



December 20, 2023

VIA ELECTRONIC MAIL AND HAND DELIVERY

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

**Re: Response to Council Interrogatories
PETITION NO. 1592 - Santa Fuel, Inc. petition for a declaratory ruling,
pursuant to Connecticut General Statutes §4-176 and §16-50k, for the
proposed construction, maintenance and operation of a 3.75-megawatt AC
solar photovoltaic electric generating facility located at the 159 South Road,
Somers, Connecticut, and associated electrical interconnection.**

Dear Ms. Bachman:

On behalf of Santa Fuel, Inc., I am enclosing the original and fifteen copies of the Responses to the Interrogatories issued by the Council on December 4, 2023 in connection with the above-referenced petition. Should you have any questions concerning this submittal, please contact me at your convenience. I certify that copies of this submittal have been submitted to all parties on the Petition Services List as of this date.

Sincerely,

Timothy A. Coon, P.E.
J.R. Russo & Associates, LLC

Enclosures

**STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL**

Santa Fuel, Inc. petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 3.75-megawatt AC solar photovoltaic electric generating facility located at the 159 South Road, Somers, Connecticut, and associated electrical interconnection.

Petition No. 1592

December 19, 2023

**RESPONSES TO THE DECEMBER 4, 2023 PRE-HEARING INTERROGATORIES
DIRECTED TO SANTA FUEL, INC. FROM THE CONNECTICUT SITING COUNCIL**

Petitioner Santa Fuel, Inc (“SFI” or “Petitioner”) hereby submits the following responses to the Interrogatories that were directed to SFI by the Connecticut Siting Council on December 4, 2023.

Notice

1. Has Santa Fuel, Inc. (SFI) received any comments since the petition was submitted to the Council? If yes, summarize the comments and how these comments were addressed.
 - A. Comments and correspondence received since the petition was posted are summarized and discussed below. Copies of all written comments are available for review on the CSC’s website under the “Pending Matters” link.
 - i. Letter from the Town of Somers Conservation Commission dated September 19, 2023

This letter indicated the support of the project by the Conservation Commission with a single request to use a pollinator seed mix in any areas that will be disturbed and reseeded. The current plans have already been revised to specify a pollinator seed mix for use in the disturbed field areas.
 - ii. Comments from the Council on Environmental Quality (CEQ) dated September 28, 2023
 - a. The CEQ recommended that the Petitioner employ best practices during construction and operation that might allow for the future restoration of farmland soils to a more productive agricultural state by retaining the topsoil and minimizing grading, trenching, and compaction of farmland soils. The CEQ also recommended that the Petitioner consider utilizing updated methods and techniques for minimizing erosion and sedimentation based on the best currently available

technology and strategies, as identified in DEEP's draft Soil Erosion & Sediment Control Guidelines update and draft Connecticut Stormwater Quality Manual update. As stated in the Petition, the majority of the solar array will be installed at the existing grades while maintaining the existing vegetation. Where grading is required, the existing topsoil will be removed, the area graded and the topsoil put back in place so that there will be no net loss of topsoil at the site. The Petitioner believes that the proposed restoration and soil erosion control measures are consistent with the DEEP's draft Soil Erosion & Sediment Control Guidelines and draft Connecticut Stormwater Quality Manual Update and will provide adequate protection from sedimentation and erosion.

- b. The CEQ expressed concerns about the potential for reduction of core forest and questioned whether a core forest material impact review is required. Subsequently, the Petitioner provided project information to the DEEP along with a request for a core forest material impact review. The DEEP Bureau of Natural Resources issued a letter on October 30, 2023 stating that the proposed project will not materially affect the status of such Site as core forest. A copy of this letter was submitted to CSC and is available on the CSC's website under the "Pending Matters" link.
 - c. The CEQ expressed concerns regarding potential impacts to the Northern Long-eared Bat (NLEB), a federally listed "Endangered" species. As a result, the Petitioner utilized the United State Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) system to review the propose project and obtained a determination that the proposed project will have "No Effect" on the NLEB. A copy of this determination is provided as Attachment 1.
 - d. The CEQ questioned whether the project site was assessed for the presence of vernal pools since there is no mention of vernal pools in the Petition filing. The Certified Soil Scientist who completed the wetland delineation confirmed that his investigation included an evaluation of the subject site for the presence of vernal pools and potential vernal pools. He verified that none were present at the site, and the lack of a discussion of vernal pools in his report was simply the result of their absence.
 - e. The CEQ recommended the use of native, deer-resistant species for the proposed landscape screen. According to available literature, the white spruce proposed to be used for screening are naturally deer resistant.
- iii. Comments from the Department of Energy and Environmental Protection (DEEP) Office of Environmental Review & Strategic Initiatives dated October 18, 2023.
- a. DEEP noted that, prior to construction, the project will require registration under the DEEP's National Pollutant Discharge Elimination System (NPDES) General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (General Permit) and recommended a pre-application meeting with DEEP prior to registration. A pre-application meeting with the

DEEP, including Stormwater Section personnel, was conducted on August 16, 2023, and the requirements of the general permit were discussed. Based on this meeting, the DEEP stormwater section appeared to be satisfied with the proposed stormwater management and erosion control measures. The Petitioner intends to register under the General Permit after receipt of CSC approval and prior to construction.

- b. DEEP also noted that, although not located within core forest, a core forest material impact review is required. In response, the Petitioner provided project information to the DEEP along with a request for a core forest material impact review. Subsequently, the DEEP Bureau of Natural Resources issued a letter on October 30, 2023 stating that the proposed project will not materially affect the status of such Site as core forest. A copy of this letter was submitted to CSC and is available on the CSC's website under the "Pending Matters" link.
- c. DEEP also noted two inconsistencies in the Petition. First the introduction states that the project will be located within a 20-acre lease area, while the project description states that the project site consists of 22.1 acres. Both of these statements are in fact correct. The lease area is proposed to be 20 acres. However, the project site includes additional areas outside of the lease area that will be impacted by the project by activities such as tree clearing and grading. Secondly, DEEP pointed out that the project description in the decommissioning plan states that the operational life of the project will be 25 years with the option to extend, while the cost section of the decommissioning plan states that the lifetime of the project is 40 years. The 25 years refers to the lease, which has the option to be extended. The available operational life of the system is estimated to be 40 years.
- iv. Letter from the Town of Somers First Selectman dated October 18, 2023.
 - a. The first selectman's letter simply requested that the CSC hold a public hearing regarding the project. The CSC subsequently voted to hold a public hearing on January 11, 2024.
- v. The Petitioner's engineer was also contacted by abutting property owners Karen Murphy and John Talcott. These conversations involved answering specific questions about the project. At the end of the calls, the abutter's appeared satisfied with the information provided.

Project Development

- 2. If the project is approved, identify all permits necessary for construction and operation and which entity will hold the permit(s)?
 - A. Permits include 1) coverage under the DEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities which will be issued to SFI, 2) an Encroachment Permit for work proposed in the State Highway Right-of-Way which will be issued to the site contractor to be determined, and 3) building and/or

electrical permits to be issued by the Town of Somers to the selected racking installer and selected electrical contractor.

3. What is the estimated cost of the project?
 - A. Upwards of \$2.00 per watt/DC or an estimated \$9,580,000, which includes a contingency budget for the Eversource upgrades.
4. Is the project, or any portion of the project, proposed to be undertaken by state departments, institutions or agencies, or to be funded in whole or in part by the state through any contract or grant?
 - A. No
5. Was the project selected through a RFP process? If so, which RFP? If not, would SFI submit the project in future RFPs?
 - A. No
6. Is the project subject to a virtual net metering agreement? Would all 3.85 megawatts AC be dedicated to virtual net metering?
 - A. No
7. Does SFI have a contract to sell the electricity and renewable energy certificates (RECs) it expects to generate with the proposed project? If so, to which public utility? If the electricity is to be sold to more than one public utility, provide the percentage to be sold to each public utility.
 - A. Contract negotiations are underway.
8. What authority approves the power purchase agreement (PPA) for the facility? Has a PPA with an electric distribution company been executed? If so, at what alternating current megawatt output? If not, when would the PPA be finalized?
 - A. The project is intending to sell the power via a retail supply contract with a wholesale provider that is a Market Participant within ISO-NE.
9. What is the length of the PPA? Are there provisions for any extension of time in the PPA? Is there an option to renew?
 - A. Contract negotiations are underway, but a minimum of 20-year PPAs are contemplated with options to extend in five (5) year increments.

10. Is the alternating current megawatt capacity of the facility fixed at a certain amount per the PPA and/or the RFP? Is there an option within the PPA to allow for changes in the total output of the facility based on unforeseen circumstances?
- A. Contract negotiations are underway, but there will likely be minimum production guarantees as part of the final contract.
11. If the PPA expires and is not renewed and the solar facility has not reached the end of its lifespan, will SFI decommission the facility or seek other revenue mechanisms for the power produced by the facility?
- A. That will be a decision of the ownership group at that time, but both options will be available to the project.
12. If SFI transfers the facility to another entity, would SFI provide the Council with a written agreement as to the entity responsible for any outstanding conditions of the Declaratory Ruling and quarterly assessment charges under CGS §16-50v(b)(2) that may be associated with this facility, including contact information for the individual acting on behalf of the transferee?
- A. Yes

Proposed Site

13. Referencing Petition p. 3, in the lease agreement with the property owner, are there any provisions related to decommissioning or site restoration at the end of the project's useful life to facilitate the host property owner's future intended use of the site? If so, please describe and/or provide any such provisions.
- A. Yes. The following language is included in the lease:
- a. "a. Abandonment/Noncompliance with Section 24(a). If Tenant either (i) abandons the Leased Premises or (ii) does not provide the notice to Landlords described in Section 24(a) within the time period for such notice described therein, then Landlords shall notify Tenant whether Landlords desires to enter into a new lease as described in Section (24)(a)(i) or desires Tenant to remove the Solar Farm as described in Section 24(a)(ii), and the parties shall proceed accordingly; provided however that in the event that Landlords and Tenant have not entered into the new lease described in Section 24(a)(i) at least ten (10) days prior to the expiration of the Term (including the expiration of any extension to such Term under Section 3), then Tenant shall remove the Solar Farm as set forth in Section 24(a)(ii). If Tenant is obligated under this Section 24 to remove the Solar Farm and fails to do so within the time set forth in Section 24(a)(ii), then Tenant shall be in default, and Landlords, after notice of default and expiration of the applicable cure periods set forth in Section 22 hereof, may remove the Solar Farm at Tenant's cost."

