ENGLOBE

March 20, 2026

Town of Olds
3501 70 Avenue
Olds, AB T4H 1L7
Attention: Adrian Pedro, CET – Director of Infrastructure

Subject: **Peer Review – Noise Impact Assessment (NIA) – Olds Data Center**

Englobe reference: 02602899.000

1 Introduction

Englobe Corp. (Englobe) was retained by the Town of Olds (Olds), via a standing consulting service agreement held by MPE a division of Englobe, to carry out a peer review of the Preliminary Noise Impact Assessment (NIA) written by OpenCycle Technologies Inc. (OpenCycle), dated February 06, 2026, prepared for Synapse Real Estate Corporation (Synapse) with respect to the risk planning and screening for the proposed Olds Data Center.

In preparation for the technical peer review process, a site visit was conducted by MPE staff on behalf of Englobe on March 05, 2026, to verify the existing site conditions and surrounding properties referenced in the NIA report. In support of this peer review, the following documents been reviewed:

— Attached "Noise Impact Assessment (Stage-1)" for Synapse's Proposed Data Center in Olds, Revision 0, prepared by OpenCycle, dated February 06, 2026;
— Architectural Drawings of the proposed Olds Data Center, prepared by CYNC Architecture, Issued for "DP Revision", dated February 09, 2026;
— Alberta Utilities Commission (AUC) Rule 012 Noise Control, dated June 05, 2024;

This peer review was prepared with the understanding that OpenCycle has identified this NIA as "preliminary" (or "Stage-1"), and that the intention is for the NIA to be updated with interim studies "as details become available".

2 Project Background

Synapse is proposing to construct a new Data Center facility located at W-04-033-01 W5M in Olds, Alberta. The proposed Data Center is to be located near the northeast intersection of Highways 2A and 27, and consists of ten (10) blocks, each made up of one (1) 100 MW Data Center Building and one (1) 140 MW Natural Gas Plant.

According to the NIA, operations at the Data Center will include, but are not limited to:

— The operation of up to eighty (80) chillers per block (total of 800 chillers);
— The operation of up to sixty (60) back-up generators per block (total of 600 generators);
  - The NIA describes the generator maintenance schedule as bi-annual testing of individual generators at 100% load for up to 2 hours.

— The operation of up to ten (10) natural gas plants with auxiliary equipment, each including:
  - Two (2) gas turbines, two (2) heat recovery steam generators, one (1) steam turbine with generator unit, eight (8) air intakes per plant building, twenty (20) ventilation inlets/outlets (whether this is the total or per plant building is not specified), twelve (12) step-up transformers per plant building, one (1) air-cooled condenser unit per plant building, and an exhaust stack (number of stacks unspecified).

The NIA includes twenty-eight (28) existing noise sensitive points of reception, labelled R01 to R28. It is assumed that the receptors were selected by OpenCycle as being representative of the most impacted sensitive receptors in all directions around the Site. Lands surrounding the site are a combination of rural, residential, institutional, commercial, industrial and agricultural land uses.

3 Review Comments

A review of the NIA has been completed by Englobe. The following comments summarize our findings.

Comment #1 – In the NIA's "Study Area" Section, it is stated that Highway 2A and Highway 27 are heavily traveled transportation corridors. Item 2.1(7) of the AUC Rule 012 states "*Documentation justifying that a road is heavily travelled must be compiled and submitted with the noise impact assessment to support the use of Category 2 or Category 3 from Table 1*." Furthermore, the Glossary in Appendix 1 of the AUC Rule 012 contains specific methods to be used to validate the travel volumes. It is recommended that the NIA be revised to include such documentation.

Comment #2 – In the NIA's "Study Area" Section, there is no acknowledgement of the rail line which passes through the Town. Englobe understands that it is the main Canadian Pacific Kansas City (CPKC) line between Calgary and Edmonton, which is used regularly. It is recommended that the report acknowledge it and discuss whether or not it impacts the Ambient Sound Level (ASL) of receptors in its proximity.

Comment #3 - In the NIA's "Study Area" Section, it is stated that "reconnaissance" was conducted by OpenCycle staff to confirm whether or not adjacent energy facilities exist in the area. Did OpenCycle staff visit the Town of Olds as part of the NIA in order to validate these statements? It is recommended that this be explicitly discussed as part of the NIA.

Comment #4 - In the NIA's "Study Area" Section, it is stated that "representative residences for the town are labeled as R22 to R28 at different receiver locations". However, based on Figure 1A, in many of these cases potential points of reception located closer to the proposed Data Center do exist, which are typically considered worst-case unless it can be demonstrated that a point of reception further from the noise source is exposed to greater noise levels due to other factors, such as greater receiver elevation, unobstructed line-of-sight to the noise sources, etc. Additionally, many disabled CadnaA "Receiver" objects are visible in Figure 3, leading Englobe to believe that every potential point of reception in the Town of Olds was considered, which could be how R22 to R28 were selected, although this is admittedly only speculative since the methodology is not discussed in the NIA. It is recommended that the NIA be revised to provide greater clarity regarding how the locations for R22 to R28 were selected.

Comment #5 – In the NIA's "Study Area" Section, Figure 1A's Legend should be updated to indicate that the 1500m radius is represented by the dotted white line, consistent with the description given in the text body.

Comment #6 - In the NIA's "Study Area" Section, Figure 1B should be updated such that the "5.5m Noise Barrier" markup near the bottom of the figure points to the associated object in the figure, similar to the other markups.

Comment #7 – In the NIA's "Noise Criteria" Section, it is stated that "the ASL is assumed to be 5 dBA below the PSL, as prescribed by the Rule." Given the magnitude of the proposed Data Center and the potential presence of noise sources other than energy-related facilities (such as agricultural industries and traffic noise, refer to Item 2.5(3) of the AUC Rule 012), it is recommended that ambient sound levels in the area be measured in order to apply a Class A2 adjustment, per Item 2.1(10) of the AUC Rule 012. This would result in greater precision in the reported PSL, which effectively serves as the noise level limit.

Comment #8 – In the NIA's "Major Equipment" Section, Table 1, the equipment associated with the "Data Center Buildings" include chillers and back-up generators. Englobe expects additional acoustically significant equipment to be associated with a building of this size and function, including (but not limited to): cooling towers, air handling units, transformers, ventilation openings/louvres/exhausts, etc. It is acknowledged that the NIA states that the details were obtained from the information provided by the client, which is preliminary. However, for environmental noise risk assessments at the municipal level, it is recommended that the NIA be updated to provide more details pertaining to any such additional equipment in order to better portray a worst-case scenario.

Comment #9 – In the NIA's "Major Equipment" Section, Table 1, it is stated that the chiller sound power levels were obtained from manufacturer data, which is also stated in Table D, Appendix D. However, the chiller manufacturer and model is not provided, preventing the verification of the associated sound power levels. It is recommended that manufacturer cutsheets showing the sound power levels used be included in the NIA.

Comment #10 – In the NIA's "Major Equipment" Section, Table 1, it is stated that the back-up generator sound power levels were obtained from manufacturer data, of make and model "Baudouin 16M55G2D2". In Appendix D, generator sound level data is listed as being sourced from a "Previous Study" (presumably the "Beacon AI Centers – Indus Project" prepared by Stantec). Is the referenced Baudouin generator the make/model to be used in the design of the Olds Data Center, or is it the make/model used in the Stantec report, which was assumed similar to what will be included in the design of the Olds Data Center? It is also recommended that manufacturer cutsheets showing the sound power levels used be included in the NIA.

Comment #11 – In the NIA's "Major Equipment" Section, Table 1, the equipment associated with the "Natural Gas Plants" is currently not available, leading to the use of technical information contained in a similar NIA for the "Beacon AI Centers – Indus Project" prepared by Stantec. The Stantec report was not provided to Englobe for review. It is understood based on Table D (in Appendix D of the NIA) that all of the noise level information associated with the Natural Gas Plant equipment is sourced from the "Previous Study" prepared by Stantec, which is for a Natural Gas Plant of a higher capacity, and that this data has been "scaled down" to estimate the noise levels of the proposed 140 MW output. It is recommended that the actual manufacturer sound level data be provided, along with a higher level of technical clarity regarding how the noise level data was "scaled down", or that the NIA be revised using more detailed design/manufacturer data, such that mention of the "Previous Study" prepared by Stantec can be removed.

Comment #12 – In the NIA's "Method" Section, the third bullet point states that the generator maintenance schedule consists of bi-annual testing of individual generators at 100% load for up to 2 hours. For 600 generators, assumed to be tested during weekday daytime hours only, this results in an average of 4.8 generators tested per day. There is no mention of any other more frequent, partial-load (or no-load) testing, which Englobe understands would typically include monthly testing, as outlined in applicable guidelines (ex: NFPA 110 “Standard for Emergency and Standby Power Systems”, or similar). It is recommended that the client confirm that the generator maintenance schedule described in the NIA is a reasonable/feasible approach to generator maintenance, representative of a worst-case scenario for the NIA. Additionally, 100% load testing typically involves a load bank, which features relatively loud cooling functions. It is also recommended that the NIA include load banks in its list of significant noise sources.

Comment #13 – In the NIA’s “Method” Section, it is recommended that the fifth and sixth bullet points be updated for clarity to add the word “Cumulative” in front of SPL (for the fifth bullet point), and to change the word “Facility” to “Cumulative” (for the sixth bullet point). This will ensure consistency with the wording used in the results Tables (ex: Table 3).

Comment #14 – In the NIA’s “Modeling Parameters” Section, the Ground Factor absorption is set to 0.0 for bodies of water and roads, 0.3 within all facility limits, and 1.0 everywhere else. It is recommended that the Ground Factor for “everywhere else” be set to 0.8, since 1.0 is defined in the report as “suitable for uncultivated land, such as forest floor and loose ground”, which does not seem like an accurate description of the average soil conditions in and around Olds. Using 1.0 can lead to an over-estimation of the absorbed noise, leading to lower predicted noise levels at the receivers.

Comment #15 – In the NIA’s “Modeling Parameters” Section, regarding the “Topography” parameter, it is unclear whether or not the 15ft-tall berm located along the west side of the facility property (as shown on Drawing A101) has been included in the model. It is recommended that the NIA be updated accordingly.

Comment #16 – In the NIA’s “Results” Section, Table 3 lists which receivers are considered as being 2-storeys. During a site visit to Olds by Englobe on March 05, 2026, some discrepancies were observed from street level, as described below:

- R05, 4601 46 Ave. (Pomeroy Inn): this building has four (4) storeys, instead of the two (2) noted in the NIA;
- R06, 33171 Range Rd. 14: this building’s west side seems to indicate that it is a one (1) storey building, instead of the two (2) noted in the NIA;
- R08, 33171 Range Rd. 14: this building has one (1) storey, instead of the two (2) noted in the NIA;
- R22, 4738 49 St.: this one (1) storey building is near taller buildings (ex: 4737 49 St.) which may be exposed to higher noise levels from the proposed Data Center;
- R23, 4902 51st Ave.: this two (2) storey building is near taller buildings (ex: 5026 49 St.) which may be exposed to higher noise levels from the proposed Data Center;
- R25, 4902 Shannon Dr.: this one (1) storey building is near taller buildings (ex: 4906 Shannon Dr.) which may be exposed to higher noise levels from the proposed Data Center;
- R27, 5502 50 St.: this building has one (1) storey, instead of the two (2) noted in the NIA. Also, this building is near taller buildings (ex: 5314 50 St.) which may be exposed to higher noise levels from the proposed Data Center;
- *Potential new receiver*: 4501 46 Ave.: this two (2) storey building is adjacent to the proposed Data Center. Why was it not included in the NIA?
- *Potential new receiver*: 33080 Range Rd. 14.: this one (1) storey building is closer to the proposed Data Center than R10. Why was it not included in the NIA?
- *Potential new receiver*: 4500 50 Ave.: this three (3) storey building is closer to the proposed Data Center than R24. Why was it not included in the NIA?
- *Potential new receiver*: 4214 50 Ave.: this two (2) storey building is closer to the proposed Data Center than R25. Why was it not included in the NIA?
- NOTE: The list above should not be considered exhaustive - other discrepancies may also exist.

It is recommended that the receivers be described using their civic addresses, and that the selections be reviewed and/or justified in light of the site visit observations listed in Comment #16.

Comment #17 – In the NIA's "Results" Section, it is stated that the secondary assessment of low frequency noise is inconclusive at this stage because there is insufficient 1/3 octave band data. While Englobe understands that it is not strictly required by the AUC Rule 012 to verify low frequency noise issues as part of an NIA (refer to Item 3.2(13)(a) of the AUC Rule 012), given the magnitude of the proposed Data Center, it is recommended that the 1/3 octave band noise level data be collected and analyzed for low frequency noise issues as part of the "Stage 4 *Validation*" phase of work previously described in the NIA's "Introduction" Section. Ideally, low frequency noise issues could even be assessed earlier during the "Stage 2 *Detailed Design*" phase of work in order to mitigate any potential issues early during the design to reduce overall costs. 1/3 octave band data could be collected by OpenCycle at nearby facilities which house the same equipment that is planned to be used at the proposed Olds Data Center.

Comment #18 - In the NIA's "Results" Section, Figure 2B is labelled as the "Cumulative SPL Nighttime" results, but the values according to the Figure's coloured legend do not match the Cumulative SPL values given in Table 3. Also, it is unclear on Figure 2B what the green lines represent (in reference to the two circular shapes with green lines also visible on Figure 2A, as well as the green lines set approximately 500m on either side of Highways 2A and 27). It is recommended that the figures be updated for clarity.

Comment #19 – In the NIA's "Results" Section, Table 4 states that 1,758 noise sources were considered for the nighttime operating scenario, whereas Table 8 (mislabelled as Table 4) states that 1,510 noise sources were considered for the daytime operating scenario, even though the daytime operating scenario is described as considering more noise sources (NIA p.18: "Daytime operations include testing back-up generators in addition to normal operations"). It is recommended that the tables be revised to fix this discrepancy.

Comment #20 – In the NIA's "Noise Control Recommendations – Nighttime" Section, in Table 5, it is recommended to limit the sound power levels to 85 dBA for the chillers (which are currently 110 dBA according to Table 1) and 80 dBA for the Natural Gas Plant step-up transformers (which are currently 92 dBA according to Table 1). It is recommended that OpenCycle and/or Synapse comment on the feasibility of sourcing such quieter equipment, especially the chillers which need to be significantly reduced by 25 dBA. Quieter equipment is typically smaller and may not meet the proposed Data Center's capacity requirements.

Comment #21 – In the NIA's "Noise Control Recommendations – Nighttime" Section, in Table 5, it is recommended to install air inlet silencers for the Natural Gas Plant generator turbine building air intakes to achieve a maximum sound power level of 85 dBA per unit. It is unclear which noise source this corresponds to in Table D, Appendix D. It is recommended that the NIA be updated such that the same noise source names are used throughout the NIA report and its appendices, for increased clarity and ease of identification.

Comment #22 – In the NIA's "Noise Control Recommendations – Nighttime" Section, in Table 5, it is recommended to install a "highly absorbing noise barrier". It is not specified which side of the barrier (or perhaps both sides) should be highly absorbing, and what sort of absorption coefficient was assumed for this noise barrier. Furthermore, basic noise barrier design details, such as minimum barrier material density requirements, are not provided as part of the recommendations in the NIA. It is recommended that the NIA be updated to provide these details.

Comment #23 – In the NIA's "Noise Control Recommendations – Nighttime" Section, in Table 6, three (3) receivers (R04, R24 and R25) show Cumulative SPL values "After Noise Control" which are above the associated PSL, yet it says that the PSL was met. Additionally, the calculated Cumulative SPL, which

Englobe understands is the logarithmic sum of the Facility SPL and the ASL, is wrong for four (4) receivers (R04, R23, R24 and R25). It is recommended that Table 6 be revised accordingly.

Comment #24 – In the NIA's "Overall Sound Pressure Levels - Daytime" Section, it is stated that the scenario for daytime includes the operation of one back-up generator directly facing R15. It is not clear why this particular generator was chosen and whether or not it represents a worst-case scenario, especially considering that there are generators operating much closer to other receivers (ex: R01, where generators are expected to operate at approximately 130m away, vs. R15 where generator are expected to operate at approximately 1km away). It is acknowledged that R01 has a higher PSL than R15, but it is not clearly demonstrated that this makes R15 the worst-case scenario – for example, based on the available figures, it looks like R17 is closer to a Data Center generator compared to R15, event though they have the same PSL. It is recommended that a more thorough technical justification be provided for the consideration of the currently-presented daytime scenario, or that a different generator be selected to better represent the worst-case scenario.

Comment #25 – In the NIA's "Overall Sound Pressure Levels - Daytime" Section, in Table 7, the calculated Cumulative SPL, which Englobe understands is the logarithmic sum of the Facility SPL and the ASL, is wrong for four (4) receivers (R04, R23, R24 and R25). It is recommended that Table 7 be revised accordingly.

