

**STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL**

PETITION OF DOOSAN FUEL CELL, : PETITION NO.  
AMERICA, INC. FOR A DECLARATORY :  
RULING FOR THE LOCATION AND :  
CONSTRUCTION OF A 0.44 MEGAWATT :  
FUEL CELL CUSTOMER-SIDE DISTRIBUTED :  
ENERGY RESOURCE AT 375 Howard Ave,  
Bridgeport, Connecticut, Cherry St Lofts

PETITION OF DOOSAN FUEL CELL AMERICA, INC. AS AN AGENT  
FOR A DECLARATORY RULING

Pursuant to Conn. Gen. Stat. §§ 4-176 and 16-50k(a) and Conn. Agencies Regs. § 16-50j-38 et seq., Doosan Fuel Cell America, Inc. (“Doosan”), as an agent for a NuPower Cherry St FC LLC, requests that the Connecticut Siting Council (“Council”) approve by declaratory ruling the location and construction of a customer-side distributed resources project comprised of one (1) new natural-gas fueled PureCell® Model 400 phosphoric acid fuel cell (“Fuel Cell”) and associated equipment (the “Facility”), providing 0.44-megawatts (“MW”) (net) of power to the Cherry Street Lofts Facility located at 375 Howard Ave, Bridgeport, Connecticut (the “Site”) (*See Attachment 1*). The Facility will be installed, owned, maintained, and operated by NuPower Cherry StFC LLC.

Conn. Gen. Stat. § 16-50k(a) provides that:

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.”

## **I. INTRODUCTION**

The proposed Facility will be a customer-side distributed resource under 65 MW that complies with the air and water quality standards of the Department of Energy and Environmental Protection (“DEEP”). Doosan submits that no Certificate of Environmental Compatibility and Public Need is required because the proposed installation will not have a substantial adverse environmental effect.

## **II. DESCRIPTION AND PURPOSE OF THE PROJECT**

The Facility will be a customer-side installed distributed generation resource with grid interconnection to be located at the Site. The Facility will be placed in the courtyard adjacent to the school building. The proposed installation consists of one (1) Fuel Cell manufactured by Doosan in South Windsor, Connecticut (*See Attachment #3 for Model 400 Data Sheets*). The overall dimension of the Fuel Cell is eight feet four inches wide by twenty-seven feet four inches long by nine feet eleven inches tall. The unit is totally enclosed and factory-assembled and tested prior to shipment.

The purpose of the proposed Facility is for power and distributed generation. The Fuel Cell for Cherry St Lofts will be capable of producing a total of 440 kW of reliable electric power. The Facility will be net metered and will operate in parallel with the utility grid, any electricity generated in surplus of the site’s demand will be traded to the grid in accordance with United Illuminating Interconnection Technical requirements. NuPower Cherry St FC LLC was approved by PURA to submeter power to tenants at the proposed project location, refer to Attachment #18.

When a utility grid outage occurs, the Fuel Cell will automatically disconnect from the host facility electrical system using an internal breaker while continuing to operate providing all the internal loads needed to operate the Fuel Cell. Upon return of the utility supply, the fuel cell will monitor the grid for stability for five minutes and then will automatically reconnect and ramp up output.

The Fuel Cell is designed to have a minimum 20-year product life. This requires overhaul or replacement of major components after 10 years of operation. Components requiring overhaul include the cell stack assemblies and components in the fuel processing system.

### III. SAFETY

The Fuel Cell is certified by CSA international to meet strict ANSI/CSA FC-1 2014 safety standards to protect against risks from electrical, mechanical, chemical, and combustion safety hazards. The Fuel Cell will be installed in accordance with NFPA 853. In accordance with Public Act 11-101, the fuel line pipe cleaning procedure uses inert nitrogen gas or atmospheric air. The following items are a few of the safety measures incorporated into the design. Please also refer to the Cherry St Lofts emergency Response Plan in *Attachment #4*.

#### A. Fire Protection

The Fuel Cell 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 Fuel Cell 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 Doosan service personnel. The Fuel Cell 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.

#### B. Gas Leak

The Fuel Cell is 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 in order 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.

#### C. Cell Stacks and Hydrogen

The Fuel Cell operates by converting hydrogen to DC electricity. Hydrogen is lighter than air and thus does not pool like other fuels and will readily dissipate with proper ventilation, making it less likely to ignite. Also, the Fuel Cell does not store hydrogen; instead, it produces hydrogen-rich gas at a rate equal to what it requires to produce power. The Fuel Cell stack is wrapped in a fire-retardant blanket. There are no materials inside the unit that would sustain a flame. There is no large volume of gas or any ignition that occurs within the cell stack.

#### D. Phosphoric Acid



Phosphoric acid is an integral part of the fuel cell system, acting as the electrolyte within the fuel cell stack. Phosphoric acid is a surprisingly common substance that is contained in common cola drinks. A leak of phosphoric acid is not possible because there is no reservoir of liquid: phosphoric acid is constrained within the porous structure of the fuel cell stack material by capillary action.

#### E. 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.

#### IV. **HAZARDOUS MATERIALS**

The Fuel Cell is capable of delivering 440 kW of electric power. As with other fuel cell technologies, hydrogen and oxygen combine in the presence of a catalyst, which causes an electrochemical reaction to produce an electric current. A phosphoric acid fuel cell uses an inorganic, concentrated phosphoric acid as the electrolyte, allowing the electrochemical reaction to take place. The Fuel Cell also employs on-board natural gas reforming as part of the balance of plant to provide hydrogen to the fuel cell. Within this Fuel Cell, there are only two components that contain hazardous material: the Cell Stack Assembly (“CSA”) and the Integrated Low-Temperature Shift Converter (“ILS”). Neither of these components present risk when servicing the Fuel Cell. The material in both the CSA and the ILS is classified as

hazardous material for the purposes of shipping. The CSA is classified as a “bulk bin,” made from the repeating elements of the Fuel Cell stack. Some of these repeating elements are porous carbon graphite plates. The phosphoric acid used as the electrolyte is contained by capillary action within the pores of these plates. The ILS is a tank containing a self-heating solid catalyst composed of copper, zinc oxide, and alumina. Safety Data Sheets (“SDS”) are available in the Cherry St Lofts emergency Response Plan (*See Attachment #4*).

A. Shipping of Hazardous Material

The Fuel Cell is classified as “hazardous in transportation” under the U.S. Department of Transportation (“DOT”) 49CFR regulations, and likewise as dangerous goods under the International Maritime Dangerous Goods (“IMDG”) regulations. The description of hazardous materials contained within each Fuel Cell are listed in subsections B and C below.

B. Integrated Low Shift Converter

The tank, a non-DOT specification container as described below, is a SELF HEATING SOLID INORGANIC N.O.S. (contains metallic copper on zinc oxide and alumina), CLASS 4.2, UN3190, PGII, 900 lb. net wt of hazardous material.

C. Cell Stack Assembly

The bulk bin, a non-DOT specification container as described below, is a SOLIDS CONTAINING CORROSIVE LIQUID N.O.S. (contains phosphoric acid), Class 8, UN3244, PGII, 1200 lb. net of hazardous material. The amount of phosphoric acid in the Fuel Cell complies

with all applicable state and federal regulations. The exact amount of phosphoric acid is proprietary technical information and is less than the 5,000 lb. reportable quantity under 40 CFR 117.3.

#### D. Integration into Fuel Cell Power Plant

The above items are individual components assembled side by side, with other non-hazardous components, to form one complete Fuel Cell. The containers holding the hazardous material are non-DOT specification containers. DOT regulations allow for the transportation of the hazardous material noted above in non-DOT specification portable tanks and closed bulk bins, as used for the shipment of the Fuel Cell. IMDG regulations require United Nations (“UN”) specified containers or an exemption for international ocean transport.

#### E. Servicing of Product with Hazardous Material Present

The hazardous material contained within the CSA and the ILS presents no danger to installation and service personnel because direct exposure to the material is not possible. Under normal operating conditions, each container, as defined above, will contain its hazardous material for the life of the component. When end of life requires replacement of either component, no special precautions need to be employed with respect to handling because hazardous material will not come in contact with service personnel.

#### F. Hazardous Waste

The Fuel Cell does not produce any hazardous waste.

## V. **THE SITE**

The Facility is proposed to be located entirely on the Site. The proposed location is zoned MU-LI under the zoning regulations of the City Of Bridgeport. The surrounding parcels bordering the north and west of the host property are zoned for C2 use (*See Attachment #5*). Attachment #6 shows an aerial map of the location of Facility on the Site. Cherry Street Lofts is a residential property. The nearest neighboring properties zoned residential are North East of the property and over 300 feet from the Facility. The proposed Fuel Cell facility will be fenced. No trees are required to be removed for the installation of the Facility, and no parking spaces need to be removed for the installation of the Facility. Stratford Airport, the nearest airport, is 6.2 miles from the proposed facility. The proposed Facility will be a maximum of 15 feet above ground level and does not fall under the FAA notification requirement of 14 CFR Part 77.9 (Attachment 7).

## VI. **PROJECT BENEFITS**

Fuel cell technology represents an important step in advancing Connecticut's goal of diversifying its energy supply through the use of renewable energy, as expressed in Connecticut General Statutes Section 16-244 et seq. The Facility will serve as a cost-effective clean energy source while also reducing the demand for grid electricity from this location. Further, this Fuel Cell installation will support the efforts of the State of Connecticut to be a leader in the utilization of fuel cell technology.

Because a fuel cell does not burn fuel, the system will significantly reduce air emissions associated with acid rain and smog. Emissions standards of Connecticut will further be

discussed in the next section. The Facility is designed to operate in total water balance – no make-up water is normally required after start-up and no water discharges to the environment will occur under normal operating circumstances.

**VII. ENVIRONMENTAL EFFECTS**

**1. Water, Heat and Air Emissions**

The proposed installation will have no substantial adverse environmental effect. The installation and operation of the Fuel Cell will meet all air and water quality standards of DEEP.

Section 22a-174-42 of the Regulations of Connecticut State Agencies (“RCSA”) governing air emissions from new distributed generators exempts fuel cells from air permitting requirements. Notwithstanding this exemption, the Fuel Cell meets the Connecticut emissions standards for a new distributed generator as shown in Table 1 below, and no permits, registrations or applications are required under rules based on the actual emissions of the Fuel Cell. Furthermore, the Fuel Cell is certified by the California Air Resources Board to meet the Distributed Generation Certification Regulation 2007 Fossil Fuel Emissions Standards (*See Attachment #8*).

**Table 1: CT Emissions Standards for a New Distributed Generator**

Air Pollutant	CT Emissions Standard (lbs/MWh)	PureCell Model 400 Fuel Cell System at Rated Power (lbs/MWh)
Oxides of Nitrogen	0.15	.01
Carbon Monoxide	1	.02
Carbon Dioxide	1650	1,049

With respect to water discharges, the Fuel Cell is designed to operate without water discharge under normal operating conditions. To the extent that minimal water overflow may occasionally occur, such discharges will consist of de-ionized water and will be directed to a site dry well. This discharge will be incorporated into the overall site design, and will be covered by the Site’s water discharge permit, if necessary. The Fuel Cell operates in water balance below 86°F. The initial fill requires 350 gallons of water. The amount of make-up water above 86°F increases linearly from 0gpm to 1gpm at 110°F.

The Facility will also meet state criteria thresholds and projected emissions for all greenhouse gases defined in as Section 22a-174-1(49) as shown in Table 2. Section 22a-174-1(49) states the following: “Greenhouse gases” or “GHGs” means the aggregate of the following six components gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexa fluoride (SF<sub>6</sub>), any hydrofluorocarbon (HFC) or any perfluorocarbon (PFC).” There is no defined criteria threshold for these compounds, however Section 22a-174-1(21) provides a method for computing carbon dioxide equivalent emissions “CO<sub>2</sub>e.” The proposed Facility will have no emissions of SF<sub>6</sub>, HFC, and PFC. Emissions of CH<sub>4</sub> and N<sub>2</sub>O will be very low and will not contribute significantly to the GWP of the proposed facility.

**Table 2: PureCell® Model Emissions Data**

Emission Type	Projected Emissions	GWP in 40 CFR 98, Table A-1	Projected CO <sub>2</sub> e
CO <sub>2</sub>	2025 ton/yr	1	2025 ton/yr
CH <sub>4</sub>	<0.02 ton/yr	25	<0.5 ton/yr
N <sub>2</sub> O	<0.01 ton/yr	298	<3 ton/yr
SF <sub>6</sub>	N/A	22,800	N/A
HFC	N/A	12 to 14,900*	N/A

PFC	N/A	7,390 to 17,340	N/A
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Current control technologies are not commercially available to reduce the greenhouse gas emissions from the Facility. The utilization of the waste heat in the Facility into the host factory's processes on site will offset the facilities consumption of natural gas and is projected to reduce the CO<sub>2</sub> emissions by 820 ton / yr.

**2. Wildlife and Habitat**

According to the relevant portion of the CT DEEP Bridgeport Natural Diverse Database Areas Map (*See attachments #9*), the proposed Site is not located within the Bridgeport Natural Diversity Data Base Areas.

**3. Noise Analysis**

The Fuel Cell will not emit noise in excess of limitations set forth in City of Bridgeport, CT zoning regulations. The fuel cell will be located in a courtyard where the host property and adjoining properties within the courtyard are all zoned for mixed use industrial. The City of Bridgeport noise level ordinance specifies a maximum of 70 dBA from an industrial emitter to an Industrial receptor. The closest location zoned residential is 300 ft from the proposed fuel cell location. Noise from the fuel cell area to this residential zoning will be significantly impeded by the buildings surrounding the courtyard. The fuel cell and associated cooling module is expected to operate at full power (440 kW), with a noise level in free field of below 65dBA at 40 feet. Therefore, the fuel cell is not expected to emit noise in excess of the City of Bridgeport regulations to any neighboring properties.

#### **4. Visual Impact**

The Facility will not cause any significant visual effects. The Site hosts former industrial buildings within its proximity. The Facility would be visible only from inside the courtyard of this the Site.

#### **5. Public Notice**

Notice was provided via certified mail to all property owners, abutters and state and local officials pursuant to Conn. Agencies Regs. §16-50j-40(a). Doosan's copy of the notice letter, Abutters list and Abutters' Map are included in *Attachments* 11, 12 and 13. Prior to filing this Petition, Doosan sent notices to all applicable Federal, State and Municipal officials of Bridgeport as listed in *Attachment* 14. Attachment 15 shows the certified mail receipts for State and Municipal officials and Abutters.

#### **Project Decommissioning Plan**

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

- A) 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.
- B) 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.
- C) Contractor will work in concert with Doosan's Service Department personnel during decommissioning and shutdown.
- D) Return Site to original condition with the exception of the concrete pads.



E) The decommissioned Fuel Cell will be stripped, the parts are separated and either recycled, reclaimed or transported to landfill.

**7. Aquifer Protection Area, Coastal Boundaries, and Flood Zones**

Based on an analysis of the Federal Emergency Management Agency's ("FEMA") National Flood Insurance Program ("NFIP") flood mapping data for Bridgeport (*See Attachment #16*), the proposed Facility is not situated in a 100 year flood zone. The Site is in already disturbed area with existing construction on the Site plus several industrial properties within its vicinity. The city of Bridgeport has no Aquifer Protection Areas. The proposed project is not located in the city of Bridgeport's coastal boundary zone. (*See Attachment #19*)

**8. Cultural Resources.**

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

**9. Natural Gas Desulfurization Process**

Sulfur is present in pipeline natural gas. It is primarily used as an odorant so leaks can be easily detected. Unfortunately, sulfur is also a poison to fuel cell systems and must be removed

by the Fuel Cell. For further details of desulfurization please refer to the attached Desulfurization Memo (*See Attachment #17*).

## **VIII. CONSTRUCTION AND MAINTENANCE**

If approved by the council Doosan plans to start construction work by April 2020. Construction will take approximately fifteen weeks, followed by approximately four weeks of testing and startup. Regular working hours for the proposed project are Monday through Friday from 8:00 am to 5:00 pm. Doosan and its contractors will fully cooperate with the City Inspector and will follow all City of Bridgeport and Connecticut State construction policies and codes.

## **IX. LOCAL INPUT AND STATE FUNDING**

A project launch event was held on October 23, 2019 with Doosan, NuPower, and the Mayor of Bridgeport in attendance (Attachment #10). This project has been awarded a contract to sell Low Emission Renewable Energy Credits (LREC) to Eversource through the CT Low and Zero Emission Renewable Energy Credit Program. Doosan will complete all necessary permitting before installing the Fuel Cell.

**X. CONCLUSION**

As set forth above, Doosan requests that the Council issue a determination, in the form of a declaratory ruling, that the proposed installation above is not one that would have a substantial adverse effect, and, therefore, that a Certificate is not needed.

Respectfully submitted,

.....

Donald Emanuel

Installation Project Manager

Doosan Fuel Cell America, Inc.

## **LIST OF ATTACHMENTS**

- Attachment 1: Site Plan
- Attachment 2: Photos of proposed project location
- Attachment 3: Doosan PureCell® Model 400 Datasheet
- Attachment 4: 375 Howard Ave Bridgeport CT Emergency Response Plan
- Attachment 5: City Zoning Map
- Attachment 6: Aerial Map
- Attachment 7: 14CFR Part 77.9
- Attachment 8: California Air Resources Board Emission Certification
- Attachment 9: DEEP Diverse Database Areas Map
- Attachment 10: Project Launch Event
- Attachment 11: Officials and Abutters Notification Letter
- Attachment 12: Abutters Map
- Attachment 13: Abutters List
- Attachment 14: Complete Officials List
- Attachment 15: Copy of Certified Mail receipts for letters to Abutters, State/Town

Officials

Attachment 16: NFIP Map

Attachment 17: Doosan Natural Gas Desulphurization Process Memo

Attachment 18: PURA approval of submetering

Attachment 19: Coastal Boundary Zone Map

# Attachment 1 Site Plan

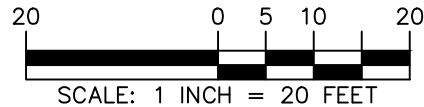
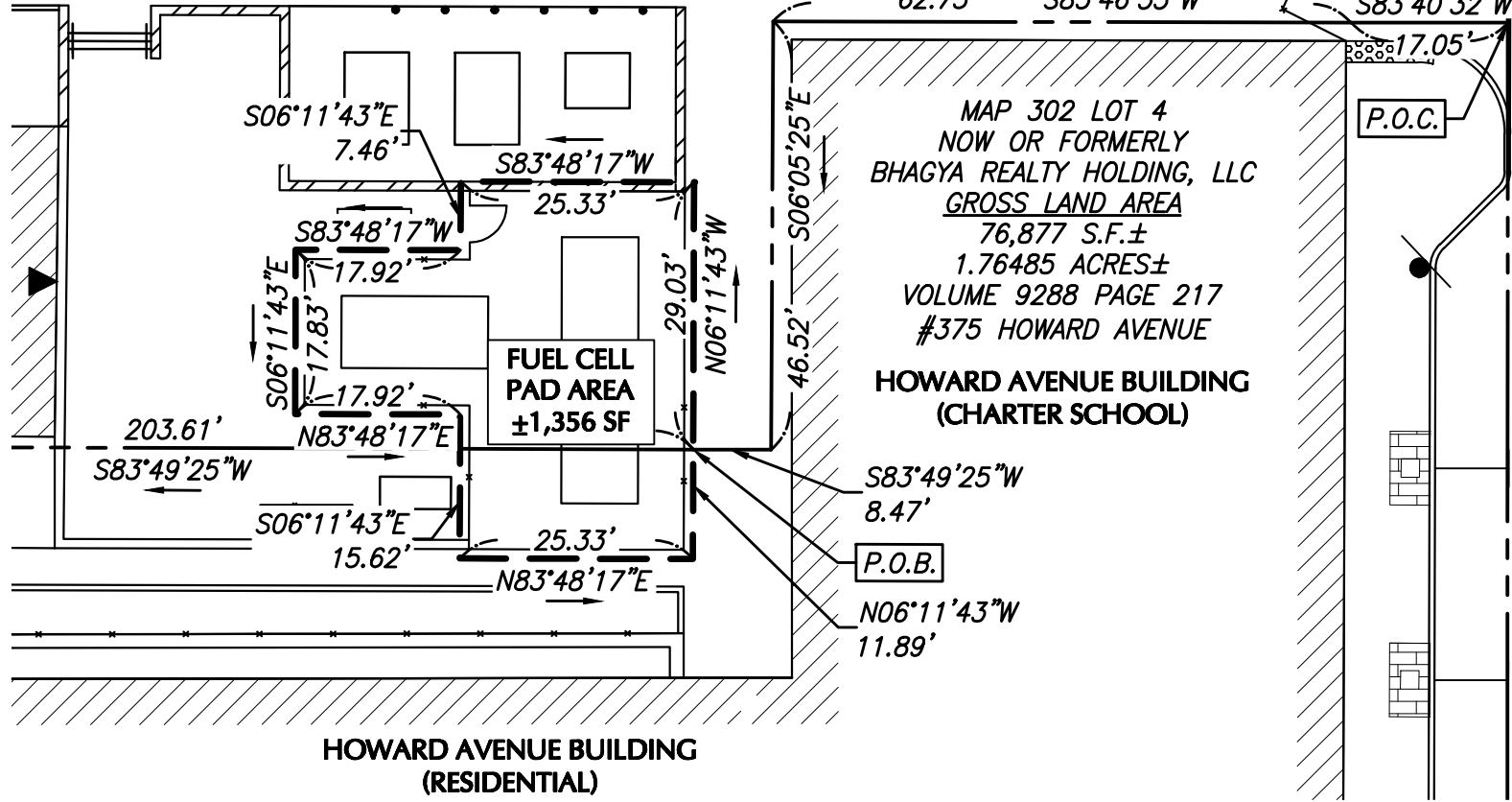
MAP 302 LOT 5  
NOW OR FORMERLY  
AL PARK ASSOCIATES, LLC  
GROSS LAND AREA

41,217 S.F.±  
0.94621 ACRES±  
VOLUME 8865 PAGE 203  
#1289 RAILROAD AVENUE

MAP 302 LOT 4  
NOW OR FORMERLY  
BHAGYA REALTY HOLDING, LLC  
GROSS LAND AREA  
76,877 S.F.±  
1.76485 ACRES±  
VOLUME 9288 PAGE 217  
#375 HOWARD AVENUE

HOWARD AVENUE BUILDING  
(CHARTER SCHOOL)

HOWARD AVENUE BUILDING  
(RESIDENTIAL)



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Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan CT, Inc.  
Langan International LLC  
Collectively known as Langan

Project

**CHERRY STREET  
LOFTS**

1289 RAILROAD AVENUE  
375 HOWARD AVENUE

BRIDGEPORT

CONNECTICUT

Drawing Title

**FUEL CELL PAD  
AREA FIGURE**

Project No.

