### STATE OF CONNECTICUT

#### CONNECTICUT SITING COUNCIL

NuPower Bridgeport FC, LLC Petition for a DeclaratoryPetition 1406ARuling, Pursuant to Connecticut General Statutes §4-176:and §16-50k, for the Proposed Construction, Maintenance:and Operation of a Grid-side 9.66-Megawatt Fuel Cell:Facility and Associated Equipment to be Located at 600:Iranistan Avenue, Bridgeport, Connecticut, and Associated:Electrical Interconnection to The United Illuminating:Company's Existing Congress Street Substation:

#### PETITION FOR DECLARATORY RULING OF NUPOWER BRIDGEPORT FC, LLC

#### I. Introduction and Background

Pursuant to Connecticut General Statutes ("Conn. Gen. Stat.") §§ 4-176 and 16-50k and Regulations of Connecticut State Agencies ("RCSA") §16-50j-38 et seq., NuPower Bridgeport FC, LLC ("NuPower"), a Connecticut limited liability company, requests from the Connecticut Siting Council ("Council") a declaratory ruling that a certificate of environmental compatibility and public need ("Certificate") is not required for the construction, operation and maintenance of 9.66-megawatts ("MW") of fuel cells and associated equipment (together, the "Project"). The Project will be located within an approximately 0.5 acre property at 600 Iranistan Avenue, Bridgeport, Connecticut. *See* Figure 1.



Figure 1

The Project will be comprised of natural-gas fueled fuel cells providing 9.66-MW of power to The United Illuminating Company's ("UI") Congress Street Substation, in Bridgeport. The Project will be installed by Doosan Fuel Cell America, Inc. ("Doosan") and owned and operated by NuPower.

Conn. Gen. Stat. §16-50k(a) provides, in pertinent part:

Notwithstanding the provisions of this chapter or title 16a, the council shall, in the exercise of its jurisdiction over the siting of generating facilities, approve by declaratory ruling . . . (B) the construction or location of any fuel cell, unless the council finds a substantial adverse environmental effect or of any customer-side distributed resources project or facility with a capacity of not more than sixty-five megawatts, as long as such project meets air and water quality standards of the Department of Energy and Environmental Projection."

As discussed more fully in this Petition, the construction, operation and maintenance of the Project satisfies the statutory elements of Conn. Gen. Stat. §16-50k(a) and will not have a substantial adverse environmental effect. Accordingly, this Petition for a Declaratory Ruling should be approved by the Council. The Project furthers Connecticut's renewable energy goals and contributes to the state's grid reliability. The Project's utilization of fuel cells, a Class I renewable energy source pursuant to Conn. Gen. Stat. §16-1(a)(20), supports Connecticut's renewable energy policy,<sup>1</sup> while contributing to the reliability of Connecticut's electric supply and the competitiveness of Connecticut's electric market.<sup>2</sup>

On May 11, 2020 Doosan filed a similar petition to this one and on December 18, 2020 the Council voted to deny without prejudice because "the petition remains incomplete and the proposed facility appears to have a substantial adverse environmental effect, particularly with regard to matters of public health and safety." December 18, 2020 Letter from the Council to Walter Bonola of Doosan (the "2020 Decision"). The 2020 Decision identified the following deficiencies and potential adverse effects in public health and safety: (1) lack of site detail provided in project plans; (2) failure to address natural gas safety issues; (3) failure to address the safety implications of the facility's location in relation to other existing infrastructure; (4) failure to address potential vapor plume hazards to the I-95 highway or potential mitigation measures; and (5) failure to address the potential to incorporate noise mitigation measures prior to the commencement of facility operation. In addition to information required by the Council's statutes, regulations and filing guidelines, this Petition addresses each of the deficiencies identified in the 2020 Decision in Petition 1406:

1. Site detail in project plans: Detailed site plan drawings that show the locations and details of the proposed building, other equipment/infrastructure, and overhead/underground are provided in Attachment A.

<sup>&</sup>lt;sup>1</sup> Conn. Gen. Stat. §16a-35k.

<sup>&</sup>lt;sup>2</sup> Conn. Gen. Stat. §16-50p(c)(1).

2. and 3. Natural gas safety issues. At the request of NuPower, Doosan conducted a hazard analysis of the Project to determine the risks associated with the installation of the Project and has developed mitigation plans for the risks identified. The analysis has resulted in design modifications to mitigate the risk of an explosion. See Petition Section X.

4. Vapor plume hazards to the I-95 highway and potential mitigation measures. NuPower retained Trinity Consultants to conduct a modelling analysis to predict fogging and icing event caused by the Project. Attachment B. Trinity determined that the fogging/icing conditions "are primarily driven by the existing, natural metrological conditions in the region". For example, while there were over 116 hours of fog in 2016 – 2020 the facility's modeled plume-induced fogging conditions produced a total of three hours over the five year period. Attachment B at 1, 9. See Petition Section IX(J).

5. Since the Council's December 2020 decision on Petition 1406, NuPower has worked with Doosan to further address noise emitted by the Project and mitigation measures have been incorporated into the design of the Project. See Petition Section IX(H).

#### II. <u>The Petitioner</u>

NuPower is a Connecticut limited liability company and has a principal place of business located at 103 North Park Avenue, Easton, CT. NuPower is a leading sustainable power developer and investor that is involved in a wide variety of sustainable power technologies including fuel cells, biomass, combined heat and power and district energy. NuPower has exclusive rights to a long-term (up to 20 year plus renewals) lease

of the Site. NuPower will lead the Project development and has engaged skilled and competent contractors to develop the Project. NuPower owns and operates a 440kw Doosan fuel cell located in the courtyard of the Cherry Streets Lofts Complex in Bridgeport. The Cherry Street fuel cell project was approved by the Connecticut Siting Council in Petition 1391 and has been successfully operating since its September 2020 COD. South Windsor-based Doosan will provide the twenty-one (21) natural-gas fueled PureCell® Model 400 fuel cells energy units (collectively, the "Units") for the Project. Doosan operates more than 500 fuel cell units worldwide producing over 230 MW in the United States and 20 MW of commercial-scale fuel cell systems in Connecticut.

Please address all correspondence and/or communications regarding this Petition

to:

NuPower LLC 103 North Park Avenue Easton, CT 06612 Attn: Daniel Donovan Telephone: 203.395.4148 E-mail: ddonovan@nupowerllc.net

A copy of all correspondence or communications should also be sent to NuPower's

attorney:

Murtha Cullina LLP 265 Church Street New Haven, CT 06510 Attn: Bruce L. McDermott Telephone: 203.772.7787 Fax: 203.772.7723 E-mail: bmcdermott@murthalaw.com

### III. <u>Site Description</u>

The site of the Project is a 0.51 acre parcel zoned Light Industrial and located at 600 Iranistan Avenue in Bridgeport and bounded by I-95 South to the South, Iranistan Avenue to the West and Railroad Avenue and the Metro North railroad to the North. *See* Figures 2 and 3 below. *See also*, Attachment C.





Figure 2: Site view from Iranistan Avenue (west) Figure 3: Aerial view (nothwest).

The Project will be entirely housed within a 3 ½ story steel structure and the floors of the structure will be made of reinforced concrete in order to provide support for the units. The structure is approximately 203 feet long by 37 feet wide (avg.) with the top level reaching 60 feet above grade. The ground footprint measures approximately 7,500 square feet and would feature open air floors on each level. The site of the Project is in the area of predominantly flat urban land and the nearest residential properties are approximately 136 feet North of the site across Railroad Avenue, Metro North Railway and Railroad Avenue.



Figure 4: Project Location

NuPower proposes to construct the Project using twenty-one (21) 460KW Model 400 Fuel Cells manufactured by Doosan. The overall dimension of the individual fuel cells is 8' 4" wide by 27' 4" long by 9' 11" tall. The fuel cells are factory-assembled and tested prior to shipment and will have an operational life of 20 years. Six fuel cells will be installed on the first and third floors with nine additional fuel cells on the second floor.

The total height of the facility with the cooling fans will be approximately 70' 6" above ground level and approximately 84' 6" above mean sea level. The top of the parapet wall (base of steel structure) for the elevated highway ranges from 67.53' to 58.83' from east to west along the property. The structure will be a minimum of 5' from the property line and the distance from the property line to the I-95 roadway varies from approximately 6' to 8' as depicted on the site survey so therefore the setback is approximately 12' from the I-95 roadway. The structure is not attached to the bridge and will be approximately 13' from the bridge parapet. The Project is not in the highway right-of-way or within the non-access highway line. The structure would be approximately 40' from the sidewalk along Iranistan Avenue to the west and approximately 30' from the curb line of Railroad Avenue to the northeast.

Doosan fuel cells are currently in operation numerous multi-level projects in South Korea. The most recent project to come on line is the Daesan Hydrogen Fuel Cell Power Plant where Doosan supplied 114 fuel cells. That project is shown in Attachment D. That project is the world's first and largest fuel cell by-product hydrogen power plant. The plant can produce 50 MW of power - approximately 5 times the size of the NuPower Project. Another multi-level project utilizing Doosan fuel cells is shown in Attachment E - the Korea South-East Power Company Bundang site where Doosan has three multi-level projects totaling 54 fuel cells which is approximately 2.5 times the size of the NuPower Project.

#### IV. <u>Description of the Project</u>

As shown in Figure 1, the 21 fuel cell units will be housed within the 3 ½ story galvanized steel and poured concrete structure and no exterior finishes are proposed. The first floor of the building will house four (4) 2500 kVA and one (1) 1500 kVA,

13.8kV/480V transformers, low voltage and medium voltage switchgear, and associated metering equipment. Other site components/infrastructure consist of an underground nitrogen tank and associated piping for a centralized purge system, a medium voltage switchgear pad and a point of interconnection with the utility along the northeast side of the site, a water meter vault and a reverse osmosis system/backflow preventer enclosure in the northwest corner of the site, and a natural gas meter interconnection pad on the west side of the site.

The facility is designed with blocks of fuel cells connected to independent transformers. The 21 fuel cells are connected in four groups of five that connect to four 4000 amp switchboards and one fuel cell will connect to a 1600 amp switchboard. Each switchboard is connected to a dedicated step-up transformer that will connect to a 13.8kV medium voltage distribution switchboard which is then connected to the UI's medium voltage distribution system.



Figure 5: PureCell Model 400 Subsystems

The fuel cells use hydrogen to generate electricity. Because of the current lack of available hydrogen fuel in the United States, the fuel cell internally reformulates the natural gas into its own hydrogen fuel along with oxygen as a byproduct. The Project's natural gas will be supplied by Southern Connecticut Gas. The fuel cell produces electricity by physically passing the hydrogen through its fuel cell stack. Once this is completed, the hydrogen combines with the oxygen to form clean water which supports the fuel cell's internal cooling. As a result of the inherent nature of the fuel cell electrical production process, there is an extremely small emission level and water discharge.

#### V. Interconnection

The Project will be interconnected to UI's Congress Street Substation through a new duct bank/overhead route that is currently being designed and will be constructed by a NuPower and UI joint venture. As currently proposed, the length of the route is 7,800'. UI and NuPower have signed an Interconnection Participation MOU that provides that the parties will work together to design and construct the electric interconnection. Under that agreement, NuPower is responsible for the civil component of the interconnection and has hired Black & Veatch to assist in this effort. Black & Veatch is one of the world's leading electrical engineering design firms for utility infrastructure. UI and NuPower are now optimizing the interconnection route as part of the interconnection design phase.

VI. <u>Project Benefits</u>

#### A. Grid Stabilization and Green Energy

The Project will provide the state's electrical system with additional generating capacity that will meet demand using renewable energy, upgrade grid infrastructure, contribute to grid stability and foster the redevelopment and reuse of an underutilized

property. The Project is consistent with Connecticut's 2013 Comprehensive Energy Strategy ("CES"), which sets forth clear goals for increasing the use of renewable energy as part of the state's power generation portfolio:

The Global Warming Solutions Act (Connecticut Public Act 08-98) sets a goal of reducing greenhouse gas emissions by 80% by 2050. Connecticut's Renewable Portfolio Standard (RPS) requires that 20% of generation serving state customers be from renewables by 2020. Meeting the 2020 RPS goal will require the development of 6,196 gigawatt-hours, or nearly 3 gigawatts of low carbon supply – more than 25 times the amount of power generated by Class I resources (i.e., solar power, wind power, and fuel cells) within Connecticut in 2011.

CES, at 76 (footnotes omitted).<sup>3</sup>

As a Class I renewable energy facility, the Project will contribute to Connecticut's renewable energy portfolio standards and will advance the state's renewable energy goals by providing constant and reliable generation of electricity with minimal emissions.<sup>4</sup>

The Project will provide clean, renewable electricity that will support achieving the state's legislatively mandated obligations under the RPS, as well as its other energy policies, including the goal to "develop and utilize renewable energy resources, such as solar and wind energy, to the maximum practicable extent." Conn. Gen. Stat. §16a-35k. The Project was selected by UI under the Request for Proposals ("RFP") for energy and Class I and/or Class III renewable energy certificates from combined heat and power

<sup>&</sup>lt;sup>3</sup> In its decision in Docket No. 18-08-14, *PURA Review of the Combined Heat and Power Project Solicitation Pursuant to Conn. Gen. Stat.* §16-258e, the Public Utilities Regulatory Authority ("PURA") determined that "the main benefit to ratepayers from this project is the advancement of the CES, which in this instance, relates to meeting the state's greenhouse gas emission reductions targets specified in Conn. Gen. Stat. § 22a-200a. This matches the main benefits proposed by NuPower itself: to develop and evaluate a district heating systems' capacity to reduce both natural gas demand and greenhouse gas emissions." Final Decision at 15.

<sup>&</sup>lt;sup>4</sup> The project is not configured to operate as a micro-grid.

system facilities in distressed municipalities, pursuant to Conn. Gen. Stat. §16-258e.<sup>5</sup> In addition, the Project is able to operate on 100% hydrogen fuel rather than the current natural gas supply. This will permit the Project to participate in the coming hydrogen economy over its 20-year life and further reduce greenhouse gas emissions.

B. Emissions

The Project will not need to be supplemented by combustion-based generation during peak hours when intermittent renewables are often unavailable. This will further contribute to a significant reduction in greenhouse gasses: (1) nitrogen oxides (NO<sub>X</sub>) by 18.64 metric tons; (2) sulfur oxides (SO<sub>X</sub>) by 4.68 metric tons; and (3) carbon dioxide (CO<sub>2</sub>) by 5,057 metric tons. See Attachment F. The Project is designed to operate in total water balance – no make-up water is required after start-up and no water discharges to the environment will occur under normal operating circumstances.

C. Economic

NuPower estimates that the Project will (1) provide up to 20 construction jobs in Connecticut; (2) provide up to \$78 million in capital investment; (3) generate over \$5.5 million in state tax revenue over 20 years; and (4) generate over \$5 million in local tax revenue over 20 years.

## VII. Local Input and Notice

Throughout the process, NuPower has kept the City and state regulators apprised of the Project's progress and engaged in providing feedback on Project design and

<sup>&</sup>lt;sup>5</sup> Power produced by the facility would be sold to UI in accordance with a PURA-approved power purchase agreement ("PPA") between UI and NuPower in Docket No. 18-08-14. Although not part of this Petition, in addition to the power produced by proposed facility, it will provide thermal energy to the district heating loop. The combined heat and power facility would be able to recover useful heat from electricity generation, and when used, can result in a fuel cell electrical efficiency factor of up to 90 percent.

permitting. NuPower has been committed to soliciting input from officials from the City and from the general public in an effort to develop a Project that results in the most public benefit with the least impact. For example, since 2016 representatives of the Project have met with the Bridgeport South End Revitalization Zone and Bruce Nelson, the City's Building Official, Lynn Haig, the City's Director of Planning and Max Perez, the City's Director of Business Development. Additionally, a site tour was conducted for City Council members Denese Taylor-Moye and Jorge Cruz whose districts include the subject property. The City has indicated that the "plans for this project are consistent with the overall intent of Plan Bridgeport - Bridgeport's Plan of Conservation and Development ("POCD") and that the City finds the Project "is in the best interests of the City and will provide significant fiscal and conversation benefits." Finally, the letter concludes that the City "supports the Connecticut Siting Council approval of this Project". Additionally, the Project has the support of the Bridgeport state legislative delegation and the Bridgeport Regional Business Council. See Attachment G. NuPower has also responded to numerous questions concerning equipment safety, emissions, chemicals, EMF, and noise emissions from residents of Seaside Village which is located approximately 575' from the Project site. Additionally, on February 27, 2021, NuPower and Doosan held an information meeting for the Seaside Village Homeowners Association at NuPower's Cherry Street fuel cell project. During the meeting site plans and project renderings were distributed and topics such as project lighting, emissions, drainage, site selection, maintenance, decommissioning, noise, economic benefits, thermal loop and visual impacts were discussed.

NuPower provided notice of this Petition to all persons and appropriate municipal officials and governmental agencies to whom notice is required to be given pursuant to RCSA §16-50j-40(a).<sup>6</sup> A copy of the notice letters and a service lists are attached as Attachment H. NuPower will continue to work with officials from the City and the local community by pursuing a multi-faceted and inclusive public outreach effort.

#### VIII. ISO-NE

The Project has completed a Transmission System Impact Study required by ISO-NE. On July 14, 2020, ISO-NE issued a letter to UI in which it stated that following a review of the proposed Project no "significant adverse effect on the reliability or operating characteristics of the transmission facilities of UI, the transmission facilities of another Transmission Owner or the system of any other Market Participant were identified." Attachment I

#### IX. Potential Environmental Effects

#### A. Land Use

The Project is located in the northern portion of the City's South End neighborhood district, in an area historically used and zoned for Mixed Use – Light Industrial development. See Figure 6.

<sup>&</sup>lt;sup>6</sup> RCSA § 16-50j-40(a) requires that "[p]rior to submitting a petition for a declaratory ruling to the Council, the petitioner shall, where applicable, provide notice to each person . . . appearing of record as an owner of property which abuts . . . the proposed facility, each person appearing of record as an owner of the property or properties on which . . . proposed facility is to be located, and the appropriate municipal officials and government agencies [listed in Section 16-50] of the Connecticut General Statutes]."



Figure 6: Bridgeport Zoning Map Showing Project Site

Property to the north on opposite side of the MetroNorth Railroad tracks is zoned Industrial Light. Similarly, property to the south of the Project site on the opposite side of I-95 is similarly zoned Industrial Light. The block immediately to the south of the Project site is occupied by an auto repair and gas station, car wash, car rental and a storage and waste hauling business. Beyond that Industrial Light zone is a residential area in the Residential – C Multi Family Zone (R-C). *See* Figure 6. The R-C zone is approximately 350' feet from the Project site.

MU-LI In Section 5 of the POCD entitled, "Bridgeport Values Nature" the 7th goal is to continue to shift towards clear and renewable energy sources and the POCD make specific reference to this project: "Support state funding efforts for solar thermal energy and fuel cell technology with the continued expansion of the Bridgeport Thermal Energy Project with NuPower."<sup>7</sup>

The South End Revitalization Zone Strategic Plan (2014) shows the Project area within an "eco-industrial" planning district. The Plan recognizes that the properties along

http://planbridgeport.com/documents/plan.pdf

Bridgeport harbor consist nearly exclusively of power generation-related uses, such as PSEG's BHS, and recommends that the effect that these uses have on the South End be mitigation by screening and landscaping and that eventually the older power generating facilities be transitioned to renewable energy.<sup>8</sup>

Connecticut's Conservation & Development Policies Plan 2013-2018 (2013) encourages the utilization of the state's renewable power generation potential to the extent that it is "compatible with state goals for environmental protection, and minimize potential impacts to rural character and scenic resources when siting new power generation facilities and/or transmission infrastructure."<sup>9</sup>

B. Proposed Land Use Impact

Development of the Project will transform an underutilized property to a productive fuel cell facility that will deliver renewable energy to the regional grid. The Project is consistent with local, state and federal land use plans and is consistent with Bridgeport's Plan of Conservation and Development.

As demonstrated below, the construction and operation of the Project will not result in any substantial adverse environmental effects in the State of Connecticut.

C. Wetlands, Wildlife, Endangered or Threatened Species, Critical Habitats, Recreational, Historical, Scenic or Water Quality Effects

The Project is located within a previously disturbed and developed industrial area located between I-95 and the railroad tracks and will be housed entirely within the 3 ½ story structure. The development of the Project will not cause adverse impacts on wetlands,

<sup>&</sup>lt;sup>8</sup> www.bridgeportct.gov/filestorage/341650/341652/346105/342427/342494/342518/FINAL\_Design\_0212.pdf
<sup>9</sup> https://partel.st.gov//media/ODM//CD/ODC/adplan/20122049\_FINAL\_CD\_PI\_AN\_ray/\_lupp\_2017\_pdf at 10

<sup>&</sup>lt;sup>9</sup> https://portal.ct.gov/-/media/OPM/IGP/ORG/cdplan/20132018-FINAL-CD-PLAN-rev-June-2017.pdf at 19.

wildlife, endangered or threatened species, critical habitats, recreational attributes, historic attributes, scenic attributes, or water quality.

#### D. Air Emissions

The proposed installation will have no substantial adverse environmental effect and the installation and operation of the fuel cell facility will meet all air quality standards of DEEP.

Air emissions from the fuel cell associated with the Project, assuming continuous year round full power operation, are conservatively expected to be as follows:

Pollutant	Total Potential Emissions (tpv)
Oxides of Nitrogen ("NOx")	0.85
Oxides of Sulfur ("SOx")	0.00
Particulate Matter ("PM")	0.00
Carbon Monoxide ("CO")	0.42
Volatile Organic Compounds ("VOC")	0.42
Carbon Dioxide ("CO2")	45,465
Methane (CH4)	0.42
Nitrous oxide (N2O)	<0.2
Sulfur hexafluoride (SF6)	0.00
Hydrofluorocarbons (HFCs)	0.00
Perfluorocarbons (PFCs)	0.00

#### Table 1

Total emissions from the proposed Project will be below levels that would render the Project a "major stationary source" as defined at RCSA § 22a-174-1(63). The Project's maximum emissions will operate well below the serious non-attainment area thresholds for VOC and NOx. Thus, the Project will be a minor source and is not subject to Federal Non-Attainment New Source Review ("NSR"). Also, there is no requirement for emission offsets for this Project as it will be below the non-attainment NSR major source thresholds. A Permit to Construct and Operate Stationary Sources is not required for the Project because the potential emissions of any individual air pollutant from each emission unit are less than 15 tpy; the source is not a new major stationary source; and, the source is not a new major source of hazardous air pollutants. The Project is also not subject to the DEEP's "permit by rules" because the potential emissions from the fuel cell are less than 15 tpy. Thus, there are no registrations or applications required to be submitted to the DEEP; nor are there anticipated to be any approvals from the DEEP Air Bureau required prior to the construction and operation of the Project.

On May 13, 2010, EPA issued the final greenhouse gas ("GHG") Tailoring Rule. This rule effectively raised the thresholds for GHG emissions that define when permits under the Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. However, since the potential GHG emissions from the Project will be well below the 75,000 tpy trigger established by the Tailoring Rule, those emissions will not trigger the requirement for an air permit.

The Project would also emit negligible amounts of sulfur oxides, volatile organic compounds and particulate matter. Furthermore, the fuel cells to be used at the Project are certified by the California Air Resources Board to meet the Distributed Generation Certification Regulation 2007 Fossil Fuel Emissions Standards. *See* Attachment J.

E. Water Emissions

The Project will comply will all applicable DEEP water quality standards as no water will be consumed or discharged once the Project is operational. A stormwater permit does not need to be obtained from DEEP.

The fuel cell operates in water balance below 86°F. The initial fill requires 350 gallons of water and the amount of make-up water above 86°F increases linearly from 0 gallons per minute (gpm) to 1 gpm at 110°F. The Project will use approximately 90,000 gallons of water per year, which is estimated based on a Reverse Osmosis system with a 70% recovery rate and 3,000 gallons per year per fuel cell. The thermal loop is a closed loop system and will not significantly impact the water consumption for the Project. Water will be supplied by Aquarion Water Company with water mains are located along Railroad Avenue and Iranistan Avenue.

F. Soil

Geotechnical and environmental sampling and testing has been performed at the site and environmental testing showed the soil is below direct exposure criteria and pollutant mobility criteria. The soil is appropriate for re-use on the site but not suitable for export from the site, which is not an issue as all soil will be reused on the site. Geotechnical testing showed the soil conditions on site are in-line with the geologic conditions of the surrounding area and prior fill brought onto the site. The structure will requirement some controlled structural fill and piers to stabilize the soil and support the weight of the structure. The soil characteristics will not affect Project construction timeline. A copy of the environmental testing consultant cover letter is included as Attachment K.

G. Wildlife and Habitat

According to the relevant portion of the CT DEEP Bridgeport Natural Diverse Database Areas Map, the proposed Site is not located within the City of Bridgeport Natural Diversity Data Base Areas. See Attachment L.

#### H. Noise Analysis

The airborne noise levels expected to be generated by the proposed Project were simulated by use of six co-located speakers at the expected location of the fuel cells and airborne noise with the speakers operating was measured at distances from 5 to 160 meters from the proposed fuel cell locations. The speakers produced overall A-weighted sound pressure of approximately 86 to 87 dBA at 5 meters and 77 to 84 dBA at 10 meters from the proposed fuel cell locations at ground level. Airborne noise from the speakers at nearby properties was measured at levels from 53 to 73 dBA. The highest property line measurement was 73 dBA at 571 Iranistan Avenue. Industrial Zone measurements on Railroad and South Avenues were lower because of the longer distance to the speakers. Beyond 80 meters the speakers could not be heard. Analysis of the speaker data indicated propagation losses from 8 to 25 dB from the fuel cell location to the nearby property lines. Airborne noise estimates from one fuel cell were than scaled up to 21 fuel cells to produce an overall sound level at each of six property lines. See Attachment M.

The primary sources of noise for the proposed project are the dry air coolers located on the top floor of the structure. Although the site is located in an area with high background noise, initial acoustical modeling indicated that the Project could exceed the State of Connecticut standard (RCSA §22a-69-3) that limits noise from a source, as measured at certain Noise Zones. The exceedances are at several residential receptors and at an industrial receptor.

NuPower has incorporated noise mitigation into the design of the Project in order to provide sufficient sound attenuation so the noise generated by the fuel cells will not exceed the 70 dBA industrial and 51 dBA residential limits. A sound attenuation product

has been selected for use in the structure to bring noise emissions below City and State standards. See Attachment N. The structure has been designed to accept the additional structural loads involving the installation of the noise controls. Once installed further testing will be performed to assure compliance with City and State standards.<sup>10</sup>

I. Visual Impact

The surrounding properties along Railroad Avenue and Iranistan Avenue contain

a mix of commercial and residential properties. Specifically:

North	Railroad tracks, past the tracks: New Beginnings Family Academy, Calzone Case Co., Greenskeeper Lawn Care, Driveway Seal, and residential property
South:	Interstate 95, Nunes Auto Care & Car Wash, Makroteks Textile LLC, Approved Storage & Waste Hauling, Inc.
East:	Interstate 95, railroad tracks, and Future Health Care Systems medical waste transfer station
West:	Medelco, Inc. and Interstate 95

The proposed facility will fit with the light industrial nature of the area the Project is situated and will not adversely affect views in the surrounding area. The proposed facility will be visible from adjoining surface streets, I-95, and the Metro-North Railroad. The proposed facility will not be visible from residential areas.

J. Ice and Fog

The facility will be located on the site parcel so as to reduce the potential for fog or

ice from the Project from impacting I-95.<sup>11</sup> Additionally, the fuel cell vents will not be

<sup>&</sup>lt;sup>10</sup> An acoustic barrier was utilized and post-construction noise measurements were taken in order to ensure compliance with DEEP's standards at NuPower's Cherry Street project (Petition No. 1393).

<sup>&</sup>lt;sup>11</sup> The Department of Transportation commented on the proposed project on June 10, 2020 as part of Petition 1406 and noted the facility abutted a state high-way right of way. No comments were made regarding concerns over icing or vapor plume.

https://portal.ct.gov/-/media/CSC/3\_Petitions-medialibrary/Petitions\_MediaLibrary/MediaPetitionNos1401-1410/PE1406/State\_Municipal/Petition-1406\_dotcomments.pdf

combined but rather will be routed individually to the top of the structure and extended 9' above the base of the top floor of the structure at approximately 57' above the ground level. The Project's design mitigates the facility's plume by locating the fuel cell exhaust vents on the side of the structure opposite the highway and locating the dry air-coolers between the exhaust and the highway. The dry heated air provided by the dry air-coolers will serve to mix with the exhaust gas to evaporate fog-like water vapor plumes.

In response to the Council's December 18, 2020 decision in Petition 1406, NuPower and Doosan retained Trinity Consultants to analyze the source-induced fog and ice from the facility's exhaust streams. Trinity utilized the California Puff ("CALPUFF") model FOG codes to determine the fogging and icing impacts from the 21 exhaust vents. CALPUFF determines the frequency of visible plume impacts at receptor points and predicts the length and height of visible plumes. The model indicated that the Project will have an insignificant impact. During the period 2016-2020 the modeled plume-induced conditions produced only one hour of icing conditions and three total hours of fog over the five year period. In comparison, natural meteorological conditions produced 116 hours over the same period.<sup>12</sup>

#### K. Lighting

All interior and exterior lighting will be LED. Interior lighting will consist of strip lighting sufficient to support intended tasks and meet OSHA required illumination. All

<sup>&</sup>lt;sup>12</sup> NuPower believes that its meetings with the DOT have been productive and DOT has not expressed any concerns to us about the location of the Project. DOT has indicated it will enter into an access agreement to allow use of the area under the highway for storage during the construction of the Project.

exterior lighting will utilize flush lens design to minimize fugitive light and lighting on the roof top level will utilize side shielding to minimize distraction on the highway.

L. Aquifer Protection Area, Coastal Boundaries, and Flood Zones

The City of Bridgeport has no Aquifer Protection Areas. The proposed project is located within the City of Bridgeport's coast boundary zone. See Attachment O. NuPower has filed a coastal boundary zone permit application with the City.

The new building would require structural fill and piers for stabilization and building support. Environmental testing indicates site soils/old fill materials are below direct exposure and pollutant mobility criteria. Excavated soils can be re-used on the site but are not suitable for export from the site.

Based on an analysis of the Federal Emergency Management Agency's ("FEMA") National Flood Insurance Program ("NFIP") flood mapping data for Bridgeport, the proposed project location is within the 100 yr. flood zone area, in an area with a base flood elevation of 12'. Fill will be added to the site as needed to bring the base elevation for all equipment 2' above the flood elevation providing reduced flood risk to the fuel cells, electrical switchgear, transformers, natural gas meters, gas regulators and heat recovery pumps. The additional two feet of ground elevation would comply with Public Act 18-82, *An Act Concerning Climate Change and Resiliency*, which requires that residential and community structures in areas subject to coastal flooding be elevated two feet above the base flood elevation to account for projected sea level rise. If additional fill was imported to the site to allow for an additional one-foot of flood protection, the estimated incremental cost increase is \$117,000.

#### M. Cultural Resources

The proposed Facility will be located in an already developed vicinity, consequently construction and operation of the Project will have no adverse effect on any cultural (historical and archaeological) resources in the area.

#### X. Public Health and Safety

#### A. General

The Project represents a clean and safe method of electricity generation in a manner consistent with federal and state policies to protect public health and safety. In terms of public health the Project will generate electricity in a cleaner and more environmentally acceptable manner compared to conventional generation such as nuclear, combustible natural gas, coal or oil as fuel. In terms of safety, the Project will meet all applicable safety requirements for construction operation and electrical interconnection.

While there is no fuel storage at the facility, in order to mitigate risks associated with chemical explosions (fires) due to natural gas leaks two mitigations were incorporated into the design since the Council's decision in Petition 1406 to stop the flow of natural gas in the event there is a ruptured gas line or large impact to the structure:

Excess flow valve - Excess flow valves are designed to automatically restrict and stop flow when the natural gas flow exceeds certain limits, such as when a service line is damaged due to excavation or vehicle impact. When activated, the excess flow valve will stop the flow of natural gas, limiting the risk of escaping natural gas due to damage or a pipe failure. An excess flow valve will be installed local to the natural gas utility regulator.

Earthquake valve - An earthquake, or seismic, valve automatically shuts flow of

natural gas in the event a seismic event is detected. This valve will be installed where

the natural gas line comes into the structure and will stop flow of natural gas immediately

upon detecting a significant impact to the structure. See Attachment A, Sheet M2.0

Specific elements of the safety and security system or as described below

Security system - A plant wide security system that consists of video security and fire alarms will be incorporated in final design plans. The video is recorded and the entire security system can be remotely monitored.

Emergency shut down system - There are three separate levels of emergency shut down.

Individual fuel cell operating plants – each of the fuel cell power plants is equipped with emergency stop push buttons. Pressing one of these push button shuts down the respective fuel cell plant.

Site natural gas shut down – First responders will have access to the site with the use of a Knox Security box positioned outside the gate. They will have access to shutoff the natural gas supply valve which will stop incoming fuel supply.

Site electrical shut down - There two push button electrical feeder break at the electrical switches where power first enters the facility. Depressing all push buttons will open the feeder switchgears and effectively decouple the distribution interconnection at the site.

The Project will have a customized emergency response plan. The plan will

include owner contact information for use for local emergency response and by the

various utilities. Escape routes will be prominently displayed at various points throughout

the facility and all personnel will receive instructions on where to exit and muster in the

event of emergency. The Project design will include automatic acting emergency sensors

located within the fuel cell power plant. In addition, facility operators will continuously

monitor process flows, temperatures, pressures and voltages for any deviations from

expected values.