14. Does the lease agreement with the property owner contain provisions for agricultural co-uses at the site? If yes, describe the co-uses.
 - A. Nothing is expressly written in the lease, but the property owner can continue to use the land outside of the lease area to continue to hay the land as they see fit.
15. Is the site, or any portion of the host parcel, part of the Public Act 490 Program? If so, how does the municipal land use code classify the parcel(s)? How would the project affect the use classification?
 - A. The project site is currently assessed under the PA 490 program. Upon construction of the solar array, the project site will be re-classified as commercial land.
16. Has the State of Connecticut Department of Agriculture purchased any development rights for the facility site or any portion of the facility site as part of the State Program for the Preservation of Agricultural Land?
 - A. A review of the land records indicates that the development rights for the site have not been purchased by the State.
17. Are any portions of the site under lease by any third party? If yes, when does the lease expire?
 - A. No leases exist that impacts the solar project.
18. Provide the distance, direction and address of the nearest property line and nearest off-site residence from the solar field perimeter fence, transformer pads, and the proposed access drive.
 - A. The nearest property line to the perimeter fence is 21.7' to the north. The abutting property is 103 South Road, which is other agricultural land of the owner of the project site.
 - B. The nearest property line to the transformer pads is approximately 97' to the east. The abutting property is 700 Main Street, which is the preserved forested land owned by the Northern Connecticut Land Trust.
 - C. The nearest property line to the access drive is the highway line along South Road which the access drive crosses in order to provide access to the site.
 - D. The nearest off-site residence to the perimeter fence is approximately 66.5' to the south at 185 South Road.
 - E. The nearest off-site resident to the transformers is approximately 707' to the southwest at 160 South Road.
 - F. The nearest off-site residence to the access drive is approximately 160' to the west at 176 South Road.
19. Referencing Petition Exhibit XIII Phase 1 Archeological Investigation, the Site Plan depicts a larger project footprint which was subsequently reduced. What were the reasons for the reduction in the size of the project?
 - A. The Site Plan A101 provided in the Phase 1 Archeological Investigation was a preliminary conceptual layout of the proposed array for the purpose of defining the limits of the archaeological study area. Subsequently, the array size was reduced to eliminate the majority of the panels in the southwest corner due to the presence of steep slopes and core forest in this area.

Energy Output

20. Is the project being designed to accommodate a potential future battery storage system? If so, please indicate the anticipated size of the system, where it may be located on the site, and the impact it may have on any contract(s).
- A. There are no plans to accommodate a potential future battery energy storage system at this time. A new Eversource application and impact study would have to be initiated to allow for a battery storage addition.
21. If one section of the solar array experiences electrical problems causing the section to shut down, could other sections of the system still operate and transmit power to the grid? By what mechanism are sections electrically isolated from each other?
- A. The project will still be able to generate power if one section of the site is down. The project is split into sections by transformers, switchboards, inverters, and panels. There is one switchboard and transformer for each of the inverter banks, which have seven inverters each, and each inverter has individual strings of PV modules. If one of the inverters in either section is non-operational the other six inverters will still be able to generate energy since each of the inverters is connected to different trackers and modules. Additionally, if one individual string on an inverter is not able to generate DC power, then that will not impact the production of the other strings on that inverter. Furthermore, even if one of the switchboards or transformers is not in service, the other half of the site will still be able to generate energy.
22. Would SFI participate in an ISO-NE Forward Capacity Auction? If yes, which auction(s) and capacity commitment period(s)?
- A. This has not been contemplated until the PPA discussions are completed in case Capacity rights are required to be included in the PPA.
23. What is the projected capacity factor (expressed as a percentage) for the proposed project?
- A. The proposed project will have an estimated capacity factor of around 19%.
24. Have electrical loss assumptions been factored into the output of the facility?
- A. Yes, a detailed engineering analysis to evaluate the estimated yearly production of the system was completed. This analysis included but was not limited to the losses associated with soiling, shading, wiring, equipment losses, other electrical losses, and unavailability losses.
25. Would the power output of the solar panels decline as the panels age? If so, estimate the percent per year.
- A. The power output of the solar panels will decline by up to half of one percent per year that they are in service. One thing to note is that this will only limit the overall total DC production for the facility, but since there is a DC/AC ratio that is greater than 1.25x, the site will be able to theoretically generate the nameplate AC capacity over the life of the system.

26. Would SFI construct the facility if the solar array footprint was further reduced? If yes, indicate the minimum facility output (MW) required to retain the project's viability.
- A. SFI would contemplate a project down to 1 MW/AC.

Proposed Facility and Associated Equipment

27. How many inverters are proposed for the two inverter racks shown on Site Plans 5 & 6?
- A. There are seven inverters proposed on each of the inverter racks that are shown on pages 5 and 6 of the Site Plans.
28. Could the location of the inverters be modified to reduce operating noise at the property lines to the maximum extent possible? Explain.
- A. The inverters have purposely been placed on the eastern portion of the site, away from the residences along South Road and Mountain View Road, in an effort to minimize potential noise impacts. The nearest residence to the inverters is located over 700' to the southwest, on the opposite side of the array. Any noise will be buffered by the panels and vegetation located between the inverters and the residences. Based on the results of the noise emissions analysis, the collective operational detectable noise at the nearest habited property boundary will be approximately 44 dB, which is under the allowable daytime noise level of 55 dB as required by DEEP Noise Standards and the town of Somers ordinances
29. Referring to Petition Exhibit IV, PV Module Specification Sheets, define the term Micro Gap.
- A. The term Micro Gap refers to the distance between the individual solar PV cells in each string on the solar module.
30. Provide a specification sheet for the inverters. At what time interval would the inverters need to be replaced?
- A. A specification sheet for the CPS SCH275KTL-DO/US-800-36 inverters has been attached to our interrogatory response as Attachment 2. There have been incredible advancements in inverter technology over the last couple of years, and modern inverters are expected to be in operation for at least ten to fifteen years before they will need to be replaced.
31. Is the wiring from the panels to the inverters installed on the racking? If wiring is external, how would it be protected from potential damage from weather exposure, vegetation maintenance, or animals?
- A. The wiring between the panels and inverters will be installed and secured both underneath the racking and in conduit that will be routed to each of the respective inverter banks. Any external wiring will be protected from potential damage based on industry best practices and NEC code requirements.

Electrical Interconnection

32. Referring to Petition p. 7, has SFI submitted an interconnection request to Eversource? If yes, what is the status of the interconnection request? If not, when would it be filed?
- A. Yes, an interconnection application was submitted to Eversource in November 2023. Eversource has completed the system impact study, which analyzes the project's impact on the local electrical distribution network.
33. Is the facility interconnection required to be reviewed by ISO-NE? Is the project listed on the most recent ISO-NE Interconnection Queue? Is an ISO-NE study or approval required?
- A. Yes, based on the AC size of the system, this project will need to be reviewed and approved by ISO-NE and this project is currently in the ISO-NE queue.
34. Referring to Petition p. 7, what off-site upgrades are necessary to facilitate the Project interconnection?
- A. Since there is no hosting capacity on the circuit on South Rd, Eversource will need to do a line extension on the circuit that is at the corner of Mountain View Rd and South Rd and bring this new extension to the system point of interconnection (POI) at the project entrance. Based on the current design, Eversource is planning to build over the existing lines on the western edge of South Rd. in an effort to minimize the number of new poles that will need to be installed.
35. Referencing Petition Exhibit XIII Phase 1 Archeological Investigation Site Plan A-101C, dated March 31, 2023, the interconnection and access drive area does not match that provided in the Petition Site Plans. Submit a revised Site Plan A-101C that shows the current proposed project design.
- A. As mentioned above, the Site Plans provided in the Phase 1 Archaeological Investigation were conceptual preliminary layouts for the purpose of determining the limits of the archaeological study. The subsequent relocation of the interconnection and access drive has no bearing on the results of the Archaeological investigation. Thus, having the archaeologist provide an updated Site Plan is a waste of resources. The accurate location of the interconnection and access drive are shown on the Site Plans that were submitted with the Petition. If the CSC still requires an updated plan for the Archaeological study, Santa is willing to provide it as a condition of approval.
36. What were the reasons the project interconnection was redesigned from the configuration shown on Site Plan A-101C dated March 31, 2023?
- A. The Site Plan A-101C provided in the Phase 1 Archeological Investigation was a preliminary conceptual layout for the purpose of defining the limits of the archaeological study area. The driveway and interconnection location were subsequently reconfigured and finalized based on the existing topography and features at the site, as well as discussions with Eversource.
37. Petition Site Plan 6 shows a new utility pole on the west side of Route 83 to facilitate the Project interconnection. What is the address of this residence? Was this residence and abutting residences notified of the Project? If yes, when and by what means? If not, when will notice be made?
- A. The address of the property on the west side of Route 83 where the new utility pole is proposed is 176 South Road. At the time the Petition was submitted, a Notice of Intent to File a Petition for a Declaratory Ruling was sent to property owners that directly abutted the subject parcel at 159 South Road. A copy of the notification and list of those notified were provided in Exhibit VI of the

petition. Unfortunately, because the property owners on the west side of Route 83 were not direct abutters to the project site, they were excluded from the initial notification. To remedy this situation, notices informing the property owner at 176 South Road and the other abutters on the west side of Route 83 where the utility company will extend the new circuit on the existing poles were notified by Certified Mail on December 6, 2023. A copy of the notification letter and list of additional abutters who received this letter is provided in Attachment 3.

38. Have there been any discussions with Eversource to use pad-mounted equipment rather than pole-mounted equipment? Provide cost estimates for both an overhead and underground interconnection.
- A. Not at this time. Those discussions may occur once the deposits are made after full project approval.

Public Safety

39. Would the project comply with the current Connecticut State Building Code, National Electrical Code and Connecticut State Fire Prevention Code?
- A. Yes, the project will comply with all applicable state of Connecticut building, electrical, and fire codes. The electrical design and installation work and safety provisions will be in compliance with the most recent National Electrical Code, NFPA 70, and other NFPA codes that pertain to this solar installation. The mechanical and structural design and installation work will comply with the 2021 IBC portion of the 2022 CT State Building Code.
40. What are industry Best Management Practices for Electric and Magnetic Fields at solar facilities? Would the site design conform to these practices.
- A. According to the Council's revised EMF Best Management Practices dated February 7, 2014, the Council acknowledged that a 2010 guideline established that 2,000 mG was the acceptable exposure level to electromagnetic fields (EMF). The Massachusetts Department of Energy Resources, Department of Environmental Protection, and Clean Energy Center released a solar report that states that PV arrays generate EMF in the same extremely low-frequency range as electrical appliances and wiring found in most homes and buildings and that the measurements at three commercial PV arrays in MA gave off less than 0.5 mG at the sites' boundaries, and typically PV arrays give off less than 1.0 mG within three inches of the panels, whereas a vacuum cleaner three feet away from a motor is approximately 2.0 mG. Since EMF is expected to be minimal at the proposed solar facility and since there is a lack of scientific evidence that this is a significant health issue according to studies performed by the World Health Organization, Santa Fuel Inc. is not aware of any BMPs for EMF at solar facilities.
41. The Petition Decommissioning Plan mentions an alarm system. Will an alarm system be installed at this site?
- A. There will not be an auditory alarm system installed at this site, but there will be a monitoring data acquisition system (DAS) that will remotely track the production of the system and monitor all of the equipment on the project.

