Exhibit D

Equipment Sound Assessment

SOFC Fuel Cell Project

University of Connecticut

Storrs, Connecticut

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Prepared For:

FuelCell Energy, Inc.
3 Great Pasture Road
Danbury, CT 006790

Prepared By:

Modeling Specialties
30 Maple Road
Westford, MA 01886

Environmental Sound Assessment
UCONN SOFC Project

Background

A New Technology Fuel Cell Project is proposed at the University of Connecticut (UCONN) in Storrs, Connecticut. The Fuel Cell process combines Connecticut Class I Renewable Energy resources, uses proven commercial technologies, is ultra-clean, and is more efficient than any other electricity generating technology in its size range. The following assessment is based on the criteria provided by the Connecticut Department of Energy & Environmental Protection (CTDEEP). Sound levels from the proposed equipment were estimated based on vendor design. Sound level modeling techniques were used to estimate the potential impacts at receiving locations. What follows is an analysis of the facility sound using the estimated equipment configuration and using 3-dimensional noise modeling software package CadnaA by Datakustic.

Overview of Project and Site Vicinity

The proposed equipment location is less than 5 miles from Interstate 84 to the north-northwest, but the terrain shields the campus from any significant distant highway sound. Local sources in the project area are limited to traffic on secondary roadways. The Project is located along the south side of the Innovation Partnership Building at the UCONN Storrs campus. Once active, the proposed fuel cell units will join other utility infrastructure in this lower level of the building near the loading docks. The facility will be provided natural gas through existing campus supply. The fuel cells will provide the building with up to a megawatt of electricity and also heat as a byproduct of the unit operation. The fuel cell is a continuous source of electricity so it is assumed in this study to operate continuously during the daytime and at night. The project is planned in two phases. The first phase will include two units, each with 250 kW capacity. The second phase will double the capacity to approximately 1 megawatt.

The host facility is the Innovation Partnership Building, locally known simply as “IPB”. This part of the UCONN institution corresponds to essentially commercial use. There is a significant part of the northwest campus that is open space and parking. The nearest area used for residential use are the Charter Oak Apartments off Tower Ct. Rd to the east. These are residential use but are within the University Campus for student housing. There are off-campus residences to the west off Grandview Circle. The nearest of these residences is about 1435 feet from the proposed equipment. While distant, these are the nearest off-campus receivers so are included in the modeling along with the campus housing. Figure 1 shows an aerial perspective of the northwest campus showing the proposed equipment, community locations and campus property lines. While it is common to include the local zoning for the area, the campus includes the entire area that is potentially affected by the equipment sound.

