

BRUCE L. MCDERMOTT
203.772.7787 DIRECT TELEPHONE
860.240.5723 DIRECT FACSIMILE
bmcdermott@murthalaw.com

February 14, 2023

Melanie A. Bachman, Esq.
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition No. 1553 - Allen Place FC, LLC petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a customer-side 250-kilowatt fuel combined heat and power cell facility and associated equipment near North Campus Hall in the northern portion of the Trinity College campus located at 159 Allen Place, Hartford, Connecticut

Dear Ms. Bachman:

Allen Place FC, LLC ("APFC") hereby submits to the Connecticut Siting Council ("Council") its responses to the Council's first set of interrogatories dated January 23, 2023. An original and fifteen (15) copies of APFC's responses will be hand delivered to the Council.

Should you have any questions regarding this filing, please do not hesitate to contact me.

Very truly yours,



Bruce L. McDermott

Enclosure

Murtha Cullina LLP
265 Church Street
New Haven, CT 06510
T 203.772.7700
F 203.772.7723

Interrogatory CSC 1-1

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-1: Referencing page 8 of the Petition, has the City of Hartford and/or any abutters provided comments to Allen Place FC, LLC (APFC) since the Petition filing? If so, please summarize the comments and how these comments were addressed.

A-CSC 1-1: APFC has not received any comments from the City of Hartford and/or any abutters.

Interrogatory CSC 1-2

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-2: Is the project, or any portion of the project, proposed to be undertaken by state departments, institutions or agencies, or to be funded in whole or in part by the state through any contract or grant?

A-CSC 1-2: No, although APFC was selected as a winning bidder in the LREC/ZREC program and entered into a long-term contract with the Connecticut Light and Power dba Eversource for the sale of Renewable Energy Certificates ("RECs") generated by the SureSource Solid Oxide Fuel Cell ("SOFC") unit, compensation for the RECs will not be funded by the state.