140103901

Date

11/04/2019

Scale

1"=20'

Drawn By

Checked By

AMK

AGI

Submission Date

--

Drawing No.

**FIG. 1**

Sheet 1 of 1

Fuel Cell Area in Courtyard of Cherry St Lofts  
Attachment #2

Attachment 2  
Photos of proposed project location





Fuel Cell Area in Courtyard of Cherry St Lofts  
Attachment #2





Fuel Cell Area in Courtyard of Cherry St Lofts  
Attachment #2



## PURECELL SYSTEM BENEFITS

### Energy Security

Proven PAFC fuel cell technology that is setting durability records

### Energy Productivity

Increased efficiency and continuous on-site generation reduces energy costs

### Energy Responsibility

Ultra-low emissions equals sustainability

## PURECELL SYSTEM COMPETITIVE ADVANTAGES

### Long Life

Industry leading 10-year cell stack life assures high availability and low service cost

### Modular & Scalable

Solutions for multi-megawatt applications to meet growing energy demand

### Experience

Most knowledgeable and experienced team in the industry

### High Efficiency

Up to 90% total CHP Efficiency

### Grid-Independence

Proven performance delivering power when the utility grid fails

### Load Following

Capable of dispatching power to match building needs

### Small Footprint

Highest power density among clean generation technologies

### Flexible Siting

Indoor, outdoor, rooftop, multi-unit

## RATED POWER OUTPUT: 440KW, 480VAC/60HZ

Characteristic	Units	Operating Mode	
		Maximum Power <sup>1</sup>	Baseload Power <sup>1</sup>
Electric Power Output <sup>1</sup>	kW/kVA	440/440	400/471
Electrical Efficiency	%, LHV	41%	42%
Peak Overall Efficiency	%, LHV	90%	90%
Gas Consumption	MMBtu/h, HHV (kW)	4.06 (1,190)	3.60 (1,056)
Gas Consumption <sup>2</sup>	SCFH (Nm <sup>3</sup> /h)	3,961 (106.1)	3,515 (94.2)
High Grade Heat Output @ up to 250°F <sup>1</sup>	MMBtu/h (kW)	0.76 (223)	0.64 (188)
Low Grade Heat Output @ up to 140°F <sup>1</sup>	MMBtu/h (kW)	0.99 (290)	0.88 (258)

## FUEL

Supply..... Natural Gas  
Inlet Pressure ..... 10 to 14 in. water (2.5 - 3.5 mbar)

## EMISSIONS<sup>3,4</sup>

NOx ..... 0.01 lbs/MWh (0.006 kg/MWh)  
CO ..... 0.02 lbs/MWh (0.009 kg/MWh)  
VOC ..... 0.02 lbs/MWh (0.009 kg/MWh)  
SO<sub>2</sub>..... Negligible  
Particulate Matter..... Negligible  
CO<sub>2</sub><sup>1</sup> (electric only) ..... 1049 lbs/MWh (476 kg/MWh)  
(with full heat recovery) ..... 495 lbs/MWh<sup>5</sup> (225 kg/MWh)

## OTHER

Ambient Operating Temp ..... -20°F to 104°F (-29°C to 40°C)  
Sound Level ..... <65 dBA @ 33 ft. (10m)  
Water Consumption ..... None (up to 86°F (30°C) Ambient Temp.)  
Water Discharge ..... None (Normal Operating Conditions)

## CODES AND STANDARDS

ANSI/CSA FC1-2014: Stationary Fuel Cell Power Systems  
UL1741-2010: Inverters for Use With Distributed Energy Resources

## NOTES

1. Average performance during 1st year of operation.
2. Based on natural gas higher heating value of 1025 Btu/SCF (40.4 MJ/Nm<sup>3</sup>)
3. Emissions based on 440 kW operation.
4. Fuel cells are exempt from air permitting in many U.S. states.
5. Includes CO<sub>2</sub> emissions savings due to reduced on-site boiler gas consumption



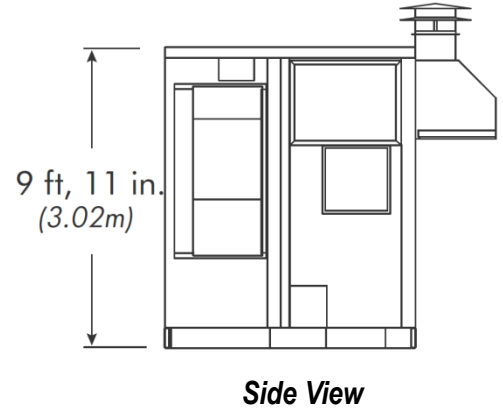
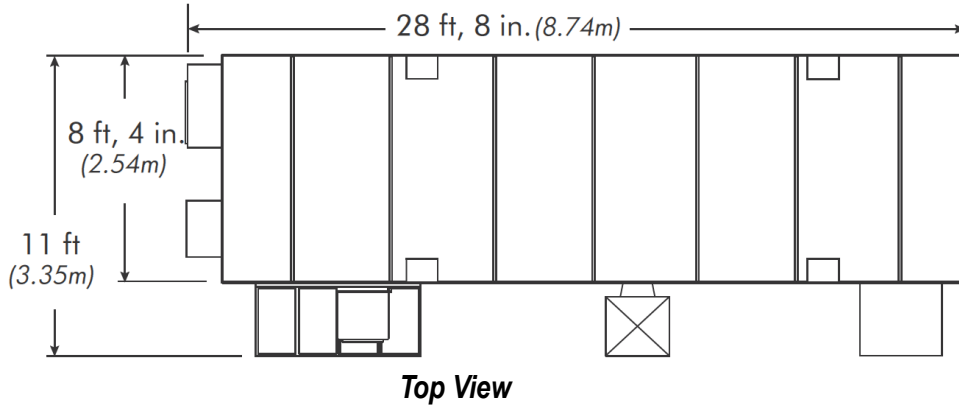
Doosan Fuel Cell America, Inc.  
Corporate Headquarters  
195 Governor's Highway  
South Windsor, CT 06074  
860.727.2253  
www.doosanfuelcell.com



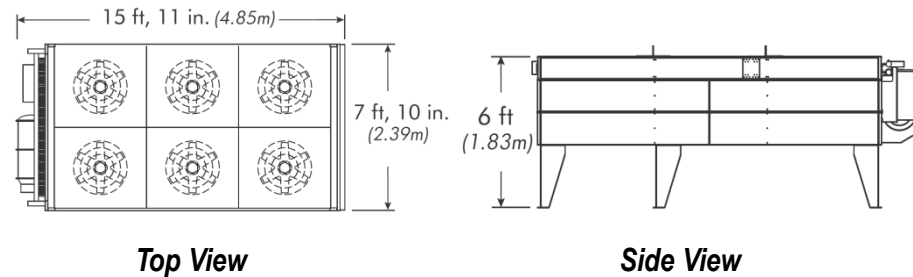
# PureCell® Model 400

## SYSTEM DIMENSIONS

### Power Module



### Cooling Module



### PHYSICAL SPECIFICATIONS

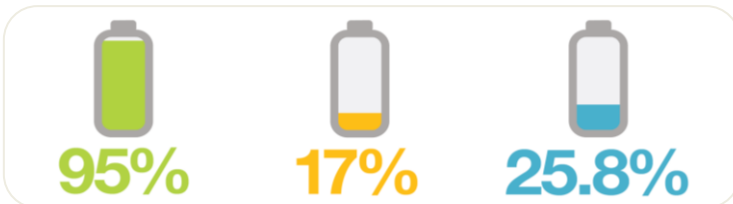
	Power Module	Cooling Module
Length	28' 11" (8.74m)	15' 11" (4.85m)
Width	8' 4" (2.54m)	7' 10" (2.39m)
Height	9' 11" (3.02m)	6' 0" (1.83m)
Weight	57,000 lb (27,216 kg)	3,190lb (1,447 kg)

## PURECELL ADVANTAGE

### OFFSET 3x MORE CO<sub>2</sub>



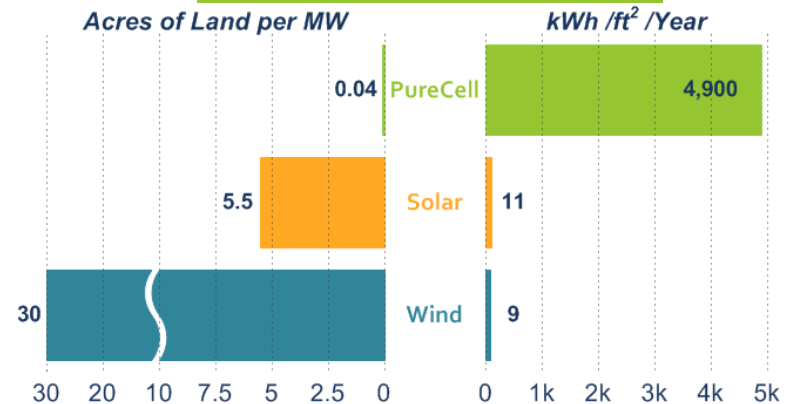
### CAPACITY FACTOR



### CO<sub>2</sub> OFFSET



### USE LESS LAND



Doosan Fuel Cell America, Inc.  
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860.727.2253  
www.doosanfuelcell.com

The manufacturer reserves the right to change or modify, without notice, the design or equipment specifications without incurring any obligation either with respect to equipment previously sold or in the process of construction. The manufacturer does not warrant the data on this document. Warranted specifications are documented separately.

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# Attachment 4 Emergency Response Plan

## Doosan Fuel Cell America, Inc. Fuel Cell Emergency Response Guide

Cherry St Lofts.  
375 Howard Ave,  
Bridgeport, CT 06605





## DISCLAIMER

Doosan Fuel Cell America reserves the right to change or modify, without notice, the design or equipment specifications of the PureCell® system Model 400 without obligation with respect to equipment either previously sold or to be sold. This guide is provided by Doosan Fuel Cell America, and no liability will accrue to Doosan Fuel Cell America based on the information or specifications included herein. No warranties or representations are made by this guide and no warranties or representations shall apply to the equipment except as stated in Doosan Fuel Cell America's standard terms and conditions of sale applicable at the time of purchase, a copy of which will be provided upon request. The Model 400 is designed to provide safe and reliable service when operated within design specifications, according to all applicable instructions, and with the appropriate operating materials. When operating this equipment, use good judgment and follow safety precautions to avoid damage to equipment and property or injury to personnel. Be sure to understand and follow the procedures and safety precautions contained in all applicable instructions, operating materials, and those listed in this guide. All information in this document is as of January 23, 2020.

### Policy

The following plan has been developed to minimize the severity of damage to human health, the environment, and property in the event of an unexpected failure.

### Scope

***This Emergency Response Guide shall be integrated into the site Emergency Response Plan.*** Information contained in this document is customized to meet local requirements and shall be shared with local responders as necessary. This guide in no way assumes or transfers liability or ownership. Doosan Fuel Cell America should be contacted if clarification is needed.

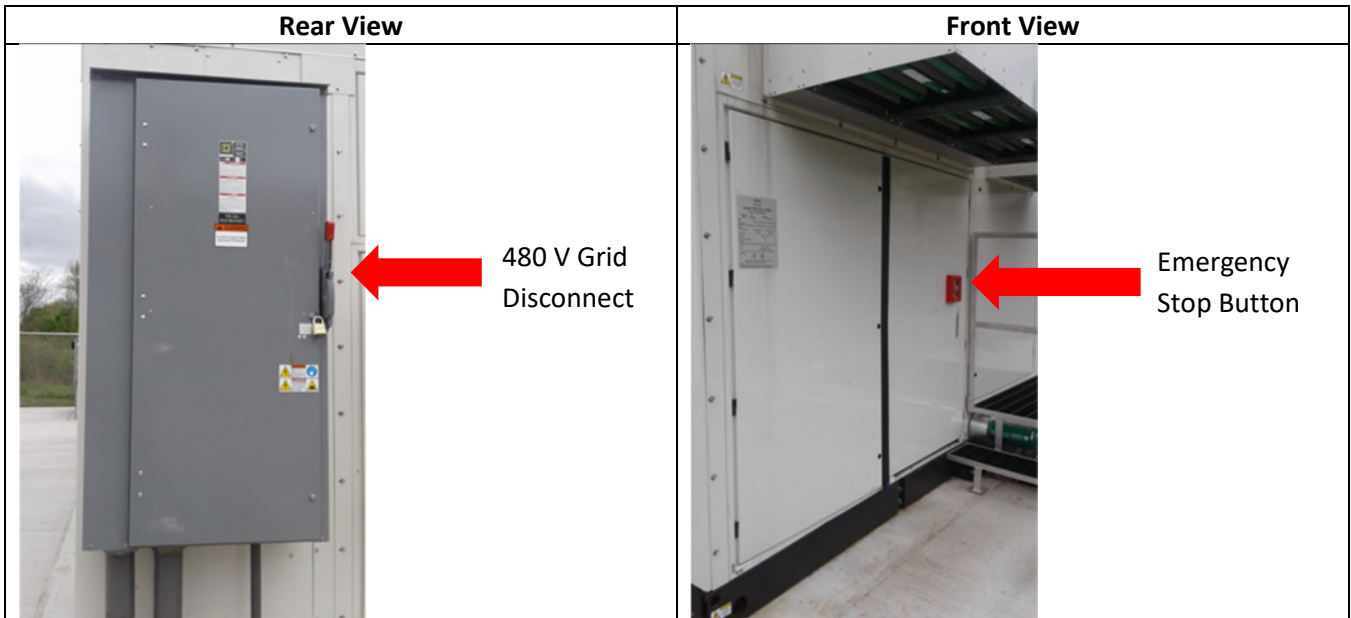
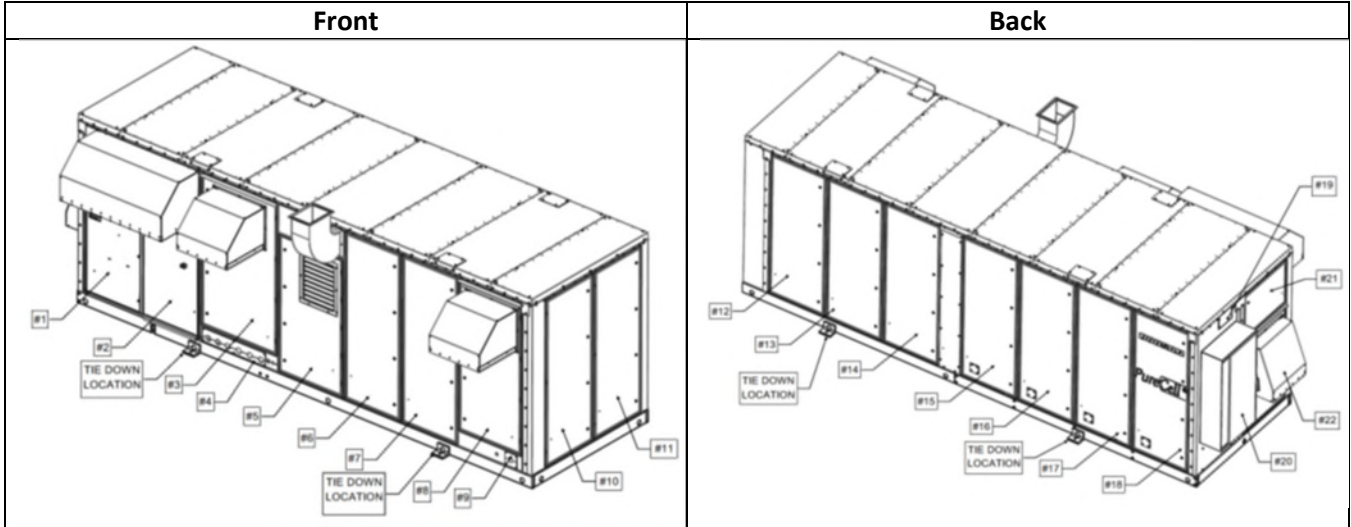


## Emergency Contacts and Numbers

Local Emergency Number	<b>911</b>
Doosan Fuel Cell America Control Center	<b>(860) 727-2847</b>
Fire Department – Non-emergency number	Bridgeport Fire Department <b>(203) 337-2068</b>
Hospital – Non-emergency number	St. Vincent’s Hospital and Medical Center 2800 Main St. Bridgeport CT 06112 203-576-6000
Electric Utility Name: United Illuminating	<b>800 722-5584</b>
Gas Utility  Name: Southern Ct Gas	<b>866-268-2887</b>
Local Oil & Chemical Spill Response Division	<b>800-645-8265</b>
Connecticut Oil & Chemical Spill Response Division	<b>860-424-3338</b>
EPA - Environmental Protection Agency Region 1	<b>(800) 424-8802</b> Environmental Emergency
OSHA - Occupational Safety and Health Admin.  Emergency Number	<b>(800) 321-6742</b> National Emergency Number
Poison Control Center	<b>(800) 222-1222</b> National Emergency Number



## Fuel Cell Hazard Overview





Rear View Panel	Primary Hazard	Front View Panel	Primary Hazard
<b>1 (Computer Terminal)</b>	Electrical = 120 VAC	<b>12 (Reformer)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
		<b>13 (Reformer)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
<b>2 (Swing Door)</b>	Electrical = 480 VAC	<b>14 (Reformer)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam
<b>3 (Mechanical Entry)</b>	Electrical = 480 VAC Chemical = Propylene Glycol Thermal = 350°F Steam Pressure = 150 psi Steam	<b>15 (DC Cell Stack)</b>	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
<b>4 (Mechanical Entry)</b>	Chemical = Propylene Glycol Thermal = 350°F Steam Pressure = 150 psi Steam	<b>16 (DC Cell Stack)</b>	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
<b>5 (TMS)</b>	Electrical = 480 VAC Chemical = Propylene Glycol / Deionized Water / Resin Thermal = 350oF Steam Pressure = 150 psi Steam	<b>17 (DC Cell Stack)</b>	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
<b>6 (ILS)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	<b>18 (DC Cell Stack)</b>	Electrical = 300 VDC Chemical = Solid phosphoric acid / combustibles
<b>7 (Fuel Processing Area)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	<b>19</b>	Not accessible
<b>8 (Fuel Processing Area)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	<b>20 (Grid Connect Disconnect)</b>	Electrical = 480 VAC
<b>9 (Gas/Nitrogen Inlet)</b>	Chemical = combustibles	<b>21 (Blower 110)</b>	Electrical = 300 VDC Mechanical = Blower
<b>10 (Reformer)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	<b>22</b>	Electrical = 1400 VDC / 480 VAC
<b>11 (Reformer)</b>	Electrical = 480 VAC Chemical = Air sensitive catalyst / combustibles Thermal = 600°F Reformer Pressure = 150 psi steam	<b>ALL Roof Panels</b>	Multiple Hazards DO NOT WALK ON ROOF!