All applicable health and safety requirements relevant to fuel cell energy generating facilities will be followed during construction and operation. The Project will not pose any safety concerns or hazards to the general public. The construction contractors and employees involved with this Project's development have previously received general and project-specific health and safety training. The contractors and their employees will be made aware of state and local health and safety requirements, location and routes to nearby emergency care facilities, stop work triggers, and communication protocols for reporting health and safety issues. All construction workers will comply with required health and safety controls and will understand and observe the health and safety plan developed for the Project. Any and all unsafe conditions will be reported to the construction manager. During construction, Doosan would use inert nitrogen gas or atmospheric air under pressure as pipe cleaning media, in accordance with Public Act 11-101, *An Act Adopting Certain Safety Recommendations of the Thomas Commission*.

Given the site's unique location, NuPower does not anticipate that the Project will have a significant impact on traffic flow. However, NuPower will coordinate with local authorities to minimize potential impacts of Project-related construction on existing traffic patterns and roadways. The location of the Project site will minimize effect on local roadways. Any potential construction-related traffic will be temporary and restricted to the Project's approximately 18-month construction period. Once operational, the Project will be generally unstaffed and will require only occasional vehicle trips to the Project area for the purpose of routine site maintenance activities. No raw or hazardous materials or fuels will be delivered to or stored at the Property.

Before Project operation commences, NuPower will meet with local first responders to supply information on responding to emergencies at fuel cell facilities. A tour of the Project will be provided and the clearly marked disconnect switches will be identified for use during an emergency. The system will be remotely monitored through a DAS, allowing for remote shutdown of the Project in the event of a fault or other power outage event. Emergency vehicles and service equipment will be provided adequate access to the Project area. An emergency response guide that provides emergency response information specific to the fuel cell installation and supporting infrastructure will be provided to first responders.

The proposed perimeter fencing is a decorative steel fence approximately 8' high with a curved section at the top providing the anti-climb feature. The Project fence will be consistent with the National Electric Safety Code and National Electric Code. Additionally, the Project will have a locked gate and limited access for authorized personnel only.

Fall protection along the open perimeter of each floor would be accomplished by OSHA-approved guard rails and kick plates. The Project will not impact the public health and safety of the Property or that of the area surrounding the Property.

B. Fire Protection

The Project design incorporates a combustible gas sensor and thermal fuses located throughout the fuel cell cabinet. The detection of a potential combustible gas mixture, a fire, or the failure of this detection circuit will result in a shutdown, closing of the natural gas supply valves, and a subsequent inert gas (nitrogen) purge of the fuel cell stack and fuel processing system. This event will also result in an alarm callout

notification to service personnel. The Project is designed with an integral stop button on the outside of the enclosure to enable immediate shutdown in the event of an emergency. There is also a site-installed manual gas shut-off valve and electrical disconnect switch easily accessible to emergency personnel. First responders will have access to the site with the use of a Knox Security box positioned outside the gate directly adjacent to the natural gas shut off.

The Project will use city fire hydrants for fire protection. Under the definitions in NFPA 853 the site is an outdoor installation with no flammable or combustible liquid fuel storage. NFPA 853 section 8.1.1.3 indicates that city hydrant protection shall be considered to meet required site protection fire requirements. Per NFPA 853 Section 3.3.15.2 defines an outdoor installation as "A power system installation that is not located inside a building or that has only partial weather protection (maximum coverage of a roof and up to 50 percent enclosing walls."

#### C. Gas Leak

The fuel cells are designed with a physical barrier that separates the equipment handling combustible gases (fuel compartment) from electrical or potential spark-creating equipment (motor compartment). The fuel compartment is maintained at a negative pressure relative to both ambient and the motor compartment to ensure that any gas leaks do not reach the electrical equipment in the motor compartment. The cabinet ventilation system ("CVS") is designed to dilute a potential gas leak in the fuel compartment to non-combustible levels.

#### D. Fluid Leak

The only fluid source is water. All piping systems and pressurized water vessels are designed and fabricated to the appropriate ASME codes. Water produced through the electrochemical process is "pure" water and is reclaimed and reused by the process. Water mixed with propylene glycol and a rust inhibitor (to prevent rust and freezing in colder climates) is also used in the external cooling module.

#### XI. Decommissioning Plan

Following the 20-year operational life of the Project, the decommissioning plan is as follows:

- Isolate, lock out and disconnect all piping for cooling module at the power module. Remove gas piping to the unit. Disconnect nitrogen purge system at power module.
- Disconnect all electrical conductors and conduit at the fuel cell to include electrical power, cooling module power, and nitrogen pressure switch. Shore power to be maintained to the unit to maintain temperature as needed.
- Return site to original condition with the exception of the concrete pads and steel structure.
- 4. The decommissioned fuel cells will be stripped, the parts are separated and either recycled, reclaimed or transported to landfill.

#### XII. <u>Construction Schedule</u>

Construction of the Project is planned to start construction by June 2021. Construction will take eighteen (18) months, followed by approximately three months of testing and startup and commercial operation is anticipated in the second half of 2022.

Regular construction hours for the Project are Monday through Friday from 8:00 am to 5:00 pm.

#### XIII. Conclusion

Accordingly, for the reasons stated herein, NuPower respectfully requests that the Council rule that the Project would not have a substantial adverse environmental effect, and pursuant to Conn. Gen. Stat. §16-50k, would not require a Certificate of Environmental Compatibility and Public Need.

Respectfully submitted,

On behalf of NuPower Bridgeport FC, LLC

By:

Bruce L. McDermott Murtha Cullina LLP 265 Church Street New Haven, CT 06510 Tel: (203) 772-7787 bmcdermott@murthalaw.com

Attachment A Design Drawings Attachment B Trinity Consultants Fogging/Icing Dispersion Modelling Analysis Attachment C Area Photographs Attachment D Daesan Hydrogen Fuel Cell Power Plant Attachment E South-East Power Company Bundang Attachment F Emissions Reduction Calculation Attachment G Letters of Support Attachment H Service of Petition Attachment I ISO New England Letter State of California Air Resources Board Executive Order DG-047 Attachment J Attachment K Berkshire Environmental Services & Technology, LLC April 29, 2020 Letter Attachment L DEEP NDDB Map Attachment M Acoustical Technologies Inc. Acoustic Assessment Attachment N AID Sound Walls Brochure and Specifications Attachment O Coastal Boundary Zone Map

## ATTACHMENT A

# 9.66 MEGAWATT FUEL CELL INSTALLATION

SITE:

ENGINEER:

**PROJECT MANAGER:** 



# Nupower Bridgeport Thermal Project

BRIDGEPORT, CONNECTICUT

) DOSS/A/M D

9.66 MW FUEL CELL INSTALLATION 600 IRANISTAN AVENUE BRIDGEPORT, CT 06605

INNOVATIVE CONSTRUCTION & DESIGN SOLUTIONS, LLC 419A WHITFIELD STREET GUILFORD, CT 06437 (203) 453-8596

DOOSAN FUEL CELL AMERICA, INC. WALTER BONOLA 101 EAST RIVER DRIVE EAST HARTFORD, CT 06108 (860) 727-2010

CS1 0	COVER SH	FFT	M1 0	MECHANICAL GENERAL NOTES SPECS & LEGEND
001.0	00 VER ON		M1.0 M2.0	MECHANICAL UNDERGROUND PLAN
GA1 0	GROUND F	I OOR GENERAL ARRANGEMENT	M2.0 M2.1	MECHANICAL GROUND ELOOR PLAN
GA1 1	SECOND E	LOOR GENERAL ARRANGEMENT	M2.1	MECHANICAL SECOND FLOOR PLAN
GA1 2	THIRD FLO	OR GENERAL ARRANGEMENT	M2.2	
GA1.3	ROOF GEN	ERAL ARRANGEMENT	M2.4	MECHANICAL ROOF PLAN
SP1 0	SITE PI AN		M3 0	MECHANICAL DETAILS
SD-1	STORM DR	AINAGE PLAN	M3.1	MECHANICAL DETAILS
S0.0	STRUCTUF	RAL NOTES	M4.0	FUEL CELL POWER PLANT PIPING & INSTRUMENTATION DIAGRAMS
S1.0	STRUCTUF	RAL CONCRETE FOUNDATION PLAN	M4.1	HIGH GRADE PIPING THERMAL RECOVERY
S1.1	STRUCTUF	AL CONCRETE GROUND FLOOR PLAN		PIPING & INSTRUMENTATION DIAGRAM
S1.2	STRUCTUF	RAL CONCRETE SECOND FLOOR PLAN		
S1.3	STRUCTUF	AL CONCRETE THIRD FLOOR PLAN	E1.0	ELECTRICAL ONE LINE DIAGRAM
			E1.1	ELECTRICAL THREE LINE DIAGRAM
S2.0	STRUCTUF	AL STEEL SECOND FLOOR FRAMING PLAN	E1.2	ELECTRICAL THREE LINE DIAGRAM
S2.1	STRUCTUF	RAL STEEL THIRD FLOOR FRAMING PLAN		
S2.2	STRUCTUF	RAL STEEL ROOF FRAMING PLAN	E2.0	ELECTRICAL GROUND FLOOR PLAN
			E2.1	ELECTRICAL SECOND FLOOR PLAN
S3.0	STRUCTUF	RAL FOOTING SCHEDULE, SECTIONS & DETAILS	E2.2	ELECTRICAL THIRD FLOOR PLAN
S3.1	STRUCTUF	RAL CONCRETE SECTIONS & DETAILS	E2.3	ELECTRICAL ROOF PLAN (LATER)
S3.2	STRUCTUF	RAL STEEL BRACED ELEVATIONS		
S3.3	STRUCTUF	RAL STEEL COLUMN SCHEDULE	E3.0	ELECTRICAL DETAILS
S3.4	STRUCTUF	RAL STEEL SECTIONS & DETAILS		
S3.5	STRUCTUF	RAL STEEL SECTIONS & DETAILS	E4.0	ELECTRICAL SPECIFICATIONS (BOOK SPECS LATER)
REFERENCE DOCUMENTS			DESIGN CODES	
FCM PRN	1AN89412 1AN69600	DOOSAN INSTALLATION MANUAL DOOSAN PRODUCT DATA AND APPLICATIONS GUI	DE	CONNECTICUT STATE BUILDING CODE 2018 AS AMENDED 2017 NATIONAL ELECTRICAL CODE (NFPA 70) 2015 INTERNATIONAL BUILDING CODE

							B 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	Rev. Date Description
		419A Whitfield Street	Guilford, CT 06437		Phone:(203) 453-8596	Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
		BOD IPANISTAN AVE BDT CT							COVER SHEEL
Dat	e: 12/ lle: N	/31/ .T.S	20 S.		De	sign	KF By: KFI By: DS	H  F	
Dr	rawin	ng No		5			•	(	)

30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

2015 INTERNATIONAL MECHANICAL CODE

2015 INTERNATIONAL PLUMBING CODE 2015 NATIONAL FUEL GAS CODE (NFPA 54)

# **DRAWING INDEX**



GROUND FLOOR GENERAL ARRANGEMENT Scale: 3/32" = 1'-0"



## 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION







1

Scale: 1/8" = 1'-0"

				01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	12/31/20 30% DESIGN DEVELOPEMENT	Date Description
				Ш	A	Rev.
	419A Whitfield Street Guilford, CT 06437	Phone:(203) 453-8596	Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
BRIDGEPORT 9.66MW FUEL CELI	600 IRANISTAN AVE. BPT., CT	Dra	awn	By: KF		SECOND FLOOR GENERAL ARKANGEMEN I
Project N Project N Project N Date: 12/	600 IRANISTAN AVE. BPT., CT	Dra	awn sign	By: By: KFI		SECOND FLOOK GENERAL AKKANGEMEN I
ITAD TANK FUEL CELL Date: 12/ Scale: AS N		Dra	awn sign eck	By: KFI By: DSI		SECOND FLOOK GENERAL AKKANGEMEN I



## 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION







1

THIRD FLOOR GENERAL ARRANGEMENT Scale: 1/8" = 1'-0"

		B 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	Rev. Date Description
19A Whitfield Street Guilford, CT 06437	Phone: (203) 453-8596 Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
				N
BRIDGEPORT 9.66MW FUEL CE 600 IRANISTAN AVE. BPT., CT				I HIKU FLOUK GENEKAL AKKANGEME
BRIDGEPORT 9.66MW FUEL CE 600 IRANISTAN AVE. BPT., CT Date: 12/31/20	Drawn Design Check	By: KFI By: DS		



## 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION




UPDATED 30% 30% DESIGN DE Description a < 419A Whitfield Street Guilford, CT 06437 ) 453-8596 jiedslle.com **1S, LLC** Phone:(20) Email: info CELL ARRANGEMENT BRIDGEPORT 9.66MW FUEL ( 600 IRANISTAN AVE. BPT., CT ROOF GENERAL Project No.: Drawn By: KFH Date: Design By: 12/31/20 KFH Check By: DSF Scale: AS NOTED Drawing No.: GA1.3





NOTE: 1. ALL SITE UTILITIES, DIMENSIONS, EASEMENTS, EASEMENT LOCATIONS ETC. ARE TAKEN FROM: ANCHOR ENGINEERING SERVICES, INC EXISTING CONDITIONS PLAN BOUNDRY SURVEY PREPARED FOR NUPOWER LLC PROJECT No. 1418-01 DATE 12/10/2018		B01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription
	Solution of the street Guilford, CT 06437	Innovative Construction & Design Solutions, LLC
$\frac{1}{2} \frac{1}{2} \frac{1}$	BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	SITE PLAN
EXISTING EASEMENT IN FAVOR THE CONNECTICUT LIGHT & P COMPANY VOL. 7460 PG. 152 TOP OF PARAPET WALL ELEV. = 64.32	Project No.: Date: 12/31/20 Scale: AS NOTED Drawing No.:	Drawn By: KFH Design By: KFH Check By: DSF
30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION	<b>SP</b>	1.0





### **GENERAL NOTES**

- 1. THE STRUCTURAL DRAWINGS AND SPECIFICATIONS, TO THE BEST OF OUR KNOWLEDGE, COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE 2018 CONNECTICUT STATE BUILDING CODE, AND AMENDMENTS TO THE 2015 INTERNATIONAL BUILDING CODE.
- 2. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE 2015 INTERNATIONAL BUILDING CODE WITH STATE OF CONNECTICUT AMENDMENTS AND ALL APPLICABLE FEDERAL & STATE CODES, STANDARDS, **REGULATIONS AND LAWS.**
- 3. ALL REFERENCED STANDARDS REFER TO THE EDITION IN FORCE AT THE TIME THESE PLANS AND SPECIFICATIONS ARE ISSUED FOR PERMIT.
- 4. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
- 5. IN ANY CASE OF CONFLICT BETWEEN THE NOTES, DETAILS AND SPECIFICATIONS, THE MOST RIGID REQUIREMENTS SHALL GOVERN. CONTRACTOR SHALL MAKE NO DEVIATION FROM CONTRACT DOCUMENTS WITHOUT WRITTEN APPROVAL OF THE ENGINEER.
- 6. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AND COORDINATE WITH LAYOUT DRAWINGS, DRAWINGS FROM OTHER CONSULTANTS, PROJECT SHOP DRAWINGS AND FIELD CONDITIONS.
- 7. THE CONTRACTOR SHALL PROTECT EXISTING FACILITIES, STRUCTURES AND UTILITY LINES FROM ALL DAMAGE.
- 8. JOB SAFETY AND CONSTRUCTION PROCEDURES ARE THE RESPONSIBILITY OF THE CONTRACTOR
- 9. THE STRUCTURES ARE DESIGNED FOR THE FOLLOWING LOADS:

SEISMIC LOADS: SEISMIC PARAMETERS -SPECTRAL ACCELERATIONS: Ss = 0.209, S1 = 0.064 -SEISMIC DESIGN CATEGORY: "D"

<u>WIND LOADS</u> ULTIMATE DESIGN WIND SPEED = 120 MPH. -EXPOSURE "C"

GROUND SNOW LOAD = 30 PSF + DRIFT

FLOOD DESIGN DATA -FLOOD ZONE: (LATER) -GROUND ELEVATION: (LATER)

10. THE PLAN AND DETAILS HERE IN ARE BASED ON LIMITED SITE OBSERVATIONS AND EXISTING DRAWINGS. ANY DISCREPANCIES BETWEEN EXISTING FIELD CONDITIONS AND THE DRAWINGS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER.

11. THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE SO THAT ANY EXISTING MATERIALS THAT ARE TO REMAIN SHALL NOT BE DAMAGED. IF THE CONTRACTOR DAMAGES ANY MATERIALS THAT ARE TO REMAIN IN PLACE, THE DAMAGED MATERIALS SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.

12. ALL AREAS DISTURBED BY THE CONTRACTOR WITHOUT AUTHORIZATION OF THE ENGINEER SHALL BE RESTORED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE.

#### FOUNDATION NOTES

- 1. FOUNDATION DESIGN PARAMETERS FROM GEOTECHNICAL INVESTIGATION REPORT PREPARED BY WELTI GEOTECHNICAL, INC. OF GLASTONBURY, CT. DATED APRIL 28, 2020.
- 2. FOUNDATION IS DESIGNED TO BE SUPPORTED ON BEARING PRESSURE OF 4.000 PSF ON THE CRUSHED STONE LAYER ATOP THE NATURAL SOILS OR ON CONTROLLED FILL.
- 3. CONTRACTOR SHALL BE FAMILIAR WITH THE SUBSURFACE CONDITIONS AND GEOTECHNICAL REPORT BEFORE COMMENCING EXCAVATION.
- 4. DOWELS FROM FOOTINGS INTO PIERS AND WALLS ABOVE SHALL BE THE SAME SIZE AND NUMBER AS VERTICAL REBAR IN PIERS AND WALLS, AND SHALL BE EXTENDED "LTE" INTO FOOTINGS AND "LTS" INTO PIERS AND WALLS UNLESS OTHERWISE SHOWN.
- 5. DROP BOTTOM OF WALLS AND PIERS TO TOP OF FOOTINGS TO OBTAIN FULL EXTENT OF CONTACT, UNLESS OTHERWISE SHOWN.
- 6. CENTERLINE OF FOOTINGS SHALL BE CENTERLINE OF WALLS, PIERS AND COLUMNS, UNLESS OTHERWISE SHOWN.
- 7. NO BACKFILLING SHALL BE DONE AGAINST FOUNDATION AND RETAINING WALLS UNTIL CONCRETE HAS ATTAINED AT LEAST 75% OF ITS DESIGN STRENGTH. BEFORE BACKFILLING, PROVIDE BRACING FOR WALLS SUSTAINING MORE THAN 3 FEET OF EARTH PRESSURE. THIS BRACING SHALL REMAIN IN PLACE UNTIL ALL SLABS AND BEAMS FRAMING INTO WALL HAVE BEEN PLACED AND SET.
- 8. IN NO CASE SHALL BULLDOZERS OR OTHER HEAVY EQUIPMENT BE PERMITTED CLOSER THAN 5 FEET FROM ANY FOUNDATION WALL. IF IT IS NECESSARY TO OPERATE SUCH EQUIPMENT CLOSER THAN 8 FEET TO THE WALL, THE CONTRACTOR SHALL BE THE SOLE RESPONSIBLE PARTY AND AT THEIR OWN EXPENSE SHALL PROVIDE ADEQUATE SUPPORTS OR BRACE THE WALL TO WITHSTAND THE ADDITIONAL LOADS SUPERIMPOSED FROM SUCH EQUIPMENT.
- 9. CONTRACTOR SHALL BE RESPONSIBLE TO ADEQUATELY PROTECT ALL EXCAVATION SLOPES. WHERE NECESSARY, SHEETING AND SHORING OF EXCAVATION SHALL BE PROVIDED WITH ALL REQUIRED TIEBACKS AND BRACING.
- 10. METHODS EMPLOYED IN ALL SHEETING AND SHORING SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT.
- 11. MATERIAL FOR CONTROLLED FILL SHALL MEET THE FOLLOWING CRITERIA: SELECT EXCAVATED GRAVEL OR STONE MATERIALS FREE OF ORGANIC MATERIAL, LOAM, TRASH, SNOW, ICE, FROZEN SOIL, AND OTHER OBJECTIONABLE MATERIAL, CONFORMING TO THE GRADATION REQUIREMENTS AS FOLLOWS:

SIEVE SIZE	%PASSING (BY WEIGHT)	
3-1/2"	100 %	NOTE:
3/4"	50-100 %	THE FRACTION PASSING THE NO. 200 SIEVE SHALL BE LESS
#4	25-75 %	THAN 15% OF THE FRACTION PASSING THE NO. 4 SIEVE

- 12. ON-SITE EXCAVATED MATERIAL MAY ONLY BE SUITABLE FOR USE AS GRANULAR FILL IF IT CONFORMS TO THE SPECIFICATIONS NOTED AND IS APPROVED FOR USE BY THE GEOTECHNICAL ENGINEER. REFER TO GEOTECHNICAL REPORT FOR MORE INFORMATION.
- 13. STRUCTURAL FILL MATERIAL SHOULD BE PLACED IN UNIFORM 12" THICK LOOSE LIFTS AND COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY, AT OPTIMUM MOISTURE CONTENT, IN ACCORDANCE WITH ASTM D1557-00. IN RESTRICTED AREAS WHERE ONLY HAND-OPERATED EQUIPMENT IS PERMITTED, THE MAXIMUM LOOSE LIFT SHALL BE 8".
- 14. SOIL COMPACTION SHALL BE CONTROLLED BY A QUALIFIED TESTING LABORATORY OR GEOTECHNICAL ENGINEER AS PART OF SPECIAL INSPECTIONS. TAKE A MINIMUM OF ONE FIELD DENSITY TEST FOR EACH LAYER. LOCATION OF TEST SHALL BE DETERMINED BY THE TESTING AGENCY.
- 15. PROVIDE A MINIMUM 6" THICK LAYER OF 3/4" CLEAN CRUSHED STONE WITH A LAYER OF GEO-FABRIC UNDER SLAB ON GRADE.
- 16. REMOVE ALL FROST DISTURBED SOILS AT 2'-0" BELOW EXISTING GRADES. REMOVE ALL EXISTING FILLS. PLACE ALL FOOTINGS ON NATURAL INORGANIC SOILS. EXTEND CONTROLLED FILL HORIZONTALLY THE SAME AS VERTICALLY.

### **REINFORCED CONCRETE NOTES**

- - SLABS, AREA PAVI Α. WATER TIGHT CON MACHINERY FOUN
  - STATIONARY EQUI STRUCTURES AND MISC CONCRETE FILL AND UNDERGROUND DUCT BANKS 2,000

- GRADE 50.
- LIFTS DURING CONCRETE PLACEMENT TO ENSURE PROPER POSITION IN SLAB.
- ALL BARS.
- -LAP GRADE BEAM AND WALL BOTTOM HORIZONTAL REINFORCEMENT AT SUPPORT
- SLABS ..... 3/4 IN.
- WALLS ..... 1 IN. COLUMNS .... 1-1/2 IN. ALL CONCRETE EXPOSED TO EARTH/ WEATHER...... 2 IN.
- SUBMIT SHOP DRAWINGS SHOWING CONSTRUCTION JOINT DETAILS, LOCATIONS AND THE SEQUENCE
- LENGTH OF CONCRETE PLACEMENT.

GRADE BEAMS: AT CENTERLINES BETWEEN SUPPORTS

- THE ENGINEER.
- DRAWINGS FOR FIELD USE.
- BONDING AGENT AS REQUIRED.

- ANCHOR RODS.
- INDEPENDENT TESTING AGENCY RETAINED BY THE OWNER FOR THE FOLLOWING ITEMS:
- A. INSPECT BOTTOM OF FOOTING SOIL CONDITIONS B. INSPECT FORMWORK AND PLACEMENT OF CONCRETE
- C. TESTING FRESH CONCRETE IN THE FIELD PER ASTM C-172, MODIFIED FOR SLUMP BY ASTM C-94
- EACH TYPE OF CONRETE.
- E. TEST AIR CONTENT PER ASTM C-173 (VOLUMETRIC METHOD) OR ASTM C-231 (PRESSURE METHOD),
- F. COMPRESSION TEST CYLINDERS PER ASTM C-31 (4-CYLINDERS)
- G. TEST CONCRETE TEMPERATURE EACH TIME A SET OF CYLINDERS IS CAST H. COMPRESSION STRENGTH TEST PER ASTM C-39:
- a. ONE CYLINDER TESTED AT 7 DAYS
- b. TWO CYLINDERS TESTED AT 28 DAYS

- APPROVAL.
- NON-SHRINK, NON-METALIC TYPE.
- 30. DETAILING OF REINFORCEMENT SHALL BE PERFORMED USING STANDARD END HOOKS AND WITH LAP SPLICE &

1. STRUCTURAL CONCRETE AND CONCRETING PRACTICES SHALL CONFORM WITH ACI-318, "AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" LATEST EDITION. DETAILS SHALL BE IN ACCORDANCE WITH ACI-315, "DETAILS AND DETILING OF CONCRETE REINFORCEMENT" UNLESS OTHERWISE NOTED ON THE DRAWINGS. ALL ACI REQUIREMENTS FOR HOT AND COLD WEATHERING CONCRETING MUST BE ADHERED TO.

2. ALL CAST-IN-PLACE CONCRETE MIXES SHALL HAVE A MINIMUM 28 DAYS COMPRESSIVE

/ LE 0/ (0 )		
STRENGTI	H AS FOLLOWS UNLESS OTHERWISE NOTED ON DRAWINGS:	
		f'c (PSI) (28 DAY)
А.	SLABS, AREA PAVING, AND ROADS	4,000
В.	WATER TIGHT CONCRETE	4,000
С.	MACHINERY FOUNDATIONS	4,000
D.	STATIONARY EQUIPMENT FOUNDATIONS	4,000
E.	STRUCTURES AND THEIR FOUNDATIONS	4,000
<b>–</b>		2 000

3. ALL CONCRETE EXPOSED TO WEATHER SHALL HAVE AN AIR-ENTRAINING AGENT.

4. REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60 UNLESS REQUIRED TO BE WELDED AS SHOWN ON PLANS. ALL REINFORCING BARS REQUIRED TO BE WELDED SHALL CONFORM TO ASTM A706,

5. WELDED WIRE FABRIC (W.W.F.) SHALL CONFORM TO ASTM A185. SUPPORT FABRIC WITH CHAIRS OR

6. ALL REINFORCEMENT SHALL BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF RQUIRED, ADDITIONAL BARS OR STRIRRUPS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR

7. ALL REINFORCING BARS SHALL BE LAPPED AS SPECIFICALLY DETAILED ON THE DRAWINGS. SPLICING & EMBEDMENTS SHALL BE IN ACCORDANCE WITH ACI 318 WHERE NOT SPECIFICALLY DETAILED/ INDICATED ON THE DRAWINGS. ALL REINFORCING BARS SHALL BE LAPPED USING THE TENSION SPLICE (LTS) AND COMPRESSION SPLICE (LCS) LENGTHS NOTED IN THE LAP SPLICE SCHEDULE.

-LAP GRADE BEAM AND WALL TOP HORIZONTAL REINFORCEMENT AT CENTER OF SPAN

-LAP INSIDE FACE WALL VERTICAL REINFORCEMENT AT SUPPORT

-LAP OUTSIDE FACE VERTICAL WALL REINFORCEMENT AT MID-HEIGHT OF WALL

-UNLESS NOTED OTHERWISE, TERMINATE BARS AT DISCONTINUOUS ENDS WITH STANDARD HOOKS -ALL HOOKED BARS NOT DIMENSIONED SHALL BE STANDARD HOOKS

8. MINIMUM CONCRETE COVER SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE ON THE DRAWINGS:

### ALL CONCRETE CAST AGAINST EARTH (NO FORMWORK).... 3 IN.

9. PROVIDE CONSTRUCTION JOINTS IN ACCORDANCE WITH ACI-318, CHAPTER 6.4

OF POURS FOR THE STRUCTURAL ENGINEER'S REVIEW PRIOR TO BEGINNING WORK. 10. WALL AND GRADE BEAM CONSTRUCTION JOINTS SHALL BE LOCATED TO PROVIDE A 60-FOOT MAXIMUM

11. VERTICAL CONSTRUCTION JOINTS IN GRADE BEAMS AND WALLS SHALL BE USED ONLY WITH PRIOR APPROVAL OF THE ENGINEER (SEE NOTE 9 ABOVE) AND SHALL BE LOCATED AS FOLLOWS:

FOUNDATION WALLS: MINIMUM 8'-0" FROM ANY COLUMN LINE OR WALL OPENING

12. NO HORIZONTAL CONSTRUCTION JOINTS WILL BE PERMITTED IN BEAMS, WALLS AND SLABS UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS OR APPROVED IN WRITING PRIOR TO CONSTRUCTION BY

13. NO CONCRETE TEST WILL BE ACCEPTED IF CONCRETE IS TAMPERED WITH IN ANY WAY AFTER SAID TEST IS PERFORMED. REPEAT TEST IF WATER IS ADDED AFTER INITIAL SAMPLING.

14. THE CONTRACTOR SHALL PROVIDE REINFORCING STEEL ERECTOR WITH A SET OF APPROVED SHOP

15. ALL ADJOINING SURFACES NOT CAST MONOLITHICALLY SHALL BE ROUGHENED TO 1/4 INCH AMPLITUDE FOR THE ENTIRE INTERSECTING SURFACE ACCORDING TO ACI RECOMMENDATIONS AND APPLY A

16. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS AND LOCATIONS OF ALL OPENINGS. PIPE SLEEVES. CURBS, ETC., AS REQUIRED BY OTHER TRADES BEFORE CONCRETE IS PLACED.

17. CONTRACTOR SHALL COORDINATE LOCATION OF INSERTS, WELDED PLATES AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE WITH ARCHITECTURAL, MECHANICAL AND STRUCTURAL DRAWINGS.

18, CONTRACTOR SHALL COORDINATE LOCATION OF FLOOR DRAINS, CURBS, CONCRETE PADS, FLOOR DEPRESSIONS, ETC. WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.

19. HORIZONTAL PIPES OR CONDUITS PLACED IN SLABS SHALL NOT BE SPACED CLOSER THAN 3 x THE DIAMETER OF CENTER, PIPE AND CONDUITS PLACED IN SLABS SHALL NOT HAVE AN OUTSIDE DIAMETER LARGER THAN 1/3 OF SLAB THICKNESS. ALUMINUM CONDUITS SHALL NOT BE PLACED IN CONCRETE. NO CONDUITS SHALL BE PLACED IN THE SLAB WITHIN 12 INCHES OF ANY COLUMN FACE.

20. CONTRACTOR SHALL USE RIGID STEEL TEMPLATES (SUPPLIED BY THE STEEL FABRICATOR) TO INSTALL

21. ALL CONCRETE WORK, REINFORCING, PLACEMENT, AND FORMWORK SHALL BE INSPECTED BY AN

D. SLUMP TEST PER ASTM C-143, ONE TEST AT POINT OF DISCHARGE FOR EACH DAYS POUR FOR

ONE TEST FOR EACH DAYS POUR FOR EACH TYPE OF CONCRETE.

ONE SET FOR EACH DAYS POUR + ADDITIONAL SETS FOR EACH 50-CUBIC YARDS OVER AND

ABOVE THE IRST 25-CUBIC YARDS USING THE FOLLOWING ORDER:

c. ONE CYLINDER RETAINED FOR LATER TESTING, IF REQUIRED

22. ANCHOR BOLT STEEL SHALL CONFORM TO ASTM SPECIFICATION A36 OR A307.

23. EMBEDDED STEEL MATERIAL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE NOTED ON THE DRAWINGS.

24. EMBEDDED PIPE SLEEVES SHALL BE ASTM A53 GRADE B UNLESS OTHERWISE NOTED ON THE DRAWINGS.

25. ALL EXPOSED CORNERS SHALL HAVE 3/4" CHAMFER UNLESS NOTED ON PLAN.

26. ALL EXTERIOR CONCRETE SHALL HAVE AIR-ENTRAINING ADMIXTURE PROVIDING 4% TO 6% TOTAL AIR CONTENT. 27. ALL EXPOSED CONCRETE SURFACES SHALL BE CURED IMMEDIATELY AFTER FINISHING. CONCRETE SHALL BE

KEPT CONTINUOUSLY MOIST FOR A MINIMUM OF 7 DAYS OR APPLY TWO COATS OF CURING COMPOUND WITH A SECOND COAT APPLIED AT RIGHT ANGLE TO FIRST COAT. ALTERNATE METHODS MAY BE USED WITH PRIOR

28. GROUT UNDER ALL STRUCTURAL COLUMNS, MISCELLANEOUS BASE PLATE SUPPORTS, EQUIPMENT BASES, AROUND ANCHOR BOLTS, AND INSIDE ANCHOR BOLT SLEEVES SHALL BE PREPACKAGED, CEMENTIOUS,

29. WELDING OF REINFORCEMENT (INCLUDING TACK WELDS) SHALL NOT BE PERMITTED UNLESS NOTED ON PLAN.

EMBEDMENT LENGTHS ONLY AS INDICATED ON DRAWINGS.

31. ALL EXTERIOR SLAB SURFACES SHALL HAVE A WOOD FLOAT FINISH.

#### STRUCTURAL STEEL NOTES:

- STRUCTURAL STEEL DESIGN, FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS - ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN" AND "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (LATEST EDITIONS).
- HIGH STRENGTH BOLTING SHALL BE IN ACCORDANCE WITH AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS (LATEST EDITIONS).
- 3. ALL WELDING SHALL BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY D1.1 "STRUCTURAL WELDING CODE-STEEL" (LATEST EDITION).