Interrogatory CSC 1-3

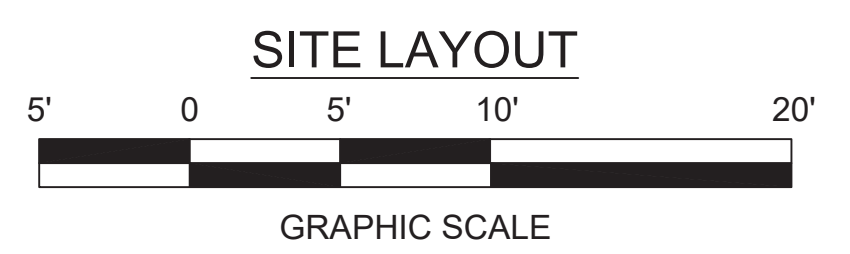
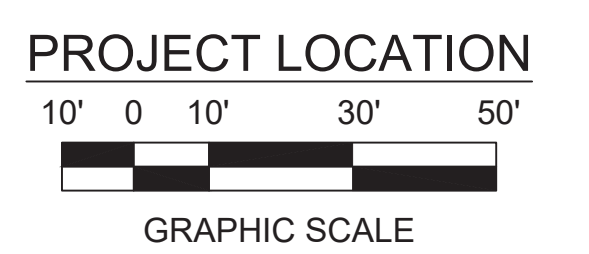
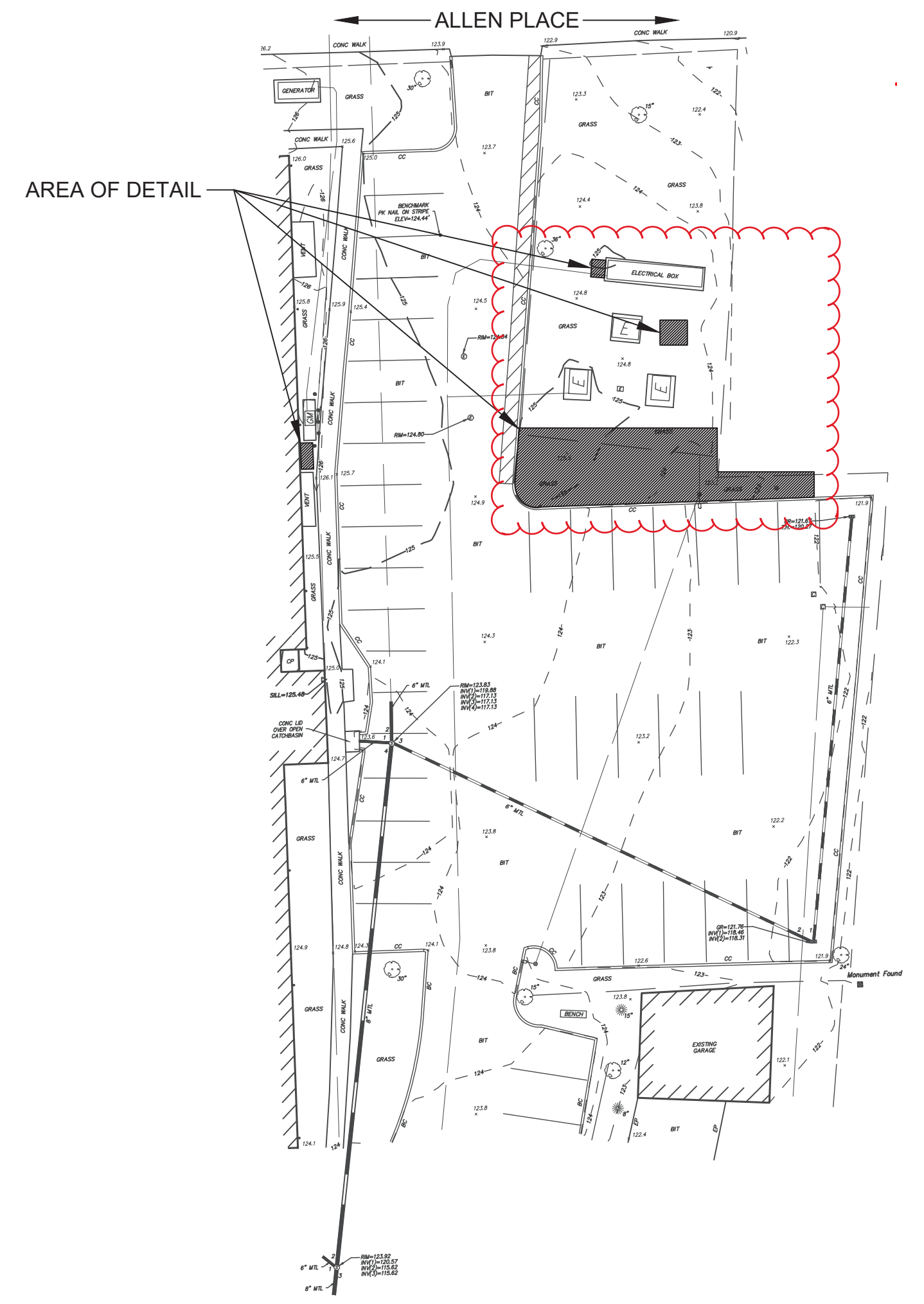
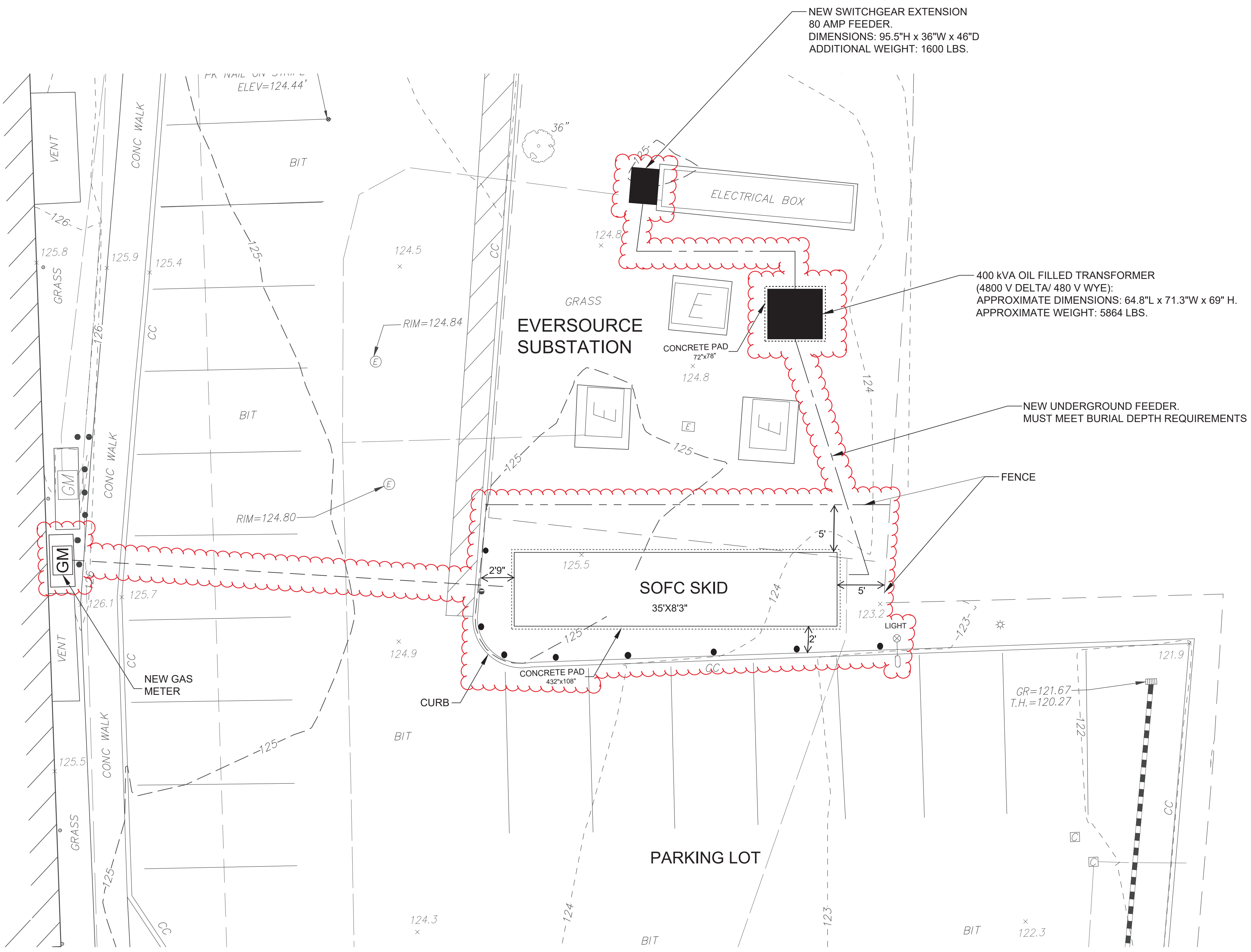
Allen Place FC, LLC
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Witness: Saffi Gilani
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Q-CSC 1-3: Where is Eversource's Allen Place Substation located?