Comment #26 – In the NIA's "Overall Sound Pressure Levels - Daytime" Section, above Table 8 (mislabelled as Table 4), it is stated that the Cumulative SPL at R15 is 40 dBA, and that the PSL is 40 dBA, whereas Table 7 indicates values of 46 dBA and 50 dBA, respectively. It is recommended that the statement be updated to reflect Table 7.

Comment #27 – In the NIA's "Overall Sound Pressure Levels - Daytime" Section, in Table 8 (mislabelled as Table 4), the top six (6) loudest noise source contributors are from the generator, components of which are significantly louder at R15 than the loudest chiller component according to Table 8. However, in Table D (Appendix D), the sound power levels for the chiller components are significantly louder than the generator components. It is assumed that the worst-case chiller from the perspective of R15 is likely to be adjacent to the generator (ie. "directly facing R15"), in which case it would be reasonable to expect that the chiller components would be louder than the generator components at R15. Yet Table 8 indicates that that is not the case. It is recommended that more clarity be provided to help the NIA reader understand the source order ranking presented in Table 8.

Comment #28 – In the NIA's "Overall Sound Pressure Levels - Daytime" Section, in Table 8 (mislabelled as Table 4), the values of the bottom two rows seem to be inversed: Cumulative SPL should be 46 dBA and PSL should be 50 dBA, according to Table 7. It is recommended that Table 4 be revised accordingly.

Comment #29 – In the NIA's "References" Section, the entry to AUC's Rule 012 is for the version dated June 15, 2017. The latest version of Rule 012, which was used to prepare this peer review, is dated June 5, 2024. If the 2017 version of Rule 012 was indeed used for this NIA, it is recommended that the NIA be updated for consistency with the latest version of Rule 012.

Comment #30 – In the NIA's "Appendix A – Glossary", Table A, it is recommended that the definition of "Heavily Travelled Road" be updated to correspond to the definition provided in the AUC's Rule 012.

4 Conclusions and Recommendations

Englobe has completed a review of the Preliminary Noise Impact Assessment of the proposed Olds Data Center prepared by OpenCycle, dated February 06, 2026. At this time, Englobe believes that clarifications are required in order for the NIA report to meet the noise impact assessment requirements of the AUC Rule 012.

We trust the foregoing meets the requirements of the current stages of the proposed project. For additional comments or questions regarding this peer review, please contact the undersigned.

Yours very truly,

Englobe Corp.

Martin Villeneuve, P.Eng.
Senior Engineer - Acoustics

APPENDICES

Appendix A – NIA Documents

Revisions and publications log

REVISION No.	DATE	DESCRIPTION
00	March 20, 2026	Peer review comments for original NIS

Distribution

1 PDF copy	Mr. Adrian Pedro, CET – Director of Infrastructure

Property and Confidentiality

Appendix A - NIA Documents

Noise Impact Assessment (Stage-1) for the Synapse Real Estate Corporation's Proposed Data Center in Olds, Revision 0, prepared by OpenCycle Technologies Inc., dated February 06, 2026.

ENGLOBE

Noise Impact Assessment
Stage-1

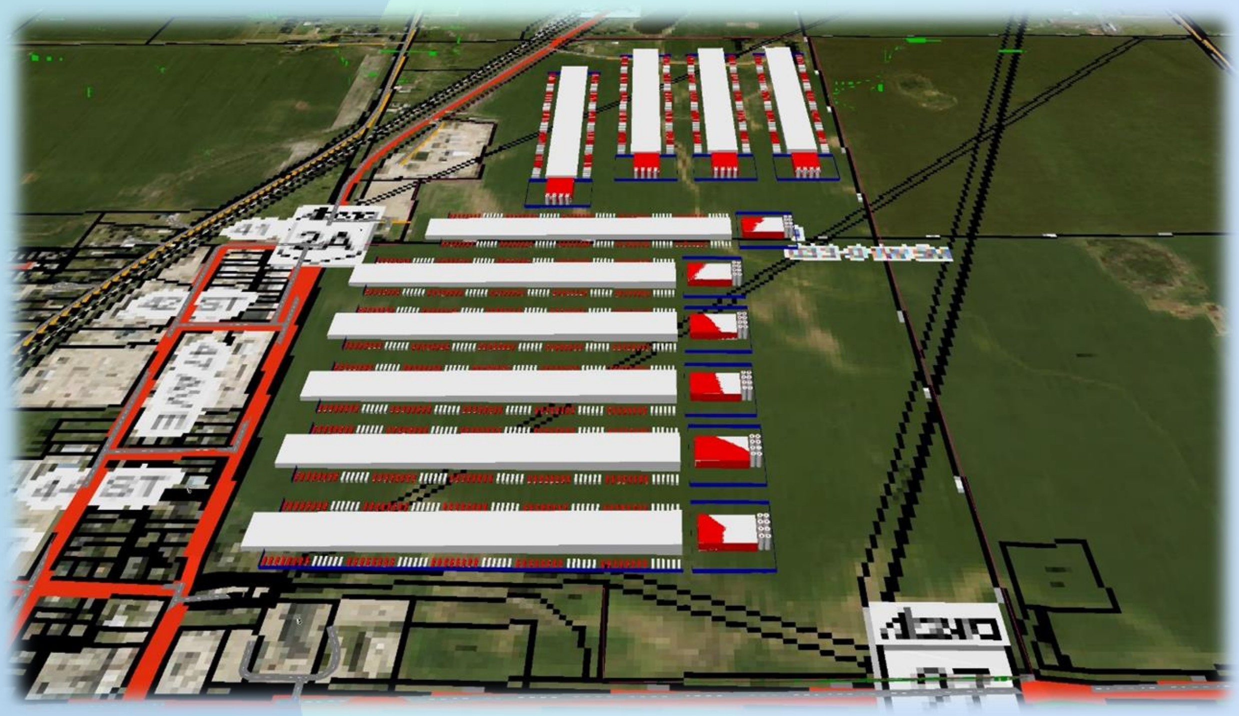
Synapse Real Estate Corporation
Olds Data Center
W-04-033-01 W5M

2026-02-06

REVISION 0

PREPARED FOR
Jason Van Gaal, Principal
Synapse Real Estate Corporation

PREPARED BY
OpenCycle Technologies Inc.



Notice

This report has been prepared by OpenCycle Technologies Inc. (OC) in response to a specific request for service from, and for the exclusive use of, the Client to whom it is addressed. The findings contained in this report are based, in part, upon information provided by others. The information contained in this study is not intended for the use of, nor is it intended to be relied upon, by any person, firm, or corporation other than the Client to whom it is addressed, with the exception of the applicable regulating authority to whom this document may be submitted. OpenCycle accepts no liability or responsibility for any damage that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

Professional Authentication and Validation

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Version Control

Version	Version Description	Revised By	Date
0	• Initial model and results with available preliminary data	BC	February 6, 2026

Executive Summary

Synapse Real Estate Corporation (Synapse) retained OpenCycle Technologies Inc. (OpenCycle) to conduct a Preliminary Noise Impact Assessment (NIA) for the purposes of risk planning & screening for Olds Data Center facility located at W-04-033-01 W5M (the subject facility). This NIA was conducted in accordance with the requirements of Alberta Utilities Commission (AUC) Rule 012: Noise Control (the Rule).

This is a proposed facility that Synapse plans to build ten (10) blocks with data halls and natural gas plants each having:

- One (1) 100 MW Data Center Building with eighty (80) Chillers and sixty (60) Back-up Generators
- One (1) 140 MW Natural Gas Plant with auxiliary equipment. Detailed design and equipment data are not currently available, and assumptions are based on a similar NIA found on AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058)

Synapse and OpenCycle have agreed on a four-stage progressive Noise Management Program designed to reduce uncertainty and manage risk:

1- **Risk Planning & Screening:** Early due diligence using assumptions to identify risk and guide detailed design.
2- **Detailed Design:** Ambient noise monitoring and refined/detailed data and modeling to support a full NIA.
3- **Mitigation:** Detailed mitigation design.
4- **Validation:** Empirical measurements of a similar data center or shop measurements of actual/similar equipment to validate assumptions.

The purpose of Stage-1 assessment is to predict the proposed facility's noise impact on surrounding residences including town of Olds and support detailed design and next steps. Interim studies may be expected as details become available.

Reconnaissance conducted by OpenCycle staff using publicly available data in February 2026 confirms that there is no adjacent energy facility in the study area that is emitting significant noise.

There are hundreds of receivers located within 1500 m of the subject facility. Twenty-one (21) residences were modeled in addition to the residences of town of Olds. The representative residences for the town are labeled as R22 to R28 at different receiver locations. For residents having secondary stories, additional receivers (i.e., R01-2nd Story) are modeled at 4.5 m from ground level to assess the noise levels at secondary stories.

An analysis of two operating scenarios was considered in this study:

- **Nighttime Operation**: representing normal maximum operation, all chillers and natural gas plant are operating; back-up generators are not operating
- **Daytime Operation:** representing normal maximum operation and testing one back-up generator at a time

The tables below summarize the overall Sound Pressure Levels (SPL) predictions from the model for each receiver in the study area for nighttime and daytime operation. The Facility SPL is the overall SPL from all the facilities in the study area. The Cumulative SPL includes the contribution of the Facility SPL and the Ambient Sound Levels (ASL).

Overall Sound Pressure Levels - As Proposed/After Noise Control - Nighttime

Receiver	Approximate Distance & Direction from the Center of the Subject Facility	PSL (dBA)	ASL (dBA)	As Proposed				After Noise Control				
				Facility SPL (dBA)	Cumulative SPL (dBA)	Meet the PSL	dBC-dBA	Facility SPL (dBA)	Cumulative SPL (dBA)	Noise Reduction (dBA)	Meet the PSL	dBC-dBA
R01	650 m SSW	53.0	48.0	70.8	**70.8**	No	4.0	45.8	**50.0**	25.0	Yes	10.3
R01-2nd Story	650 m SSW	53.0	48.0	72.4	**72.4**	No	3.8	47.3	**50.7**	25.1	Yes	9.2
R02	400 m W	53.0	48.0	70.0	**70.0**	No	4.1	45.2	**49.8**	24.8	Yes	11.8
R03	1190 m NNW	45.0	40.0	63.8	**63.8**	No	4.3	39.1	**42.6**	24.7	Yes	12.6
R03-2nd Story	1190 m NNW	45.0	40.0	64.0	**64.0**	No	4.3	39.2	**42.6**	24.8	Yes	12.7
R04	750 m SSW	45.0	40.0	69.0	**69.0**	No	4.8	44.3	**46.7**	24.7	Yes	12.0
R04-2nd Story	750 m SSW	45.0	40.0	70.6	**70.6**	No	4.4	45.8	**47.6**	24.8	Yes	10.9
R05	920 m SSW	48.0	43.0	65.7	**65.7**	No	4.5	41.5	**45.3**	24.2	Yes	13.3
R05-2nd Story	920 m SSW	48.0	43.0	66.3	**66.3**	No	4.4	42.0	**45.5**	24.3	Yes	13.0
R06	2280 m N	40.0	35.0	55.4	**55.4**	No	5.5	31.1	**36.5**	24.3	Yes	15.6
R06-2nd Story	2280 m N	40.0	35.0	55.6	**55.6**	No	5.4	31.3	**36.5**	24.3	Yes	15.4
R07	2200 m N	40.0	35.0	56.0	**56.0**	No	5.4	31.7	**36.7**	24.3	Yes	15.3
R08	2020 m NNE	45.0	40.0	57.6	**57.7**	No	5.2	33.3	**40.8**	24.3	Yes	14.6
R08-2nd Story	2020 m NNE	45.0	40.0	57.8	**57.9**	No	5.1	33.4	**40.9**	24.4	Yes	14.6
R09	1500 m NNE	45.0	40.0	61.9	**61.9**	No	4.6	37.3	**41.9**	24.6	Yes	13.4
R10	1880 m NNW	40.0	35.0	58.0	**58.0**	No	5.1	33.6	**37.4**	24.4	Yes	14.5
R11	1760 m N	40.0	35.0	59.4	**59.4**	No	4.9	34.9	**38.0**	24.5	Yes	14.1
R12	2100 m SE	40.0	35.0	55.7	**55.7**	No	5.4	31.9	**36.7**	23.8	Yes	16.4
R13	2150 m SE	40.0	35.0	55.4	**55.4**	No	5.4	31.6	**36.6**	23.8	Yes	16.4
R13-2nd Story	2150 m SE	40.0	35.0	55.4	**55.4**	No	5.4	31.7	**36.7**	23.7	Yes	16.3
R14	1410 m ESE	45.0	40.0	60.5	**60.5**	No	4.7	36.9	**41.7**	23.6	Yes	15.8
R15	1240 m E	40.0	35.0	61.9	**61.9**	No	4.6	38.3	**40.0**	23.6	Yes	15.7
R16	1430 m ENE	40.0	35.0	60.9	**60.9**	No	4.7	37.0	**39.1**	23.9	Yes	15.2
R17	1500 m NE	40.0	35.0	61.3	**61.3**	No	4.6	37.0	**39.1**	24.3	Yes	14.1
R18	590 m NW	45.0	40.0	69.3	**69.3**	No	4.0	43.3	**45.0**	26.0	Yes	13.0
R19	660 m NNW	45.0	40.0	68.9	**68.9**	No	4.0	42.8	**44.6**	26.1	Yes	12.9
R20	1010 m NNW	45.0	40.0	64.7	**64.7**	No	4.3	39.7	**42.9**	25.0	Yes	12.8
R21	290 m W	53.0	48.0	72.3	**72.3**	No	4.0	47.4	**50.7**	24.9	Yes	11.2
R22	1260 m SSW	51.0	46.0	61.7	**61.8**	No	4.6	37.3	**46.5**	24.4	Yes	13.6
R23	1510 m SW	46.0	41.0	59.2	**59.3**	No	4.9	34.7	**46.3**	24.5	Yes	14.1
R23-2nd Story	1510 m SW	46.0	41.0	59.3	**59.4**	No	4.9	34.9	**46.3**	24.4	Yes	14.1
R24	1120 m WSW	46.0	41.0	62.1	**62.1**	No	4.7	37.5	**46.6**	24.6	Yes	13.2
R25	760 m WSW	46.0	41.0	65.4	**65.4**	No	4.5	40.7	**47.1**	24.7	Yes	12.5
R26	1640 m WSW	51.0	46.0	57.2	**57.5**	No	5.3	32.6	**46.2**	24.6	Yes	14.9
R27	1870 m WSW	51.0	46.0	55.9	**56.3**	No	5.3	31.5	**46.2**	24.4	Yes	15.0
R27-2nd Story	1870 m WSW	51.0	46.0	56.7	**57.1**	No	5.3	32.3	**46.2**	24.4	Yes	14.7
R28	1340 m W	46.0	41.0	60.1	**60.2**	No	4.9	35.6	**42.1**	24.5	Yes	13.9
R28-2nd Story	1340 m W	46.0	41.0	60.3	**60.4**	No	5.0	35.7	**42.1**	24.6	Yes	13.8

Overall Sound Pressure Levels - As Proposed -Daytime

Receiver	Approximate Distance & Direction from the Center of the Subject Facility		PSL (dBA)	ASL (dBA)	As Proposed			
					Facility SPL (dBA)	Cumulative SPL (dBA)	Meet the PSL	dBC-dBA
R01	650 m	SSW	63.0	58.0	45.9	**58.3**	Yes	10.5
R01-2nd Story	650 m	SSW	63.0	58.0	47.4	**58.4**	Yes	9.5
R02	400 m	W	63.0	58.0	45.4	**58.2**	Yes	11.8
R03	1190 m	NNW	55.0	50.0	39.4	**50.4**	Yes	12.5
R03 -2nd Story	1190 m	NNW	55.0	50.0	39.5	**50.4**	Yes	12.5
R04	750 m	SSW	55.0	50.0	44.4	**53.6**	Yes	12.2
R04 -2nd Story	750 m	SSW	55.0	50.0	45.9	**53.8**	Yes	11.1
R05	920 m	SSW	58.0	53.0	41.8	**53.3**	Yes	13.4
R05 -2nd Story	920 m	SSW	58.0	53.0	42.4	**53.4**	Yes	13.0
R06	2280 m	N	50.0	45.0	31.4	**45.2**	Yes	15.5
R06-2nd Story	2280 m	N	50.0	45.0	31.5	**45.2**	Yes	15.5
R07	2200 m	N	50.0	45.0	31.9	**45.2**	Yes	15.3
R08	2020 m	NNE	55.0	50.0	33.6	**50.1**	Yes	14.6
R08-2nd Story	2020 m	NNE	55.0	50.0	33.8	**50.1**	Yes	14.6
R09	1500 m	NNE	55.0	50.0	37.6	**50.2**	Yes	13.4
R10	1880 m	NNW	50.0	45.0	34.0	**45.3**	Yes	14.3
R11	1760 m	N	50.0	45.0	35.1	**45.4**	Yes	14.1
R12	2100 m	SE	50.0	45.0	32.9	**45.3**	Yes	15.9
R13	2150 m	SE	50.0	45.0	32.5	**45.2**	Yes	16.0
R13-2nd Story	2150 m	SE	50.0	45.0	32.6	**45.2**	Yes	15.9
R14	1410 m	ESE	55.0	50.0	38.1	**50.3**	Yes	15.2
R15	1240 m	E	50.0	45.0	39.0	**46.0**	Yes	15.7
R16	1430 m	ENE	50.0	45.0	37.3	**45.7**	Yes	15.2
R17	1500 m	NE	50.0	45.0	37.4	**45.7**	Yes	14.0
R18	590 m	NW	55.0	50.0	43.5	**50.9**	Yes	13.0
R19	660 m	NNW	55.0	50.0	43.0	**50.8**	Yes	12.8
R20	1010 m	NNW	55.0	50.0	40.0	**50.4**	Yes	12.6
R21	290 m	W	63.0	58.0	47.5	**58.4**	Yes	11.3
R22	1260 m	SSW	61.0	56.0	37.8	**56.1**	Yes	13.6
R23	1510 m	SW	56.0	51.0	35.3	**56.0**	Yes	14.0
R23-2nd Story	1510 m	SW	56.0	51.0	35.4	**56.0**	Yes	14.1
R24	1120 m	WSW	56.0	51.0	38.0	**56.1**	Yes	13.2
R25	760 m	WSW	56.0	51.0	41.2	**56.1**	Yes	12.5
R26	1640 m	WSW	61.0	56.0	33.2	**56.0**	Yes	14.8
R27	1870 m	WSW	61.0	56.0	32.2	**56.0**	Yes	14.8
R27-2nd Story	1870 m	WSW	61.0	56.0	32.9	**56.0**	Yes	14.6
R28	1340 m	W	56.0	51.0	36.0	**51.1**	Yes	13.9
R28-2nd Story	1340 m	W	56.0	51.0	36.1	**51.1**	Yes	13.9

R22-R28 are representative receivers in the town of Olds.