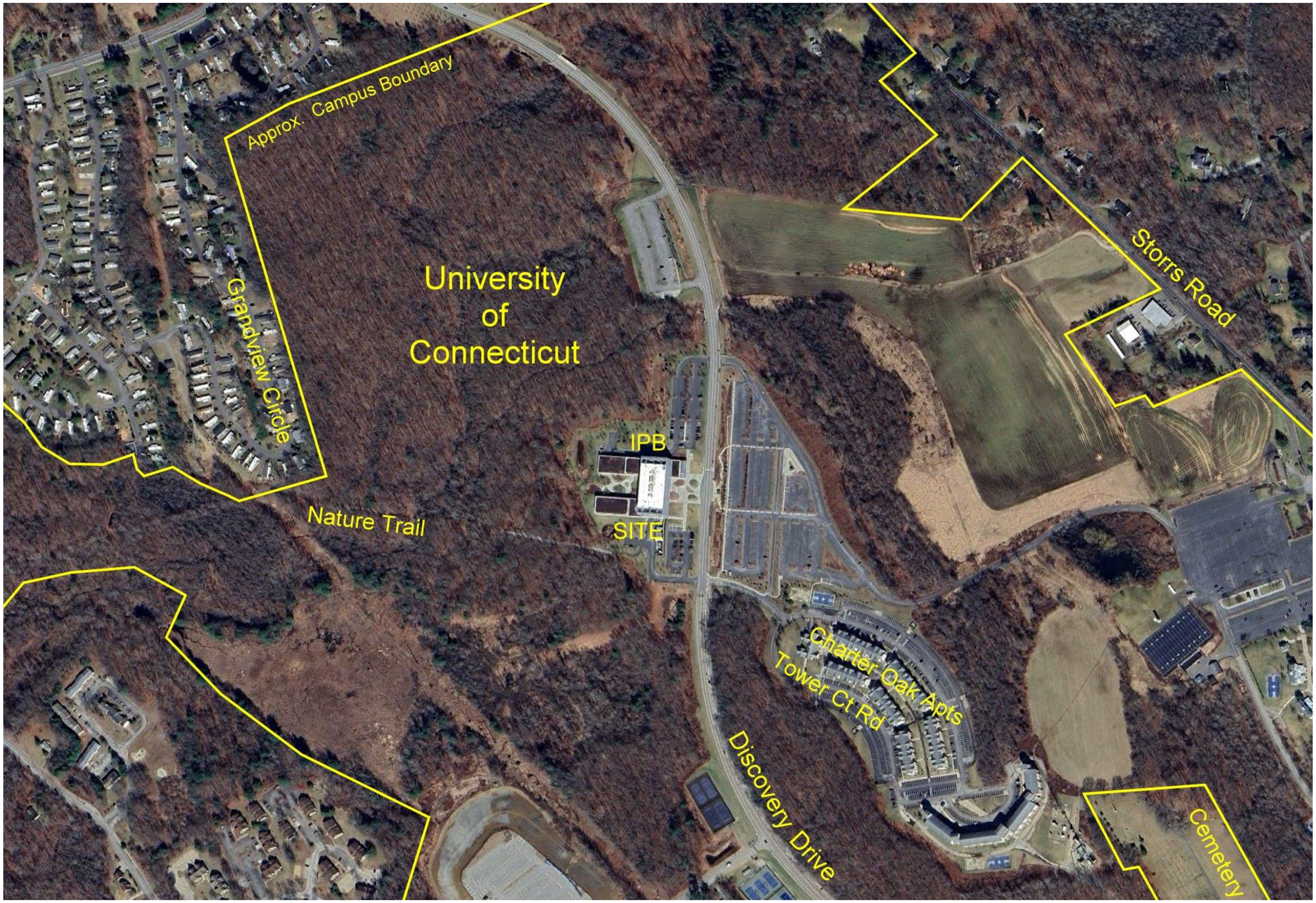

Figure 1: **UCONN Property Boundary based on Storrs Property Records overlaid on Google Earth**

Discussion of Analysis Methods

There are a number of ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. Following is a brief introduction to the noise measurement terminology used in this assessment.

The Sound Level Meter used to measure noise is a standardized instrument.[1] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. One of these is the *A-weighting* network. A-weighted sound levels emphasize the middle frequency sounds and de-emphasize lower and higher frequency sounds; they are reported in decibels designated as "dBA." Figure 2 illustrates typical sound levels produced by sources that are familiar from everyday experience.

The sounds in our environment usually vary with time so they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are *exceedance levels* and *equivalent levels.* Both are derived from a large number of moment-to-moment A-weighted sound level measurements. Exceedance levels are designated L_n, where "n" can have any value from 0 to 100 percent. For example:

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the *residual* sound level, which is the sound level observed when there are no loud, transient noises.
- L_{50} is the median sound level; the sound level in dBA exceeded 50 percent of the time during the measurement period.
- L_{10} is the sound level in dBA exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the *intrusive* sound level because it is caused by occasional louder noises like those from passing motor vehicles. By using exceedance levels, it is possible to separate prevailing, steady noises (L_{90}) from occasional, louder noises (L_{10}) in the environment.
- The *equivalent level* is the level of a hypothetical steady sound that has the same energy as the actual fluctuating sound observed. The equivalent level is designated L_{eq}, and is also A-weighted. The equivalent level is strongly influenced by occasional loud, intrusive noises.