A-CSC 1-3: Eversource's Allen Place Substation is located at 159 Allen Place, Hartford, CT, adjacent to the proposed SOFC Site. See attached Site Map (Exhibit CSC 1-3-1).

REVISION HISTORY				
REV	DESCRIPTION	BY	APPROVED	DATE
1	INITIAL RELEASE	KGG	A.BARLOW	01/17/2023



FUELCELL ENERGY, INC. PROPRIETARY THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND MAY NOT BE DISCLOSED, COPIED OR REPRODUCED EXCEPT BY WRITTEN PERMISSION FROM FUELCELL ENERGY INC. CAGE CODE 63161	SIGNATURES		3 Great Pasture Road Danbury, CT 06810 www.fuelcellenergy.com	TITLE		
	DRAWN:	K.GROSS 01/17/23		SUB-MW SOFC		
	ENGINEER:	S.GILANI 01/17/23		TRINITY COLLEGE, HARTFORD, CT		
	APPROVED:	A.BARLOW 01/17/23		GAS METER LOCATION		
	RELEASED:	P.BEAUDOIN 01/17/23				
	UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE ±1/16"		SIZE	Location	DWG NO	REV
	REVISION INDICATOR	D	---	712001-11-01	1	1
	FLAG NOTE	SCALE	AS NOTED	SHEET	1 OF 1	

Interrogatory CSC 1-4

Allen Place FC, LLC
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Q-CSC 1-4: What is the voltage of Eversource's Allen Place Substation? Would the project require any upgrades to the substation? If so, describe the nature of these upgrades.

A-CSC 1-4: The switchgear supply voltage is 4.8 kV and the distribution transformer has a primary voltage of 23 kV. Upgrades to Eversource's Allen Place Substation are not required. APFC will install a new transformer, a switchgear extension and a new feeder to the existing switchgear. See Exhibits CSC 1-3-1 and 1-4-1 (One Line Diagram).

REVISION HISTORY				
REV	DESCRIPTION	BY	APPROVED	
1	RELOCATED SEL-751 & ADDED SHT 2	A.HOOD		07/27/2022
2	UPDATED TRANSFORMER SIZE	A.HOOD		07/28/2022
3	REVISED PER MARKUPS FROM CdA	MJR		07/29/2022
4	REVISED PER MARKUPS FROM CdA & SP	MJR		08/03/2022
5	REVISED PER MARKUPS FROM SP	MJR		08/12/2022
6	REVISED PER MARKUPS FROM JM	MJR		10/14/2022
7	REVISED PER MARKUPS FROM KW	MJR		10/20/2022
8	REVISED PER MARKUPS FROM SD	MJR		10/21/2022
9	REVISED PER MARKUPS FROM JM	MJR		11/03/2022
10	REVISED PER MARKUPS FROM SD	MJR		11/07/2022
11	REVISED PER MARKUPS FROM SD	MJR		11/08/2022
12	REVISED PER MEETING MARKUPS	MJR		11/23/2022
13	CORRECTED PCU BREAKER FROM 150A TO 250A	MJR		01/06/2023

250KW SOFC PLANT TRINITY, NORTH CAMPUS

NOTES:

