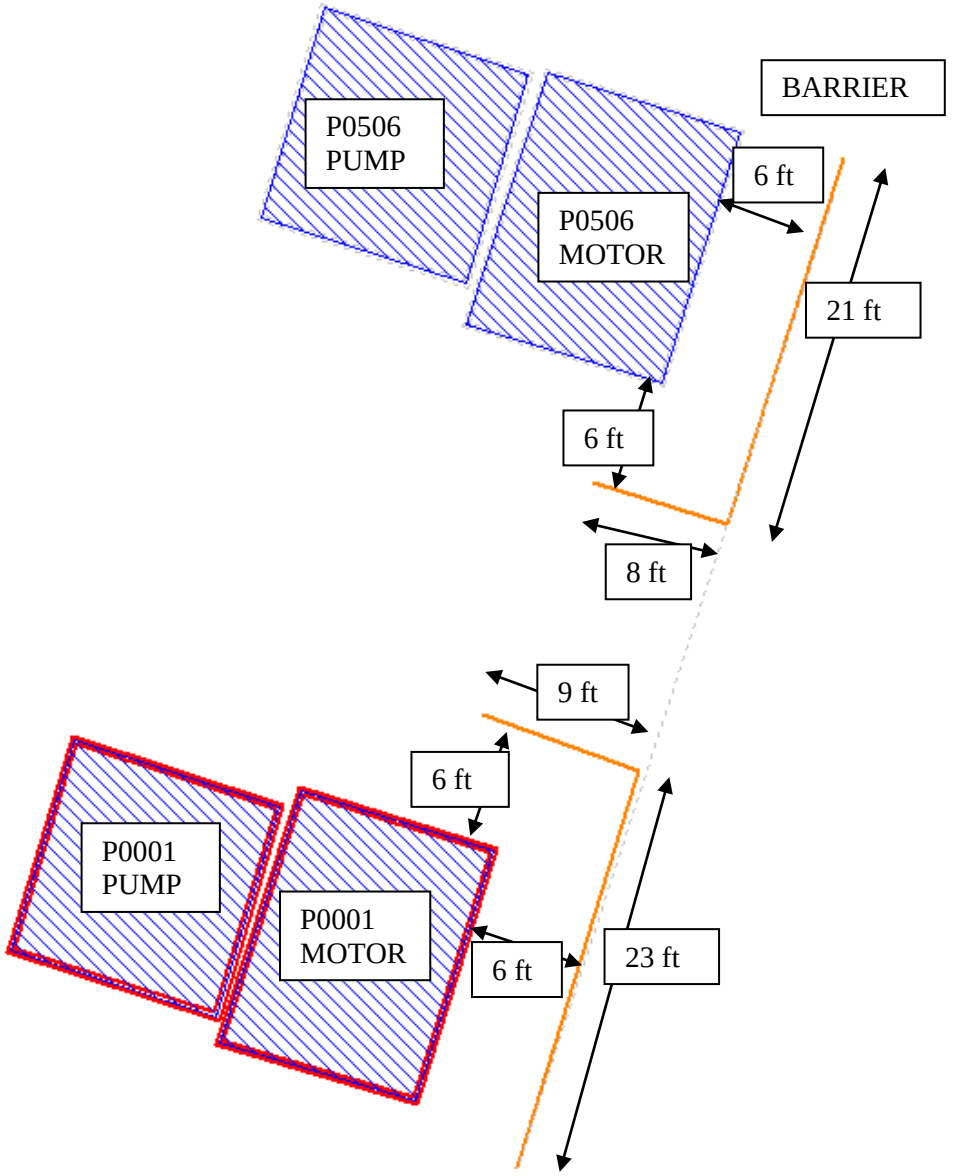


Southern Tank Farm



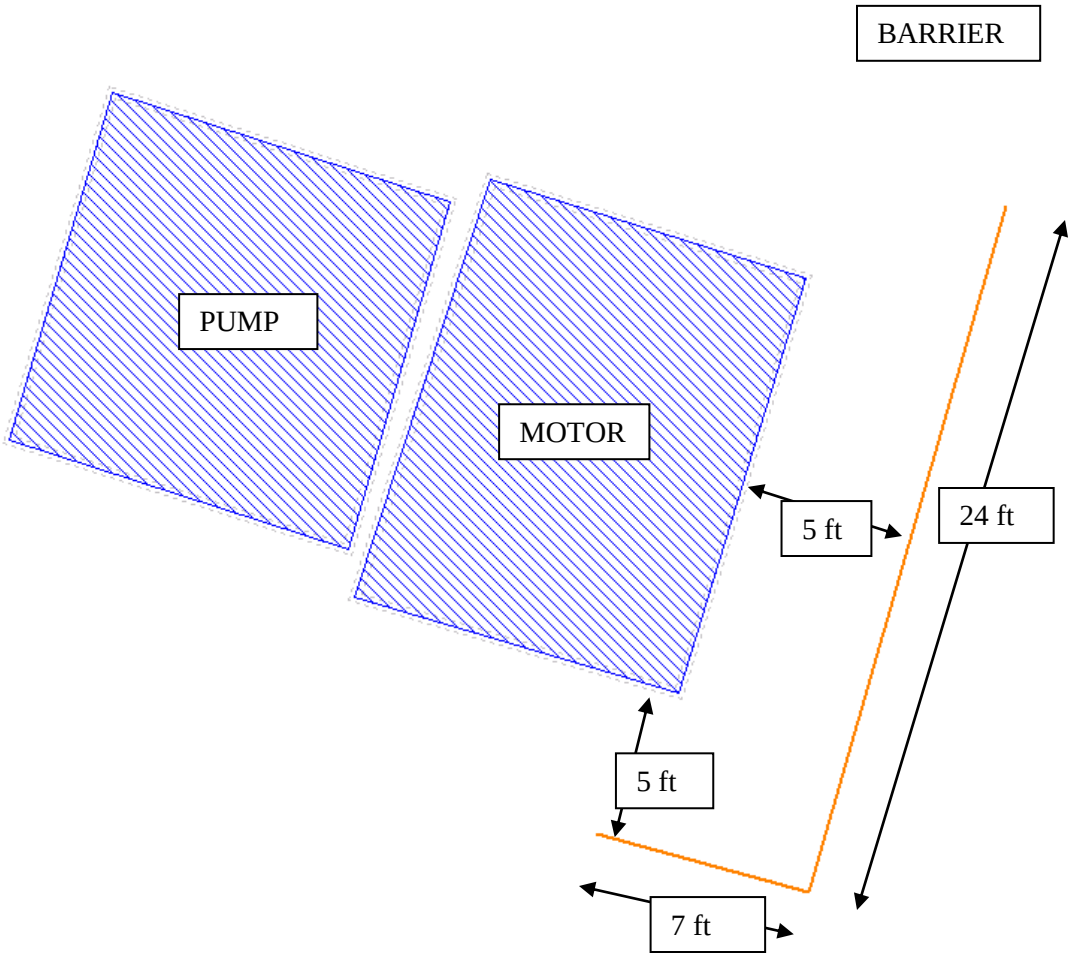
P0001 and P0506
P0001 barrier is 16.5 ft tall
P0506 barrier 12 ft tall