When a steady sound is observed, all of the L_n and L_{eq} are equal. This analysis is based on the background or L_{90} metric. All broadband levels represented in this study are weighted using the A-weighting scale.

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1 *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983, published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

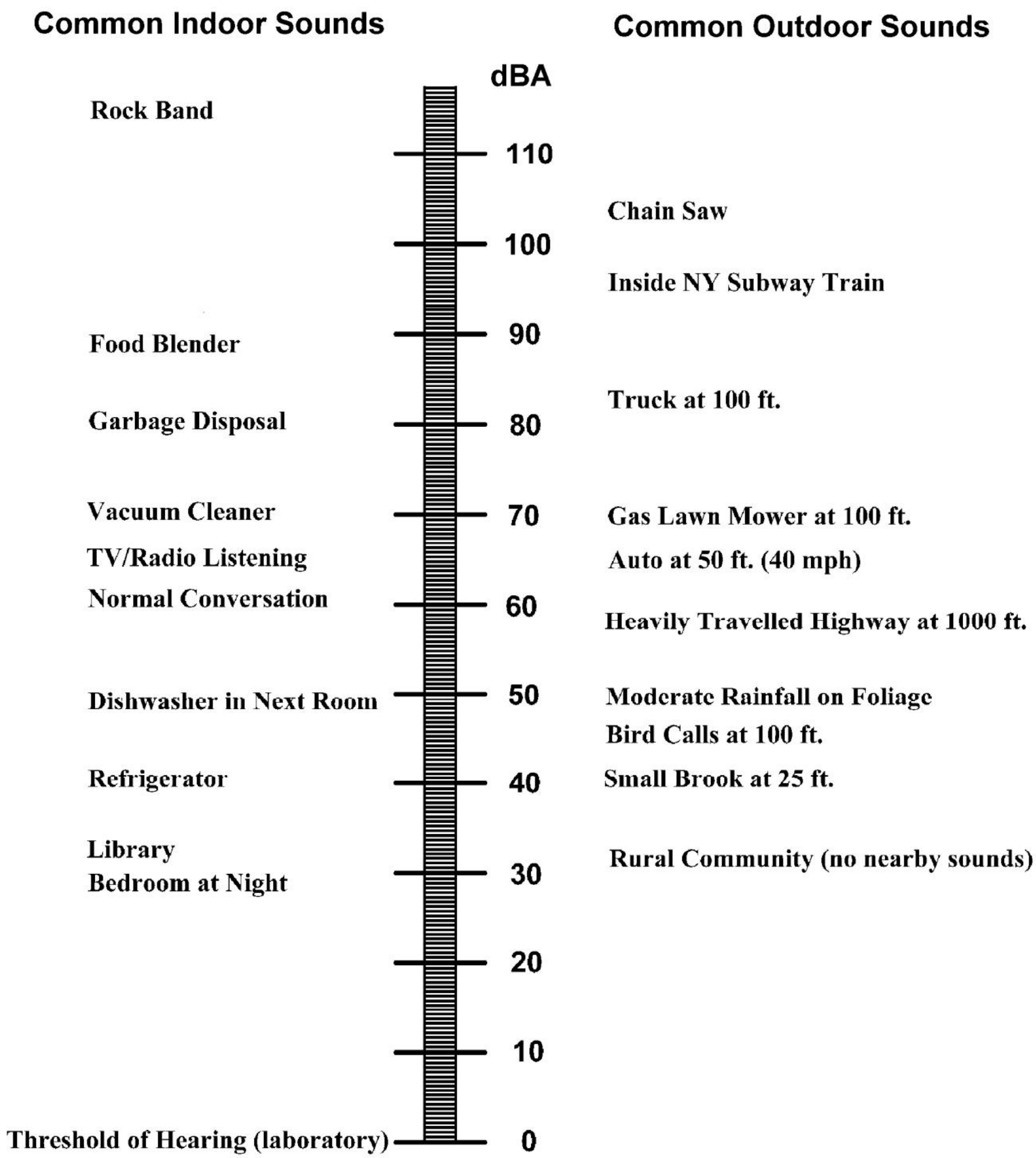

Figure 2: **Typical Sound Levels from Everyday Experience**

In the design of noise control treatments, it is essential to know something about the frequency spectrum of the sound of interest. Noise control treatments do not function like the human ear, so simple A-weighted levels are not useful for noise-control design or the identification of tones. The frequency spectra of sounds are usually stated in terms of *octave band sound pressure levels*, in dB, with the octave frequency bands being those established by standard.[2] The sounds in the community were measured in 1/3 octave band levels. The sounds expected as a result of this project were evaluated with respect to the octave band sound pressure levels as well as the A-weighted equivalent sound level. For simplicity they are summarized in this report as A-weighted levels.

Noise Regulations and Criteria

Sound compliance is evaluated on two bases: the extent to which Federal and State regulations or guidelines are met, and the extent to which it is estimated that the community is protected from excessive sound levels. The governmental regulations that may be applicable to sound produced by activities at the Site are summarized below.

- ***Federal***

Occupational noise exposure standards: 29 CFR 1910.95. This regulation restricts the noise exposure of employees at the workplace as referred to in Occupational Safety and Health Administration requirements. The facility will emit only occasional sounds of modest levels, as demonstrated by this study.

- ***State***

The state of Connecticut (Connecticut Department of Energy & Environmental Protection or CTDEEP) regulates noise at Regulation Title 22a, Sections 69-1 through 69-7.4, Control of Noise. The project is an electrical generator which seems to make it a Class C (Industrial) emitter. The details of the CTDEEP performance criteria are shown in Table 1 based on the source and receiving land uses.