1. POWER CONVERSION UNIT (PCU) DYNAPOWER 125kW, MPS-125, CERTIFIED TO UL-1741(SA), IEEE-1547.
2. SWITCHGEAR INCLUDES PROTECTIVE RELAYS FROM SCHWEITZER ENGINEERING LABORATORIES MODEL 751, PART NUMBER 751402CDCDC70851620 RELAY.
3. NGR VALUE IS APPROXIMATE BASED ON SYSTEM VOLTAGE AND 5A @ 10s RATING. EXACT OHMIC VALUE SHALL BE DETERMINED DURING EQUIPMENT PURCHASE.
4. FEEDER FROM TR01 TO BOP HAS TO BE MAXIMUM 10FT PER NFPA70: TAP RULE 240.21(B)(1), OR SIZE THE SAME AS THE FEEDER.
5. TR01 SECONDARY CONDUCTORS INSTALLED PER NFPA 70 SECTION 240.21(C)(6).
6. SPLICE PER NFPA 70
7. CIRCUIT BREAKER, 500A, THERM-MAG TRIP UNIT, TM240 ATAM, 65kA, 3 POLE, 600A FRAME, H INTERRUPT CLASS, SIEMENS. ALL CT'S WIRED TO SEL-751 SHALL BE PROTECTION CLASS UNLESS OTHERWISE NOTED. SWITCHGEAR AND CT SELECTION MAY CHANGE AFTER SHORT CIRCUIT STUDY IS COMPLETE.
8. INVERTER OUTPUT AC OVERCURRENT PROTECTION 50P SET FOR 150 AMPS.
9. ALENCON DC TO DC SPOT CONVERTERS

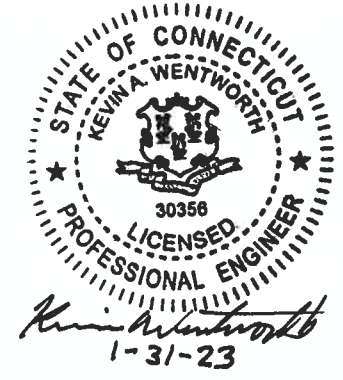
ABNORMAL VOLTAGE AND FREQUENCY SETTINGS (SEL RELAYS)

HIGH VOLTAGE 2 (ANSI 59)	120%	0.16 SECOND
HIGH VOLTAGE 1 (ANSI 59)	110%	2 SECONDS
LOW VOLTAGE 1 (ANSI 27)	88%	2 SECONDS
LOW VOLTAGE 2 (ANSI 27)	50%	1.1 SECOND
OVER FREQUENCY 1 (81O)	62.0Hz	0.16 SECOND
OVER FREQUENCY 2 (81O)	61.2Hz	300 SECONDS
UNDER FREQUENCY 1 (81U)	58.5Hz	300 SECONDS
UNDER FREQUENCY 2 (81U)	56.5Hz	0.16 SECOND