42. In the event of a brush or electrical fire, how are potential electric hazards that could be encountered by emergency response personnel mitigated?
- A. In the event of a fire, the facility will have a NEC NFPA 70 compliant Service Disconnect accessible for emergency responders to shut down the facility from utility power. The Service Disconnect will be labeled in accordance with NEC and Utility requirements. Upon isolation from utility power, all Inverters will shut down and stop producing energy as required per NEC and IEEE 1547 within two seconds. Additionally, the project will have comprehensive signage with clear warnings relating to the equipment location(s) and hazards associated therewith- throughout the project area, including at the main entrance, on exterior fencing, and on the solar equipment.
43. What type of media and/or specialized equipment would be necessary to extinguish a solar panel/electrical component fire?
- A. Generally, fire personnel have an understanding of their preferred means to extinguish electrical fires associated with solar equipment. Typically, fire personnel do not actively try to extinguish fires within a solar array, instead, the first responders typically observe the situation and allow the component (i.e., solar modules, inverter, etc.) to burn itself out while looking to contain any spread outside of the array.
44. What type of oil is within the transformers? Do the transformers have a containment system in the event of a leak? How are oil leaks detected?
- A. The proposed transformers on this project will have FR3 fluid, which provides better transformer performance, fire safety, and environmental benefits. As a natural ester dielectric fluid, FR3 fluid is derived from vegetable oil (>95%)—a 100% renewable resource—and is reclaimable and recyclable. It contains no petroleum, halogens, silicones, or sulfurs. According to GHS, the Globally Harmonized System of Classification and Labeling of Chemicals, FR3 fluid is classified as nonhazardous as well as nontoxic in soil and water. FR3 fluid’s ready biodegradation means that it biodegrades in less than 28 days. The transformers are equipped with monitoring contacts that will be able to determine the liquid level inside the unit, and this will be connected to the site data acquisition system (DAS) that will be consistently monitored. Any potential leaks. If the oil ever drops below the minimum level required, the operations team would be dispatched to investigate. In the unlikely event of an environmental release, the operations team would follow all state and local requirements for spill reporting and clean up.
45. Referencing Petition p. 15, identify the distance/direction of the nearest federally-obligated airport from the proposed site. Is an aviation glare analysis required for potential glare hazards to aviation using this airport?
- A. A search conducted on the FAA Obstruction Evaluation web-site indicates that the nearest airport from the proposed site is the Ellington Airport located approximately 3.1 miles to the south. As presented in the Petition, the FAA’s on-line Notice Criteria Tool concluded that the project did not trigger any notification requirements. In addition, based on FAA policy issued in May 2021, a glare study is not required at off-airport solar facilities.
46. Would the installation of racking posts affect well water quality from construction impacts, such as vibrations and sedimentation?
- A. No, the installation of the tracker foundations should not impact the well water quality in the surrounding area since the vibrations from foundation installation are not expected to cause

sediment releases. Solar foundations are typically driven to a maximum embedment depth of up to 12'. Based on information provided by the Town of Somers Sanitarian, the surrounding properties are served by drilled wells into the underlying bedrock ranging from approximately 100' to 250' in depth. The nearest well at 187 South Road, has approximately 40' of casing and an overall depth of 252'.

47. What noise-generating equipment would be installed at the site? Provide noise profile information for all noise generating equipment during site operation.
 - A. The noise-generating equipment that is proposed in this project will include inverters and transformers. The noise profile information has been provided in Attachment 10.
48. Referencing Petition p. 14, what does the 61 dBA noise value represent, one inverter unit or a bank of inverters operating simultaneously?
 - A. The 61 dBA noise value mentioned on page 14 of the petition is the noise that would be generated by the operation of the proposed pad mount liquid-filled transformer at a distance of one meter away.
49. Based on the noise profile information for the selected equipment, what is the collective operational noise level of the equipment at the nearest property boundary? Does this noise level meet applicable DEEP Noise Standards?
 - A. Based on the results of the noise emissions analysis, the collective operational detectable noise at the nearest habited property boundary will be approximately 44 dB, which is under the allowable daytime noise level of 55 dB as required by DEEP Noise Standards and the town of Somers ordinances.

Environmental Effects and Mitigation Measures

50. Referencing Petition Site Plan 1, does the abutting land to the east, owned by the Northern Connecticut Land Trust, contain hiking trails? If yes, would the project be visible from the trails?
 - A. The abutting property to the east of the project site owned by the Northern Connecticut Land Trust is referred to as the McClain Farm. As shown on the attached trail map (Attachment 5) obtained from Somers Recreation Department web-page, there does appear to be a hiking trail, The Jerry Stage Trail, located in the woods to the east of the project site. A site walk conducted on December 8, 2023, determined that the project will be visible from portions of the trail through the woods after the leaves have fallen (see Photo 11 in Attachment 7). Based on the walk, it appears that the closest section of the trail to the edge of the field where the project will be located is approximately 140 feet.

51. Referring to Petition 15, it states the Project would not require clearing in core forest. Would removal of edge forest for site construction shift the boundary of the edge forest further east, thereby causing a reduction in the amount of core forest? Provide an aerial photograph that depicts pre- and post-construction acreage of core and edge forest.

A. Attachment 6 provides an aerial photograph of the existing site and overlay demonstrating the existing and proposed edge of the forest, including the edge forest and core forest. As shown on the attachment, the proposed clearing does not extend into the core forest. In addition, based on comments received from the Council on Environmental Quality and DEEP Office of Environmental Review & Strategic Initiatives, the Petitioner provided project information to the DEEP's Bureau of Natural Resources for review. Based on their review, the DEEP Bureau of Natural Resources issued a determination dated October 30, 2023 that the proposed project will not materially affect the status of the core forest. A copy of this letter was previously submitted to CSC and is available on the CSC's website under the "Pending Matters" link.

52. Submit photographic site documentation with notations linked to the site plans or a detailed aerial image that identify locations of site-specific and representative site features. The submission should include photographs of the site from public road(s) or publicly accessible area(s) as well as Site-specific locations depicting site features including, but not necessarily limited to, the following locations as applicable:

For each photo, please indicate the photo viewpoint direction and stake or flag the locations of site-specific and representative site features. Site-specific and representative site features include, but are not limited to, as applicable:

1. wetlands, watercourses and vernal pools;
2. forest/forest edge areas;
3. agricultural soil areas;
4. sloping terrain;
5. proposed stormwater control features;
6. nearest residences;
7. Site access and interior access road(s);
8. utility pads/electrical interconnection(s);
9. clearing limits/property lines;
10. mitigation areas; and
11. any other noteworthy features relative to the Project.

A photolog graphic must accompany the submission, using a site plan or a detailed aerial image, depicting each numbered photograph for reference. For each photo, indicate the photo location number and viewpoint direction, and clearly identify the locations of site-specific and representative site features show (e.g., physical staking/flagging or other means of marking the subject area).

A. A photo exhibit and accompanying key map of photo locations has been prepared and is provided in Attachment 7.

Facility Construction

53. Submit a construction fuel materials storage, refueling and spill response plan.
- A. A Spill Response and Control Plan to address these items is provided in Attachment 8
54. Petition p. 10 states slopes in the southern portion of the array will be regraded to 15%. What is the existing grade in this area?
- A. Slopes in the areas to be re-graded are currently at 15-20% with small isolated areas that range from 20-25%.

Facility Maintenance/Decommissioning

55. Provide an Operations and Maintenance Plan to include procedures for vegetation maintenance, stormwater control inspections and repair, pesticide/herbicide use, panel washing and landscape vegetation replacement.
- A. An Operations and Maintenance Plan for the project is provided in Attachment 9.
56. Would project decommissioning include stormwater management features? If yes, how would the stormwater management system be removed?
- A. There are no plans to fill in the stormwater management basins upon the decommissioning of the solar array.

ATTACHMENT 1
U.S Fish & Wildlife Service No Effect Determination
Regarding the Northern Long-Eared Bat



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project code: 2024-0000039
Project Name: Somers Solar

October 02, 2023

Federal Action Agency (if applicable):

Subject: Record of project representative's no effect determination for 'Somers Solar'

Dear Timothy Coon:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on October 02, 2023, for 'Somers Solar' (here forward, Project). This project has been assigned Project Code 2024-0000039 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of "No Effect" on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A

consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2024-0000039 associated with this Project.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Somers Solar

2. Description

The following description was provided for the project 'Somers Solar':

3.85 MWAC Solar development on approximately 22 acres at 159 South Road in Somers, CT. To be constructed in 2024.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.976569,-72.44171471241597,14z>



DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (*Myotis septentrionalis*). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats are likely to be present in the action area, answer "NO" and continue through the key.

Do you want to make a no effect determination?

Yes

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Timothy Coon
Address: P.O. Box 938
City: East Windsor
State: CT
Zip: 06035
Email: tcoon@jrusso.com
Phone: 8606230569

ATTACHMENT 2
Inverter Spec Sheet

250/275kW, 1500Vdc String Inverters for North America



CPS SCH275KTL-DO/US-800

The 250/275kW high power CPS three phase string inverters are designed for ground mount applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiencies, wide operating voltages, broad temperature ranges and NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The SCH275KTL inverters include a selectable Active Power of either 250kW or 275kW (factory default) with 12 MPPTs and are available with either 36 fused PV string inputs or 24 unfused PV string inputs. The CPS FlexOM solution enables communication, controls and remote product upgrades.