#### CONNECTIONS

- 1. UNLESS SPECIFICALLY NOTED ON THE DRAWINGS, SHOP CONNECTIONS MAY BE ASSEMBLED BY EITHER BOLTING OR WELDING.
- 2. BOLTED CONNECTIONS FOR PRIMARY STRUCTURAL MEMBERS SHALL BE BOLTED WITH HIGH STRENGTH BOLTS CONFORMING TO ASTM A 325 UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- BOLTED CONNECTIONS FOR SECONDARY STRUCTURAL MEMBERS (PURLINS, GIRTS, STAIR 3. FRAMING, STAIR BRACING, TOE PLATE, HANDRAIL, LADDERS, ETC) USING GREATER THAN 5/8" DIA. BOLTS SHALL BE BOLTED WITH HIGH STRENGTH BOLTS CONFORMING TO ASTM A 325, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- 4. ALL HIGH STRENGTH BOLTED CONNECTIONS SHALL BE BEARING TYPE WITH THREADS INCLUDED IN SHEAR.
- HIGH STRENGTH BOLT SIZES SHALL BE 3/4 INCH DIAMETER MINIMUM (UNO).
- THICKNESS OF GUSSET AND STIFFENER PLATES, IF NOT CALLED FOR ON THE DRAWINGS, SHALL BE INCH MINIMUM.
- WORKING POINTS FOR HORIZONTAL BRACING CONNECTIONS SHALL BE THE CENTERLINE OF THE INTERSECTING HORIZONTAL BEAMS UNLESS NOTED OTHERWISE ON THE DRAWINGS. HORIZONTAL BRACING SHALL BE CONNECTED TO TWO (2) BEAMS WHEREVER POSSIBLE.
- 8. WORKING POINTS FOR VERTICAL BRACING CONNECTIONS SHALL BE THE CENTERLINE OF BEAM AND CENTERLINE OF COLUMN, UNLESS NOTED OTHERWISE ON THE DRAWINGS. VERTICAL BRACING SHALL BE CONNECTED TO BOTH BEAM & COLUMN.
- GRATING SHALL BE CONNECTED TO SUPPORT BEAMS WITH SADDLE CLIPS & SELF-TAPPING 9. SCREWS. FRICTION CLIPS ARE NOT PERMITTED.
- 10. USE 4-BOLT MINIMUM FOR WT BRACE CONNECTIONS AND 2-BOLT MINIMUM FOR ANGLE BRACE CONNECTIONS
- 11. SURFACES OF STRUCTURAL STEEL SHALL NOT RECEIVE SHOP-APPLIED PAINT WITHIN 4" OF FIELD WELDS.
- 12. WHERE FIELD WELDS WILL BE DONE ON EXISTING STEEL ALL EXISTING COATINGS SHALL BE CONSIDERED TO BE LEAD BASED. AN APPROVED CONTRACTOR SHALL STRIP EXISTING SURFACE COATINGS AND THE REMOVAL PROCEDURE SHALL COMPLY WITH OSHA STANDARD 1926.354. EXISTING COATING SHALL BE REMOVED A MINIMUM OF 4" FROM THE AREA TO BE WELDED. ALL EXPOSED AREAS SHALL BE PAINTED AFTER THE COMPLETION OF WORK.
- 13. IF BEAM REACTIONS ARE NOT SHOWN ON THE DRAWINGS, CONNECTIONS SHALL BE DETAILED TO SUPPORT ONE-HALF THE TOTAL UNIFORM LOAD CAPACITY SHOWN IN TABLES OF 'UNIFORM LOAD', FOR THE GIVEN BEAM, SPAN & GRADE OF STEEL SPECIFIED. THESE TABLES SHALL BE AS LISTED IN AISC 'MANUAL OF STEEL CONSTRUCTION'.

#### MATERIALS

- STRUCTURAL STEEL "W" "WT" AND "S" SHAPES SHALL CONFORM TO ASTM A 992, GRADE 50. ALL CHANNELS, ANGLES AND PLATES SHALL CONFORM TO ASTM A 36 UNLESS NOTED OTHERWISE.
- HIGH STRENGTH BOLTS, NUTS AND HARDENED WASHERS SHALL CONFORM TO ASTM A 325, ASTM A 563 DH, AND ASTM F 436 RESPECTIVELY. MACHINE BOLTS AND NUTS SHALL CONFORM TO ASTM A 307, AND PLAIN WASHERS SHALL CONFORM TO ANSI B18.22.1.
- WELDING ELECTRODES USED FOR FIELD CONNECTIONS SHALL CONFORM TO AWS A5.1, CLASS 3 E70XX UNLESS NOTED OTHERWISE ON THE DRAWINGS. WELDING ELECTRODES USED FOR SHOP CONNECTIONS SHALL CONFORM TO AWS A5.1. WITH A MINIMUM ELECTRODE TENSILE STRENGTH OF 70 KSI, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- GRATING SHALL BE WELDED STEEL BAR TYPE WITH 1 INCH X INCH BEARING BARS SPACED AT 1 CENTER TO 4 16 16 CENTER, UNLESS NOTED OTHERWISE ON THE DRAWINGS. CROSS BARS SHALL BE SPACED AT 4 INCHES CENTER TO CENTER. ALL BEARING BARS AND CROSS BARS SHALL BE WELDING QUALITY MILD CARBON STEEL AND SHALL CONFORM TO ASTM A 569. GRATING SHALL BE HOT-DIPPED GALVANIZED.
- CHECKERED FLOOR PLATE SHALL BE FOUR WAY RAISED PATTERN STEEL PLATE OF THE THICKNESS CALLED FOR ON THE DRAWINGS, PLATE MATERIAL SHALL CONFORM TO ASTM A 36 OR ASTM A786. HOLLOW STRUCTURAL STEEL (HSS): ASTM A500 GRADE B, MIN. YIELD STRENGTH OF 42 KSI FOR PIPES, 46 KSI FOR TUBES
- ALL STRUCTURAL STEEL, MISCELLANEOUS STEEL, HANDRAIL AND LADDERS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION (UNLESS NOTED OTHERWISE) IN ACCORDANCE WITH SPECIFICATION (LATER)
- ALL BOLTS SHALL CONFORM TO ASTM A325 OR A490, NUTS SHALL CONFORM TO ASTM A563 AND WASHERS SHALL CONFORM TO ASTM A-F436.
- 8. ALL ANCHOR BOLTS/RODS SHALL CONFORM TO ASTM F-1554 GRADE 36 WITH WELD ABILITY
- SUPPLEMENT S1, UNLESS OTHERWISE NOTED. SUBMIT GRADE CERTIFICATIONS FOR RECORD. STEEL SUPPLIER SHALL SUPPLY RIGID STEEL TEMPLATES FOR ANCHOR ROD INSTALLATION.
- 10. OVERSIZED OR SLOTTED HOLES SHALL NOT BE USED FOR ANY CONNECTIONS UNLESS SPECIFICALLY INDICATED ON THE DRAWINGS OR APPROVED IN WRITING BY THE ENGINEER.
- 11. ALL BUTT AND FULL PENETRATION WELDS SHALL BE MADE USING RUN OFF TABS WHICH SHALL BE REMOVED AND GROUND SMOOTH AFTER WELD IS COMPLETED.
- 12. ALL WELD BACK UP BARS SHALL BE REMOVED AND GROUND SMOOTH AFTER WELD IS COMPLETED, UNLESS NOTED OTHERWISE.
- 13. ALL WELDS INDICATED SHALL MEET THE MINIMUM WELD SIDE SPECIFIED BY THE AISC MANUAL OF STEEL DESIGN. (SINGLE PASS AS REQUIRED)
- 14. ALL WELDS SHALL BE PERFORMED BY QUALIFIED WELDERS IN ACCORDANCE WITH A.W.S. SPECIFICATIONS, LATEST EDITIONS. ALL WELDING ELECTRODES SHALL CONFORM TO A.W.S. A5.1 GRADE E-70. BARE ELECTRODES AND GRANULAR FLUX SHALL CONFORM TO A.W.S. A5.17, F70 A.W.S. FLUX CLASSIFICATION.
- 15. ALTERNATE CONNECTIONS WILL BE ACCEPTED ONLY WITH THE WRITTEN APPROVAL OF THE ENGINEER. HOWEVER, THE ENGINEER SHALL BE THE SOLE JUDGE OF THE ACCEPTABILITY AND THE CONTRACTOR'S BID SHALL ANTICIPATE THE USE OF THOSE SPECIFIC DETAILS SHOWN ON THE DRAWINGS. IN ANY EVENT THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF SUCH ALTERNATE DETAILS WHICH THEY PROPOSE.
- 16. SHOP AND FIELD CONNECTIONS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE BOLTED OR WELDED.

STRUCTURAL STEEL NOTES (CONT.) 15. WHEN NOT SPECIFICALLY DETAILED ELSEWHERE ON THE DRAWINGS, ALL BEAM TO		PEMENT
BEAM AND BEAM TO COLUMN CONNECTIONS SHALL BE DETAILED AS SHOWN IN THE TYPICAL BEAM CONNECTION DETAILS.		DEVELOF
The reaction of the reaction of the reaction of the reaction denoted by the "GRAVITY SHEAR REACTION" SYMBOL ON THE PLANS. PROVIDE A MINIMUM 2 BOLT CONNECTION.		ESIGN E
17. FILLER BEAMS SHOULD BE SPACED EQUALLY BETWEEN THE SUPPORTS UNLESS OTHERWISE NOTED ON THE DRAWINGS.		D 30% D SIGN DE
18. ALL HOLES AND CUTS SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.		UPDATE 30% DES Descriț
19. STEEL MEMBERS INDICATED ON THE DRAWINGS TO BE ENCASED IN CONCRETE SHALL BE UNPAINTED ON THE CONTACT SURFACES AND SHALL BE WRAPPED WITH A MINIMUM 6X6-W2.9xW2.9 W.W.F. REINFORCING UNLESS OTHERWISE NOTED.		2.0.0
20. THE STRUCTURAL STEEL CONTRACTOR SHALL COORDINATE THE BOTTOM OF BASE PLATE ELEVATION WITH THE TOP OF CONCRETE ELEVATION.		01/15/2 12/31/2 Date
21. THE MAXIMUM LOAD HUNG FROM ANY BEAM FOR MEP DUCTWORK, PIPING ETC SHALL BE DISTRIBUTED TO THE BEAM'S TRIBUTARY AREA IN A WAY THAT THE ALLOWABLE DESIGN LOADS LISTED IN THE GENERAL NOTES ARE NOT EXCEEDED. THE CONTRACTOR SHALL COORDINATE THE LOADS OF ALL TRADES AND PROVIDE ADDITIONAL SUPPORT OR DISTRIBUTION FRAMING AS REQUIRED TO ACHIEVE THESE LOADS.		Rev.
22. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS, MECHANICAL DRAWINGS AND DRAWINGS RELATED TO OTHER TRADES. THE GENERAL CONTRACTOR IS RESPONSIBLE TO CHECK AND COORDINATE DIMENSIONS, CLEARANCES, ETC., WITH THE WORK OF THE OTHER TRADES.		
23. PROVIDE ANY TEMPORARY BRACING OR GUYS TO PROVIDE LATERAL SUPPORT OF THE STRUCTURES AND INDIVIDUAL ELEMENTS UNTIL PERMANENT FRAME IS COMPLETELY INSTALLED.		
24. ALL STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE GALVANIZED.		
25. ALL TUBE & PIPE SECTIONS EXPOSED TO WEATHER SHALL HAVE OPEN ENDS CAPPED WITH 1/4" PLATE.	1 Street 06437	3-8596 ille.com LLC
26. ALL STRUCTURAL STEEL TO RECEIVE SPRAY APPLIED FIRE PROTECTION SHALL BE LEFT UNCOATED.	Vhitfield rd, CT (	203) 45. nfo@icds <b>ions,</b>
27. FOR EXPOSED INTERIOR STRUCTURAL STEEL, REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR SURFACE PREPARATION AND FINISH REQUIREMENTS.	419A W Guilfor	Phone:( Email: i Solut
28. STEEL FABRICATOR SHALL COORDINATE ALL HOLE LOCATIONS FOR SIMPSON TIE DOWN ANCHORS. ALL HOLES SHALL BE SHOP DRILLED THROUGH BEAM FLANGES.	7	Vesign
CONSTRUCTION METHODS:		
1. BOTTOM OF EXCAVATION FOR SPREAD FOUNDATIONS AND MATS SHALL BE INSPECTED BY A QUALIFIED GEOTECHNICAL ENGINEER. ADDITIONAL UNDERCUT DEPTHS, IF REQUIRED, SHALL THEN BE DETERMINED. LIMITS OF BACKFILL SHALL EXTEND BEYOND FOUNDATION PERIMETER 1.5 TIMES THE UNDERCUT DEPTH.		truction
<ol> <li>BACKFILL MATERIAL SHALL BE AS SPECIFIED AND PLACED IN 8" MAXIMUM LIFTS. ALL</li> <li>BACKFILL WILL BE COMPACTED TO THE FOLLOWING PERCENT OF THE MAXIMUM</li> <li>DENSITY OBTAINED ACCORDING TO ASTM DENSITY TEST D-1557C.</li> <li>95 PERCENT OF MAXIMUM DRY DENSITY BELOW THE BASE OF FOOTINGS.</li> <li>95 PERCENT OF MAXIMUM DRY DENSITY BELOW SLABS.</li> </ol>		ative Cons
3. COORDINATE CONCRETE WORK WITH PLUMBING, PIPING, ELECTRICAL AND MECHANICAL WORK PRIOR TO PLACING CONCRETE.		noon
4. CONSTRUCTION JOINTS SHALL BE MADE AT THE LOCATIONS AND IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS. GRADE BEAM CONSTRUCTION JOINTS SHALL BE MADE NEAR THE MID-SPAN OF THE BEAM.	<u>├</u>	
5. LOCATIONS AND DETAILS OF JOINTS FOR SLABS AT GRADE ARE SHOWN ON THE DRAWINGS. SAWED CONTROL JOINTS SHALL BE SAWED WITHIN 12 TO 24 HOURS AFTER PLACING CONCRETE.		
EXCAVATION NOTES:		
1. THE CONTRACTOR WILL DETERMINE THE LOCATION OF ALL EXISTING UNDERGROUND UTILITY LINES BEFORE EXCAVATION OPERATIONS. EXISTING UTILITY LINES KNOWN TO THE CONTRACTOR BEFORE EXCAVATION AND UTILITY LINES UNCOVERED DURING EXCAVATION OPERATIONS, WILL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND BACK FILLING AND, IF DAMAGED, WILL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE C/M, AT NO ADDITIONAL COST TO THE OWNER. NOTIFY THE C/M OF UNEXPECTED SUBSURFACE CONDITIONS AND STOP AFFECTED WORK IN AREA UNTIL NOTIFIED TO RESUME WORK.	N FUEL E. BPT., C	NOTES
2. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF TEMPORARY SHORING TO SUPPORT THE EXCAVATION AS REQUIRED. CONTRACTOR SHALL EXCAVATE WITH CARE SO NOT TO UNDERMINE EXISTING FOUNDATIONS.	6M AVE	SAL N
SPECIAL INSPECTIONS	AN AN	Ц Ц Ц
THE FOLLOWING CONTROLLED INSPECTIONS ARE REQUIRED TO BE PERFORMED IN ACCORDANCE WITH THE BUILDING CODE OF THE STATE OF CONNECTICUT, LATEST EDITION.	ST C	CT
ITEM: CONCRETE CONSTRUCTION STEEL CONSTRUCTION	L'ANNA	RU
CONTRACTORS DESIGN RESPONSIBILITY	Ц Ц Ц Ц Ц Ц Ц Ц Ц	ST
<ol> <li>THE LISTED BELOW PROJECT ITEMS ASSOCIATED WITH FABRICATION, ERECTION AND CONTRACTORS MEANS AND METHODS AND REQUIRING STRUCTURAL DESIGN ARE THE RESPONSIBILITY OF THE CONTRACTOR.</li> </ol>	С 000 000	
<ol> <li>THE CONTRACTOR SHALL RETAIN THE SERVICES OF STRUCTURAL PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF CONNECTICUT TO PERFORM THE DESIGN OF THESE ITEMS.</li> </ol>		
<ol> <li>CALCULATIONS FOR ITEMS MARKED THUS (*) SHALL BE SUBMITTED FOR REVIEW AND APPROVAL TO THE ENGINEER OF RECORD, OTHERWISE THE ITEMS SHALL ONLY BE SUBMITTED FOR THE OWNERS RECORD:</li> </ol>	B	
A. STEEL SHOP DRAWING B. CONCRETE MIX DESIGN C. REINFORCING STEEL PLACEMENT PLAN	Project No.:	Drawn By: KFH
C. REINFORGING STEEL PLACEMENT PLAN	Date: 12/31/20	Design By:
	12/31/20 Scale:	CAB Check By:
	AS NOTED	САВ
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30% DESIGN DEVELOPMENT		
		J.U



1 FOUNDATION PLAN Scale: 1/8" = 1'-0"

NOTES: . FOR GENERAL . REFER TO DRA . REFER TO GEN ELECTRICAL DI LOCATIONS & C	CONCRETE NOTES REFER TO DRAWING S0.0 WING S3.0 FOR FOOTING TYPES. IERAL ARRANGEMENT, MECHANICAL AND RAWINGS FOR ALL UNDERGROUND UTILITY GRADE BEAM SLEEVE PENETRATIONS.			B01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTDD12/31/20	Rev. Date Description
			19A Whitfield Street     419A Whitfield Street       Guilford, CT 06437	Innovative Construction & Design Solutions, LLC	
			BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	STRUCTURAL CONCRETE	
		F  _ _	Date: 12/31/20 Scale: AS NOTED	Drawn By: KFH Design By: CAB Check By: CAB	
	30% DESIGN DEVELOP	MENT FION	Drawing No.:	.0	





└── RETAINING WALL



GROUND FLOOR PLAN EL. 15'-0" (H.P.)

Scale: 1/8" = 1'-0"

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### 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL CONCRETE NOTES REFER TO DRAWING S 0.0





 SECOND FLOOR SLAB PLAN

 T.O.S. EL. (34'-5") U.O.N.

 Scale: 1/8" = 1'-0"

		3 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	ev. Date Description
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# NOTES:

1. FOR GENERAL CONCRETE NOTES REFER TO DRAWING S 0.0





# 1CONCRETE THIRD FLOOR PLANT.O.S. EL. (54'-5") U.O.N.Scale: 1/8" = 1'-0"

		01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	12/31/20 30% DESIGN DEVELOPEMENT	Date Description
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## NOTES:

1. FOR GENERAL CONCRETE NOTES REFER TO DRAWING S 0.0





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# SECOND FLOOR FRAMING PLAN T.O.S. EL. (34'-5") U.O.N. Scale: 1/8" = 1'-0"

## DESIGN LOADS:

1

FUEL CELL:	180 PSF
4" HOUSEKEEPING PAD:	50 PSF
6" (AVG.) CONC:	75 PSF
STEEL (INCL. FORM DECK):	25 PSF
HUNG LOAD:	20 PSF
TOTAL:	350 PSF

	<ul> <li>GENERAL NOTES:</li> <li>1. FORM DECK SHALL BE VULCRAFT 2C CONFORM, NON-COMPOSITE FORM DECK AT 4'-8" CENTER TO CENTER SPAN.</li> <li>2. DECK SHALL BE WELDED AS PER SDI REQUIREMENTS.</li> <li>3. ATTACHMENT OF DECK TO SUPPORTING STRUCTURAL MEMBERS SHALL BE AS FOLLOWS:</li> <li>4. 5/8" DIAMETER PUDDLE WELDS AT 12" AT ALL CROSS MEMBERS (MINIMUM 4 PER SHEET, USE WELD PATTERN 36/4).</li> <li>5. #12 SELF-DRILLING SCREWS AT MID-SPAN OF SIDE JOINTS (3'-0" O/C MAX.). 5/8" DIAMETER PUDDLE WELDS AT 2'-0" AT PERIMETERS. SPLIT OF PARTIAL PANELS SHALL BE ATTACHED TO SUPPORTING MEMBERS AT EACH VALLEY.</li> <li>6. WELD WASHERS SHALL NOT BE USED FOR DECK WITH THICKNESS GREATER THAN 22 GAGE.</li> <li>7. DESIGN OF DECK IS BASED ON UNSHORED CONDITIONS.</li> </ul>		D1/15/21UPDATED 30% DESIGN DEVELOPEMENT12/31/2030% DESIGN DEVELOPEMENTDateDescription
;	<ol> <li>REFER TO DRAWING S2.0 FOR GENERAL STRUCTURAL STEEL NOTES.</li> <li>MC## DENOTES MOMENT CONNECTION TYPE. SEE DRAWING S3.5 FOR MC DETAILS.</li> <li>STEEL FABRICATOR TO PROVIDE THIRD PARTY DESIGN AND CALCS. BY CT. P.E. FOR EOR APP.</li> </ol>	treet 437	596 com CC B A A Rev.
-C Removable		419A Whitfield St Guilford, CT 062	Innovative Construction & Design Solutions, Li
-B - DENOTE CONNE(		RIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	SECOND FLOOR FRAMING PLAN
	30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION	Project No.: Date: 12/31/20 Scale: AS NOTED Drawing No.: Scale:	Drawn By: KFH Design By: CAB Check By: CAB





		5)	17	7'-2 <u>1</u> "		(	6		17'-	-2 <u>1</u> "		7		17'	-2 <u>1</u> "			3)		18'-8	3 <u>1</u> "					18	6'-9"		(1	0
8.5																							2D							
INT	<u>PL.</u> _		62 + BE	ent pl			<u> </u>	24x6	2 + BEN	NT PL.		v	V24x6	62 + BEI	NT PL.			<b>-</b> W2	4x62 +	BENT	PL.			<b>-</b> W2	24x62 -	+ BEN	Γ PL.			<u> </u>
			(50)			•	T		(50)			1		(50)					(5)	0)		-				50)			-	
									- <u>-</u> 	  - 18 GA																				
				 0	 ما			 1	۲` 		-UK	 ഗ	 ک	۔۔۔۔۔ د			2		Г   Ю	 م									NT PL.	
W24X5 (30)	W24x5	(30) W24x5	(30)	(30) (30)	W24x5	( <u>30)</u> W24x5	(30)	W24X5	(30) W24x5	(30) M2445	(30)	W24x5 (30)	W24x5	(30) W24x5	(30)	W24x5 (30)	W24x5	(30)	W24x5 (30)	W24x5	(30)	W24x5 (30)	W24x5	(30)	W24x5 (30)	W24x5	(30)	W24x5 (30)	(55 + BE	- (30)-
																													W24)	
-+-						]									!				L.L								!			
w	<u>36x182</u>		 	<u> </u>		1		 		<u> </u>	W36x1	82			<u> </u>	<u> </u>				<u> </u>	N36x21	10					<u> </u>		<u> </u>	¦ ≢— - —
	(100)										(100)	,						7			(100)								JT PL.	
W18x40 (20)	W18x40	(20) W18x40	(20)	(20)	W18x40	- (20) 	(20)	W18x40	(∠∪) W18x40	(20) //18×40	(20)	<u>W18x40</u> (20)	W18x40	(20) W18x40	(20)	<u>W18x40</u> (20)	W18x40	(20)	W18x40 (20)	W18x40	(20)	<u>W18x40</u> (20)	W18x40	(20)	W18x40 (20)	W18x40	(20)	W18x40 (20)	10 + BEN	(20)
																											<sup>1</sup>		W18x4	
	4'-4"	<u> </u>	4'-4"	- 4'-	-4" -	4'-2 <u>1</u> " 	4'-4	4"	4'-4"	4'-4"	4'-4"	- 4'	-4"	4'-4"	4'-4"	, 4' 	-2 <u>1</u> "	4'-8'	' 4 	'-8"	4'-8" -		-8 <u>1</u> " -8 <u>1</u> "	4'-8' -		4'-8" -	4'-8		4'-9" <u>-</u>	-
	_													<b>▲</b> ]			4						_						1	
ΤΡĹ						•			W21x50	) + BENT (30)	PL.								W2	1x50 + (3	- BENT 30)	PL.		<b>-</b>	Ŵ	/21x50	+ BEN (30)	T PL.	Ĕ	<b>*</b> i
			$\searrow$	/ J \S3.4	Қ н,	ANDRA	IL							\$3.5															BRAC	

# THIRD FLOOR FRAMING PLAN T.O.S. EL. (54'-5") U.O.N. Scale: 1/8" = 1'-0"

# 

1

DESIGN LOAD	<u>S:</u>
FUEL CELL:	180 PSF
4" HOUSEKEEPING PAD:	50 PSF
6" (AVG.) CONC:	75 PSF
STEEL (INCL. FORM DECK):	25 PSF
HUNG LOAD:	20 PSF
ΤΟΤΑΙ	350 PSF

				UPDATED 30% DESIGN DEVELOPEMENT	30% DESIGN DEVELOPEMENT	Description
				01/15/21	12/31/20	Date
				۵	A	Rev.
		Guilford, CT 06437	Phone:(203) 453-8596 Email: info@icdslle.com	Innovative Construction & Design Solutions, LLC		
		OUU IKANISTAN AVE. BPT., CI		STRUCTURAL STEEL		I HIKU FLOUK FRAMING PLAN
╏╙						
Proje Date:	ct No.	/20	Draw Desig	n By: KF In By:	Н —— В	
Project Date: 1 Scale AS	ct No. 12/31 9: 5 NC	/20 /TED	Draw Desig Chec	n By: KF In By: CA k By: CA	H B B	

### NOTES:

- 1. REFER TO DRAWINGS S0.0 AND S2.0 FOR GENERAL STRUCTURAL STEEL NOTES.
- 2. MC ## DENOTES MOMENT CONNECTION TYPE. SEE DWG.
   S3.5 FOR MC DETAILS.
- STEEL FAB. TO PROVIDE THIRD PARTY DESIGN AND CALCS. BY CT P.E. FOR EOR APP.





20 PSF 18 PSF HUNG LOAD: 100 PSF LIVE LOAD: TOTAL: 150 PSF + COOLING MODULES

ND S2.0 FOR GENERAL CONNECTION TYPE. SEE DWG. RD PARTY DESIGN AND CALCS.		UPDATED 30% DESIGN DEVELOPEMENT 30% DESIGN DEVELOPEMENT Description
		01/15/21 12/31/20 <b>Date</b>
		Rev.
	Image: Alga Whitfield Street       Guilford, CT 06437	Innovative Construction & Design Solutions, LLC
	BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	STRUCTURAL STEEL ROOF FRAMING PLAN
	Project No.: Date:	Drawn By: KFH Design By:
	12/31/20 Scale: AS NOTED	CAB Check By: CAB
N DEVELOPMENT CONSTRUCTION	Drawing No.:	2.2

NOTES:

1. REFER TO DRAWINGS S0.0 AN STRUCTURAL STEEL NOTES.

2. 2. MC ## DENOTES MOMENT C S3.5 FOR MC DETAILS.

3. STEEL FAB. TO PROVIDE THIR BY CT P.E. FOR EOR APP.

30% DESIGI NOT FOR

									FOC	DTIN	GS	CHED	ULE						
				FOOTI	NGS							PIERS			ANCH	OR BOL	TS	REMARKS	COLUMN MK.
QTY.	MARK	FTG.		SIZE	S	REINFOR	CEMENT	B.O. FTG.	PIER	SIZ	ES	REIN	NF.	T.O.C.	LAYOUT		A.B.		
		TYPE	А	В	Т	TOP	BOTT.	EL.	TYPE	D	Е	DOWELS	TIES	EL.	TYPE	DIA.	PROJ.		
1	F-1	1	7'-0"	7'-0"	1'-3"	-	8-#5 E.W.	6'-0"	В	30"	30"	-	-	15'-8"	4	1"	41⁄2"	PIER AT A-1 SAME	A-10
2	F-2	1	8'-0"	8'-0"	1'-6"	-	9 <b>-</b> #6 E.W.	6'-0"	В	30"	30"	-	-	15'-8"	4	1"	4½"	PIER AT D-3 TYPE A & 24"x24	D-3, C-10
4	F-3	1	9'-0"	9'-0"	1'-9"	-	10 <b>-</b> #6 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	3	1"	41⁄2"	-	A-5, A-7, A-9, B-
2	F-3	1	9'-0"	9'-0"	1'-9"	-	10 <b>-</b> #6 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	2	1"	41⁄2"	-	A-6, A-8
3	F-4	1	10'-0"	10'-0"	2'-0"	-	11-#7 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	3	1"	41⁄2"	-	C-5, C-7, C-9
3	F-4	1	10'-0"	10'-0"	2'-0"	-	11 <b>-</b> #7 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	2	1"	41⁄2"	-	A-4, C-6, C-8
1	F-5	1	12'-0"	12'-0"	2'-3"	-	13 <b>-</b> #7 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	2	1"	41⁄2"	-	C-4
1	F-6	1	14'-0"	14'-0"	2'-9"	-	15-#8 E.W.	6'-0"	С	30"	30"	-	-	15'-8"	2	1"	41⁄2"	-	B-10
3	F-7	1	18'-0"	18'-0"	3'-6"	-	19 <b>-</b> #9 E.W.	6'-0"	A	36"	36"	-	-	13'-8"	6	1"	41⁄2"	-	B-4, B-6, B-8
1	F-8	1	23'-0"	23'-0"	3'-0"	24-#8 & 13-#8	24-#8 & 13-#8	6'-0"	S	EE PLAI	١	-	-	15'-8"					C-1, C-2, D-1, D
1	F-9	1	24'-0"	12'-0"	3'-0"	25-#8 & 13-#8	25-#8 & 13-#8	6'-0"	s	EE PLAI	1	_	-	15'-8"		1"		-	A-1, A-2

![](_page_48_Figure_1.jpeg)

![](_page_48_Figure_2.jpeg)

![](_page_48_Figure_3.jpeg)

![](_page_48_Figure_4.jpeg)

TYPE A

![](_page_48_Figure_6.jpeg)

TYPE B

![](_page_48_Figure_8.jpeg)

# ANCHOR BOLT LAYOUTS

![](_page_48_Figure_10.jpeg)

-					1. 2. 3. 4. 5. 6.	ANCHC THREA NUTS: I WASHE PLATES SLEEVE	PR BOLT DS: COU HEAVY F ERS: ST S: ASTM ES: MOL	SPEC S: ASTM JRSE SE IEX AS ANDAR A36 DED HIG	IFICAT A36 OR RIES - A STM A36 D WROL	TIONS A307 INSI B1.1 OR A307 JGHT IRON-ONE PER BOLT SITY POLYETHYLENE		
				ANC	HOF	R B	OLT	SC	HED	ULE		
NO.REQ'E	MARK NUMBER	ТҮРЕ	DIAM. D	BC LENGTH L	LT ноок н	THREAD E	PLA WIDTH W	ATE тнск's т	SLEI LENGTH S	EVE DIAM. R	NO.OF NUTS (PER BOLT	REMARKS/ DWG. SHOWN ON

COLUMN 1"GROUT (TYP) GUI F GUI F GUI F GROUT GROUT (TYP) GUI F GUI F GROUT G	T.O. PIER EL. (3)#4 TIES	419A Whitfield Street Guilford, CT 06437	Phone:(203) 453-8596Phone:(203) 453-8596Email: info@icdslle.comB01/15/21UPDATED 30% DESIGN DEVELOPEMENTB01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription
COMPACTED SUBGRADE	<u>5</u> SECTION		Innovative Construction & Desi
TION PLAN FOR RENTAION		BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	FOOTING SCHEDULE, SECTIONS & DETAIL
3-8		Project No.: Date:	Drawn By: KFH Design By:
		12/31/20 Scale: AS NOTED	CAB Check By: CAB
	30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION	Drawing No.:	3.0

![](_page_49_Figure_0.jpeg)

![](_page_50_Figure_0.jpeg)

![](_page_50_Figure_1.jpeg)

BRACED ELEVATION ALONG COLUMN LINE "A" (LOOKING NORTH)

![](_page_50_Figure_3.jpeg)

![](_page_50_Figure_4.jpeg)

![](_page_50_Figure_5.jpeg)

![](_page_50_Figure_7.jpeg)

COLUM	I RS																											
ELEVATIONS	/ A-1	A-2	A-4	A-5	A-6	A-7	A-8	A-9	A-10		<del>п</del> 1	B 4	B-6	В-8	B-10	<u>5</u>	C-2	0 4	-2 C	မှ ပ	C-7	ар С	C-9	C-10	0 1	D-2	D-3	
STAIR TOWER ROOF (T.O. STEEL EL. 85'-0") (T.O. STEEL EL. 83'-0")																												
T/GRATING EL. 75'-0" (T.O. STEEL EL. 74'-10 1/2")																												
	W12x40	W12x65	W14×90	W12x40	W14x90	W12x40	W14x90	W12x40	W12x40		W12x40	W14x109	W14x109	W14x109	W12x65	W12x40	W12x65	W14×90	W12x40	W14x90	W12x40	W14×90	W12x40	W12x40	W12X40	W12X40	W12X40	
SPLICE EL. 59'-0" SEE DETAIL BELOW 3rd FLOOR EL. 55'-0" (H.P.) (T.O. STEEL EL. 54'-5")																 												
2nd EL 00R EL 35'-0" (H.P.)																												
(T.O. STEEL EL. 34'-5")	W12x53	W14x109	W14x145	W12x65	W14x145	W12x65	W14x145	W12x65	W12x53		W12x65	W14x257	<sup>1'-4"</sup> W14x257	W14x257	W14x109	W12x53	W14x109	W14x145	W12x65	W14x145	W12x65	W14x145	W12X65	W12X65	<sup>8"</sup> W12x40	W12x40	W12x40	
(GROUND FLOOR H.P. EL. 15'-2")																												
							BO	ГТОМ ОІ	BASE	PLATE (T	YPICAL	)	4															
	A-1	A-2	A-4	A-5	A-6	A-7	A-8	A-9	A-10		<del>д</del> 1-	В 4	В-6	В-8	B-10		C-2	0 4	2 C	မှ ပ	C-7	8 0	-0 0	C-10	 - -	D-2	D-3	
BASE PLATE SIZE (inches)	A     18       B     14       T     1	22	22	18 18	22 22	18 18	22 22	18 18	18		18 18	24 24	24 24	24 24	22 22	18	22 22	22 22	18 18	22 22	18 18	22 22	18 18	18 18	18	18 14	18 14	
	1   1   1   1   1   1   1   1   1   1	$2\frac{1}{4}$	1 <del>4</del> 1 <del>5</del> 1 <del>6</del>	1 ½ 1 5 16	1 <del>4</del> 1 <del>5</del> 16	1 ½ 1 5 16	1 <del>4</del> 1 <del>5</del> 1 <del>6</del>	1 <del>1</del> 1 <del>5</del> 1 <del>6</del>	1 1 <u>5</u> 16		1 <del>½</del> 1 <del>5</del> 1 6	$2\frac{1}{2}$	2 ½ 1 <u>5</u> 1 6	$2\frac{1}{2}$ $1\frac{5}{16}$	$2\frac{1}{4}$	1 1 <u>5</u> 16	$2\frac{1}{4}$ $1\frac{5}{16}$	1 <del>4</del> 1 <del>5</del> 16	1 ½ 1 5 16	1 <del>4</del> 1 <del>5</del> 1 6	1 <del>5</del> 1 <del>5</del> 1 <del>6</del>	1 <del>4</del> 1 <del>5</del> 1 <del>6</del>	1 <del>1</del> /2 1 <del>5</del> /16	1 <del>5</del> 1 <del>5</del> 16	1 1 <u>5</u> 16	1 <u>5</u> 1 <u>16</u>	1 <u>5</u> 1 <u>5</u>	
DASE PLATE TYPE	A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	

