Lincoln Office
600 P Street, Suite 310
Lincoln, NE 68508
Monolith-corp.com

September 9, 2026

Village of Hallam
c/o Robin Likens, Village Clerk and Treasurer
315 Main Street
Hallam, NE 68368

RE: Addition of Sound Study to Application Filed July 15, 2026

Dear Ms. Likens,

Monolith Materials, Inc., with its affiliates ("Monolith"), in cooperation with its proposed operator Crusoe Technologies LLC, through its affiliates ("Crusoe"), provides the enclosed sound study prepared by Kimley Horn and Associates Inc. related to its application for special permit filed July 15, 2026.

The enclosed sound study is provided in response to community comments and demonstrates the proposed Project's anticipated compliance with the sound restrictions of § 11-603(E) of the Hallam Zoning Code and the proposed special permit conditions of approval. The sound study is based on expected equipment and preliminary site design. While the final equipment or site configuration may vary from those modeled, the Project will at all times remain subject to the applicable sound restrictions of the Hallam Zoning Code and the special permit conditions of approval.

As proposed, the special permit conditions of approval would further require the project operator to commission an additional sound study within six months following completion of construction to confirm operational compliance with all sound restrictions of the Hallam Zoning Code and the special permit conditions of approval.

Thank you for your consideration and please contact us with any questions.

Sincerely,

Austin Burk
Vice President, Capital Projects

Lincoln Office
600 P Street, Suite 310
Lincoln, NE 68508
Monolith-corp.com

Sound Study

[Attached]

NOISE MODEL STUDY

CRUSOE SPARK – HALLAM, NE

LANCASTER COUNTY, NEBRASKA

Prepared for:

Crusoe, Inc.

Prepared By:

Tad Hardy, P.E., Kimley-Horn and Associates, Inc.

September 9, 2026

Kimley-Horn Project No. 060011589

Contents

1.0 EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc. (Kimley-Horn) was retained by Crusoe, Inc. to summarize the measured existing noise levels as well as the evaluated noise levels associated with the operational equipment expected to be located at the proposed Crusoe Spark – Hallam, NE data center site in Lancaster County, NE.

1.1 OVERVIEW

The proposed data center site will be located on a property that is currently industrial-zoned land. The proposed data center project site is located approximately 0.4 miles northeast of the Village of Hallam, approximately 4 miles southwest of Princeton, approximately 6 miles southwest of Sprague, approximately 5 miles southeast of Kramer, and approximately 5 miles northwest of Cortland. The site is generally located west of SW 42nd Street and south of W Pella Road. The data center site will be located on undeveloped land that is currently zoned industrial with industrial land uses to the west and scattered rural residential and agricultural land uses to the north, south, and east. Additionally, active Union Pacific (UP) railroad tracks are located directly west of the site.

1.2 ANALYSIS FINDINGS

Lancaster County Nebraska does not establish a numerical noise level limit for industrial-zoned areas, and the State of Nebraska does not impose any relevant numerical maximum decibel noise level. The Village of Hallam imposes a noise level limit of 55 dB(A) for receiving residential land uses. It is noted that although the project site is not located in Hallam, the village does impose an ordinance that states “the Village Board of Trustees shall control and enforce the zoning of all land within the village limits of Hallam and the area within one (1) mile thereof”. The Crusoe Spark – Hallam, NE site is located approximately 0.4 miles north of Hallam and would therefore be subject to the 55 dB(A) noise level limit for receiving residential land uses.

Ambient surveys were conducted at the project site and at the northeastern corner of the Hallam Congregational Cemetery for 48-hour measurement periods. The 48-hour average ambient noise levels at the proposed site were evaluated for A-weighted decibels, which ranged between approximately 45 dB(A) and 52 dB(A) with traffic and insect noise excluded. The 48-hour average ambient noise levels near Hallam Congregational Cemetery ranged between approximately 49 dB(A) and 63 dB(A) with insect, livestock, and agricultural equipment excluded. The 48-hour average ambient noise levels were also evaluated at C-weighted decibels, and the noise levels at the proposed site ranged between approximately 53 dB(C) and 71 dB(C) with traffic and insect noise excluded. The 48-hour average C-weighted ambient noise levels at the Hallam Congregational Cemetery ranged between approximately 52 dB(C) and 67 dB(C) with insect, livestock, and agricultural equipment excluded.

The primary sources of noise at the Crusoe Spark – Hallam, NE site are anticipated to be the ventilation/chiller units at each data center building, battery cabinets, emergency generators during testing periods or power outages, and the pad-mounted transformers. Note that no exemptions for noise from emergency generators are anticipated to be applicable for this site. Unmitigated hourly equivalent operational noise levels from the data center facility during typical mechanical operations are estimated to be approximately 40 dB(A) and 55 dB(C) at the nearest residential land use. Unmitigated hourly equivalent operational noise levels for the data center facility during emergency operations are estimated to be approximately 44 dB(A) and 63 dB(C). Estimated operational and emergency operations noise levels are anticipated to remain below the Village of Hallam maximum noise level of 55 dB(A) at the closest residential receptors as well as the maximum noise level of 75 dB(A) for industrial receiving land uses for the west adjacent industrial facility, and emergency generators will only be operational during emergency situations.