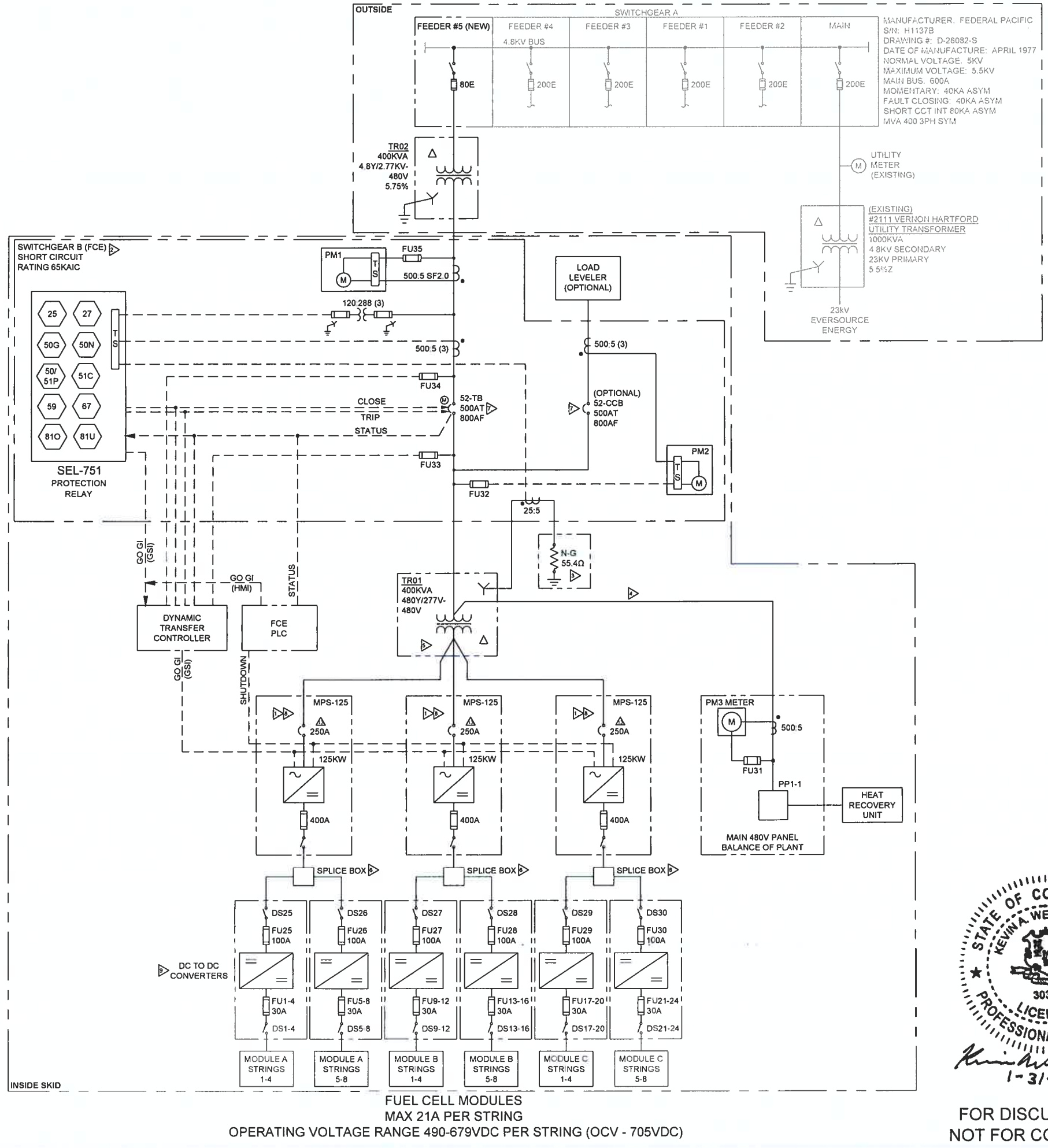
GRID PROTECTION FUNCTION LEGEND

25	-- SYNCH CHECK
27	-- PHASE UNDERVOLTAGE
50P	-- PHASE INSTANTANEOUS OVERCURRENT
50N/G	-- NEUTRAL/GROUND INSTANTANEOUS OVERCURRENT
51N/G	-- NEUTRAL/GROUND TIME OVERCURRENT
51C	-- VOLTAGE CONTROLLED PHASE TIMED OVERCURRENT
51P	-- PHASE TIME OVERCURRENT
59	-- PHASE OVERVOLTAGE
67	-- DIRECTIONAL OVERCURRENT
81O/81U	-- OVER/UNDER FREQUENCY

FUELCELL ENERGY, INC. PROPRIETARY		SIGNATURES		FuelCell Energy	
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND MAY NOT BE DISCLOSED, COPIED OR REPRODUCED EXCEPT BY WRITTEN PERMISSION FROM FUELCELL ENERGY INC.		DATE: M RACK 11/18/2022	SIGNATURE: S DAR 11/18/2022	3 Great Wall Rd Danbury CT 06810 www.fuelcellenergy.com	
CAGE CODE 63161		DATE: A HOOD 11/18/2022	SIGNATURE: P. BEAUDOIN 11/18/2022	TITLE TRINITY NORTH CAMPUS 250KW SOFC PLANT ONE-LINE-DIAGRAM	
REVISION INDICATOR		UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE ±1/16"		SIZE Location	DWG NO
FLAG NOTE		REVISION INDICATOR		D SITE	21-0012-54-01
SCALE NONE		SHEET 1 OF 1		REV 13	



FOR DISCUSSION ONLY
NOT FOR CONSTRUCTION



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FILE LOCATION: 21-0012-54-01.dwg

Interrogatory CSC 1-5

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-5: What is the distance and direction of the nearest off-campus residence from the proposed fuel cell facility?

A-CSC 1-5: The closest off-campus residence is 160 Allen Place, Hartford, CT, which is about 123 feet north of the proposed fuel cell facility. See Exhibit CSC 1-5-1.



Exhibit CSC 1-5-1

Interrogatory CSC 1-6

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-6: What is the distance and direction of the nearest on-campus building from the proposed fuel cell facility? What is that building used for?

A-CSC 1-6: The nearest on-campus building is 155 Allen Place, Hartford, CT, which is about 45 feet west from the proposed fuel cell facility. The building is used as an office, The Charleston House of Interfaith Cooperation. See Exhibit CSC 1-5-1.

Interrogatory CSC 1-7

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-7: What is the distance and direction of Eversource's Allen Place Substation from the proposed fuel cell facility?

A-CSC 1-7: The SOFC Site will be located adjacent to the south fence of Eversource's Allen Place Substation, approximately five (5) feet away from the south fence. See Exhibit CSC 1-3-1.

Interrogatory CSC 1-8

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-8: Referencing page 5 of the Petition, please define a federal Opportunity Zone.

A-CSC 1-8: A Federal Opportunity Zone is an economically-distressed community where new investments, under certain conditions, may be eligible for preferential tax treatment. The Federal Opportunity Zone program was designed to incentivize public and private stakeholders to work together to rebuild American cities. Seventy-two urban and suburban areas across Connecticut currently have been federally designated as Opportunity Zones. Eligible projects generally include real estate projects for new developments or for existing buildings in need of substantial renovation, business investments in businesses that derive most of their revenues from sales within Opportunity Zones, and energy efficiency and renewable energy projects.

Interrogatory CSC 1-9

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-9: What percentage of the college campus's electrical load would the proposed fuel cell facility provide?

A-CSC 1-9: The SOFC facility can provide up to 75% of Trinity College's North Campus Hall electrical load.

Interrogatory CSC1-10

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-10: Could the facility continue operating during a power outage and provide seamless uninterruptable power?