Key Features

- NFPA 70, NEC 2017 compliant
- Touch safe DC Fuse holders adds convenience and safety
- CPS FlexOM Gateway enables remote FW upgrades
- Integrated DC disconnect switch
- Protection Functions for enhanced reliability and safety
- Selectable Max AC Active Power of 250kW or 275kW
- 12 MPPTs with 36 fused inputs or 24 unfused inputs
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- Full power capacity up to 42°C
- Standard 5 year warranty with extensions to 20 years
- Supported comm protocols (Modbus RTU, TCP/IP, PLC, CAN)

Model Name	CPS SCH275KTL-DO/US-800-36	CPS SCH275KTL-DO/US-800-24
DC Input		
Max. DC Input Voltage	1500V	
Operating DC Input Voltage Range	500-1450Vdc	
Start-up DC Input Voltage / Power	550Vdc / 500W	
MPPT Voltage Range @ PF>0.99 ¹	900-1300Vdc	
Number of MPP Trackers	12	12
Max. PV Input Current	26A per MPPT	30A per MPPT
Max. PV Short-Circuit Current	600A, 50A per MPPT	600A, 50A per MPPT
Number of DC Inputs	36 Fused Inputs, 3 per MPPT	24 Non-Fused Inputs
DC Disconnection Type	Load-rated DC switches	
DC Surge Protection	Type II	
AC Output		
Max AC Output Power (Selectable) @ PF>0.99	250kW / 275kW	
Max. AC Apparent Power	275kVA	
Rated Output Voltage	800Vac	
Output Voltage Range ²	704-880Vac	
Grid Connection Type	3-Phase / PE	
Max. AC Output Current @800Vac	198.5A	
Rated Output Frequency	60Hz	
Output Frequency Range ²	57 - 63Hz	
Power Factor	>0.99 (±0.8 adjustable)	
Current THD @ Rated Load	<3%	
Max. Fault Current Contribution (1 Cycle RMS)	215.2A	
Max. OCPD Rating	300A	
AC Surge Protection	Type II	
System and Performance		
Max. Efficiency	99.0%	
CEC Efficiency	98.5%	
Stand-by / Night Consumption	5W	
Environment		
Enclosure Protection Degree	NEMA Type 4X	
Cooling Method	Variable speed cooling fans	
Operating Temperature Range ³	-22°F to +140°F / -30°C to +60°C (derating from +107°F / +42°C)	
Operating Humidity	0 to 100%	
Operating Altitude	8202ft / 2500m (no derating)	
Audible Noise	<80dBA @ 1m and 25°C	
Display and Communication		
User Interface and Display	LED indicators, WiFi + APP	
Inverter Monitoring	Modbus RS485 / Ethernet TCP/IP / PLC / CAN	
Site Level Monitoring	CPS FlexOM (1 per 32 inverters)	
Modbus Data Mapping	SunSpec / CPS	
Remote Diagnostics / FW Upgrade Functions	Standard / (with FlexOM Gateway)	
Mechanical		
Dimensions (HxWxD)	27.2 x 41.3 x 15.7in (690 x 1050 x 400mm)	
Weight	Approx. 262lbs / 119kg	
Mounting / Installation Angle	Vertical installation	
AC Termination	Stud Type Terminal (Wire range: 3/0AWG – 600kcmil AL/CU, Lugs not supplied)	
DC Termination	36 Fused Input: Screw Clamp Fuse Holder (Wire range: #14 - #6 AWG CU) 24 Non-Fused Input: Screw Clamp Terminal (Wire range: #14 - #8 and #6 - #4 AWG CU)	
Fused String Inputs (3 per MPPT) ⁴	20A fuses provided (Fuse values up to 30A acceptable)	
Safety		
Certifications and Standards	UL1741-SA Ed. 2, CSA-22.2 NO.107.1-16, IEEE1547-2018, FCC PART15	
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-NE	
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-Var, Freq-Watt, Volt-Watt	
Protection Functions		
Reactive Power at Night	Yes	
IV Curve Tracing	Yes	
Insulation Resistance Monitoring	Yes	
Onboard Fault Oscillography	Yes	
PV String Current Monitoring	Yes	
Residual Current Monitoring	Yes	
Input Reverse Polarity Protection	Yes	
Output Overcurrent Protection	Yes	
Output Short-Circuit Protection	Yes	
Output Overvoltage Protection	Yes	
Warranty		
Standard	5 Years	
Extended Terms	10, 15 and 20 years	

1) See user manual for further information regarding MPPT Voltage Range when operating at non-unity PF

2) The "Output Voltage Range" and "Output Frequency Range" may differ according to the specific grid standard.

3) See user manual for further requirements regarding non-operating conditions.

4) Fused string inputs only applicable to the SCH275KTL 36 input model.

ATTACHMENT 3
Notification of Additional South Road Residences

ADDITIONAL SOUTH ROAD MAILING LIST

<u>Street Address</u>	<u>Owner/Mailing Address</u>
168 South Road	Jian Bo Huang & Hui Yun Zheng 35 Early Ave Stratford, CT 06615
176 South Road	Glenn D Stahouski 176 South Road Somers, CT 06071
184 South Road	Patricia Laughlan 184 South Road Somers, CT 06071
190 South Road	William Kozikowski 190 South Road Somers, CT 06071
192 South Road	Christopher White 192 South Road Somers, CT 06071
203 South Road	Kathleen E Fuller 328 Springfield Road Somers, CT 06071



December 8, 2023

Via Certified Mail

<Name and Address>

Re: Petition No. 1592, Santa Fuel, Inc. – Notice of Filing of a Petition for Declaratory Ruling for the Construction, Operation and Maintenance of a 3.85 MW(ac) Solar Photovoltaic Electric Generating Facility at the 159 South Road in Somers, Connecticut

Dear <Salutation>:

This letter serves as notice that Santa Fuel, Inc. has filed a Petition for Declaratory Ruling (Petition No. 1592) with the Connecticut Siting Council (Council), seeking approval of the construction, operation and maintenance of a 3.85 megawatt (MW)(ac) solar power generating facility, including all associated equipment, related site improvements, and interconnection (the Project).

The Project is located at 159 South Road in Somers, Connecticut. The Project will include an approximate 17.11 acre solar array. The Project shall provide power to the Eversource grid. The Project will consist of the installation of ground-mounted photovoltaic panels, centralized inverters and transformers, electrical lines, electrical transformers, a perimeter fence and stormwater management controls, and evergreens for screening. For details regarding the location and layout of the Project, please see the attached reduced sized copy of the Overall Site Plan.

Pursuant to the provisions of the Connecticut General Statutes §16-50g et seq., the location of certain project features may change as this Petition proceeds through the Council's regulatory review process.

Additional information regarding this Petition can be obtained on the Council's Petition No. 1592 project web-page at the following link:

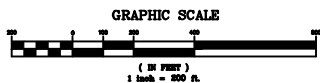
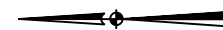
https://portal.ct.gov/CSC/1_Applications-and-Other-Pending-Matters/Pending-Matters

If you have any questions, please feel free to contact me. My contact information is provided below.

Respectfully,

Timothy A. Coon, P.E.
J.R. Russo & Associates, LLC

Attachment (Overall Plan)



Applicant
Santa Fuel, Inc.
 154 Admiral Street
 Bridgeport, CT 06605

REVISIONS	
BY	DATE

Somers Solar
 159 South Road
 Somers, Connecticut
 Map 05 Lot 73 Zone: A-1

Overall Aerial Site Plan

DATE

9-14-23

SCALE

1"=200'

JOB NUMBER

2023-001

SHEET

4 of 8

7021 1970 0001 2136 0150

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<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
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Street and Apt. No., or PO Box No.		
176 South Road		
City, State, ZIP+4®		
Somers, CT 06071		

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<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	.63	
Total Postage and Fees	8.13	
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Street and Apt. No., or PO Box No.		
192 South Road		
City, State, ZIP+4®		
Somers, CT 06071		

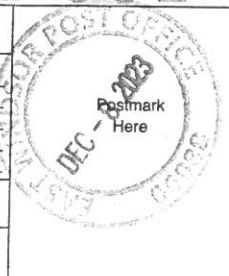
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Total Postage and Fees	8.13	
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Street and Apt. No., or PO Box No.		
190 South Road		
City, State, ZIP+4®		
Somers, CT 06071		

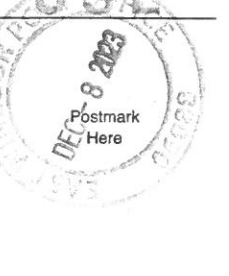
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Street and Apt. No., or PO Box No.		
189 South Road		
City, State, ZIP+4®		
Somers, CT 06071		

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<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	.63	
Total Postage and Fees	8.13	
Sent To: Jian Bo's Hui Yan Zheng		
Street and Apt. No., or PO Box No.		
35 Early Ave		
City, State, ZIP+4®		
Stafford, CT 06615		


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<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	
Postage	.63	
Total Postage and Fees	8.13	
Sent To: Kathleen E Foller		
Street and Apt. No., or PO Box No.		
328 Springfield Road		
City, State, ZIP+4®		
Somers, CT 06071		

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instruction

ATTACHMENT 4
Noise Analysis



Noise Analysis

Somers Solar

159 South Rd, Somers, CT 06071

4,790.50 kW DC / 3,850.00 kW AC



Table of Contents

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3.0	CONCLUSION	6
4.0	APPENDICES	7



1.0 INTRODUCTION

The purpose of this report is to calculate the noise generated by the solar project and to verify that the noise level is below the maximum noise level allowed by the zoning and land use ordinance of the town of Somers. Noise generated by this project will derive from the operation of fourteen Chint Power CPS SCH275KTL-DO/US-800 string inverters and two 2000kVA transformers. All the equipment will be installed on an equipment pad, with each equipment pad containing seven inverters and one transformer. The locations of these equipment pads are shown in Figure 1 below. According to the Chint Power equipment specifications, one CPS SCH275KTL-DO/US-800 inverter has a maximum acoustic noise output of 80dBA at a distance of 1m (3.28'), meanwhile, a single 2000kVA transformer has a maximum acoustic noise output of 61dBA at a distance of 1m (3.28'). For the purposes of this study, we have calculated the noise level at three sides of the property, as shown in Figures 2 -4.

Solar projects only operate during the day hence it must comply with the daytime noise regulations. As stated in the Zoning Regulations for the Town of Somers Section 7.11 F, noise emitted from residential zones cannot exceed 55dBA at a residential zone boundary, 55dBA at a commercial zone boundary and 62dBA at an industrial zone boundary.