2.0 INTRODUCTION

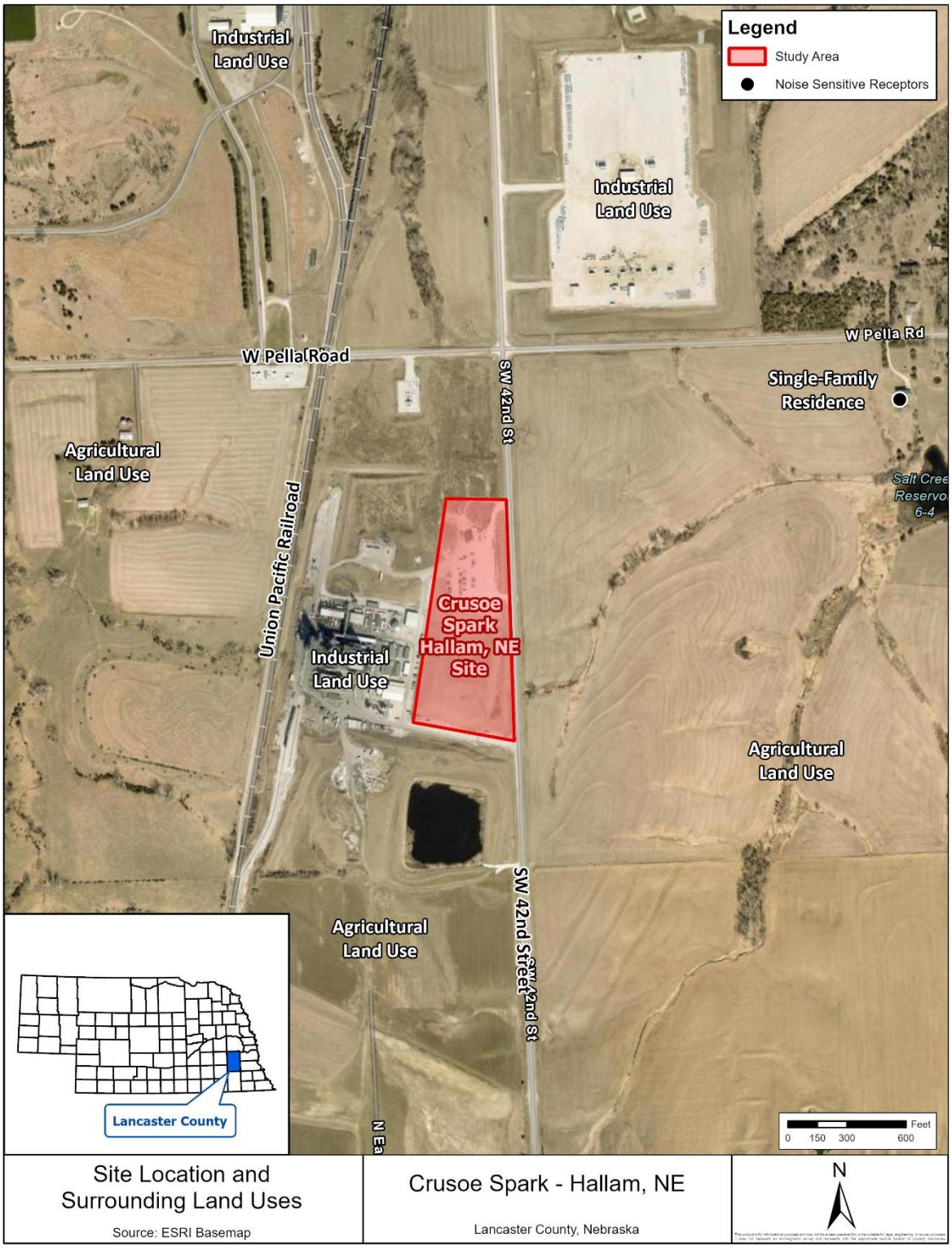
2.1 SITE LOCATION AND VICINITY

The proposed data center project site is located approximately 0.4 miles northeast of the Village of Hallam, approximately 4 miles southwest of Princeton, approximately 6 miles southwest of Sprague, approximately 5 miles southeast of Kramer, and approximately 5 miles northwest of Cortland. The site is generally located west of SW 42nd Street and south of W Pella Road. Land use surrounding the site includes industrial land with scattered rural residential and agricultural land uses in the surrounding area. Additionally, active Union Pacific (UP) railroad tracks are located directly west of the site. The nearest noise sensitive receptor, a rural single-family residence, is located approximately 2,050 feet northeast of the site boundary. The location of the proposed Crusoe Spark – Hallam, NE data center site is shown in **Figure 1**.

2.2 PROJECT DESCRIPTION

The proposed Crusoe Spark – Hallam, NE data center site will be developed on approximately 10 acres of land in Lancaster County, NE. Based on preliminary site design, the proposed data center campus will consist of thirty-six (36) data center units, each approximately 840 square feet and containing power, cooling, monitoring, fire suppression, and high-density racks. The site will have ten (10) generators in a generator yard in the central and northern portions of the site, three (3) chillers adjacent to each data center building, ten (10) BESS cabinets in the central and northern portions of the site, and twenty-six (26) pad-mounted transformers located throughout the project site.