![](_page_51_Figure_1.jpeg)

![](_page_51_Figure_2.jpeg)

BASE PLATE TYPE 'B'

## BASE PLATE TYPES

![](_page_51_Figure_5.jpeg)

![](_page_51_Figure_6.jpeg)

![](_page_51_Figure_7.jpeg)

![](_page_51_Figure_8.jpeg)

![](_page_51_Figure_9.jpeg)

![](_page_51_Figure_10.jpeg)

![](_page_51_Figure_11.jpeg)

![](_page_51_Figure_13.jpeg)

![](_page_52_Figure_0.jpeg)

![](_page_53_Picture_0.jpeg)

![](_page_53_Figure_1.jpeg)

MOMENT CONNECTION MC-1

![](_page_53_Figure_3.jpeg)

FIELD WELD IF REQ'D FOR ERECTION (TYP)

![](_page_53_Figure_10.jpeg)

![](_page_53_Picture_11.jpeg)

TYPICAL MOMENT CONNECTION DETAIL

MOMENT CONNECTION SCHEDULE															
	END PLATE							STIFFI	ENER		WEB DOUBLER REMARKS				
MARK	thick.	width	len.	weld	size	bolt Ø	thick width len.		weld	REQ'D./					
	Т	W	L	А	В	D	TS	WS	LS	С	NOT REQ'D.				
							1								

![](_page_53_Figure_13.jpeg)

	B01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription									
194 Whitfield Street         419A Whitfield Street         Guilford, CT 06437         Phone:(203) 453-8596         Phone:(203) 453-8596         Email: info@icdsllc.com         Ovative Construction & Design Solutions, LLC										
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	STRUCTURAL STEEL SECTIONS & DETAILS									
KFHDate: 12/31/20Design By: CABScale: AS NOTEDCheck By: CABDrawing No.:CAS										

#### **SCOPE OF WORK**

- 1. INSTALL ALL HOODS AND DRIP EDGES, WITH DOOSAN FURNISHED FASTENERS.
- 2. ANCHOR COOLING MODULE LEGS TO STEEL.
- 3. FURNISH AND INSTALL ALL EQUIPMENT, PIPING, INSTRUMENTATION AND CONTROLS AS SHOWN ON THE M-SERIES DRAWINGS UNLESS OTHERWISE NOTED. FUEL CELL SHALL BE PROVIDED BY DOOSAN FUEL CELL AMERICA (DOOSAN).
- 4. FURNISH AND INSTALL 1" THREADOLET AND 1" FULL PORT BALL VALVE FOR HG SUPPLY FLOW METER (BY OTHERS).
- 5. FURNISH AND INSTALL <sup>3</sup>/<sub>4</sub>" THREADOLET AND THERMOWELL FOR HG SUPPLY AND RETURN TEMPERATURE SENSORS (BY OTHERS).
- 6. INSULATE PIPING FOR HEAT CONSERVATION AND COVER FOR WEATHER PROTECTION AS PER DRAWINGS.
- 7. INSULATE ABOVE GROUND COOLING MODULE PIPING FOR PERSONNEL PROTECTION AND COVER FOR WEATHER PROTECTION.
- 8. DOOSAN SHALL FURNISH DOW FROST GLYCOL FOR COOLING MODULE AND FILL PIPING.
- 9. COMPLETE GAS PIPING FROM A NEW UTILITY GAS SERVICE.
- 10. VENT REGULATOR BLEED LINE TO 15FT AWAY FROM ANY AIR INTAKES.
- 11. INSTALL NITROGEN GAS SYSTEM (TBD).
- 12. FURNISH AND INSTALL NITROGEN PIPING FROM MANIFOLD TO FUEL CELL PER DRAWINGS. (TBD)

13. COMPLETE CITY WATER MAKEUP PIPING TO FUEL

- 14. HEAT TRACE AND INSULATE ABOVE GROUND WAT DETAIL 2 (TBD) FOR SPECIFIC APPLICATIONS.
- 15. WATER DISCHARGE PIPE TO CONDENSATE RECEIVER IN FUEL CELL YARD AS SHOWN.
- 16. BREAK ALL PIPE LINES AT FUEL CELL EQUIPMENT AND FLUSH CLEAN IN ACCORDANCE WITH FUEL CELL INSTALLATION MANUAL.
- 17. BREAK ALL PIPE LINES AT EQUIPMENT AND BLANK. PRESSURE TEST WITH AIR OR N2 AND HOLD FOR 24HRS AND PROVIDE A REPORT. COORDINATE WITH OWNER AND LOCAL BUILDING INSPECTOR TO WITNESS TESTS AS NECESSARY.
- 18. BUILD AND INSTALL MAINTENANCE PLATFORM TO COVER CM AND HG PIPING TO PROTECT PIPING AND INSULATION. INCLUDE REMOVABLE OSHA RAILS AND ACCESS TO VALVES BELOW. PLATFORM AND RAILS SHALL BE GALVANIZED (OR EQUAL) FOR WEATHER RESISTANCE.
- 19. LABEL ALL PIPELINES PER CUSTOMER STANDARDS. IF CUSTOMER STANDARDS ARE NOT AVAILABLE THEN LABEL IN ACCORDANCE WITH ANSI/ASME A13.1.
- CUSTOMER STANDARDS ARE NOT AVAILABLE THEN PAINT THEM WHITE.
- 21. BALANCE ALL WATER FLOWS PER SPECIFICATIONS AND PROVIDE DOOSAN WITH A FINAL REPORT.

#### P&ID PIPING SCH DESIGNATOR SERVICE MATERIAL CONNECTIONS FLUID INSU COOLING MODULE CM(CI,CO)-CU A53 GR B ERW SCH 40 STEEL 40% GLYCOL- 60% DI WATER 2" FIBE WELDED 40% DOWFROST GLYCOL -HG(HI)-CS HIGH GRADE A53 GR B ERW SCH 40 STEEL WELDED FDA / 60% POTABLE WATER 2" FIBE BY OTHERS 40% DOWFROST GLYCOL -1/2" FIBERG FDA / 60% POTABLE WATER HG(HO)-CS A53 GR B ERW SCH 40 STEEL WELDED HIGH GRADE 2" FIBERGL BY OTHERS MU WATER MU(WI)-CU ASTM B88 TYPE L COPPER SOLDERED WATER 3" POLYISC WASTE WATER WW(WO)-CU ASTM B88 TYPE L COPPER SOLDERED WASTE WATER 1" FIBE NG(FI)-CS NATURAL GAS A53 GR B ERW STEEL WELDED/FLANGED NATURAL GAS N2(NI)-CU NITROGEN GAS ASTM B88 TYPE K COPPER BRAZED COMPRESSED NITROGEN MU(WI)-CU 1" FIBE ASTM B88 TYPE L COPPER SOLDERED WATER MU WATER

#### **PIPING & DUCTWORK SPECIFICATIONS**

1. REFER TO P&ID PIPING SCHEDULE FOR APPLICABILITY OF PIPING MATERIALS.

#### 2. QUALITY ASSURANCE:

- 2.1. ASME COMPLIANCE: COMPLY WITH ASME B31.9, "BUILDING SERVICES PIPING," FOR MATERIALS, PRODUCTS, AND INSTALLATION. SAFETY VALVES AND PRESSURE VESSELS SHALL BEAR THE APPROPRIATE ASME LABEL. ALL PRESSURE VESSELS TO COMPLY WITH THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, DIVISION 1. 2.2. ALL EQUIPMENT INSTALLATION SHALL COMPLY WITH AND FOLLOW ALL MANUFACTURERS INSTALLATION REQUIREMENTS INCLUDING, BUT NOT LIMITED TO, TRAINING QUALIFICATIONS, INSTALLATION MANUALS, REQUIRED CLEARANCES, AND REQUIRED CERTIFICATIONS.
- 3. COPPER PIPING SPECIFICATION:
- 3.1. REFER TO THE APPLICABLE DETAIL DRAWING FOR PIPING CONNECTIONS, INSTRUMENTATION AND VALVE REQUIREMENTS. 3.2. CONFIRM FLOW DIRECTIONS FOR SUPPLY AND RETURN LINES PRIOR TO INSTALLATION OF ANY WORK.
- 3.3. ALL PIPING SHALL BE TYPE K COPPER, ASTM B-88, WITH CAST COPPER BRAZED FITTINGS. BRAZED JOINTS SHALL BE JOINED USING AWS A5.8, BAg1, SILVER SOLDER.
- 3.4. INSULATE PIPING AS PER THE P&ID SCHEDULE.
- 3.5. FOR EXTERIOR APPLICATIONS PROVIDE WITH EMBOSSED ALUMINUM (20 MIL) JACKETS AND WEATHER PROOF SEAL. 3.6. PROVIDE DIELECTRIC CONNECTIONS AT ALL CONNECTIONS TO DISSIMILAR MATERIALS (I.E., COPPER AND STEEL).
- 3.7. ROUTE PIPING SUCH THAT IT DOES NOT IMPEDE ACCESS TO ANY EQUIPMENT.
- 3.8. SUPPORT PIPING AS SHOWN ON THE APPLICABLE DETAIL DRAWING.
- 3.9. SUPPORT NON ROOFTOP PIPING WITH LIGHT-DUTY CLEVIS HANGERS SUSPENDED FROM THE CEILING USING THREADED ROD ATTACHED TO A STRUCTURAL BEAM FLANGE OR SIDE BEAM BRACKET. PROVIDE VIBRATION ISOLATORS AS NECESSARY TO PREVENT STRUCTURE-BORNE NOISE. WHERE HANGING FROM THE THE CEILING IS NOT PRACTICAL, SUPPORT PIPE FROM THE FLOOR USING A THREADED ROD AND A PIPE CLAMP ANCHORED TO THE CONCRETE VIA A CEILING FLANGE. INSTALL CLAMP OR CLEVIS OVER INSULATION WITH PIPE PROTECTION SADDLES.
- 3.10. SUPPORT ROOFTOP PIPING USING MIRO INDUSTRIES (OR EQUAL) FLOATING PIPE SUPPORT SYSTEM.
- 3.11. PITCH ALL PIPING TOWARDS ITS EQUIPMENT SOURCE TO PROVIDE SELF-DRAINING TO THE MAXIMUM EXTENT POSSIBLE. PROVIDE 3/4" DRAIN BALL VALVES WITH CAPPED HOSE END CONNECTIONS AT ALL SYSTEM HIGH AND LOW-POINTS AND AS SHOWN ON THE DRAWINGS.
- 4. STEEL PIPING SPECIFICATION:

4.1. REFER TO THE APPLICABLE DETAIL DRAWING FOR PIPING CONNECTIONS, INSTRUMENTATION AND VALVE REQUIREMENTS. 4.2. CONFIRM FLOW DIRECTIONS FOR SUPPLY AND RETURN LINES PRIOR TO INSTALLATION OF ANY WORK. 4.3. ALL NEW PIPING SHALL BE SCHEDULE 40, CUT GROOVED STEEL, ASTM A-53 Tp. S, DUCTILE IRON GROOVED-END FITTINGS AND COUPLINGS, VICTAULIC OR APPROVED EQUAL. GASKETS SHALL BE SUITABLE FOR HVAC SERVICE EXCEPT FOR HEAT MEDIUM PIPING WHICH SHALL REQUIRE EHP GASKETS. FOR ANY PIPE AND FITTINGS LESS THAN 3", TYPE K COPPER, ASTM B-88, WITH CAST COPPER BRAZED JOINT FITTINGS MAY BE SUBSTITUTED. JOINTS SHALL BE BRAZED USING APPROPRIATE SILVER SOLDER.

- 4.4. INSULATE PIPING AS PER THE P&ID SCHEDULE.
- 4.5. FOR EXTERIOR APPLICATION PROVIDE WITH EMBOSSED ALUMINUM (20 MIL) JACKETS AND WEATHER PROOF SEAL. 4.6. PROVIDE DIELECTRIC CONNECTIONS AT ALL CONNECTIONS TO DISSIMILAR MATERIALS (I.E., COPPER AND STEEL).
- 4.7. SUPPORT PIPING AS SHOWN ON THE APPLICABLE DETAIL DRAWING. 4.8. SUPPORT NON ROOFTOP PIPING WITH LIGHT-DUTY CLEVIS HANGERS SUSPENDED FROM THE CEILING USING THREADED ROD ATTACHED TO A STRUCTURAL BEAM FLANGE OR SIDE BEAM BRACKET. PROVIDE VIBRATION ISOLATORS AS NECESSARY TO PREVENT STRUCTURE-BORNE NOISE. WHERE HANGING FROM THE THE CEILING IS NOT PRACTICAL, SUPPORT PIPE FROM THE FLOOR USING A THREADED ROD AND A PIPE CLAMP ANCHORED TO THE CONCRETE VIA A CEILING FLANGE. INSTALL CLAMP OR CLEVIS OVER INSULATION WITH PIPE PROTECTION SADDLES.
- 4.9. PITCH ALL PIPING TOWARDS ITS EQUIPMENT SOURCE TO PROVIDE SELF-DRAINING TO THE MAXIMUM EXTENT POSSIBLE. PROVIDE 3/4" DRAIN VALVES WITH CAPPED HOSE END CONNECTIONS AT ALL SYSTEM HIGH AND LOW-POINTS AND AS SHOWN ON THE DRAWINGS.
- 4.10 MEGA-PRESS IS AN ACCEPTABLE SUBSTITION AS ALLOWED BY CODE. (NO UNDERGROUND MEGA-PRESS FOR GAS)
- NATURAL GAS PIPING SPECIFICATION:
- 5.1. NATURAL GAS INSTALLATION SHALL COMPLY WITH NFPA 54-2012 FUEL GAS CODE. INSTALL MANUAL, LOCKABLE GAS SHUTOFF VALVE WITH A 1/2" NPT PRESSURE TAP FOR TEST GAGE CONNECTION AT FUEL CELL. 5.2. NATURAL GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE ASTM A 53/A 53M, TYPE E OR S, GRADE B WITH BEVELED
- ENDS. FITTINGS SHALL BE SCHEDULE 40 WROUGHT STEEL BUTT WELDED FITTINGS, ASTM A2 34. JOIN PIPING USING TAPES, GASKETS, AND BOLTS AND NUTS: SUITABLE FOR NATURAL GAS AND AS RECOMMENDED BY PIPING MANUFACTURER AND THE NATIONAL FUEL GAS CODE, ANSI Z223.1. 5.3. VERIFY GAS PRESSURE AT EACH FUEL CELL IS AT LEAST 10" W.G. TO SUPPORT THE MINIMUM PRESSURE REQUIRED WHILE
- GAS IS FLOWING. 5.4. MAXIMUM ALLOWABLE PRESSURE IS 14" W.G. PROVIDE LOCK-OUT PRESSURE REGULATOR AS SHOWN ON THE MECH DWGS. 5.5. ALTERNATE UNDERGROUND GAS PIPING: POLYETHYLENE ASTM D2513; YELLOW MDPE 2406/2708 GAS DISTRIBUTION AND GAS SERVICE PIPING. PIPING MUST TRANSITION TO STEEL PIPE INSTALLED IN A PVC SLEEVE PRIOR TO EXITING THE
- GROUND. INSTALLATION OF MDPE GAS PIPING SHALL BE IN ACCORDANCE TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND NFPA 54.
- 6. UNDERGROUND PIPING
  - 6.1 ALL UNDERGROUND PIPING SHALL BE ALL-WELDED (STEEL) OR ALL-BRAZED (COPPER) CONSTRUCTION, SEE PIPING SCHEDULE ON THIS DRAWING.
  - 6.2 ALL UNDERGROUND PIPING EXCEPT FOR GAS AND N2 PIPING SHALL BE INSULATED AND WATER-PROOFED IN ACCORDANCE WITH THE DETAILS ON THIS DRAWING OR APPROVED EQUAL.
  - 6.3 ALTERNATE FOR UNDERGROUND MAKE UP WATER: PERMA-PIPE PREINSULATED TYPE K SERVICE PIPE WITH INTEGRATED HEAT TUBE FASTENED TO SERVICE PIPE WITH ALUMINIZED TAPE WITH SS BANDING.

CELL FROM NEW CUSTOMER SUPPLY	
ER PIPING. REFER TO DRAWING E 3.0,	

- 20. PAINT PIPELINES AND/OR INSULATION IN ACCORDANCE WITH CUSTOMER STANDARDS IF

### **GENERAL INSTALLATION NOTES**

- 1. THE INSTALLATION MUST BE IN STRICT ACCORDANCE WITH NFPA 853 STANDARD FOR THE INSTALLATION OF STATIONARY FUEL CELL POWER SYSTEMS.
- 2. THE FUEL CELL ENCLOSURE MUST BE PROTECTED AGAINST WELD, SOLDER, OR BRAZING SPLATTER DURING CONSTRUCTION.
- 3. REFER TO DOOSAN POWER MODULE AND COOLING MODULE SUBMITTALS FOR ADDITIONAL INFORMATION.

### **DESIGN INTENT NOTES**

THE HG HEAT RECOVERY GYLCOL PIPING WILL BE INSTALLED TO THE CUSTOMER INTERFACE LOCATION CONNECTION (DRAWING M4.1). GYLCOL FILL SHALL BE BY OTHERS.

	PIPE SIZE DESIGNA FLOW LA MATERIA	E TOR BEL (S = SUPPLY, R = RETURN) L
IEDULE	4" - LGS - CU >	
LATION	JACKET	NOTES
ERGLASS	ALUMINUM OUTSIDE, FIBERGLASS JACKET UNDERGROUND	DI WATER & GYCOL BY DOOSAN
ERGLASS	ALUMINUM OUTSIDE, ALL SERVICE JACKET INSIDE	2 1/2" AND LARGER
GLASS (< 1.5" ID), LASS (⋝ 2" ID)	ALUMINUM OUTSIDE, ALL SERVICE JACKET INSIDE	2" AND SMALLER
OCYANURATE	HDPE SEAMLESS JACKET 175 MIL MINIMUM	UNDERGROUND
ERGLASS	ALUMINUM OUTSIDE, ALL SERVICE JACKET INSIDE	
N/A	BELOW GRADE PIPING SHALL HAVE AN EPOXY ADHESIVE & POLYETHYLENE COATING	
N/A	N/A	
ERGLASS	ALUMINUM OUTSIDE, ALL SERVICE JACKET INSIDE	

### **GENERAL NOTES**

- 1. THE MECHANICAL CONTRACTOR SHALL BE FA FOR ALL TRADES AND SHALL COORDINATE WI
- DRAWINGS ARE DIAGRAMMATIC ONLY, FINAL LOCATIONS SHALL BE DETERMINED IN THE FI ETC., SHALL BE PROVIDED AND INSTALLED W OWNER.
- 3. THE MECHANICAL CONTRACTOR SHALL FURN ACCESSORIES NECESSARY TO MAKE THE FUR OPERATION.
- 4. ALL MECHANICAL WORK SHALL BE IN ACCORI AND LOCAL CODES.
- 5. ALL MECHANICAL EQUIPMENT SHALL BE INST MANUFACTURER'S RECOMMENDATIONS.
- FURNISH AND INSTALL PIPING AS SIZED ON TI CONNECTIONS, INSTRUMENTATION AND VAL DIRECTIONS FOR SUPPLY AND RETURN LINES
- NATURAL GAS INSTALLATION SHALL COMPLY MANUAL GAS SHUTOFF VALVE WITH A 1/2" NP CONNECTION AT UNIT.
- 8. SUBJECT PIPING SYSTEM TO HYDROSTATIC T THAN 1.5 TIMES THE DESIGN PRESSURE. TEST PRESSURE FOR ANY VESSEL, PUMP, VALVE, OF VERIFY THAT STRESS DUE TO PRESSURE AT BO EXCEED EITHER 90 PERCENT OF SPECIFIED MI VALUE IN APPENDIX A OF ASME B31.9, "BUILDIN HYDROSTATIC TEST PRESSURE HAS BEEN APF PIPING, JOINTS, AND CONNECTIONS FOR LEAK REPAIRING, OR REPLACING COMPONENTS, ANI THERE ARE NO LEAKS. COORDINATE FILLING & BLANK OFF THE FIELD-INSTALLED PIPING AT TH BEFORE PRESSURE TESTING IS CONDUCTED. I PRESSURE TEST. ALL COOLING AND HEAT REC CLEANED BEFORE PLACING IN OPERATION TO MILL SCALE. OIL AND ALL OTHER MATERIAL FO THE POWER MODULE AND COOLING MODULE I PIPING. DO NOT FLUSH EITHER THE COOLING ( EITHER MODULE MAY RESULT IN DAMAGE TO T MODULE. FLUSHING PROCEDURE SHOULD CON ADDITION, THESE FLUSHING REQUIREMENTS A
- DOOSAN PERSONAL SHALL BE NOTIFIED OF TH PIPING
- DUE TO THE ISOLATION OF THE POWER MODUL FLUSHING, A TEMPORARY BYPASS MAY BE NEC CONNECTIONS TO PERMIT CIRCULATION THRO
- THE POWER MODULE WILL NOT BE AVAILABLE CIRCULATED DURING FLUSHING. THE BUILDING TEMPORARY HEATING SOURCE, WILL NEED TO
- ALL INSTRUMENTS, SUCH AS FLOWMETERS, TH REMOVED FROM THE FLOW STREAM AS THE PI IF THE PIPING SYSTEM IS NOT TO BE FILLED IM THE PIPING SYSTEM MUST BE DRAINED AND DR
- REMOVE ALL LIQUID. 9. COORDINATE WITH OWNER REGARDING POI ADVANCED NOTICE FOR LOUD AND DISRUPTIV
- REQUIREMENTS. PROVIDE ALL MANUFACTURE MATERIALS BEING USED ON SITE FOR RECORD OF RELATED MATERIALS. NO MATERIALS ARE PROJECT AND ARE TO BE REMOVED FROM THE THE WORK BEING DONE.
- 10. CONTRACTOR SHALL WARRANTEE ALL WOR ONE-YEAR FROM THE SUBSTANTIAL COMPLETI SUBJECT TO THE MANUFACTURER'S WARRANT PERIOD OF ONE-YEAR FROM SUBSTANTIAL COM
- 11. TEST & BALANCE SHALL BE BY OTHERS.
- 12. THE CONTRACTORS SHALL PROVIDE ELECT INSTALLATION METHODS, MATERIALS AND ACC SUBMITTALS SHALL BE ASSEMBLED AND SUBM WORK, AND SHOULD INCLUDE:
- A. PIPING AND TUBING MATERIALS
- PIPE AND TUBING SUPPORTS PIPING SPECIALTIES AND VALVES
- NATURAL GAS REGULATOR
- PIPING/INSULATING MATERIALS PIPE SHOP DRAWINGS
- PIPE HEAT TRACING SYSTEM
- AS-BUILTS OF ALL ABOVE SUBMITTALS AT C **OPERATION & MAINTENANCE MANUAL.**
- 14. NATURAL GAS AND NITROGEN PIPING SHALL COMPRESSED AIR, NITRGEN, OR OTHER NON TO THE FUEL CELL.

	М
ITH OTHER CONTRACTORS.	SYMBO
ELD. ADDITIONAL OFFSETS, ELBOWS, /ITHOUT ADDITIONAL COST TO THE	X
NISH AND INSTALL ALL INCIDENTAL EL CELL COMPLETE AND READY FOR	NC
DANCE WITH APPLICABLE FEDERAL, STATE	၊ဝ်၊
ALLED IN ACCORDANCE WITH THE	ıбı
HE PLANS. REFER TO P&ID FOR PIPING	ıĄı
S PRIOR TO INSTALLATION OF ANY WORK.	₩ A
T PRESSURE TAP FOR TEST GAUGE	5
EST PRESSURE THAT IS NOT LESS PRESSURE SHALL NOT EXCEED MAXIMUM R OTHER COMPONENT IN SYSTEM UNDER OTTOM OF VERTICAL BLINS DOES NOT	۰ ۴
NIMUM YIELD STRENGTH OR 1.7 TIMES "SE" IG SERVICES PIPING." AFTER PLIED FOR AT LEAST 10 MINUTES, EXAMINE	بلا
AGE. ELIMINATE LEAKS BY TIGHTENING, D REPEAT HYDROSTATIC TEST UNTIL & PRESSURIZING OF LG WITH OWNER.	Ŕ
HE POWER MODULE AND COOLING MODULE DOOSAN MAY REQUEST TO WITNESS THE OVERY PIPING SHALL BE THOROUGHLY	اکما
REMOVE ALL DIRT, PIPING COMPOUND, REIGN TO THE FLUID BEING CIRCULATED. MUST BE ISOLATED WHEN FLUSHING THE	لې اړ
DR POWER MODULES. FLUSHING THROUGH THE POWER MODULE AND COOLING NFORM TO THE DESIGN SPECIFICATIONS. IN	×
IE FLUSHING SCHEDULE FOR ALL	
LE AND COOLING MODULE DURING CESSARY AT THE SUPPLY AND RETURN DUGH THE ENTIRE PIPING SYSTEM. TO HEAT THE FLUSHING FLUID AS IT IS	Δ
B BACKUP HEATING, OR OTHER BE USED. HERMOWELLS, AND GAUGES, MUST BE	C
PES ARE BEING FLUSHED. MEDIATELY AFTER FLUSHING, THEN RIED OUT WITH COMPRESSED AIR TO	⊣ ⊦
LICY OF DAILY WORK SITE CLEANUP, E WORK, AND SECURITY / SIGN-IN	
ERS SAFETY DATA SHEETS (MSDS) FOR ALL TO THE OWNER PRIOR TO SITE ARRIVAL TO BE LEFT REMAINING AT THE CLOSE OF	μνη
	ت 
ION OF WORK. ALL MATERIALS SHALL BE IEE PERIOD, BUT FOR NOT LESS THAN A MPLETION.	
RONIC SUBMITTALS OF ALL	PI
ESSORIES FOR REVIEW AND APPROVAL. IITTED PRIOR TO ANY INSTALLATION	-
	PS -
	FT
COMPLETION OF PROJECT; INCLUDING AN	
BE CLEARED OF FOREIGN MATERIAL USING FLAMABLE GAS PRIOR TO CONNECTING	
	U.O.N
	FC

MEC	HANICAL SYMBOLS
SYMBOL	DESCRIPTION
$\bowtie$	GATE VALVE (NORM OPEN)
NC	GATE VALVE (NORM CLOSED)
၊၆၊	BALL VALVE (NORM OPEN)
ıбı	BALL VALVE (NORM CLOSED)
١٩	GAS COCK
	PRESSURE RELIEF VALVE
Г Ф С	AIR RELIEF VALVE
ı ج	HOSE BIB
K K	PRESSURE REGULATOR
၊င်ာ၊	BUTTERFLY VALVE (NORM OPEN)
الحد	BUTTERFLY VALVE (NORM CLOSED)
	CALIBRATED BALANCE VALVE
<u>}</u>	CONTROL VALVE (SEE VALVE SCH)
$\square$	REDUCER
С	HOSE COUPLING
⊣∣⊦	DIELECTRIC UNION
•	FLOW ARROW
μνγ	FLEXIBLE CONNECTOR
Ъ	THERMOWELL
	8" THERMOMETER
$\bigcirc$	4" PRESSURE GAUGE
PI -	PRESSURE GAUGE - ASHCROFT 1009 SERIES 4" DIAL, STAINLESS STEEL CASE RANGE 0-30" H₂O FOR GAS, O-100 PSIG FOR LIQUID, UNLESS OTHERWISE INDICATED.
PS -	PRESSURE SWITCH
FT -	FLOW METER (FOR HRM)
	TEMPERATURE SENSOR (FOR HRM)
U.O.N.	UNLESS OTHERWISE NOTED
FC	FUEL CELL
MUW	MAKE-UP WATER

	B01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription
19A Whitfield Street       Guilford, CT 06437	Innovative Construction & Design Solutions, LLC
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	MECHANICAL GENERAL NOTES, SPECS & LEGEND
Project No.: Date:	Drawn By: SAC Design By:
12/31/20 Scale: N.T.S.	SDF Check By: DSF
Drawing No.:	1.0

![](_page_55_Figure_0.jpeg)

	419A Whitfield Street Guilford, CT 06437	Phone:(203) 453-8596Phone:(203) 453-8596Email: info@icdsllc.comBB01/15/21B01/15/21A12/31/20A12/31/20Rev.DateDateDescription
S S S S S S S S S S S S S S S S S S S	66MW FUEL CELL N AVE. BPT., CT	ANICAL Rest Construction & Desig
RGE SYSTEM	<b>6 LAOABO (USINAL ODD)</b> Project No.: Date: 12/31/20 Scale: AS NOTED	Drawn By: SAC Design By: SDF Check By: SDF
30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION	Drawing No.:	2.0

(SEE DRAWING SD-1)

PIPING TO 8 X 12 EXCHANGER SKID AND 8 X

CONC <u>PIER</u>

![](_page_56_Figure_0.jpeg)

NON I

![](_page_56_Picture_1.jpeg)

1

			1/15/21 UPDATED 30% DESIGN DEVELOPEMENT	2/31/20 30% DESIGN DEVELOPEMENT	Date Description	
			В	A 1	lev.	
	field Street CT 06437 ) 453-8596 ) 453-8596 ) idsllc.com tS, LLC B Rev.					
	Alph Guit	Phone Email	Innovative Construction & Design Soli			
BRIDGEPORT 9.66MW FUEL CELL	SRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT MECHANICAL GROUND FLOOR PLAN				GROUND FLOOK PLAN	
Project	No.:	Drawn	By: SA	С		
Date: 12	/31/20	Desigr	By: SD	F		
Scale: AS I	NOTED	Check	<sup>By:</sup> SD	F		
Drawing No.:						

![](_page_56_Figure_4.jpeg)

![](_page_57_Figure_0.jpeg)

![](_page_57_Picture_1.jpeg)

	B01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription			
419A Whitfield Street Guilford, CT 06437	Innovative Construction & Design Solutions, LLC			
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	MECHANICAL SECOND FLOOR PLAN			
Project No.: Date: 12/31/20	Drawn By: SAC Design By: SDF			
<sup>Scale:</sup> AS NOTED	Check By: SDF			
Drawing No.:				

30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

∽x" WW(WO) DN,

-(B

![](_page_58_Figure_0.jpeg)

![](_page_58_Picture_1.jpeg)

![](_page_58_Figure_2.jpeg)

					21 UPDATED 30% DESIGN DEVELOPEMENT	20 30% DESIGN DEVELOPEMENT	e Description
					01/15/2	12/31/2	. Date
					Ш	A	Rev
	A19A Whitfield Street Guilford CT 06437		Phone:(203) 453-8596	Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT MECHANICAL THIRD FLOOR PLAN							
<b>BRIDGEPORT 9.6</b>	600 IRANISTAN				MECHANI		
9 0 BRIDGEPORT 9 0	600 IRANISTAN		Dra	awn			
9 6 LAOABOAR Project N Date: 12/	000 IVISTAN 31/20	)	Dra	awn			
9 6 LAOABOAR Project N Date: 12/ Scale: AS N Drawin		) :D	Dra De	awn sign eck			

∽x" WW(WO) DN,

\_\_\_\_\_

-(B

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![](_page_59_Picture_0.jpeg)

![](_page_59_Figure_1.jpeg)

![](_page_59_Picture_2.jpeg)

![](_page_59_Picture_3.jpeg)

1

	B01/15/21UPDATED 30% DESIGN DEVELOPEMENTB01/15/21UPDATED 30% DESIGN DEVELOPEMENTA12/31/2030% DESIGN DEVELOPEMENTRev.DateDescription
419A Whitfield Street       Guilford, CT 06437	Innovative Construction & Design Solutions, LLC
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	MECHANICAL ROOF PLAN
Project No.: Date: 12/31/20 Scale: AS NOTED	Drawn By: SAC Design By: SDF Check By: SDF
Drawing No.:	2.4

-**B** 

-

![](_page_60_Figure_0.jpeg)

SYMBOL:       DESCRIPTION:         →       90° ELBOW TURNED UP         →       90° ELBOW TURNED DOWN	419A Whitfield Street         419A Whitfield Street         Guilford, CT 06437         Phone:(203) 453-8596	Email: info@icdsllc.com       Email: info@icdsllc.com         ction & Design Solutions, LLC       B       01/15/21       UPDATED 30% DESIGN DEVELOPEMENT         A       12/31/20       30% DESIGN DEVELOPEMENT       Rev.       Date       Description
X         OB         Lebon (NHOR           X         EPAPABOLO PHPING         EPAPABOLO PHPING           X         FIELD JOINT         EPAPABOLO PHPING           X         FIELD JOINT         FIELD JOINT           X         MORE REPERSION PHPING         EPAPABOLO PHPING           X         FIELD JOINT         FIELD JOINT           X         CARRIER PIPE: SCHEDULE 40 A-53 GRADE B ERW CARBON STEEL           Y         FIFTINGS: CLADDING ON STRAIGHT SECTIONS CONSIST OF MULTIPLE LAYERS OF FIBERGLASS REINFORCED PLASTIC (PRP) 90-00 MILS THICK WOUND DIRECTLY ON THE CARRIER PIPE OR OVER THE INSULATION.           Y         FIFTINGS: PREFABRICATED FITTINGS UTILIZING BUTT WELD FITTINGS, WITH HAND LAMINATED GLASS MATT SATURATED WITH RESIN AND CATALYST TO A MINIMUM THICKNESS OF 100 MILS APPLIED DIRECTLY ONTO THE STEEL CARRIER PIPE AND FITTINGS.           Y         ANCHORS: PREFABRICATED UTILIZING 3/8" STEEL PLATE WELDED TO THE CARRIER PIPE AND HOCHOR PLATA SHALL BE 6"LARGER THAN THE PIPE AND POURED IN CONCRETE BY THE INSTALLING CONTRACTOR.           Y         FIELD JOINTS: FIELD JOINTS SHALL CONSIST OF HAND LAY-UP FIBERGLASS MAT SATURATED WITH A RESIN AND CATALYST. THICKNESS SHALL BE 100 MILS THICK IDENTICAL TO THE STRAIGHT LEGRITH SECTIONS.           Y         INSULATION SHALL BE 2" THICK WITH FRP CASING           SLAB OR FINISHED GRADE         KING TAPE SHALL BE PLACED 12' ISHED GRADE ABOVE ALL PIPING.           X         SLAB OR FINISHED GRADE           RING TAPE SH	RIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	MECHANICAL DETAILS
SAND OR FINE GRAVEL 4" SAND BED ETAIL	Project No.: Dra Date: De 12/31/20 Scale: Ch AS NOTED	awn By: KFH sign By: SDF eck By: DSF
30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION	Drawing No.:	.0

SYMBOL:	DESCRIPTION:
ф	90° ELBOW TURNED UP
$\widehat{}$	90° ELBOW TURNED DOWN
×	ANCHOR
[	END SEAL (WELD, GLAND, OR HEAT SHRINK)
	EXPANSION PIPING
+	FIELD JOINT

### UNDERGROUND PIPING SPECIFICATION

- STEEL
- FRP CLADDING: CLADDING ON STRAIGHT SECTIONS CONSIST OF MULTIPLI

- LAYERS OF FIBERGLASS REINFORCED PLASTIC (FRP) 90-100 MILS THICK

CARRIER PIPE:	SCHEDULE 40	A-53 GRADE	B ERW CARBON S

- CONCRETE SLAB OR FINISHED GRADE
- PIPING MARKING TAPE SHALL BE PLACED 12" BELOW FINISHED GRADE ABOVE ALL PIPING.