A-CSC 1-10: Although the SOFC facility was not designed to operate as a backup power source, during a power outage, the SOFC is capable of going into island mode and supply power to the balance of plant loads. If required, electrical power can be re-routed to the customer critical load with the installation of additional equipment and load studies.

Interrogatory CSC 1-11

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-11: Provide a detailed site plan of the facility, including, but not limited to the dimensions and location of the proposed fuel cell and its features, concrete pad, the fence design and bollards (if applicable), utility connections and points of interconnection.

A-CSC 1-11: The SOFC Site will be located adjacent to Eversource's Allen Place Substation. The SOFC skid will be installed 5' from the Eversource substation's south fence and it will be mounted on a 432" by 108" concrete pad. Similarly, a transformer and switch gear extension will be installed on 72" by 78" and 108" by 48" concrete pads, respectively. These are initial dimensions for pads and might later be reassessed during detailed site engineering. See attached Site Map (Exhibit CSC 1-3-1).

Interrogatory CSC 1-12

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-12: Referencing page 7 of the Petition, how would the fuel cell facility be interconnected for backup power to Eversource's Allen Substation?

A-CSC 1-12: The fuel cell is not providing backup power to Eversource's Allen Place Substation. It is an additional source of power (250 kW) added to the switchgear, feeding North Campus Hall.

Interrogatory CSC 1-13

Allen Place FC, LLC
Petition No. 1553

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Q-CSC 1-13: What percentage of the North Campus Hall Building's thermal load would be served by the waste heat from the fuel cell facility?

A-CSC 1-13: SOFC exhaust heat will offset less than a quarter (around 24%) of the annual thermal load for North Campus Hall.

Interrogatory CSC 1-14

Allen Place FC, LLC
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Q-CSC 1-14: Would outdoor cooling units be required to neutralize any waste heat that is not utilized inside the building? If yes, how many would be required and where would they be located?

A-CSC 1-14: Outdoor cooling units will not be required to neutralize heat that is not utilized inside the North Campus Hall building.

Interrogatory CSC 1-15

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-15: Referencing page 7 of the Petition, what is the status of the Interconnection Application?

A-CSC 1-15: An electrical Interconnection application was submitted in December 2022 that Eversource is currently processing.

Interrogatory CSC 1-16

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-16: Using the inverse square law or other noise analysis method, would operational noise from the fuel cell meet the applicable Department of Energy and Environmental Protection Noise Control Standards at the nearest abutting property line?

A-CSC 1-16: A noise study for the site was conducted by a noise consulting company. See Exhibit CSC 1-16-1. The Consultant developed a computer model, using the inverse square law, for the facility's sound emissions based on conservative sound propagation principles and determined that based on applicable Department of Energy and Environmental Protection Noise Control Standards and City of Hartford Zoning Ordinance, the SOFC meets the noise criteria at the nearest abutting property line.

The noise study basis assumed that the SOFC facility will produce a maximum operational sound level of 65 dBA at a distance of 10 feet from the skid. Using the inverse square law, the equivalent noise level at 160 Allen Place (the nearest abutting property line to the proposed fuel cell facility), located 123 feet north of the SOFC skid would be 50 dBA. Thus, the operational noise from the fuel cell facility will meet the applicable state noise levels at the nearest abutting property line. Confirmation of the noise level will be measured after construction and if noise exceeds projected levels, additional noise suppression mitigation will be employed.

Equipment Sound Assessment



SOFC Fuel Cell Project

Trinity College
Hartford, Connecticut
February 8, 2023

Prepared For:

FuelCell Energy, Inc.
539 Technology Park Dr
Torrington, CT 06790



Prepared By:

Modeling Specialties
30 Maple Road
Westford, MA 01886



Environmental Sound Assessment Trinity College SOFC Project

Background

A New Technology Fuel Cell Project is proposed at Trinity College in Hartford, 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 City of Hartford and the Connecticut Department of Energy & Environmental Protection (CDEEP). 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 a desktop 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 Project is located north of the main Trinity College campus in Hartford. The proposed site is less than one mile from Interstate 84 to the north-northwest. Interstate 91 is less than ½ mile to the west. The proposed equipment location is in an open space on the North Campus 159 Allen Pl. parcel that already supports other utility uses. Once active, the proposed fuel cell is intended to be a continuous source of electricity so it is assumed in this study to operate continuously during the daytime and at night.

The host facility (North Campus Hall) and the adjacent building (155 Allen Pl) are used for commercial uses - activities and offices. Many of the neighboring parcels are used for residential uses. This study will distinguish between the residential uses associated with the college and those that are privately owned. Most of the residences south of Allen Place are under the control of Trinity College. The nearest on-campus residence to the proposed equipment is 149 Allen Pl to the east. The nearest off-campus residence is 160 Allen Pl to the north. Figure 1 shows a City Layout of the existing campus utility area, proposed equipment and the modeled receptor areas annotated with distances.