## Conditional Assessment

Normal Condition	Potential Abnormal Condition	Response
<p><b>Fuel Cell</b></p> <p>White steam exiting power plant at exhaust chimney, above panel #6 (It can be a large amount of white steam depending on ambient conditions)</p>	Dark colored smoke exiting chimney or any other part of enclosure	<ol style="list-style-type: none"> <li>1. Establish safe perimeter</li> <li>2. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b></li> </ol>
	Observable fire or heavy smoke at any point on fuel cell	<ol style="list-style-type: none"> <li>1. Press Fuel Cell 'Stop Button' – Only if safely accessible!</li> <li>2. Dial 911 or Local Emergency Response Number</li> <li>3. Establish safe perimeter</li> <li>4. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b></li> </ol>
<p><b>Fuel Cell</b></p> <p>Moderate humming, clicking and fan sounds</p>	Grinding or loud intermittent noises	<ol style="list-style-type: none"> <li>1. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b></li> </ol>
	Observable fire or heavy smoke at any point on fuel cell	<ol style="list-style-type: none"> <li>1. Press Fuel Cell 'Stop Button' – Only if safely accessible!</li> <li>2. Dial 911 or Local Emergency Response Number</li> <li>3. Establish safe perimeter</li> <li>4. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b></li> </ol>
<p><b>Cooling Module</b></p> <p>Fan humming</p>	Smoke or fire coming from module	<ol style="list-style-type: none"> <li>1. Press Fuel Cell 'Stop Button' – Only if safely accessible!</li> <li>2. Dial 911 or Local Emergency Response Number</li> <li>3. Establish safe perimeter</li> <li>4. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b></li> </ol>



	Grinding or loud noise coming from fans	1. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
<b><u>Cooling Module</u></b>  No leaking from cooling loop piping or coils	Small leak dripping from joint, valve or connection	1. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
	Medium to large leak	1. Follow local spill response protocol or contact Clean Harbors Emergency Cleanup Response <b>(800) 645-8265</b>  2. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
<b><u>Mechanical Hi/Lo Grade Piping</u></b>  Small amounts of condensate dripping from piping	Small leak dripping from joint, valve or connection	1. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
	Medium to large leak	1. Follow local spill response protocol or contact Clean Harbors Emergency Cleanup Response <b>(800) 645-8265</b>  2. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
<b><u>Disconnects/Other Equipment</u></b>  No leaks or smoke	Smoke or fire coming from equipment	1. Dial 911 or Local Emergency Response Number  2. Establish safe perimeter  3. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>
<b><u>Compressed Gas Manifold (N2/H2)</u></b>  No leaks, May hear intermittent gas flow during purges	Leaks – may be able to hear hissing sound.	1. <b>If Indoors – Evacuate Immediately!</b> Dial 911 or Local Emergency Response Number  2. Establish safe perimeter  3. Contact Doosan Fuel Cell America Control Center <b>(860) 727-2847</b>



## Fuel Cell Related Safety Data Sheets (SDS)

1	Propylene Glycol – DowFrost®
2	Phosphoric Acid – Solid
3	Reformer/ILS Catalysts
4	Anion/Cation Resin
5	Nitrogen / Hydrogen Compressed Gas Mixture (non-flammable)

## Inspections

Inspection Type	Equipment Requirements	Frequency Required
General Maintenance	Laptop, Service Vehicle	Monthly
General Housekeeping	N/A	Monthly
Waste and Chemical Storage*	N/A	Weekly
Internal Combustible Gas Monitor	AT-160 Calibration Kit	Annual
Fire Prevention	N/A	Monthly

\*When applicable

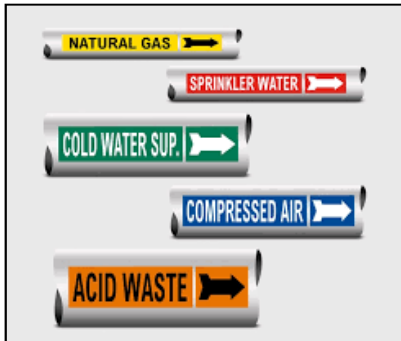
Fuel Cell operation is monitored and controlled remotely 24 hours a day 7 days a week by the Doosan Fuel Cell America Control Center. Upset or abnormal occurrences outside of normal operating parameters are immediately identified and service technicians are dispatched within 24 hours to respond when required.

## Emergency Procedures

Alarms	There are no audible or visual alarms on Fuel Cell. Alarm conditions are relayed immediately to the Doosan Fuel Cell America Control Center. The Doosan Fuel Cell America Control Center will then contact the appropriate site personnel on the site's emergency contact list.
Emergency Shut Down Onsite	Actuate Fuel Cell Stop Button
Emergency Area Egress - Gas Odor	Evacuate 330 Feet in all directions
Emergency Area Egress - Fire	Evacuate 330 Feet in all directions – CV000 automatic natural gas supply shut off
Emergency Egress - General	Fuel cell is unmanned remotely monitored and controlled. No Doosan Fuel Cell America employees attending unit unless service or maintenance is required.



## Signage and labeling



Perimeter fencing will have signage clearly identifying that “No smoking, no ignition sources” on every side of the fence. Signage will be similar to the sign below:



## General:

### Safety Hazard Analysis

The PureCell® Model 400 fuel cell system has been designed to meet strict ANSI/CSA safety standards to protect against risks from electrical, mechanical, chemical, and combustion safety hazards. The following items are a few of the safety measures incorporated into the design.

### Fire Detection and Protection:

The power plant design incorporates a combustible gas sensor as well as thermal fuses located throughout the power module cabinet to detect fire. The detection of a potential flammable gas mixture, a fire, or the failure of this detection circuit will result in a power plant shutdown 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 Doosan Fuel Cell America service personnel. The power plant is designed with an integral emergency-stop button on the outside of the enclosure to enable immediate shutdown in the event of an emergency. There is also a gas shut-off valve and electrical disconnect switch easily accessible to emergency personnel. There are no restrictions for type of fire suppression equipment.



### **Gas Leak:**

Augmenting the internal combustible gas sensor, the power plant also monitors the flow rate of natural gas. If the gas flow rate exceeds the equivalent power production of the power plant then a shutdown will result. The largest possible accumulation from a leak prior to shutdown is below combustible limits. Fuel valves inside the power plant are “fail safe” and will return to their normally closed position upon loss of power. The power plant is designed to have 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 kept at a negative pressure to contain and remove any potential gas leaks, whereas the motor compartment is pressurized by a fan source to prevent combustible gases from entering.

### **Hydrogen:**

Hydrogen is lighter than air and thus does not pool like other fuels and will readily dissipate with proper ventilation making it less likely to ignite. Although hydrogen has low self-ignition characteristics, the fuel in the power plant is not pure hydrogen. Also, the power plant is not producing or storing hydrogen, it consumes hydrogen-rich gas equal to what it requires to produce power. The fuel cell stack is wrapped in a fire retardant blanket. There are no materials inside the unit that would sustain a flame. There is no large volume of gas or any ignition that occurs within the cell stack.

### **Phosphoric Acid:**

Phosphoric acid is integral part of the fuel cell system, acting as the electrolyte within the fuel cell stack. Phosphoric acid is a surprisingly common substance that is contained in common cola drinks. A leak of phosphoric acid is not possible because phosphoric acid is not in liquid form once applied in the equipment. There is no reservoir of liquid. Phosphoric acid is contained in the porous structure of the fuel cell stack material by capillary action, similar to how ink is absorbed into a blotter.

### **Fluid Leak:**

The only fluid source is water. All pressurized water vessels are designed to ASME boiler codes and inspected annually. All piping, welds, etc. meet pressurized piping standards. Water produced through the electrochemical process is “pure” water and is reclaimed and reused by the process. The other source of water is water used in the external cooling module, which is mixed with a polypropylene glycol and a rust inhibitor to prevent rust and freezing in colder climates.

### **Hazardous Waste:**

The fuel cell does not produce any hazardous waste. Standard Material Safety Data Sheets (MSDS) are available upon request.



## **APPENDIX 1 – SAFETY DATA SHEETS**



Version: 1.0  
Revision date: 04-07-2014

# SAFETY DATA SHEET

## 1. Identification

Product identifier: PHOSPHORIC ACID

### Other means of identification

Synonyms: Ortho-Phosphoric Acid, White Phosphoric Acid  
Product No.: 0240, 6908, 2798, 2797, 5854, 2796, 5804, 2788, 0259, 5372, 0274, 0269, 0268, 0265, 0264, 0262, 0260, 0255, 0251

### Recommended use and restriction on use

Recommended use: Not available.  
Restrictions on use: Not known.

### Manufacturer/Importer/Supplier/Distributor information

#### Manufacturer

Company Name: Avantor Performance Materials, Inc.  
Address: 3477 Corporate Parkway, Suite 200  
Center Valley, PA 18034

Telephone: Customer Service: 855-282-6867

Fax:  
Contact Person: Environmental Health & Safety  
e-mail: info@avantormaterials.com

Emergency telephone number:  
24 Hour Emergency: 908-859-2151

Chemtec: 800-424-9300

## 2. Hazard(s) identification

### Hazard classification

#### Physical hazards

Corrosive to metals Category 1

#### Health hazards

Acute toxicity (Oral) Category 4

Skin corrosion/irritation Category 1

Serious eye damage/eye irritation Category 1

Specific target organ toxicity - single exposure Category 3

#### Unknown toxicity

Acute toxicity, oral 0 %

Acute toxicity, dermal 0 %

Acute toxicity, inhalation, vapor 100 %

Acute toxicity, inhalation, dust or mist 100 %

#### Unknown toxicity

Acute hazards to the aquatic environment 84 %

Chronic hazards to the aquatic environment 84 %

### Label elements

SDS\_US - SDSMIX000331



**Hazard symbol:**



**Signal word:** Danger

**Hazard statement:** May be corrosive to metals.  
Harmful if swallowed.  
Causes severe skin burns and eye damage.  
May cause respiratory irritation.

**Precautionary statement**

**Prevention:** Keep only in original container. Do not breathe dust/fume/mist/vapors. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling.

**Response:** Absorb spillage to prevent material damage. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

**Storage:** Store locked up. Store in a well-ventilated place. Keep container tightly closed. Store in corrosive resistant container with a resistant inner liner.

**Disposal:** Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other hazards which do not result in GHS classification:** None.

**3. Composition/information on ingredients**

**Mixtures**

Chemical identity	Common name and synonyms	CAS number	Content in percent (%) <sup>*</sup>
PHOSPHORIC ACID		7664-38-2	80 - 90%

<sup>\*</sup> All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

**4. First-aid measures**

**General information:** Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.





<b>Ingestion:</b>	Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>Inhalation:</b>	Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.
<b>Skin contact:</b>	Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
<b>Eye contact:</b>	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

**Most important symptoms/effects, acute and delayed**

<b>Symptoms:</b>	Causes severe skin and eye burns. Causes digestive tract burns.
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**Indication of immediate medical attention and special treatment needed**

<b>Treatment:</b>	Treat symptomatically. Symptoms may be delayed.
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**5. Fire-fighting measures**

<b>General fire hazards:</b>	No data available.
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**Suitable (and unsuitable) extinguishing media**

<b>Suitable extinguishing media:</b>	The product is non-combustible. Use fire-extinguishing media appropriate for surrounding materials.
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<b>Unsuitable extinguishing media:</b>	None known.
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<b>Specific hazards arising from the chemical:</b>	Not combustible, but if involved in a fire decomposes to produce toxic gases.
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**Special protective equipment and precautions for firefighters**

<b>Special fire fighting procedures:</b>	Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool.
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<b>Special protective equipment for fire-fighters:</b>	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Product is highly acidic. Wear protective gear if spilled during fire fighting.
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**6. Accidental release measures**

<b>Personal precautions, protective equipment and emergency procedures:</b>	See Section 8 of the MSDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them.
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Version: 1.0  
Revision date: 04-07-2014

**Methods and material for containment and cleaning up:** Neutralize with lime or soda ash. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

**Notification Procedures:** Inform authorities if large amounts are involved.

**Environmental precautions:** Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

### 7. Handling and storage

**Precautions for safe handling:** Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when adding this material to water. Add material slowly when mixing with water. Do not add water to the material; instead, add the material to the water.

**Conditions for safe storage, including any incompatibilities:** Do not store in metal containers. Keep container tightly closed. Store in a well-ventilated place.

### 8. Exposure controls/personal protection

#### Control parameters

#### Occupational exposure limits

Chemical identity	Type	Exposure Limit values	Source
PHOSPHORIC ACID	TWA	1 mg/m <sup>3</sup>	US, ACGIH Threshold Limit Values (2011)
	STEL	3 mg/m <sup>3</sup>	US, ACGIH Threshold Limit Values (2011)
	REL	1 mg/m <sup>3</sup>	US, NIOSH: Pocket Guide to Chemical Hazards (2010)
	STEL	3 mg/m <sup>3</sup>	US, NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 mg/m <sup>3</sup>	US, OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 mg/m <sup>3</sup>	US, OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	STEL	3 mg/m <sup>3</sup>	US, OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	TWA	1 mg/m <sup>3</sup>	US, Tennessee, OELs, Occupational Exposure Limits, Table Z1A (08 2008)
	STEL	3 mg/m <sup>3</sup>	US, Tennessee, OELs, Occupational Exposure Limits, Table Z1A (08 2008)
	ST ESL	10 µg/m <sup>3</sup>	US, Texas, Effects Screening Levels (Texas Commission on Environmental Quality) (12 2010)
	AN ESL	1 µg/m <sup>3</sup>	US, Texas, Effects Screening Levels (Texas Commission on Environmental Quality) (12 2010)
	TWA PEL	1 mg/m <sup>3</sup>	US, California Code of Regulations, Title 8, Section 5155, Airborne Contaminants (08 2010)
	STEL	3 mg/m <sup>3</sup>	US, California Code of Regulations, Title 8, Section 5155, Airborne Contaminants (08 2010)

**Appropriate engineering controls** No data available.



Version: 1.0  
Revision date: 04-07-2014

**Individual protection measures, such as personal protective equipment**

<b>General information:</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.
<b>Eye/face protection:</b>	Wear safety glasses with side shields (or goggles) and a face shield.
<b>Skin protection</b>	
<b>Hand protection:</b>	Chemical resistant gloves
<b>Other:</b>	Wear suitable protective clothing and gloves.
<b>Respiratory protection:</b>	In case of inadequate ventilation use suitable respirator. Respirator type: Chemical respirator with acid gas cartridge.
<b>Hygiene measures:</b>	Provide eyewash station and safety shower. Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Avoid contact with eyes. Avoid contact with skin.

**9. Physical and chemical properties**

**Appearance**

<b>Physical state:</b>	Liquid
<b>Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>Odor:</b>	Odorless
<b>Odor threshold:</b>	No data available.
<b>pH:</b>	1.5 0.1 N Aqueous solution
<b>Melting point/freezing point:</b>	21.1 °C
<b>Initial boiling point and boiling range:</b>	158 °C
<b>Flash Point:</b>	Not applicable
<b>Evaporation rate:</b>	No data available.
<b>Flammability (solid, gas):</b>	No data available.
<b>Upper/lower limit on flammability or explosive limits</b>	
<b>Flammability limit - upper (%):</b>	No data available.
<b>Flammability limit - lower (%):</b>	No data available.
<b>Explosive limit - upper (%):</b>	No data available.
<b>Explosive limit - lower (%):</b>	No data available.
<b>Vapor pressure:</b>	0.3 kPa
<b>Vapor density:</b>	No data available.
<b>Relative density:</b>	1.69 (20 °C)
<b>Solubility(ies)</b>	
<b>Solubility in water:</b>	Miscible with water.
<b>Solubility (other):</b>	No data available.
<b>Partition coefficient (n-octanol/water):</b>	No data available.
<b>Auto-ignition temperature:</b>	No data available.
<b>Decomposition temperature:</b>	No data available.
<b>Viscosity:</b>	No data available.



Version: 1.0  
Revision date: 04-07-2014

**10. Stability and reactivity**

<b>Reactivity:</b>	No dangerous reaction known under conditions of normal use.
<b>Chemical stability:</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions:</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid:</b>	Avoid contact with oxidizing agents. Avoid contact with strong reducing agents. Contact with alkalis.
<b>Incompatible materials:</b>	Strong reducing agents. Alkalies. Strong oxidizing agents. Metals.
<b>Hazardous decomposition products:</b>	oxides of phosphorus

**11. Toxicological information**

**Information on likely routes of exposure**

<b>Ingestion:</b>	Harmful if swallowed.
<b>Inhalation:</b>	Severely irritating to respiratory system.
<b>Skin contact:</b>	Causes severe skin burns.
<b>Eye contact:</b>	Causes serious eye damage.

**Information on toxicological effects**

**Acute toxicity (list all possible routes of exposure)**

<b>Oral</b>	
<b>Product:</b>	ATEmix (Rat): 1,700 mg/kg
<b>Dermal</b>	
<b>Product:</b>	ATEmix (): 3,044.44 mg/kg
<b>Inhalation</b>	
<b>Product:</b>	No data available.

<b>Repeated dose toxicity</b>	
<b>Product:</b>	No data available.

<b>Skin corrosion/irritation</b>	
<b>Product:</b>	Causes severe skin burns.

<b>Serious eye damage/eye irritation</b>	
<b>Product:</b>	Causes serious eye damage.

<b>Respiratory or skin sensitization</b>	
<b>Product:</b>	Not a skin sensitizer.

<b>Carcinogenicity</b>	
<b>Product:</b>	This substance has no evidence of carcinogenic properties.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**  
No carcinogenic components identified

**US. National Toxicology Program (NTP) Report on Carcinogens:**  
No carcinogenic components identified



Version: 1.0  
Revision date: 04-07-2014

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):**  
No carcinogenic components identified

**Germ cell mutagenicity**

**In vitro**  
Product: No mutagenic components identified

**In vivo**  
Product: No mutagenic components identified

**Reproductive toxicity**

Product: No components toxic to reproduction

**Specific target organ toxicity - single exposure**

Product: None known.

**Specific target organ toxicity - repeated exposure**

Product: None known.

**Aspiration hazard**

Product: Not classified

**Other effects:** Not known.

**12. Ecological information**

**Ecotoxicity:**

**Acute hazards to the aquatic environment:**

**Fish**  
Product: No data available.

**Aquatic invertebrates**  
Product: No data available.

**Chronic hazards to the aquatic environment:**

**Fish**  
Product: No data available.

**Aquatic invertebrates**  
Product: No data available.

**Toxicity to Aquatic Plants**  
Product: No data available.

**Persistence and degradability**

**Biodegradation**  
Product: Expected to be readily biodegradable.

**BOD/COD ratio**  
Product: No data available.

**Bioaccumulative potential**

**Bioconcentration factor (BCF)**  
Product: No data available on bioaccumulation.

**Partition coefficient n-octanol / water (log Kow)**  
Product: No data available.



Version: 1.0  
Revision date: 04-07-2014

**Mobility in soil:** The product is water soluble and may spread in water systems.  
**Other adverse effects:** The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

**13. Disposal considerations**

**Disposal instructions:** Discharge, treatment, or disposal may be subject to national, state, or local laws.  
**Contaminated packaging:** Since emptied containers retain product residue, follow label warnings even after container is emptied.

**14. Transport information**

**DOT**  
UN number: UN 1805  
UN proper shipping name: Phosphoric acid solution  
Transport hazard class(es):  
Class(es): 8  
Label(s): 8  
Packing group: III  
Marine Pollutant: No

**IMDG**  
UN number: UN 1805  
UN proper shipping name: PHOSPHORIC ACID SOLUTION  
Transport hazard class(es):  
Class(es): 8  
Label(s): 8  
EmS No.: F-A, S-B  
Packing group: III  
Marine Pollutant: No

**IATA**  
UN number: UN 1805  
Proper Shipping Name: Phosphoric acid, solution  
Transport hazard class(es):  
Class(es): 8  
Label(s): 8  
Marine Pollutant: No  
Packing group: III

**15. Regulatory information**

**US federal regulations**

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**  
**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**  
None present or none present in regulated quantities.

**CERCLA Hazardous Substance List (40 CFR 302.4):**  
PHOSPHORIC ACID Reportable quantity: 5000 lbs.





**Superfund amendments and reauthorization act of 1986 (SARA)**

**Hazard categories**

Acute (Immediate)  Chronic (Delayed)  Fire  Reactive  Pressure Generating

**SARA 302 Extremely hazardous substance**

None present or none present in regulated quantities.

**SARA 304 Emergency release notification**

Chemical identity	RQ
PHOSPHORIC ACID	5000 lbs.

**SARA 311/312 Hazardous chemical**

Chemical identity	Threshold Planning Quantity
PHOSPHORIC ACID	500 lbs

**SARA 313 (TRI reporting)**

None present or none present in regulated quantities.

**Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)**

PHOSPHORIC ACID Reportable quantity: 5000 lbs.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):**

None present or none present in regulated quantities.

**US state regulations**

**US. California Proposition 65**

No ingredient regulated by CA Prop 65 present.

**US. New Jersey Worker and Community Right-to-Know Act**

PHOSPHORIC ACID Listed

**US. Massachusetts RTK - Substance List**

PHOSPHORIC ACID Listed

**US. Pennsylvania RTK - Hazardous Substances**

PHOSPHORIC ACID Listed

**US. Rhode Island RTK**

PHOSPHORIC ACID Listed

**Inventory Status:**

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

**16. Other information, including date of preparation or last revision**



Version: 1.0  
Revision date: 04-07-2014

**NFPA Hazard ID**



-  Flammability
-  Health
-  Reactivity
-  Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

**Issue date:** 04-07-2014  
**Revision date:** No data available.  
**Version #:** 1.0  
**Further information:** No data available.

**Disclaimer:** THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET (MSDS/SDS) WAS PREPARED BY TECHNICAL PERSONNEL BASED ON DATA THAT THEY BELIEVE IN THEIR GOOD FAITH JUDGMENT IS ACCURATE. HOWEVER, THE INFORMATION PROVIDED HEREIN IS PROVIDED "AS IS," AND AVANTOR PERFORMANCE MATERIALS MAKES AND GIVES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, AND EXPRESSLY DISCLAIMS ALL WARRANTIES REGARDING SUCH INFORMATION AND THE PRODUCT TO WHICH IT RELATES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION, WARRANTIES OF ACCURACY, COMPLETENESS, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY, STABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS MSDS/SDS IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PROPERLY TRAINED PERSON USING THIS PRODUCT, AND IS NOT INTENDED TO BE COMPREHENSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING, STORAGE, OR DISPOSAL OF THE PRODUCT. INDIVIDUALS RECEIVING THIS MSDS/SDS MUST ALWAYS EXERCISE THEIR OWN INDEPENDENT JUDGMENT IN DETERMINING THE APPROPRIATENESS OF SUCH ISSUES. ACCORDINGLY, AVANTOR PERFORMANCE MATERIALS ASSUMES NO LIABILITY WHATSOEVER FOR THE USE OF OR RELIANCE UPON THIS INFORMATION. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS, A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR TO VIOLATE ANY FEDERAL, STATE, LOCAL, OR FOREIGN LAWS. AVANTOR PERFORMANCE MATERIALS REMINDS YOU THAT IT IS YOUR LEGAL DUTY TO MAKE ALL INFORMATION IN THIS MSDS/SDS AVAILABLE TO YOUR EMPLOYEES.