CLEAN FILL
6" SAND OR FINE GRAVEL LESS THAN 1/2" DIA. ABOVE
SAND OR FINE GRAVEL

![](_page_61_Figure_0.jpeg)

		B 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	Rev. Date Description
Image: Contract of the street     419A Whitfield Street       Image: Contract of the street     Guilford, CT 06437	Phone:(203) 453-8596 Email: info@icdsllc.com	innovative Construction & Design Solutions, LLC		
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT MECHANICAL DETAILS				
Date: 12/31/20 Scale: AS NOTED Drawing No.:	Design Check B	By: SD By: DS	F	

— PRESSURE GAUGE (0.2 PSIG) — NATURAL GAS ANALYSIS PORT 

# 1) TYPICAL FUEL CELL P&ID CONNECTIONS (21 TOTAL) SCALE: NTS

![](_page_62_Figure_1.jpeg)

#### REVERSE OSMOSIS / POTABLE WATER SUPPLY SYSTEM 3)-SCALE: NTS

HIGH CAPACITY —

AUTOMATIC AIR VENT

—HIGH GRADE PRIMARY PRESSURE RELIEF VALVE RELIEF PRESSURE SET TO 125 PSI, PIPE WITH FULL OUTLET SIZE TO 2" - CMR - CU TO COOLING MODULE ON ROOF

![](_page_62_Figure_6.jpeg)

![](_page_62_Figure_7.jpeg)

## 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

![](_page_62_Figure_12.jpeg)

PI

- BRASS FLANGE CONNECTION WITH DIELECTRIC GASKET KIT (TYP.) FOR COOLING MODULE

	B 01/15/21 U	A         12/31/20         30           Rev.         Date         D
5 19A Whitfield Street Guilford, CT 06437	Innovative Construction & Design Solutions, LLC	
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT	FUEL CELL POWER PLANT	<b>PIPING &amp; INSTRUMENTATION DIAGRAMS</b>
Project No.: Date:	Drawn By: SD Design By:	)F
12/31/20 Scale: AS NOTED	Check By: DS	۶F
Drawing No.:		

![](_page_63_Figure_0.jpeg)

![](_page_63_Picture_2.jpeg)

\_\_\_\_\_ ------\_\_\_\_\_

840 GPM

		01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	12/31/20 30% DESIGN DEVELOPEMENT	Date Description
		۵	A	Rev.
19A Whitfield Street       Guilford, CT 06437	Phone:(203) 453-8596 Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
GEPORT 9.66MW FUEL CELL 300 IRANISTAN AVE. BPT., CT				NG & INSTRUMENTATION DIAGRAM
BRIDO	-			קול
Project No.: Date: 12/31/20	Drawn Design	By:		
Project No.: Date: 12/31/20 Scale:	Drawn Design Check	By: By:		

CUSTOMER SPECIFICATIONS (BY OTHERS, ESTIMATED): FLOW: 757.6 GPM HWS TEMP: 248 °F HWR TEMP: 192 °F

=

FUTURE PRIMARY PUMP SETS (BY OTHERS)

TERMINATE 8" HGS & R PIPES 1' ABOVE SLAB WITH BLIND FLANGE (FOR FUTURE CONNECTION)

30% DESIGN DEVELOPMENT

NOT FOR CONSTRUCTION

HIGH GRADE SPECIFICATIONS: FLOW: 840 GPM HEAD: TBD

 $\overline{}$ 

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![](_page_64_Figure_0.jpeg)

	SITE I FUEL C
ANSI C37 DEVICE NUMBER	PROTECTION FUN
27-1	UNDER VOLTAG
27-2	UNDER VOLTAG
59-1	OVER VOLTAG
59-2	OVER VOLTAG
81U-1	
81U-2	
81U-3	
810	

		B 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	Rev. Date Description
419A Whitfield Street       Guilford, CT 06437	Phone: (203) 453-8596 Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT				ELECTRICAL UNE-LINE DIAGRAM
Project No.: Date: 12/31/20 Scale: N.T.S.	Drawn Design Check I	By: KF By: DS By: DS	H F F	
Drawing No.:				

![](_page_65_Figure_0.jpeg)

| <u>m</u> | ≺ g C 4Q N H N Ш  $\geq$ DIAGRA  $\mathbf{O}$ Ц О FUE BPT., ( THREE-LINE BRIDGEPORT 9.66MW 600 IRANISTAN AVE. AL ELECTRIC Project No.: Drawn By: KFH Design By: Date: DSF 12/31/20 Check By: Scale: N.T.S. DSF Drawing No.:

![](_page_66_Figure_0.jpeg)

![](_page_67_Figure_0.jpeg)

**GROUND FLOOR PLAN** Scale: 1/8" = 1'-0"

		B 01/15/21 UPDATED 30% DESIGN DEVELOPEMENT	A 12/31/20 30% DESIGN DEVELOPEMENT	Rev. Date Description
2014 Whitfield Street Guilford, CT 06437	Phone:(203) 453-8596 Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
BRIDGEPORT 9.66MW FUEL CELL 600 IRANISTAN AVE. BPT., CT		ELECIRICAL		GROUND FLOOK PLAN
Project No.: Date: 12/31/20 Scale: AS NOTED Drawing No.:	Drawn Design Check	By: KFI By: DSI By: SDI	H F F	

![](_page_68_Picture_0.jpeg)

![](_page_68_Figure_1.jpeg)

1 Scale: 1/8" = 1'-0"

| m | ≺ Whitfield Street ford, CT 06437 J Q llc M 419A Guilf Phon Email Soln CELL BRIDGEPORT 9.66MW FUEL ( 600 IRANISTAN AVE. BPT., CT AN Ω CTRICAL FLOOR F ELECT SECOND FI Project No.: Drawn By: KFH Design By: Date: 12/31/20 DSF Check By: SDF Scale: AS NOTED Drawing No.: E2. 

### 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

-----A

![](_page_69_Picture_0.jpeg)

![](_page_69_Figure_1.jpeg)

THIRD FLOOR PLAN 1 Scale: 1/8" = 1'-0"

			UPDATED 30% DESIGN DEVELOPEMENT	30% DESIGN DEVELOPEMENT	Description
			01/15/21	12/31/20	Date
			۵	A	Rev.
	Guilford, CT 06437	Phone:(203) 453-8596 Email: info@icdsllc.com	Innovative Construction & Design Solutions, LLC		
<b>GEPORT 9.66MW FUEL CELL</b>	600 IRANISTAN AVE. BPT., CT		ELECTRICAL		I HIRD FLOOK FLAN
BRIC					
Project Date:	No.: /31/20	Drawn Desigr	By: KF By: DS	H	
Project Date: 12, Scale: AS I	No.: /31/20 NOTED	Drawn Desigr Check	By: KF DS By: SD	H F	

![](_page_70_Picture_0.jpeg)

![](_page_70_Figure_1.jpeg)

ROOF PLAN

(1)

Scale: 1/8" = 1'-0"

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	<u>+</u>							A

419A Whitfield Street Guilford, CT 06437 LLCC Phone Email: Solu BRIDGEPORT 9.66MW FUEL CELI 600 IRANISTAN AVE. BPT., CT ELECTRICAL ROOF PLAN Project No.: Drawn By: KFH Date: Design By: 12/31/20 DSF Scale: AS NOTED Check By: SDF Drawing No.: E2.3

## 30% DESIGN DEVELOPMENT NOT FOR CONSTRUCTION

![](_page_71_Figure_0.jpeg)
	BASIC ELECTRICAL REQUIREMENTS	2. AT COMPLETION OF PROJEC
A. 1.	NOTES DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND	ANY FINAL CORRECTIONS SIGNATURE THEREON.
	SUPPLEMENTARY CONDITIONS AND ALL OTHER SPECIFICATION SECTIONS, APPLY TO THIS SECTION.	3. A COPY OF THESE ASBUILT
2.	THE CONTRACTOR FOR THIS WORK IS REQUIRED TO READ THE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL DIVISIONS OF WORK AND IS RESPONSIBLE FOR THE COORDINATION OF THIS WORK AND THE WORK OF ALL DIVISIONS. IT IS THIS CONTRACTOR'S RESPONSIBILITY TO PROVIDE SUBCONTRACTORS WITH A COMPLETE SET OF BID DOCUMENTS.	I. <u>DISCREPANCIES IN DOCUM</u> 1. DRAWINGS (PLANS, SPECIFI GENERAL LOCATION AND INTE
	THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING THE COMPLETION AND INSPECTION OF THIS WORK AND THE SUBCONTRACTORS WORK TO COMPLY WITH OWNER'S SCHEDULE AND THE PROJECT COMPLETION DATE.	THE CONSTRUCTION MANAGE INTERPRETATION OF CONTRAC ADDITIONAL COMPENSATION F
-	THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF BID TO DETERMINE CONDITIONS AFFECTING THE WORK. ANY ITEMS WHICH ARE NOT COVERED IN THE BID DOCUMENTS OR ANY PROPOSED SUBSTITUTIONS SHALL BE LISTED SEPARATELY AND QUALIFIED IN THE CONTRACTOR'S BID. SUBMITTAL OF BID SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.	<ol> <li>2. THE LOCATION OF OUTLETS AND SCHEMATIC IN NATURE. C FIXTURES BEFORE THEY ARE I</li> <li>3. HOMERUNS SHOWN ARE SC FROM DIFFERENT LOCATIONS.</li> </ol>
В.	GENERAL REQUIREMENTS	J. <u>DEMOLITION</u> 1. THE CONTRACTOR SHALL B
1.	THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION, INCIDENTALS AND DETAILS NECESSARY TO PROVIDE COMPLETE ELECTRICAL SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS. ALL WORK NOT SPECIFICALLY NOTED AS BEING BY POWER COMPANY SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CLOSELY COORDINATE THE ENTIRE INSTALLATION WITH THE POWER COMPANY AND WITH DOOSAN AS REQUIRED. FURNISH AND INSTALL EQUIPMENT THAT IS RATED FOR AVAILABLE FAULT CURRENT LEVELS. FURNISH AND INSTALL "CABLE LIMITERS" IF NECESSARY TO LIMIT FAULT CURRENT. FIELD VERIFY THE EXACT TYPE, SIZE, LOCATION, REQUIREMENTS, ETC. OF EXISTING POWER AND TELEPHONE FACILITIES PRIOR TO SUBMISSION OF BID.	<ol> <li>THE CONTRACTOR SHALL B AND EXISTING WORK . COORE INTACT.</li> <li>K. <u>SLEEVES</u></li> <li>1. THE CONTRACTOR SHALL P INSTALLATION. EACH SLEEVE PARTITION AND SHALL BE CUT PENETRATE THE FLOOR, WHIC</li> <li>2. ALL SLEEVES AND OPENING</li> </ol>
	ALL MATERIALS, PRODUCTS, AND EQUIPMENT, INCLUDING ALL COMPONENTS THEREOF, SHALL BE NEW. RECONDITIONED OR RE-CERTIFIEDEQUIPMENT SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY DOOSAN. EQUIPMENT SHALL BE UNDERWRITERS LABORATORIES LISTED FOR IT'S APPLICATION, AND BEAR THE UL LABEL. EQUIPMENT SHALL BE SIZED IN CONFORMITY WITH REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES, WHICHEVER IS MORE STRINGENT.	SEALED WITH CALCIUM SILICA EQUAL, SO AS TO RETAIN THEI 3. SLEEVES IN BEARING AND M WEIGHT STEEL PIPE FINISHED PARTITIONS, THROUGH SUSPE
3.	THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER AND ANY MATERIAL OR LABOR CALLED FOR IN ONE SHALL BE PROVIDED EVEN THOUGH NOT	SLEEVES SHALL BE NO. 22 U.S L. HANGERS
	SPECIFICALLY MENTIONED IN BOTH. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON THE DRAWINGS NOR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK OR WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER, SHALL BE PROVIDED AS PART OF CONTRACT.	1. HANGERS SHALL INCLUDE A C-CLAMPS WITH RETAINING CL INSTALLATION OF WORK.
4.	WHERE THE DRAWINGS OR SPECIFICATIONS CALL FOR ITEMS WHICH EXCEED CODES. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING THE SYSTEM WITH THE MORE STRINGENT REQUIREMENTS AS DESIGNED AND DESCRIBED ON THESE DRAWINGS, UNLESS NOTED OTHERWISE.	2. HANGERS SHALL BE FASTER OTHER CONDUIT OR PIPING. H TOP OF THE BAR JOIST. HANG INTERFERENCE OCCUR, IN OR TRAPEZE TYPE HANGERS OF
5.	ALL ELECTRICAL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATING, SERVICING, MAINTAINING AND REPAIRING. THIS CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUFFICIENT SERVICE ACCESS TO ALL EQUIPMENT.	INTERFERE WITH ACCESS TO F OTHER EQUIPMENT SERVICE F
3.	THE CONTRACTOR SHALL DO ALL CUTTING, CHASING, OR CHANNELING AND PATCHING REQUIRED FOR ANY WORK UNDER THIS DIVISION. ALL CUTTING SHALL HAVE PRIOR APPROVAL BY THE OWNER. ALL PATCHING IS TO MATCH SURROUNDING SURFACES.	BASIC ELECTRICAL MATERIA
7. 8.	EXISTING MANHOLE MAY HAVE STANDING WATER. PLAN ON PUMPING OUR THE WATER AS NECESSARY. COMPLY WITH APPLICABLE OSHA SAFETY REQUIREMENTS FOR WORKING IN A MANHOLE. EXCAVATION: COORDINATE WITH EXISTING UNDERGROUND INSTALLATION. USE SERVICES OF CALL BEFORE YOU DIG OR SIMILAR. EXCAVATE WITH CARE AND BY HAND WHERE NECESSARY, ESPECIALLY EXCAVATING NEAR ELECTRICAL LINES AND GAS PIPING	1. THE CONTRACTOR SHALL F TOOLS, TRANSPORTATION NEC TRANSPORTATION, AND FACIL TO, THE FURNISHING, INSTALL ELECTRICAL SYSTEMS AS SHO AND AS REQUIRED BY JOB CO
9.	THE CONTRACTOR SHALL MAKE ALL FINAL ELECTRICAL CONNECTIONS AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.	FOLLOWING: a. A COMPLETE ELECTRIC PANELBOARDS, SAFETY
с.	TEMPORARY LIGHT AND POWER	SERVICE EQUIPMENT N REFER TO ELECTRICAL
1. D	THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY WIRING AND RELATED GROUND FAULT INTERRUPTION PROTECTION FOR LIGHT AND FOR ALL CONTRACTORS POWER REQUIREMENTS AND IS RESPONSIBLE FOR IT'S REMOVAL.	b. THE CONTRACTOR MUS COMPLETE THE SYSTEM JUNCTION BOXES, OUT c. METERING AND CURRED d. THE WIRING OF MECHA
).  . 2.	ALL WORK SHALL BE PERFORMED IN A NEAT AND PROFESSIONAL MANNER AND CONFORM TO THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE, THE STATE'S, COUNTY'S, CITY'S AND LOCAL CODES AND ORDINANCES, SAFETY AND HEALTH CODES, NFPA CODES, ENERGY CODES, AND ALL OTHER APPLICABLE CODES AND REQUIREMENTS. THE CONTRACTOR SHALL INQUIRE INTO AND COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL INCLUDE ANY CHANGES REQUIRED BY CODES IN THE BID AND IF THESE CHANGES ARE NOT INCLUDED IN THE BID, THEY MUST BE QUALIFIED AS A SEPARATE LINE ITEM IN THE BID. AFTER CONTRACT IS ISSUED, NO ADDITIONAL COST DUE TO CODE ISSUES SHALL BE REIMBURSED TO THE CONTRACTOR. COMPLY WITH 2018 STATE OF CONNECTICUT BUILDING CODE AND NEC 2017 AND APPLICABLE AMENDMENTS.	<ul> <li>SPECIFICATIONS. WOR POWER WIRING OF MEC ALL LOW VOLTAGE (24 V RESPONSIBILITY OF THE DRAWING.</li> <li>INSTALLATION OF LIGHT ALL DEVICES, EQUIPME</li> <li>TEMPORARY SERVICE A</li> <li>SMOKE/FIRE ALARM WIF DRAWINGS OR AS NECE REQUIREMENTS.</li> <li>INSTALLATION OF CONE</li> </ul>
E.	LICENSES, PERMITS, INSPECTIONS AND FEES	PERMITTED. SEE SECTI i. VERIFY FUEL CELL PHA MEASURE VOLTAGE AC
1.	THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS, INSPECTIONS, AND FEES REQUIRED OR RELATED TO HIS WORK.	SIMILAR IN MAGNITUDE j. CONDUCTOR MARKING ROTATION
2.	FURNISH TO OWNER ALL CERTIFICATES OF INSPECTION AND FINAL INSPECTION APPROVAL AT COMPLETION OF PROJECT.	2. THE FOLLOWING ITEMS OF P CONTRACT:
F.	TRADE NAMES, MANUFACTURERS AND SHOP DRAWINGS	a. 24 VOLT TEMPERATURE b. TELEPHONE INSTRUME
	SPECIFICATIONS, THE EXACT EQUIPMENT SHALL BE USED AS A MINIMUM FOR THE BASE BID. MANUFACTURERS CONSIDERED AS AN EQUAL OR BETTER IN ALL ASPECTS TO THAT SPECIFIED WILL BE SUBJECT TO APPROVAL IN WRITING, THROUGH SHOP DRAWING SUBMITTAL PROCESS, BY THE CONSTRUCTION MANAGER PRIOR TO ACCEPTANCE. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.	<ol> <li>BEFORE STARTING WORK, T MECHANICAL PLANS, SHO AND INTEGRATE THE VARI EQUIPMENT WITH OTHER ( B. <u>CONDUIT</u></li> </ol>
2.	THE CONTRACTOR SHALL PROVIDE SUBMITTALS FOR ALL EQUIPMENT TO DOOSAN/OWNER FOR APPROVAL. SUBMISSIONS SHALL BE MADE EARLY ENOUGH IN PROJECT TO ALLOW FOR (7) WORKING DAYS FOR DOOSAN AND ENGINEER REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BEAR THE STAMP OF THE ARCHITECT/ENGINEER OFFICE AND SUB-CONTRACTOR SHOWING THAT HE HAS REVIEWED AND CONFLICTS TO THE JUBMITTAL SADE IN CONFORMANCE WITH THE CONTRACT PROVINCE	<ol> <li>THE CONTRACTOR SHALL FUNCTION OF THE CONTRACTOR SHALL FUNCTION OF THE INFORMATION OF THE INTE INFORMATION OF THE I</li></ol>
G.	AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS HAVE BEEN TAKEN.	PROTECTION COATING OF RESIN, APPROVED FOR THIS ASTM D6386. ALL FIELD CUT
1.	THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORK PROVIDED UNDER HIS CONTRACT AND SHALL MAKE GOOD, REPAIR OR REPLACE AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL, REQUIREMENT WHICH MAY BE DISCOVERED WITHIN A PERIOD	CONDUCTIVE RUST-RESIST 3. EMT SHALL BE FOR INDOOR TYPE.
	OF 12 MONTHS FROM THE DATE OF ACCEPTANCE (IN WRITING) OF THE INSTALLATION BY THE OWNER. EXTENDED WARRANTIES ARE SPECIFIED WITH INDIVIDUAL EQUIPMENT.	4. CONDUIT UNDER SLAB ON G WITH RIGID STEEL ELLS WH
⊣. 1	RECORD DRAWINGS	5. UNDERGROUND CONDUITS
••	DEVIATIONS FROM CONTRACT DRAWINGS, SUCH AS: a. LOCATION OF JUNCTION BOXES AND RECEPTACLES.	6. ALL CONDUIT INSTALLATION
	<ul> <li>D. LOCATION OF ALL HOMERONS SHOWING WIRE/CONDULT SIZES.</li> <li>c. REVISIONS, ADDENDUMS, AND CHANGE ORDERS.</li> <li>d. SIGNIFICANT DEVIATIONS MADE NECESSARY BY FIELD CONDITIONS, APPROVED EQUIPMENT SUBSTITUTIONS AND CONTRACTOR'S COORDINATION WITH OTHER TRADES</li> </ul>	7. SPARE CONDUITS SHALL HA

#### CT AND BEFORE FINAL APPROVAL, THE CONTRACTOR SHALL MAKE TO DRAWINGS AND CERTIFY THE ACCURACY OF EACH PRINT BY

DRAWINGS WILL BE GIVEN TO DOOSAN / OWNER.

## MENTS

ICATIONS, AND DETAILS) ARE DIAGRAMMATICAL AND INDICATE THE ENT OF THE ELECTRICAL SYSTEMS. WHERE DRAWINGS, EXISTING TIONS OR OTHER TRADES CONFLICT OR ARE UNCLEAR, ADVISE ER IN WRITING PRIOR TO SUBMITTAL OF BID. OTHERWISE, OWNER'S ACT DOCUMENTS OR COMMENTS SHALL BE FINAL WITH NO PERMITTED.

S AND EQUIPMENT SHOWN ON THE DRAWINGS ARE APPROXIMATE OWNER SHALL HAVE THE RIGHT TO RELOCATE ANY OUTLETS OR INSTALLED WITHOUT ADDITIONAL COST.

CHEMATIC. ELECTRICAL CONTRACTOR MAY ORIGINATE HOMERUNS

BE RESPONSIBLE FOR THE COORDINATION OF EQUIPMENT REMOVAL DINATE WITH OWNER, EXISTING EQUIPMENT REQUIRED TO BE LEFT

PROVIDE SLEEVES TO PROTECT EQUIPMENT OR FACILITIES IN THE E SHALL EXTEND THROUGH IT'S RESPECTIVE FLOOR, WALL OR T FLUSH WITH EACH SURFACE EXCEPT SLEEVES THAT CH SHALL EXTEND 4" ABOVE THE FLOOR.

GS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE FIRE ATE, SILICONE "RTV" FOAM, "3M" FIRE RATED SEALANTS OR EIR FIRE RATING.

MASONRY WALLS, FLOORS AND PARTITIONS SHALL BE STANDARD O WITH SMOOTH EDGES. FOR OTHER THAN MASONRY ENDED CEILINGS, OR FOR CONCEALED VERTICAL CONDUIT, S.G. GALVANIZED STEEL MINIMUM.

ALL MISCELLANEOUS STEEL SUCH AS IRON, WIRE, UNISTRUT, LIPS, CHANNELS, HANGER RODS, ETC., NECESSARY FOR THE

NED TO BUILDING STEEL, CONCRETE, OR MASONRY, BUT NOT TO HANGERS UPPER ATTACHMENT MUST BE SUPPORTED FROM THE BING FROM METAL DECK IS NOT PERMITTED. WHERE CDER TO SUPPORT CONDUIT, THE CONTRACTOR MUST INSTALL SUPPORTS WHICH SHALL BE LOCATED WHERE THEY DO NOT FIRE DAMPERS, VALVES, JUNCTION BOXES, ACCESS DOORS, REQUIREMENTS AND/OR OTHER TRADES.

## ALS AND METHODS

FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, CESSARY FOR EQUIPMENT, SERVICES, TOOLS, LITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL LATION, COMPLETION AND TESTING OF ALL THE WORK FOR THE OWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, ONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE

CAL DISTRIBUTION SYSTEM INCLUDING THE INSTALLATION OF TY AN DISCONNECT SWITCHES, LIGHTING AND RECEPTACLES. IT IS TRACTOR'S RESPONSIBILITY TO INCLUDE IN HIS BID FOR PROVIDING NECESSARY TO OBTAIN SERVICE FROM LOCAL UTILITY COMPANY. L ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION. IST ALSO INCLUDE IN BID ALL NECESSARY MATERIALS REQUIRED TO EM INCLUDING, BUT NOT LIMITED TO, FEEDERS, BRANCH CIRCUITS, TLET BOXES, WIRING DEVICES, COVERPLATES, CONDUITS, ETC. ENT TRANSFORMERS AS REQUIRED BY DRAWINGS, UTILITY COMPANY. ANICAL EQUIPMENT AS OUTLINED ON THE DRAWINGS AND IN THE RK SHALL INCLUDE WIRING OF ALL STARTERS, DISCONNECTS, AND ECHANICAL EQUIPMENT EXCEPT AS SPECIFICALLY NOTED OTHERWISE. VOLT) TEMPERATURE CONTROL WIRING SHALL BE THE HE MECHANICAL CONTRACTOR UNLESS NOTED SPECIFICALLY ON

T FIXTURES AND LAMPS AS SHOWN ON THE DRAWINGS INCLUDING ENT, ETC. REQUIRED FOR MOUNTING. AS INDICATED IN THE SPECIFICATIONS, INCLUDING IT'S REMOVAL. RING, DEVICES AND CONDUIT, AS SHOWN OR DESCRIBED ON

ESSARY TO MEET STATE, LOCAL, INSURANCE AND FIRE DEPARTMENT DUITS AND WIRING TO CONTROL PANEL, CABLES ARE NOT TON G FOR LOW VOLTAGE CONTROLS REQUIREMENTS. ASE ROTATION MATCHES THE BUILDING ELECTRICAL SERVICE.

CROSS EACH PHASE OF MCB001AND VERIFY THAT EACH PHASE IS ... SHALL BE IN ACCORDANCE TO NEC 408.3(E) REGARDING PHASE

ELECTRICAL CONSTRUCTION ARE NOT INCLUDED IN THIS E CONTROL WIRING UNLESS NOTED OTHERWISE

ENTS AND WIRING UNLESS NOTED OTHERWISE

THE CONTRACTOR SHALL EXAMINE THE STRUCTURAL AND OP DRAWINGS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, IOUS ELEMENTS OF THE ELECTRICAL SYSTEM, MATERIALS AND CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

FURNISH AND INSTALL ALL CONDUITS SERVING ALL EQUIPMENT ED TO, LIGHTING, RECEPTACLES, HEATING AIR CONDITIONING, TELEPHONE, DATA AND ELECTRICAL EQUIPMENT.

GALVANIZED RMC OR EMT UNLESS OTHERWISE SPECIFIED. ALL CLED. ALL CONDUIT SHALL RECEIVE A SUPPLENTARY CORROSION ZINC-RICH PAINT, ACRYLIC OR WEATHER-STABLE EPOXY-BASED S PURPOSE. THE CONDUIT SHOULD BE PREPARED FOR COATING PER T THREADS SHALL BE PROTECTED AGAINST CORROSION WITH CANT ZINC-RICH PAINT.

R USE ONLY. EMT CONNECTORS SHALL BE STEEL COMPRESSION

GRADE SHALL BE GALVANIZED RIGID STEEL, OR SCHEDULE 40 PVC IERE PERMITTED BY CODE.

SHALL BE PVC SCH. 40. EXPOSED OUTDOOR CONDUITS SHALL BE EPS WHERE PVC CONDUIT EMERGES FROM GRADE.

NS SHALL BE COMPLIANT WITH OWNERS BUILDING STANDARD. SHALL BE 3/4 INCH.

AVE NYLON PULL WIRES INSTALLED IN THEM.

8. SUPPORT ALL CONDUIT, INCLUDING SEISMIC AND SWAY BRACING, IN ACCORDANCE WITH THE NEC AND LOCAL CODES.

9. GENERALLY, ALL CONDUIT SHALL BE CONCEALED EXCEPT FOR UNFINISHED AREAS, SUCH AS EQUIPMENT ROOMS. EXPOSED CONDUIT SHALL BE ALLOWED ONLY AS NOTED ON PLAN AND AS APPROVED BY DOOSAN.

10.LIQUID TIGHT FLEXIBLE CONDUIT (LTFC)

- a. LIQUID TIGHT FLEXIBLE CONDUIT AND ASSOCIATED FITTINGS SHALL BE INSTALLED PER MANUFACTURER'S GUIDELINES WITH SPECIAL ATTENTION TO FITTING TORQUES.
  b. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR THE FOLLOWING APPLICATIONS:
- FINAL CONNECTIONS TO MOTORS. FINAL CONNECTIONS TO VIBRATING EQUIPMENT. c. LIQUID TIGHT FLEXIBLE CONDUIT MUST BE THE SAME SIZE AS THE RMC OR EMT CONDUIT TO WHICH IT IS CONNECTED. BOTH THE FLEXIBLE METAL CONDUIT AND IT'S FITTINGS ARE TO
- d. THE USE OF MC CABLE OR GREENFIELD IS NOT PERMITTED.e. CONNECTION TO OUTDOOR
- EQUIPMENT MUST BE WEATHERPROOF( LIQUID TIGHT OR SEALTIGHT).
- PROVIDE PULL-WIRE IN ALL EMPTY CONDUITS EXCEPT AS NOTED OTHERWISE ON DRAWINGS.
   HOME RUNS AND MAIN CONDUIT RUNS ARE TO BE HELD TIGHT TO STRUCTURE ABOVE OR AS

REQUIRED TO ALLOW PROPER SERVICE ACCESS AND OTHER TRADES WORK.