The results of this assessment indicate that, for daytime and nighttime operations, the Cumulative SPL is expected to exceed the PSL at all receivers in the study area with. The most impacted receiver is R01, located 650 m SSW from the subject facility center. Additional noise control is required for the subject facility to comply with the AUC Rule 012: Noise Control.

Once the recommended noise control items have been implemented, the Cumulative SPL is expected to meet the PSL at all receivers in the study area for nighttime operations. The most impacted receiver becomes R21, located 290 m W from the subject facility center.

Noise control items are discussed in the Noise Control Recommendations section of this report for nighttime compliance. Once the recommended noise control items have been implemented, the Cumulative SPL is expected to meet the PSL at all receivers for daytime testing operations.

OpenCycle also recommends updating the model and results as design data become available and execute subsequent stages of the four-stage analysis approach.

For general technical details on sound levels and analysis, as well as for a best practices approach as recommended by the Rule, see Appendix G.

Table of Contents

Acronyms

Acronym	Description
AADT	Average Annual Daily Traffic
AB	Alberta
AUC	Alberta Utilities Commission
ASL	Ambient Sound Level
BC	British Columbia
BSL	Basic Sound Level
dB	Decibel
dBA	A-Weighted Decibel
dBC	C-Weighted Decibel
dBZ	Z-Weighted Decibel or Linear Decibel
CSL	Comprehensive Sound Level
DIL	Dynamic Insertion Loss
ISO	International Organization for Standardization
L_{eq}	Energy Equivalent Sound Level
LFN	Low Frequency Noise
LSD	Legal Subdivision
NIA	Noise Impact Assessment
NC	Noise Control
NR	Noise Reduction
OGC	Oil & Gas Commission
PSL	Permissible Sound Level
PWL	Sound Power Level
SPL	Sound Pressure Level
TL	Transmission Loss
UTM	Universal Transverse Mercator

Introduction

Synapse Real Estate Corporation (Synapse) retained OpenCycle Technologies Inc. (OpenCycle) to conduct a Preliminary Noise Impact Assessment (NIA) for the purposes of risk planning & screening for Olds Data Center facility located at W-04-033-01 W5M (the subject facility). This NIA was conducted in accordance with the requirements of Alberta Utilities Commission (AUC) Rule 012: Noise Control (the Rule)

This is a proposed facility that Synapse plans to build ten (10) blocks with data halls and natural gas plants each having:

- One (1) 100 MW Data Center Building with eighty (80) Chillers and sixty (60) Back-up Generators
- One (1) 140 MW Natural Gas Plant with auxiliary equipment. Detailed design and equipment data are not currently available, and assumptions are based on a similar NIA found on AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058)

Synapse and OpenCycle have agreed on a four-stage progressive Noise Management Program designed to reduce uncertainty and manage risk:

1- **Risk Planning & Screening**: Early due diligence using assumptions to identify risk and guide detailed design.
2- **Detailed Design**: Ambient noise monitoring and refined/detailed data and modeling to support a full NIA.
3- **Mitigation**: Detailed mitigation design.
4- **Validation**: Empirical measurements of a similar data center or shop measurements of actual/similar equipment to validate assumptions.

The purpose of Stage-1 assessment is to predict the proposed facility's noise impact on surrounding residences including town of Olds and support detailed design and next steps. Interim studies may be expected as details become available.

Study Area

The subject facility is located at W-04-033-01 W5M, near the town of Olds, Alberta. The terrain cover in the study area is mainly urban and prairie grassland. Highway 2A and Highway 27, which are heavily traveled transportation corridors traverse through the study area.

Reconnaissance conducted by OpenCycle staff in February 2026 confirms that there is no adjacent energy facility in the study area that is emitting significant noise.

There are hundreds of receivers located within 1500 m of the subject facility. Twenty-one (21) residences were modeled in addition to the residences of town of Olds. The representative residences for the town are labeled as R22 to R28 at different receiver locations. For residents having secondary stories, additional receivers (i.e., R01-2nd Story) are modeled at 4.5 m from ground level to assess the noise levels at secondary stories.

Figure 1A shows a map of the study area. The 1500 m boundary from the subject facility fence line is shown in dotted white line. Figure 1B shows the 3D modeling of the subject facility.

Figure 1A: Study Area Map

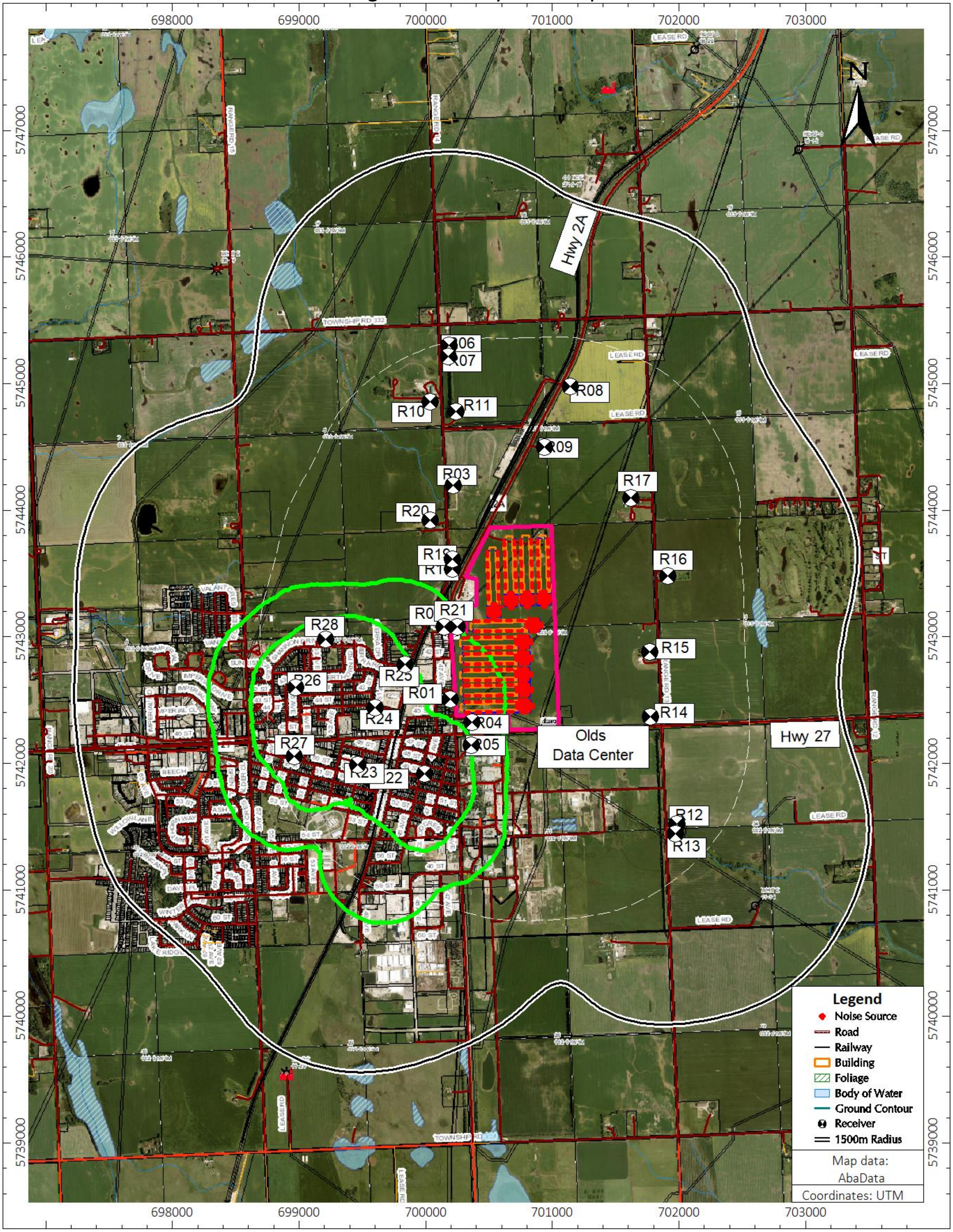
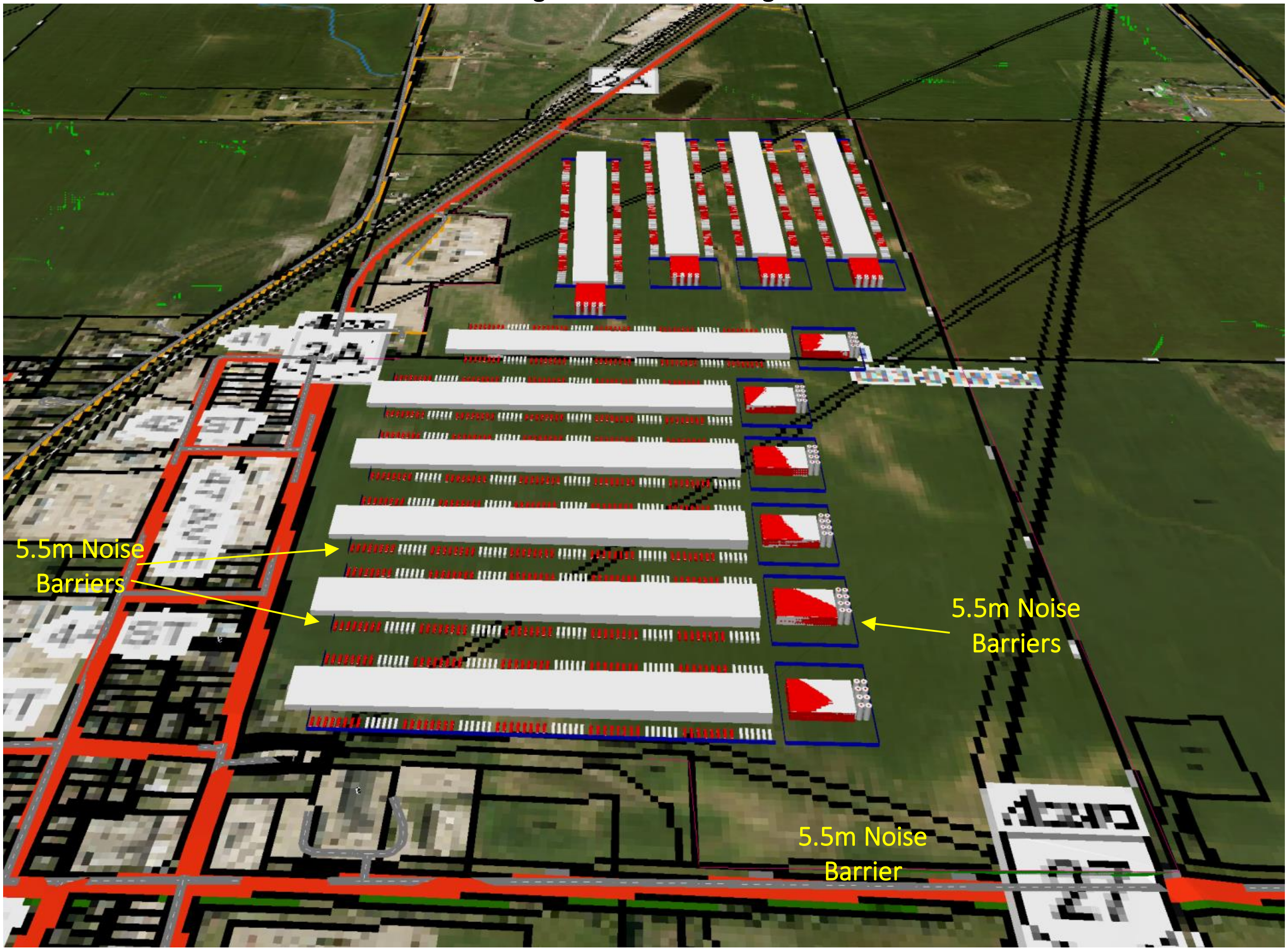


Figure 1B:3D Modeling



Noise Criteria

Primary Overall dBA Analysis

Noise for energy related facilities is regulated through the AUC Rule 012: Noise Control. The regulator sets the Permissible Sound Level (PSL), which is the limit that the Sound Pressure Level (SPL) emanating from the facilities in the study area plus the Ambient Sound Level (ASL) may not exceed over a specified period, as measured at specific locations of interest (the receivers). These allowable limits are dependent on the population density, proximity to heavily traveled transportation routes (motor vehicles, rail and aircraft) and other specified adjustments. The SPL is the sound level received at a specific location. The ASL is the average background sound level not attributable to energy industry facilities. The ASL is assumed to be 5 dBA below the PSL, as prescribed by the Rule. The receivers are located at the residences existing within 1500 m of the subject facility, or else at the study area boundary.

There are hundreds of receivers located within 1500 m of the subject facility. Twenty-one (21) residences were modeled in addition to the residences of town of Olds. The representative residences for the town are labeled as R22 to R28 at different receiver locations. Highway 2A and Highway 27, which are heavily traveled transportation corridors traverse through the study area.

PSLs for each receiver were calculated as prescribed by the Rule.

Secondary Low Frequency Noise Analysis

The Rule outlines criteria for Low Frequency Noise (LFN) consideration. LFN considers noise that may be satisfactory on a dBA basis but contains a dominant low frequency that may increase annoyance at nearby residences. LFN analysis is considered a "second-stage" investigation by the Rule and is only to be conducted as a specific response to a LFN complaint. According to the Rule, an LFN component exists when:

- the dBC minus dBA sound level is equal to or greater than 20 dB, and
- there is a clear tonal component at a $^{1}/_{3}$ octave frequency of 250 Hz or below.

If an LFN component is identified as per the Rule, then a 5 dBA penalty is added to the measured or predicted SPL. In this analysis, there is no specific LFN complaint from any receiver in the area. Moreover, there is insufficient spectral data available to predict the existence of a tonal component at any of the receiver location. As such, this study evaluates potential LFN for information purposes only, by investigating the predicted dBC-dBA levels at all the receivers.

Major Equipment

Tables 1 gives details of the proposed major equipment at the subject facility. The details were obtained from the information provided by the client and similar NIA found on AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058). See Appendix C for a plot plan showing the subject facility equipment layout.