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### MATERIAL SAFETY DATA SHEET

**PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372

#### SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Doosan Fuel Cell America, Inc. 195 Governors Hwy. South Windsor, CT 06074 USA	TELEPHONE: 24 HOUR EMERGENCY: 1-800-424-9300 (CHEMTREG) PRODUCT INFORMATION: 860-727-2300
--	--

MSDS NO: NN53	INITIAL RELEASE DATE: 4/23/2009	REVISION DATE:
---------------	---------------------------------	----------------

<b>GENERIC DESCRIPTION:</b>	Reduced catalyst
<b>PHYSICAL FORM:</b>	Cylindrical tablets
<b>COLOR:</b>	Dark brown
<b>ODOR:</b>	None

NFPA 704 CODES: HEALTH: 1 FLAMMABILITY: 4 REACTIVITY: 2

NOTE: NFPA = NATIONAL FIRE PROTECTION ASSOCIATION

#### SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

CAS NUMBER	%WT/VOL	COMPONENTS	EXPOSURE LIMITS	
			OSHA	AGGIH

The following is the composition of the packed tablets:

1344-28-1	9-12	Aluminum oxide	15 mg/m3 5 mg/m3 (respirable)	1 mg/m <sup>3</sup> (respirable)
7440-50-8	55-62	Copper	1 mg/m3	1 mg/m <sup>3</sup> (dust)
1314-13-2	28-33	Zinc oxide	15 mg/m3 5 mg/m3 (respirable)	2 mg/m <sup>3</sup> (respirable)



### MATERIAL SAFETY DATA SHEET

**PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372

**SECTION 3. EFFECTS OF OVEREXPOSURE**

**ACUTE EFFECTS:**

**EYE:** May cause irritation

**SKIN:** Frequent or prolonged contact may irritate the skin and cause a skin rash (dermatitis).

**INHALATION:** Prolonged or repeated inhalation may cause lung damage. Prolonged or excessive inhalation may cause respiratory tract irritation.

**ORAL:** Moderately toxic and may be harmful if swallowed; may damage the liver, pancreas, kidney or nervous systems.

**REPEATED EXPOSURE EFFECTS:**

**EYE:** Signs and symptoms of overexposure may include scratch or abrasion, damage to cornea (necrosis).

**SKIN:** Overexposure may cause skin rash, dermatitis and or itching.

**INHALATION:** Overexposure may cause coughing, wheezing, shortness of breath, difficult breathing, chest pain.

**ORAL:** Ingestion may cause upset stomach and intestinal distress.

**SECTION 3. EFFECTS OF OVEREXPOSURE**

**NOTE TO PHYSICIANS:** N/D

THIS MATERIAL CONTAINS THE FOLLOWING COMPONENTS WITH THE SPECIAL HAZARDS LISTED BELOW.

<u>CARCINOGENS</u>	N/A
<u>TERATOGENS</u>	N/A
<u>MUTAGENS</u>	N/A
<u>REPRODUCTIVE TOXINS</u>	N/A
<u>SENSITIZERS</u>	N/A
<u>COMMENTS:</u>	None
<u>NTP CLASSIFICATION:</u>	N/A
<u>IARC CLASSIFICATION:</u>	N/A
<u>OSHA CLASSIFICATION:</u>	N/A

**MATERIAL SAFETY DATA SHEET****PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372**SECTION 4. FIRST AID MEASURES**

**EYE:** Immediately flush eyes with plenty of water for at least 30 minutes. Get immediate medical attention.

**SKIN:** Wash with plenty of soap and water. Get medical attention if irritation develops or persists.

**INHALATION:** Remove to fresh air. If breathing is difficult seek immediate medical attention.

**ORAL:** If swallowed, do NOT induce vomiting. Give victim large quantities of water. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

**COMMENTS:** Exposure to fumes of the metal oxides may cause metal fume fever including irritation of eyes and respiratory tract and flu-like symptoms.

**SECTION 5. FIRE FIGHTING MEASURES**

**FLASH POINT (METHOD):** N/A

**AUTOIGNITION TEMPERATURE:** N/A

**FLAMMABILITY LIMITS IN AIR:** N/A

**EXTINGUISHING MEDIA:** Protect exposures; cool with water fog. For small fires use Class D extinguishing media.

**UNSUITABLE EXTINGUISHING MEDIA:** N/D

**FIRE FIGHTING PROCEDURES:** Wear full protective clothing and SCBA's.

**UNUSUAL FIRE HAZARDS:** Packed material will spontaneously oxidize in air, producing significant heat. Keep away from combustible materials.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Toxic metal fumes may be emitted if thermally decomposed.

**SECTION 6. ACCIDENTAL RELEASE MEASURES****CONTAINMENT / CLEAN UP:**

**Small spill** With shovel or scoop, place material onto clean, dry non-flammable surface to allow catalyst to oxidize. Place oxidized catalyst into container and cover loosely. Remove containers from spill area. Protect against inhalation of dusts or fumes, Wear eye protection.

**Large spill** Wet methods of cleanup are preferred. Keep airborne particulates to a minimum. Protect against inhalation of dusts or fumes, Wear eye protection. Place in appropriate containers for disposal.



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## MATERIAL SAFETY DATA SHEET

**PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372

### SECTION 7. HANDLING AND STORAGE

**HANDLING:** No special precautions for intact containers.

**STORAGE:** Store in dry area. Prevent exposure to air by maintaining under an inert gas atmosphere such as nitrogen. Use additional precautions to prevent asphyxiant hazards due to inert gas usage.

### SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### ENGINEERING CONTROLS

**LOCAL EXHAUST:** If user operations generate dust or fume, use ventilation to keep exposure to airborne contaminants below the exposure limits.

**GENERAL VENTILATION:** N/A

#### PERSONAL PROTECTIVE EQUIPMENT FOR ROUTINE HANDLING

**EYES:** Wear safety glasses with side shields or goggles.

**SKIN:** Wear protective clothing, including long sleeves and gloves to prevent skin contact.

**SUITABLE GLOVES:** Impermeable, such as latex, Nitrile, etc.

**INHALATION:** Wear NIOSH approved respirator with particulate filter.

#### PERSONAL PROTECTIVE EQUIPMENT FOR SPILLS

**EYES:** Chemical goggles

**SKIN:** Chemical resistant gloves

**INHALATION / SUITABLE RESPIRATOR:** (Min) Use NIOSH-approved respirator with particulate filter

**PRECAUTIONARY MEASURES:** N/D

**MATERIAL SAFETY DATA SHEET****PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES****TYPICAL PHYSICAL PROPERTIES ARE GIVEN BELOW.**

APPEARANCE: Cylindrical tablets	POUR POINT C (F): N/A
COLOR: Dark brown	FREEZING POINT C (F): N/A
ODOR: None	VOLATILE ORGANIC COMPOUND:
ODOR THRESHOLD: N/A	SPECIFIC GRAVITY: (H <sub>2</sub> O = 1) >8
pH: N/A	VAPOR PRESSURE - mmHg: N/A
BOILING POINT C (F): N/A	VAPOR DENSITY @ TEMP:____: N/A
MELTING POINT C (F): N/A	EVAPORATION RATE RELATIVE TO____: N/A
SOLUBILITY IN WATER: Insoluble	EXPLOSIVE PROPERTIES: Will not explode
VISCOSITY AT____: N/A	OXIDIZING PROPERTIES: Not an oxidizer
VISCOSITY AT____:	
RELATIVE DENSITY TO: 65-85 lb./CF (bulk)	

**SECTION 10. STABILITY AND REACTIVITY**

**STABILITY (THERMAL, LIGHT, ETC.):** Generally considered stable when contained under an inert atmosphere.

**CONDITIONS TO AVOID:** Exposure to air.

**INCOMPATIBILITY (MATERIALS TO AVOID):** Combustible materials.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition may produce metal oxide fumes.

**HAZARDOUS POLYMERIZATION:** Not expected to occur.

**MATERIAL SAFETY DATA SHEET****PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372**SECTION 11. TOXICOLOGICAL DATA**

Exposure to metal oxide fume may produce "metal fume fever" which is characterized by flu-like symptoms including fever, chills and general aches.

**SECTION 12. ECOLOGICAL INFORMATION**

No data available.

**SECTION 13. DISPOSAL CONSIDERATIONS**

Local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state and local environmental control regulations.

**SECTION 14. TRANSPORT INFORMATION****PROPER SHIPPING NAME:** Self-heating solid, inorganic, N.O.S.**HAZARD TECHNICAL NAME:** Reduced copper catalysts.**HAZARD CLASS:** 4.2**UN NUMBER:** 3190**PACKING GROUP:** II**SECTION 15. REGULATORY INFORMATION****TSCA STATUS:** Component materials are in the TSCA inventory.**EPA SARA TITLE III CHEMICAL LISTINGS:****SECTION 302 HAZARDOUS SUBSTANCES:** No**SECTION 355 EXTREMELY HAZARDOUS SUBSTANCES:** No



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### MATERIAL SAFETY DATA SHEET

**PRODUCT NAME:** Shift Max 230, Reduced Heterogeneous Catalyst, FC72372

#### SECTION 15. REGULATORY INFORMATION, CONTINUED

##### SECTION 312 HAZARD CLASS:

**ACUTE:** Yes  
**CHRONIC:** Yes  
**FIRE:** Yes  
**PRESSURE:** No  
**REACTIVE:** No

**SECTION 372 TOXIC CHEMICALS:** Copper.

#### SECTION 16. OTHER INFORMATION

**COMMENTS:** N/D = Not Determined  
N/A = Not Applicable

As a unit, the materials do not pose a hazard. However, should the container be compromised and the packed catalyst become available, measures must be taken to prevent exposure to air.

**PREPARED BY:** D. Black, J. Preston  
Revision By:

**DATE:** 4/23/2009

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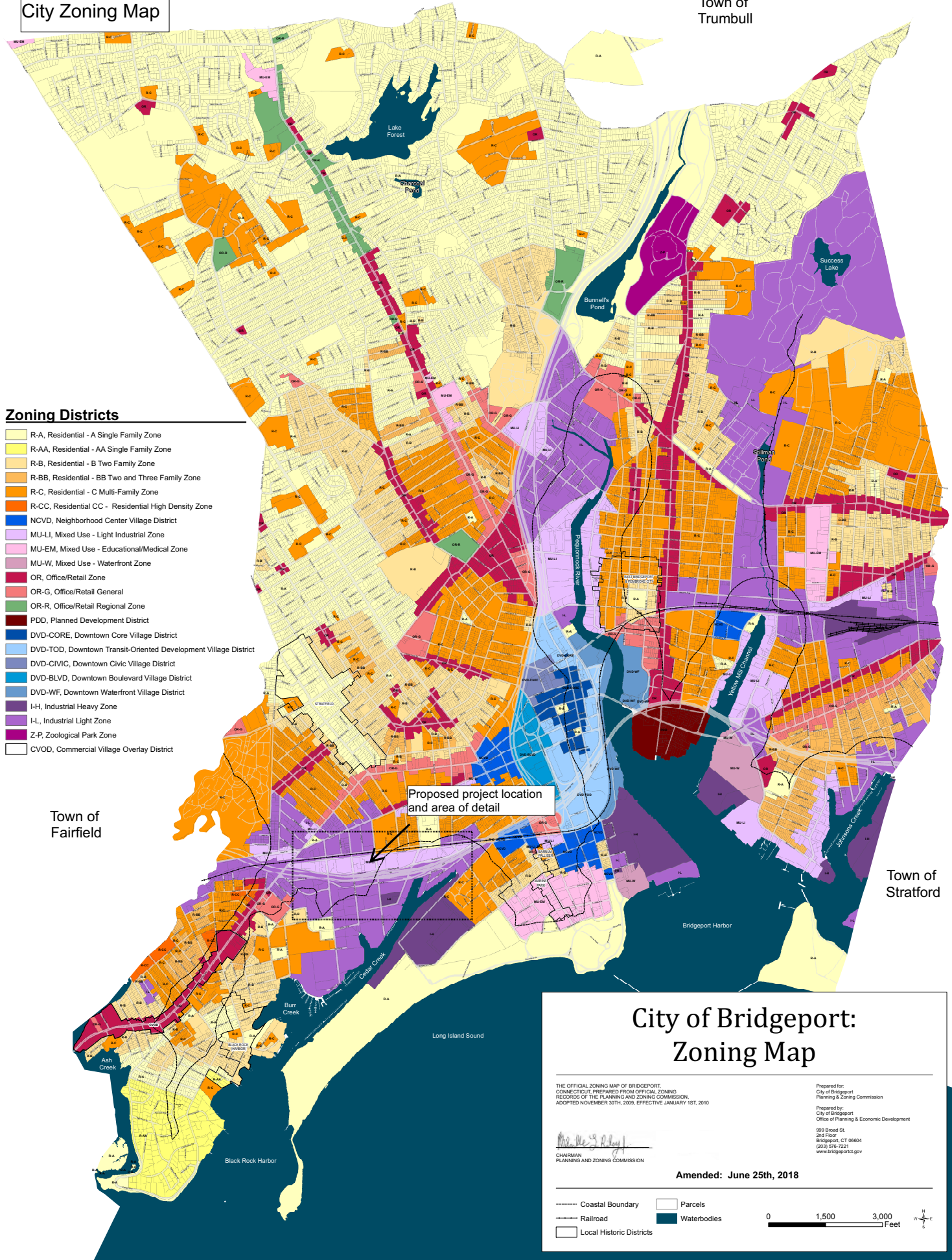
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AMERICA CORPORATION IS NOT AUTHORIZED AND MAY RESULT IN CIVIL LIABILITY.



**Attachment 5  
City Zoning Map**

Town of Trumbull



- Zoning Districts**
- R-A, Residential - A Single Family Zone
  - R-AA, Residential - AA Single Family Zone
  - R-B, Residential - B Two Family Zone
  - R-BB, Residential - BB Two and Three Family Zone
  - R-C, Residential - C Multi-Family Zone
  - R-CC, Residential CC - Residential High Density Zone
  - NCDV, Neighborhood Center Village District
  - MU-LI, Mixed Use - Light Industrial Zone
  - MU-EM, Mixed Use - Educational/Medical Zone
  - MU-W, Mixed Use - Waterfront Zone
  - OR, Office/Retail Zone
  - OR-G, Office/Retail General
  - OR-R, Office/Retail Regional Zone
  - PDD, Planned Development District
  - DVD-CORE, Downtown Core Village District
  - DVD-TOD, Downtown Transit-Oriented Development Village District
  - DVD-CIVIC, Downtown Civic Village District
  - DVD-BLVD, Downtown Boulevard Village District
  - DVD-WF, Downtown Waterfront Village District
  - I-H, Industrial Heavy Zone
  - I-L, Industrial Light Zone
  - Z-P, Zoological Park Zone
  - CVOV, Commercial Village Overlay District

Town of Fairfield

Town of Stratford

Proposed project location and area of detail

**City of Bridgeport:  
Zoning Map**

THE OFFICIAL ZONING MAP OF BRIDGEPORT, CONNECTICUT, PREPARED FROM OFFICIAL ZONING RECORDS OF THE PLANNING AND ZONING COMMISSION, ADOPTED NOVEMBER 30TH, 2009, EFFECTIVE JANUARY 1ST, 2010

Prepared for:  
City of Bridgeport  
Planning & Zoning Commission  
Prepared by:  
City of Bridgeport  
Office of Planning & Economic Development  
909 Broad St.  
2nd Floor  
Bridgeport, CT 06604  
(203) 336-7221  
www.bridgeportct.gov

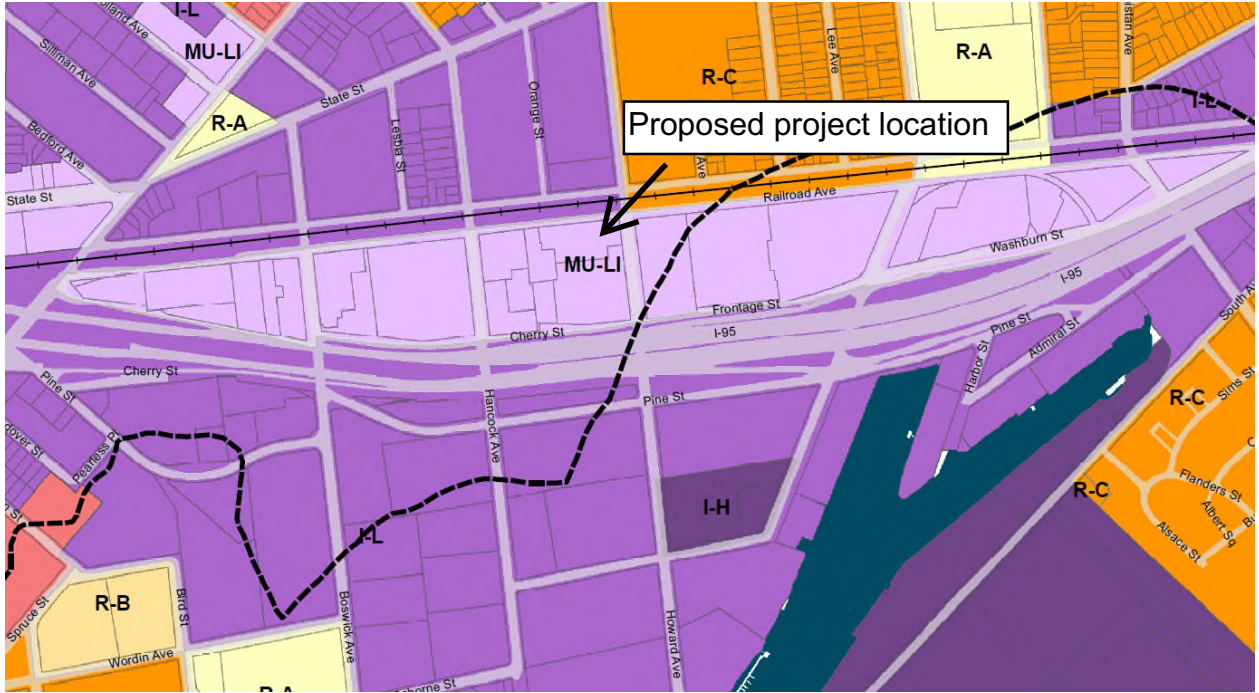
*Mr. Wes P. Ray*  
CHAIRMAN  
PLANNING AND ZONING COMMISSION

Amended: June 25th, 2018

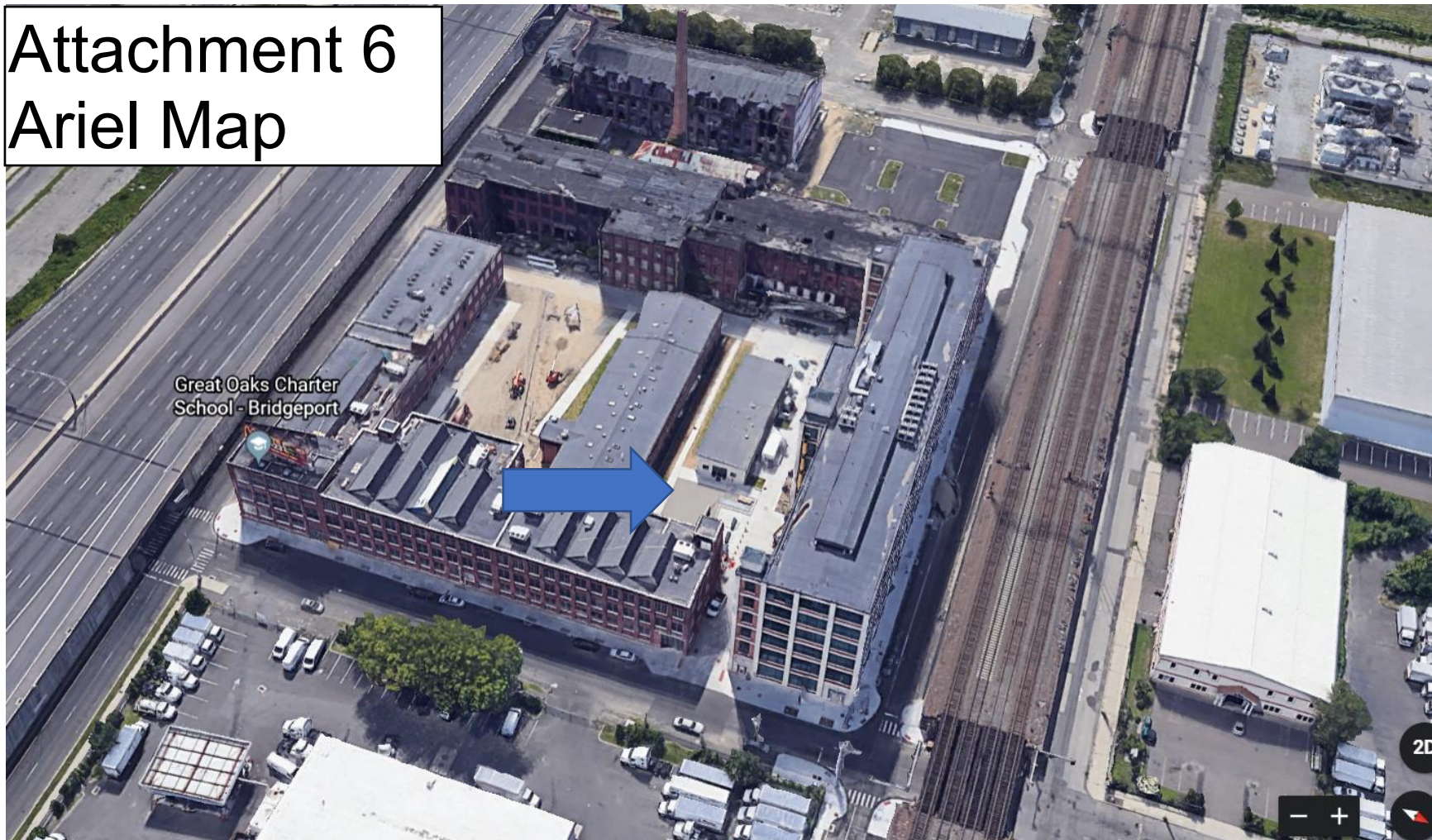
Coastal Boundary      Parcels  
 Railroad      Waterbodies  
 Local Historic Districts

0     1,500     3,000 Feet





# Attachment 6 Ariel Map



**Cherry Street Lofts**    arrow indicates position of the Fuel Cell installation.

# NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

## § 77.7 Form and time of notice.

### Attachment 7 14CFR Part 77.9

(a) If you are required to file notice under §77.9, completed FAA Construction available at internet.