- 9. ALL CONDUITS MUST BE SIZED PER NEC AND LOCAL CODES.
- 10. ALL CONDUIT SUPPORTS, BOLTS, STRAPS, SCREWS ETC. SHALL BE GALVANIZED / CORROSION RESISTANT.
- C. OUTLET BOXES
- ALL OUTLET BOXES SHALL BE GALVANIZED PRESSED STEEL OF THE, STANDARD KNOCKOUT TYPE. NO ROUND OUTLET BOXES SHALL BE PERMITTED, EXCEPT AS SPECIFICALLY NOTED ON DRAWINGS BOXES SHALL NOT BE LESS THAN 4" SQUARE AND 1 1/2" DEEP.
- 2. ALL KNOCKOUT BOXES, UPON WHICH LIGHTING FIXTURES ARE TO BE INSTALLED, SHALL BE EQUIPPED WITH 3/8" FIXTURE STUDS.
- 3. EXTERIOR BOXES SHALL BE CAST RUST-RESISTING METAL WITH GASKETED COVERS.
- 4. INSTALL BOXES RIGIDLY FROM BUILDING STRUCTURE AND SUPPORT INDEPENDENTLY OF THE CONDUIT SYSTEM. ALSO PROVIDE SUITABLE BOX EXTENSIONS TO EXTEND BOXES TO FINISHED FACE OF CEILINGS. ALL OUTLET BOXES TO BE PROVIDED WITH CADDY "QICK-MOUNT BOX SUPPORT" TO MINIMIZE THE DEFLECTION THAT OCCURS WHEN PLUGGING/UNPLUGGING INTO THESE DEVICES.
- 5. UNLESS OTHERWISE NOTED ON DRAWINGS OR OTHERWISE REQUIRED BY THE NATIONAL ELECTRICAL CODE, HANDICAP CODES OR LOCAL CODES, OUTLET HEIGHTS SHALL BE AS FOLLOWS:
- a. SWITCH HEIGHT 48" FROM FINISHED FLOOR TO CENTERLINE OF OUTLET.
  b. CONVENIENCE OUTLETS: 24" FROM FINISHED FLOOR TO CENTERLINE OF OUTLET.
  D. JUNCTION AND PULL BOXES
- 1. THE DRAWINGS INDICATE SCHEMATIC ROUTINGS FOR CONDUIT RUNS. CONTRACTOR SHALL
- FURNISH AND INSTALL ADDITIONAL BOXES WHERE REQUIRED BY FIELD CONDITIONS OR BY CODE.
- 2. BOXES AND COVERS SHALL BE GALVANIZED/PAINTED STEEL OF CODE GAUGE SIZE.
- 3. INSTALL BOXES RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE AND SUPPORTED INDEPENDENT OF THE CONDUIT SYSTEM.
- 4. ARRANGE CIRCUITS TO AVOID THE USE OF JUNCTION BOXES IN INACCESSIBLE LOCATIONS.
- 5. JUNCTION AND PULL BOXES MUST BE LABELED WITH CIRCUIT NUMBER IDENTIFICATION AND SYSTEM TYPE ON COVER.
- E. <u>WIRING</u>
- 1. CONDUCTORS FOR FEEDERS AND BRANCH CIRCUITS SHALL BE COPPER AND THE AWG SIZE AND TYPE AS SHOWN ON DRAWINGS. MINIMUM WIRE SIZE #12. THE CONDUCTORS SHALL BE 600 VOLT INSULATION TYPE THW, THWN OR THHN. ALUMINUM CONDUCTORS ARE NOT ALLOWED.
- ON ALL 20 AMP BRANCH CIRCUITS, CONDUCTORS LARGER THAN #10 AWG SHALL BE REDUCED TO #10 AWG WITHIN 10 FEET OF PANEL BOARD AND DEVICE IN JUNCTION BOXES ON RATED TERMINAL STRIPS.
- 3. CONDUCTORS SHALL BE STRANDED.
- 4. ALL WIRING SHALL BE IN CONDUIT, UNLESS SPECIFICALLY NOTED OTHERWISE (IE. LOW VOLTAGE PLENUM RATED WIRE)
- EACH CIRCUIT SHALL HAVE A DEDICATED NEUTRAL CONDUCTOR WHEN REQUIRED AND SHALL SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- 6. THE USE OF MC CABLE, ETC. IS NOT PERMITTED.
- 7. WIRE CONNECTORS SHALL BE EQUAL TO "SCOTCH LOCK" FOR #8 AWG WIRE AND SMALLER AND EQUAL TO T & B "LOCKTIGHT" FOR #6 AWG AND LARGER.

#### 8. ALL WIRING TO BE COLOR-CODED AS FOLLOWS: 120/208 VOLT SYSTEM 277/480 VOLT SYSTEM

120/208 VOLT	<u>SYSTEM</u> 2	277/480 VOLT SYSTEM	MEDIUM VOLTAGE SYSTEM
NEUTRAL - V	VHITE N	IEUTRAL - GREY	NEUTRAL - WHITE
PHASE A - E	BLACK F	PHASE A - BROWN	PHASE A - BLACK
PHASE B - F	RED F	PHASE B - ORANGE	PHASE B - RED
PHASE C - E	SLUE F	PHASE C - YELLOW	PHASE C - BLUE
GROUND - G	GREEN (	GROUND - GREEN	GROUND - GREEN

- F. WIRING DEVICES
- 1. CONTRACTOR SHALL FURNISH AND INSTALL SWITCHES AND RECEPTACLES, UNLESS NOTED OTHERWISE, AS NECESSARY FOR A COMPLETE INSTALLATION. COLOR OF DEVICES AND PLATES SHALL BE WHITE UNLESS OTHERWISE NOTED. THE DEVICES SHALL BE OF THE TYPES AND RATINGS LISTED, OR EQUALS BY HUBBELL, BRYANT OR PASS & SEYMOUR. WEATHERPROOF GFI RECEPTACLES SHALL BE INSTALLED WHERE SHOWN ON DRAWINGS OR AS REQUIRED BY CODE.
- 2. ALL WIRING DEVICES SHALL BE HEAVY DUTY GRADE, CONFIGURATION TO SUIT SERVICE.
- G. HEATING, VENTILATION, PROCESS AND CONTROLS WIRING
- 1. THE ELECTRICAL CONTRACTOR SHALL REFER TO MECHANICAL AND CONTROL DETAILS ON MECHANICAL DRAWINGS FOR ADDITIONAL ELECTRICAL WORK TO BE INCLUDED IN HIS BID.
- ELECTRICAL CONTRACTOR SHALL DO ALL POWER WIRING, LINE VOLTAGE WIRING, AND LINE VOLTAGE CONTROL WIRING INDICATED UNDER THE HEATING AND VENTILATION SPECIFICATIONS AND DRAWINGS. THIS CONTRACTOR SHALL ALSO DO ALL INTERCONNECTING LINE VOLTAGE WIRING BETWEEN RELAYS AND DEVICES AS REQUIRED.
- 3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FURNISHING AN INSTALLING CONDUIT FOR HVAC CONTROL WIRING. ELECTRICAL CONTRACTOR SHALL GROUP DEVICES TOGETHER AS NEEDED TO MINIMIZE THE QUANTITY OF CONTROL CONDUITS. SIZE CONDUITS IN ACCORDANCE WITH NEC.
- H. SAFETY AND DISCONNECT SWITCHES
- SAFETY AND DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, QUICK-MAKE, QUICK-BREAK FUSED OR NON-FUSIBLE WITH RATINGS AND SIZES AS NOTED ON PLANS AND REQUIRED BY CODES.
- 2. AT SERVICE ENTRANCE, DISCONNECT SHALL BEAR THE MANUFACTURER'S LABEL INDICATING THE EQUIPMENT IS UL RATED FOR APPLICATION IN ACCORDANCE WITH ALL CODES.
- 3. MANUFACTURER SHALL BE GENERAL ELECTRIC, SQUARE D, EATON OR APPROVED EQUAL

ı. 1.	FURNISH AND INSTALL COMPLETE WIRED GROUNDING CONDUCTOR SYSTEM, #12 AWG MINIMUM, SIZED AND INSTALLED IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES, AND AS NOTED IN THE SPECIFICATIONS AND AS INDICATED ON THE DRAWINGS.		DEVELOPEMEN EMENT
2.	ALL CONDUIT, INCLUDING FLEXIBLE CONDUIT, SHALL BE GROUNDED WITH A GREEN GROUNDING CONDUCTOR.		DESIGN
3.	GROUNDING CONNECTIONS MADE TO THE WATER PIPING SYSTEM SHALL BE COORDINATED WITH THE PLUMBING CONTRACTOR AND A BONDING JUMPERS INSTALLED AROUND WATER METER PER CODES AND AS INDICATED ON DRAWINGS.		ED 30% ESIGN DE
4.	ALL DEVICES SHALL BE BONDED TO THE CONDUIT SYSTEM. USE A BONDING JUMPER BETWEEN THE OUTLET BOX AND THE DEVICE GROUNDING TERMINAL. METAL-TO-METAL CONTACT BETWEEN THE DEVICE YOKE AND THE OUTLET BOX IS NOT ACCEPTABLE AS A BOND FOR EITHER SURFACE MOUNTED BOXES OR FLUSH TYPE BOXES. ALL JUNCTION BOXES, OUTLET BOXES, AND PULL BOXES SHALL BE BONDED TO THE CONDUIT SYSTEM.		UPDA1 30% D
5.	FOR PANEL FEEDERS, BOND THE GROUNDING CONDUCTOR TO THE CONDUIT, WHERE ENTERING AND LEAVING THE CONDUIT. THE GROUNDING CONDUCTOR SHALL BE COPPER WITH GREEN IDENTIFICATION AND SIZED PER N.E.C.		01/15/21 12/31/20 Date
6.	ALL ENCLOSURES AND NON-CURRENT CARRYING METAL PARTS ARE TO BE GROUNDED. CONDUIT SYSTEM IS TO BE ELECTRICALLY CONTINUOUS. ALL LOCKNUTS MUST CUT THROUGH ENAMELED OR PAINTED SURFACES ON ENCLOSURES. WHERE ENCLOSURES ANDNON-CURRENT CARRYING METAL PARTS ARE ISOLATED FROM THE CONDUIT SYSTEM, USE BONDING JUMPERS WITH APPROVED CLAMPS. ALL GROUND CLAMPS SHALL BE "PENN-UNION" OR EQUAL, SIMILAR TO "GPL" TYPE.		B A Rev.
J.	LIGHTING FIXTURES		
1.	THE CONTRACTOR SHALL INSTALL ALL LIGHTING FIXTURES AND LAMPS AS SHOWN ON THE DRAWINGS.CONTRACTOR IS TO REPLACE ALL NON-WORKING LAMPS PRIOR TO ACCEPTANCE BY DOOSAN/OWNER.		
K.	SUBMITTALS		
1.	THE CONTRACTOR SHALL PROVIDE 5 COPIES OF (AS WELL AS ELECTRONIC) SUBMITTALS OF ALL INSTALLATION METHODS, MATERIALS AND ACCESSORIES FOR REVIEW AND APPROVAL.SUBMITTALS FOR EQUIPMENT SHALL SPECIFICALLY STATE "NEW" OR "RECONDITIONED" FOR EACH ITEM. RECONDITIONED EQUIPMENT SHALL REQUIRE SPECIFIC APPROVAL BY DOOSAN. SUBMITTALS SHALL BE ASSEMBLED AND SUBMITTED PRIOR TO ANY INSTALLATION WORK, AND SHOULD INCLUDE: WIRE CONDULT	/hitfield Street d, CT 06437	203) 453-8596 to@icdsllc.com <b>iONS, LLC</b>
•	DISCONNECT SWITCH SWITCHBOARD AND SWITCHGEAR - NEW AND MODIFICATIONS AND ACCESSORIES	19A W hullfor	hone:() mail: in o <i>lut</i>
•	ENCLOSURES CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS AND TEST BLOCKS	40	gn S
•	HEAT TRACE UTILITY METER WIREWAY, PULL BOX	$\sim$	Desi
			$\mathcal{Z}_{n}^{\ast}$
L. 1.	ACCEPTANCE TESTS:		nctic
•	TEST THE FOLLOWING IN ACCORDANCE WITH APPLICABLE SECTIONS OF THE LATEST NETA-ACCEPTANCE TESTING STANDARD. PROVIDE SERVICES OF A QUALIFIED ELECTRICAL TESTING COMPANY AS REQUIRED. TRANSFORMER SWITCHBOARD BREAKERS, RATED 250 A AND LARGER - BREAKERS SHALL BE TESTED USING PRIMARY INJECTION METHOD, WITH FINAL SETTINGS ADVISED BY THE ENGINEER IN A COORDINATION STUDY. PROTECTIVE RELAYS - BENCH TEST WITH FINAL SETTINGS. ALSO PROVIDE WITNESS TESTING		Innovative Constr
•	AS REQUIRED BY THE UTILITY COMPANY AND AHJ. ALSO INCLUDE THE SEL RELAYS PROVIDED IN THE FUEL CELLS. CONDUCTORS- MV CONDUCTORS SHALL BE HI-POT TESTED. PANELBOARDS DISCONNECT SWITCHES		
•	CT AND PTS. GROUNDING- USE FALL OF POTENTIAL METHOD AND CONTINUITY CHECKS.		
2.	ALL CONNECTIONS AT PANELS AND SWITCHES ARE TO BE MADE, ALL SPLICES COMPLETE, ALL FUSES IN PLACE, AND ALL CIRCUITS CONTINUOUS FROM POINT OF SERVICE CONNECTION TO ITS FINAL DESTINATION, AND ALL COVERS AND PLATES INSTALLED PRIOR TO THE TIME OF FINAL INSPECTION BY OWNERS ENGINEER.	CT CE	SNC
3.	UPON COMPLETION OF THE WORK, ALL PARTS OF THE ELECTRICAL INSTALLATION SHALL BE TESTED AND PROVED FREE OF UNWANTED GROUNDS AND OTHER DEFECTS.	$\square$ .	<b>TIC</b>
4.	ALL OVERLOAD DEVICES, INCLUDING EQUIPMENT FURNISHED UNDER OTHER CONTRACTS, SHALL BE SET AND ADJUSTED TO SUIT THE LOAD CONDITIONS.		CP
5.	TEST AND MAKE CORRECTIONS/ADJUSTMENTS FOR PHASE BALANCING.	≥i	Ē
6.	PROVIDE FINAL REPORT TO DOOSAN AT TIME OF PUNCH-OUT.	ΣŽ	С Ш
M.	CLEANING	00 × ×	PE
1.	AT THE END OF THE PROJECT, THE CONTRACTOR SHALL CLEAN ALL EQUIPMENT, TO THE SATISFACTION OF OWNER. ALL DUST, DIRT, DEBRIS, AND FOREIGN MATTER SHALL BE REMOVED	AN 0	ں ا
	FROM ALL EQUIPMENT.		AL
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			SDF
		Drawing No.:	SDF

C4.(

# ATTACHMENT B



March 24, 2021

Mr. James Kenney Doosan Fuel Cell America, Inc. 101 East Riverside Drive East Hartford, CT 06108 James.kenney@doosan.com

#### RE: Doosan Fuel Cell America, Inc – Bridgeport, Connecticut Fogging/Icing Dispersion Modeling Analysis

Dear Mr. Kenney:

This report was prepared by Trinity Consultants (Trinity) at the request of Doosan Fuel Cell American, Inc. (Doosan) with the purpose of describing the fogging and icing analysis performed for NuPower LLC's (NuPower) proposed project in Bridgeport, Connecticut. NuPower is proposing to construct, maintain, and operate a grid-side 9.66-Megawatt fuel cell facility and associated equipment in Bridgeport, Connecticut and have expressed the desire to evaluate the potential for source-induced fog from the proposed exhaust streams on a nearby roadway.

The analysis described in this document focuses on the modeling aspects of source-induced fogging events and summarizes the probability of such events based upon represented facility operations.

## **BACKGROUND INFORMATION**

NuPower is seeking approval from the Connecticut Siting Council for a fuel cell project located on a 0.5-acre private industrial site located adjacent to Interstate-95 (I-95). Trinity has simulated the stack plume impacts on the elevated I-95 to determine if there is an increased potential for fogging and icing conditions. Trinity conducted the fogging/icing modeling analysis utilizing the FOG module of the CALPUFF dispersion model<sup>1</sup>.

In summary, the conclusion in this report is that the fogging/icing modeling analysis predicts that the NuPower facility will have a negligible contribution to plume-induced fogging/icing conditions at the nearby roadway. Fogging/icing conditions are primarily driven by the existing, natural meteorological conditions in the region.

## **Facility Description**

The proposed facility is located in Bridgeport, Fairfield County, Connecticut. This 0.5-acre parcel of land is 0.61 meters in elevation, and is bordered by a railroad, Iranistan avenue, and I-95. The latitude and longitude are approximately 41.1686°N and 73.2006°W. The below Figure 1 is an aerial view of the facility.

The facility is located at the following address: 600 Iranistan Avenue Bridgeport, Connecticut 06605

<sup>&</sup>lt;sup>1</sup> http://www.src.com/

Mr. James Kenney - Page 2 March 24, 2021



#### Figure 1 – Bridgeport Facility - Aerial View

## **MODEL SELECTION AND STAGES**

Trinity utilized the California Puff (CALPUFF) model FOG codes (version 7.2.1) to determine the potential fogging and icing impacts from 21 exhaust chimneys. CALPUFF is a Lagrangian puff model that is typically used as a dispersion model for long-distance transport applications, complex terrain and coastal settings. It is also the only refined dispersion model with the encoded ability to perform visible water plume impacts. The "fogging mode" in CALPUFF allows the user to determine the frequency of visible plume impacts at discrete receptor points (receptor mode), as well as to predict the length and height of visible plumes (plume mode). This report will provide receptor mode impacts.

This modeling system contains pre- and post-processors to compute the visible plume length and fogging/icing statistics. To accommodate these pre- and post-processors, the fogging/icing modeling analysis includes three stages (each with an executable run). These stages are named after their executable and described in further detail below:

- Stage 1 FGEMISS. The first stage involves the pre-processor entitled "Flue Gas Emissions Processor" (FGEMISS). A control file (input file) is generated containing building information, stack release parameters, and water vapor emission rates. After running the FGEMISS executable, it generates a PTEMARB.DAT point source emission file which reformats the control file information. This file (.pt2 file extension) is used in the second stage of the modeling sequence.
- Stage 2 CALPUFFLite. The second stage requires generation of the CALPUFF Lite input file and running the so-called "CALPUFF Lite" dispersion model. Several model options are specified including

Mr. James Kenney - Page 3 March 24, 2021

meteorological and computational grids. A list of receptor data points, including their elevations, is included at the end of the input file. The PTEMARB.DAT file from stage 1, the input file, and meteorological data are utilized in the CALPUFF Lite run. The output file CALFOG.OUT is processed in the third stage of the modeling system.

Stage 3 - POSTRM2 (Receptor Mode). The third stage employs a post-processor. The CALPUFF FOG codes contain two post-processors: plume mode or receptor mode. Trinity selected the receptor mode post-processor which extracts the occurrences (e.g., number of hours) of background fogging/icing conditions and plume-induced fogging/icing conditions from the CALFOG.OUT file for specified data points (receptors).

In order to step through these three stages, Trinity collected the necessary meteorological and elevation datasets. Details about these datasets are briefly described below.

### **Meteorological Data**

In general, CALPUFF is known for utilizing more complex meteorological information; however, the CALPUFF FOG codes use an Industrial Source Complex (ISC)-like meteorological dataset similar to what is used in the regulatory preferred American Meteorological Society Environmental Protection Agency Regulatory Model (AERMOD). This meteorological data set used a meteorological pre-processer utility called CPRAMMET, which is a modification to PCRAMMET that augments its treatment of relative humidity when preparing a data file that is acceptable in CALPUFF.

This meteorological data set utilized National Weather Service (NWS) data from Igor I. Sikorsky Memorial Airport surface data (KBDR) and Brookhaven, NY upper air data (KOKX) for 2016 through 2020. KBDR is located approximately 6 kilometers due east of the proposed project and is the closest meteorological station with complete, high quality surface data.

### **Elevation Data**

Trinity was provided information indicating the I-95 roadway elevations nearby the proposed project. Building and source elevations were interpolated from 1/3 arc-second National Elevation Dataset (NED) data obtained from the U.S. Geological Survey (USGS) from datum year 1983 using the latest version of AERMAP (v18081). Buildings and sources at the facility were assumed to have the same base grade elevation.

## **MODEL SETUP AND ASSUMPTIONS**

This section contains information about the model setup and assumptions.

## **AERMOD Modeling Files**

Trinity prepared an AERMOD basefile to include all of the facility's proposed sources, buildings, and receptors. This AERMOD file was used to obtain the BPIP building downwash block data, coordinate information, and discrete receptor placement.

### **Coordinate System**

Trinity determined the locations of emission sources, structures, and receptors using the Universal Transverse Mercator (UTM) coordinate system, North American Datum 1983 (NAD83). This information was utilized in the CALPUFF input file setup.

Mr. James Kenney - Page 4 March 24, 2021

### **Building Downwash**

The emission units at the proposed facility were evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if stack discharges might become caught in the turbulent wakes of these structures leading to downwash of the plumes. Wind blowing around a building creates zones of turbulence that are greater than if the building were absent. For such modeling situations, the direction-specific building dimensions are used as model input. The projected building dimensions in this study were calculated using the U.S. EPA sanctioned Building Profile Input Program, PRIME version (BPIP PRIME), version 04274.

Building downwash characteristics are a required input variable for the FGEMISS control file. The Building Profile Input Program (BPIP) with Plume Rise Model Enhancements (PRIME) was utilized to determine the building downwash characteristics for each stack in 10 degree directional intervals. BPIP PRIME is the most recent, regulatory approved version of BPIP used for air dispersion modeling analyses for AERMOD.

The CALPUFF FOG module only implements BPIP (not BPIP PRIME) variables (which include building height and width information only). Therefore, Trinity ran BPIP PRIME but only incorporated the building height and width (not length) output in the FGEMISS control file. Table 1 lists the buildings included in the BPIP PRIME analysis.

Structure Name	X Dimension (feet)	Y Dimension (feet)	Building Height (feet)
Building 1	148.67	48.88	74.87

#### Table 1. Building Parameters

#### **Meteorological Data**

As previously noted, the meteorological data were processed from 2016 through 2020 and were considered in the fogging/icing modeling analysis. For reference, a wind rose outlining the wind conditions at the Igor I. Sikorsky Memorial Airport is included in Figure 2. The wind rose petals indicate the direction from which the wind is blowing. Mr. James Kenney - Page 5 March 24, 2021



## Figure 2. Igor I. Sikorsky Memorial Airport Wind Rose – Years 2016 through 2020

## **Elevation Data and Roadway Receptors**

NuPower provided the above ground elevation for the nearby I-95 elevated roadway. Trinity spaced receptors at 10-meter intervals and used an average elevation above ground level of 63 feet to represent the discrete receptors. Figure 3 shows a schematic of the model setup from AERMOD. The yellow "+" represent discrete receptors, the blue rectangle represents the building, and the teal dots represent the exhaust points.

Mr. James Kenney - Page 6 March 24, 2021



## Figure 3 – Discrete Receptor and Model Setup

## **Source Description**

Trinity conducted a fogging/icing modeling review specifically for the exhaust stacks which have exhaust air flows with high moisture content. The 21 exhaust stacks are represented in the model as vertical-oriented point sources, adjacent to a single structure. Figure 4 shows a closer aerial view at the model's stack locations, where the exhaust stacks are noted in as teal dots.

Mr. James Kenney - Page 7 March 24, 2021



#### Figure 4 – Stack Location Aerial View

These emission units were parameterized with the following modeling variables:

- Water vapor mass emission rate
- Gas exit temperature
- Gas exit velocity
- Stack height
- Stack Diameter
- Projected downwash dimensions

Table 2 summarizes the source parameters used in the CALPUFF modeling analysis.

Mr. James Kenney - Page 8 March 24, 2021

Description	X Coord. (m)	Y Coord. (m)	Elevation (m)	H <sub>2</sub> O Emission Rate (Ib/hr)	Stack Height (ft)	Stack Temp. (F)	Stack Velocity (acfm)	Stack Diameter (ft)
Stack 1	650958.5	4559028.2	0.61	461.0	82.88	114	2720	1.37
Stack 2	650959.0	4559028.4	0.61	461.0	82.88	114	2720	1.37
Stack 3	650959.6	4559028.7	0.61	461.0	82.88	114	2720	1.37
Stack 4	650960.7	4559029.2	0.61	461.0	82.88	114	2720	1.37
Stack 5	650961.2	4559029.5	0.61	461.0	82.88	114	2720	1.37
Stack 6	650961.7	4559029.7	0.61	461.0	82.88	114	2720	1.37
Stack 7	650964.6	4559031.2	0.61	461.0	82.88	114	2720	1.37
Stack 8	650964.1	4559031.0	0.61	461.0	82.88	114	2720	1.37
Stack 9	650963.5	4559030.8	0.61	461.0	82.88	114	2720	1.37
Stack 10	650965.5	4559031.8	0.61	461.0	82.88	114	2720	1.37
Stack 11	650966.0	4559032.0	0.61	461.0	82.88	114	2720	1.37
Stack 12	650966.4	4559032.2	0.61	461.0	82.88	114	2720	1.37
Stack 13	650978.8	4559038.8	0.61	461.0	82.88	114	2720	1.37
Stack 14	650978.3	4559038.5	0.61	461.0	82.88	114	2720	1.37
Stack 15	650977.8	4559038.2	0.61	461.0	82.88	114	2720	1.37
Stack 16	650979.7	4559039.2	0.61	461.0	82.88	114	2720	1.37
Stack 17	650980.2	4559039.5	0.61	461.0	82.88	114	2720	1.37
Stack 18	650983.5	4559041.2	0.61	461.0	82.88	114	2720	1.37
Stack 19	650983.9	4559041.4	0.61	461.0	82.88	114	2720	1.37
Stack 20	650984.8	4559041.9	0.61	461.0	82.88	114	2720	1.37
Stack 21	650985.2	4559042.0	0.61	461.0	82.88	114	2720	1.37

**Table 2. Model Source Parameters** 

## MODEL RESULTS AND CONCLUSIONS

Following the steps and setup outlined in the previous sections, Trinity conducted the fogging/icing modeling analysis for the NuPower facility. The output of the "receptor mode" post processor provides the following explanation (note "RH" and "Conc" indicate relative humidity and concentration, respectively).

- "Background fog" hours are those where the background RH = 100%, Temp > 32°F
- "Background ice" hours are those where the background RH = 100%, Temp ≤ 32°F
- "Plume-induced fog" hours are those where the background RH < 100%, Total Conc. > Saturation, Temp > 32°F
- "Plume-induced ice" hours are those where background RH < 100%, Total Conc. > Saturation, Temp ≤ 32°F

The "background" values are based on the existing meteorological conditions as derived from the meteorological data processing. The plume-induced fogging/icing conditions occur when the natural relative humidity is less than 100% and the total concentration of the water in the air when considering the

Mr. James Kenney - Page 9 March 24, 2021

additional plume moisture is greater than saturation. Considering meteorological years 2016-2020, the modeling results are provided in Table 3.

Event	2016	2017	2018	2019	2020
Background Fog	1	1	59	28	27
Background Ice	1	0	0	0	0
Total Background Fog + Ice	2	1	59	28	27
Plume-Induced Fog	0	0	1	1	1
Plume-Induced Ice	0	0	0	1	0
Total Plume-Induced Fog + Ice	0	0	1	2	1

Table 3. CALPUFF F	OG Model	Fogging/Icing	Results
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The results presented in Table 3 demonstrate that the NuPower facility would have a negligible contribution to the amount of icing conditions at the nearby roadway. Over the 2016-2020 winter seasons, the modeled plume-induced ice produced only one (1) hour of icing conditions. Likewise, the NuPower facility would have a negligible contribution to fogging conditions at the nearby roadway. As a point of comparison, the facility modeled plume-induced fogging conditions produced 3 hours of fog over calendar years 2016-2020 while natural meteorological conditions produced 116 hours over the same timeframe.

In conclusion, this modeling analysis report predicts the NuPower fuel cell facility will have a negligible contribution to plume-induced fogging/icing induced impact on the nearby Interstate 95. Fogging/icing conditions are primarily driven by the existing, natural meteorological conditions in the region.

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If you have any questions or comments about the information presented in this letter, please do not hesitate to call me at 847-334-2603.

Sincerely,

TRINITY CONSULTANTS

monellallace

Simone Wallace Senior Consultant

Attachments

cc: Mr. Tony Schroeder, Trinity Consultants

# ATTACHMENT C





























# ATTACHMENT D

Daesan Hydrogen Fuel Cell Power Plant



11111420v1

# ATTACHMENT E



# ATTACHMENT F

u W

Customer:	NuPower
Location:	Bridgeport Heat Loop
System:	PureCell <sup>®</sup> Model 400
QNTY:	21
Electrical Utilization:	100%
High Grade Heat Utilization:	100%
Low Grade Heat Utilization:	0%
Cooling Utilization:	0%
Heating Fuel:	Natural Gas
eGrid Sub-region (see map):	NEWE
T&D Losses:	4.88%

Annual Emissions Balance	Energy Balance		Emissions Balance		
Sheet	Electricity (kWh)	Fuel (MMBTU)	CO2 (m	NOx etric tons - M	SOx T)
Facility Avoided Emissions	(84,313,577)	(158,063)	(43,083)	(19.37)	(4.68)
On-Site Power Emissions	0	715,631	38,026	0.73	0.00
BALANCE	(84,313,577)	557,568	(5,057)	(18.64)	(4.68)

Date: 2/25/2021

Emissions Summany	Emissions Reduction				
Emissions Summary	Metric Tons	Equivalence	%		
CO <sub>2</sub>	5,057	1167 acres of trees	12%		
NOx	18.64	1069 cars	96%		
SO <sub>2</sub>	4.68		100%		
Water	35,909,153 gal	54.6 olympic pools	100%		

Utility emissions factors based on U.S. EPA eGRID 2018 for fossil fuel generation in sub-region.

# ATTACHMENT G

#### **CITY OF BRIDGEPORT, CONNECTICUT**

999 BROAD STREET BRIDGEPORT, CONNECTICUT 06604 TELEPHONE (203) 576-7201 FAX (203) 576-3913

October 13, 2020

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

Dear Ms. Bachman:

Re: Petition No. 1406 - Doosan Fuel Cell America, Inc. petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a grid-side 9.66-megawatt fuel cell facility and associated equipment to be located at 600 Iranistan Avenue, Bridgeport, Connecticut, and associated electrical interconnection to the United Illuminating Company's existing Congress Street Substation

The City of Bridgeport has been working closely with Doosan and NuPower in their plans for a fuel cell project to be located at 600 Iranistan Avenue on a vacant property bounded by Railroad Avenue and I-95. The City has met with representatives from the project on several occasions and the City has appreciated the project's collaborative outreach efforts. The plans for this project are consistent with the overall intent of Plan Bridgeport – Bridgeport's Plan of Conservation and Development (POCD). The City is very comfortable in taking the position that this project is in the best interests of the City and will provide significant fiscal and conversation benefits. If the project is approved by the Council it will deliver additional tax revenue to the City, create employment opportunities and encourage the development of and significantly contribute to Connecticut's clean energy future.

Our City has gained a well-deserved reputation for innovation, resilience and sustainability through the support and adoption of projects like these. As Connecticut's most populous city located along Long Island Sound, we are keenly aware of the dangers associated with global warming and especially with rising sea levels. This is truly a unique opportunity to bring all the environmental and financial benefits together under one project.

The City supports the Connecticut Siting Council approval of this Project and we are looking forward in anticipation to the start of its construction.

seph P. Gresko

Green Initiatives Coordinator City of Bridgeport



GENERAL ASSEMBLY

February 4, 2021

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

Re: Petition No. 1406A - NuPower Bridgeport FC LLC

Dear Ms. Bachman,

The Bridgeport legislative delegation has worked closely with NuPower in connection with their plans to use a vacant property near I-95 for use as an approximately 10-megawatt renewable energy facility. We have discussed this project with NuPower for the past seven years and are keenly aware of NuPower's efforts to bring the fuel cell project and the associated thermal loop to fruition. We have appreciated the collaborative efforts of NuPower.

It is our opinion that the fuel cell project will benefit the City and the State both environmentally and economically by providing clean renewable energy while not having an adverse environmental effect. This project advances Connecticut's renewable energy goals and contributes to the state grid reliability. It is also worth noting that the fuel cell technology is Connecticut based and will support hundreds of state jobs.

We understand that during the Council's initial consideration of this project that various questions and concerns were raised about the safety of the project as well as various impacts the project may have on the surrounding community. We have discussed the project with NuPower and it is our understanding these issues will be fully addressed in this new petition. Therefore, the undersigned are in support of this facility pending Connecticut Siting Council review and approval.

Sincerely,

Christopher Rosario State Representative 128<sup>th</sup> District

Antonio Felipe State Representative 130<sup>th</sup> District

Steven Stafstrom State Representative 129<sup>th</sup> District

Dennis Bradley Senator Dennis Bradley 23rd Senate District


Together we are the BRBC!

March 5, 2021

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

Re: Petition No. 1406A - NuPower Bridgeport FC LLC

Dear Ms. Bachman,

The Bridgeport Regional Business Council has supported NuPower's efforts to establish a thermal loop connected to a fuel cell in Bridgeport since the project got underway in 2014. District heating is arguably the most efficient and environmentally attractive approach to heating cities and is well established in many European and U.S. locations.

The location of the fuel cell on Iranistan Ave in between the I-95 overhead highway and the Metro-North tracks is ideal; creating significant economic benefit on property for which there is little economic potential. Since the location is cut off from surrounding businesses and residences, we view it as uniquely suited for this use.

The fuel cells are manufactured in our state resulting in Connecticut jobs. The majority of the construction work will also go to local companies and workers.

For these reasons we ask your approval of the petition and look forward to a thermal loop in Bridgeport.

Sincerely,

that Off

Dan Onofrio President & CEO Bridgeport Regional Business Council 203-335-3800

BRIDGEPORT REGIONAL BUSINESS COUNCIL (BRBC) | WHERE COMMERCE & COMMUNITY CONNECT CHAMBERS OF COMMERCE: Bridgeport, Stratford, and Trumbull LEADERSHIP PROGRAMS | NETWORKING GROUPS: Business Referral Network (BRN) | CEO Peer Group | Leadership Greater Bridgeport THRIVE: Emerging Leaders | Women's Leadership Network ECONOMIC DEVELOPMENT AFFILIATE: Bridgeport Economic Development Corporation 10 MIDDLE STREET, 14 <sup>FL</sup> | BRIDGEPORT, CT 06604 | P: 203.335.3800 | F: 203.366.0105 | www.brbc.org

# ATTACHMENT H

# **CERTIFICATION OF SERVICE OF PETITION**

Pursuant to section 16-50/(b) of the Connecticut General Statutes, I hereby certify that on or before March 31, 2021, I caused a copy of NuPower Bridgeport FC, LLC's petition to the Connecticut Siting Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property") to be served upon the individuals and agencies set forth on Attachment A.