Figure 1: Site Location and Surrounding Land Uses



3.0 CHARACTERISTICS OF NOISE

Noise is generally defined as unwanted sound. It is emitted from many natural and man-made sources. Sound pressure levels are usually measured and expressed in decibels (dB). The decibel scale is logarithmic and expresses the ratio of the sound pressure unit being measured to a standard reference level. Most sounds occurring in the environment do not consist of a single frequency, but rather a broad band of differing frequencies. The intensities of each frequency add together to generate sound. Because the human ear does not respond to all frequencies equally, the method commonly used to quantify environmental noise consists of evaluating all of the frequencies of a sound according to a weighting system. It has been found that the A-weighted decibel [dB(A)] filter on a sound level meter, which includes circuits to differentially measure selected audible frequencies, best approximates the frequency response of the human ear.

The degree of disturbance from exposure to unwanted sound – noise – depends upon three factors:

1. The amount, nature, and duration of the intruding noise
2. The relationship between the intruding noise and the existing sound environment; and
3. The situation in which the disturbing noise is heard

In considering the first of these factors, it is important to note that individuals have varying sensitivity to noise. Loud noises bother some people more than other people, and some individuals become increasingly upset if an unwanted noise persists. The time patterns and durations of noise(s) also affect perception as to whether or not it is offensive. For example, noises that occur during nighttime (sleeping) hours are typically considered to be more offensive than the same noises in the daytime.

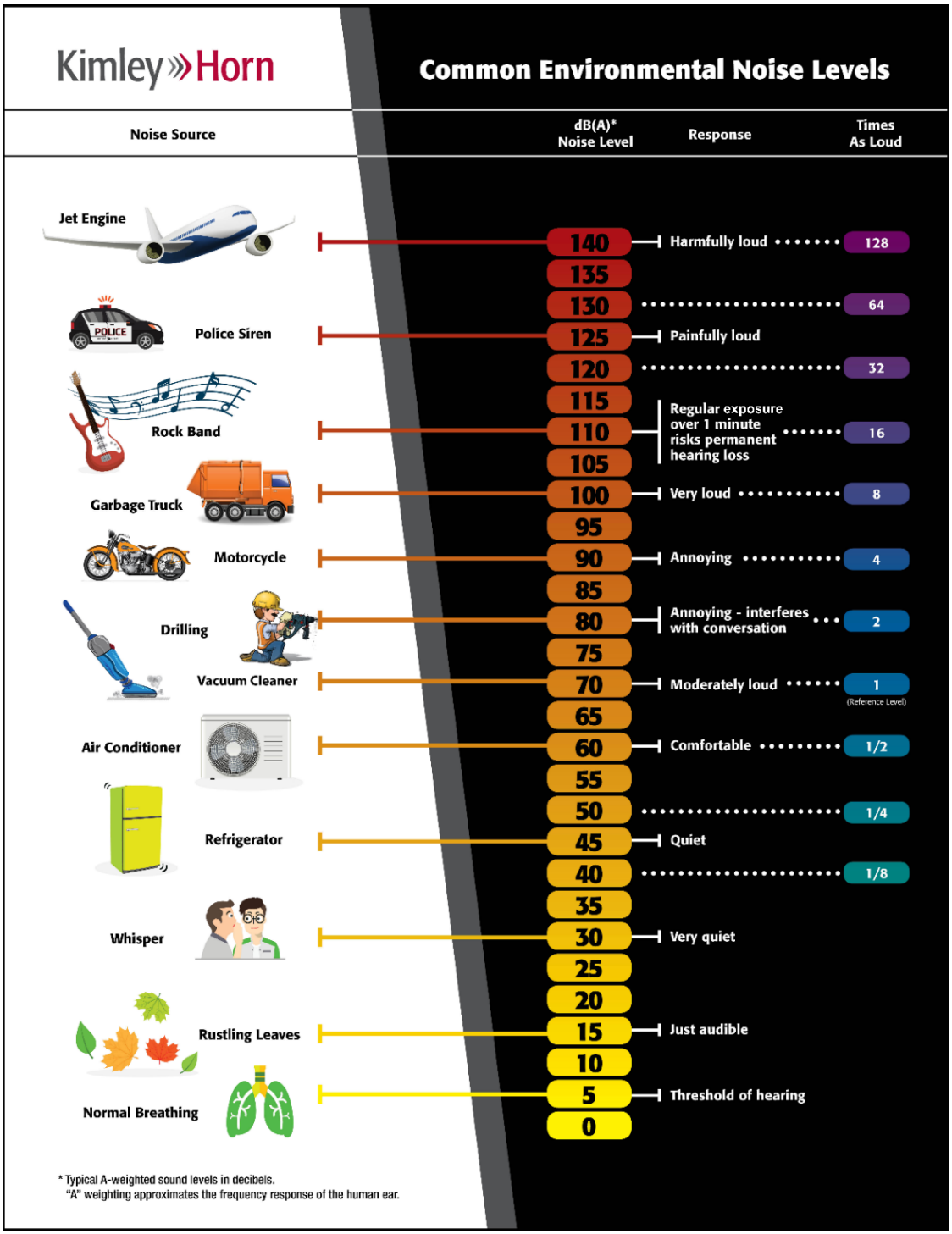
With regard to the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). A car horn blowing at night when background noise levels are low would generally be more objectionable than one blowing in the afternoon when background noise levels are typically higher. The response to noise stimulus is analogous to the response to turning on an interior light. During the daytime an illuminated bulb simply adds to the ambient light, but when eyes are conditioned to the dark of night, a suddenly illuminated bulb can be temporarily blinding. It is also possible for weather and other meteorology events to influence unwanted noise, as temperature, humidity and wind can change the landscape of how sound is received. Large wind events can increase and decrease the distance of where noise is received, and rain and weather events can add to the existing background noise.