Fig 1: Equipment pad locations closest to property boundary



The three locations are marked in red below:

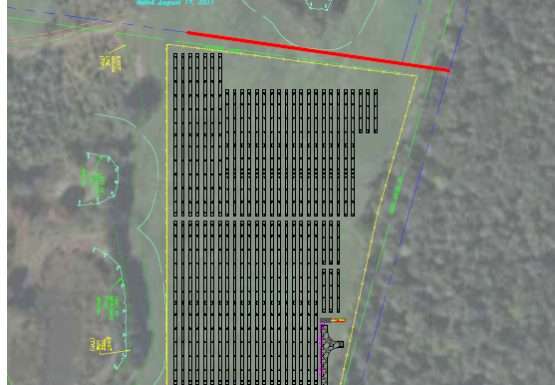


Fig 2: 103 South Rd (Northern Parcel Boundary)



Fig 3: 187 South Rd (Southern Parcel Boundary)

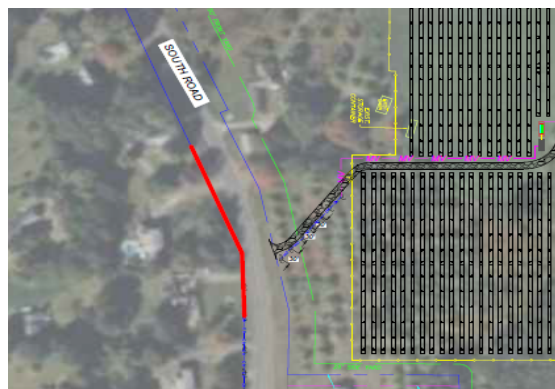


Fig 4: South Road (Western Parcels)

Santa Fuel, Inc.
154 Admiral St, Bridgeport, CT 06605
(203) 367-3661 | www.santaenergy.com



2.0 CALCULATION

To quantify the noise output of all equipment, a logarithmic decibel addition formula and an audibility formula must be used to accurately determine amplification of sound. This formula and the processes related to calculating a result are illustrated below.

Equation 1: Decibel Addition

$$L = 10 \text{Log}_{10} \left(\sum_{i=1}^n 10^{(L_i / 10)} \right)$$

Equation 2: Audibility

$$DL = LP2 - LP1 = 20\text{Log}(R1/R2)$$

DL = Difference in sound pressure (dBA)

LP1 = Sound pressure at location 1

LP2 = Sound pressure at location 2

R1 = Distance from source to location 1

R2 = Distance from source to location 2

For the purposes of this study, the noise level at three sides of the property were calculated using the nearest equipment pad. The distance of the nearest equipment pad from the property line is mentioned below:

Distance to 103 South Rd (Fig 2), parcel to the north of the property from the nearest equipment pad is 660'.

Distance to 187 South Rd (Fig 3), parcel to the south of the property from the nearest equipment pad is 532'.

Distance to South Road (Fig 4), parcels to the west of the property from the nearest equipment pad is 613'.

Noise emission from (1) Chint Power CPS SCH275KTL-DO/US-800 @ 1m (3.28') = 80dB

Noise emission from (1) 2000kVA transformer @ 1m (3.28') = 61dB

Using equation 1, noise emission from all seven inverters on an equipment pad during operation = 88.45dB



Using equation 1, combined noise emission from all the equipment (7 inverters and 1 transformer) during operation = 88.45dB

The noise level at the three property boundaries were calculated below:

103 South Rd, parcel to the north

Distance between property line and equipment pad = 660'

Using equation 2, $DL = 20\log(3.28/660) = -46.07$

Noise emission at the parcel boundary = $88.45\text{dB} - 46.07\text{dB} = 42.38\text{dB}$

187 South Rd, parcel to the south

Distance between property line and equipment pad = 532'

Using equation 2, $DL = 20\log(3.28/532) = -44.20$

Noise emission at the parcel boundary = $88.45\text{dB} - 44.20\text{dB} = 44.25\text{dB}$

South Road, parcels to the west

Distance between property line and equipment pad = 613'

Using equation 2, $DL = 20\log(3.28/613) = -45.43\text{dB}$

Noise emission at South Road = $88.45\text{dB} - 45.43\text{dB} = 43.02\text{dB}$



3.0 CONCLUSION

The noise levels at the three property boundaries are mentioned below.

LOCATION	NOISE LEVEL (dBA)
103 South Rd, Northern Property Boundary	42.38 dBA
187 South Rd, Southern Property Boundary	44.25 dBA
South Rd, Western Property Boundary	43.02 dBA

All three parcels are classified as residential parcels, hence the maximum noise level allowed at the property boundary during daytime is 55dBA.

In conclusion, the combined noise level emitted by the inverter and transformer on the equipment pad comply with the applicable regulations.



4.0 APPENDICES

- 1) Chint Power CPS SCH275KTL-DO/US-800 Datasheet

250/275kW, 1500Vdc String Inverters for North America



CPS SCH275KTL-DO/US-800

The 250/275kW high power CPS three phase string inverters are designed for ground mount applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiencies, wide operating voltages, broad temperature ranges and NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The SCH275KTL inverters include a selectable Active Power of either 250kW or 275kW (factory default) with 12 MPPTs and are available with either 36 fused PV string inputs or 24 unfused PV string inputs. The CPS FlexOM solution enables communication, controls and remote product upgrades.

Key Features

- NFPA 70, NEC 2017 compliant
- Touch safe DC Fuse holders adds convenience and safety
- CPS FlexOM Gateway enables remote FW upgrades
- Integrated DC disconnect switch
- Protection Functions for enhanced reliability and safety
- Selectable Max AC Active Power of 250kW or 275kW
- 12 MPPTs with 36 fused inputs or 24 unfused inputs
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- Full power capacity up to 42°C
- Standard 5 year warranty with extensions to 20 years
- Supported comm protocols (Modbus RTU, TCP/IP, PLC, CAN)

Model Name	CPS SCH275KTL-DO/US-800-36	CPS SCH275KTL-DO/US-800-24
DC Input		
Max. DC Input Voltage	1500V	
Operating DC Input Voltage Range	500-1450Vdc	
Start-up DC Input Voltage / Power	550Vdc / 500W	
MPPT Voltage Range @ PF>0.99 ¹	900-1300Vdc	
Number of MPP Trackers	12	12
Max. PV Input Current	26A per MPPT	30A per MPPT
Max. PV Short-Circuit Current	600A, 50A per MPPT	600A, 50A per MPPT
Number of DC Inputs	36 Fused Inputs, 3 per MPPT	24 Non-Fused Inputs
DC Disconnection Type	Load-rated DC switches	
DC Surge Protection	Type II	
AC Output		
Max AC Output Power (Selectable) @ PF>0.99	250kW / 275kW	
Max. AC Apparent Power	275kVA	
Rated Output Voltage	800Vac	
Output Voltage Range ²	704-880Vac	
Grid Connection Type	3-Phase / PE	
Max. AC Output Current @800Vac	198.5A	
Rated Output Frequency	60Hz	
Output Frequency Range ²	57 - 63Hz	
Power Factor	>0.99 (±0.8 adjustable)	
Current THD @ Rated Load	<3%	
Max. Fault Current Contribution (1 Cycle RMS)	215.2A	
Max. OCPD Rating	300A	
AC Surge Protection	Type II	
System and Performance		
Max. Efficiency	99.0%	
CEC Efficiency	98.5%	
Stand-by / Night Consumption	5W	
Environment		
Enclosure Protection Degree	NEMA Type 4X	
Cooling Method	Variable speed cooling fans	
Operating Temperature Range ³	-22°F to +140°F / -30°C to +60°C (derating from +107°F / +42°C)	
Operating Humidity	0 to 100%	
Operating Altitude	8202ft / 2500m (no derating)	
Audible Noise	<80dBA @ 1m and 25°C	
Display and Communication		
User Interface and Display	LED indicators, WiFi + APP	
Inverter Monitoring	Modbus RS485 / Ethernet TCP/IP / PLC / CAN	
Site Level Monitoring	CPS FlexOM (1 per 32 inverters)	
Modbus Data Mapping	SunSpec / CPS	
Remote Diagnostics / FW Upgrade Functions	Standard / (with FlexOM Gateway)	
Mechanical		
Dimensions (HxWxD)	27.2 x 41.3 x 15.7in (690 x 1050 x 400mm)	
Weight	Approx. 262lbs / 119kg	
Mounting / Installation Angle	Vertical installation	
AC Termination	Stud Type Terminal (Wire range: 3/0AWG – 600kcmil AL/CU, Lugs not supplied)	
DC Termination	36 Fused Input: Screw Clamp Fuse Holder (Wire range: #14 - #6 AWG CU) 24 Non-Fused Input: Screw Clamp Terminal (Wire range: #14 - #8 and #6 - #4 AWG CU)	
Fused String Inputs (3 per MPPT) ⁴	20A fuses provided (Fuse values up to 30A acceptable)	
Safety		
Certifications and Standards	UL1741-SA Ed. 2, CSA-22.2 NO.107.1-16, IEEE1547-2018, FCC PART15	
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-NE	
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-Var, Freq-Watt, Volt-Watt	
Protection Functions		
Reactive Power at Night	Yes	
IV Curve Tracing	Yes	
Insulation Resistance Monitoring	Yes	
Onboard Fault Oscillography	Yes	
PV String Current Monitoring	Yes	
Residual Current Monitoring	Yes	
Input Reverse Polarity Protection	Yes	
Output Overcurrent Protection	Yes	
Output Short-Circuit Protection	Yes	
Output Overvoltage Protection	Yes	
Warranty		
Standard	5 Years	
Extended Terms	10, 15 and 20 years	

1) See user manual for further information regarding MPPT Voltage Range when operating at non-unity PF

2) The "Output Voltage Range" and "Output Frequency Range" may differ according to the specific grid standard.

3) See user manual for further requirements regarding non-operating conditions.

4) Fused string inputs only applicable to the SCH275KTL 36 input model.