By

Bruce L. McDermott Murtha Cullina LLP One Century Tower 265 Church Street New Haven, CT 06510 (203) 772-7787 bmcdermott@murthalaw.com

### Attachment A

#### Petition Service List

Joseph P. Ganim Mayor City of Bridgeport Margaret E. Morton Government Center 999 Broad Street Bridgeport, CT 06604

Neil Bonney Zoning Enforcement Officer Zoning Department City Hall 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Lydia N. Martinez City Clerk 45 Lyon Terrace, Room 204 Bridgeport, CT 06604

Senator Dennis Bradley 853 Fairfield Avenue Bridgeport, CT 06604

Attorney General William Tong Office of the Attorney General 165 Capitol Avenue Hartford, CT 06106

Katie Dykes Commissioner Connecticut Department of Energy and Environmental Protection 79 Elm Street Hartford, CT 06106-5127 Dennis Buckley Zoning Administrator/Zoning Official Zoning Department City Hall 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Melville T. Riley, Jr. Acting-Chairperson Planning & Zoning Commission City Hall 45 Lyon Terrace Room 210 Bridgeport, CT 06604

The Inland Wetlands and Watercourses Agency of the City of Bridgeport Dennis Buckley Zoning Administrator Zoning Department 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Representative Antonio Felipe 666 Iranistan Avenue Bridgeport, CT 06605

Margaret Q. Chapple Deputy Attorney General Office of the Attorney General Ten Franklin Square New Britain, CT 06051

Randy Fiveash Director Connecticut Office of Tourism 450 Columbus Blvd. Suite 5 Hartford, CT 06103 Matt Fulda Executive Director Connecticut Metropolitan Council of Governments 1000 Lafayette Boulevard Suite 925 Bridgeport, CT 06604-4902

Deidre S. Gifford, MD Acting Commissioner Department of Public Health 410 Capitol Avenue Hartford, CT 06134

Joseph Giulietti Commissioner Department of Transportation 2800 Berlin Turnpike Newington, CT 06111

David Lehman, Commissioner Economic & Community Development Department 450 Columbus Boulevard Hartford, CT 06103

Susan D. Merrow Chair Connecticut Council on Environmental Quality 79 Elm Street Hartford, CT 06106

Michelle H. Seagull Commissioner Department of Consumer Protection 450 Columbus Boulevard Suite 901 Hartford, CT 06103-1840

Kurt Westby Commissioner Connecticut Department of Labor 200 Folly Brook Boulevard Wethersfield, CT 06109 Josh Geballe Commissioner Department of Administrative Services Office of the Deputy Commissioner 450 Columbus Boulevard Hartford, CT 06103

Marissa Paslick Gillett Chairman Public Utilities Regulatory Authority Ten Franklin Square New Britain, CT 06051

Bryan P. Hurlburt Commissioner Connecticut Department of Agriculture 450 Columbus Boulevard, Suite 701 Hartford, CT 06103

Melissa McCaw Secretary Office of Policy and Management 450 Capitol Avenue Hartford, CT 06106

James C. Rovella Commissioner Department of Emergency Services and Public Protection 1111 Country Club Road Middletown, CT 06457

Richard Sobolewski Acting Consumer Counsel Office of Consumer Counsel Ten Franklin Square New Britain, CT 06051



March 31, 2021

Joseph P. Ganim Mayor City of Bridgeport Margaret E. Morton Government Center 999 Broad Street Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mayor Ganim:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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March 31, 2021

Dennis Buckley Zoning Administrator/Zoning Official Zoning Department City Hall 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Buckley:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

Bruce L. McDermott

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March 31, 2021

Neil Bonney Zoning Enforcement Officer Zoning Department City Hall 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Bonney:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

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March 31, 2021

Melville T. Riley, Jr. Acting-Chairperson Planning & Zoning Commission City Hall 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Riley:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

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March 31, 2021

Lydia N. Martinez City Clerk 45 Lyon Terrace, Room 204 Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Ms. Martinez:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

m.

Bruce L. McDermott

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

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March 31, 2021

The Inland Wetlands and Watercourses Agency of the City of Bridgeport Dennis Buckley Zoning Administrator Zoning Department 45 Lyon Terrace, Room 210 Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Buckley:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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March 31, 2021

Senator Dennis Bradley 853 Fairfield Avenue Bridgeport, CT 06604

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Senator Bradley:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Representative Antonio Felipe 666 Iranistan Avenue Bridgeport, CT 06605

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Representative Felipe:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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March 31, 2021

Attorney General William Tong Office of the Attorney General 165 Capitol Avenue Hartford, CT 06106

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Attorney General Tong:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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March 31, 2021

Margaret Q. Chapple Deputy Attorney General Office of the Attorney General Ten Franklin Square New Britain, CT 06051

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Ms. Chapple:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Katie Dykes Commissioner Connecticut Department of Energy and Environmental Protection 79 Elm Street Hartford, CT 06106-5127

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Dykes:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Bruce L. McDermott

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March 31, 2021

Randy Fiveash Director Connecticut Office of Tourism 450 Columbus Blvd. Suite 5 Hartford, CT 06103

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Fiveash:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

Bruce L. McDermott

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March 31, 2021

Matt Fulda Executive Director Connecticut Metropolitan Council of Governments 1000 Lafayette Boulevard Suite 925 Bridgeport, CT 06604-4902

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Fulda:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Josh Geballe Commissioner Department of Administrative Services Office of the Deputy Commissioner 450 Columbus Boulevard Hartford, CT 06103

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Geballe:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

Bruce L. McDermott

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March 31, 2021

Deidre S. Gifford, MD Acting Commissioner Department of Public Health 410 Capitol Avenue Hartford, CT 06134

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Ms. Gifford:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Marissa Paslick Gillett Chairman Public Utilities Regulatory Authority Ten Franklin Square New Britain, CT 06051

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Gillett:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Joseph Giulietti Commissioner Department of Transportation 2800 Berlin Turnpike Newington, CT 06111

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Giulietti:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Bryan P. Hurlburt Commissioner Connecticut Department of Agriculture 450 Columbus Boulevard, Suite 701 Hartford, CT 06103

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Hurlburt:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

Bruce L. McDermott

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March 31, 2021

David Lehman, Commissioner Economic & Community Development Department 450 Columbus Boulevard Hartford, CT 06103

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Lehman:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

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Respectfully submitted,

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March 31, 2021

Melissa McCaw Secretary Office of Policy and Management 450 Capitol Avenue Hartford, CT 06106

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Ms. McCaw:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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March 31, 2021

Susan D. Merrow Chair Connecticut Council on Environmental Quality 79 Elm Street Hartford, CT 06106

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Ms. Merrow:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

Murtha Cullina LLP 265 Church Street New Haven, CT 06510 7 203.772.7700 F 203.772.7723

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March 31, 2021

James C. Rovella Commissioner Department of Emergency Services and Public Protection 1111 Country Club Road Middletown, CT 06457

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Rovella:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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March 31, 2021

Michelle H. Seagull Commissioner Department of Consumer Protection 450 Columbus Boulevard Suite 901 Hartford, CT 06103-1840

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Seagull:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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March 31, 2021

Richard Sobolewski Acting Consumer Counsel Office of Consumer Counsel Ten Franklin Square New Britain, CT 06051

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Sobolewski:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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March 31, 2021

Kurt Westby Commissioner Connecticut Department of Labor 200 Folly Brook Boulevard Wethersfield, CT 06109

Re: NuPower Bridgeport FC, LLC Petition for a Declaratory Ruling for the Proposed Construction, Maintenance and Operation of a 9.66-Megawatt Fuel Cell Facility and Associated Equipment to be Located at 600 Iranistan Avenue, Bridgeport, Connecticut

Dear Commissioner Westby:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that will involve the installation of a 9.66-megawatt fuel cell facility, an electrical interconnection and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property"). NuPower will be seeking a petition for a declaratory ruling from the Connecticut Siting Council ("Council") that no Certificate of Environmental Compatibility and Public Need is necessary for the installation of the Facility at the Property.

The purpose of this letter is to provide you with notice of the intent of NuPower to file its Petition with the Council. The Petition will be submitted on or after March 31, 2021. Section 16-50n(a) of the Connecticut General Statutes provides that each person entitled to receive a copy of a Petition under § 16-50/ may become a party to the proceeding by giving the Council a notice of intent to be a party. The Council's address is: Connecticut Siting Council, 10 Franklin Square, New Britain, CT 06051.

Respectfully submitted,

Bruce L. McDermott

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

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## CERTIFICATION OF SERVICE UPON ABUTTING PROPERTY OWNERS

Pursuant to section 16-50/(b) of the Connecticut General Statutes, I hereby certify that on or before March 31, 2021, I caused notice of the intent of NuPower Bridgeport FC, LLC to file a petition with the Connecticut Siting Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is necessary for the construction, maintenance and operation of a grid-side 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") to be located at 600 Iranistan Avenue, Bridgeport, Connecticut to be sent to abutting property owners of the Property with a letter describing the Project. The list of the abutting property owners who were notified and a sample notification letter, which was sent to these abutting property owners, are found on <u>Attachment A</u>.

By

Bruce L. McDermett

Bruce L. McDermott Murtha Cullina LLP One Century Tower 265 Church Street New Haven, CT 06510 (203) 772-7787 bmcdermott@murthalaw.com

# Attachment A

	ADDRESS	OWNER NAME	MAILING ADDRESS
1	34 Norman Street	Norman Street Associates LLC	323 North Avenue Bridgeport, CT 06604
2	828 Railroad Avenue	Norman Street Associates LLC	323 North Avenue Bridgeport, CT 06604
3	619 Iranistan Avenue #621	Cabrera-Astudillo Kleber O	621 Iranistan Ave Bridgport, CT 06605
4	629 Iranistan Avenue	Juan Santiago	629 Iranistan Ave Bridgport, CT 06605
5	790 Railroad Avenue	DOS JAY LLC	1540 Iranistan Avenue Bridgeport, CT 06604
6	778 Railroad Avenue	Adam Uszkiewicz	778 Railroad Avenue #782 Bridgeport, CT 06604
7	770 Railroad Avenue	Trefz Management Co. Inc.	P.O. Box 310 Bridgeport, CT 06601
8	756 Railroad Avenue	Trefz Management Co. Inc.	P.O. Box 310 Bridgeport, CT 06601
9	746 Railroad Avenue	Kenneth Lombardi	8 Huntington Street Suite 141 Shelton, CT 06484
10	740 Railroad Avenue	RR Ave LLC	26 Manor Drive Monroe, CT 06468
11	772 Railroad Avenue	RR Ave LLC	26 Manor Drive Monroe, CT 06468
12	225 Black Rock Avenue	Calzone Brothers Partnership	225 Black Rock Avenue Bridgeport, CT 06605
13	188 Garden Street	New Beginnings Family	184 Garden Street Bridgeport, CT 06605
14	141 Garden Street	New Beginnings Family	184 Garden Street Bridgeport, CT 06605
15	816 South Avenue	816 South Avenue, LLC	816 South Avenue Bridgeport, CT 06605
16	816 South Avenue	816 South Avenue, LLC	816 South Avenue Bridgeport, CT 06605
17	840 South Avenue	Maria and Theresa Nunes	840 South Avenue Bridgeport, CT 06604
18	500 Iranistan Avenue	Jose Maria Nunes	500 Iranistan Avenue Bridgeport, CT 06605
19	478 Iranistan Avenue	Maria and Theresa Nunes	840 South Avenue Bridgeport, CT 06604

ilret.	ADDRESS	OWNER NAME	MAILING ADDRESS
20	455 Iranistan Avenue	Iranistan Ave Venture LLC	154 Admiral Street Bridgeport, CT 06601
21	32 Washburn Street	54 Washburn Street LLC	54 Washburn Street Bridgeport, CT 06605





March 31, 2021

Norman Street Associates LLC 323 North Avenue Bridgeport, CT 06604

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

If you would like more information concerning the proposed Project, please visit the Project website at https://portal.ct.gov/CSC/1\_Applications-and-Other-Pending-Matters/Pending-Matters or you may email NuPower at sguilmartin@me.com.

Sincerely,

Bruce L. McDermott

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

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March 31, 2021

Kleber Cabrera-Astudillo Kleberee 621 Iranistan Ave Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Neighbor:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

If you would like more information concerning the proposed Project, please visit the Project website at https://portal.ct.gov/CSC/1\_Applications-and-Other-Pending-Matters/Pending-Matters or you may email NuPower at sguilmartin@me.com.

Sincerely,

Bruce L. McDermott

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

CONNECTICUT + MASSACHUSETTS + NEW YORK


BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860.240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Juan Santiago 629 Iranistan Avenue Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Mr. Santiago:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

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Sincerely,

Bruce L. McDermott

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

CONNECTICUT + MASSACHUSETTS + NEW YORK



BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860 240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

DOS JAY LLC 1540 Iranistan Avenue Bridgeport, CT 06604

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

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Sincerely,

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860.240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Adam Uszkiewicz 778 Railroad Avenue #782 Bridgeport, CT 06604

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Mr. Uszkiewicz:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

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Sincerely,

Bruce L. McDermott

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

CONNECTICUT + MASSACHUSETTS + NEW YORK



BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860 240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Trefz Management Co. Inc. P.O. Box 310 Bridgeport, CT 06601

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

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Sincerely,

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860.240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW COM

March 31, 2021

Kenneth Lombardi 8 Huntington Street Suite 141 Shelton, CT 06484

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Mr. Lombardi:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

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Sincerely,

Bruce L. McDermott

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

CONNECTICUT + MASSACHUSETTS + NEW YORK



BRUCE L MCDERMOTT 203.772 7787 DIRECT TELEPHONE 860.240 5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

RR Ave LLC 26 Manor Drive Monroe, CT 06468

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

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Sincerely,

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860.240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Calzone Brothers Partnership 225 Black Rock Avenue Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

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Sincerely,

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203.772.7787 DIRECT TELEPHONE 860.240.5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

New Beginnings Family 184 Garden Street Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

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Sincerely,

Cur ~

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203,772,7787 DIRECT TELEPHONE 860,240,5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW COM

March 31, 2021

816 South Avenue, LLC 816 South Avenue Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

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Sincerely,

Bruce L. McDermott

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

CONNECTICUT + MASSACHUSETTS + NEW YORK



BRUCE L. MCDERMOTT 203,772,7787 DIRECT TELEPHONE 860,240,5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Maria and Theresa Nunes 840 South Avenue Bridgeport, CT 06604

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Mses. Nunes:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

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Sincerely,

Sala

Bruce L. McDermott

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BRUCE L. MCDERMOTT 203,772,7787 DIRECT TELEPHONE 860,240,5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Jose Maria Nunes 500 Iranistan Avenue Bridgeport, CT 06605

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

Dear Mr. Nunes:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

Since the Project is very near your property, NuPower is committed to keeping you informed.

This letter is to provide you notice that on or about March 31, 2021, NuPower intends to submit to the Connecticut Siting Council a petition for a declaratory ruling, pursuant to Connecticut General Statutes Sections 4-176 and 16-50k, for the proposed construction, maintenance, and operation of the Project. The Council will undertake a thorough review of the proposed Project and consider input from interested stakeholders. If the Project is approved by the Council, NuPower anticipates starting construction in second half of 2021 with completion in 2022. This schedule is approximate and subject to change. Please note this work will not interrupt electric service to homes or businesses.

If you would like more information concerning the proposed Project, please visit the Project website at https://portal.ct.gov/CSC/1\_Applications-and-Other-Pending-Matters/Pending-Matters or you may email NuPower at sguilmartin@me.com.

Sincerely,

Bruce L. McDermott

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

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BRUCE L. MCDERMOTT 203,772,7787 DIRECT TELEPHONE 860,240,5723 DIRECT FACSIMILE BMCDERMOTT@MURTHALAW.COM

March 31, 2021

Iranistan Ave Venture LLC 154 Admiral Street Bridgeport, CT 06601

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

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Sincerely,

Bruce L. McDermott

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

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March 31, 2021

54 Washburn Street LLC 54 Washburn Street Bridgeport, CT 06650

Re: Notice to Owners of Property Abutting Proposed Fuel Cell Project

To Whom It May Concern:

NuPower Bridgeport FC, LLC ("NuPower") is undertaking a project that involves the installation of a 9.66-megawatt fuel cell facility and associated equipment (collectively, the "Project") located at 600 Iranistan Avenue, Bridgeport, Connecticut (the "Property").

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Sincerely,

Bruce L. McDermott

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

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# ATTACHMENT I



Alan McBride Director, Transmission Services & Resource Oualification

July 14, 2020

Mr. Edward Roedel Avangrid 100 Marsh Hill Road Orange, CT 06418

Subject: Bridgeport Fuel Cell Project - Proposed Plan Application (PPA) UI-20-G03

Dear Mr. Roedel:

This letter is to inform you that, pursuant to review under Section I.3.9 of the ISO Tariff, no significant adverse effect has been identified with regard to the following PPA:

**UI-20-G03** – Generator application from Avangrid/United Illuminating (UI), for the Bridgeport Fuel Cell Project. The in-service date of the project is December 1, 2021. The Reliability Committee (RC) reviewed the materials presented in support of the proposed project and did not identify a significant adverse effect on the reliability or operating characteristics of the transmission facilities of UI, the transmission facilities of another Transmission Owner or the system of any other Market Participant.

Having given due consideration to the RC review, ISO New England has determined that implementation of the plan will not have a significant adverse effect upon the reliability or operating characteristics of the Transmission Owner's transmission facilities, the transmission facilities of another Transmission Owner, or the system of a Market Participant.

A determination under Section I.3.9 of the ISO Tariff is limited to a review of the reliability impacts of a proposed project as submitted by Participants and does not constitute an approval of a proposed project under any other provisions of the ISO Tariff.

Sincerely,

/s/ Al McBride Alan McBride Director, Transmission Services and Resource Qualification

cc: Proposed Plan Applications

# ATTACHMENT J

A Column Internet

### State of California AIR RESOURCES BOARD Executive Order DG-047 Distributed Generation Certification of Doosan Fuel Cell America, Inc. 460 kW PureCell Model 400

WHEREAS, the Air Resources Board (ARB) was given the authority under California Health and Safety Code section 41514.9 to establish a statewide Distributed Generation (DG) Certification Program to certify electrical generation technologies that are exempt from the permit requirements of air pollution control or air quality management districts;

WHEREAS, this DG Certification does not constitute an air pollution permit or eliminate the responsibility of the end user to comply with all federal, state, and local laws, rules and regulations;

WHEREAS, on October 26, 2017, Doosan Fuel Cell America, Inc. applied for a DG Certification of its 460 kW PureCell Model 400 fuel cell power plant and whose application was deemed complete on February 7, 2018;

WHEREAS, Doosan Fuel Cell America, Inc. has demonstrated, according to test methods specified in title 17, California Code of Regulations (CCR), section 94207, that its natural-gas-fueled 460 kW PureCell Model 400 fuel cell power plant has complied with the following emission standards:

- 1. Emissions of oxides of nitrogen no greater than 0.07 pounds per megawatt-hour; and
- 2. Emissions of carbon monoxide no greater than 0.10 pounds per megawatt-hour; and
- 3. Emissions of volatile organic compounds no greater than 0.02 pounds per megawatt-hour.

WHEREAS, Doosan Fuel Cell America, Inc. has demonstrated that its 460 kW PureCell Model 400 fuel cell power plant complies with the emission durability requirements in title 17, CCR, section 94203 (d);

WHEREAS, I find that the Applicant, Doosan Fuel Cell America, Inc., has met the requirements specified in article 3, title 17, CCR, and has satisfactorily demonstrated that the 460 kW PureCell Model 400 fuel cell power plant meets the DG Certification Regulation 2007 Fossil Fuel Emission Standards;

NOW THEREFORE, IT IS HEREBY ORDERED, that a DG Certification, Executive Order DG-047 is granted.

This DG Certification:

- 1) is subject to all conditions and requirements of the ARB's DG Certification Program, article 3, title 17, CCR, including the provisions relating to inspection, denial, suspension, and revocation; and
- shall be void if any manufacturer's modification results in an increase in emissions or changes the efficiency or operating conditions of a model, such that the model no longer meets the DG Certification Regulation 2007 Fossil Fuel Emission Standards; and
- 3) shall expire on the 5th day of April, 2023.

Executed at Sacramento, California, this 6th day of April 2018.

/S/

Floyd V. Vergara, Esq., P.E. Chief, Industrial Strategies Division

# ATTACHMENT K



April 29, 2020

Mr. Walter Bonola Doosan Fuel Cell America, Inc. 195 Governor's Highway South Windsor, CT 06074

### Re: Soil Sample Collection & Laboratory Analysis Undeveloped Parcel, Railroad Avenue & Iranistan Avenue, Bridgeport, Connecticut

Dear Mr. Bonola:

Berkshire Environmental Services & Technology, LLC (Berkshire) conducted soil sample collection and laboratory analysis at the above-referenced Site to characterize soil conditions in the vicinity of the proposed construction area.

On April 14, 2020 Berkshire was on-site to collect soil samples from soil borings completed by your geotechnical drilling contractor, Clarence Welti Associates, Inc. A total of five (5) representative soil borings were advanced at the Site (SB-1, SB-2, SB-3, SB-4, and SB-5) in the anticipated work area. The soil borings were advanced to depths ranging from approximately 6 feet below grade in SB-1 to 10 feet below grade in SB-2 and SB-5 with the use of a hollow stem auger drilling rig. Figure 1, attached, depicts the soil boring locations.

Two (2) soil samples for laboratory analysis were collected from representative intervals at each boring location. Additionally, a total of 21 soil samples were field-screened for the presence volatile organic compounds (VOCs) utilizing a photoionization detector. No PID responses were recorded in any of the soil samples.

Soil samples submitted for laboratory analysis were collected as follows:

- SB-1/0-2 (0 to 2 feet below grade from SB-1)
- SB-1/4-6 (4 to 6 feet below grade from SB-1)
- SB-2/2-4 (2 to 4 feet below grade from SB-2)
- SB-2/8-10 (8 to 10 feet below grade from SB-2)
- SB-3/1-3 (1 to 3 feet below grade from SB-3)
- SB-3/5-7 (5 to 7 feet below grade from SB-3)
- SB-4/1-3 (1 to 3 feet below grade from SB-4)
- SB-4/5-7 (5 to 7 feet below grade from SB-4)
- SB-5/0-2 (0 to 2 feet below grade from SB-5)
- SB-5/7-9 (7 to 9 feet below grade from SB-5)

The soil samples were submitted for laboratory analysis to Phoenix Environmental Laboratories, Inc. (Phoenix) in Manchester, Connecticut under proper chain of custody protocol. Phoenix is a

Mr. Walter Bonola / Doosan Fuel Cell America, Inc. April 29, 2020 Page 2

Connecticut-certified laboratory. The samples were analyzed in accordance with the Reasonable Confidence Protocols (RCPs) established by the CT DEEP.

The soil samples were submitted for laboratory analysis for the following parameters:

- Volatile Organic Compounds (VOCs) via EPA Method 8260 (5035 Sample Collection Method)
- Semi-Volatile Organic Compounds (SVOCs) via EPA Method 8270
- Polychlorinated Biphenyls (PCBs) via EPA Method 8082
- State of Connecticut Extractable Total Petroleum Hydrocarbons (CT ETPH)
- RCRA 8 Metals via total analysis
- RCRA 8 Metals via the Synthetic Precipitate Leaching Procedure (SPLP)
- Pesticides via EPA Method 8081
- Herbicides via EPA Method 8151

Soil samples submitted for VOC analysis were collected in accordance with the procedures outlined in the CT DEEP Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory Determination of Volatile Organic Compounds (March 1, 2006). Specifically, undisturbed soil samples were collected with disposable TerraCore samplers and weighed. The samples were subsequently placed into pre-weighed, laboratory-preserved vials containing methanol and deionized water in accordance with EPA Method 5030 / 5035, and placed into a cooler and maintained at 4°C until delivery to the laboratory under proper chain of custody protocol.

The laboratory analytical results did not reveal the presence of VOCs, TPH, PCBs, or herbicides at concentrations above their respective laboratory reporting limits. Low concentrations of SVOCs, pesticides, and metals were detected in the samples. The detected concentrations are generally consistent with levels typically encountered within urban fill. All detected concentrations are below the Residential Direct Exposure Criteria, Industrial/Commercial Direct Exposure Criteria, and GB Pollutant Mobility Criteria as outlined in the State of Connecticut Remediation Standard Regulations. The soil represented by the soil borings is appropriate for re-use on the Site, however, this soil would not suitable for export as clean fill to any other property.

The laboratory analytical results are summarized on Table 1 in Appendix B and the complete laboratory analytical results are included in Appendix C.



Mr. Walter Bonola / Doosan Fuel Cell America, Inc. April 29, 2020 Page 3

Thank you for the opportunity to work with you on this project. Please feel free to contact me at (860) 482-6399 or via e-mail at fwright@best-env.com. If you have any questions regarding this letter.

Sincerely yours, Berkshire Environmental Services & Technology, LLC

R 140

Francis Wright Principal / Geologist

Sens W Cha

James W. Ciaglo, III, LEP Senior Project Manager

Attachments: Appendix A – Site Sketch Appendix B – Summary Table Appendix C - Laboratory Analytical Results

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### ATTACHMENT L



# ATTACHMENT M

### Prepared For: Doosan Fuel Cell America Inc.

Point of Contact: Walter Bonola

# Prepared by: Acoustical Technologies Inc. **50 Myrock Avenue** Waterford, CT 06385-3008

Subject: Bridgeport New Power **Twenty-One Fuel Cells Airborne Noise Assessment** At 600 Iranistan Avenue

Author: Carl Cascio

Date: May 8, 2020

Revision: 1

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### Country of Origin is the United States of America

#### Summary

This document makes an acoustic assessment that should help in meeting any acoustic noise concerns during the operation of twenty-one Doosan 460 KW fuel cells at the 600 Iranistan Avenue site in Bridgeport, CT. An acoustic assessment plan was developed and executed to acquire airborne acoustic information to explain and mitigate the potential airborne noise issues associated with operation of the Doosan fuel cells. It is important to show that the airborne noise generated by the fuel cells will not significantly impact the facility's neighbors. On site acoustic testing after installation of the fuel cells is recommended to confirm that the acoustic environment at the nearby properties due to the fuel cells is acceptable.

The airborne noise levels expected to be generated by the twenty-one Doosan fuel cells operating at the Bridgeport site were simulated by exciting a set of six co-located speakers at the fuel cell Cooling and Power Module positions. (The Cooling Module is the dominant noise source.) The six speakers produced an overall airborne noise level that was 6 to 12 dB higher than the levels measured for a similar Doosan fuel cell installed at New Britain High School in New Britain, CT. One-third octave band analysis showed the speakers to be near the New Britain fuel cell airborne noise levels at frequencies up to 250 Hertz where the airborne noise levels were low and to exceed the fuel cell signature by 5 to 20 dB at higher frequencies where the fuel cell signature was higher in noise level. Airborne noise with the speakers operating was measured at distances from 5 to 160 meters from the proposed fuel cell locations at the Bridgeport site. The speakers produced overall A-weighted sound pressure of approximately 86 to 87 dBA at 5 meters and 77 to 84 dBA at 10 meters (ref 20 microPascals) from the proposed fuel cell locations at ground level. Airborne noise from the speakers at nearby properties was measured at levels from 53 to 73 dBA. The highest property line measurement was 73 dBA at 571 Iranistan Avenue. Industrial Zone measurements on Railroad and South Avenues were lower because of the longer distance to the speakers. Beyond 80 meters the speakers could not be heard. Analysis of the speaker data indicated propagation losses from 8 to 25 dB from the fuel cell location to the nearby property lines. The acoustic source level at 10 meters from the operation of a Doosan fuel cell at New Britain High School was then used as a basis for making the Doosan fuel cell airborne noise estimates at all the locations. Airborne noise estimates from one fuel cell were than scaled up to 21 fuel cells using the "noisetools" application to account for the height of the installed Cooling and Power Modules. A power summation of the twenty-one individual Cooling and Power Module estimates was then used to produce an overall sound level at each of six property lines.

Operation of the twenty-one Doosan fuel cells without noise mitigation may produce noise levels above both the Industrial and Residential Zone noise limits at some of the closest nearby properties. Background noise levels at properties near Interstate 195 often exceed the 51 dBA night time noise limit. The closest Residential Zone properties may be above the night time residential noise limit of 51 dBA with predicted airborne noise levels of 58 to 62 dBA with the twenty-one fuel cells on. These predicted levels may not exceed the background noise by 5 dB. The nearest industrial property at 571 Iranistan Avenue could see a noise level of 70 to 71 dBA. Airborne noise levels along South and Railroad Avenues should be below 69 dBA. The highest expected residential airborne noise level may be 62 dBA at the residence at 720 Black Rock Avenue. Other nearby residences on Black Rock Avenue should see similar noise levels. Airborne noise from the twenty-one fuel cells might have to be mitigated to preclude the combined Cooling and Power Module noise from exceeding both the 70 dBA industrial limit and the night time residential limit of 51 dBA. This mitigation should be designed to provide sufficient sound attenuation to show that the airborne noise generated by the fuel cells will not significantly impact the facility's very closest neighbors. The major goal to reduce the airborne noise to levels below 51 dBA or below 5 dB above background at the nearby residences on Black Rock, Garden and South Avenues is recommended. This will also reduce the airborne noise along Railroad Avenue where the few residences in the Industrial Zone will also benefit.

The Connecticut's Noise Code (Reference 1) also calls for review of acoustic issues associated with impulse noise, prominent discrete tones, infrasonic and ultrasonic noise. Operation of the twenty-one fuel cells is expected to meet all of these requirements at all of the nearby properties.

### Introduction

Acoustical Technologies Inc. was tasked as part of a Doosan site permitting process with an assessment of potential acoustic issues associated with fuel cell airborne noise reaching the properties adjacent to 600 Iranistan Avenue in Bridgeport, CT. Responding to a request from Walter Bonola, a site visit was made on April 23, 2020. During the visit, a survey of the airborne noise levels produced by a set of speakers simulating the airborne noise produced by a Doosan Fuel Cell was made in order to identify potential airborne noise issues. Airborne noise measurements were taken to quantify the propagation of the simulated fuel cell airborne noise to the adjacent properties. Background airborne noise levels were also made with the speakers off. This document provides an acoustic assessment to assist in meeting acoustic noise concerns during the permitting process for the siting of twenty-one Doosan fuel cells at 600 Iranistan Avenue in Bridgeport, CT.

#### **Development of the Acoustic Assessment Plan**

The purpose of this effort is to acquire acoustic information useful in explaining the potential airborne noise issues associated with the operation of twenty-one Doosan 460-kiloWatt fuel cells at 600 Iranistan Avenue in Bridgeport, CT. The site at 600 Iranistan Avenue is located in a Mixed Use – Light Industrial Zone near Interstate 95 and is surrounded by a Mixed Use – Light Industrial Zone to the west and Industrial Light Zones to the north and south, as well as Residential Multi-Family Zones to the north, north east and south east. (The Bridgeport zoning map near the site is given below.) It is important to determine whether the airborne noise generated by the twenty-one Doosan fuel cells will impact these neighbors.

The acoustic impact is assessed in the following way. The 460-KW fuel cells are yet to be installed so there is no way to measure fuel cell operating airborne noise levels at the new site. The fuel cell airborne noise has been measured at other sites and both overall and one-third octave band airborne noise data of Doosan 400- and 460-KW fuel cells are available (References 2 and 3). The only difference between the 400-KW and 460-KW fuel cells is the electrical output of the cell stacks. The rest of the hardware including fans and fan noise remain the same between the models. Using this data, a set of six speakers have been programmed through a set of octave and one-third octave band filters to generate a noise spectrum similar to that of the new fuel cells. (It is assumed that the Cooling and Power Module noise in the two measured units are similar to the new units.) This spectrum will then be played through an audio amplifier to create the electrical voltage necessary to drive the six speakers. In order to overcome the potentially high background noise at the site the speaker output will be increased to levels that vary from 6 to 12 dB higher than the overall airborne noise level measured on one 460-KW fuel cell at a distance of 10 meters.

With the six speakers on, this approach then follows the traditional "What is the airborne noise level at the neighbor's property line?". The six speakers were run and airborne measurements made near the proposed fuel cell locations and at the nearest neighbor's property lines. This measured site data can also be used to estimate noise levels at other neighbor's property lines. Using the measurements for one fuel cell, the performance of twenty-one fuel cells will then be scaled up to account for all the fuel cells operating at the same time. The City of Bridgeport has

a Noise Ordinance (Ref. 4) with similar noise requirements to the State of Connecticut's Noise Ordinance and both have been consulted to assess the impact of the measured and estimated acoustic levels. Because of the closeness of the fuel cell site to the nearby properties noise mitigation may be recommended if the airborne noise estimated for the twenty-one fuel cells comes near or exceeds the airborne noise requirements at the neighbors' property lines.

#### Acoustic Measurement Program

The acoustic data necessary to assess the impact of the twenty-one fuel cells are described below: Airborne sound pressure measurements and audio tape recordings were conducted at the 600 Iranistan Avenue site on April 23, 2020 during the daylight hours (11 am -2 pm). This testing established both background airborne noise levels and simulated airborne noise levels with the speakers operating. The overall A-weighted airborne noise measurements were made with an ExTech model 407780A Digital Sound Level Meter (s/n 140401544) that was calibrated prior to and just after the test with a Quest model QC-10 Calibrator (s/n Q19080194). Measurements were taken with A-weighting (frequency filtering that corresponds to human hearing) and with the sound level meter in a Slow response mode. For reference, a noise level increase of 1 dB is equal to an airborne sound pressure increase of 12.2 per cent. The audio tape recordings were made with a Sony Digital Audio Tape Recorder (model TCD-D7 s/n 142000) with microphones on channels 1 and 2. The two PCB microphones (model 130F20 s/n 53933 and 130F20 s/n 53994) were powered by two Wilcoxon P702B power supply/amplifiers (s/n 1992 and 1995 respectively). The PCB microphones were also calibrated prior to and after the test with the Quest model QC-10 Calibrator (s/n Q19080194). All of the measurements were made with the microphones and sound level meter at a height above ground between five and six feet. A Hewlett Packard model HP3561A Dynamic Signal Analyzer, s/n 2338A00659, was used to perform A-weighted spectral analysis on the tape-recorded data. The tape-recorded data were also used to verify the ExTech sound level meter overall dBA readings.