(b) You must submit this form at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest.

(c) If you propose construction or alteration that is also subject to the licensing requirements of the Federal Communications Commission (FCC), you must submit notice to the FAA on or before the date that the application is filed with the FCC.

(d) If you propose construction or alteration to an existing structure that exceeds 2,000 ft. in height above ground level (AGL), the FAA presumes it to be a hazard to air navigation that results in an inefficient use of airspace. You must include details explaining both why the proposal would not constitute a hazard to air navigation and why it would not cause an inefficient use of airspace.

(e) The 45-day advance notice requirement is waived if immediate construction or alteration is required because of an emergency involving essential public services, public health, or public safety. You may provide notice to the FAA by any available, expeditious means. You must file a completed FAA Form 7460-1 within 5 days of the initial notice to the FAA. Outside normal business hours, the nearest flight service station will accept emergency notices.

## § 77.9 Construction or alteration requiring notice.

If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA of:

(a) Any construction or alteration that is more than 200 ft. AGL at its site.

(b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:

(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.

(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.

(3) 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section.

(c) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) or (b) of this section.

(d) Any construction or alteration on any of the following airports and heliports:

(1) A public use airport listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications;

(2) A military airport under construction, or an airport under construction that will be available for public use;

(3) An airport operated by a Federal agency or the DOD.

(4) An airport or heliport with at least one FAA-approved instrument approach procedure.

(e) You do not need to file notice for construction or alteration of:

(1) Any object that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation;

(2) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device meeting FAA-approved siting criteria or an appropriate military service siting criteria on military airports, the location and height of which are fixed by its functional purpose;

(3) Any construction or alteration for which notice is required by any other FAA regulation.

(4) Any antenna structure of 20 feet or less in height, except one that would increase the height of another antenna structure.

Mail Processing Center  
Federal Aviation Administration  
Southwest Regional Office  
Obstruction Evaluation Group  
2601 Meacham Boulevard  
Fort Worth, TX 76193  
Fax: (817) 321-7765  
Phone: (817) 321-7750

Website: <https://oeaaa.faa.gov>



## INSTRUCTIONS FOR COMPLETING FAA FORM 7460-1

PLEASE TYPE or PRINT

ITEM #1. Please include the name, address and phone number of a personal contact point as well as the company name.

ITEM #2. Please include the name, address and phone number of a personal contact point as well as the company name.

ITEM #3. New Construction would be a structure that has not yet been built.

Alteration is a change to an existing structure such as the addition of a side mounted antenna, a change to the marking and lighting, a change to power and/or frequency, or a change to the height. The nature of the alteration shall be included in ITEM #21 "Complete Description of Proposal".

Existing would be a correction to the latitude and/or longitude, a correction to the height, or if filing on an existing structure which has never been studied by the FAA. The reason for the notice shall be included in ITEM #21 "Complete Description of Proposal".

ITEM #4. If Permanent, so indicate. If Temporary, such as a crane or drilling derrick, enters the estimated length of time the temporary structure will be up.

ITEM #5. Enter the date that construction is expected to start and the date that construction should be completed.

ITEM #6. Please indicate the type of structure. DO NOT LEAVE BLANK.

ITEM #7. In the event that obstruction marking and lighting is required, please indicate type desired. If no preference, check "other" and indicate "no preference" DO NOT LEAVE BLANK. NOTE: High Intensity lighting shall be used only for structures over 500' AGL. In the absence of high intensity lighting for structures over 500' AGL, marking is also required.

ITEM #8. If this is an existing tower that has been registered with the FCC, enter the FCC Antenna Structure Registration number here.

ITEM #9 and #10. Latitude and longitude must be geographic coordinates, accurate to within the nearest second or to the nearest hundredth of a second if known. Latitude and longitude derived solely from a hand-held G P S instrument is NOT acceptable. A hand-held GPS is only accurate to within 100 meters (328 feet) 95 percent of the time. This data, when plotted, should match the site depiction submitted under ITEM #20.

ITEM #11. NAD 83 is preferred; however, latitude and longitude may be submitted in NAD 27. Also, in some geographic areas where NAD 27 and NAD 83 are not available other datum may be used. It is important to know which datum is used. DO NOT LEAVE BLANK.

ITEM #12. Enter the name of the nearest city and state to the site. If the structure is or will be in a city, enter the name of that city and state.

ITEM #13. Enter the full name of the nearest public-use (not private-use) airport or heliport or military airport or heliport to the site.

ITEM #14. Enter the distance from the airport or heliport listed in #13 to the structure.

ITEM #15. Enter the direction from the airport or heliport listed in #13 to the structure.

ITEM #16. Enter the site elevation above mean sea level and expressed in whole feet rounded to the nearest foot (e.g. 17'3" rounds to 17', 17'6" rounds to 18'). This data should match the ground contour elevations for site depiction submitted under ITEM #20.

ITEM #17. Enter the total structure height above ground level in whole feet rounded to the next highest foot (e.g. 17'3" rounds to 18'). The total structure height shall include anything mounted on top of the structure, such as antennas, obstruction lights, lightning rods, etc.

ITEM #18. Enter the overall height above mean sea level and expressed in whole feet. This will be the total of ITEM #16 + ITEM #17.

ITEM #19. If an FAA aeronautical study was previously conducted, enter the previous study number.

ITEM #20. Enter the relationship of the structure to roads, airports, prominent terrain, existing structures, etc. Attach an 8-1/2" x 11" non-reduced copy of the appropriate 7.5 minute U.S. Geological Survey (USGS) Quadrangle Map MARKED WITH A PRECISE INDICATION OF THE SITE LOCATION. To obtain maps, contact USGS at 1-888-275-8747 or via internet at "<http://store.usgs.gov>". If available, attach a copy of a documented site survey with the surveyor's certification stating the amount of vertical and horizontal accuracy in feet.

ITEM #21.

- For transmitting stations, include maximum effective radiated power (ERP) and all frequencies.
- For antennas, include the type of antenna and center of radiation (Attach the antenna pattern, if available).
- For microwave, include azimuth relative to true north.
- For overhead wires or transmission lines, include size and configuration of wires and their supporting structures (Attach depiction).
- For each pole/support, include coordinates, site elevation, and structure height above ground level or water.
- For buildings, include site orientation, coordinates of each corner, dimensions, and construction materials.
- For alterations, explain the alteration thoroughly.
- For existing structures, thoroughly explain the reason for notifying the FAA (e.g. corrections, no record or previous study, etc.).

---

Filing this information with the FAA does not relieve the sponsor of this construction or alteration from complying with any other federal, state or local rules or regulations. If you are not sure what other rules or regulations apply to your proposal, contact local/state aviation's and zoning authorities.

---

**Paperwork Reduction Work Act Statement:** This information is collected to evaluate the effect of proposed construction or alteration on air navigation and is not confidential. Providing this information is mandatory or anyone proposing construction or alteration that meets or exceeds the criteria contained in 14 CFR, part 77. We estimate that the burden of this collection is an average 19 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, completing and reviewing the collection of information. A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number. The OMB control number associated with this collection is 2120-0001. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, AES-200.





# Attachment 8 CARB Cert

State of California  
RESOURCES BOARD

Executive Order DG-040-A

## **Distributed Generation Certification of Doosan Fuel Cell America Corporation 440 kW PureCell® System 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, UTC Power Corporation applied for a DG Certification of its 440 kW PureCell® System Model 400 fuel cell and whose application was deemed complete on December 10, 2012;

WHEREAS, UTC Power Corporation was issued DG Certificate DG-040 on December 26, 2012, for its 440 kW PureCell® System Model 400 fuel cell;

WHEREAS, UTC Power Corporation had demonstrated, according to test methods specified in California Code of Regulations (CCR), title 17, §94207, that its natural-gas-fueled 440 kW PureCell® System Model 400 has complied with the following emission standards:

1. Emissions of oxides of nitrogen no greater than 0.07 pounds per megawatt-hour;
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, UTC Power Corporation had demonstrated that its 440 kW PureCell® System Model 400 fuel cell complies with the emissions durability requirements in CCR, title 17, §94207(d);

WHEREAS, UTC Power, a division of United Technologies Corporation, sold its fuel cell operation to ClearEdge Power, Inc. Subsequently, ClearEdge Power Inc. declared bankruptcy and Doosan Corporation purchased the assets of ClearEdge Power on July 2014, and re-organization into Doosan Fuel Cell

America; wherein it was noted that no material changes to model form, fit, or function were made;

WHEREAS, on February 13, 2017, Doosan Fuel Cell America applied for a change in ownership for the 440 kW PureCell® System Model 400;

WHEREAS, Doosan Fuel Cell America, Corporation was issued DG Certificate DG-040-A on April 26, 2017, for its 440 kW PureCell® System Model 400 fuel cell;

WHEREAS, Doosan Fuel Cell America, Corporation applied for recertification of its DG certificate for the 440 kW PureCell® System Model 400 fuel cell and whose application was deemed complete on December 22, 2017; and

WHEREAS, I find that the Applicant, Doosan Fuel Cell America, has met the requirements specified in CCR, title 17, article 3, Distributed Generation Certification Program and has satisfactorily demonstrated that the 440 kW PureCell® System Model 400 fuel cell meets the DG Certification Regulation 2007 Fossil Fuel Emission Standards.

NOW THEREFORE, IT IS HEREBY ORDERED, that a DG Certification, Executive Order DG-040-A, is hereby extended.

This DG Certification:

- 1) Is subject to all conditions and requirements of CCR, title 17, article 3, Distributed Generation Certification Program, including the provisions relating to inspection, denial, suspension, and revocation;
- 2) 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 2007 DG Certification emission standards; and
- 3) Shall expire on the 26th day of December 2022.

Executed at Sacramento, California, this 24th day of January 2018.

/S/




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



# Natural Diversity Data Base Areas

BRIDGEPORT, CT

December 2019

-  State and Federal Listed Species
-  Critical Habitat
-  Town Boundary

NOTE: This map shows general locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDDB) from a variety of data sources. Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDDB along with the required maps and information. More detailed instructions are provided with the request form on our website.

[www.ct.gov/deep/nddbrequest](http://www.ct.gov/deep/nddbrequest)

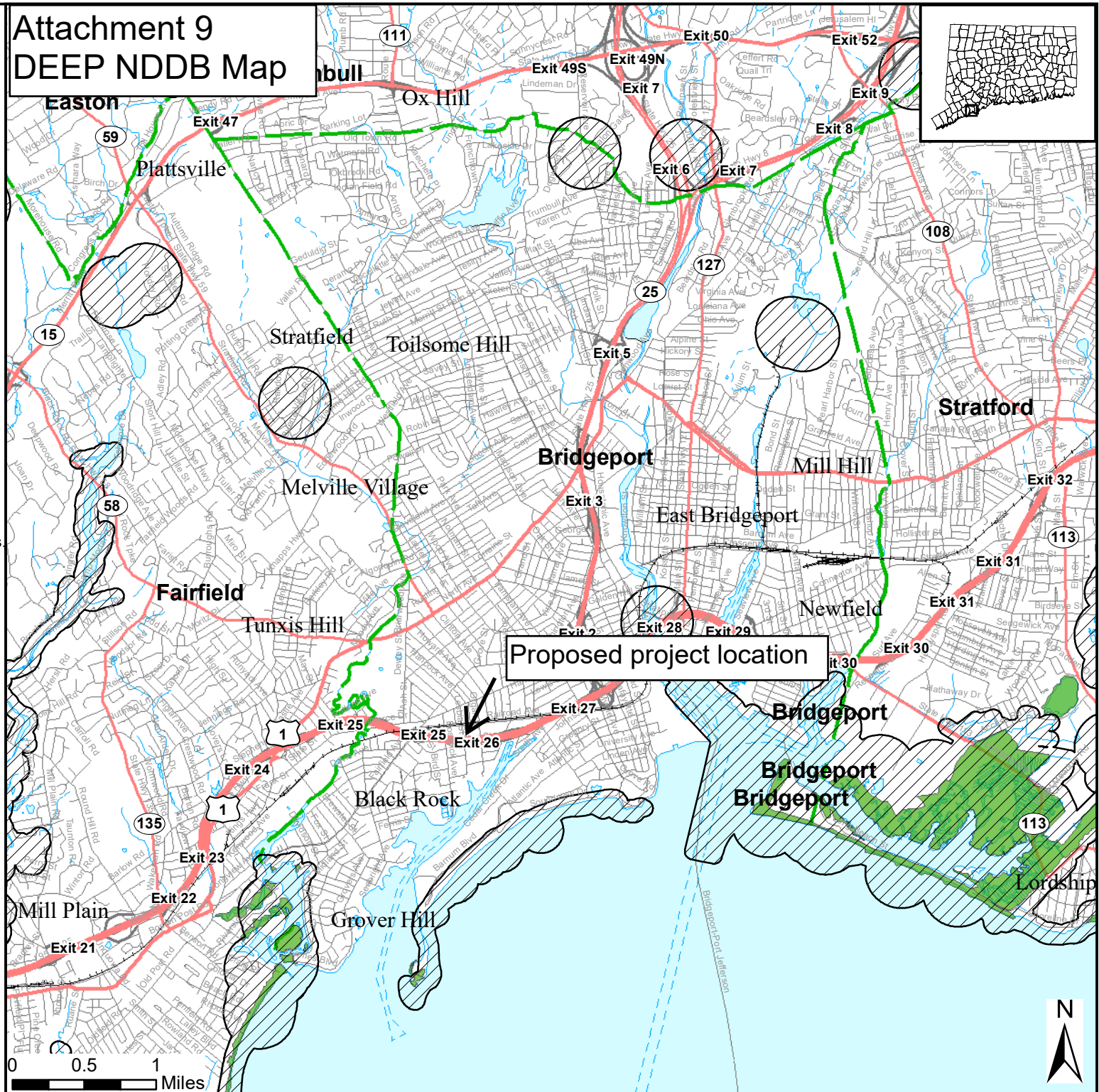
Use the CTECO Interactive Map Viewers at [www.cteco.uconn.edu](http://www.cteco.uconn.edu) to more precisely search for and locate a site and to view aerial imagery with NDDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)  
79 Elm St, Hartford, CT 06106  
email: [deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)  
Phone: (860) 424-3011



Connecticut Department of Energy & Environmental Protection  
Bureau of Natural Resources  
Wildlife Division

## Attachment 9 DEEP NDDDB Map



Proposed project location

0 0.5 1 Miles







**City of Bridgeport**  
@CityofBptCT

**Attachment 10**  
**Project Launch Event**



The Mayor joined NuPower and A1 Energy for the Green Electricity Project Launch! What does this mean, you may ask? A 440KW fuel cell will deliver lower costs and clean electric power to residents of Cherry Street Lofts and students at Great Oaks Charter School!

[#GreenElectricity](#)



7:00 PM · Oct 23, 2019 · [Hootsuite Inc.](#)



Doosan Fuel Cell America, Inc.  
195 Governor's Highway  
South Windsor, CT 06074  
T - 860 727 2200

11

# Attachment 11

January 23<sup>rd</sup>, 2020

**RE: Petition For a Declaratory Ruling That No Certificate of Environmental Compatibility And Public Need is Required ("Petition") for the Installation of One (1) on-site, 440 kW Fuel Cell at Cherry St lofts. 375 Howard ave, Bridgeport, CT 06605.**

To whom it may concern,

Pursuant to Section 16-50j-40 of the Connecticut Siting Council's (the "Council") Rules of Practice, we are notifying you that Doosan Fuel Cell America, Inc. intends to file a petition for declaratory ruling with the Connecticut Siting Council ("Council") on or about January 28<sup>th</sup> 2020. The petition will request the Council's approval of the installation of one (1) 440kW fuel cell and ancillary equipment ("the Facility") in support of a customer-side, distributed generation project at 375 Howard Ave Bridgeport, CT 06605. The Facility will be powered by natural gas and generated electricity will be consumed on-site.

The proposed placement of the fuel cell is located within the courtyard of Cherry St Lofts facility the new construction will be approximately 29 feet long, 8 feet wide and 10 feet high.

If you have any questions regarding the proposed work, please contact any of the following:

**Doosan Fuel Cell America, Inc.**  
Donald Emanuel Jr  
101 East River Dr.  
East Hartford, CT 06108  
Donald.emanuel@doosan.com

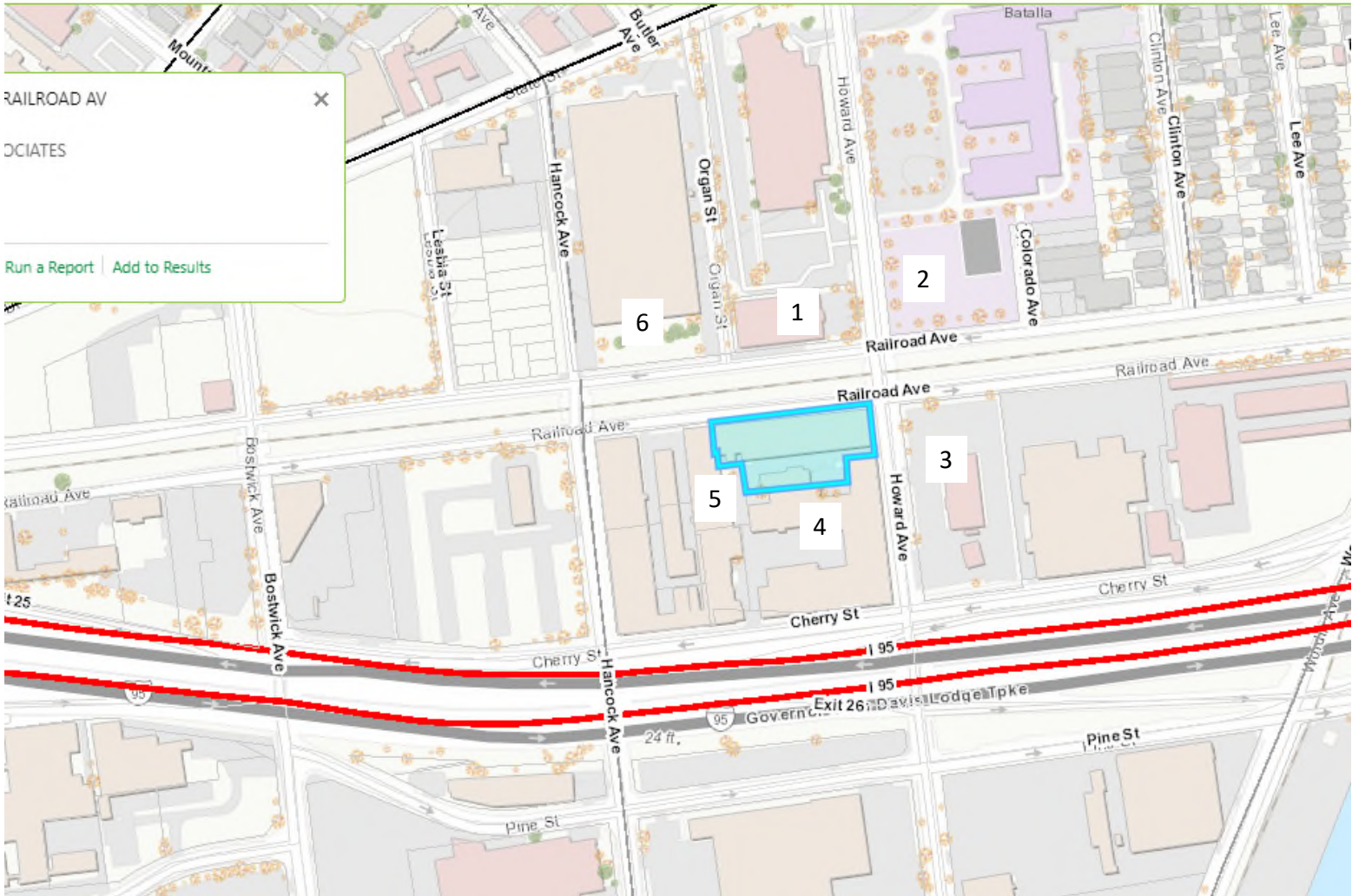
**Connecticut Siting Council**  
10 Franklin Square  
New Britain, CT 06051  
Tel: 860-827-2935

Sincerely,  
Doosan Fuel Cell America, Inc.