Table 1: Connecticut DEEP Noise Standards, by Zoning District

	Receptor's Zone			
Emitter's Zone	Industrial	Commercial	Residential/Day	Residential/Night
Residential	62 dBA	55 dBA	55 dBA	45 dBA
Commercial	62 dBA	62 dBA	55 dBA	45 dBA
Industrial	70 dBA	66 dBA	61 dBA	51 dBA

2 *American National Standard Specification for Octave, Half-octave and Third-octave Band Filter Sets*, ANSI S1.11-1966 (R1975).

CTDEEP Adjustments for high background noise levels or impulse sounds

1. In those individual cases where the background noise levels caused by sources not subject to these regulations exceed the standards contained in this chapter, a source shall be considered to cause excessive noise if the noise emitted by such source exceeds the background noise levels by five dBA, provided that no source subject to the provisions of this chapter shall emit noise in excess of eighty (80) dBA at any time, and provided that this section does not decrease the permissible levels of other sections of this chapter.
2. No person shall cause or allow the emission of impulse noise in excess of eighty (80) dB peak sound pressure level during the nighttime to any residential noise zone.
3. No person shall cause or allow the emission of impulse noise in excess of one hundred (100) dB peak sound pressure level at any time to any zone.

- ***Village of Storrs, CT***

Storrs is a Village of the Town of Mansfield, Connecticut which has a Noise Control Ordinance at ***Chapter 124: Noise***. The quantitative elements of the ordinance are summarized below: (from an "extract" provided online by the Mansfield Neighborhood Preservation).

Definition of Nighttime:
The hours between 9:00 p.m. and 10:00 a.m., Sunday evening through Saturday morning, and the between 9:00 p.m. and 10:00 a.m. Saturday evening through Sunday morning, and the eve of federal and state holidays through the following morning.

Definition of Daytime:
The hours between 8:00 a.m. and 9:00 p.m., Monday through Saturday, and the hours of 10:00 a.m. and 9:00 p.m. Sundays and federal and state holidays.

Acceptable Noise Levels.
It shall be unlawful for any person to emit or cause to be emitted any noise beyond the boundaries of his/her premises in excess of the noise levels established in these regulations.