At the 600 Iranistan Avenue site "speaker on" and background airborne noise measurements were taken near the two speaker locations and at the following nine nearby property lines:

Location	Business	Distance	Zone Type
A - 600 Iranistan Avenue	Building North End	5 &10 meters	MU Industrial Light
B - 600 Iranistan Avenue	Building South End	5 &10 meters	MU Industrial Light
P1 – 792 Railroad Avenue	Residence	80/68 meters	Industrial Light
P2-780 Railroad Avenue	Residence	65/63 meters	Industrial Light
P3 – 756 Railroad Avenue	Business	50/68 meters	Industrial Light
P4 – 744 Railroad Avenue	Greenskeeper Lawn	58/52 meters	Industrial Light
P5 – 571 Iranistan Avenue	Business	60/25 meters	MU Industrial Light
P6-478 Iranistan Avenue	Nunes Auto	80/75 meters	Industrial Light
P7 – 840 South Avenue	Nunes Auto Repairing	75/85 meters	Industrial Light
P8 – 800 South Avenue	Veolia Water	93/120 meters	Industrial Light
P9 – Garden & Railroad Ave	Parking Lot 160/19	5 meters Resid	ential M-Family

See the Google satellite map in Figure 1 for the approximate measurement locations. Position A was located at the center of the east end of the building while Position B was at the center of the

west end. Measurements at 5 and 10 meters from these proposed operating Cooling and Power Module sites were simultaneously taken with the ExTech sound level meter and two microphones recording on the digital tape recorder. Figures 2 and 3 provide photographs of the site locations for Positions A and B as well as the sensors at 5 and 10 meters. At speaker locations A and B, a one to two-minute record of the acoustic noise was stored for the speakers in the "on" condition at the start and end of the airborne noise measurements. There was a decrease of about 4 dB in sound output from the speakers for Position B. One minute of background airborne noise data were also recorded after the speaker "on" measurements.



Figure 1. Bridgeport - 600 Iranistan Avenue Site Map from Google Maps

Airborne noise measurements taken outside are corrupted by rain and wind so a day was selected when the winds were expected to be 10 miles per hour or less. Table 1 provides the weather data at New Haven Airport (closest data to 600 Iranistan Avenue) for the acoustic measurements on April 23, 2020. Measurements were taken over the period from 11:00 am until 2:00 pm. The table below shows the temperature and wind speeds in hourly intervals. Wind conditions were very good for most of the day with only one period as high as 10 mph (12:53 pm). Acoustic

measurements were further enhanced by the shielding provided by the railroad wall to the west. The wind did not affect the operating and background airborne noise measurements. There was no rain during the testing on April 23. The traffic noise from Interstate 95 next to the 600 Iranistan Avenue site generated most of the background noise for all of the measurement locations. Motor traffic along Iranistan, South and Railroad Avenues was light and few of the measurements had to be delayed until no traffic was present. Background noise levels at all but one of the measurement positions were acceptable with levels from 53 to 56 dBA. The locations nearest to the I95 highway had the highest levels (60 - 63 dBA). The noise level at Garden and Railroad (P9) was 61 dBA, 10 dB above the residential night time noise requirement. This background noise level would made it difficult to hear the speakers at any level below 55 dBA.

Figure 2. Position A – Building North End at the Bridgeport 600 Iranistan Avenue Site



Table 1. Approximate Bridgeport (East Haven) Weather Data on April 23, 2020
https://www.wunderground.com/history/daily/KHVN/date/2020-4-23

Time (EST)	Temp. (°F)	Humidity (%)	Dew Point (°F)	Barometer (in HG)	Wind Speed (mph)	Wind Direction	Condition
7:53 AM	41 F	49 %	23 F	30.06 in	6 mph	WSW	PartlyCloudy
8:53 AM	41 F	45 %	21 F	30.07 in	5 mph	WNW	Cloudy
9:53 AM	42 F	43 %	21 F	30.09 in	5 mph	SSW	Cloudy
10:53 AM	43 F	43 %	22 F	30.08 in	5 mph	WSW	Cloudy
11:53 AM	44 F	45 %	24 F	30.07 in	8 mph	SSW	Cloudy
12:53 PM	44 F	45 %	24 F	30.06 in	10 mph	SW	Cloudy
1:53 PM	44 F	51 %	27 F	30.05 in	6 mph	WSW	Cloudy
2:53 PM	45 F	46 %	25 F	30.03 in	9 mph	WSW	Cloudy
3:53 PM	45 F	52 %	28 F	30.02 in	9 mph	SSW	Cloudy
4:53 PM	45 F	52 %	28 F	30.00 in	3 mph	S	Cloudy

Figure 3. Position B - Building South End at the Bridgeport 600 Iranistan Avenue Site



Note: The speakers were raised to a height of about 10 feet above ground to provide a better path for sound to reach over the railroad tracks to the north (as shown in Figure 2).

#### **Data Analysis**

This section analyzes the airborne noise levels measured at the Bridgeport site and then estimates the source level and transmission loss to nearby property lines expected during actual fuel cell operation. Both background noise levels at the Bridgeport 600 Iranistan Avenue site and the measured speaker operating noise levels are reported in Table 2. The background data are used to correct the measured operating airborne noise levels providing estimates of only the speaker noise contribution at each location. Table 3 then reports estimated equipment operating noise levels for a single fuel cell. A following section will then develop noise estimates for all twenty-one fuel cells. Comparing the twenty-one-fuel cell estimated levels with the state and city noise limits will identify which nearby locations may or may not meet the airborne noise requirements. Position P10 is at 753 South Avenue at the bottom of Figure 1. Position P11 is at 270 Black Rock Avenue and is shown at the top of Figure 1. These and P9 are the closest residences in the nearby Residential Zones and will be analyzed to determine their expected airborne noise levels.

The complete set of overall A-weighted airborne noise levels measured at the Iranistan Avenue site are provided in Table 2 for the conditions with the speakers on and off. The range from the speakers to the microphone locations shown in Table 3 were calculated with Google Maps. Each value is the range to the center of the Position A and B speaker locations. The closest location is P5, which is about 25 meters south west from Position B to the business across the street at 571 Iranistan Avenue. The second closest location is P3, which is about 50 meters to the north from Position A and is a business that is on the other side of the railroad tracks. The next closest measurement locations where the speakers could actually be heard were at distances from 52 to

80 meters from the speakers. Beyond 80 meters the speakers could not be heard. The closest residential zone property is 110 meters to the north at 270 Block Rock Avenue. The residential properties along Garden and South Avenues are at least 165 meters away. Airborne noise at the residential zone locations to the north, north east and south east could not be heard when the speakers were operating due to the high background noise level from Interstate 95.

Location	Speakers A	Background	Bkgd Corrected	Speakers B	Background	Bkgd Corrected
Speaker 5 m	87.1	65.3	87.1	85.9	62.3	85.9
Speaker 10 m	83.7	65.4	83.6	77.5	64.6	77.3
P1 – 792 Railroad Ave	57.0	58	<50	63.6	58	62.2
P2 – 780 Railroad Ave	58.5	57	53.2	61.2	57	59.1
P3 – 756 Railroad Ave	60.3	56	58.3	58.7	56	55.4
P4 – 744 Railroad Ave	60.3	59	54.4	58.2	59	<50
P5 – 571 Iranistan Ave	64.5	63	59.2	73.1	63	72.7
P6 – 478 Iranistan Ave	63.7	58	62.4	63.9	58	62.6
P7 – 840 South Ave	63.3	59.5	61.0		59.5	-
P8 – 800 South Ave	63.6	60.6	60.6		60.6	-
P9 – Garden&Railroad	60.4	61	<55	61.7	61	53.5

Table 2. Measured Overall Sound Pressure Levels in dBA reference 20 microPascals

Figure 4. Bridgeport Zoning Map Showing the Doosan Fuel Cell Site



A comparison of the airborne noise produced at 10 meters by the Doosan fuel cell at the New Britain High School site with the airborne noise produced by the speakers at the Bridgeport site is shown in Figure 5. The speakers are near the fuel cell airborne noise for frequencies below 250 Hertz and greatly exceed the fuel cell airborne noise at the middle frequencies where the fuel cell airborne noise levels are the highest. The overall airborne noise levels are 12.1 and 5.8 dB higher for the speakers at Site A and Site B locations, respectively, as compared to what was expected from the Doosan 460 KW fuel cell that was measured at New Britain High School in New Britain, CT. The differences in level were subtracted from the Bridgeport measured levels to estimate the expected fuel cell's acoustic signature at each location for a 10-foot-high source. These noise calculations are displayed in Table 3 below. The New Britain fuel cell airborne noise levels at 10 meters for one fuel cell were used with the Bridgeport speaker data to estimate the expected single fuel cell airborne noise for nearby neighbors at the Bridgeport 600 Iranistan Avenue property lines. Next, we will scale the expected airborne noise for twenty-one fuel cells.

Fuel Cell Versus Speaker Comparison in dBA re 20 uPa Fuel Cell Versus Speaker Comparison in dBA re 20 uPa Fuel Cell Versus Speaker Comparison in dBA re 20 uPa Position A at 10 m Position A at 10 m Position B at 10 m Posi

Figure 5. At 10 Meters, 6 Speakers Generate Airborne Noise Above That of a Single Fuel Cell

The estimated airborne noise levels to be produced by a single Doosan fuel cell are shown in Table 3. For each of the nine locations the Bridgeport measurements are corrected to account for the higher speaker levels. The fuel cell noise correction at the Site A Cooling Module location is estimated to be 12.1 dB because the speaker levels are that much higher than the New Britain fuel cell level. The speakers at the Site B Power Module were estimated to be 5.8 dB higher. (These estimates are based on the overall dBA readings for the two sets of measurements. If individual one-third octave band values were calculated and then averaged over the frequencies of interest, the result would be numbers about 1 higher. The lower, more conservative overall noise level values were used in this report to scale the speaker data.)

The measurements at the 600 Iranistan Avenue site were taken at various distances from the speakers and then background corrected. Close to the speakers at 571 Iranistan Avenue the maximum airborne noise values are expected to be as high as 67 dBA for one fuel cell, which is slightly below the industrial noise limit. A pure power summation of 21 fuel cells would bring this number up to 80 dBA. This is not expected because most of the 21 fuel cells are much further away than 25 meters. Only three are at the west end of the building while the others can be as far as 60 meters away. However, the three closest fuel cells, if at ground level, would add about 4.7 dB to the noise level and produce about 72 dBA at the 571 Iranistan Avenue neighbor. The other significant difference from the Bridgeport measurements and the actual installation is that the Cooling Modules that generate most of the airborne noise will be located on the fourth floor of the building, some 51 feet above the ground level. This is 41 feet higher than where the speakers were and this difference in height needs to be addressed. All the other industrial properties are expected to have levels from a single fuel cell below 57 dBA for a single fuel cell. A pure power summation of 21 fuel cells would bring this number up to about 70 dBA, the industrial limit. This is not expected to happen because most of the units would be at greater distances and higher up on the building. The two highest levels at locations P3 and P6 will be analyzed to confirm that twenty-one fuel cells will not exceed the industrial noise limit. Nearby property in the Residential Zones to the north, north east and south east will also be analyzed.

Location	Range in Meters A / B	Speakers at A	Correction	Position A Estimated SPL in dBA	Speakers at B	Correction	Position B Estimated SPL in dBA
P1 – 792 Railroad Ave	80/68	<50	-12.1	<38	62.2	-5.8	56.4
P2 – 780 Railroad Ave	65/63	53.2	-12.1	41.1	59.1	-5.8	53.3
P3 – 756 Railroad Ave	50/68	58.3	-12.1	46.2	55.4	-5.8	49.6
P4 – 744 Railroad Ave	58/52	54.4	-12.1	42.3	<50	-5.8	44.2
P5 – 571 Iranistan Ave	60/25	59.2	-12.1	47.1	72.7	-5.8	66.9
P6 – 478 Iranistan Ave	80/75	62.4	-12.1	50.3	62.6	-5.8	56.8
P7 – 840 South Ave	75/85	61.0	-12.1	48.9		-5.8	-
P8 – 800 South Ave	93/120	60.6	-12.1	48.5	-	-5.8	=,
P9 – Garden & Railroad	160/195	<55	-12.1	42.9	53.5	-5.8	47.7

Table 3. Expected Overall Sound Pressure Levels, dBA ref. 20 microPascals for One Fuel Cell

Red indicates locations above the industrial noise limit of 70 dBA – there are no levels that high
The propagation of sound from the Cooling Modules on the fourth floor of a building is analyzed in the following way. The Cooling Module configuration has 21 modules in three rows of seven each. The first calculation concerns the propagation to the property at 571 Iranistan Avenue. The first three cooling modules are approximately 25 meters horizontal from the property line. The next three cooling modules are about 29.2 meters away, followed by three at 33.4 meters, followed by three at 37.6 meters, followed by three at 41.8 meters, followed by three at 46 meters, and followed by the last three at 50.2 meters. Sound estimates will be calculated at each of these distances and 4.8 dB added to the results for the three units at each distance. The estimates will be made for receiver heights of 5, 15 and 25 feet to account for multiple floors in the business at 571 Iranistan Avenue. The individual calculations will be power summed to account for all 21 fuel cell cooling modules. A similar process will be used for the Power Modules on the second and third floors of the building. The acoustic propagation tool at <u>http://noisetools.net/noisecalculator2</u> will be used to provide the calculations for the individual modules. The input acoustic power for a single fuel cell is taken from Table 7 of Reference 2.

A typical Cooling Module calculation is shown in Figure 6 below. The cooling module is 51 feet (15.5 m) above ground while the 4<sup>th</sup> floor is at 45 feet (13.7 m). The middle of the building is about 17.8 meters from the west end of the building. The receiver is 78 feet (23.9 m) from the west end of the building at a height of 5 feet. The estimated SPL is 43 dBA from one cooling module. The other distances have Cooling Module airborne noise levels that vary from a high of 59.2 dBA at the west end to a low of 40 dBA at the east end. These levels are power summed.



Figure 6. 571 Iranistan Avenue Noise Estimate - Cooling Module in the Middle of the Building

Location	Height	21 Total	21 Cooling	21 Power	Max	Max 5 Foot
	in feet	Estimate	Modules	Modules	Value	Measurement
P5 – 571	_					
Iranistan Ave	5	69.9	67.2	66.6		
P5 – 571					71.4	Noise Tool Est
Iranistan Ave	15	70.7	68.1	67.1		69.9
P5 – 571						Currently only
Iranistan Ave	25	71.4	69.2	67.5		2 story
P6-478						
Iranistan Ave	5	65.1	63.6	59.9		
P6-478					65.8	Noise Tool Est
Iranistan Ave	15	65.4	63.8	60.2	00.0	65.1
P6 – 478						Required
Iranistan Ave	25	65.8	64.3	60.3		70 dBA
P3 – 756						
Railroad Ave	5	67.9	66.6	62.2		
P3 – 756					68.9	Noise Tool Est
Railroad Ave	15	68.5	67.1	63.0	00.7	67.9
P3 – 756						
Railroad Ave	25	68.9	67.5	63.4		
P9 – Garden						
& Railroad	5	57.6	<b>56.3</b>	51.8		
P9 – Garden					58 1	Noise Tool Est
& Railroad	15	57.9	56.6	52.0	50.1	57.6
P9 – Garden						Required
& Railroad	25	58.1	56.8	52.1		51 dBA
P10 - 753						(night time)
South Avenue	5	57.8	56.5	51.7		
P10 - 753					59.4	Noise Tool Est
South Avenue	15	58.1	56.9	51.9	50.1	55.8
2 Story Only						
on South Ave						
P11 – 270						
Black Rock	5	61.0	59.7	55.3		
P11 – 270					61.6	Noise Tool Est
Black Rock	15	61.3	60.0	55.5	01.0	59.0
P11-270						
Black Rock	25	61.6	60.4	55.6		

Table 4. Expected Overall Sound Pressure Levels, in dBA ref. 20 microPascals

The calculations for sources at different heights are based on the acoustic propagation tool at <u>http://noisetools.net/noisecalculator2.</u> To calibrate this tool, it was used to check the measurements that were made with the speakers at a height of 10 feet. Measured data from four of the property lines was compared to the "noisetools" result for the same speaker – receiver

distances. The average difference between the measurements and the "noisetools" results was 0.2 dB. Because some differences were plus and some minus the standard deviation was 2 dB. For example, the measured level at 571 Iranistan Avenue was 72.7 dBA while the calculation was 69.7 dBA. To adjust for this variability 2 dB was added to the estimate for 21 fuel cells.

The calculation results for expected airborne noise are shown in Table 4 above. The highest airborne noise levels are expected to be at 571 Iranistan Avenue in the Industrial Zone. The expected level is just above the noise requirement and varies from 0.1 dB below to 1.4 dB above the allowed level depending on the receiver height (or floor). The maximum airborne noise at 478 Iranistan Avenue and 756 Railroad Avenue are at least 4 dB and 1 dB below the requirement, respectively. Other Industrial Zone properties should be further below the requirement. The three estimates for residential properties are expected to be from 6.6 dB to 10.6 dB over the residential zone night time noise limit of 51 dBA.

Figures 7, 8 and 9 show typical cooling and power module calculations for the properties at 478 Iranistan and 756 Railroad Avenue as well as the property at the corner of Garden and Railroad. Figure 7 shows the Cooling Module calculation for the units at the north end of the building. Figure 8 shows the Power Module calculation for the units at the south end of the building. Figure 9 shows the Power Module calculation for the units at the west end of the building. For each address the individual calculations are combined to produce a total noise level for the 21 Cooling Modules on the 4<sup>th</sup> floor as shown above. Similar calculations are made for the 21 Power Modules on the 2<sup>nd</sup> and 3<sup>rd</sup> floors. The third column has the total airborne noise. The two floors of Power Module noise estimates are combined in the results shown in the fifth column.





#### Figure 8. 756 Railroad Avenue Noise Estimate - Power Module at Opposite End of the Building



Figure 9. Garden & Railroad Ave Estimate - Cooling Module at Opposite End of the Building



Sound Propagation Level Calculator

Interactive poise source to receiver diagram with parrier calculations

#### **Allowable Noise Levels**

The Connecticut regulation for the control of noise provides in *CT section 22a-69-3* (Ref. 1) the requirements for noise emission in Connecticut. *CT section 22a-69-3*.1 states that no person shall cause or allow the emission of excessive noise beyond the boundaries of his/her Noise Zone so as to violate any provisions of these Regulations. The Bridgeport Noise Ordinance has the same noise levels as the CT Noise Ordinance but redefines daytime and night time as "Day-time hours means the hours between seven a.m. and six p.m. Monday through Friday, and the hours between nine a.m. through six p.m. on Saturday and Sunday" (Reference 4). These ordinances will be used to evaluate the noise generated by the twenty-one Doosan 460 KW fuel cells. Following sections discuss each type of noise using the results obtained from the New Britain and Mount Sinai fuel cell measurements as well as the Bridgeport speaker measurements.

The southern part of the Bridgeport zoning map near Iranistan Avenue is given in Figure 4. As stated above, this site at 600 Iranistan Avenue is located in a Mixed Use Industrial Light Zone near Interstate 95 and is surrounded by Mixed Use Industrial Light Zone to the west, Residential Zones to the north, north east and south east as well as Industrial Light Zones to the north and south. The closest residential property is 110 meters away on Black Rock Avenue to the north on the other side of the Amtrak tracks in a R-C Residential Multi-Family Zone. Other residences to the north east and south east are at least 160 meters away. Sound from the ATI speakers cannot be heard or measured at any of these locations. The acoustic estimates from position P9 show that the speaker noise was below 55 dBA at a distance of 160 meters.





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#### **Impulse** Noise

The Connecticut noise code states in *CT section 22a-69-3.2* (part a) *Impulse Noise* that no person shall cause or allow the emission of impulse noise in excess of 80 dB peak sound pressure level during the night time to any class A Noise Zone. Night time is defined as 10 pm to 7 am. *CT section 22a-69-3.2 (part b) Impulse Noise* states that no person shall cause or allow the emission of impulse noise in excess of 100 dB peak sound pressure level at any time to any Noise Zone. Bridgeport has the same 80 dB and 100 dB noise limits but defines night time as 6 pm to 7 am.

Impulse noise in excess of 80 dB was not observed on the tape-recorded data during any of the measurements of the Doosan 460 KW fuel cell made at the New Britain High School on 30 July, 2018. This fuel cell design is similar to the unit that will be installed in Bridgeport. Given the steady state nature of the fuel cell's noise signature there should be no acoustic issues with the Bridgeport and State of Connecticut's impulse noise requirements.

A few words are in order to discuss the difference between A-weighted and un-weighted impulse noise. A-weighting emphasizes the middle and higher frequencies while reducing the influence of the low frequencies. Figure 10 plots the A-weighting curve versus frequency in blue. Below a frequency of 1 kiloHertz the acoustic level is attenuated by increasing amounts. The reduction is about 10 dB at 200 Hertz, 20 dB at 90 Hertz and 30 dB at 50 Hertz. It also reduces the level at very high frequency being down in level by 10 dB at 20 kiloHertz.

#### **Prominent Discrete Tones**

The Connecticut regulation for the control of noise states in *CT section 22a-69-3.3 Prominent discrete tones:* Continuous noise measured beyond the boundary of the Noise Zone of the noise emitter in any other Noise Zone which possesses one or more audible discrete tones shall be considered excessive noise when a level of 5 dBA below the levels specified in section 3 of these Regulations is exceeded. Bridgeport's noise regulations do not mention discrete tones. The CT Regulations establish different noise limits for different land use zones. Residential (homes and condominiums) and hotel uses are in Class A. Schools, parks, recreational activities and government services are in Class B. Forestry and related services are in Class C. By my reading of the regulations the 600 Iranistan Avenue fuel cells are a Class C emitter in an Industrial Zone. The noise zone standards in *CT section 22a-69-3.5* state that a Class C emitter cannot exceed the following overall sound pressure levels:

To Class C 70 dBA To Class B 66 dBA To Class A 61 dBA (day) 51 dBA (night)

The discrete tones limits are 5 dBA lower so that no tone may be higher than the following:

To Class C 65 dBA To Class B 61 dBA To Class A 56 dBA (day) 46 dBA (night)

To address the discrete tone issue, we use measured data from the testing of a similar Doosan fuel cell (Reference 3). This data does not have A-weighting. The photo in Figure 11 plots the airborne noise measured 10 meters from the Mount Sinai Cooling Module (Reference 3) for frequencies from 0 to 1000 Hertz. This curve shows the two largest discrete tones produced by

the Doosan Fuel Cell Cooling Module. The first tone is at 86 Hertz at a level of 65 dB reference 20 microPascals. The second tone is at 630 Hertz at a level of 56 dB reference 20 microPascals. (88.6 dB added to the dBV values in the figure.) The A-weighting corrections are -21.5 dB at 86 Hertz and -1.9 dB at 630 Hertz. Incorporating these corrections gives A-weighted levels of 44 dBA at 86 Hertz and 54 dBA at 630 Hertz (for one fuel cell) both at a distance 10 meters from the Cooling Module. The minimum transmission loss to the property to the south west is 8 dB and 21 Cooling Modules adds 7.2 dB so the maximum possible discrete tone would be 53 dBA at 571 Iranistan Avenue. This level is below the 65 dBA requirement in an Industrial Zone. The minimum transmission loss to the closest Residential Zone property to the north is at least 25 dB and 21 Cooling Modules add 11 dB so the maximum possible discrete tone would be 40 dBA at 270 Black Rock Avenue. This level is below the 46 dBA requirement in a Residential Zone. Operating the twenty-one Doosan fuel cells should produce airborne noise levels well below the CT discrete tone requirement at all the property lines. There should be no acoustic issue with the CT discrete tone noise requirements.

#### Infrasonic and Ultrasonic Noise

The Connecticut regulation for the control of noise states in *CT section 22a-69-3.4 Infrasonic* and Ultrasonic that no person shall emit beyond his/her property infrasonic or ultrasonic sound in excess of 100 dB at any time. 100 dB with respect to the reference of 20 microPascals is a sound pressure of 2 Pascals or 0.00029 psi. Infrasonic sounds are sound pressure fluctuations below a frequency of 20 Hertz. Ultrasonic sounds are sound pressure fluctuations at frequencies above 20,000 Hertz. Bridgeport's noise regulations do not mention infrasonics and ultrasonics.

Narrow bandwidth sound pressure spectrums in dB reference 20 microPascals at the 10-meter Cooling Module location given in Reference 3 can be used to compare with these Infrasonic and Ultrasonic noise requirements. Mount Sinai Hospital airborne noise data were processed in the 0 to 100 Hertz and 0 to 100,000 Hertz frequency ranges. The bandwidth of each data point is 0.375 Hertz for the 100 Hertz range and 375 Hertz for the 100,000 Hertz frequency range. The infrasonic noise for frequencies up to 20 Hertz is shown in Figure 12. The maximum level at 10 meters is 57 dB reference 20 microPascals for one fuel cell. The entire 20 Hertz band can be power summed and equals 66 dB reference 20 microPascals, well below the requirement at 10 meters. The closest property is at 25 meters so the maximum possible infrasonic noise would be 65.2 dBA at the south western property line. All the other industrial locations will be below 63 dBA. The resident property at 270 Black Rock Avenue will see levels of 43 dB.

The ultrasonic noise for frequencies up to 100 KiloHertz is given in Figure 13. The maximum level at 10 meters is 20 dB reference 20 microPascals for one fuel cell. The entire 80 KiloHertz band from 20 to 100 kiloHertz has been power summed and equals a noise level value of 31 dB ref. 20 microPascals. Both of the infrasonic and ultrasonic noise levels will fall well below the 100 dB limit at a distance 10 meters from the Cooling Module. The ultrasonic airborne noise at the closest property will be 30 dB. All the other industrial locations will be below 28 dBA. The noise levels at the closest Residential Zone will be much lower (17 dBA) and there should be no issue with either infrasonic or ultrasonic noise at any of the neighboring properties. Fortunately, the measured noise levels are low at 20 kiloHertz and decrease with higher frequencies and thus, no ultrasonic acoustic issues are expected above 25 kiloHertz.



Figure 11. Discrete Tones Produced by Fuel Cell Cooling Module (0 dBV =  $88.6 \text{ dB re20}\mu\text{Pa}$ )

Figure 12. Infrasonic Noise from the Fuel Cell Cooling Module (0 dBV =  $88.6 \text{ dB re } 20\mu\text{Pa}$ )





Figure 13. Ultrasonic Noise from the Fuel Cell Cooling Module ( $0 \text{ dBV} = 88.6 \text{ dB re } 20\mu\text{Pa}$ )

#### **Overall Sound Pressure Levels**

The Connecticut regulations for the control of noise state that (a) No person in a Class C Noise Zone shall emit noise exceeding the levels below:

To Class C 70 dBA To Class B 66 dBA To Class A 61 dBA (day) 51 dBA (night)

The Bridgeport 600 Iranistan Avenue site is in an Industrial Zone that is surrounded by other Industrial Zones and Residential Zones to the north, north east and south east. The nearby neighbors are classified as industrial with noise limits of 70 dBA. The nearby Residential Zones have a noise limit of 51 dBA at night and 61 dBA during the day. These limits may be increased by up to 5 dB above the background if the background noise levels are higher than the limits in the ordinance. The city of Bridgeport has the same noise limits as the State of Connecticut.

Acoustical Technologies Inc. measured the airborne noise from six speakers used to simulate the noise generated by a Doosan 640 KW fuel cell. The acoustic source level at 10 meters from the operation of a Doosan fuel cell at New Britain High School was then used as a basis for making Doosan fuel cell airborne noise estimates at all the measured locations. Airborne noise estimates from one fuel cell were than scaled up to 21 fuel cells using the "noisetools" application to account for the height of the installed Cooling and Power Modules. A power summation of the twenty-one individual Cooling and Power Module estimates was then calculated to produce an overall sound level at each of six property lines as shown in Table 4.

Table 3 provides the single fuel cell estimates from the data taken on April 23, 2020. Table 4 provides the airborne noise estimates for twenty-one fuel cells operating simultaneously. The second column in Table 4 gives the approximate receiver height for each measurement location, with locations identified by a P number in Figure 1. Estimates for the first, second and third floors of nearby buildings were made. Column 3 gives the total estimated noise levels expected from twenty-one fuel cells. Column 4 gives the Cooling Module contribution. Column 5 gives the Power Module contribution. Column 6 gives the maximum noise level expected at each property. Column 7 gives the expected value at the first floor from the "noisetools" analysis. Values shown in red may be above the night time residential noise requirement of 51 dBA and the industrial noise requirement of 70 dBA.

Reviewing Table 4, it is clear that the expected airborne noise levels may be high near the closest residences and within 25 meters of the fuel cells at 571 Iranistan Avenue. A summary of the maximum expected levels (at the 3rd floor) are given in Table 5 below. The 1st floor values are approximately 0.5 to 1 dB lower. The P11 residence at 720 Black Rock Avenue is expected to see airborne noise levels of 62 dBA with all the fuel cells operating. Other homes along Black Rock Avenue should see similar airborne noise levels. This level may be 1 dB above the day time requirement and 11 dB above the night time requirement. The residences along Garden and South Avenues should see airborne noise levels of 58 dBA and lower. The nearby residential properties to the north, north east and south east may be above the night time noise requirement and require noise mitigation. The expected maximum airborne noise value at 571 Iranistan Avenue is marginally above the industrial noise requirement as shown in Table 5 below. A less substantial noise treatment for the 4<sup>th</sup> floor of the south end of the building would be useful in improving the noise performance at 571 Iranistan Avenue. (Treating the residential noise emanating on the north, east and south sides of the 4<sup>th</sup> floor may redirect sound energy towards the west side and 571 Iranistan). All of the other industrial property line estimates on Railroad and South Avenues should meet the 70 dBA Industrial Zone noise limits.

Operation of the Doosan fuel cells may have significant acoustic impact at all of the closest Residential Zone properties to the north, north east and south east sides of the 600 Iranistan Avenue site. The industrial property next to the 600 Iranistan Avenue site at 571 Iranistan Avenue may exceed the 70 dBA requirement. Railroad and South Avenue industrial properties should see airborne noise levels from the 21 fuel cells no higher than 69 dBA which is just below the industrial noise limit of 70 dBA. All of the other nearby industrial properties should not be affected by the operation of the fuel cells. Background airborne noise levels of 53 to 63 dBA from the traffic on Interstate 95 were measured during a normal working day. These background noise levels will drop during the overnight hours as the traffic levels decrease. (The L90 background level has to exceed 46 dBA before background noise can affect the night time noise limit. This may or may not happen.) As a result, the fuel cell noise may or may not become the dominant noise source for the nearby residences. Noise mitigation may be recommended to bring the fuel cell noise levels down to airborne noise values less than 51 dBA or less than the background plus 5 dB in the Residential Zones and below 70 dBA for the business at 571 Iranistan Avenue. On site acoustic testing after installation of the fuel cells is recommended to confirm that the acoustic environment at the nearby properties is acceptable.

### ATTACHMENT N

10



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Span <sup>1</sup>	8 ft -12 ft (2.44 m - 3.66 m)	8 ft -14 ft (2.44 m - 4.27 m)
Panel Width	2.70 in (68.58 mm)	2.70 in (68.58 mm)
Panel Height	5.96 in ± .10 in (151.38 mm ± 0.25 mm)	5.96 in ± .10 in (151.38 mm ± 0.25 mm)
Weight	4.301bs/ft <sup>2</sup> (21 kg/m <sup>2</sup> ) <sup>4</sup>	Min, 4.10 lbs/ft² (20 kg/m²)
Wall Height	Greater than 30'/ 9 m	Greater than 30'/ 9 m
STC Rating	up to 39 <sup>2</sup>	up to 31
NRC Rating	0.95 <sup>3</sup>	n/a

For product technical specifications visit ailsoundwalls.com

- Span is governed by wind loads and varies on code requirements. Contact AIL Sound Walls for recommended panel spans for your project.
- 2. Standard Silent Protector has an STC rating of 32. Silent Protector Plus can achieve STC of 39.
- 3. Standard Silent Protector NRC 0.95. Silent Protector Plus NRC is 0.90.
- 4. Weight of Silent Protector Plus is 7 30 lbs/ft² (36kg/m²)

#### Sound Transmission Loss ASTM E90 / E413





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Octave Band Number	2	3	4	5	6	7	STC
Center Frequency (Hz)	125	250	500	1000	2000	4000	1.51
Silent Protector®	23	21	28	42	48	49	SOUND TRANSMISSION
Silent Protector® Plus	30	28	34	43	45	49	CLASS RATINGS UP TO
Tuf-Barrier®	23	19	30	45	45	54	WITH SILENT PROTECTOR PLA

#### Sound Absorption Coefficients ASTM C423/E795

Octave Band Number	2	3	4	5	6	7	NRC
Center Frequency (Hz)	125	250	500	1000	2000	4000	
Silent Protector®	0.29	0.80	1.13	1.00	0.96	0.72	0.95
Silent Protector* Plus	0.28	0.71	1.06	0.97	0.94	0.78	0.90

#### STC - Sound Transmission Class

STC is an integer rating used to measure the decibel reduction through a partition. It states the number of decibels lost through that partition in a laboratory environment.

#### NRC - Noise Reduction Coefficient

NRC is a rating between 0 and 1 to index how absorptive a material is. An NRC of 0 means no sound waves are absorbed whereas a rating of 1 means all of the sound waves are absorbed.

NRC	Qualitative
0.4 or less	Poor
0.5 to 0.6	Mediocre
0.6 to 0.7	Good
0.7 to 0.85	Very Good
> 0.85	Excellent
0.95	AIL Silent Protector®

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# Save time. Save money. Choose efficient sound mitigation solutions from AIL Sound Walls.

#### We support you.

- Be confident with an AIL Sound Walls solution
- Designs based on wind loading and local soil conditions
- Detailed proposals complete with installation budget estimates
- Engineer-stamped project drawings for approvals and construction
- Professional support in engineering, project management and site assistance

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AlL products contain recycled content and are 100% recyclable





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### ATTACHMENT O