Donald Emanuel Jr  
Installation Project Manager

# Attachment 12

## Abutters Map



Cherry St Lofts FC LLC - Abutters Mailing List

No	Property ID	Site Address	Owner Name	Mailing Address	Mailing City	Mailing State	Mailing Zip
1	10023	485 Howard Ave	Bridgeport, City of	45 LYON TERRACE	Bridgeport	CT	06604
2	10021	606 Howard Av	Bridgeport Redevelopment	45 LYON TERRACE	Bridgeport	CT	06604
3	2489	410 Howard Ave	Ryder Truck Rental, Inc.	PO Box 025719	Miami	FL	33102
4	302-4	375 Howard Ave	72 Cherry St Associates	162 Jimmo Dr	Colchester	VT	05446
5	2487	1325 Railroad Ave	Hancock Avenue Partners LLC	471 Hancock Ave	Bridgeport	CT	06605
6	10025	1435 State St	Bridgeport Fields LLC	521 NE Spanish Trail	Boca Raton	FL	33432

**Attachment 13**  
**Abutters Mailing List**

<b>Office of the Mayor</b> Joseph Ganim 999 Broad St Bridgeport, Ct. 06604	<b>Attachment 14</b> <b>Official Notification List</b>
<b>Building Official</b> Bruce A Nelson 45 Lyon terrace Bridgeport , Ct 06604	<b>Planing and Zoning Commission</b> Dennis Buckley 45 Lyon Terrace rm 210 Bridgeport, Ct 06604
<b>State House</b> Marilyn Moore House District 22 666 Cleavland Ave Bridgeport CT 06605	<b>South Windsor Engineering</b> John Urquidi PE, Town Engineer 45 Lyon Terr rm 216 Bridgeport CT 06604
<b>State Senate</b> Dennis Bradley - Representative House District 23 853 Fairfield ave Bridgeport CT 06604	<b>State House</b> Stephen Stafstrom - Representative House District 129 120 Sailors Lane Bridgeport CT 06605
<b>United State Senator</b> Christopher S. Murphy One Constitution Plaza, 7th Floor Hartford, CT 06103	<b>United State Senator</b> Richard Blumenthal 90 State House Square Hartford, CT 06103
<b>State Department of Energy and Env Protection</b> Kaite Dykes, Commissioner 79 Elm Street Hartford, CT 06106	<b>Raul Pino, M.D M.P.H.</b> State Department of Public Health 410 Capitol Avenue Hartford, CT 06134
<b>State Council on Environmental Quality</b> State Council on Environmental Quality 79 Elm Street Hartford, CT 06106	<b>State Department of Agriculture</b> Melody A. Currey, Acting Commissioner 165 Capitol Avenue Hartford, CT 06106
<b>Office of Policy and Management</b> Melissa, McCaw, Secretary 450 Capitol Avenue Hartford, CT 06106-1379	<b>State Department of Economic and Community Development</b> David Lehman, Commissioner 505 Hudson Street Hartford, CT 06106-7106
<b>Capitol Region Council of Governments</b> Marcia Leclerc, Chair 241 Main St. #4 Hartford, CT 06106	<b>William Tong, Attorney General</b> Office of the Attorney General 55 Elm Street Hartford, CT 06106



<b>Public Utilities Regularity Authority</b>	<b>Department of Transportation</b>
John W. Betkoski III - Vice Chairman Ten Franklin Square, New Britain, CT 06051	Joseph Giuliatti, Commissioner 2800 Berlin Turnpike, Newington, CT 06111
<b>Department of Emergency Services and Public Protection</b>	<b>Department of Consumer Protection</b>
James C. Rovella, Commissioner 1111 Country Club Road Middletown, CT 06457	Michelle H. Seagull Commissioner 450 Columbus Blvd Hartford, CT 06103
<b>Department of Administrative Services</b>	<b>Department of Labor</b>
Josh Geballe, Commissioner 450 Columbus Blvd Hartford, CT 06103	Kurt Westby Commissioner 200 Folly Brook Boulevard Wethersfield, CT 06109
<b>Director of Planning</b>	
Thomas F Gill 999 Broad st Bridgeport, Ct. 06605	

|

Attachment 15  
Certified Mail Receipts

15

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NOTES TO USERS

# Attachment 16 NFIP Map

is for use in administering the National Flood Insurance Program. It does not identify all areas subject to flooding, particularly from local drainage of small size. The community map repository should be consulted for updated or additional flood hazard information.

more detailed information in areas where **Base Flood Elevations (BFEs)** have been determined, users are encouraged to consult the Flood Insurance Data and/or Summary of Significant Elevations tables contained in the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users aware that BFEs shown on the FIRM represent rounded whole-foot values. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, station data presented in the FIS Report should be utilized in conjunction with the FIS Report for purposes of construction and/or floodplain management.

**Base Flood Elevations** shown on this map apply only to landward of 8.0 American Vertical Datum of 1988 (AVD88). Users of this FIRM should be aware that flood elevations are also provided in the Summary of Significant Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations in the Summary of Significant Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations on the FIRM.

of the floodways were computed at cross sections and interpolated across cross sections. The floodways were based on hydraulic considerations with requirements of the National Flood Insurance Program. Floodway widths represent floodway data as provided in the Flood Insurance Study Report.

areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

action used in the preparation of this map was Connecticut State Plane (NAD 83 zone 1803). The horizontal datum was NAD 83 (GRS 1980). Differences in datum, projection, or UTM zones used in the preparation of this map may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

ations on this map are referenced to the North American Vertical Datum of 1988. Users of this FIRM should be aware that flood elevations must be compared to structure and ground elevations at the same vertical datum. For information regarding conversion to the National Geodetic Vertical Datum of 1928 and the North American Datum of 1983, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following information services:

Information Services  
 IVG512  
 Geospatial Survey  
 #9202  
 West Highway  
 Langley, Maryland 20610-3282  
 #342

current elevation, description, and/or location information for bench marks on this map, please contact the Information Services Branch of the National Survey of (301) 713-3242, or visit its website at <http://www.nsv.noaa.gov>.

information shown on FIRM panels produced for this coastal study mission used from United States Geological Survey 2008 High Resolution Topography produced from 1 foot pixel cells from photography dated April 2008, station data used in the preparation of this map was Connecticut State Plane Feet, zone 1803. The horizontal datum used was North American Datum of 1983.

one category has been divided by a **Limit of Moderate Wave Action**. The LMWA represents the approximate landward limit of the 1.5 foot breaking effects of wave hazards between the VE Zone and the LMWA (or between the LMWA and the LMWA for unassessable VE Zones are not identified) will be similar to severals from those in the VE Zone.

to base lines depicted on this map represent the hydraulic modeling boundaries of the flood profiles in the FIS report. As a result of improved topographic data, base lines, in some cases, may deviate significantly from the channel or appear outside the SFHA.

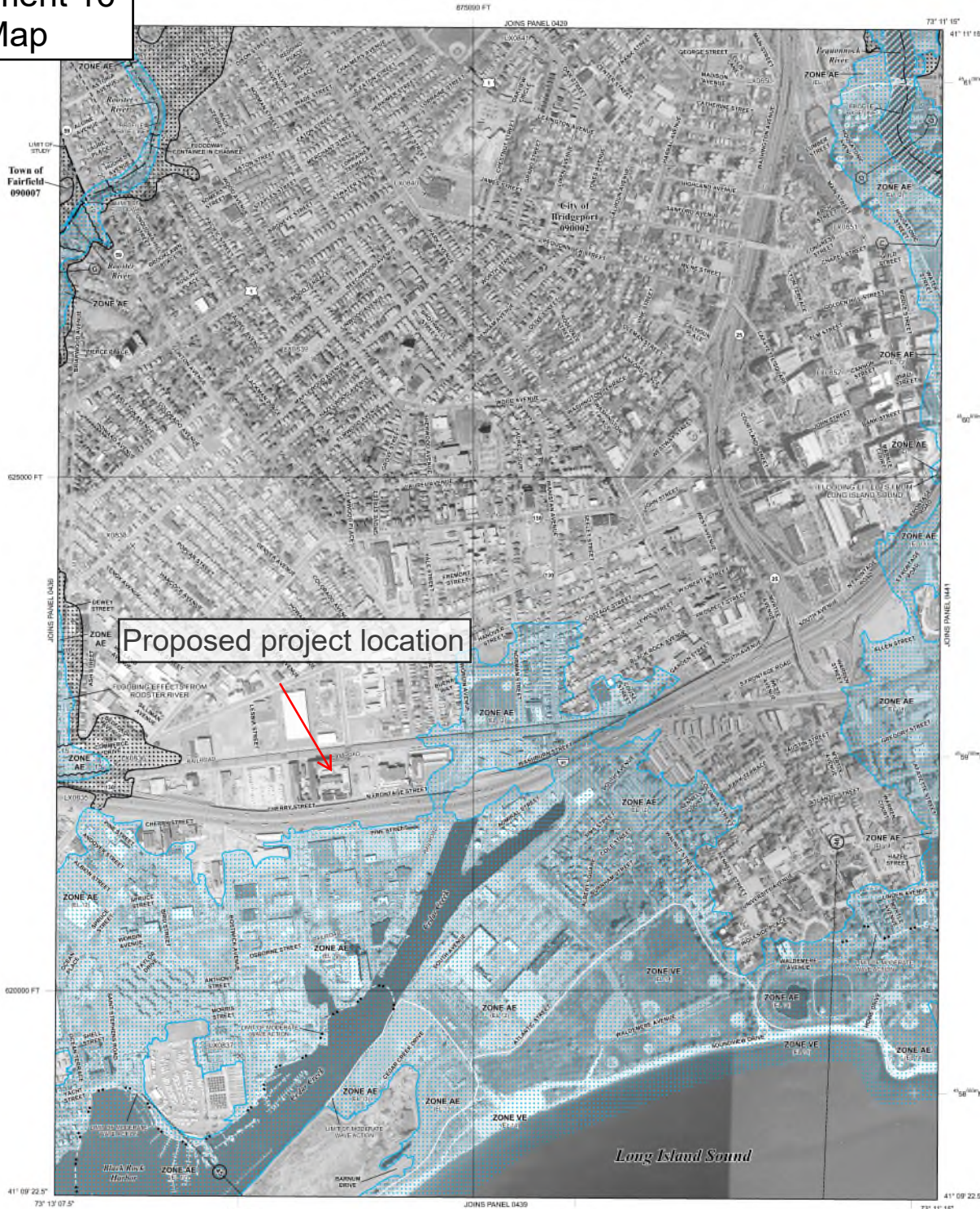
dated topographic information this map reflects more detailed and stream channel configurations and floodplain delineations than shown on the previous FIRM for this jurisdiction. As a result, the Flood Insurance Study Report for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect several differences that differ from what is shown on the map. Also, the floodplain delineations for unassessable streams may differ from what is shown on previous maps.

limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred since this map was published, map users should contact appropriate officials to verify current corporate limit locations.

refer to the separately printed **Map Index** for an overview map of the layout of map panels, community map repository addresses, listing of Communities table containing National Flood Insurance Program community numbers as well as a listing of the panels on which each community is located.

ation on available products associated with this FIRM visit the **Map Center (MSC)** website at <http://www.fema.gov>. Available products may include revised Letters of Map Change, a Flood Insurance Study Report, digital versions of this map. Many of these products can be ordered or purchased directly from the MSC website.

ve questions about this map, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information Center (FMIC)** at 1-877-FEMA-MAP (1-877-336-2827) or visit the FEMA website at <http://www.fema.gov/business/firm>.



Proposed project location

### LEGEND

**SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the **Base Flood**, is the flood with a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AV, VE, V, X, Y, Z, and D. The **Base Flood Elevation** is the water elevation of the 1% annual chance flood.

**ZONE A** No Base Flood Elevations determined

**ZONE AE** Base Flood Elevations determined

**ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevation determined

**ZONE AO** Flood depths of 1 to 3 feet (usually when flow or slugging occurs); Base Flood Elevation determined; For sites of **AVULSIVE FLOODING**, velocities also determined

**ZONE AR** Special Flood Hazard Areas formerly produced from the 1% annual chance flood by a Flood Control System that has subsequently deteriorated. The AO indicates that the former Flood Control System is being removed in protection from the 1% annual chance or greater flood.

**ZONE AV** Area in protection from 1% annual chance flood by a Federal Flood Protection System under construction; no Base Flood Elevation determined

**ZONE VE** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevation determined

**ZONE V** Coastal flood zone with velocity hazard (wave action); Base Flood Elevation determined

**FLOODWAY AREAS IN ZONE AE**

**OTHER FLOOD AREAS**

**ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; areas protected by levees from 1% annual chance flood

**OTHER AREAS**

**ZONE D** Areas determined to be outside the 0.2% annual chance floodplain; Areas in which flood hazards are unassessable, but possible

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway Boundary

Zone D Boundary

CBRS and OPA Boundary

Boundary denoting Special Flood Hazard Area Zones and the adjoining Special Flood Hazard Areas of different Base Flood Flood depths, or flood velocities

Limit of Moderate Wave Action

Limit of Moderate Wave Action

Base Flood Elevation line and value; elevation in feet (ELEV)

Base Flood Elevation value where uniform within area; elevation in feet

\*Referenced to the North American Vertical Datum of 1988

Other section line

Center line

Bridge

Trunk line

45° 12' 00" N, 73° 12' 00" W

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) system Hemisphere

5600 feet grid

Connecticut State Plane Feet, Zone 1803 (FIPS Zone 1803) Lambert Conformal Conic projection 1983 datum

Universal Transverse Mercator grid values, Zone 18Q

Bench mark (see explanation in Notes to Users section of this panel)

MAP REVISIONS

Refer to Map Revisions list on Map Index

EFFECTIVE DATE OF COUNTY-WIDE FLOOD INSURANCE RATE MAP

June 18, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

July 6, 2013 - to change Base Flood Elevations and Special Flood Hazard Areas to change zone designations, to update the effects of wave action to update elevation limits to add reach and realignments to incorporate previously issued Letters of Map Revision and to modify Coastal Barrier Resources System areas

This community map revision history prior to community mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-625-6227.

**NFIP** PANEL 0437G

**FIRM**  
 FLOOD INSURANCE RATE MAP  
 FAIRFIELD COUNTY,  
 CONNECTICUT  
 (ALL JURISDICTIONS)

PANEL 437 OF 626  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	DATE
FAIRFIELD, CITY OF	0437G	06/18/2010
FAIRFIELD, TOWNSHIP	0437G	06/18/2010

Notice to User: The Map Number shown should be used when placing map on Community Number shown above at used on insurance applications for the community.

MAP NUMBER: 09001C0  
 MAP REVISION: JULY 8, 2013  
 Federal Emergency Management Agency



# Attachment 17: Desulfurization Memo

## Desulfurization Memorandum

PureCell® Model 400 Stationary Fuel Cell System



Date: 2017-01-05

### PureCell Model 400 Fuel Processing System (FPS)

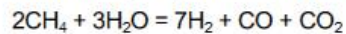
The FPS converts pipeline-quality natural gas into hydrogen reformat – a hydrogen-rich gas that is delivered to the anode side of the fuel cell stacks. This module includes a condenser to recover water generated in the fuel cell reaction by condensing water vapor from the process exhaust. This eliminates the need for makeup water under most operating conditions. The recovered water is used in the steam reformation process. The main components of the FPS include the following:

#### Hydro-Desulfurizer

The desulfurizer system removes sulfur used as an odorant in natural gas, which is a poison to the catalysts used in the fuel cell systems. Sulfur is converted to zinc-sulfide, a non-hazardous waste, within the desulfurizer and remains there until an overhaul is required, nominally after 10 years. This system will also remove small amounts of oxygen in the gas.

#### Steam Reformer

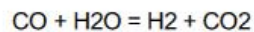
Steam (H<sub>2</sub>O) generated in the cell stack cooling loop of the TMS is combined in the reformer with methane (CH<sub>4</sub>) in the natural gas to generate a gas composed of hydrogen (H<sub>2</sub>), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>).



Equation 1

#### Integrated Low-Temperature Shift Converter

The integrated low-temperature shift converter (ILS) generates additional hydrogen through a water-gas reaction in which CO and water is converted to hydrogen and CO<sub>2</sub>. The reduced CO content minimizes its adverse effect on fuel cell stack performance.



Equation 2

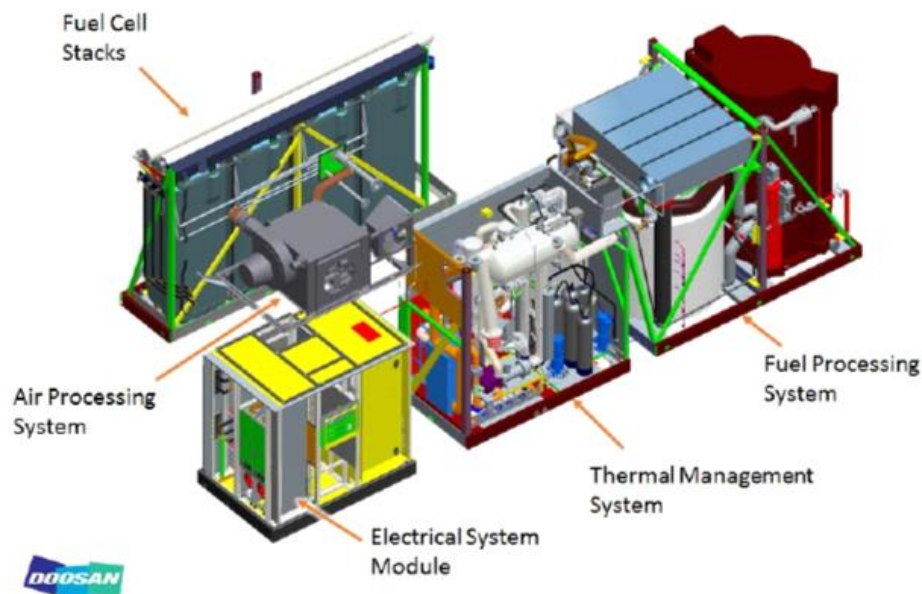


Figure 1. PureCell Model 400 Subsystems



### **Sulfur Background**

Sulfur is present in pipeline natural gas. It is primarily used as an odorant so leaks can be detected. Unfortunately, sulfur is also a poison to fuel cell systems and exposure to sulfur will drastically reduce the life and efficiency of the fuel cell.

Types of sulfur found in natural gas vary from region to region. Some common examples are:

- Hydrogen Sulfide (H<sub>2</sub>S)
- Tetrahydrothiophene (THT)
- Mercaptain – (MCP) - Broad family of sulfur molecules characterized by a sulfur atom attached to a hydrocarbon molecule or chain

The majority of the odorants are organic with the exception of hydrogen sulfide. Standard pipeline natural gas contains up to 6 parts per million by volume (ppmv) sulfur on average with spikes as high as 30 ppmv possible. In order to successfully maintain operation of the fuel cell for a period of 10 years, the sulfur levels must be reduced to less than 0.02 ppmv, or a 99.7% removal rate. An additional benefit of this is that it removes sulfur dioxide from the emissions of the fuel cell power plant.

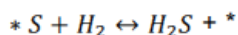
### **Sulfur Removal Techniques**

Sulfur removal can be broken down into two main techniques, physical capture and reactive capture.

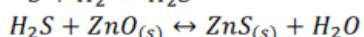
Physical capture involves using porous media such as activated carbon or molecular sieves to capture and concentrate the odorant before it enters the fuel cell. Doosan elected not to pursue this path due to several factors, including:

- The process concentrates the odorant and turned it into hazardous waste
- The concentrated odorant is highly toxic and requires specially trained personnel to handle the waste
- Would result in more service being required at customer sites to maintain the system

Reactive capture is the method used by Doosan to remove sulfur. It involves chemically reacting the odorant over a catalyst bed in order to separate the sulfur molecule. Once the sulfur molecule is separated from the odorant, the remaining odorant is destroyed in another catalyst bed. The sulfur molecule is then captured and converted to a compound called Zinc Sulfide.



*Equation 4*



*Equation 5*

Note: \* represents the non-sulfur odorant components

Doosan's system has been sized such that it will run for the 10 year service life of the unit and not need to be changed out. When the unit is removed from service, the decommissioning or refurbishment of the unit will be carried out by trained personnel and a company specializing in removal of the waste Zinc Sulfide will recover the spent material. Zinc sulfide has some commercial value, so that company will either process it and sell it or split it into Zinc and Sulfur and sell them separately.