Table 1: Olds Data Center Equipment Details

Equipment Name and Tag No	Plot Plan Item #	Equipment Details
Chillers	N/A	• Located in mechanical yards of each block • Eighty (80) chillers per block, totaling eight hundred (800) in the plant, all operating year round • Each chiller PWL is 110 dBA as per the manufacturer data
Back-up Generators	N/A	• Located in mechanical yards of each block • Sixty (60) generators per block, totaling six hundred (600) in the facility • Make & Model: Baudouin 16M55G2D2/6, diesel • Back-up/emergency equipment, not operating during nighttime; one (1) generator at a time tested individually at 100% load for up to 2 hours twice per year as part of regular maintenance and testing • Each self-enclosed generator rated 85 dBA @ 7m

Table 1: Olds Data Center Equipment Details

<table>
<tr><th>Equipment Name and Tag No</th><th>Plot Plan Item #</th><th>Equipment Details</th></tr>
<tr><td>NG Plant</td><td>N/A</td><td>

- Located near the data halls of each block
- One (1) 140 MW plant and auxiliary equipment per block, totaling ten (10) in the plant, operating year round
- Design data is currently not available for the NG Plant; as suggested by the client, PWLs acquired from similar NIA found on AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058). Assumptions are as follows:
  - The NG Plant that was studied in Beacon AI Centers NIA is a Siemens SCC-800 3x1 Combined Cycle Power Plant with 62 MW rating
  - The sources associated with the plant are scaled down to estimate a SCC-800 2x1 Combined Cycle Power Plant with 50 MW rating to approximate 140 MW output. Assumptions include:
    - 5.5 m high absorbing noise barriers installed around each plant to shield all plant building openings; i.e. vents, louvers, air intakes, doors and windows etc.
    - Two (2) SGT-800 GT Units, Two (2) HRSG Units, One (1) ST and generator unit and ventilation systems
    - Eight (8) air intakes per plant building, PWL 88 dBA each
    - Twenty (20) ventilation inlets plant building, PWL 86 dBA each with mitigation if required
    - Twenty (20) ventilation outlets plant building, PWL 84 dBA each with mitigation if required
    - Twelve (12) step-up transformers per plant, PWL 92 dBA each
    - One (1) ACC Unit per plant building; assumed outdoor duct lagging installed, steam intake and outlets PWLs ≤85 dBA with mitigation if required
    - Exhaust Stack PWL ≤100 dBA each with mitigation if required

</td></tr>
</table>

Method

The method used in the NIA follows the requirements set forth in the Rule.

- The study area and facility physical layouts were determined from drawings obtained from client and satellite images.

- The Sound Power Levels (PWL) were determined for the major facility noise sources through theoretical calculations, manufacturer's data, previous study on similar units and previous NIA obtained from AUC E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058). See Appendix D for a list of all the calculated PWL.

- It is assumed that the normal facility operating conditions do not change significantly between the daytime and the nighttime period. Daytime operations include testing of back-up generators; one (1) generator at a time tested individually at 100% load for up to 2 hours twice per year as part of regular maintenance and testing. As such, the NIA analysis focuses on both nighttime and daytime conditions.

- Sound propagation calculations were undertaken using the noise modeling software package CadnaA to determine the facility SPL at the receivers. All calculations were undertaken in linear octave bands.

- The resulting SPL were compared to the PSL to determine if the subject facility is in compliance with the Rule.

- If the Facility SPL exceeds the PSL, then noise control recommendations are designed to bring the facility SPL down to meet the PSL for all the receivers in the study area.

Modeling Parameters

Table 2 lists the major parameters used in the noise model. These parameters meet the standard set forth in the Rule. The modeled conditions produce results representative of meteorological conditions favouring sound propagation (e.g., downwind or mild temperature inversion conditions) during the summer nighttime, as prescribed by the Rule. These conditions do not occur all the time at the receiver and the resulting SPL are expected to be lower than those predicted for most of the time. Therefore, the environmental conditions modeled represent "close-to-worst-case" sound propagation conditions.

Table 2: Modeling Parameters

Parameter	Value	Description
Modeling software	CadnaA by Datakustik Version 2026 MR1	An advanced noise propagation model that considers geometric spreading, atmospheric sound absorption, ground impedance effects, site topography and geometry, vegetation and environmental conditions. The CadnaA model calculates the contribution level of each noise source at the receiver location in octave bands as well as calculating the overall facility sound level.
Standard followed	ISO 9613	As recommended in the Rule guidelines. Specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The published accuracy for this standard is ±3 dBA between 100 m to 1000 m. Accuracy levels beyond 1000 m are not published.
Wind Condition	1 – 5 m/s Downwind	ISO 9613 uses a slight downwind condition from each noise source to each receiver. Wind speed is measured at a height of 3 m to 11 m above ground and covers the acceptable range specified in the Rule.
Ground Factor	0.0 for water bodies and roads 0.3 within all facility limits 1.0 everywhere else	The ground factor G is a property of the ground material, with value ranging from 0 to 1. The typical values below were determined from several standards and guidelines, including ISO 9613, Commission Directive EU 2015/996, and Nord 2000. G = 0.0 is suitable for asphalt, concrete, pavement, water G = 0.3 is suitable for compacted dense ground, gravel road, hard soil G = 0.6 is suitable for sand, compacted field and gravel, roadside dirt G = 0.8 is suitable for cultivated land, such as farmland G = 1.0 is suitable for uncultivated land, such as forest floor and loose ground For residential properties, the ground factor was determined from the proportion of the above typical values, based on satellite images.
Order of Reflection	2	The model calculates reflection effects from the reflective surfaces included in the model.
Foliage	Excluded	Not included based on conservative considerations due to the presence of human dwelling residences in the study area.
Temperature	10ºC	Represents typical summer nighttime temperature.
Relative Humidity	80%	Represents typical summer nighttime relative humidity.
Topography	1 m Resolution	Topographical data obtained from Natural Resources Canada.

Results

Overall Sound Pressure Levels – Nighttime

Table 3 summarizes the overall Sound Pressure Levels (SPL) predictions for the receivers in the study area for nighttime. The Facility SPL is the overall SPL from all the facilities in the study area. The Cumulative SPL includes the contribution of the Facility SPL and the Ambient Sound Levels (ASL).

Table 3: Overall Sound Pressure Levels - As Proposed - Nighttime

Receiver	Approximate Distance & Direction from the Center of the Subject Facility		PSL (dBA)	ASL (dBA)	As Proposed			
					Facility SPL (dBA)	Cumulative SPL (dBA)	Meet the PSL	dBC-dBA
R01	650 m	SSW	53.0	48.0	70.8	70.8	No	4.0
R01-2nd Story	650 m	SSW	53.0	48.0	72.4	72.4	No	3.8
R02	400 m	W	53.0	48.0	70.0	70.0	No	4.1
R03	1190 m	NNW	45.0	40.0	63.8	63.8	No	4.3
R03 - 2nd Story	1190 m	NNW	45.0	40.0	64.0	64.0	No	4.3
R04	750 m	SSW	45.0	40.0	69.0	69.0	No	4.8
R04 - 2nd Story	750 m	SSW	45.0	40.0	70.6	70.6	No	4.4
R05	920 m	SSW	48.0	43.0	65.7	65.7	No	4.5
R05 - 2nd Story	920 m	SSW	48.0	43.0	66.3	66.3	No	4.4
R06	2280 m	N	40.0	35.0	55.4	55.4	No	5.5
R06-2nd Story	2280 m	N	40.0	35.0	55.6	55.6	No	5.4
R07	2200 m	N	40.0	35.0	56.0	56.0	No	5.4
R08	2020 m	NNE	45.0	40.0	57.6	57.7	No	5.2
R08-2nd Story	2020 m	NNE	45.0	40.0	57.8	57.9	No	5.1
R09	1500 m	NNE	45.0	40.0	61.9	61.9	No	4.6
R10	1880 m	NNW	40.0	35.0	58.0	58.0	No	5.1
R11	1760 m	N	40.0	35.0	59.4	59.4	No	4.9
R12	2100 m	SE	40.0	35.0	55.7	55.7	No	5.4
R13	2150 m	SE	40.0	35.0	55.4	55.4	No	5.4
R13-2nd Story	2150 m	SE	40.0	35.0	55.4	55.4	No	5.4
R14	1410 m	ESE	45.0	40.0	60.5	60.5	No	4.7
R15	1240 m	E	40.0	35.0	61.9	61.9	No	4.6
R16	1430 m	ENE	40.0	35.0	60.9	60.9	No	4.7
R17	1500 m	NE	40.0	35.0	61.3	61.3	No	4.6
R18	590 m	NW	45.0	40.0	69.3	69.3	No	4.0
R19	660 m	NNW	45.0	40.0	68.9	68.9	No	4.0
R20	1010 m	NNW	45.0	40.0	64.7	64.7	No	4.3
R21	290 m	W	53.0	48.0	72.3	72.3	No	4.0
R22	1260 m	SSW	51.0	46.0	61.7	61.8	No	4.6
R23	1510 m	SW	46.0	41.0	59.2	59.4	No	4.9
R23-2nd Story	1510 m	SW	46.0	41.0	59.3	59.5	No	4.9
R24	1120 m	WSW	46.0	41.0	62.1	62.2	No	4.7

Table 3: Overall Sound Pressure Levels - As Proposed - Nighttime

R25	760 m	WSW	46.0	41.0	65.4	**65.4**	No	4.5
R26	1640 m	WSW	51.0	46.0	57.2	**57.5**	No	5.3
R27	1870 m	WSW	51.0	46.0	55.9	**56.3**	No	5.3
R27-2nd Story	1870 m	WSW	51.0	46.0	56.7	**57.1**	No	5.3
R28	1340 m	W	46.0	41.0	60.1	**60.2**	No	4.9
R28-2nd Story	1340 m	W	46.0	41.0	60.3	**60.4**	No	5.0

R22-R28 are representative receivers in the town of Olds.

The results of this assessment indicate that, the Cumulative SPL is expected to exceed the PSL at all of the receivers in the study area for nighttime operations. The most impacted receiver is R01, located 650 m SSW from the subject facility center, with a Cumulative SPL of 72.4 dBA, and a PSL of 53.0 dBA. Additional noise control is required for the subject facility to comply with the Rule.

The above results also indicate that the dBC-dBA values are expected to meet the 20 dB limit at all of the receivers in the study area. However, the secondary assessment of LFN is inconclusive at this stage because there are insufficient 1/3 octave band data at the receivers to determine tonality. As such, the predicted dBC-dBA values in the above table are provided for information purposes only.

Figure 2A shows the noise map of the area with the expanded Facility SPL contours, that is, the facility noise emissions contours excluding the ASL. Figure 2B shows the noise map of the area with Cumulative SPL contours, that is, the facility noise emissions contours including the ASL. The Cumulative SPL map is the one that can be compared to the PSL at the receivers.

Figure 2A: Noise Contour Map – Facility SPL - Nighttime

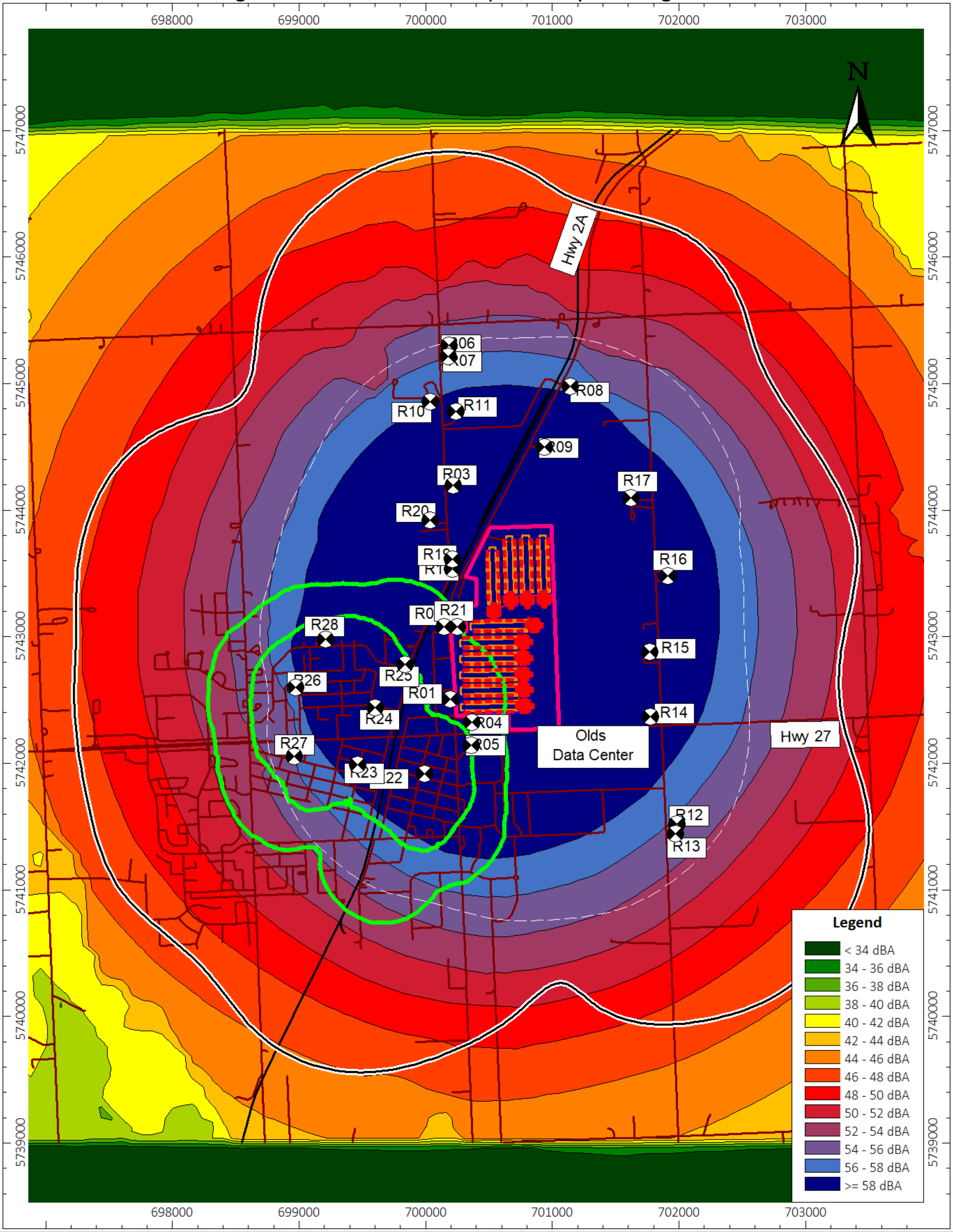
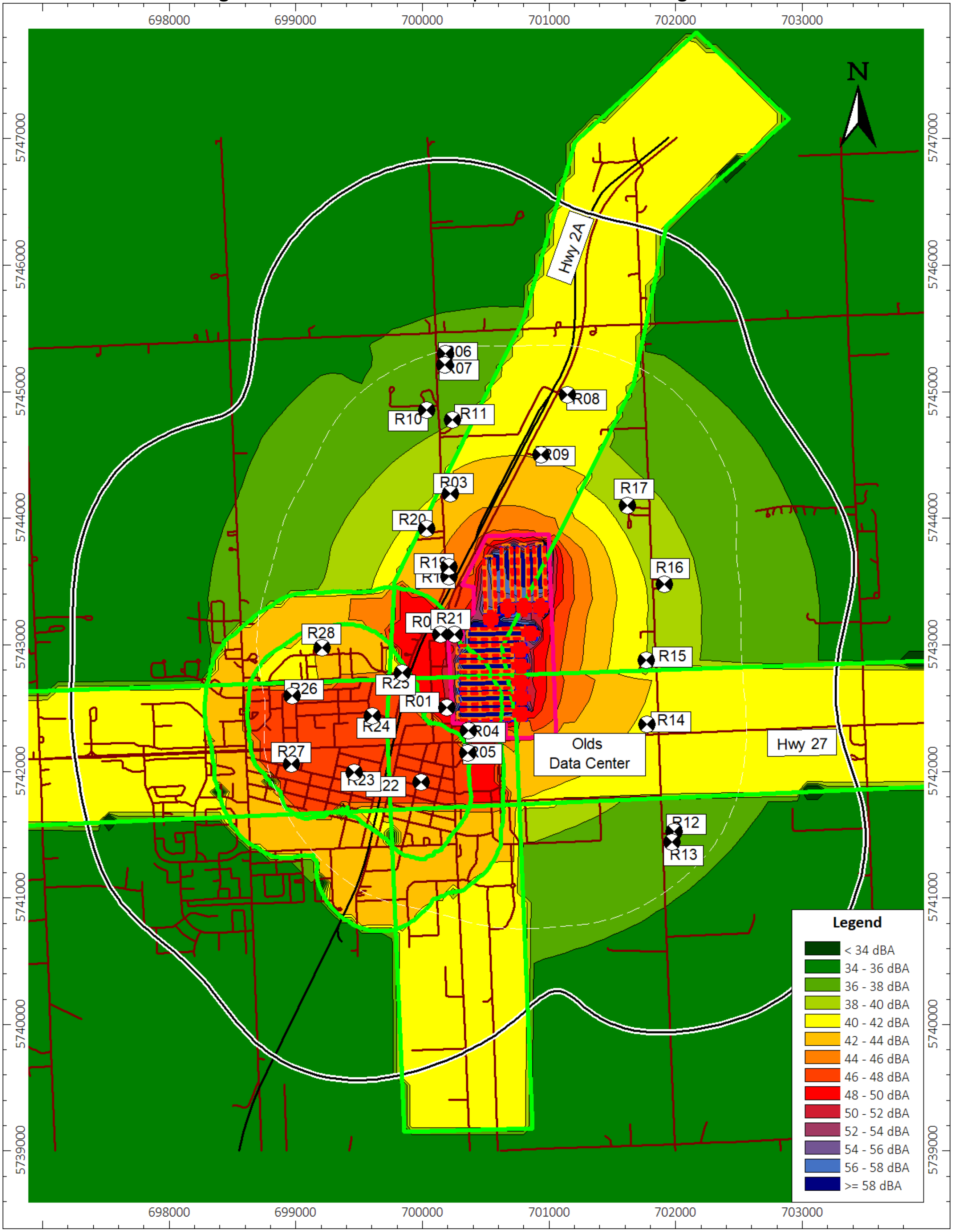


Figure 2B: Noise Contour Map –Cumulative SPL -Nighttime



Source Order Ranking – Nighttime

Table 4 lists the top ten dominant noise sources received at the most impacted receiver R01, located 650 m SSW from the subject facility center. See Appendix E for the complete source order ranking table.

