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KM Acoustic Studies

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SUBJECT: *Construction Noise Analysis for 3300 Panorama Road, Morro Bay, California.*

To Whom It May Concern:

Thank you for the opportunity to participate in the environmental analysis for a construction related demolition project located in Morro Bay, California. As described in the information you provided, the project consists of removing several large steel fuel tanks, concrete pads, and surrounding support facilities. The City of Morro Bay (City) has indicated that an acoustical analysis is required due to the duration of the demolition activities and the project sites' proximity to residential areas. The purpose of this analysis is to assess existing noise conditions in the study area and compare that to the projected noise produced by the project (onsite activities and truck trips to and from the site) to determine if a significant impact would be experienced by residents in close proximity to the site or along the designated haul route.

EXISTING CONDITIONS

Ambient sound levels were measured on 1/27/2017 in order to serve as a reference point to which a comparison can be made with estimated noise levels associated with proposed construction activities. Ambient levels included noise contributions from all sources of normal neighborhood activities plus noise generated by traffic on local neighborhood streets and to a lesser degree State Route 1. Measured ambient levels were between 48 and 52 dBA L_{eq}[1] as seen in Table 1.

[1] L_{eq} is a time weighted average over a given measurement period, 10 minutes at each location in this case.

Table 1: Noise Monitoring Data

Monitoring Location	Noise Level dBA L_{eq}
1	48
2	50
3	52
4	52
5	50

Refer to Figure 1 for Monitoring Locations

EVALUATION METHODOLGY

In some planning jurisdictions there are guidelines established in order to help evaluate construction noise, and perhaps thresholds established defining overall maximum acceptable noise levels (L_{max}) or acceptable time averaged hourly levels ($L_{eq(h)}$) during construction activities. However, the City's General Plan Noise Element does not address construction related noise nor do any of the City's community noise ordinances that were referenced.

Often used for long range planning purposes, the Community Noise Equivalent Level (CNEL) or Day-Night Average Sound Level (L_{dn}) methodologies would not be good evaluation techniques in this case because either metric is a 24-hour time-averaged exposure level, adjusted with various penalties assigned for evening and or night operations. Since there will not be evening (7-10 PM) or night (7 PM to 7 AM) activities at the site, a more relevant evaluation technique should be used. The Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) use the hourly average noise level, $L_{eq(h)}$, in assessing construction related noise in their environmental documents. Consistent with those agencies, $L_{eq(h)}$ was used in quantifying estimated hourly noise levels for this project.

Construction noise evaluation can vary considerably in terms of scope and desired outcome and can broadly be categorized as follows:

- No criteria specified;
- Qualitative criteria, "Noise levels shall not cause a disturbance";
- Relative criteria, "Noise levels shall not exceed ambient noise levels by more than x dB";
- Absolute criteria, "Maximum noise levels shall not exceed x dB"; and
- Criteria containing a combination absolute and relative noise level limits.

For this project, because it is in a relatively quiet residential area, and projected to last for up to three months, I would suggest a maximum not to exceed level of +25 dBA Leq(h) over baseline, with an average level of up to +20 dBA Leq(h) as acceptable for day to day operations at the project site over baseline conditions.

Due to the complexity associated with quantifying construction noise at the project site because of all the different types of activities, potential operation of several large and small pieces of equipment at a time, how equipment might be grouped, equipment operating locations within the site with respect to varying distances from sensitive receptor locations, time based usage factors of equipment, existing shielding provided by buildings and berms, varying topography, etc., the FHWA Roadway Construction Noise Model (RCNM) was utilized in this evaluation. The program enables the calculation of construction noise levels in more detail than manual methods while avoiding the need to collect extensive amounts of project-specific input data. Using the RCNM, predicted noise levels can be evaluated at any distance from the project site using specific user inputs.

MODELING RESULTS

Mobile equipment such as dozers, excavators, loaders, etc., operate in a cyclic fashion in which a period of full power is followed by a period of reduced power, causing a difference in perceived noise levels over time. Other equipment such as generators and compressors, considered to be stationary when operating, typically don't have different noise levels that vary over time, rather they produce sound at a steady state.

As described, the tank removal portion of the project will have 1 excavator operating most of the time. Contractor anticipates using two excavators occasionally. Contractor will only have two heavy equipment operators on site at a time, so only two machines would be operating occasionally together, with the potential addition of a water truck. The following equipment list anticipated to be used on the project was supplied by the contractor:

- Liebherr 934 demolition with a rotating shear
- Linkbelt 350 with rotating s hear by genesis, gxp 660
- Linkbelt 290lx with grapple
- Bobcat t190
- Late model water truck, 2500 gallons
- John Deere 50 mini excavator
- John Deere 544 loader
- 10-wheel dump trucks

A busy day of the tank removal portion of the project was simulated with the default equipment type being selected in the RCNM with 2 excavators, 2 dump trucks, a generator, and a compressor all operating within the site at the same time. The excavators and dump trucks were placed near the tanks, and the stationary equipment was modeled at 50' from a residence. The RCNM predicted that an average hourly level of approximately 69 dBA could reasonably be expected under these inputs for the closest receptor. For noise monitoring location #1 (refer to Figure 1), this would mean up to a 20 decibel increase over ambient levels, well within the 25 decibel increase suggested earlier.

Keep in mind that any number of predictions could be made by changing equipment types, distance to receptor location, grouping of equipment, etc., and that the above analysis was considered very conservative because it is highly unlikely that both a high power generator and compressor would ever be operating in unison that close to someone's house with all the other things happening at the same within the site. Fifty feet was considered to be the closest distance at which a residence would be located to the project boundary, and thus the most potentially impacted.