The third factor – situational noise – is related to the interference of noise with activities of individuals. In a 60 dB(A) environment such as is commonly found in a large business office, normal conversation would be possible, while sleep might be difficult. Loud noises may easily interrupt activities that require a quiet setting for greater mental concentration or rest; however, the same loud noises may not interrupt activities requiring less mental focus or tranquility.

As shown in **Figure 2**, most individuals are exposed to fairly high noise levels from many sources on a regular basis. To perceive sounds of greatly varying pressure levels, human hearing has a non-linear sensitivity to sound pressure exposure. Doubling the sound pressure results in a three decibel change in the noise level; however, variations of three decibels [3 dB(A)] or less are commonly considered “barely perceptible” to normal human hearing. A five decibel [5 dB(A)] change is more readily noticeable. A ten-

fold increase in the sound pressure level correlates to a 10 decibel [10 dB(A)] noise level increase; however, it is judged by most people as only sounding “twice as loud”.

Figure 2: Common Noise Levels



Over time, individuals tend to accept the noises that intrude into their lives on a regular basis. However, exposure to prolonged and/or extremely loud noise(s) can prevent use of exterior and interior spaces.

4.0 EXISTING CONDITIONS

The predominant sources of noise in the vicinity of the proposed Crusoe Spark – Hallam, NE data center facility were observed to be environmental factors such as light rain and insect noise as well as traffic along SW 42nd Street. Other sources of noise included the adjacent industrial site, Monolith Olive Creek 1, and ambient environmental noise, such as wind and birds chirping. Noise measurements were also obtained near the Village of Hallam community at the northeast corner of the Hallam Congregational Cemetery. The predominant noise sources in the cemetery's vicinity were insect noise, wind, landscaping equipment, and nearby livestock.

To assess existing noise conditions near the proposed data center facility, two (2) long-term noise measurements were collected for a 48-hour duration from August 11, 2026, to August 13, 2026. Two (2) Svantek SV 917 Class 1 Sound Level Meters were set up. One measurement location was on the eastern portion of the proposed data center site, approximately 120 feet west of SW 42nd Street. The second measurement location was at the northeastern corner of the Hallam Congregational Cemetery. Long-term measurement hourly Leq values obtained in the field and within the proposed data center site were between 41 dB(A) - 61 dB(A) and 53 dB(C) – 71 dB(C), respectively. A summary of the long-term noise field data is shown in **Table 1**.

Table 1: Long-term Noise Measurement Data

Setup	LT1	LT2
Location Description	**Eastern portion of site, approximately 120 feet west of SW 42nd Street**	**Northeastern portion of Hallam Congregational Cemetery**
Measurement Time	**6:00 AM (08/11) – 6:00 AM (08/13)**	**5:30 AM (08/11) – 5:30 AM (08/13)**
Day 1 - Average Daytime L_{eq} Noise Level [dB(A)]	48.3	56.2
Day 1 - Average Nighttime L_{eq} Noise Level [dB(A)]	51.1	59.3
Day 1 - Average Daytime L_{eq} Noise Level [dB(C)]	60.7	59.4
Day 1 - Average Nighttime L_{eq} Noise Level [dB(C)]	62.9	60.7
Day 2 - Average Daytime L_{eq} Noise Level [dB(A)]	48.1	57.5
Day 2 - Average Nighttime L_{eq} Noise Level [dB(A)]	50.5	60.9
Day 2 - Average Daytime L_{eq} Noise Level [dB(C)]	59.2	58.9
Day 2 - Average Nighttime L_{eq} Noise Level [dB(C)]	59.3	59.9

The measurements were taken using the A-weighted and C-weighted scale and are reported in decibels [dB(A)] and [dB(C)]. Data collected by the noise meters included time, average noise level (Leq), maximum noise level (Lmax), and instantaneous peak noise level (Lpk) for each interval. Hourly average noise levels (Leq(h)) were derived from the Leq values. The existing noise measurements were collected under meteorologically acceptable conditions and were conducted based on the acceptable collection of existing noise level readings. The locations of the monitoring sites are shown in **Figure 3**.

Figure 3: Measurement Site Locations

5.0 REGULATIONS

5.1 VILLAGE OF HALLAM

Crusoe Spark – Hallam, NE is located approximately 0.4 miles from the Village of Hallam; however, the Hallam Code of Ordinances, Chapter 11, Article 2, § 11-204 states that "The Village Board of Trustees shall control and enforce the zoning of all land within the village limits of Hallam and the area within one (1) mile thereof". Therefore, the Crusoe Spark – Hallam, NE site is subject to any zoning laws and/or regulations set by the Village of Hallam.