Noise level standards shall be as follows:
Residential/Day: 55 dBA
Residential/Night: 45 dBA

For the purposes of the Connecticut Siting Council review, the Connecticut DEEP Noise Standards will be used for this project at all off-site locations. The site is within the University of Connecticut campus, where the Mansfield Noise Control Ordinance will be used.

Existing Community Sound Levels

A site survey and noise measurement study were conducted for the facility on May 2, 2024. While the ambient sound typically fluctuates through the day and night, the sound from the proposed facility is expected to be essentially steady. A new source of sound tends to be noticed most during conditions that are otherwise quiet. Because of this, the ambient sound survey was scheduled at a time that represented a quiet condition for the area. Environmental conditions during the daytime survey included mostly sunny skies with a temperature of 66 °F and essentially no wind. The nighttime conditions were similar but with a lower temperature of 53 °F. No precipitation or insect sound was observed during either survey.

Attended sound level measurements were made using a Rion NA-28 sound level meter. The measurements create a baseline community sound level and captured the frequency-specific character of the sound. The meter was mounted on a tripod approximately 5 feet above the ground. The microphone was fitted with factory recommended foam windscreen. The meter meets the requirements of ANSI S1.4 Type 1 – Precision specification for sound level meters. The meter was calibrated in the field using a Larsen Davis Cal-250 acoustical calibrator before and after the sessions. The field calibrations indicated that the meters did not drift during the study. The spectrum analyzer complies with the requirements of the ANSI S1-11 for octave band filters.

The meter at the site location was programmed to take measurements for 20 minutes and then store processed statistical levels. A spot (5 min) measurement was also made across the street in the center of the Student Parking lot K. The L_{90} characterizes the background sound level, much like the "residual" which is the level in the absence of any nearby intrusive sources. The sound from short term or infrequent sources is statistically excluded from the L90 samples. Much of the sound measured in the project area is from passing vehicles on Discovery Drive which momentarily elevate the Leq levels, but which are screened from the L90 results. Both Leq and L90 are provided in Table 2. The highest levels measured during both daytime and at night were from passing vehicles. Steady sound was also contributed by the utility equipment near the IPB loading docks. The recognized equipment included a 2-cell cooling tower and a separate single-cell cooling tower, a large enclosed standby generator and a Nitrogen plant. One cooling tower made a smooth and gentle fan sound. The Nitrogen plant was active, but emitted only minor sound. The modest springtime conditions of the survey often correspond to 'no significant heating or cooling' of buildings. It is suspected (but not observed) that the cooling towers and generator dominate the local sound field when they are fully operating. It is noted that any sound from this equipment is shielded from the nearest residences by a retaining wall more than 20 feet tall to the east and the IPB to the north.

Results of the Ambient Survey

The results of the ambient sound level measurements are summarized in Table 2. The community sensitivity is usually based on the lower background levels. In this case, Comparing the Leq levels (including all sounds) to the L90 levels (quietest 10% of samples) illustrates the sound character of the area. Baseline levels are affected by community conditions, meteorology, seasons, insects and traffic patterns. Because the measured levels are dominated by traffic patterns, they can be expected to fluctuate. However, the background levels show that the existing community are well within the target levels of the CTDEEP standards.

Consistent with most communities, the daytime is affected by elevated traffic volumes on local and distant roadways. Nighttime levels tend to be lower because of lower traffic volumes and the lack of neighborhood activities.

Table 2: Ambient Sound Levels Measured on May 2, 2024

Location	Time	Period	L_{eq}	L_{90}
Site (near head of Nature Trail)	1:10 PM	Day	48 dBA	44 dBA
Lot K parking (Center)	1:48 PM	Day	53 dBA	44 dBA
Site	12:28 AM	Night	44 dBA	41 dBA
Lot K parking	1:06 AM	Night	54 dBA	39 dBA