Respectfully,  
Jesse Hayes, Director, Product Management, Doosan Fuel Cell  
195 Governors Highway  
South Windsor, CT 06074  
[Jesse.hayes@doosan.com](mailto:Jesse.hayes@doosan.com)  
(860) 560-3309





# STATE OF CONNECTICUT

## Attachment 18 PURA Approval of Submetering

PUBLIC UTILITIES REGULATORY AUTHORITY  
TEN FRANKLIN SQUARE  
NEW BRITAIN, CT 06051

**DOCKET NO. 19-02-44    APPLICATION OF NUPOWER CHERRY STREET FC LLC FOR APPROVAL TO INSTALL AND USE AN ELECTRICITY SUBMETERING SYSTEM AT 375 HOWARD ST., (CHARTER SCHOOL) BRIDGEPORT, CT, 375 HOWARD AVE., (TUDOR HOUSING) BRIDGEPORT, CT, 437 HOWARD ST., (COMMUNITY BLDG.) BRIDGEPORT, CT, 1239 RAILROAD AVE., (RAILROAD AVE. BLDG.) BRIDGEPORT, CT, 375 HOWARD ST., (TOWN HOUSE BLDGS.) BRIDGEPORT, CT**

August 14, 2019

By the following Commissioners:

Michael A. Caron  
John W. Betkoski, III  
Marissa P. Gillett

Lead Staff: P.Carver  
Legal Advisor: A. SSantoro

**DECISION**

## TABLE OF CONTENTS

<b>I. INTRODUCTION .....</b>	<b>1</b>
<b>A. SUMMARY .....</b>	<b>1</b>
<b>B. BACKGROUND OF THE PROCEEDING.....</b>	<b>1</b>
<b>C. CONDUCT OF THE PROCEEDING .....</b>	<b>1</b>
<b>D. PARTICIPANTS.....</b>	<b>2</b>
<b>II. APPLICATION .....</b>	<b>2</b>
<b>III. AUTHORITY ANALYSIS.....</b>	<b>3</b>
<b>A. APPLICANT INFORMATION AND ELIGIBILITY .....</b>	<b>3</b>
<b>B. INSTALLATION AND USE OF SUBMETERING SYSTEM .....</b>	<b>4</b>
<b>C. CUSTOMER SERVICE.....</b>	<b>5</b>
<b>1. General.....</b>	<b>5</b>
<b>2. Customer Billing .....</b>	<b>5</b>
<b>3. Contact/Complaint Information .....</b>	<b>6</b>
<b>4. Submeter Testing Upon Customer Request.....</b>	<b>7</b>
<b>D. SERVICE IN OTHER STATES .....</b>	<b>7</b>
<b>E. CONSERVATION .....</b>	<b>7</b>
<b>F. RATES CHARGED BY SUBMETERING CUSTOMERS .....</b>	<b>7</b>
<b>1. EDCY Proxy Bill .....</b>	<b>7</b>
<b>2. EDC Charge .....</b>	<b>8</b>
<b>3. RDG Charge.....</b>	<b>8</b>
<b>IV. FINDINGS OF FACT .....</b>	<b>9</b>
<b>V. CONCLUSION AND ORDERS.....</b>	<b>11</b>
<b>A. CONCLUSION.....</b>	<b>11</b>
<b>B. ORDERS.....</b>	<b>11</b>

## **DECISION**

### **I. INTRODUCTION**

#### **A. SUMMARY**

In this Decision, the Public Utilities Regulatory Authority approves the application of NuPower Cherry Street FC LLC to install and use an electricity submetering system at 375 Howard Street, 375 Howard Avenue, 437 Howard Street, and 1239 Railroad Avenue, Bridgeport, Connecticut, subject to certain conditions.

#### **B. BACKGROUND OF THE PROCEEDING**

In its Interim Decision dated August 6, 2014 in Docket No. 13-01-26, PURA Generic Investigation of Electric Submetering (Interim Decision), the Public Utilities Regulatory Authority (Authority or PURA) developed an application and approval process for permitting the submetering of electricity in accordance with Section 16-19ff of the General Statutes of Connecticut (Conn. Gen. Stat.).

In its Final Decision dated July 1, 2015 in Docket No. 13-01-26, PURA Generic Investigation of Electric Submetering (Final Decision; together with the Interim Decision, Submetering Decisions), the Authority established additional requirements for electric submetering with on-site generation. The Final Decision established maximum rates that may be charged to submetered parties (tenants) for renewable distributed generation supply owned by the submetering customer (landlords).<sup>1</sup>

NuPower Cherry Street FC LLC (Applicant or Company) submitted an application on February 28, 2019 to install and use an electricity submetering system at 375 Howard Street, 375 Howard Avenue, 437 Howard Street, and 1239 Railroad Avenue, Bridgeport, Connecticut.

#### **C. CONDUCT OF THE PROCEEDING**

There is no statutory requirement for a hearing, no person requested a hearing, and none was held.

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<sup>1</sup>Section 16-11-100(f)(g) of the Regulations of Connecticut State Agencies (Conn. Agencies Regs.) defines "Submetering Customer" as any recreational campground, or other facility as approved by the [Authority], whose electric service is furnished by an electric company and who is authorized to submeter the service to other parties within such facility; and "Submetered Party" as any person, partnership, firm, company, corporation or organization whose electric service is furnished by a submetering customer of an electric company.

A Proposed Final Decision was issued in this proceeding on August 6, 2019. Participants were provided the opportunity to submit Written Exceptions to and present Oral Arguments on the Proposed Final Decision.

#### D. PARTICIPANTS

The Authority recognized the following as Participants to the proceeding: NuPower Cherry Street FC LLC, 103 North Park Avenue, Easton, CT 06612; The Office of Consumer Counsel, Ten Franklin Square, New Britain, CT 06051; The United Illuminating Company, 180 Marsh Hill Road, Orange, CT 06477; and the Commissioner of the Department of Energy and Environmental Protection, 79 Elm Street, Hartford, CT 06106.

#### II. APPLICATION

The Facility is located in Bridgeport, CT and consists of five buildings (Cherry Street Lofts). Application, Section B-1. The information for five buildings and the proposed submetering system of the Facility are presented in the table below:

Table. Facility and Submetering Information

Building Name	Charter School	Tutor Housing	Community Building	Railroad Avenue Building	Town House Building
Floors	1	3	1	6	2
Total Units	1	17	1	128	29
Submeters	1	17	1	128	29
Unit Type	Commercial	Residential	Commercial	Residential	Residential
Address	375 Howard St	375 Howard Ave	437 Howard St	1239 Railroad Ave	375 Howard St
Expected Occupancy Date	July 2019	July 2019	December 2018	June 2019	December 2018

Id., Exhibit B-1 and Section B-2.

The United Illuminating Company (UI) provides electric distribution services to the Facility. Id., Section C-1.

The Applicant intends to use PayLease LLC (Vendor) to manage the meter reading and billing services for each submetered unit at the Facility. Id., Section A-8. The Vendor provides residential billing and utility expense management tools for home owner associations and property management companies. Id., Section A-16.

The Applicant planned to install a 460 kW fuel cell as a Class I renewable energy resource at the Facility. Section B-7. The specific fuel cell planned is the PureCell Model 400 system produce by Doosan Fuel Cells America, Inc. Id. The Applicant stated that the fuel cell will be installed as a renewable energy resource to provide power to the tenants and, this will preclude individual utility meters. Id., Section B-1. The Applicant expected to complete construction and interconnection of the fuel cell by January 2020. Id., Section B-3.

The Facility is new construction and the Applicant provided the expected occupancy date in the Table above. The buildings of the Facility that are occupied currently have existing UI meters. Id., Section B-3. The Facility does not have a submetering system installed. Id. The Applicant planned to replace existing UI meters with submeters once the fuel cell is installed and operational. Id.

The Applicant did not provide an electrician, but stated that it will select one that is licensed to install the submetering system. Id., Section B-9.

### **III. AUTHORITY ANALYSIS**

Conn. Gen. Stat. § 16-19ff(a) states:

Notwithstanding any provisions of the general statutes to the contrary, each electric company or electric distribution company shall allow the installation of submeters at (1) a recreational campground, (2) individual slips at marinas for metering the electric use by individual boat owners, (3) commercial, industrial, multifamily residential or multiuse buildings where the electric power or thermal energy is provided by a Class I renewable energy source, as defined in section 16-1, or a combined heat and power system, as defined in section 16-1, or (4) in any other location as approved by the authority where submetering promotes the state's energy goals, as described in the Comprehensive Energy Strategy, while protecting consumers against termination of residential utility service or other related issues. Each entity approved to submeter by the Public Utilities Regulatory Authority, pursuant to subsection (c) of this section, shall provide electricity to any allowed facility, as described in this subsection, at a rate no greater than the rate charged to that customer class for the service territory in which such allowed facility is located, provided nothing in this section shall permit such entity to charge a submetered account for (A) usage for any common areas of a commercial, industrial or multifamily residential building, or (B) other usage not solely for use by such account.

The Applicant is applying to submeter at the Facility pursuant to Conn. Gen. Stat. § 16-19ff(a)(3). Application, Section A-17.

#### **A. APPLICANT INFORMATION AND ELIGIBILITY**

The Authority finds that the Application includes all the relevant information regarding the Applicant and the Vendor, including company names, business locations, websites and experience in submetering. Application, Sections A-1 through A-17.

The Authority finds that the Applicant is eligible to submeter at this Facility under Conn. Gen. Stat. § 16-19ff(a)(3). Since the Applicant's eligibility to submeter, in this instance, is based upon the provision of power to the Facility from a Class I renewable energy source, the Authority will require the Applicant to complete installation and interconnection of the fuel cell before the Applicant will be allowed to submeter. Accordingly, the Authority directs the Applicant to notify the PURA when service

interconnection is complete and the fuel cell is operational. Likewise, the Authority directs the Applicant to notify the PURA if the fuel cell is permanently taken out of service.

The Authority directs the Applicant to provide verification of the certificate of occupancy for all buildings of the Facility no later than 30 days before it commences operating the submetering system.

## **B. INSTALLATION AND USE OF SUBMETERING SYSTEM**

The Authority finds that the Applicant has provided all the requisite information governing its plans for the technical use and installation of the submetering system. This information includes a description of the Facility, including a complete set of electrical plans that shows the wiring of the fuel cell with the submeters in the individual units and the common areas. Id., Sections B-1 through B-4.

The Applicant proposed to install and use Landis and Gyr submeters along with NextCentury data collection system manufactured by Ohio Semitronics Inc. for remote meter data collection. Id., Section B-6. The Authority finds that the Applicant has submitted the requisite technical information and specification regarding the submeters including the installation, maintenance and testing instructions. Id., Exhibits B-6, C-6a, and C-6b. The Applicant has shown that the proposed submeters meet the minimum standards outlined in the Interim Decision, including ANSI C12.1 or 12.20. Id.; Interim Decision, pp. 8 and 9.

The Applicant provided its policies and procedures for performing a certified bench test to measure the accuracy of the submeters. Application, Exhibit C-6a. The Authority finds that the Applicant satisfies the technical requirements for testing submeter accuracy.

Accordingly, the Authority approves the Applicant's proposed installation and use of its submetering and data collection systems. To affirm that the actual meters were installed as presented in the Application, the Authority will require the Applicant to provide the meter manufacturer information for actual installed meters if different than what was provided in the Application.

The Authority finds that the Applicant has provided all the requisite information pertaining to the fuel cell system which is the Class I renewable energy source driving the installation of submeters. The relevant information includes the make, the size and the model numbers and other manufacturer specifications of the fuel cell. Application, Section B-7 and Exhibit B-7.

Since the Applicant has yet to install the submeters and has yet to complete installation, interconnection and operation of the fuel cell, the Authority will direct the Applicant to affirm that both systems have been installed and interconnected as represented in this proceeding, once final construction is complete.

In the Final Decision, the Authority established a minimum set of performance standards for Class I renewable energy sources. Final Decision, Appendix B, p. 7. In the case of a fuel cell, the fuel cell must meet at least 80% of the annual kWh needs of the Facility. To comply with this requirement, the Applicant hired an energy consulting firm



to estimate the electricity usage of the facility. Application, Exhibit B-4b. The estimated total electric consumption for the Facility based on the consulting firms benchmarking software platform was 3,805,620 kWh. Id. The Applicant estimated the annual output of the fuel cell at 3,626,004 kWh. Id. The Authority finds that the Applicant has shown that the fuel cell provides roughly 95% of the Facility's electrical energy needs. Id. The Authority accepts this initial estimate, however, to ensure that the fuel cell system meets the performance standards<sup>2</sup> in practice, the Authority directs the Applicant to report on total fuel cell output (in kWh) and Facility consumption (in kWh) on an annual basis.

The Authority directs the Applicant to notify the PURA when the fuel cell is installed. At that time the Applicant must also provide an estimate for when the installation of the submeters is to be complete for each building and the expected submeter operation date for each building. The Authority directs the Applicant to notify the PURA when the submetering system is fully installed and operational for all buildings. The Applicant should include the electrician who installed the submetering system. The Applicant should include the actual submeters installed and include all information in Sections BXX-BYY if the submeters are different than what was proposed in the Application.

## **C. CUSTOMER SERVICE**

### **1. General**

In the Interim Decision, the Authority concluded that in order for electric submetering to be fair and effective in Connecticut, submetering applicants must be required to comply with 19 consumer protections. The consumer protections are outlined on pages 12 through 14 of the Interim Decision. The Applicant will be directed to comply with all of these requirements.

### **2. Customer Billing**

The Applicant proposes to bill submetered customers monthly. Each month, the property manager will send the Vendor copies of the Property's EDC electric bills and the most recent applicable EDC rates. The property manager will also send the Vendor a copy of the monthly fuel cell production direct from the fuel cell remote monitoring system, which will be established by Doosan, once the fuel cell is installed. The Vendor will follow the billing calculation methodology outlined in Exhibit C-2d of the Application to determine the CHP and EDC rates and consumption. These components will be reflected on the bill as EDC and CHP kwh consumption multiplied by the applicable rates. The bill will also include a CHP Basic Service Charge that matches the applicable Basic Service Charge assessed by the EDC. Application, Exhibit C-1. The bills will be sent out to submetered customers once a month and the billing period will be set to coincide with the EDC's billing period. Id., Section B-10; Exhibit B-10a-B10-c, C2-g. The Authority has reviewed the Applicant's proposed bill form and finds it to be compliant with Conn. Agencies Regs. § 16-11-69. Id., Exhibits C-1d and C-3a.

According to the Applicant, there may be estimated bills under certain circumstances, such as when the Vendor is unable to obtain an accurate reading of the

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<sup>2</sup> To meet the performance standards outlined in the Final Decision, the Final Decision, Appendix B, p. 7.

meter during a billing cycle. In those circumstances, a resident will be sent an estimated bill. The estimate will be based on the average kWh usage for the unit over the prior three months. The estimate may be higher or lower than the resident's actual usage. The Vendor will reconcile the correct usage on a future bill. The Applicant will provide residents with its written policies for estimated bills and comply with the provisions of Conn. Agencies Regs. §§ 16-3-102C and 16-3-102D concerning estimated bills. Application, Section C-3c and Exhibit C-1.

The Property Manager provides move-in dates and resident's billing information to the Vendor at least 15 days prior to the scheduled move-in confirmation of the actual move in date. The Vendor establishes an account for each new resident on the move in date. The first bill will be sent in coordination with the established billing cycle schedule and the new resident will be billed for his or her exact usage in that billing cycle. The resident will notify the Applicant of their intention and date of move-out. The Applicant will notify the Vendor of the date of the move out to end billing on that specific date. Application, Section C-2b and Exhibit E-2.

The Applicant will notify residents of any pending rate changes within 30 days of receiving notice from The United Illuminating Company, or when the current supplier's contract terms are established. The notification of any rate change is included in advance as part of the bill as an account message. Response to Interrogatory CA-2. Additionally the Applicant will annually provide the rate and rate calculation information to each resident purchasing submetered service. Application, Exhibit C-2e.

The Authority has reviewed the Applicant's collection process for overdue bills. Conn. Agencies Regs. § 16-3-100(a)(5) states, in part, that a bill is considered overdue if payment is not received on or before the 33<sup>rd</sup> day after the bill is mailed. The Applicant stated that there can be a \$5.00 late charge assessed in those instances. The Applicant also displays the bill due date period less than 30 days. Application, Exhibit C-3b. To comply with the aforementioned statute, the Applicant cannot charge a late fee unless the resident more than 33 days in arrears and will be so ordered to revise the bill and billing procedures to align with the requirements of Conn. Agencies Regs. § 16-3-100(a)(5). Application, Exhibits C-2a, C-3 and D-1.

Conn. Agencies Regs. § 16-11-110 provides the guiding principle for the adjustment of incorrect bills. The Applicant has submitted documentation of its intent to follow the requirements of this regulation. The Authority will require that a summary of this information also be provided annually to submetered residents whether by mail, bill insert, or flyer.

### **3. Contact/Complaint Information**

The Applicant has provided multiple contact persons for residents to utilize in the event they have question or concerns. The Applicant's Electric Submetering Policies and Procedures also advise unit owners that they may contact the Authority if they are unable to resolve any billing complaint. Application, Exhibits D-1.

The Authority finds the proposed contact information acceptable.

#### **4. Submeter Testing Upon Customer Request**

Conn. Agencies Regs. § 16-11-126 provides for the testing of metering equipment upon customer request. The Applicant will confirm such a test will be scheduled after a request is received. The Applicant will notify the resident that they have a right to be present at the test, and will work with the resident to assure that the test can be conducted at a time and date that is mutually convenient for the resident and the testing company. The Property Manager will provide the resident with a written report of the test results upon receipt of those results. The Applicant also provided a copy of its policies and procedures for submeter testing. Application, Section C-6a through C-6c, Exhibit D-1.

The Authority finds the proposed testing procedure acceptable.

#### **D. SERVICE IN OTHER STATES**

The Applicant, 375 Howard Ave, has not been cited or fined for any violations of consumer protection law or regulation by any State or Federal agency. Application, Sections A-14 and A-15.

#### **E. CONSERVATION**

The primary reasons the Authority supports submetering is the economic incentive that allows customers the opportunity to save money by reducing their usage through conservation. Final Decision, p. 5. The Applicant provides written materials to residents regarding conservation although it is not clear if this information is provided to all existing residents and new tenants. Application, Exhibit D-2. Accordingly, the Authority will direct the Applicant to affirm to the PURA that it will provide this information package to all existing residents and to any new resident at the Facility. Application, Exhibit D-2.

The Vendor has developed procedures for monitoring a resident's consumption of electricity for the purpose of identifying abnormally high usage. Application, Exhibit D-3a through D-3c.

#### **F. RATES CHARGED BY SUBMETERING CUSTOMERS**

##### **1. EDCY Proxy Bill**

The EDC Proxy Bill is the billed amount that "each tenant would otherwise incur if the tenant were a direct customer of the EDC." Final Decision p. 6. The Applicant stated that the relevant tariff or rate classification for the submetered tenants is UI Residential Rate. Application, Exhibit C-1. To calculate the EDC Proxy Bill for each tenant, the Applicant shall multiply the submetered kW and kWh by the applicable rate under the tariff, with the sum being added to the fixed customer charge. The Applicant provided documentation describing its compliance with the requirement that billings not exceed the EDC Proxy Bill. Id., Exhibit C-1b. Specifically, the Applicant stated that it will monitor the prevailing proxy rate and if any changes to the proxy EDC rate occur, the landlord's rate will be assessed to determine it is below the proxy rate cap. Id. If the landlord's rate is above the proxy cap, the tenants' rates are reduced to the appropriate amount. Id.

Since Connecticut allows for residential retail choice, the generation service rate could differ depending on individual customer elections. As customer elections for retail choice varies by customer, and is not predictable, the Authority finds that the use of the EDC's effective standard service and/or last resort service generation rates are appropriate when calculating the EDC Proxy Bill. The Authority will require that the Applicant calculate the EDC Proxy Bill for each billing cycle for each submetered tenant, using the prevailing standard service rate, to ensure the billed amount does not exceed the EDC Proxy Bill. The Authority will direct the Applicant to report on its billing and the corresponding Proxy Bills annually to ensure compliance.

## **2. EDC Charge**

Pursuant to the Final Decision, the EDC Charge is the amount billed by the EDC for electricity delivered to the facility allocated to each tenant based on the tenant's prorata share of consumption on a kWh basis. Each month, a facility rate for the EDC Charge is to be calculated by dividing the monthly EDC billed amount by the total facility kWh consumption. Total facility kWh consumption is determined by combining the metered consumption stated on the EDC's bill with the metered production of the RDG supply source. The resulting facility rate is then multiplied by each tenant's submetered kWh to arrive at the tenant's EDC Charge.

The Applicant submitted information describing its monthly calculation of the EDC Charge. Exhibit C-1b. The sample bill provided by the Applicant included all the minimum requirements on the tenant's bill. Exhibits C-1 and C-3.

The Authority finds that the Applicant's approach to the monthly calculation of the EDC charge is in compliance with the requirements of the Submetering Decisions. To allow a submetered tenant and the Authority to effectively review this portion of the bill, the EDC Charge for each tenant shall be stated separately on the tenant's bill. The bill shall also include, at a minimum, (i) the applicable EDC tariff; (ii) the total facility kWh consumption, (iii) total facility EDC billed amount, (iv) the facility rate on a \$/kWh unit, and (v) the tenant's submetered kWh.

## **3. RDG Charge**

The RDG Charge is calculated by multiplying (i) the amount of a tenant's consumption attributed to RDG (RDG consumption) by (ii) rates set by the submetering customer (landlord). Application, Exhibits C-1 and C-1b

The submetered tenant's RDG consumption is the tenant's submetered consumption multiplied by the percentage of electricity generated by the RDG system. To determine this percentage, the total output of the RDG system is divided by the total facility kWh consumption. Id.