The Hallam Code of Ordinance, Chapter 11, Article 6, § 11-6013(E) states that "No operation shall be carried on which involves noise to the receiving land use in excess of the sound limits included in the following table:"

Receiving: Land-use	**1 Hour Energy (Leq) Average**
Residential	55
Commercial	65
Industrial	75
Note: Leq in the energy average, not the arithmetic average	

It is noted that the closest residential land uses are located approximately 2,050 feet northeast and approximately 2,830 feet southeast of the proposed data center site and is within the above discussed one mile area around the Village of Hallam. The Village of Hallam, the nearby rural residences, and the Crusoe Spark – Hallam, NE site are subject to this ordinance. Therefore, the Crusoe Spark – Hallam, NE site is subject to the most restrictive noise ordinance of 55 dB(A) for receiving residential land uses. Also, the Monolith Olive Creek 1 carbon factory is located west adjacent to the Crusoe Spark – Hallam NE site and therefore, the Crusoe Spark – Hallam NE site is subject to the 75 dB(A) maximum noise level on the western property line for receiving industrial land uses.

Furthermore, while not outlined within the Hallam Code of Ordinances, a request made by the Village to incorporate findings regarding the C-weighted scale has also been included in this analysis. Sound pressure levels are usually measured in decibels however due to the nature of human ears and how sound travels, different frequency weightings are applied to these sound pressure levels. The A-weighting scale reads sound pressure levels by accounting for the mid-range frequencies that the human ear can typically hear and flattens out at the very low and high frequencies. The C-weighted scale reads sound pressure levels by accounting for the low and high frequencies that the human ear does not typically hear. In normal ambient conditions the C-weighted decibels can range anywhere from 15-20 decibels higher than its corresponding A-weighted decibel. The C-weighted decibel scale is most typically used for industrial noise sources as they are more likely to result in steady low-frequency noise. Any existing industrial infrastructure may already produce these low or high frequency noises.

6.0 NOISE ANALYSIS

Operational sound levels from the proposed Crusoe Spark – Hallam, NE site were evaluated using SoundPLAN. This program computes predicted sound levels at noise-sensitive areas through a series of adjustments to reference sound levels. SoundPLAN also accounts for topography, groundcover type, and intervening structures. Sound levels generated from chillers and emergency generators are anticipated to be the main sources of sound from the proposed data center site.

It should also be noted that noise from surrounding roadways was not modeled in this analysis, although SW 42nd Street, W. Pella Road, and other nearby roadways are anticipated to contribute to the ambient noise environment throughout the entire day. Additionally, Union Pacific (UP) railroad tracks are located approximately 1,200 feet west of the proposed site, but noise contributions from the railroad tracks were not modeled for this analysis. Typical daytime weather conditions were used for this analysis and the model did not include extreme temperature or humidity conditions as well as excluding large wind or rain events that may influence the perception of noise.

6.1 CHILLERS

Chiller equipment can generate steady, unvarying sound that may create issues when located near noise-sensitive areas. Based on the current site layout and anticipated size of each data center unit, the 840 square-foot data center unit would have three (3) Excool System chiller units. Based on this equipment's specifications a reference sound pressure level of approximately 81 dB(A) at 1 meter (i.e. 3 feet) for each chiller was used.

Sound generated by the chillers is expected to be partially mitigated by providing sufficient offsets between the chillers and surrounding noise-sensitive land uses as well as by the physical presence of the data center buildings, which are anticipated to shield and disperse some of the sound emitted by the chillers.

6.2 BESS CABINETS

BESS cabinets can also generate steady, unvarying sound that may create issues when located near noise-sensitive areas. Based on the current site layout and anticipated BESS units used, ten (10) BESS cabinets would be located in the central and northern portion of the site. Based on typical noise emission levels for battery cabinets, a reference maximum sound pressure level of 65 dB(A) at 1 meter (i.e. 3 feet) for each BESS cabinet was conservatively used. Sound generated by the BESS cabinets is expected to be partially mitigated by providing sufficient offsets between the BESS cabinets and surrounding noise-sensitive land uses as well as by the physical presence of the data center buildings.

6.3 TRANSFORMERS

Pad-mounted transformers can also generate steady, unvarying noise that may create issues when located near noise-sensitive uses. Based on the current site layout, twenty-six (26) pad-mounted transformers would be located throughout the site. Based on typical pad-mounted transformer noise emission levels, a reference maximum sound level for a transformer of 65 dB(A) at 1 meter (i.e., 3 feet) was conservatively used.

Noise generated from the transformers is not anticipated to significantly contribute to the operational project noise and is expected to be kept in control by distance to noise-sensitive receptors.

6.4 EMERGENCY GENERATORS

Emergency generator equipment can also generate steady, unvarying sound that may create issues when located near noise-sensitive areas. Based on the current site layout and anticipated size of each data center building, it was assumed that ten (10) emergency generators would be located at an equipment yard on the northern and central portions of the site. Based on noise emission levels for typical emergency generator equipment used for data center sites, a reference maximum sound level of 75 dB(A) at 7 meters (i.e., 23 feet) for the emergency generators was used.