2) Chint Power CPS SCH275KTL-DO/US-800 Noise Test

Inspection
and Detection
检验检测报告
Inspection and Detection Report
Report

No : (2022) SJSXW-WT1020

Name of Sample Grid Support Utility Interactive PV Inverter (Non-Isolated)

Party being tested _____

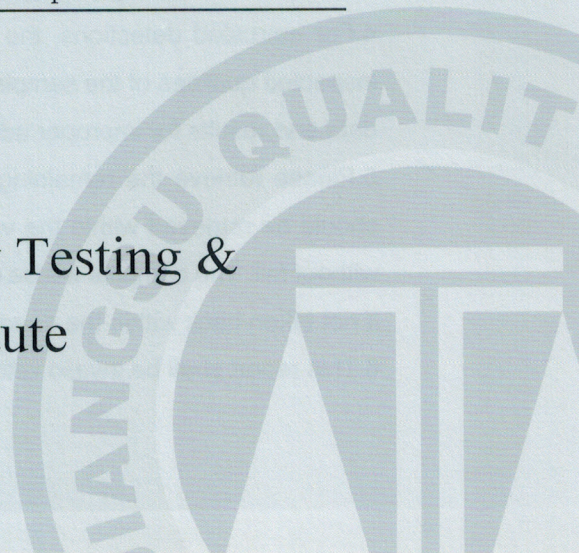
Manufacturer _____

Consigner SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Inspection and
Detection Kind Entrusted Inspection



Jiangsu Product Quality Testing &
Inspection Institute



Inspection Institute

Inspection and Detection Report

No.:(2022)SJSXW-WT1020

Page 1 of 8

Name of Sample	Grid Support Utility Interactive PV Inverter (Non-Isolated)		Type and Specifications	CPS SCH275KTL-DO/US-800	
Producing Date\Batch No.	\		Trademark	—	
Consigner\Add\Tel\PC	SHANGHAI CHINT POWER SYSTEMS CO., LTD.\ #4, 3255 Sixian Road, Songjiang District, Shanghai 201614, China\ —\ —				
Manufacturer\Add\Tel\PC	—				
Party being tested\Add\Tel\PC	—				
Inspection and Detection kind	Entrusted Inspection	Task from/Task NO.	—	Sampling List	—
Quantity of Sample	1pcs	Batch of Sample	—	Numbered of Sample	(2022)SJSXW-WT1020
Sampling Date	—	Sampling Staff	—	Sampling Location	—
Grade	—	Quantity & Location of Backup Samples	—	Sealing State	—
Arrival Date of Sample	2022-12-06	Description of Sample	Match Test Requirement	Checking of Sealing Sample	—
Inspection and Detection Date	2022-12-06		Inspection and Detection Add.	No. 1368, Wuzhongdadao Avenue, Suzhou, China	
Inspection and Detection Standard(s)	ISO 3746:2010<Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane>				
Decision Criterion	—				
Test Conclusion	No judgment.				
Note	—				



(The Special Seal for Inspection and Detection)
Signature Date: 2023-01-06

Approval 梁学俊

梁学俊

roofreader 彭彦伟

彭彦伟

Majortester 鞠伟刚

鞠伟刚

Summary of Test Results

No.	Test Item	Test Standard	Result	Judgment
1	Noise Testing	ISO 3746:2010	See more details at 1.5 and 1.6	No judgment

Remark



Description of Equipment Under Test

0 Basic Information of EUT:

0.1 EUT

Product Name:	Grid Support Utility Interactive PV Inverter (Non-Isolated)
Specifications:	CPS SCH275KTL-DO/US-800

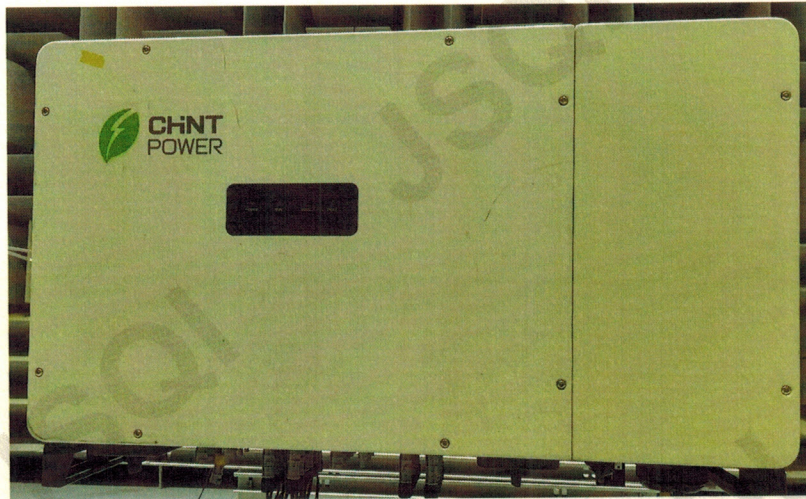



Photo 1: Appearance of sample



**CHNT
POWER**


**Grid Support Utility Interactive PV
Inverter (Non-Isolated)**

*This inverter is factory set at 275kW DEFAULT. Contact CPS to enable 250kW setting.


Product series:	CPS SCH275KTL-DO/US-800
Nominal input power:	285kWstcr/260KWstc
Number of inputs:	3 x 6 / 2 x 12 / 3 x 12
Max. input voltage:	1500Vdc
Operating input voltage range:	500—1450Vdc
MPPT voltage range:	900—1300Vdc
Max. input current:	60A x 6 / 30A x 12 / 30A x 12
Max. input short circuit current:	90A x 6 / 50A x 12 / 50A x 12
Max. Active power:	275kW / 250kW
Max. Apparent power:	275kVA
Nominal AC voltage:	800Vac / 704—880Vac 3Ø
Nominal power frequency:	60Hz
Nominal AC current:	198.5A / 180.4A
Max. AC current:	198.5A
AC current THD:	<3%
Power factor:	>0.99(adj.±0.8)
Max. efficiency:	99.0%
CEC efficiency:	98.5%
Operating temperature range:	-30°C—+60°C (>42°C derating)
Ingress protection:	TYPE 4X

Made in xxx

Serial Number



This device complies with part 15 of the FCC Rules






Photo 2: Nameplate of sample

Test Requirements and Results

1 Noise Testing

1.1 Limiting Value of Noise

No limiting value.

1.2 Test Setup

The noise test of EUT proceeds in a semi-anechoic chamber. The measurement surface is a parallelepiped with five microphone positions, as specified in Figure 1. The preferred value of the measurement distance d is 1m.

The results are tested by the five microphones in 60s in the frequency between 20Hz to 20kHz of noise.

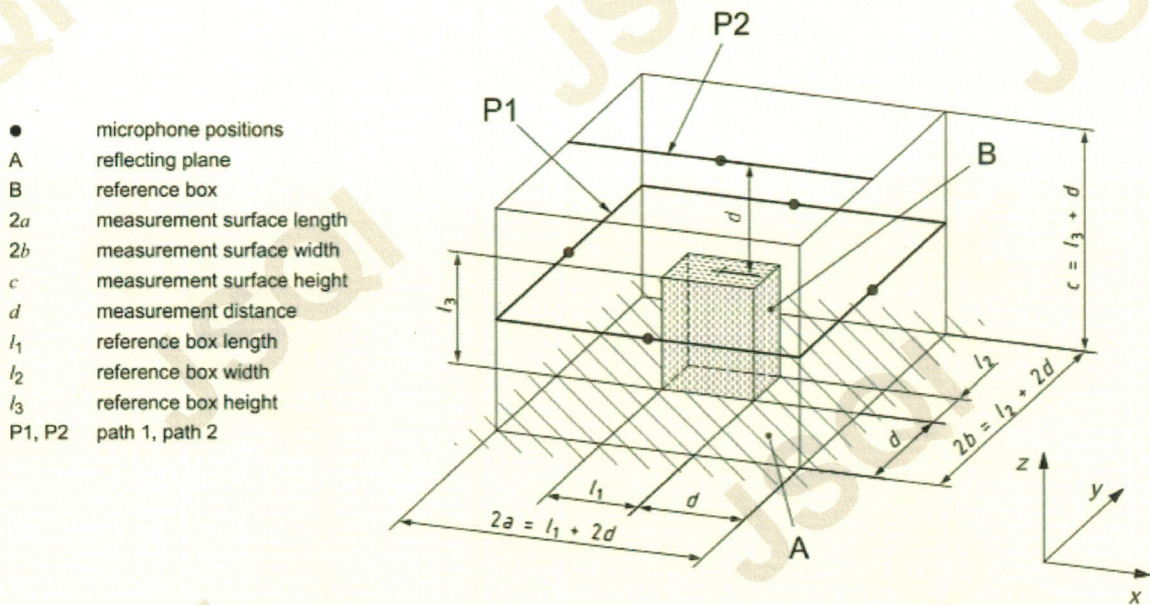
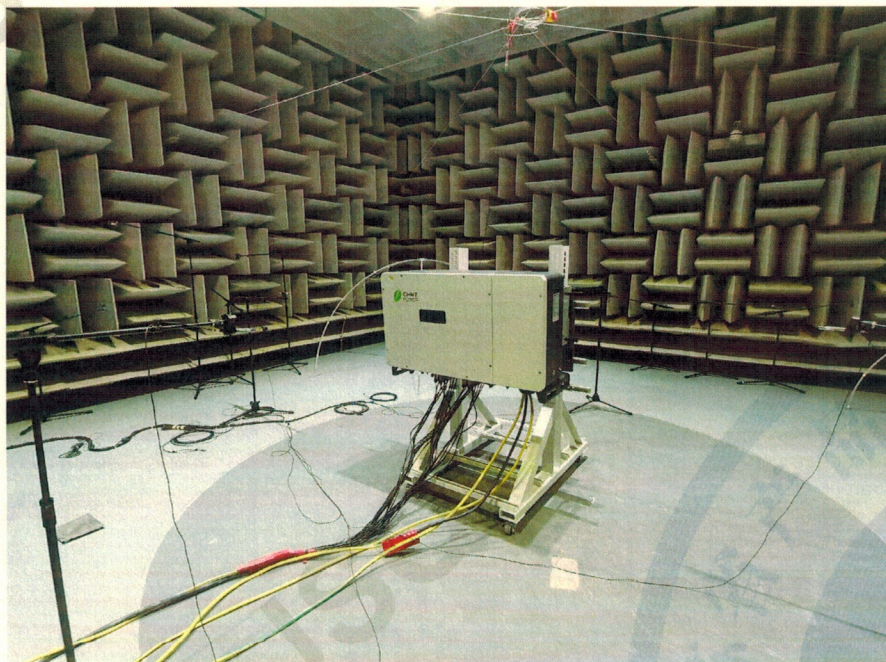


Figure 1 – Measurement surface – parallelepiped – with key microphone positions

Test Setup Photos:



Test Requirements and Results

1.3 Test Condition

Environment temperature: 14 °C; Relative humidity: 60 %RH; Atmospheric pressure: 101k Pa

1.4 Test Status

Connect the EUT to the power supply and start the test after running for 30 minutes.