The rates charged for the RDG supply are essentially at the discretion of the submetering customer, with the only caveat being that the total submetered tenant bill cannot exceed the EDC Proxy Bill. The submetering customer can establish rates for both kW demand and kWh usage. Final Decision, p. 6. The Applicant provided sample bills indicating that it intends to charge on both a kWh and kW basis. Application, Exhibit

C-3b. The sample bills includes the current CL&P kWh and kW rates. Id., Exhibits C-1 and C-3.

The Applicant's proposed method for calculating the RDG Charge is consistent with the Submetering Decisions. The Authority does not review or approve the specific rates charged to the submetered customer, or tenant. Rather, the Authority reviews the process by which the entire bill is calculated to ensure that the Authority and the submetered tenant have sufficient information to determine if the bills are less than the EDC Proxy Bill. As noted above, the Authority will order the Applicant to calculate the EDC Proxy Bill each billing cycle for each submetered tenant to ensure the billed amount does not exceed the EDC Proxy Bill.

#### **IV. FINDINGS OF FACT**

1. The Facility consists of 5 buildings with a mixture of residential and commercial units.
2. Charter School building consists of 1 floor, 1 nonresidential unit, and 1 proposed submeter.
3. Tutor Housing building consists of 3 floors, 17 residential units, and 17 proposed submeters.
4. Community Building consists of 1 floor, 1 nonresidential unit, and 1 proposed submeter.
5. Railroad Avenue building consists of 6 floors, 128 residential units, and 128 proposed submeters.
6. Town House building consists of 2 floors, 29 residential units, and 29 proposed submeters.
7. UI is the EDC that provides distribution services to the Facility.
8. PayLease LLC will manage the meter reading and billing services for each submetered unit at the Facility.
9. A fuel cell will be installed as a Class I renewable energy source.
10. The proposed fuel cell has a nameplate capacity of 460kW.
11. The fuel cell system will preclude individual utility meters.
12. The Applicant expected to complete construction and interconnection of the fuel cell by January 2020.
13. The buildings of the Facility that are occupied currently have existing UI meters.
14. The Facility does not have a submetering system installed.

15. The Applicant planned to replace existing UI meters with submeters once the fuel cell is installed and operational.
16. The Applicant did not provide an electrician.
17. The Applicant proposed to install and use Landis and Gyr submeters.
18. The Applicant proposed to install NextCentury data collection system manufactured by Ohio Semitronics for remote meter data collection.
19. The Applicant hired an energy consulting firm to estimate the electricity usage of the Facility.
20. The estimated total electric consumption for the Facility based on the consulting firms benchmarking software platform was 3,805,620 kWh.
21. The Applicant estimated the annual output of the fuel cell at 3,626,004 kWh.
22. The Applicant proposes to bill monthly, based on each resident's electric consumption for the billing period as registered on each submeter.
23. The Applicant has submitted documentation of its intent to follow the requirements of Conn. Agencies Regs. § 16-11-110 regarding the adjustment of incorrect bills.
24. The Property Manager will provide the resident with a written report of the test results upon receipt of those results.
25. The Applicant has not been cited or fined for any violations of consumer protection law or regulation by any State or Federal agency.
26. The Applicant proposed to bill monthly, based on each resident's electric consumption for the billing period as registered on each submeter.
27. The Applicant submitted documentation of its intent to follow the requirements of Conn. Agencies Regs. § 16-11-110.
28. The Applicant provided documentation describing its compliance with the requirement that billings not exceed the EDC Proxy Bill.
29. The Applicant stated that it will monitor the prevailing proxy rate and if any changes to the proxy EDC rate occur, the landlord will modify the tenants' rates in accord with Authority requirements.
30. The Applicant provided a sample tenant bill which included all the minimum requirements specified in the Submetering Decisions.



## **V. CONCLUSION AND ORDERS**

### **A. CONCLUSION**

The Authority grants the Applicant approval to install and operate electric submetering at the Facility under Conn. Gen. Stat. § 16-19ff(a)(3). The approval is conditional upon the Applicant's continued compliance with the Submetering Decisions and the Orders below. With this Decision, the Applicant will be subject to the Authority's jurisdiction with respect to its submetering activities, including, but not limited to, the PURA's authority to revoke submetering approvals, order the immediate cessation of submetering and/or impose fines pursuant to Conn. Gen. Stat. § 16-41.

### **B. ORDERS**

For the following Orders, the Company shall submit one original of the required documentation to the Executive Secretary, 10 Franklin Square, New Britain, Connecticut 06051 and file an electronic version through the Authority's website at [www.ct.gov/pura](http://www.ct.gov/pura). Submissions filed in compliance with the Authority's Orders must be identified by all three of the following: Docket Number, Title and Order Number. Compliance with orders shall commence and continue as indicated in each specific Order or until the Company requests and the Authority approves that the Company's compliance is no longer required after a certain date.

1. No later than 30 days prior to the permanent disconnection of the fuel cell, the Applicant shall notify the Authority that the Class I resource will be taken out of service permanently.
2. No later than 30 days after construction and interconnection of the fuel cell is completed, the Applicant shall affirm that the project was constructed as represented in this proceeding. If there are any changes to construction or installation, the Applicant shall clearly describe those differences. If the actual fuel cell installed has differed than what was provided in the Application, the Applicant shall submit to the Authority the manufacturer's technical specifications for the fuel cell installed.
3. No later than 30 days prior to operation of the submetering system, the Applicant shall provide verification of the certificate of occupancy for all buildings of the Facility.
4. No later than 30 days after construction is completed for the submetering system, the Applicant shall affirm that the project was constructed as represented in this proceeding. If there are any changes to construction or installation, the Applicant shall clearly describe those differences. If submeters are different than what was provided in the Application, the Applicant shall submit to the Authority the manufacturer's technical specifications for the actual meters installed. The Applicant shall provide the name(s) and license number(s) of the electrician(s) it used to install the submeters.

5. No later than March 1, 2021 and annually thereafter, the Applicant must submit the Authority an annual report comparing the actual usage in kWh of the Facility to the performance standards outlined in Section III.B. Installation and Use of Submetering System. The Report shall include the circumstances surrounding any shortfall in meeting the performance standards defined above during the preceding reporting year.
6. No later than three months following the decision the Applicant shall acknowledge in writing to the Authority that it shall comply with Conn. Gen. Stat. § 16-19ff and Conn. Agencies Regs. §§ 16-11-104 through 16-11-107; § 16-11-110; §§ 16-11-126 through 16-11-133; and §§16-11-236 through 16-11-238.
7. No later than three months following the decision the Applicant shall acknowledge in writing to the Authority that it shall comply with the Consumer Protections identified in the Decision dated August 6, 2014, in Docket No. 13-01-26, PURA Generic Investigation of Electric Submetering.
8. No later than three months following the decision the Applicant shall acknowledge in writing to the Authority that it will submit for the Authority's approval any changes to its customer service practices, procedures or policies in writing at least ten business days prior to the effective date of such change.
9. No later than three months following the decision the Applicant shall acknowledge to the Authority that it will notify residents within 30 days of any pending rate changes.
10. No later than three months following the decision, the Applicant shall acknowledge to the Authority that it will revise its bill language and billing procedures to comply with the definition of a delinquent account pursuant to Conn. Agencies Regs. § 16-3-100(a)(5).
11. No later than 45 days after the initial year of submetering billing activity, and annually thereafter, the Applicant shall file with the Authority, for each of the twelve months, a comparison of the proxy EDC bill with each submetered tenant's billed charges, and each customer's billed usage or demand.

**DOCKET NO. 19-02-44 APPLICATION OF NUPOWER CHERRY STREET FC LLC FOR APPROVAL TO INSTALL AND USE AN ELECTRICITY SUBMETERING SYSTEM AT 375 HOWARD ST., (CHARTER SCHOOL) BRIDGEPORT, CT, 375 HOWARD AVE., (TUDOR HOUSING) BRIDGEPORT, CT, 437 HOWARD ST., (COMMUNITY BLDG.) BRIDGEPORT, CT, 1239 RAILROAD AVE., (RAILROAD AVE. BLDG.) BRIDGEPORT, CT 375 HOWARD ST., (TOWN HOUSE BLDGS.) BRIDGEPORT, CT**

This Decision is adopted by the following Commissioners:

Michael A. Caron

John W. Betkoski, III

Marissa P. Gillett

CERTIFICATE OF SERVICE

The foregoing is a true and correct copy of the Decision issued by the Public Utilities Regulatory Authority, State of Connecticut, and was forwarded by Certified Mail to all parties of record in this proceeding on the date indicated.



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Jeffrey R. Gaudiosi, Esq.  
Executive Secretary  
Public Utilities Regulatory Authority

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August 14, 2019  
Date





# COASTAL BOUNDARY BRIDGEPORT, CONNECTICUT

## LEGEND

 Coastal Boundary

## EXPLANATION

The coastal boundary map shows the extent of lands and coastal waters as defined by Connecticut General Statute within Connecticut's coastal area. The coastal boundary is a continuous line delineated on the landward side by the interior contour elevation of the one hundred year frequency coastal flood zone, as defined and determined by the National Flood Insurance Act, or a one thousand foot linear setback measured from the mean high water mark in coastal waters, or a one thousand foot linear setback measured from the inland boundary of tidal wetlands, whichever is farthest inland; and shall be delineated on the seaward side by the seaward extent of the jurisdiction of the state.

Any regulated activity conducted within the coastal boundary by a municipal agency (i.e., plans of development, zoning regulations, municipal coastal programs and coastal site plan review (i.e., site plans submitted to zoning commission, subdivision or resubdivision plans submitted to planning commission, application for special permit or exception to the zoning or planning commissions or zoning board of appeals, variance submitted to

zoning board of appeals and a referral of a municipal project) must be conducted in a manner consistent with the requirements of the Connecticut Coastal Management Act (CMA). As the Coastal Boundary is a hybrid of the Coastal Area, all state and federal agency activities must be consistent with the requirements of the CMA. The coastal boundary is a hybrid of the original 1:24,000 version maps prepared by DEP and the revised boundary mapping undertaken by twenty-two coastal towns. This layer therefore does not replace the legal maps and may not be used for legal determinations.

The following twenty-two towns have adopted municipal coastal boundaries: Chester, Clinton, Darien, Deep River, East Haven, Essex, Fairfield, Greenwich, Groton, Guilford, Hamden, Ledyard, Madison, Milford, New Haven, New London, North Haven, Norwalk, Old Lyme, Old Saybrook, Stamford and Waterford. The coastal boundary maps for these towns may be at different scales than the original DEP draft maps and may contain minor adjustments to the boundary.

## DATA SOURCES

**COASTAL BOUNDARY DATA** - The original boundary maps were created in 1979 on stable mylar overlay using the 1:24,000-scale US Geological Survey topographic quadrangle maps (mylar film format). The source for tidal wetland maps were the legal 1:24,000 maps (mylar format) adopted by the Commissioner of DEP and transformed to 1:24,000 mylar-scale maps by the Office of Policy and Management (OPM) using an accurate pantograph. OPM similarly converted FEMA's flood insurance maps (various scales) to a 1:24,000 mylar overlay. The inland extent of coastal waters was plotted on 1:24,000 USGS topographic maps following the procedures and sources described in The Boundary Between Saltwater and Freshwater in Connecticut, December 1978 prepared by the State of Connecticut, Department of Environmental Protection, Coastal Area Management Program.

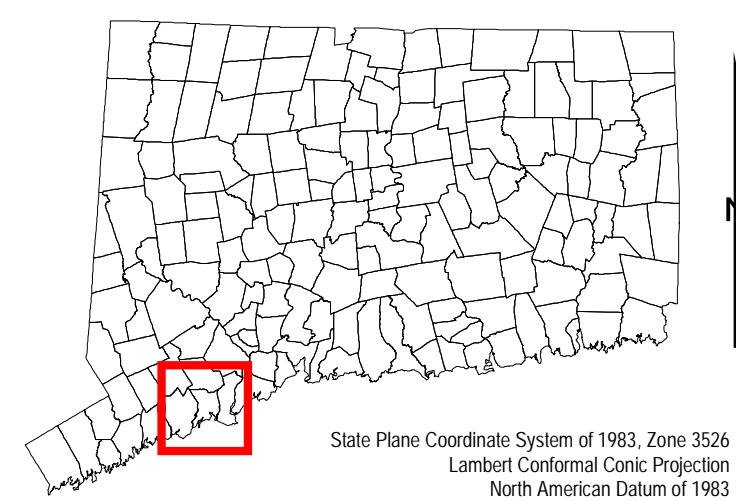
**BASE MAP DATA** - Based on data originally from 1:24,000-scale USGS 7.5 minute topographic quadrangle maps published between 1969 and 1992. It includes political boundaries, railroads, airports, hydrography, geographic names and geographic places. Streets and street names are from Tele Atlas® copyrighted data. Base map information is neither current nor complete.

### RELATED INFORMATION

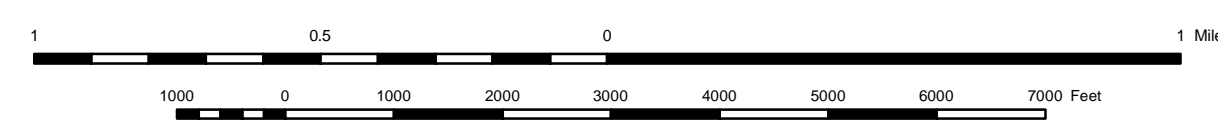
This map is intended to be printed at its original dimensions in order to maintain the 1:24,000 scale (1 inch = 2000 feet).

**MAPS AND DIGITAL DATA** - Go to the CT ECO website for this map and a variety of others. Go to the DEEP website for the digital spatial data shown on this map.

### MAP LOCATION

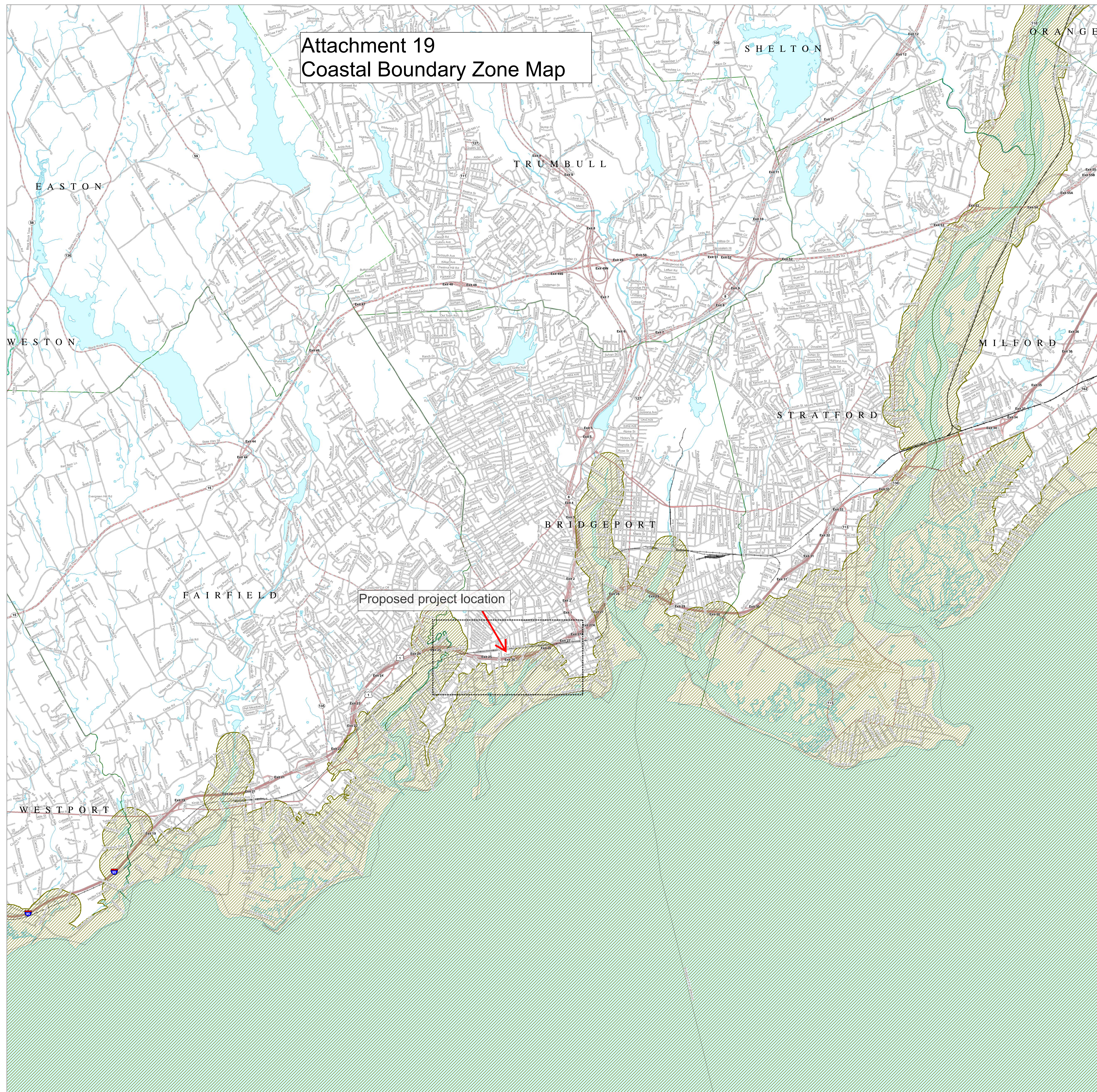


State Plane Coordinate System of 1983, Zone 1820  
Lambert Conformal Conic Projection  
North American Datum of 1983

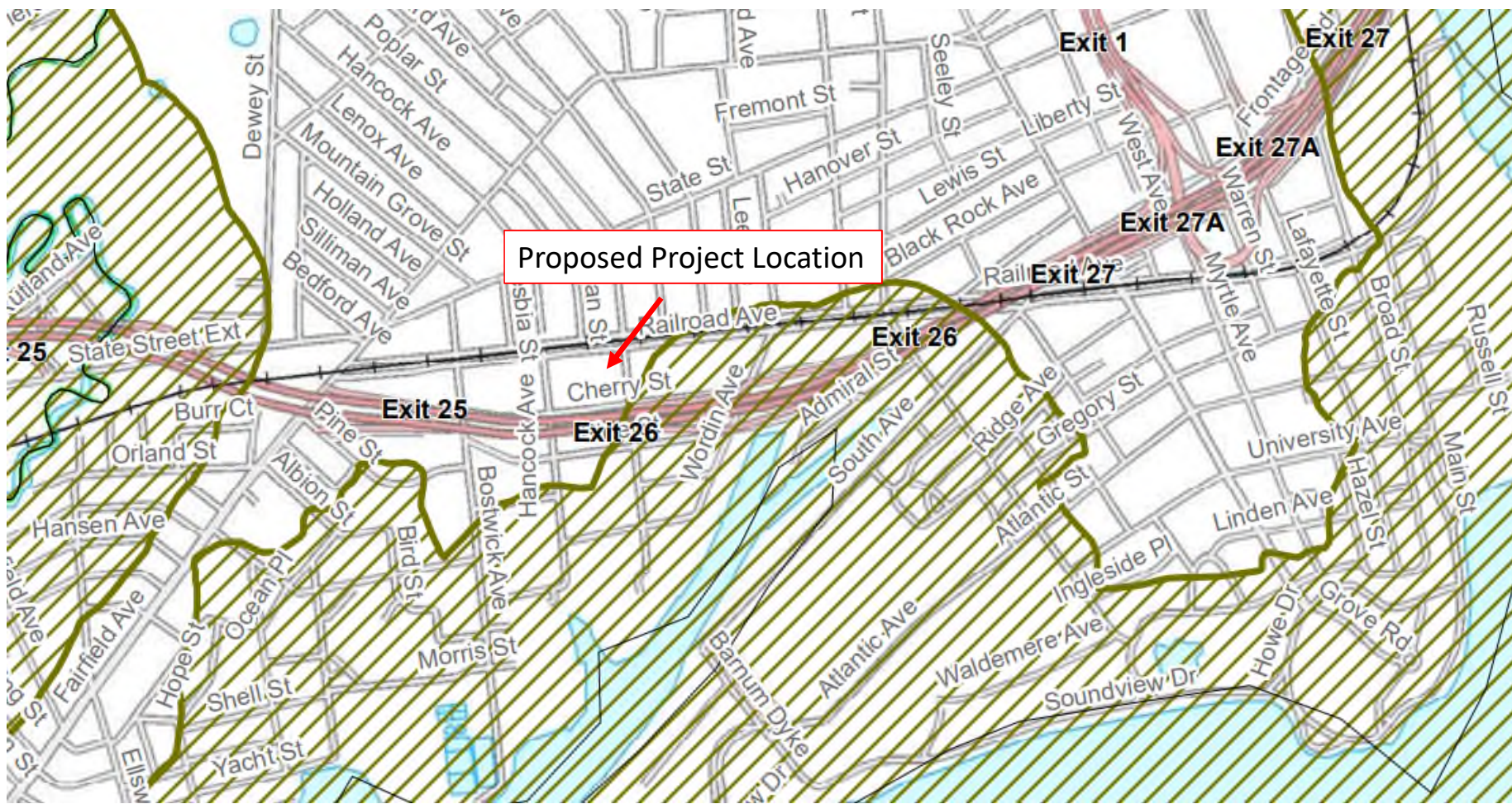


SCALE 1:24,000 (1 inch = 2000 feet) when map is printed at original size

# Attachment 19 Coastal Boundary Zone Map







Proposed Project Location

Cherry St

Exit 26

Exit 26

Exit 1

Exit 27

Exit 27A

Exit 27A

Rail Exit 27

Exit 25

Exit 25