Expected Sounds from the Proposed Installation

The proposed installation is designed with significant attention to protecting the community sound environment. The proposed equipment is manufactured by FuelCell Energy Inc. (FuelCell Energy). FuelCell Energy has developed various sites using its trademark SureSource packages that generate between 1.5 and 4.0 megaWatts (MW) of electricity. Fuel cell technology inherently lacks many of the mechanical sources of noise that are typical of power generation facilities. The proposed facility (SOFC) is based on technology that is optimized for capacities less than 1 MW. Each unit has a much smaller skid mounted footprint, roughly 35' L x 8' 3" W x 10' H). Its components are installed within a metal enclosure. As noted, the SOFC is significantly smaller scale than the SureSource installations. While they share some of the same technologies such as fuel cell module, fuel handling lines, electrical transformers, inverters and signal processing along with some form of cooling for the electronics cabinets. Each unit's sound is estimated to be at or below ***"65 dBA at a distance of 10 feet from the skid"***. The proposed layout includes two SOFC units in each of two phases. This analysis is based on the modules laid out alongside each other. While the sound from multiple modules is additive, the sound from one module will also be shielded by other modules. The modeling study is based on four SOFC units, two in phase 1 and two in phase 2. If any additional sound treatment were needed, it would be important to consider that treatment during the early project planning.

A computer model was developed for the facility's sound emissions based on conservative sound propagation principles prescribed in the acoustics literature. Most of the proposed equipment is expected to produce gentle sound of a continuous nature. The sound from each source was scaled to produce a combined sound of 65 dBA at 10 feet from the skid(s). The natural gas will be obtained from the existing building supply. Electrical output and waste heat will be exported back to the building. The aggregate sound from these sources is used to represent the proposed facility sound.

Identifying specific receiving locations is another key element of the noise modeling, since sound levels decrease exponentially with increasing distance (inverse square). The distances used in this study represent the distance between the sources and the nearest representative sensitive property. The receptor for on-campus residences was placed at the nearest dwelling unit. Similarly, the nearest off-campus residences are represented by the nearest dwelling unit.

Results of the modeling of SOFC FuelCell Skid Sources shown in Table 3. The results are summarized graphically on Figure 3.

Table 3: Summary of Initial Noise Modeling Results for the SOFC Skid Only

Receptor	Distance (ft)	Project Sound (dBA)	Criterion Day/Ngt (dBA)
Res Charter Oak Apartment	850	24	55/45
Res at Grandview Circle	1435	28	61/51

Sound levels are calculated in full octave bands but presented as units (dBA).

Conclusions

The proposed SOFC fuel cell equipment sound is inherently modest because it lacks the heavy mechanical equipment that is commonly associated with electrical generation. Furthermore, it also lacks the high-pressure air blower sources that are associated by the larger FuelCell SureSource installations. Only modest sounds are expected by sources such as pumps, electrical processing equipment and cooling fans that are located within the metal enclosure . The size of the equipment and character of the sound is more typical of commercial building mechanical equipment than of typical electrical generating sources. Mitigation measures are engineered into the equipment configuration to keep the cumulative sound from the Small Fuel Cell facility low. The sound emissions were quantified based on the manufacturer specifications. Sound level modeling techniques were employed to estimate the sound levels at the nearest receptor locations. Since sound decreases with distance, the sound will decrease at more distant and shielded locations. The modeling represents ***Phase 1: two SOFC units*** and also ***Phase 2: an additional two units***. The total installation has a nominal output of about 1 megawatt of electrical power plus heat from the unit operation.

The estimate of sound from the proposed equipment is conservatively estimated, to address the standards of the CTDEEP and the Town of Mansfield. The results of the modeling indicate that the sound from the SOFC installation is far below the applicable standards at the nearest residences on and off campus. The expected equipment sound levels at the sensitive locations are also well below the measured background sound levels in the area. Being well below the standards and also below the ambient at receivers indicates that the facility sound represents no impact, so no additional sound mitigation is indicated.

Additional receptor locations were identified where students will have routine access parking their cars. Again, the project sound levels are expected to be modest (less than nighttime ambient level) at these locations.