1.5 Test Data

Test item information	Value						
Weighting	A-weighting						
Octave	One third octave						
Distance	1m						
Uncertainties $U_{rel} (k=2)$	0.7dB						
Inherent noise(dB(A))	16.2						
Load	Frequency(Hz)	Acoustic Noise(SPL)(dB(A))					
		Front	Left	Rear	Right	Bottom	Average
275kW	20	-21.6	-23.3	-20.4	-23	30.7	23.71
	25	-15.6	-18.3	-16	-17.9	34.1	27.11
	31.5	-10.7	-11.4	-10.2	-11.3	38.9	31.91
	40	-8.1	-6.2	-6.2	-7	40	33.01
	50	0.2	2.2	1.7	2.7	45.5	38.51
	63	9.6	7.4	10.3	7.7	47.4	40.41
	80	29.7	26.6	30.2	25.6	48.4	41.58
	100	9.4	13.2	13.8	12.4	50.9	43.91
	125	28.5	22.6	36	26.3	51.8	44.96
	160	23.2	21.9	27.9	21.4	51.6	44.64
	200	23.3	27.1	35	26.2	51	44.16
	250	31.3	35.6	43.5	36.9	50.2	44.38
	315	34.4	41.2	44.2	40.3	48.4	43.88
	400	40.2	44.1	47.1	43.7	46	44.79
	500	44.2	50.1	50	50.5	47.4	48.98
	630	58.5	61	60.4	55.7	58.7	59.22
	800	47.3	45.9	51.3	47	44.9	47.9
	1000	47.9	48.3	52.8	49.4	47.8	49.71
	1250	51.1	52	51.9	51	48.9	51.11
	1600	51.4	45.7	51.9	47.9	45.4	49.31
2000	55.1	48.4	55.5	51.6	47.6	52.79	
2500	53	47.9	53.4	49	49.1	51.08	
3150	52.8	50.6	54.6	52.7	50.2	52.48	
4000	53.3	53.4	54.2	51.9	49.5	52.74	

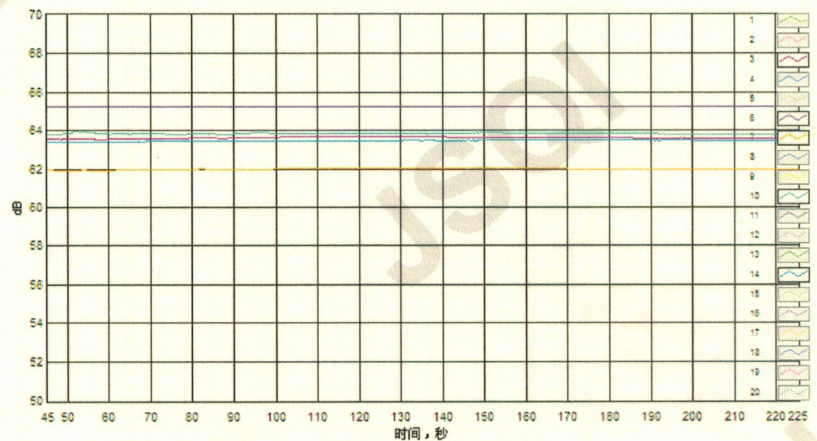
Test Requirements and Results

	5000	51.1	50.6	52.5	50.4	47.1	50.66
	6300	47.9	47.2	48.8	45.8	45.9	47.27
	8000	42.4	41.9	45.1	41.9	41.9	42.84
	10000	41.3	39.6	41.9	40	38.2	40.39
	12500	36.7	35.9	37.9	35.3	32.8	36.03
	16000	29.7	30.2	40.7	32.1	30.6	35.18
	20000	20.8	19.9	24.7	21	18.2	21.48
	Aggregate	63.6	63.7	65.3	62	63.8	63.8
Time domain curve of 275kW							
275kW	20	-20	-22.4	-20.1	-21.7	30.8	23.81
	25	-14	-17.6	-15.6	-16.7	34.4	27.41
	31.5	-9.5	-11.2	-9.9	-11.3	39.4	32.41
	40	-7.3	-5.7	-5.6	-6.6	40.4	33.41
	50	0.6	2.9	1.8	3.4	45.5	38.51
	63	9	7.4	10.3	7.7	47.5	40.51
	80	29.2	26.7	30.5	25.8	48.5	41.68
	100	9.6	13.2	13.8	12.3	51.2	44.21
	125	27.7	21.6	35.9	26.7	52.1	45.24
	160	23.3	22.1	27.8	21.6	52.1	45.14
	200	23.6	27.1	35	26.4	51.5	44.64
	250	31.9	35.7	43.6	37.4	50.5	44.65
	315	34.4	41.4	44.2	40.5	49	44.27
	400	40.3	44.2	47.2	43.7	46.5	44.99
	500	44.2	50.1	50	50.4	47.3	48.94
	630	58.1	60.7	60.4	55.6	58.3	58.98
	800	47.2	45.8	51.3	47	44.9	47.87
	1000	48	47.8	52.1	49.2	48	49.36
	1250	51	51.9	51.8	51	48.9	51.04

Test Requirements and Results

1600	51.5	45.7	51.9	48	44.9	49.32
2000	55	48.7	55.3	51.5	47.3	52.67
2500	52.9	47.6	53.4	48.9	49	50.99
3150	52.8	50.5	54.6	52.6	50	52.42
4000	53.2	53.5	54.1	51.9	49.3	52.69
5000	51.1	50.6	52.5	50.5	47	50.67
6300	47.8	47.2	48.8	45.8	45.8	47.24
8000	42.4	41.9	45.1	41.9	41.8	42.83
10000	41.2	39.6	41.9	40	38	40.34
12500	36.6	35.9	37.9	35.3	32.6	35.98
16000	29.6	31.1	42.7	33	36	37.29
20000	20.9	19.9	24.7	20.9	18	21.46
Aggregate	63.4	63.6	65.2	62	63.8	63.72

Time domain curve of 275kW



1.6 Test Result

No judgment.

Equipment List

No.	Instrument	Model No.	Serial No.	Valid Date	Used
1	Free Field Microphone	MP201+MA231	NTIe-511-020-04-C	2023-02-24	<input checked="" type="checkbox"/>
2	Free Field Microphone	MP201+MA231	NTIe-511-020-05-C	2023-02-24	<input checked="" type="checkbox"/>
3	Free Field Microphone	MP201+MA231	NTIe-511-020-06-C	2023-02-24	<input checked="" type="checkbox"/>
4	Free Field Microphone	MP201+MA231	NTIe-511-020-07-C	2023-02-24	<input checked="" type="checkbox"/>
5	Free Field Microphone	MP201+MA231	NTIe-511-020-08-C	2023-02-24	<input checked="" type="checkbox"/>
6	Acoustic Analyzer	PXI4498	NTIe-511-020-02-C	2023-03-11	<input checked="" type="checkbox"/>
7	Semi-anechoic Room	AN01	NTIe-511-076-00-C	2026-02-22	<input checked="" type="checkbox"/>
8	Acoustic Calibrator	BK 4231	NTIe-511-020-24-C	2023-03-11	<input checked="" type="checkbox"/>
9	Steel Tap	3m	NTIe-510-206-00-P	2023-03-11	<input checked="" type="checkbox"/>

Remark: stands for the equipments used in this test.

(End of Report)

简介

江苏省产品质量监督检验研究院是隶属于江苏省质量技术监督局的全额拨款公益性事业单位，是江苏省从事综合性、专业性产品质量监督检验的机构，于一九八二年二月经江苏省编制委员会批准成立。下设七个国家中心，分别是：

- **国家化妆品产品质量监督检验中心** 业务电话：025-84470308；传真：025-84470257；地址：南京市光华东街5号；邮编：210007
- **国家农药产品质量监督检验中心(南京)** 业务电话：025-84470312、84470252、84470324；传真：025-84470312；地址：南京市光华东街5号；邮编：210007
- **国家工程复合材料产品监督检验中心** 业务电话：冶金中心025-84470294、025-84470291/化建中心025-84470296、025-84470289；传真：冶金中心025-84470293 / 化建中心025-84470297；地址：南京市光华东街5号；邮编：210007
- **国家电线电缆产品质量监督检验中心(江苏)** 业务电话：0510-80713730(宜兴)0510-80713755(宜兴) / 0516-83641910(徐州)； 传真0510-80713799(南京) / 0516-85610125(徐州)；地址：宜兴市绿园路500号/徐州市新城区产业园区商聚路；邮编：214205(宜兴) / 221000(徐州)
- **国家食品包装产品质量监督检验中心** 业务电话：025-84470318；传真：025-84470263；地址：南京市光华东街5号；邮编：210007
- **国家信息网络产品质量监督检验中心(江苏)** 业务电话：0512-66591853；传真：0512-65252771；地址：苏州市吴中区吴中大道1368号吴中科技园B楼；邮编：215104

Profile

Jiangsu Product Quality Supervision and Inspection Institute (JPQSII), is specialized in product testing, quality certification, technical development and technical consultation, under the authorization from China General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and Jiangsu Quality and Technical Supervision Bureau. JPQSII now is consisted of 7 country-level product quality testing centers:

- National Quality Supervision & Testing Center for Cosmetics / National Quality Supervision & Testing Center for Pesticide (Nanjing) / National Quality Supervision & Testing Center for Engineering Composite Materials / National Quality Supervision & Testing Center for Food Packaging (Jiangsu)

Address: 5 Guanghua East Road, Nanjing; Vocational Tel: 025-84470235

- National Quality Supervision & Testing Center For Cables And Wires (JiangSu)

Address: 500 Luyuan Road, Yixing / 66 Hubei Road, Quanshan, Xuzhou; Vocational Tel: 0510-8071 3755 (Yi) / 0516-85610125 (Xu)