Figure 1: Receptors Based on City of Hartford Property Records for Site and Surrounding Area

Noise Regulations and Criteria

Sound compliance is judged 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 CDEEP) regulates noise at Regulation Title 22a, Sections 69-1 through 69-7.4, Control of Noise. The project is an electrical generator, a Class C (Industrial) emitter. The corresponding CDEEP performance criteria are shown in Table 1 based on the land use of the emitter and the potentially affected receptors.

Table 1: Connecticut DEEP Noise Standards by Noise Zone
Based on SLUCONN (Standard Land Use Classification Manual of Connecticut)

Emitter Class	Receptor's Land Use			
	Industrial	Commercial	Residential/Day	Residential/Night
Class A (Res)	62 dBA	55 dBA	55 dBA	45 dBA
Class B (Com)	62 dBA	62 dBA	55 dBA	45 dBA
Class C (Ind)	70 dBA	66 dBA	61 dBA	51 dBA

Adjustments for high background noise levels or impulse noises.

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.

- **Local Hartford Requirements**

The City of Hartford, Connecticut regulates noise in their zoning ordinance at **23 - Noise**. Electrical generation is an industrial use. The area of the campus immediately surrounding the proposed equipment is also industrial (mechanical utilities). The corresponding Hartford criteria are shown in Table 2 based on the zoning of the emitter and the potentially affected receptors. While regulated separately, the requirements are identical to the CDEEP standards including measurement requirements and the handling of existing high ambient environments.

Table 2: City of Hartford, Connecticut, by Zoning District

Emitter's Zone	Receptor'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

Since the noise standards are based on the land use of both the emitter and the receiver, the current land uses are important to the study. The campus is zoned institutional, so the school has some latitude of sound emissions that remain on campus. The nearest off-campus receptors are north of Allen Pl and will be considered separately from campus residences. This study focuses on the levels expected at on-campus residences along with these nearest off-campus locations.

Expected Sounds from the Proposed Installation

The proposed installation is being 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. It not only has a much smaller footprint, but is configured with equipment that can be installed on a single skid (roughly 35' L x 8' 3" W x 10' H). The components will be installed within a metal enclosure. As noted, it lacks the most significant sources of sound that are present at SureSource facilities which are the main air blower, its motor and the high-pressure piping connecting the blower to the fuel cell module. The SOFC is still expected to have sources such as fuel cell module, fuel handling lines, electrical transformers, inverters and signal processing along with some form of cooling for the electronics cabinets. Because the technology is under development, its sound is estimated to be at or below **"65 dBA at a distance of 10 feet from the skid"** and has not been analyzed in detail or confirmed by field measurements. This analysis represents the most likely sound levels to be expected using manufacturer's data.

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 equipment sources are expected to produce gentle sound of a continuous nature. Each of the expected sources during

routine operation of the facility was identified. The sound from each source was scaled to produce a combined sound of 65 dBA at 10 feet from the skid. The aggregate of 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 receptors was placed at the nearest part of the affected building. Two on-campus structures that appear residential (155 and 149 Allen Pl) are currently not residential. It is our understanding that 149 Allen Pl may in the future be used again as a residential rental so it was treated as residential in this conservative study. The receptors at off-campus locations are located at the sensitive property line as required for compliance with Hartford and CDEEP standards.

The analysis of sound is based on the contributions of individual sources and propagation losses to the analyzed receptors in general directions from the facility. Modeled levels are provided at the nearest properties in various directions from the equipment skid. Modeling is not provided at distant locations because the sound levels will be reduced dramatically by both distance and shielding provided by existing buildings. Results of the modeling of SOFC FuelCell Skid Sources shown in Table 4. The results are summarized graphically on Figure 2.

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

Receptor	Distance (ft)	Project Sound (dBA)	Criterion Day/Ngt (dBA)
Res 166 Allen Pl	130	50	61/51
Res 160 Allen Pl	123	50	61/51
Trinity Comm 155 Allen Pl	45	57	66
Trinity Res 149 Allen Pl	70	54	61/51
Trinity Res 147 Allen Pl	120	50	61/51
Trinity Res 94 Vernon St	170	47	61/51
Trinity Res 98 Vernon St	130	49	61/51
Trinity Res 104 Vernon St	150	48	61/51
Trinity Comm North Campus Hall	65	55	66

*Note: **Highlight** indicates a receptor that exceeds the regulatory standards (**only at night**)

Mitigation Opportunities

The engineering estimate of the facility sound is a low 65 dBA at 10 feet from the skid. For a reference, this is about the same sound as well-maintained sedan idling. The model for this study assumes that the sound is 65 dBA in all directions, which is seldom the case. If, after it is installed, the facility operates at a level that exceeds the regulatory standards in the residential direction(s), it will be evaluated for the best ways to control the errant source of sound. The installed configuration also can affect the resulting sound from the walls. An engineered solution is the preferred approach (treating the specific source of sound). At previous installations FuelCell Energy has used in-line silencers, wrapping or lagging and quieter equipment. Because the proposed equipment is inside an enclosure, it is well-suited for the use of absorptive and/or barrier lining on the inside of the enclosure. (The modeling indicates this might be needed on the east end of the enclosure.)