Sound generated by emergency generators is expected to be partially mitigated by providing sufficient offsets between the generators and surrounding noise-sensitive land uses, the inclusion of sound attenuated enclosures around each generator, and by the physical presence of the data center buildings, which are anticipated to shield/disperse some of the sound from generators. It should be noted that generators will not operate continuously, except when the primary power supply is stalled or interrupted due to emergencies.

6.5 RESULTS

The SoundPLAN-predicted maximum unmitigated hourly equivalent operational noise levels during typical mechanical operations, when only chillers, BESS cabinets, and pad-mounted transformers are operational, are anticipated to be approximately 40 dB(A) and 55 dB(C) at the nearest residential location approximately 2,050 feet northeast of the proposed data center site and approximately 38 dB(A) and 53 dB(C) at the residential location 2,830 feet southeast of the proposed data center site.

The predicted maximum unmitigated hourly equivalent emergency operational noise levels during emergency operations, when chillers, BESS cabinets, pad-mounted transformers, and emergency generators are operational, are anticipated to be approximately 44 dB(A) and 63 dB(C) at the nearest residential location approximately 2,050 feet northeast of the proposed data center site and approximately 41 dB(A) and 61 dB(C) at the residential location 2,830 feet southeast of the proposed data center site.

The anticipated operational noise contours when the chillers, BESS cabinets, and pad-mounted transformers are in operation are shown in **Figure 4** depicting dB(A) results and **Figure 5** depicting dB(C) results. The anticipated operational noise contours when the chillers, BESS cabinets, pad-mounted transformers, and emergency generators are in operation are shown in **Figure 6** depicting dB(A) results and **Figure 7** depicting dB(C) results.

Figure 4: Anticipated Operational Noise Contours During Mechanical Operations dB(A)

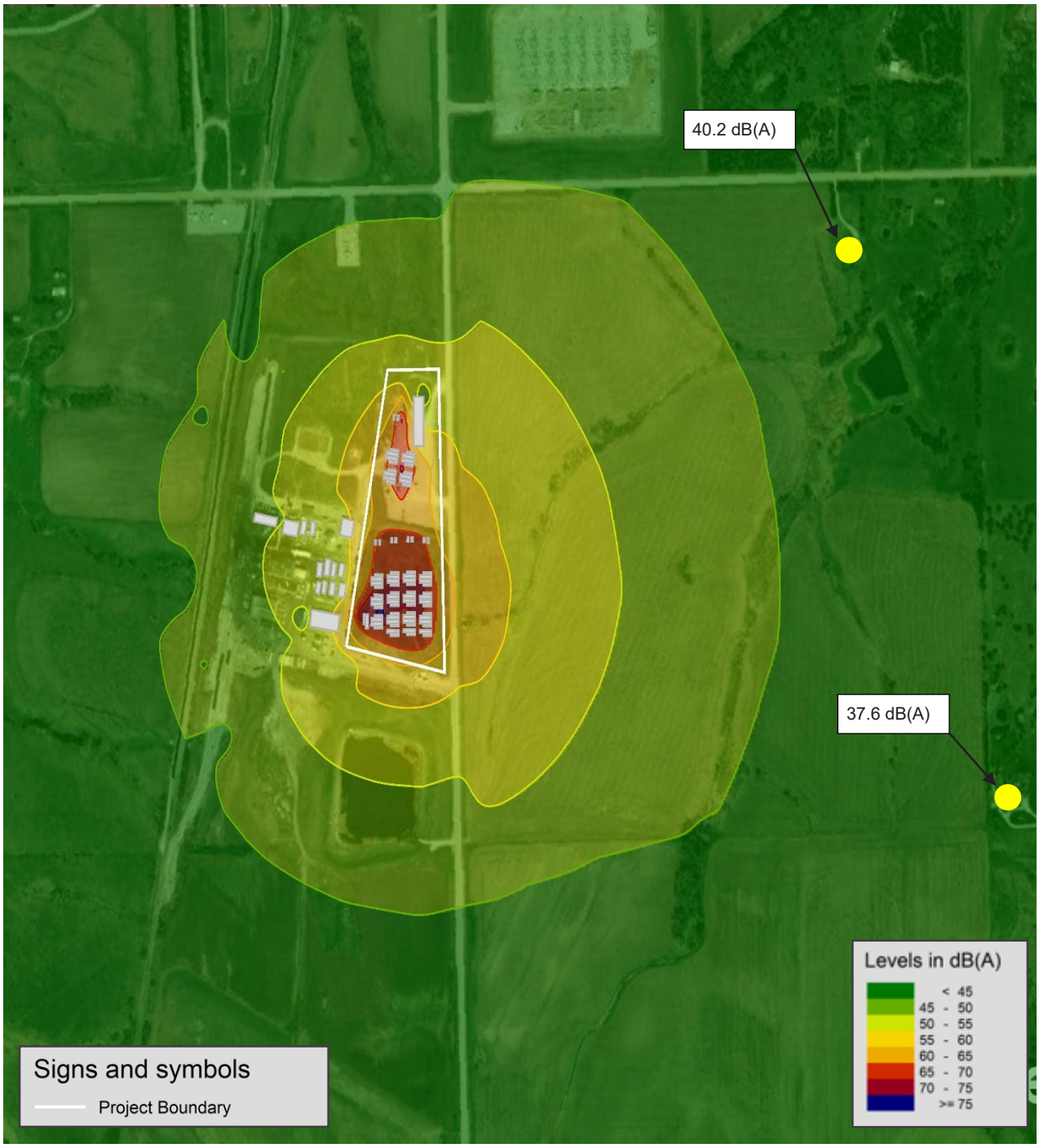


Figure 5: Anticipated Operational Noise Contours During Mechanical Operations dB(C)