Close Up View



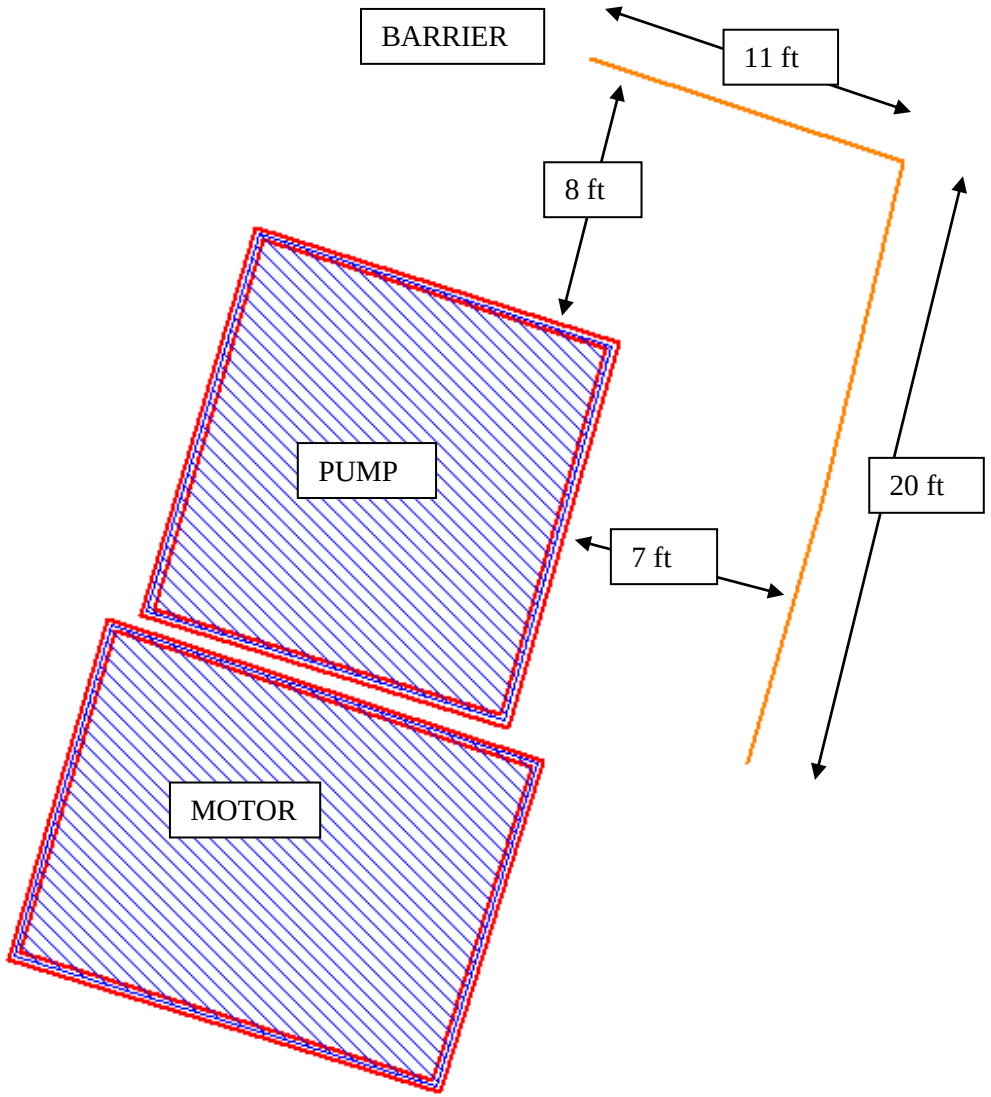
P0304
15 ft tall

Close Up View



P0800
16.5 ft tall

Close Up View



P0900
13 ft tall

Close Up View