Based on the initial modeling results, the sound exceedance is expected to be small if any. The SOFC skid-mounted enclosure could be lined with acoustical barrier material on the east end to further reduce the equipment sound profile in this sensitive residential direction.

Table 4: Summary of Noise Modeling Results with a modest Liner on the East End

Receptor	Distance (ft)	Project Sound (dBA)	Criterion Day/Ngt (dBA)
Res 166 Allen Pl	130	46	61/51
Res 160 Allen Pl	123	46	61/51
Trinity Comm 155 Allen Pl	45	52	66
Trinity Res 149 Allen Pl	70	49	61/51
Trinity Res 147 Allen Pl	120	45	61/51
Trinity Res 94 Vernon St	170	41	61/51
Trinity Res 98 Vernon St	130	43	61/51
Trinity Res 104 Vernon St	150	44	61/51
Trinity Comm North Campus Hall	65	55	66

This minor feature of east-end fence lining provides adequate additional shielding to bring the facility into compliance at all campus residences and increase the margin of compliance at off-campus residential property lines. The details of the need for mitigation can be clarified when the details of the SOFC sources is available. A graphical summary of the Table 4 results is provided on Figure 3.

Conclusions

The proposed SOFC fuel cell equipment package inherently lacks the heavy mechanical equipment that is commonly associated with electrical generation. Furthermore, it also lacks the main air blower sources that are associated by the FuelCell SureSource installations. Only modest sounds are expected by sources such as pumps, electrical processing equipment and cooling fans. 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 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 significantly at more distant and shielded locations. The results of the modeling indicate that the facility levels will exceed the Hartford and CDEEP noise criteria at several nearby on-campus receptors by a small margin.

The estimate of sound from the proposed equipment is conservatively estimated, so may meet all standards as designed. However, the analysis was expanded to include a modest noise mitigation feature at the east end of equipment enclosure. This provides the necessary reduction of sound at all campus residences to demonstrate the Hartford and CTDEEP standards at all receptors.

Finally, the CSC requested an estimate of sound inside the nearby affected structures. This is a complex question since a building is made up of many assemblies with a wide range of acoustic performances. The absorptivity of materials used inside the room also has a significant effect on the resulting inside level. Insulated wall assemblies have an STC (Sound Transmission Class) of 40 or more (inside is 40 dBA less than the outside). But windows, depending on the thickness, layers and tightness might have a STC in the 20's. The lowest rated feature that could be at the area residential structures might be a single panel wood door with an STC of about 20. The performance of the building envelope to block sound is usually defined by the weakest performing assembly. A conservative estimate for older residential buildings (like 155 Allen Pl) is an STC of 20. The corresponding estimate for commercial construction (like North Campus Hall) is 30 dBA. Table 5 provides a brief summary of Fuel Cell sound inside the nearby buildings.

Table 5: Summary of Fuel Cell Sound Expected Inside Nearby Buildings (w/out mitigation)

Receptor	Distance (ft)	Project Sound Outside (dBA)	Project Sound Inside (dBA)
Res 160 Allen Pl	130	50	30
Trinity Comm 155 Allen Pl	45	57	37
Trinity Res 149 Allen Pl	70	54	34
Trinity Res 98 Vernon St	130	49	29
Trinity Res 104 Vernon St	150	48	28
Trinity North Campus Hall	65	55	25

Recommended Noise Criterion based on use:

Bedrooms	NC20 to NC30
Private offices	NC30 to NC35
Open Plan Offices	NC40 to NC50
Kitchens, laundries, shops	NC45 to NC65



Figure 2: Graphical Summary of Predicted SOFC Sound Levels at Neighboring Receptors



Figure 3: Graphical Summary of Predicted SOFC Sound Levels with a modest Liner on the East End

Interrogatory CSC1-17

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-17: Referencing page 14 of the Petition, for the amendment to the Power Purchase Agreement, what equipment or materials would be used to ensure the facility's sound level does not exceed 65 dBA at 10 feet in any direction?

A-CSC 1-17: The panel (walls) of the fuel cell skid will have sound dampening padding/lining to ensure the sound level of the skid does not exceed 65 dBA. Additionally, air blowers are being selected with manufacturer-designed sound insulation options.

Interrogatory CSC 1-18

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-18: Referencing page 11 of the Petition, where will the liquid Nitrogen be stored on site. Explain how it would be used.

A-CSC 1-18: Liquid Nitrogen will not be stored on site. A Nitrogen mix will be stored in the gaseous phase, within the skid of the fuel cell. The Nitrogen mix will be used as cover gas.

Interrogatory CSC 1-19

Allen Place FC, LLC
Petition No. 1553

Witness: Saffi Gilani
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Q-CSC 1-19: Would lighting be used on site? If so, for what purpose and what type would be installed (e.g motion activated, preset timer...)?

A-CSC 1-19: Existing lighting at the proposed project site will provide adequate illumination to the SOFC Facility. For this reason, APCF will not be installing additional lighting.