Figure 6: Anticipated Operational Noise Contours During Emergency Operations dB(A)

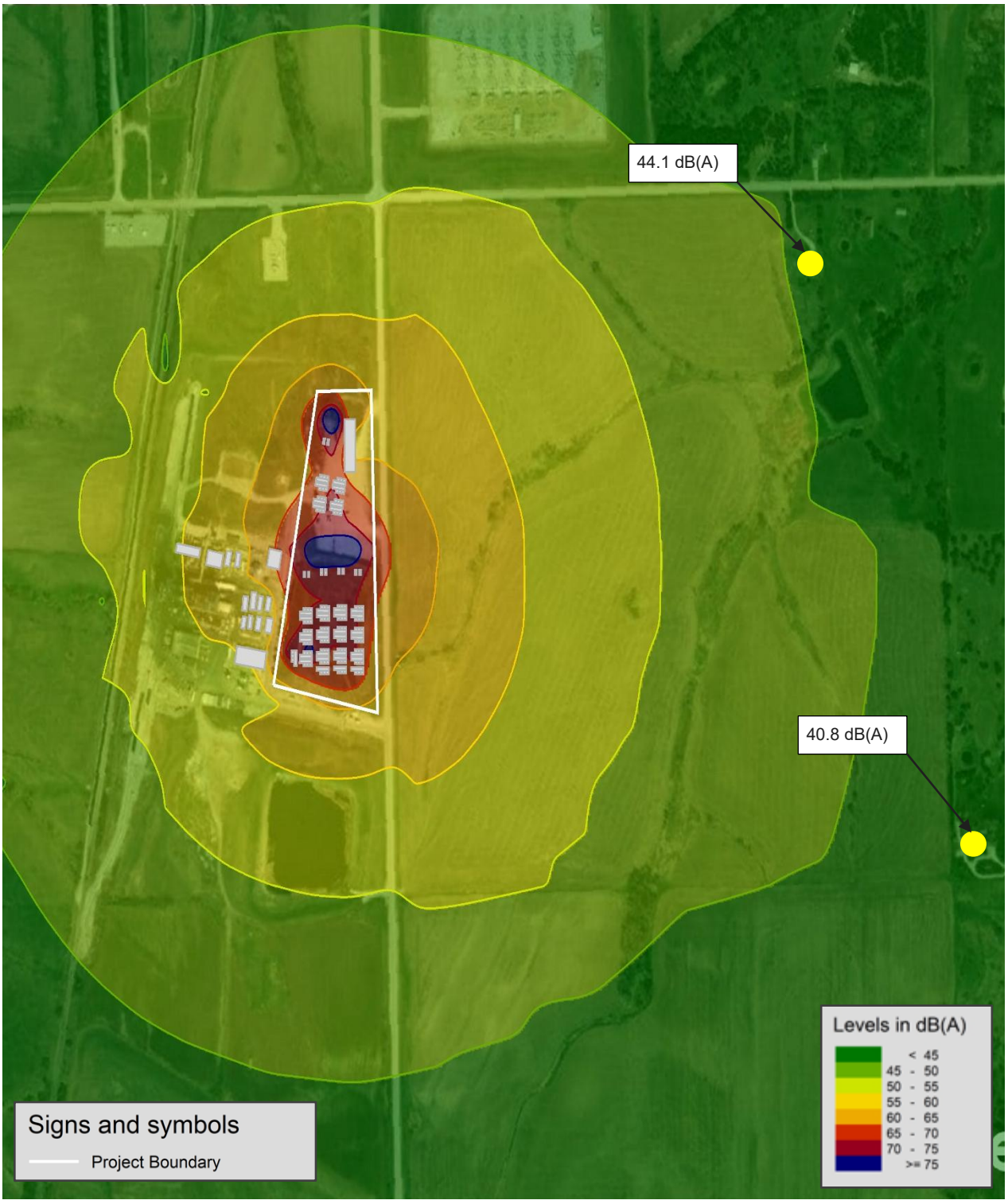
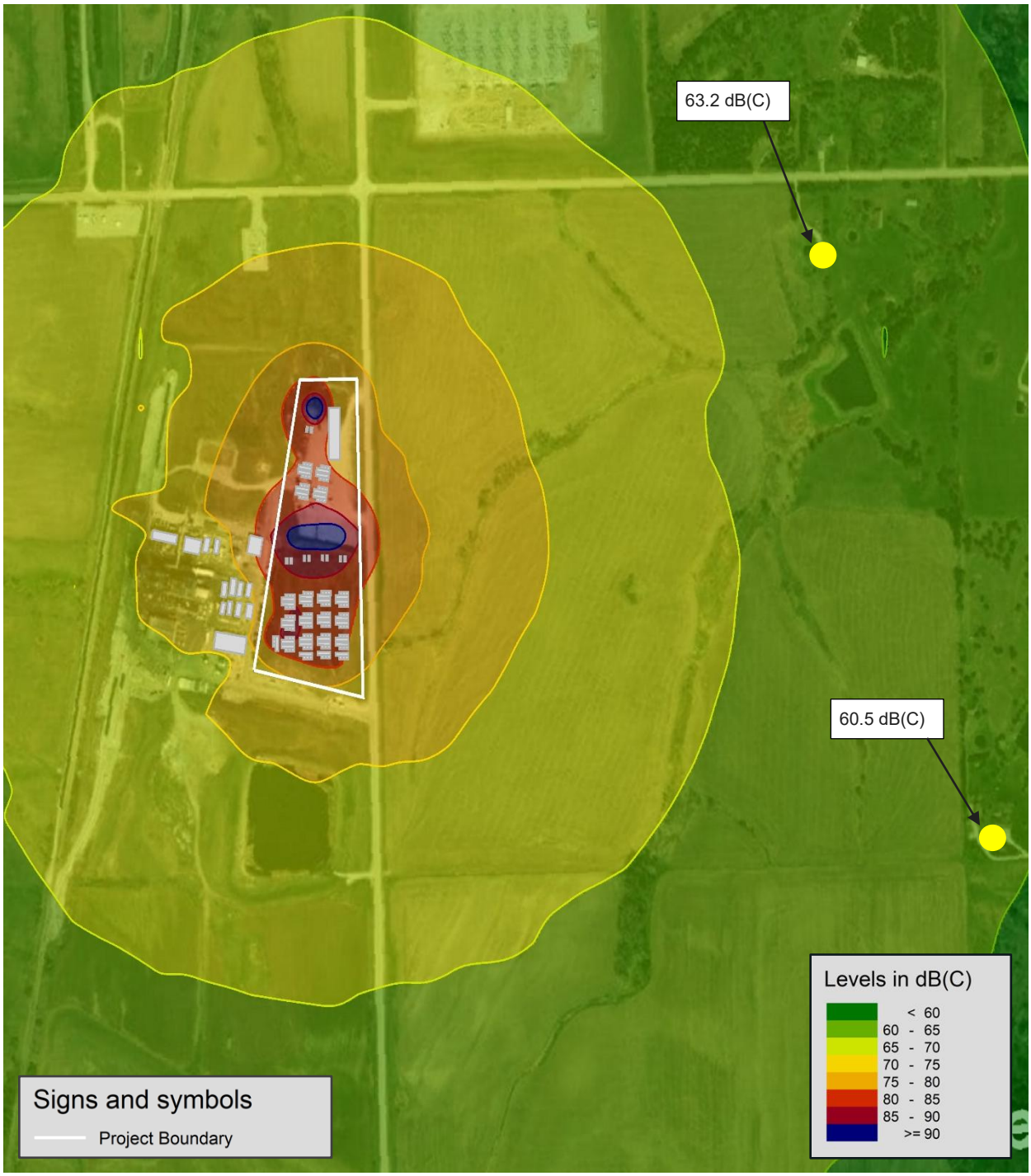