Table 4: Source Order Ranking – Nighttime – R01

Rank	Noise Source	SPL (dBA)	dBC-dBA
001	Chiller Top	56.5	3.5
002	Chiller Top	56.2	3.4
003	Chiller Top	55.7	3.7
004	Chiller Top	55.3	3.6
005	Chiller Top	55.3	3.6
006	Chiller Top	55.2	3.7
007	Chiller Top	54.2	4.1
008	Chiller Top	53.9	4.3
009	Chiller Top	53.8	2.9
010	Chiller Top	53.7	4.3
011+	Cumulative Remaining 1748 Noise Sources	71.5	4.0
	Facility SPL	72.4	3.8
	ASL	48.0	-
	Cumulative SPL	72.4	-
	PSL	53.0	-

The above results indicate that the dominant noise comes from chillers. If any noise control is desired, it should aim at attenuating the dominant noise sources.

For general technical details on sound levels and analysis, as well as for a best practices approach as recommended by the Rule, see Appendix G.

Noise Control Recommendations – Nighttime

Noise control recommendations are designed to bring the facility SPL down to meet the PSL for all the receivers in the study area. Table 5 lists the noise control items to reduce the SPL at all of the receivers for nighttime operations.

Table 5: Noise Control Recommendations – Nighttime

Item	Noise Source	Noise Control
1	Chillers	Install chillers with ≤ 85 dBA PWL per unit
2	NG Plant Step-up Transformers	Install transformers with ≤ 80 dBA PWL per unit
3	NG Plant Generator Turbine Bldg Air Intakes	Install air inlet silencers to achieve ≤ 85 dBA PWL per unit
4	Noise barriers	Install ≥7.5 m high, highly absorbing noise barrier on the NW corner of the data center as depicted on Figure 3

Figure 3: Proposed Noise Barrier Locations

Implementing Noise Control Items 1-4 is required to meet the PSL at all of the receivers in the study area. OpenCycle recommends careful consideration of specific noise mitigation measures during detailed design, and to also consider potential LFN considerations. Table 6 summarizes the overall SPL predictions from the model for each receiver in the study area once the recommended Noise Control Items 1-4 have been implemented.

Table 6: Overall Sound Pressure Levels - As Proposed/After Noise Control - Nighttime

Receiver	Approximate Distance & Direction from the Center of the Subject Facility		PSL (dBA)	ASL (dBA)	As Proposed				After Noise Control				
					Facility SPL (dBA)	Cumulative SPL (dBA)	Meet the PSL	dBC-dBA	Facility SPL (dBA)	Cumulative SPL (dBA)	Noise Reduction (dBA)	Meet the PSL	dBC-dBA
R01	650 m	SSW	53.0	48.0	70.8	**70.8**	No	4.0	45.8	**50.0**	25.0	Yes	10.3
R01-2nd Story	650 m	SSW	53.0	48.0	72.4	**72.4**	No	3.8	47.3	**50.7**	25.1	Yes	9.2
R02	400 m	W	53.0	48.0	70.0	**70.0**	No	4.1	45.2	**49.8**	24.8	Yes	11.8
R03	1190 m	NNW	45.0	40.0	63.8	**63.8**	No	4.3	39.1	**42.6**	24.7	Yes	12.6
R03-2nd Story	1190 m	NNW	45.0	40.0	64.0	**64.0**	No	4.3	39.2	**42.6**	24.8	Yes	12.7
R04	750 m	SSW	45.0	40.0	69.0	**69.0**	No	4.8	44.3	**46.7**	24.7	Yes	12.0
R04-2nd Story	750 m	SSW	45.0	40.0	70.6	**70.6**	No	4.4	45.8	**47.6**	24.8	Yes	10.9
R05	920 m	SSW	48.0	43.0	65.7	**65.7**	No	4.5	41.5	**45.3**	24.2	Yes	13.3
R05-2nd Story	920 m	SSW	48.0	43.0	66.3	**66.3**	No	4.4	42.0	**45.5**	24.3	Yes	13.0
R06	2280 m	N	40.0	35.0	55.4	**55.4**	No	5.5	31.1	**36.5**	24.3	Yes	15.6
R06-2nd Story	2280 m	N	40.0	35.0	55.6	**55.6**	No	5.4	31.3	**36.5**	24.3	Yes	15.4
R07	2200 m	N	40.0	35.0	56.0	**56.0**	No	5.4	31.7	**36.7**	24.3	Yes	15.3
R08	2020 m	NNE	45.0	40.0	57.6	**57.7**	No	5.2	33.3	**40.8**	24.3	Yes	14.6
R08-2nd Story	2020 m	NNE	45.0	40.0	57.8	**57.9**	No	5.1	33.4	**40.9**	24.4	Yes	14.6
R09	1500 m	NNE	45.0	40.0	61.9	**61.9**	No	4.6	37.3	**41.9**	24.6	Yes	13.4
R10	1880 m	NNW	40.0	35.0	58.0	**58.0**	No	5.1	33.6	**37.4**	24.4	Yes	14.5
R11	1760 m	N	40.0	35.0	59.4	**59.4**	No	4.9	34.9	**38.0**	24.5	Yes	14.1
R12	2100 m	SE	40.0	35.0	55.7	**55.7**	No	5.4	31.9	**36.7**	23.8	Yes	16.4
R13	2150 m	SE	40.0	35.0	55.4	**55.4**	No	5.4	31.6	**36.6**	23.8	Yes	16.4
R13-2nd Story	2150 m	SE	40.0	35.0	55.4	**55.4**	No	5.4	31.7	**36.7**	23.7	Yes	16.3
R14	1410 m	ESE	45.0	40.0	60.5	**60.5**	No	4.7	36.9	**41.7**	23.6	Yes	15.8
R15	1240 m	E	40.0	35.0	61.9	**61.9**	No	4.6	38.3	**40.0**	23.6	Yes	15.7
R16	1430 m	ENE	40.0	35.0	60.9	**60.9**	No	4.7	37.0	**39.1**	23.9	Yes	15.2
R17	1500 m	NE	40.0	35.0	61.3	**61.3**	No	4.6	37.0	**39.1**	24.3	Yes	14.1
R18	590 m	NW	45.0	40.0	69.3	**69.3**	No	4.0	43.3	**45.0**	26.0	Yes	13.0
R19	660 m	NNW	45.0	40.0	68.9	**68.9**	No	4.0	42.8	**44.6**	26.1	Yes	12.9
R20	1010 m	NNW	45.0	40.0	64.7	**64.7**	No	4.3	39.7	**42.9**	25.0	Yes	12.8
R21	290 m	W	53.0	48.0	72.3	**72.3**	No	4.0	47.4	**50.7**	24.9	Yes	11.2
R22	1260 m	SSW	51.0	46.0	61.7	**61.8**	No	4.6	37.3	**46.5**	24.4	Yes	13.6
R23	1510 m	SW	46.0	41.0	59.2	**59.4**	No	4.9	34.7	**46.3**	24.5	Yes	14.1
R23-2nd Story	1510 m	SW	46.0	41.0	59.3	**59.5**	No	4.9	34.9	**46.3**	24.4	Yes	14.1
R24	1120 m	WSW	46.0	41.0	62.1	**62.2**	No	4.7	37.5	**46.6**	24.6	Yes	13.2
R25	760 m	WSW	46.0	41.0	65.4	**65.4**	No	4.5	40.7	**47.1**	24.7	Yes	12.5
R26	1640 m	WSW	51.0	46.0	57.2	**57.5**	No	5.3	32.6	**46.2**	24.6	Yes	14.9
R27	1870 m	WSW	51.0	46.0	55.9	**56.3**	No	5.3	31.5	**46.2**	24.4	Yes	15.0
R27-2nd Story	1870 m	WSW	51.0	46.0	56.7	**57.1**	No	5.3	32.3	**46.2**	24.4	Yes	14.7
R28	1340 m	W	46.0	41.0	60.1	**60.2**	No	4.9	35.6	**42.1**	24.5	Yes	13.9
R28-2nd Story	1340 m	W	46.0	41.0	60.3	**60.4**	No	5.0	35.7	**42.1**	24.6	Yes	13.8

The above results indicate that, once the noise control items have been implemented, the Cumulative SPL is expected to bring the facility in compliance for all receivers in the study area. Figure 4A shows the noise map of the area with Facility SPL contours, that is, the facility noise emissions contours excluding the ASL, once the required noise control items have been implemented. Figure 4B shows the noise map of the area with Cumulative SPL contours, that is, the facility noise emissions contours including the ASL, once the required noise control items have been implemented. The Cumulative SPL map is the one that can be compared to the PSL at the receivers.

Figure 4A: Noise Contour Map – After Noise Control – Facility SPL – Nighttime

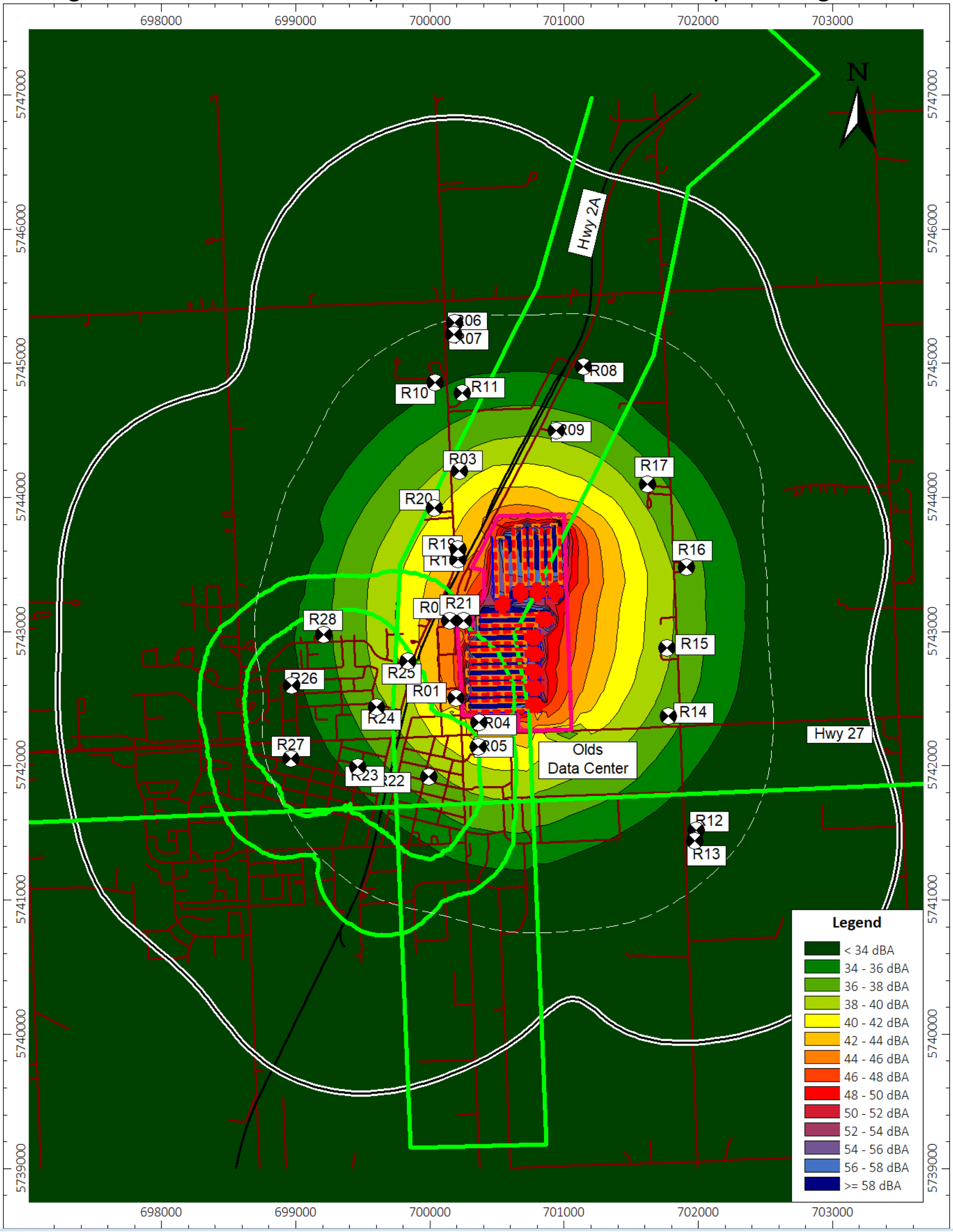
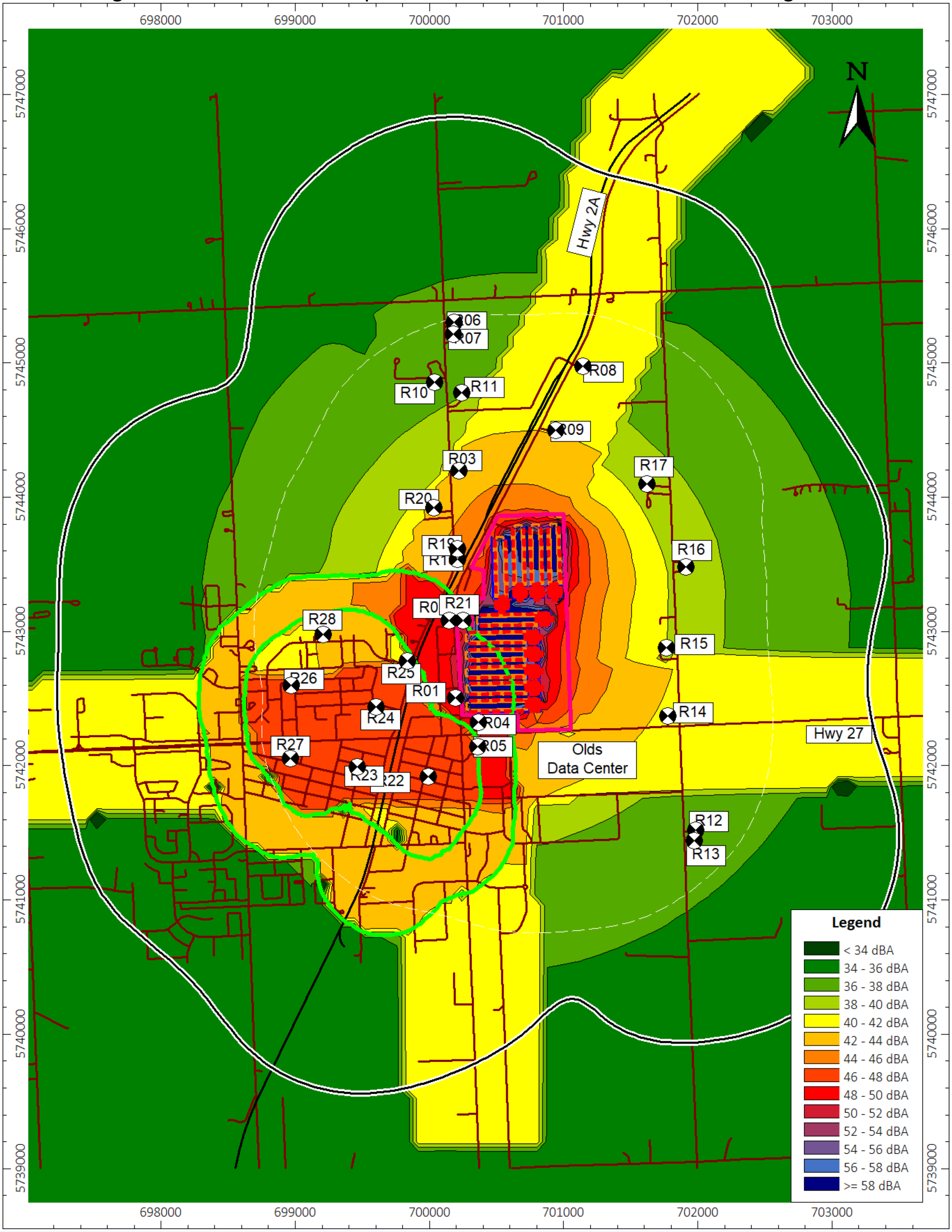


Figure 4B: Noise Contour Map – After Noise Control – Cumulative SPL – Nighttime



Overall Sound Pressure Levels – Daytime

Daytime operations include testing back-up generators in addition to normal operations. One (1) back-up generator at a time is planned to be tested individually at 100% load for up to 2 hours twice per year as part of regular maintenance and testing. Table 7 summarizes the overall Sound Pressure Levels (SPL) predictions for the receivers in the study area for a representative daytime operation with one back-up generator directly facing R15 operating, assuming nighttime compliance is achieved for all of the receivers. The Facility SPL is the overall SPL from all the facilities in the study area. The Cumulative SPL includes the contribution of the Facility SPL and the Ambient Sound Levels (ASL).