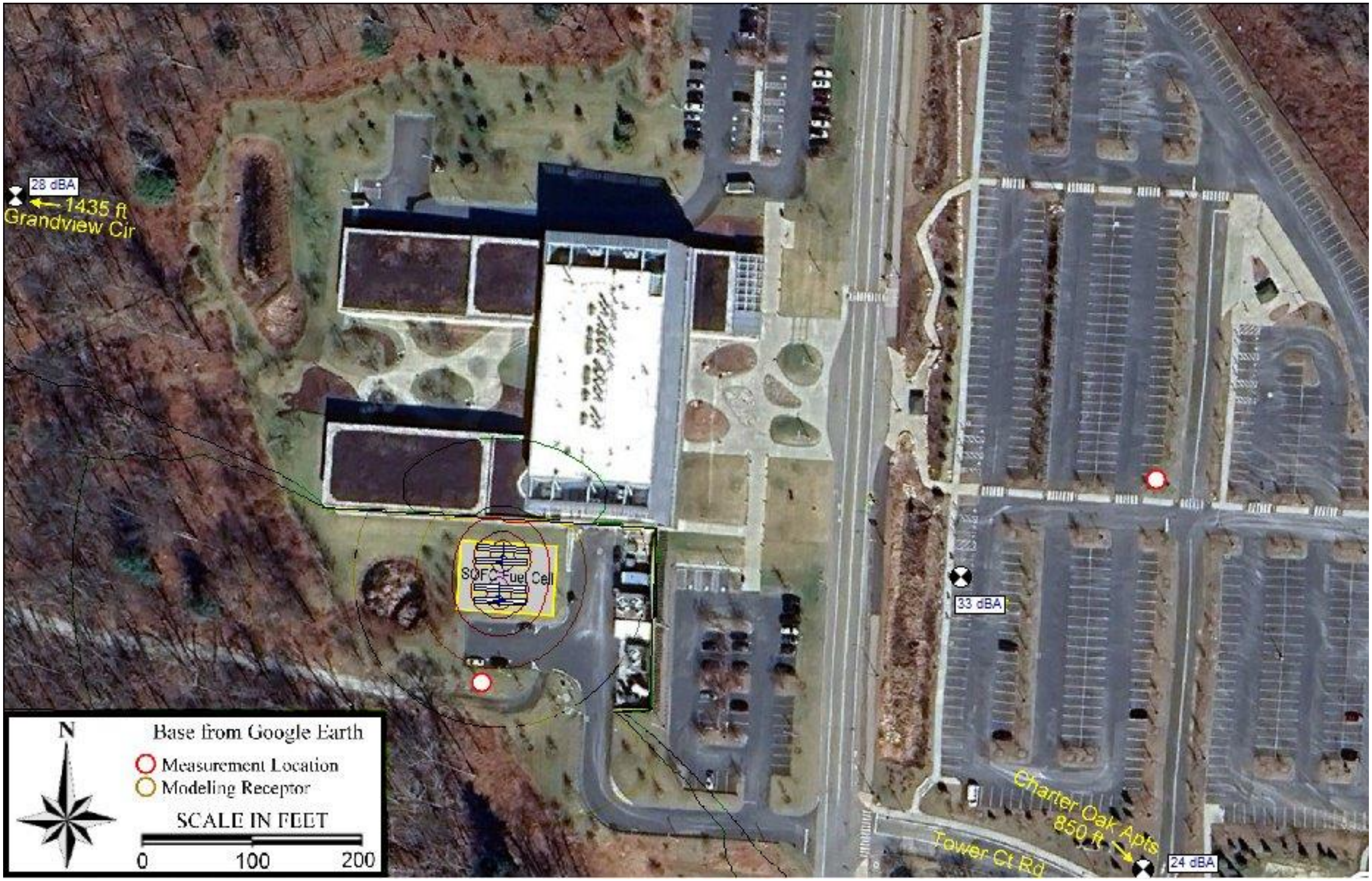

Figure 3: **Graphical Summary of Predicted SOFC Sound Levels at Various Receptor Locations**