Figure 7: Anticipated Operational Noise Contours During Emergency Operations dB(C)



7.0 CONCLUSIONS

The site is generally located west of SW 42nd Street and south of W Pella Road in unincorporated Lancaster County, Nebraska. The proposed data center site will be located on land that is currently industrial and zoned as I2 – Industrial for industrial uses. There is residential land use to the east, west, and south, industrial land uses to the west and north, and agricultural land uses to the west, east, and south. It is noted that UP railroad tracks are located west of the proposed data center.

The Village of Hallam imposes a noise level limit of 55 dB(A) for receiving residential land uses. It is noted that although the project site is not located in Hallam, the village does impose an ordinance that states “the Village Board of Trustees shall control and enforce the zoning of all land within the village limits of Hallam and the area within one (1) mile thereof”. The Crusoe Spark – Hallam, NE site is located approximately 0.4 miles north of Hallam and would therefore be subject to their zoning regulations including the 55 dB(A) residential noise level limit.

After modeling analyzing the anticipated operation noise levels at the proposed data center site, it was determined that noise levels during both mechanical and emergency operations at the site are not anticipated to exceed the 55 dB(A) for receiving residential land uses or 75 dB(A) for receiving industrial land uses. The maximum operational noise levels during mechanical operations are anticipated to be near or below approximately 40 dB(A) and 55 dB(C) at the nearest residential location approximately 2,050 feet northeast of the proposed data center site and approximately 38 dB(A) and 53 dB(C) at the residential location 2,830 feet southeast of the proposed data center site. The maximum operational noise levels during emergency operations are anticipated to remain near or below approximately 44 dB(A) and 63 dB(C) at the nearest residential location approximately 2,050 feet northeast of the proposed data center site and approximately 41 dB(A) and 61 dB(C) at the residential location 2,830 feet southeast of the proposed data center site. Abatement measures were not analyzed at this time as predicted output noise levels were estimated below all regulatory ordinances, but as final design progresses, incremental abatement measures will be studied.