Table 7: Overall Sound Pressure Levels - As Proposed & After Noise Control- Daytime

Receiver	Approximate Distance & Direction from the Center of the Subject Facility		PSL (dBA)	ASL (dBA)	As Proposed & After Noise Control			
					Facility SPL (dBA)	Cumulative SPL (dBA)	Meet the PSL	dBC-dBA
R01	650 m	SSW	63.0	58.0	45.9	**58.3**	Yes	10.5
R01-2nd Story	650 m	SSW	63.0	58.0	47.4	**58.4**	Yes	9.5
R02	400 m	W	63.0	58.0	45.4	**58.2**	Yes	11.8
R03	1190 m	NNW	55.0	50.0	39.4	**50.4**	Yes	12.5
R03 - 2nd Story	1190 m	NNW	55.0	50.0	39.5	**50.4**	Yes	12.5
R04	750 m	SSW	55.0	50.0	44.4	**53.6**	Yes	12.2
R04 - 2nd Story	750 m	SSW	55.0	50.0	45.9	**53.8**	Yes	11.1
R05	920 m	SSW	58.0	53.0	41.8	**53.3**	Yes	13.4
R05 - 2nd Story	920 m	SSW	58.0	53.0	42.4	**53.4**	Yes	13.0
R06	2280 m	N	50.0	45.0	31.4	**45.2**	Yes	15.5
R06-2nd Story	2280 m	N	50.0	45.0	31.5	**45.2**	Yes	15.5
R07	2200 m	N	50.0	45.0	31.9	**45.2**	Yes	15.3
R08	2020 m	NNE	55.0	50.0	33.6	**50.1**	Yes	14.6
R08-2nd Story	2020 m	NNE	55.0	50.0	33.8	**50.1**	Yes	14.6
R09	1500 m	NNE	55.0	50.0	37.6	**50.2**	Yes	13.4
R10	1880 m	NNW	50.0	45.0	34.0	**45.3**	Yes	14.3
R11	1760 m	N	50.0	45.0	35.1	**45.4**	Yes	14.1
R12	2100 m	SE	50.0	45.0	32.9	**45.3**	Yes	15.9
R13	2150 m	SE	50.0	45.0	32.5	**45.2**	Yes	16.0
R13-2nd Story	2150 m	SE	50.0	45.0	32.6	**45.2**	Yes	15.9
R14	1410 m	ESE	55.0	50.0	38.1	**50.3**	Yes	15.2
R15	1240 m	E	50.0	45.0	39.0	**46.0**	Yes	15.7
R16	1430 m	ENE	50.0	45.0	37.3	**45.7**	Yes	15.2
R17	1500 m	NE	50.0	45.0	37.4	**45.7**	Yes	14.0
R18	590 m	NW	55.0	50.0	43.5	**50.9**	Yes	13.0
R19	660 m	NNW	55.0	50.0	43.0	**50.8**	Yes	12.8
R20	1010 m	NNW	55.0	50.0	40.0	**50.4**	Yes	12.6
R21	290 m	W	63.0	58.0	47.5	**58.4**	Yes	11.3
R22	1260 m	SSW	61.0	56.0	37.8	**56.1**	Yes	13.6
R23	1510 m	SW	56.0	51.0	35.3	**56.0**	Yes	14.0

Table 7: Overall Sound Pressure Levels - As Proposed & After Noise Control- Daytime

R23-2nd Story	1510 m	SW	56.0	51.0	35.4	**56.0**	Yes	14.1
R24	1120 m	WSW	56.0	51.0	38.0	**56.1**	Yes	13.2
R25	760 m	WSW	56.0	51.0	41.2	**56.1**	Yes	12.5
R26	1640 m	WSW	61.0	56.0	33.2	**56.0**	Yes	14.8
R27	1870 m	WSW	61.0	56.0	32.2	**56.0**	Yes	14.8
R27-2nd Story	1870 m	WSW	61.0	56.0	32.9	**56.0**	Yes	14.6
R28	1340 m	W	56.0	51.0	36.0	**51.1**	Yes	13.9
R28-2nd Story	1340 m	W	56.0	51.0	36.1	**51.1**	Yes	13.9

R22-R28 are representative receivers in the town of Olds.

The results of this assessment indicate that, the Cumulative SPL is expected to meet the PSL at all of the receivers in the study area for daytime operations once nighttime compliance is achieved. The most impacted receiver is R01, located 650 m SSW from the subject facility center, with a Cumulative SPL of 58.3 dBA, and a PSL of 63.0 dBA. Additional noise control is not required for the subject facility to comply with the Rule.

The above results also indicate that the dBC-dBA values are expected to meet the 20 dB limit at all of the receivers in the study area. However, the secondary assessment of LFN is inconclusive at this stage because there are insufficient 1/3 octave band data at the receivers to determine tonality. As such, the predicted dBC-dBA values in the above table are provided for information purposes only.

Figure 5A shows the noise map of the area with the expanded Facility SPL contours, that is, the facility noise emissions contours excluding the ASL. Figure 5B shows the noise map of the area with Cumulative SPL contours, that is, the facility noise emissions contours including the ASL. The Cumulative SPL map is the one that can be compared to the PSL at the receivers.

Figure 5A: Noise Contour Map – Facility SPL – Daytime

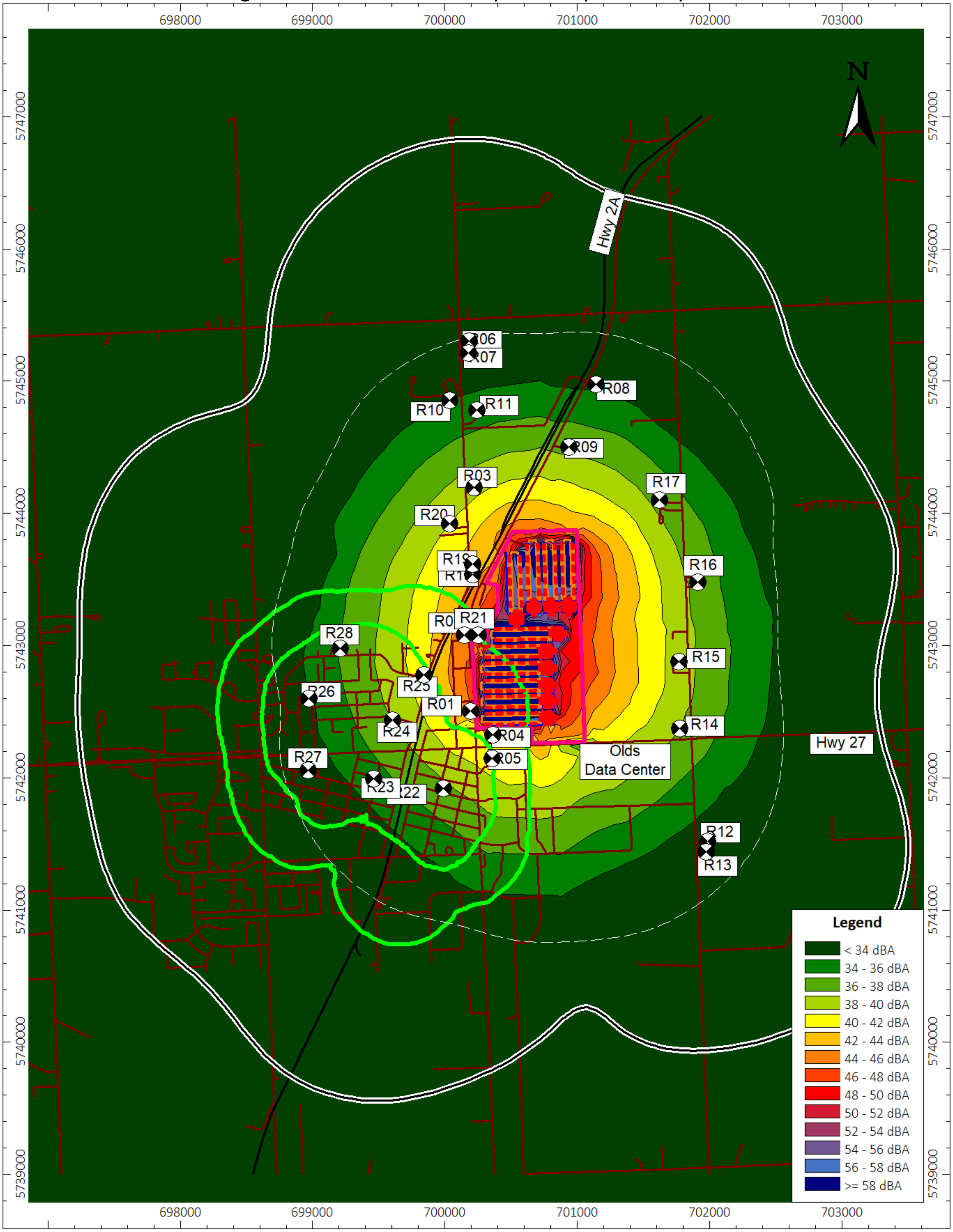


Figure 5B: Noise Contour Map –Cumulative SPL -Daytime

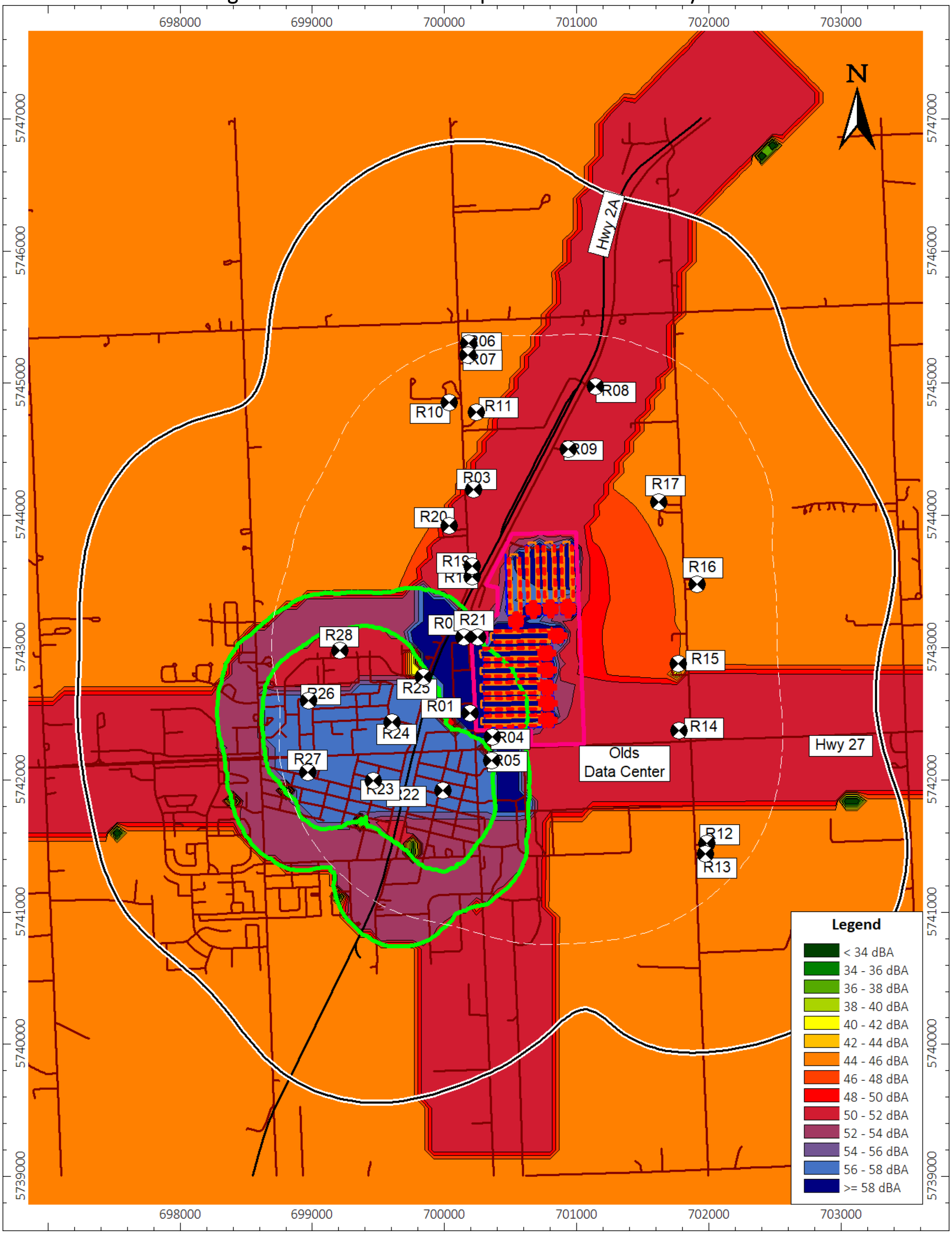


Table 8 lists the top ten dominant noise sources received at receiver R15, located 1240 m E from the subject facility center. R15 was selected to present daytime testing operation impact as this receiver's predicted Cumulative SPL is 40.0 dBA with a PSL of 40 dBA, which was not deemed adjustable due to high dwelling density or heavily travelled roadways.

Table 4: Source Order Ranking – Daytime – R15

Rank	Noise Source	SPL (dBA)	dBC-dBA
001	Genset Bldg Wall	29.6	15.5
002	Genset Air Intake	21.3	17.6
003	Genset Exhaust Pipe	18.1	12.4
004	Genset Cooler Discharge	17.3	11.6
005	Genset Exhaust Tip	17.2	13.8
006	Genset Bldg Door Closed	14.4	17.7
007	HRSG Stack Exit	12.7	19.7
008	Chiller Top	12.3	3.4
009	Chiller Top	11.8	3.2
010	Chiller Top	11.7	3.6
011+	Cumulative Remaining 1500 Noise Sources	38.1	15.7
	Facility SPL	39.1	15.6
	ASL	45.0	-
	Cumulative SPL	50.0	-
	PSL	46.0	-

The above results indicate that the dominant noise comes from the back-up generators. If any noise control is desired, it should aim at attenuating the dominant noise sources.

For general technical details on sound levels and analysis, as well as for a best practices approach as recommended by the Rule, see Appendix G.

Conclusion

Synapse Real Estate Corporation (Synapse) retained OpenCycle Technologies Inc. (OpenCycle) to conduct a Preliminary Noise Impact Assessment (NIA) for the purposes of risk planning & screening for Olds Data Center facility located at W-04-033-01 W5M (the subject facility). This NIA was conducted in accordance with the requirements of Alberta Utilities Commission (AUC) Rule 012: Noise Control (the Rule).

This is a proposed facility that Synapse plans to build ten (10) blocks with data halls and natural gas plants each having:

- One (1) 100 MW Data Center Building with eighty (80) Chillers and sixty (60) Back-up Generators
- One (1) 140 MW Natural Gas Plant with auxiliary equipment. Detailed design and equipment data are not currently available, and assumptions are based on a similar NIA found on AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058)

Synapse and OpenCycle have agreed on a four-stage progressive Noise Management Program designed to reduce uncertainty and manage risk:

5- **Risk Planning & Screening:** Early due diligence using assumptions to identify risk and guide detailed design.
6- **Detailed Design:** Ambient noise monitoring and refined/detailed data and modeling to support a full NIA.
7- **Mitigation:** Detailed mitigation design.
8- **Validation:** Empirical measurements of a similar data center or shop measurements of actual/similar equipment to validate assumptions.

The purpose of Stage-1 assessment is to predict the proposed facility's noise impact on surrounding residences including town of Olds and support detailed design and next steps. Interim studies may be expected as details become available.

Reconnaissance conducted by OpenCycle staff in February 2026 confirms that there is no adjacent energy facility in the study area that is emitting significant noise.

There are hundreds of receivers located within 1500 m of the subject facility. Twenty-one (21) residences were modeled in addition to the residences of town of Olds. The representative residences for the town are labeled as R22 to R28 at different receiver locations. For residents having secondary stories, additional receivers (i.e., R01-2nd Story) are modeled at 4.5 m from ground level to assess the noise levels at secondary stories.

An analysis of two operating scenarios was considered in this study:

- **Nighttime Operation**: representing normal maximum operation, all chillers and natural gas plant are operating; back-up generators are not operating
- **Daytime Operation:** representing normal maximum operation and testing one back-up generator at a time

The results of this assessment indicate that, for daytime and nighttime operations, the Cumulative SPL is expected to exceed the PSL at all of the receivers in the study area with. The most impacted receiver is R01, located 650 m

SSW from the subject facility center. Additional noise control is required for the subject facility to comply with the AUC Rule 012: Noise Control.

Once the recommended noise control items have been implemented, the Cumulative SPL is expected to meet the PSL at all receivers in the study area for nighttime operations. The most impacted receiver becomes R21, located 290 m W from the subject facility center.