Truck traffic is also of small concern in that there will be infrequent times where haul in/out of equipment and haul out of demolition debris will generate up to 20 truck trips per day. This level of truck trip activity would be considered infrequent and only expected to occur for several days during the project. Averaged out over the course of a typical 8 hour work day, 2-3 trips an hour would not be considered a significant increase through the residential area adjacent to the designated hail route given the short-term nature of the project.

For the concrete pad and soil / misc. debris removal portions of the project, the contractor anticipates using an excavator with a hydraulic breaker ram to bust up the concrete, with two other excavators with thumb attachments to stockpile and loadout trucks. There will also be truck trips generated by this portion of the project to haul out dirt and misc. debris similar to the tank removal portion of the project. This portion of the project is only expected to last approximately 2 weeks. Equipment expected to be used includes:

- Cat Excavator 336
- Cat Excavator 330
- Cat Excavator 328
- Bobcat t190
- Late model water truck, 2500 gallons
- John Deere 544 loader
- 10-wheel dump trucks
- Two Peterbuilt end dumps

The RCNM modeling prediction for this portion of the project included two excavators, a hydraulic breaker ram, and two dump trucks. Again, it is highly unlikely that all this equipment would be grouped closely together and operating at the same time within the site. Nonetheless, this was considered a conservative analysis and the model predicted roughly 62 dBA L_{eq} at a receptor distance of 200 feet under the above user inputs. As with the tank removal, any number of predictions could be made by changing equipment types and distances to sensitive receptor locations.

SUGGESTED NOISE MINIMIZING STRATEGIES

To ensure the project keeps construction noise to a minimum, public outreach, time constraints, noise sensitivity training, and use of equipment regulations can be effective techniques in reducing project related noise, and its perception by receivers. The measures outlined below have been evaluated for effectiveness based on the

short-term nature of the project, the feasibility, ease of implementation, cost, and reasonableness of the measure.

- Develop a public outreach program. An effective public information program provides a mechanism for notifying adjacent residents of the project. Describe what the project is, how long it will be, daily hours, haul routes, etc., best accomplished with a postcard or flyer that detail activities in a timeline. Provide a phone number, e-mail, or other way the public can register noise concerns or complaints on the informational mailing. A well informed public will be much more receptive to the project.

- Provide project level onsite worker training given by the foreman in noise sensitivity and noise-specific issues associated with the project including proper equipment operation.

- Use noisy equipment only when necessary and switch off such equipment when not in use.

- Avoid grouping equipment as much as possible.

- As much as possible, use modern equipment (Tier 3 or higher) in proper tune. Newer equipment is generally quieter than old equipment for many reasons.

- Use factory mufflers. Most construction noise originates from the engines due to the air intake and exhaust cycle. Specifying the use of factory installed muffler systems can control much of this engine noise.

- Whenever possible, position stationary noise sources such as generators and compressors as far away as possible from noise sensitive areas. If relatively static equipment such as pumps, generators, compressors, etc. must be located in close proximity to sensitive receptors, utilize existing shielding from the large existing berm and or existing structures and support facilities.

- If necessary, monitor noise levels during construction. If noise complaints are received, provide noise monitoring compliance checks.

- Develop reduced speed limits (15 mph) for trucks travelling to and from the project site through residential areas.

Regardless of the types of noise minimizing strategies employed, successes or failures are ultimately determined by the contractors' adherence to the projects conditions of approval.

NOISE MONITORING PLAN DURING CONSTRUCTION

Noise management during construction shall consist of onsite noise monitoring, a noise disturbance notification process, and a reporting process.

Onsite noise monitoring shall be conducted at a minimum with an ANSI Type 2 precision sound level meter (with windscreen for outdoor use), weighting set to the "A" scale, and the response rate set to slow. Each of the five monitoring locations (refer to Figure 1) shall be measured at least once daily during active demolition activities and the noise level recorded and logged for each location. The noise monitoring reporting log shall include a detailed description of construction activities and intensity at the time of the measurement, monitoring location, wind conditions at time of the measurement, and shall include calibration data of the meter at least once daily. Additionally, the onsite monitor will conduct instantaneous monitoring at specific locations, if it is warranted by a noise complaint.

In accordance with the terms of the projects' condition of approval provided by the City, provide the nearby residents with a means to formally complain about noise disturbances. Create a "Noise Disturbance Register" to track noise disturbance claims. Develop a notification form for residents to use to formally log complaints. A copy of the Noise Disturbance Notification shall be made available at the City Community Development Department building, or will be sent to residents upon request. Additionally, provide and or post at the job site trailer the name and number of the onsite noise monitor to receive complaints.

Noise disturbance incidents shall be investigated on a case-by-case basis. Responses to a noise disturbance claim will be based on the nature of the claim and may include (but are not limited to):

- Onsite monitor will record the noise disturbance claim in the Noise Disturbance Register and will notify the complainant that the claim has been recorded.

- If warranted, noise monitor will conduct an onsite visit to further investigate the noise disturbance.

- Onsite monitor will attempt to link the identified noise disturbance with a source (a specific event or activity conducted as part of trucking or construction), and will determine what measures may be taken to lessen the noise generation.

- If warranted, conduct a follow-up visit over the duration of the noise generating event to determine whether the noise levels have been sufficiently decreased.

Noise monitoring results shall be summarized and reported on a monthly basis to the City. A summary of the noise complaints recorded over the same time period in the Noise Complaint Registry shall be included with the monitoring results. Based on the results of the monitoring and in discussion with the project applicants representatives on site, additional minimization measures or adaptive noise management strategies will be identified and implemented as required.

Sincerely,

Karl Mikel, PE QSD MSc.