Noise control items are discussed in the Noise Control Recommendations section of this report for nighttime compliance. Once the recommended noise control items have been implemented, the Cumulative SPL is expected to meet the PSL at all receivers for daytime testing operations.

OpenCycle also recommends updating the model and results as design data become available and execute subsequent stages of the four-stage analysis approach.

For general technical details on sound levels and analysis, as well as for a best practices approach as recommended by the Rule, see Appendix G.

References

Alberta Utilities Commission (AUC). 2017. *Rule 012: Noise Control*. Amended June 15, 2017. Calgary, Alberta.

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DataKustik GmbH (DataKustik). Version 2026 MR1. *Cadna/A Computer Aided Noise Abatement Model*, Munich, Germany.

International Organization for Standardization (ISO). 1993. *Standard 9613-1, Acoustics – Attenuation of Sound during Propagation Outdoors – Part 1: Calculation of Absorption of Sound by the Atmosphere*, Geneva Switzerland.

International Organization for Standardization (ISO) 1996. *Standard 9613-2, Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation*, Geneva Switzerland.

Google Earth Pro, licensed to OpenCycle Technologies Inc.

AbaData 2.0, licensed to OpenCycle Technologies Inc.

AUC’s E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058).

Appendix A: Glossary

Table A: Glossary

Term	Description
Average Annual Daily Traffic (AADT)	The total volume of vehicle traffic of a highway or road for a year divided by 365 days.
Alberta Energy Regulator (AER)	The Alberta Energy Regulator ensures the safe, efficient, orderly, and environmentally responsible development of hydrocarbon resources over their entire life cycle. This includes allocating and conserving water resources, managing public lands, and protecting the environment while providing economic benefits for all Albertans.
Ambient sound level (ASL)	The sound pressure level that is a composite of different airborne sounds from many sources far away from and near the point of measurement. The ASL does not include any energy-related industrial component and must be measured without it. The ASL is assumed to be 5 dBA below the determined PSL as per section 2.1 of Rule 012.
A-weighted sound level (dBA)	The sound level as measured on a sound level meter using a setting that emphasizes the middle frequency components similar to the frequency response of the human ear at levels typical of rural backgrounds in mid frequencies.
Alberta Utilities Commission (AUC)	The Alberta Utilities Commission regulates the utilities sector, natural gas and electricity markets to protect social, economic and environmental interests of Alberta where competitive market forces do not.
Bands (full octave or 1/3 octave)	A series of electronic filters separate sound into discrete frequency bands, making it possible to know how sound energy is distributed as a function of frequency. Each octave band has a centre frequency that is double the centre frequency of the octave band preceding it. The 1/3 octave band analysis provides a finer breakdown of sound distribution as a function of frequency.
Cumulative SPL	The cumulative sound pressure level from the facilities and the ambient sound level.
Comprehensive Sound Level (CSL)	The sound level that is a composite of different airborne sounds from many sources far away from and near the point of measurement. The CSL does include industrial components and must be measured with them, but it should exclude abnormal noise events. The CSL is used to determine whether a facility is in compliance with the Directive.
Cumulative noise level	The sound level that is the total contribution of all industrial noise sources (existing and proposed) from EUB-regulated facilities at the receptor.
C-weighted sound level (dBC)	The C-weighting approximates the sensitivity of human hearing at industrial noise levels (above about 85 dBA). The C-weighted sound level (i.e., measured with the C-weighting) is more sensitive to sounds at low frequencies than the A-weighted sound level and is sometimes used to assess the low-frequency content of complex sound environments.
Daytime	Defined as the hours from 07:00 to 22:00.
Deferred facility	Facilities constructed and in operation prior to October 1988. These facilities do not have to demonstrate compliance in the absence of a complaint. This does not exempt them from the requirements but does recognize that they were potentially designed without the same considerations for noise as facilities approved after the date when the first comprehensive noise control directive (ID 88-1) was published and put into effect.
Directive 038: Noise Control	Directive 038: Noise Control states the requirements for noise control as they apply to all operations and facilities under the jurisdiction of the Alberta Energy and Utilities Board (EUB). The directive also provides background information and describes an approach to deal with noise problems. This directive is the fifth edition, superseding Interim Directive (ID) 99-8.
Energy equivalent sound level (Leq)	The average weighted sound level over a specified period of time. It is a single-number representation of the cumulative acoustical energy measured over a time interval. The time interval used should be specified in brackets following the Leq—e.g., Leq (9) is a 9-hour Leq. If a sound level is constant over the measurement period, the Leq will equal the constant sound level.
Emergency	An unplanned event requiring immediate action to prevent loss of life or property. Events occurring more than four times a year are not considered unplanned.
Facility SPL	The overall sound pressure level from all the facilities in the study area

Table A: Glossary

Term	Description
Heavily Travelled Road	Generally includes highways and any other road where the average traffic count is at least 10 vehicles/hour over the nighttime period. It is acknowledged that highways are sometimes lightly travelled during the nighttime period, which is usually the period of greatest concern. The AER will use the 10 vehicles/hour criterion to determine whether highways qualify as heavily travelled during the nighttime period.
Low Frequency Noise (LFN)	Where a clear tone is present below and including 250Hz and the difference between the overall C-weighted sound level and the overall A-weighted sound level exceeds 20 dB.
Nighttime	Defined as the hours from 22:00 to 07:00.
Noise	Generally associated with the unwanted portion of sound.
Noise Impact Assessment (NIA)	An NIA identifies the expected sound level emanating from a facility as measured 15 m from the nearest or most impacted permanently or seasonally occupied dwelling. It also identifies what the permissible sound level is and how it was calculated.
Permanent facility	A facility that is in operation for more than two months.
Permissible Sound Level (SPL)	The maximum SPL that a facility must not exceed at receivers located within 1500 m from the subject facility fence line. The PSL for each receiver is determined as per section 2.1 of Rule 012.
Receiver	The location of the residences existing in the NIA study area for which the SPL is determined. In the event that there are no residences existing in the study area, then hypothetical receivers are included at 1500 m from the subject facility fence line.
Representative conditions	Those conditions typical for an area and/or the nature of a complaint. For ASLs, these are conditions that portray the typical activities for the area, not the quietest time. For CSLs, these do not constitute absolute worst-case conditions or the exact conditions the complainant has highlighted if those conditions are not easily duplicated. Sound levels must be taken only when representative conditions exist; this may necessitate a survey of extensive duration (two or more consecutive nights).
Sound Power Level (PWL)	The sound level emitted. The decibel equivalent of the rate of energy (or power) emitted in the form of noise. The sound power level is given by: $PWL = 10 \times LOG_{10}\left(\frac{Sound\ as\ Power}{W_0}\right)$ Where $W_0 = 10^{-12}$ watts (or 1 pW)
Sound Pressure Level (SPL)	The sound level received. The decibel equivalent of the pressure of sound waves at a specific location, which is measured with a microphone. The sound pressure level is given by: $SPL = 10 \times LOG_{10}\left(\frac{Sound\ as\ Pressure}{P_0}\right)$ Where $P_0 = 2 \times 10^{-5}$ Pa (or 20 μPa)
Subject facility	The energy industry facility which is the object of the NIA.
Temporary facility	Any facility that will be in operation less than 60 days.
Tonal component	A pronounced peak clearly obvious within the sound level spectrum.

Appendix B: Permissible Sound Level Determination

AUC Rule 012, Section 2.1: Sample Permissible Sound Level Determination
Synapse Olds Data Center at W-04-033-01 W5
Receiver R03 in the Study Area

Basic Nighttime Sound Level

Proximity to Transportation	Dwelling Unit Density per ¼ Section of Land			Nighttime	Daytime
	1 - 8 Dwellings	9 - 160 Dwellings	>160 Dwellings		
Category 1	40	43	46	40	40
Category 2	45	48	51		
Category 3	50	53	56		
Daytime Adjustment				N/A	10
Basic Sound Levels				45	55

Class A Adjustments

Class	Reason for Adjustment	Value (dBA L_{eq})	Nighttime	Daytime
A1	Seasonal Adjustment (Wintertime Operation)	+5	N/A	N/A
A2	Ambient Monitoring Adjustment	-10 to +10	N/A	N/A
	Class Adjustment = Sum of A1 and A2 (as applicable), but not to exceed a maximum of 10 dBA L_{eq}			
Total Class A Adjustments			0	0

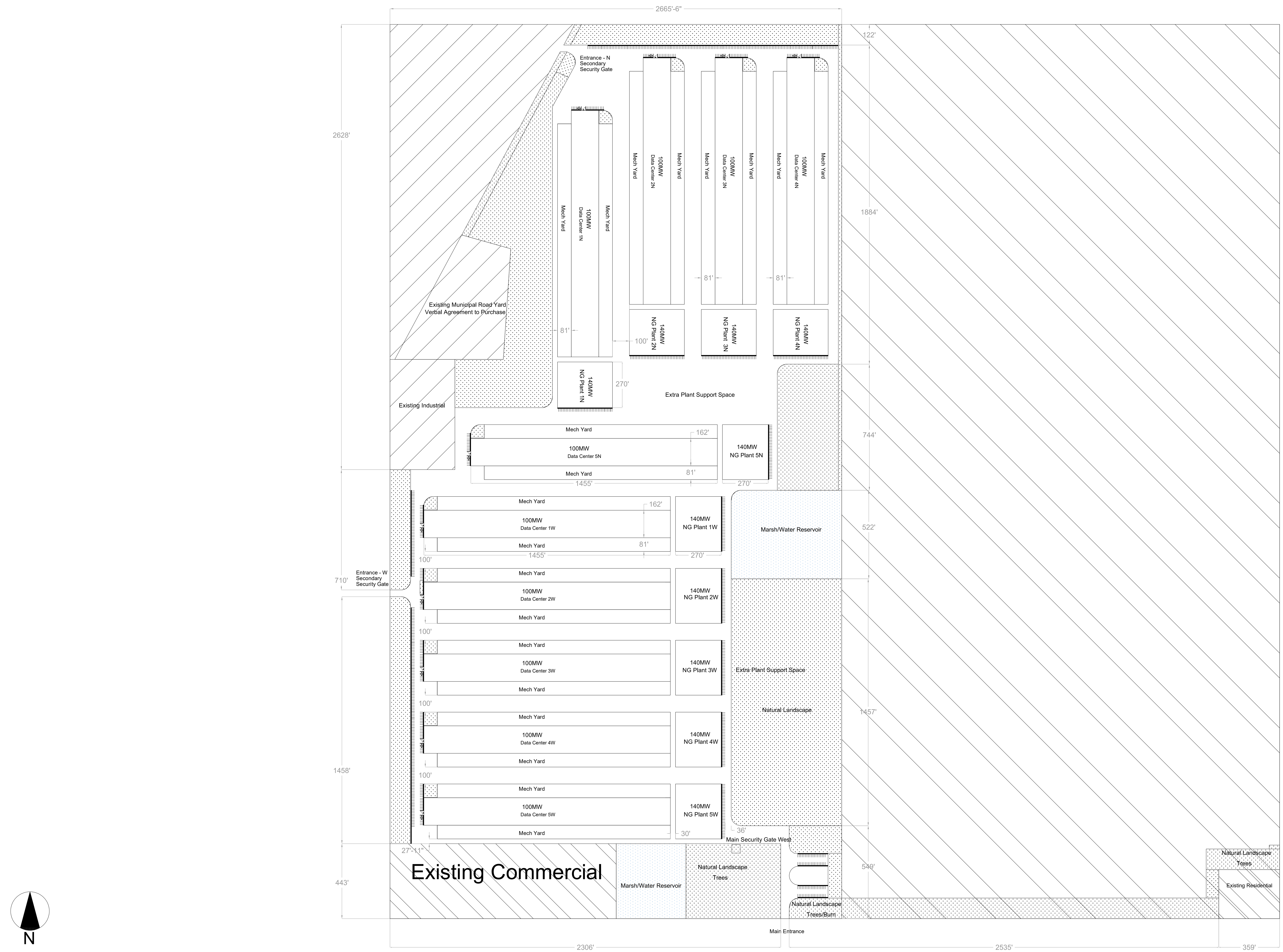
Class B Adjustments

Class	Duration of Activity	Value (dBA L_{eq})	Nighttime	Daytime
B1	1 day	+15		
B2	7 days	+10		
B3	< or = to 60 days	+5		
B4	> 60 days	0	0	0
Class B Adjustment = one only of B1, B2, B3 or B4				
Class B Adjustment			0	0

	Nighttime	Daytime
PERMISSIBLE SOUND LEVEL (dBA)	**45**	**55**

Category 1: Dwelling units more than 500 m from heavily travelled roads and/or rail lines and not subject to frequent aircraft flyovers.
Category 2: Dwelling units more than 30 m but less than 500 m from heavily travelled roads and/or rail lines and not subject to frequent aircraft flyovers.
Category 3: Dwelling units less than 30 m from heavily travelled roads and/or rail lines and/or subject to frequent aircraft flyovers.

Appendix C: Subject Facility Plot Plan



PLANUS

REVISIONS			DATE OF THIS PLOT :
REV	DATE	ISSUED FOR	
1.1	18/01/25	ISSUED FOR REVIEW	

PLANUS

CUSTOMER

Synapse Data Center Corp.
Alberta

PROJECT

Alberta, Canada
1GW Data Center

DRAWING TITLE

A1

DRAWING FILE LOCATION

DESIGNED	DRAWN	CHECKED
PLANUS	J.V.G	J.V.G
DATE	SCALE	DRAWING NO.
18/01/25	N/A	1

Appendix D: Sound Power Levels

The Sound Power Levels (PWL) were determined for all of the facility's major noise sources. The PWLs in linear octave band are presented on the table below.

- For each proposed noise source, the PWL was obtained from theoretical calculations, manufacturer's data, previous study on similar units and AUC's E-filing website (Beacon AI Centers – Indus Project NIA, Stantec, Project/File ID: 145400058).

Table D: Source Octave Band Sound Power Levels

Noise Source	Data Source	Linear Octave Band Centre Frequency (dB)									Overall (dBA)	Overall (dBC)
		31.5	63	125	250	500	1000	2000	4000	8000		
Chiller Sides	Manufacturer	90	92	105	100	108	101	98	89	82	107	111
Chiller Top	Manufacturer	90	92	105	100	108	101	98	89	82	107	111
GSU Transformers (12 for each block)	Previous Study	104	106	108	103	101	99	93	88	84	103	112
Genset Bldg Wall	Previous Study	106	109	111	104	101	95	91	87	87	102	114
ACC Steam Duct	Previous Study	95	97	90	85	81	78	94	75	64	96	100
Genset Exhaust Pipe	Previous Study	93	97	99	94	88	86	81	77	78	92	102
Genset Cooler Discharge	Previous Study	93	95	97	91	88	88	81	76	76	92	101
Genset Exhaust Tip	Previous Study	99	96	99	94	87	83	80	76	73	91	103
HRSG Stack Exit	Previous Study	103	101	93	83	84	81	85	83	81	90	104
Air Inlet Filter House	Previous Study	100	99	95	81	83	84	78	79	77	88	102
Genset Air Intake	Previous Study	92	96	99	89	84	80	77	74	75	88	101
Genset Cooler Inlet	Previous Study	90	93	99	89	85	79	75	74	76	88	101
Genset Bldg Door Closed	Previous Study	91	95	99	89	82	80	74	72	74	87	101
Gas Turbine Enclosure Ventilation Inlet	Previous Study	88	90	91	79	74	73	80	80	76	86	94
ACC Steam Intake	Previous Study	89	88	89	85	82	80	76	69	63	85	94
ACC Steam Outlet	Previous Study	89	88	89	85	82	80	76	69	63	85	94
Gas Turbine Enclosure Ventilation Outlet	Previous Study	100	92	95	87	77	70	75	70	67	84	100

Table D: Source Octave Band Sound Power Levels

NG Plant Bldg Roof	Previous Study	113	103	96	81	72	63	63	60	58	83	111
NG Plant Bldg Wall	Previous Study	113	103	96	81	72	63	63	60	58	83	111
Generator Bldg Ventilation Outlet	Previous Study	92	86	77	68	67	68	69	74	75	79	91
Generator Bldg Ventilation Inlet	Previous Study	92	86	77	68	67	68	69	74	75	79	91

Appendix E: Source Order Ranking – R01-Nighttime

Table E below shows the top 100 sources on the Source Order Ranking for R01 for nighttime operations. Full list is available upon request.

Table E: Source Order Ranking - Receiver R01-2nd Story

Rank	Noise Source	SPL (dBA)	dBC-dBA
001	Chiller Top	56.5	3.5
002	Chiller Top	56.2	3.4
003	Chiller Top	55.7	3.7
004	Chiller Top	55.3	3.6
005	Chiller Top	55.3	3.6
006	Chiller Top	55.2	3.7
007	Chiller Top	54.2	4.1
008	Chiller Top	53.9	4.3
009	Chiller Top	53.8	2.9
010	Chiller Top	53.7	4.3
011	Chiller Top	53.1	2.9
012	Chiller Top	52.7	3.0
013	Chiller Top	52.7	4.7
014	Chiller Top	52.6	3.1
015	Chiller Top	52.4	2.9
016	Chiller Top	52.4	3.1
017	Chiller Top	52.3	3.4
018	Chiller Top	52.2	3.8
019	Chiller Top	52.2	4.9
020	Chiller Top	52.1	3.3
021	Chiller Top	52.0	3.9
022	Chiller Top	51.9	3.6
023	Chiller Top	51.8	3.6
024	Chiller Top	51.7	3.6
025	Chiller Top	51.7	3.6
026	Chiller Top	51.6	5.1
027	Chiller Top	51.3	3.9
028	Chiller Top	51.1	3.9
029	Chiller Top	50.8	4.2
030	Chiller Top	50.7	2.9
031	Chiller Top	50.7	3.1
032	Chiller Top	50.4	3.7
033	Chiller Top	50.4	4.2
034	Chiller Top	50.3	4.2
035	Chiller Sides	50.2	3.5
036	Chiller Sides	50.0	3.5
037	Chiller Sides	49.9	3.6
038	Chiller Top	49.9	2.9
039	Chiller Top	49.8	3.0
040	Chiller Top	49.8	3.1
041	Chiller Top	49.8	4.1

Table E: Source Order Ranking - Receiver R01-2nd Story

042	Chiller Sides	49.7	3.6
043	Chiller Top	49.7	5.5
044	Chiller Top	49.6	3.2
045	Chiller Sides	49.5	3.7
046	Chiller Sides	49.5	3.6
047	Chiller Sides	49.5	3.6
048	Chiller Top	49.3	3.3
049	Chiller Top	49.3	5.6
050	Chiller Top	49.3	4.4
051	Chiller Sides	49.2	3.7
052	Chiller Top	49.1	3.4
053	Chiller Sides	49.0	3.7
054	Chiller Top	48.9	3.5
055	Chiller Top	48.7	3.6
056	Chiller Sides	48.6	3.9
057	Chiller Top	48.5	4.7
058	Chiller Sides	48.5	2.8
059	Chiller Top	48.4	3.1
060	Chiller Top	48.4	3.3
061	Chiller Top	48.2	3.9
062	Chiller Sides	48.1	3.8
063	Chiller Top	48.1	3.7
064	Chiller Top	47.9	5.0
065	Chiller Top	47.6	3.1
066	Chiller Sides	47.5	4.3
067	Chiller Top	47.5	3.1
068	Chiller Top	47.4	4.1
069	Chiller Top	47.4	3.3
070	Chiller Top	47.3	3.3
071	Chiller Sides	47.2	3.0
072	Chiller Top	47.1	3.4
073	Chiller Top	47.0	4.0
074	Chiller Top	46.9	4.2
075	Chiller Sides	46.9	3.2
076	Chiller Top	46.9	3.5
077	Chiller Top	46.8	4.0
078	Chiller Top	46.7	4.2
079	Chiller Top	46.7	3.8
080	Chiller Top	46.7	3.9
081	Chiller Top	46.7	3.6
082	Chiller Top	46.6	4.1
083	Chiller Top	46.6	3.5
084	Chiller Top	46.6	3.3
085	Chiller Top	46.5	3.9
086	Chiller Top	46.5	4.6
087	Chiller Sides	46.5	3.4
088	Chiller Top	46.5	3.9

Table E: Source Order Ranking - Receiver R01-2nd Story

089	Chiller Top	46.3	3.3
090	Chiller Sides	46.2	3.7
091	Chiller Top	46.2	3.7
092	Chiller Sides	46.2	3.8
093	Chiller Sides	46.1	3.6
094	Chiller Sides	46.1	3.9
095	Chiller Sides	46.0	5.0
096	Chiller Top	46.0	6.2
097	Chiller Top	46.0	2.9
098	Chiller Sides	46.0	3.5
099	Chiller Top	46.0	3.9
100	Chiller Sides	45.8	3.5

Appendix F: Noise Control Acoustic Specifications

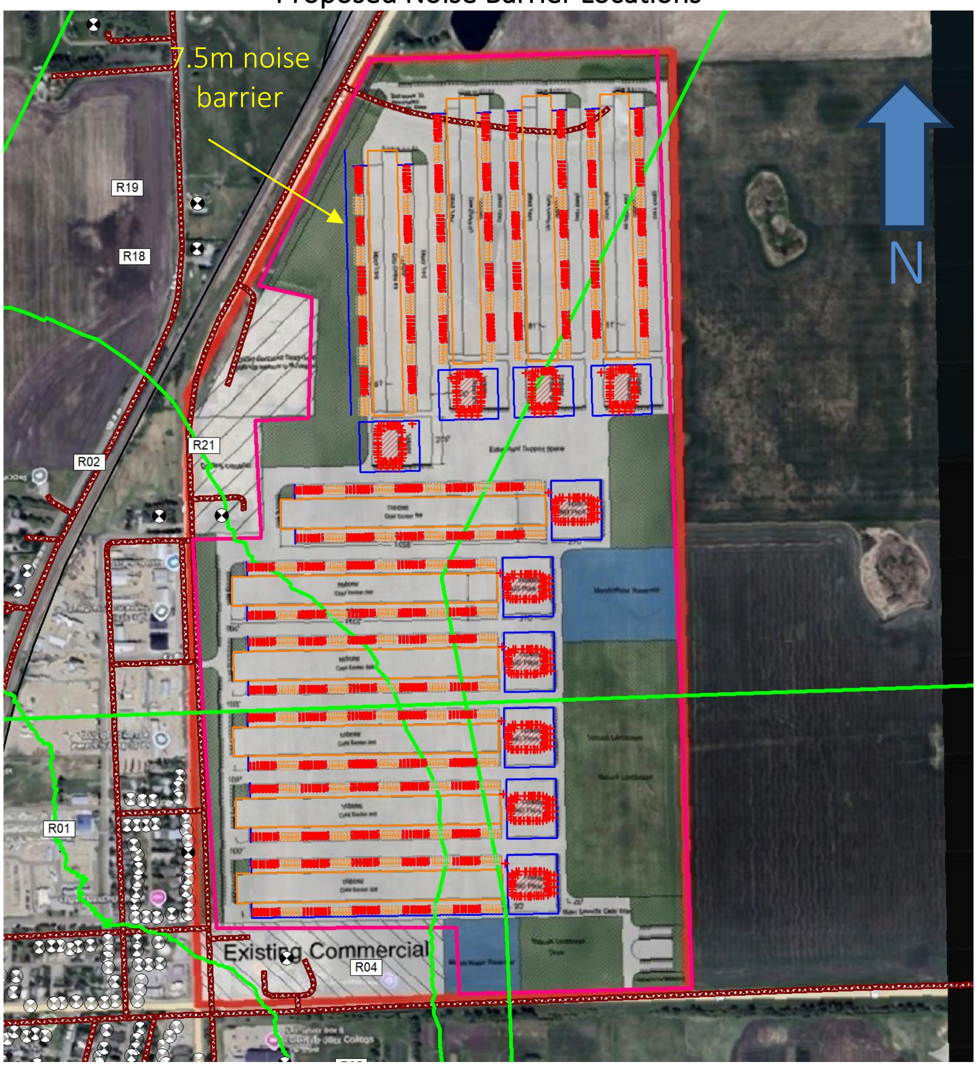
Summary

The table below lists the noise control items designed to bring the Olds Data Center in compliance with regulations for nighttime operations.

Noise Control Recommendations – Nighttime

Item	Noise Source	Noise Control
1	Chillers	Install chillers with ≤ 85 dBA PWL per unit
2	NG Plant Step-up Transformers	Install transformers with ≤ 80 dBA PWL per unit
3	NG Plant Generator Turbine Bldg Air Intakes	Install air inlet silencers to achieve ≤ 85 dBA PWL per unit
4	Noise barriers	Install ≥7.5 m high, highly absorbing noise barrier on the NW corner of the data center as depicted below

Proposed Noise Barrier Locations



Appendix G: Technical Details and Best Practices Approach

Technical Details

Sound is the phenomena of vibrations transmitted through air, or other medium such as water or a building structure. The range of pressure amplitudes, intensities, and frequencies of the sound energy is very wide, and many specialized fields have developed using different ranges of these variables, such as room acoustics and medical ultrasound.

Due to the wide range of intensities, which are perceived as sound, standard engineering units become inconvenient. Sound levels are commonly measured on a logarithmic scale, with the level (in decibels, or dB) being proportional to ten times the common logarithm of the sound energy or intensity. Normal human hearing covers a range of about twelve to fourteen orders of magnitude in energy, from the threshold of hearing to the threshold of pain. On the decibel scale, the threshold of hearing is set as zero, written as 0 dB, while the threshold of pain varies between 120 to 140 dB. The most usual measure of sound is the sound pressure level (SPL), with 0 dB SPL set at 2.0 X 10^{-5} N/m^2 (also written 20 μPa), which corresponds to a sound intensity of 10^{-12} Watts/m^2 (or 1 picoWatt/m^2, written 1 pW/m^2).

Normal human hearing spans a frequency range from about 20 Hertz (Hz, or cycles per second) to about 20,000 Hz (written 20 kHz). However, the sensitivity of human hearing is not the same at all frequencies. To accommodate the variation in sensitivity, various frequency-weighting scales have been developed. The most common is the A-weighting scale, which is based on the sensitivity of human hearing at moderate levels; this scale reflects the low sensitivity to sounds of very high or very low frequencies. Sound levels measured on the A-weighted scale are written in A-weighted decibels, commonly shown as dBA or dB(A).

Human hearing becomes more sensitive to lower frequency sounds as the level of the sound increases. For this purpose, the C-weighing scale was developed to assess reaction to higher levels sounds. Although the C-weighting scale, or the sound level in dBC, is seldom used on its own, the levels in dBC and dBA are often used together to assess the significance of the low-frequency components of sound. In some cases, a limit is placed on the dBC level at a location in order to limit the amount of low-frequency noise.

When sound is measured using the A-weighting scale, the reading is often called the "Noise level", to confirm that human sensitivity and reactions are being addressed. A table of some common noise sources and their associated noise levels are shown in the table below.

When the A-weighting scale is not used, the measurement is said to have a "linear" weighting, or to be unweighted, and may be called a "linear" level. As the linear reading is an accurate measurement of the physical (sound) pressure, the term "Sound Pressure Level", or SPL, is usually (but not universally) reserved for unweighted measurements.

Noise is usually defined as "unwanted sound", which indicates that it is not just the physical sound that is important, but also the human reaction to the sound that leads to the perception of sound as noise. It implies a judgment of the quality or quantity of sound experienced. As a human reaction to sound is involved, noise levels are usually given in A-weighted decibels (dBA). However, use of the C-weighting scale, usually in combination with the dBA level, is becoming more common as well. An alternate definition of noise is "sound made by somebody else", which emphasizes that the ability to control the level of the sound alters the perception of noise.

Noise Levels of Familiar Sources

Source Or Environment	Noise Level (dBA)
High Pressure Steam Venting To Atmosphere (3 m)	121
Steam Boiler (2 m)	90-95
Drilling Rig (10 m)	80-90
Pneumatic Drill (15 m)	85
Pump Jack (10 m)	68-72
Truck (15 m)	65-70
Business Office	65
Conversational Speech (1 m)	60
Light Auto Traffic (30 m)	50
Living Room	40
Library	35
Soft Whisper (5 m)	20-35

The single number A-weighted level is often inadequate for engineering purposes, although it does supply a good estimate of people's reaction to a noise environment. As noise sources, control measures, and materials differ in the frequency dependence of their noise responses or production, sound is measured with a narrower frequency bandwidth; the specific methodology varies with the application. For most work, the acoustic frequency range is divided into frequency bands where the center frequency of each band is twice the frequency of the next lower band; these are called "Octave" bands, as their frequency relation is called an "Octave" in music, where the field of acoustics has its roots. For more detailed work, the octave bands, and certain standard octave and 1/3 octave bands have been specified by international agreements.

Where the noise at the receiver is steady, it is easy to assess the noise level. However, both the production of noise at the source and the transmission of noise can vary with time; most noise levels are not constant, either because of the motion of the noise source (as in traffic noise), because the noise source itself varies, or because the transmission of sound to the receiver location is not steady as over long distances. This is almost always the case for environmental noise studies. Several single number descriptors have been developed and are used to assess noise in these conditions.

The most common is the measurement of the "equivalent continuous" sound level, or L_{eq}, which is the level of a hypothetical source of a constant level which would give the same total sound energy as is measured during the sampling period. This is the "energy" average noise level. Typical sampling periods are one hour, nighttime (9 hours) or one day (24 hours); the sampling period used must be reported when using this unit.

The greatest value of the L_{eq} is that the contributions of different sources to the total noise level can be assessed, or in a case where a new noise source is to be added to an existing environment, the total noise level from new and old sources can be easily calculated. It is also sensitive to short term high noise levels.

Statistical noise levels are sometimes used to assess an unsteady noise environment. They indicate the levels that exceeded a fixed percentage of the measurement time period measured. For example, the 10^{th} percentile level, written L_{10}, is the levels exceeded 10% of the time; this level is a good measure of frequent noisy occurrences such as steady road traffic. The 90% level, L_{90}, is the level exceeded 90% of the time, and is the background level, or noise floor. A steady noise source will modify the background level, while an intermittent noise source such as road or rail traffic will affect the short-term levels only.

One disadvantage with the L_{eq} measure, when used alone, is that nearby loud sources (e.g. dogs barking, or birds singing) can confuse the assessment of the situation when it is the noise from a distant plant that is the concern. For this reason, the equivalent level and the statistical levels can be used together to better understand the noise environment. One such indication is the difference between the L_{eq} and the L_{90} levels. A large difference between the L_{eq} and L_{90}, greater than 10 dB, indicates the intrusion of short-term noise events on the general background level. A small difference, less than 5 dB, indicates a very steady noise environment. If the L_{eq} value exceeds the L_{10} value this indicates the presence of significant short-term loud events.

For most noise measurement, instruments are adjusted so that the time response of the instrument is similar to the response of the human ear; this is the "Fast" setting. Measurement with the "Fast" setting therefore assesses the sound environment according to the way humans would hear it and react to it. Where the noise level varies substantially and an average level is wanted without the complexity of and L_{eq} or statistical measurement, the "Slow" setting is used on the sound level meter. The "Slow" setting is also typically used in industrial settings where hearing damage is a concern. Where the noise level changes very rapidly, for example due to impacts or detonations, the "Fast" and "Slow" settings do not respond quickly enough to assess the maximum levels, and the "Impulse" meter setting us used.

The Sound Power Level (abbreviated L_w, SWL or PWL) is the decibel equivalent of the total energy emitted from a source in the form of noise. The reference level for the sound power is 10^{-12} Watts, or 1 picoWatt (abbreviated pW). The sound power level is given by:

$$L_w, \text{SWL}, \text{PWL} = 10 \times \log_{10} (\text{Emitted Power} / 1 \text{ pW}) \text{ dB}$$

Therefore, a source emitting 1 Watt of power in the form of sound would have a sound power level of 120 dB. Sound power levels can be expressed in terms of frequency bands, an overall linear-weighted level or A-weighted, as is the case for sound pressure levels. However, sound power levels are inherent to the source of noise, whereas the sound pressure level is dependent on the source, but also on the distance from the source and other environmental factors.

Note that according to the acoustical literature (E.g. Noise Control Engineering from Bies and Hanson), the subjective effect of changes in SPL is as follows:

- A 3 dB change is "just perceptible".
- A 5 dB change is "clearly noticeable".
- A 10 dB change is "twice as loud or half as loud".
- A 20 dB change is "much louder or much quieter".

Best Practices Approach

The AUC encourages licensees to adopt and incorporate a best practices approach to noise management into their facility maintenance and operating procedures. This may include such things as taking regular fence line measurements to determine if there are any significant changes to sound emanating from the facility, orientating fans away from directly facing receivers, closing equipment building doors and windows whenever possible, equipping facility related vehicles including trucks with appropriate mufflers, and where possible, scheduling noisy events during daytime hours of 7 AM to 8 PM in order to reduce potential noise disturbances. Where high noise generating activity like high pressure blowdown or venting would occur, appropriate vent silencer should be fitted on the vent nozzle to minimize noise disturbance.

Construction Noise

Although there is no specific construction noise level limit detailed by the Rule, there are general recommendations for construction noise mitigation during equipment installation. This includes all activities associated with installation of the proposed new equipment. The document states:

> "Licensees must manage the impact of construction noise on nearby dwellings. The following mitigation measures should be used:
>
> - Conduct construction activity between the hours of 07:00 and 22:00 to reduce the potential impact of construction noise.
> - Advise nearby residents of significant noise-causing activities and schedule these events to reduce disruption to them.
> - Ensure all internal combustion engines are fitted with appropriate muffler systems; and
>
> Should a valid complaint be made during construction, the licensee is expected to respond expeditiously and take prompt action to address the complaint."

The AUC encourages licenses to adopt these recommendations into their noise management plan where reasonably practical to minimize potential noise disturbances during construction related activities.