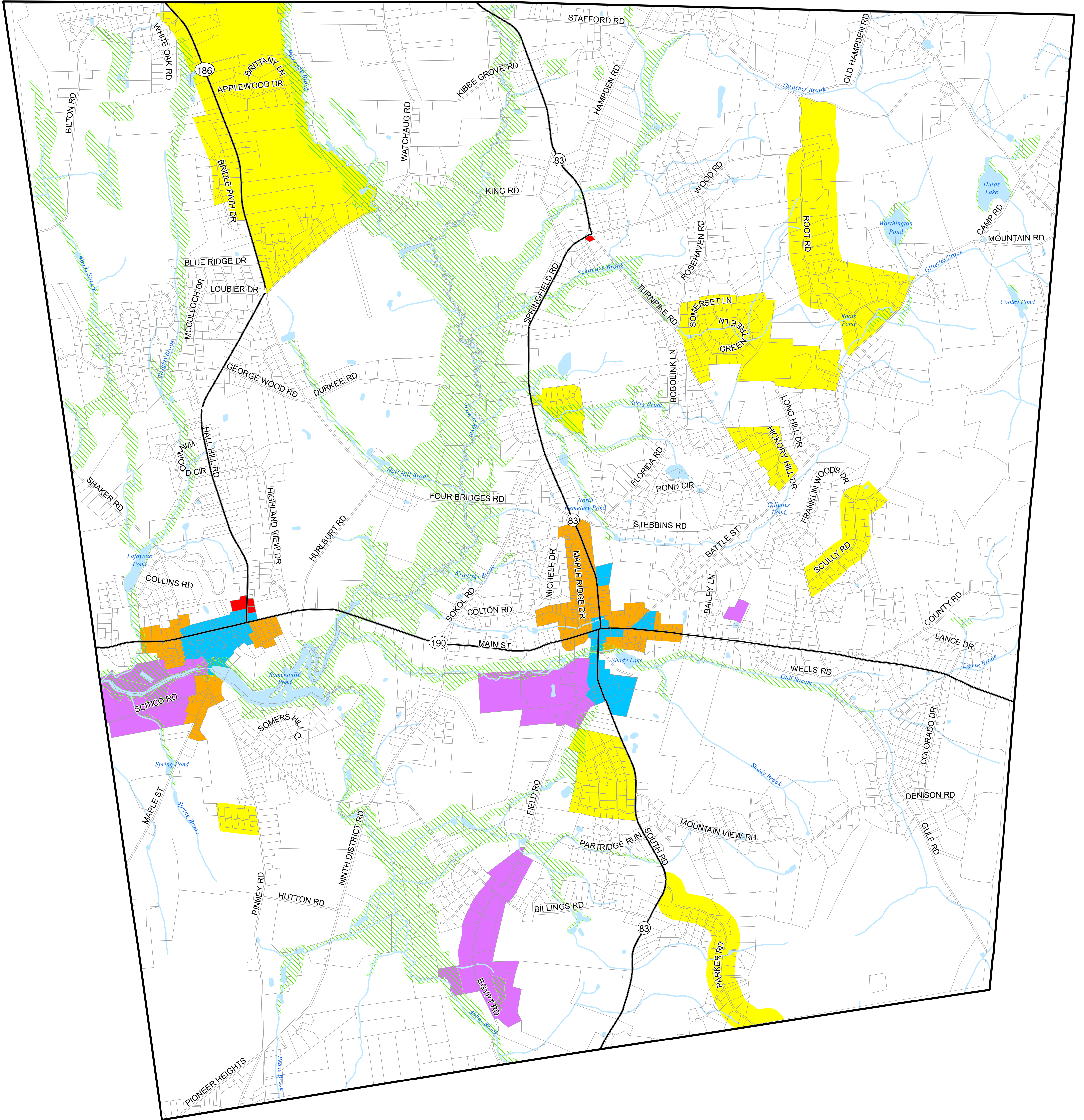
- National Quality Supervision & Testing Center for Information Network (Jiangsu)

Address: No.1368, Wuzhong Avenue, Suzhou; Vocational Tel: 0512-66591837



3) Town of Somers Zoning Map

Zoning Map Town of Somers



Residential

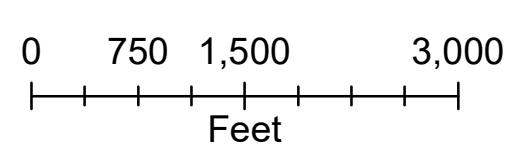
- Residential A
- Residential A-1
- Residential A-2

Business / Industrial

- Village Business (VB)
- Business (B)
- Industrial (I)

Flood Plain Overlay District

- Flood Plain Overlay District





4) Town of Somers Zoning Regulations -









<https://www.somersct.gov/download/Regulations%20and%20Ordinances/ZONING-REGULATIONS-Effec-05.01.2021.pdf>

ATTACHMENT 5
McClain Farm Trail Map

McCann Farm Trails and Whitaker Woods Trails

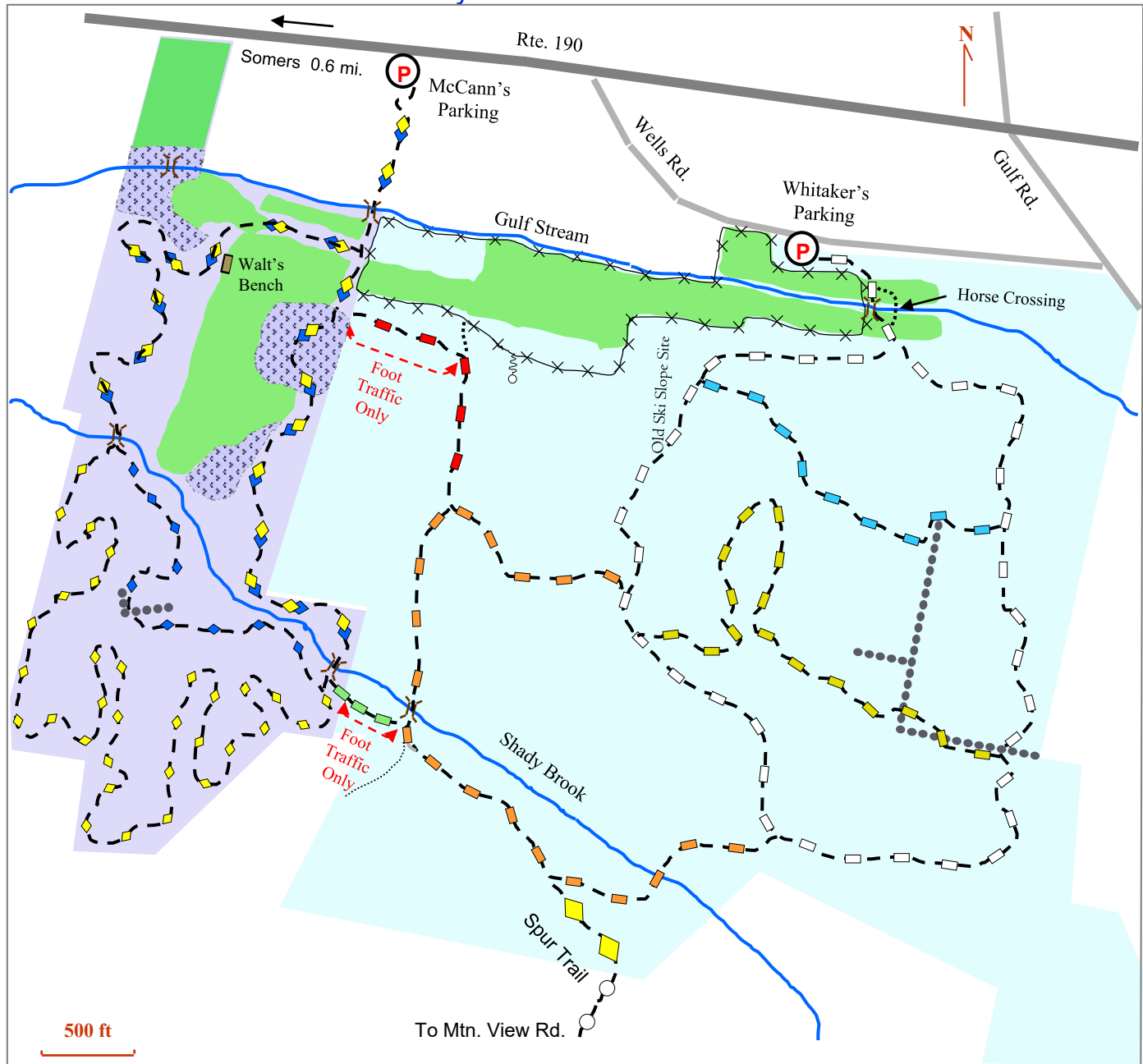
Built and Maintained by NCLT

The Trails

-  Jerry Stage Trail
-  Shady Brook Trail
-  Old Forest Loop
-  W – M Link
-  Pinecone Trail
-  Upper Shady Brook Trail
-  Underhill Trail
-  Overhill Trail

-  McCann Farm
-  Whitaker Woods
-  Fields & Pasture
-  Whit Davis Bird Sanctuary
-  Trail Bridge
-  Stone Wall
-  Spring
-  Pasture Fence

Horses are allowed on Whitaker trails except where noted. Horses are not allowed on McCann trails





McCann Family Farm & Whitaker Woods Trails

McCann Family Farm Length: 1.95 miles to 3.0 miles

Difficulty: Easy

Land Owner: Northern CT Land Trust

The popular beautiful, hilly, 84-acre McCann Family Farm stretches from near the center of Somers on Route 190 up the northwestern slopes of Soapstone Mountain. The entrance and parking area are located on the south side of Route 190 about 0.7 miles east of the light at Rt. 83 or 0.5 miles west of the light at Gulf Road. Both the parking area and the access trail leading to the preserve on the far side of Gulf Stream are on a right-of-way granted to the Northern Connecticut Land Trust.

Please respect private property by not wandering into the hay fields bordering the parking area and access trail. Dogs are welcome but must be on a leash at all times. No motorized vehicles or horses are allowed. The parking area is plowed following winter storms to allow access for passive winter recreation activities.

About 1/3 of the acreage on the property is used to produce hay, while the rest exhibits a wide variety of habitats including streams, vernal pools, wetlands, fallow fields, stands of early successional trees and shrubs, mixed forest, and a pine plantation - making it a delight for hiking and a valuable resource for teaching about natural history related subjects. More than 300 species of trees, flowers, ferns, and other plants have been identified thus far and more than 120 species of birds have been recorded.

Two marked trails are maintained as well as several unmarked paths. The 1.95 Shady Brook Trail (blue diamonds) stays in the northern 2/3 of the property, while the 3.0-mile Jerry Stage Trail (yellow diamonds) visits the southern boundary area. Both run together until reaching the north side of Shady Brook. The trails also connect to the Whitaker Woods trail system to the north and east. Visitors are welcome to walk along the edges of the hay fields but please refrain from crossing the fields which damages the hay crop.

Whitaker Woods

Length: A total of almost 5 miles of trails with opportunities for several loop hikes of various length and difficulty.

Difficulty: Varying from Easy to Moderate

Land Owner: Northern CT Land Trust

Whitaker Woods is a unique 266-acre property in the center of Somers that is pristinely maintained. The land is characterized by a variety of terrain with the network of trails taking you past stone walls, over brooks, through stands of mature white pine, and across open fields. **Motorized vehicles are not allowed.** Hikers are asked to keep dogs leashed and under control at all times. All trails except the Overhill Trail and Underhill Trail are also open to horses and riders. A total of almost five miles of trails have been built which create the opportunity for several loop hikes of various length and difficulty.

The main trail is the Old Forest Loop which starts and ends at the Wells Road parking area. The name of this trail reflects the fact that over time this woodland will be allowed to mature to old growth forest with no cutting except that required to keep the trails maintained and safe. This 1.8-mile long trail follows old woods roads for almost its entire length with steady climbs to its highest elevation at the top of the loop whether walked clockwise or counterclockwise. The trail is open to horses with a separate stream crossing across Gulf Stream to avoid the pedestrian bridge. All the other trails are accessed from the Old Forest Loop, branching off at various points. Two trails also connect to trails at the adjacent McCann Family Farm also protected by the Northern Connecticut Land Trust.

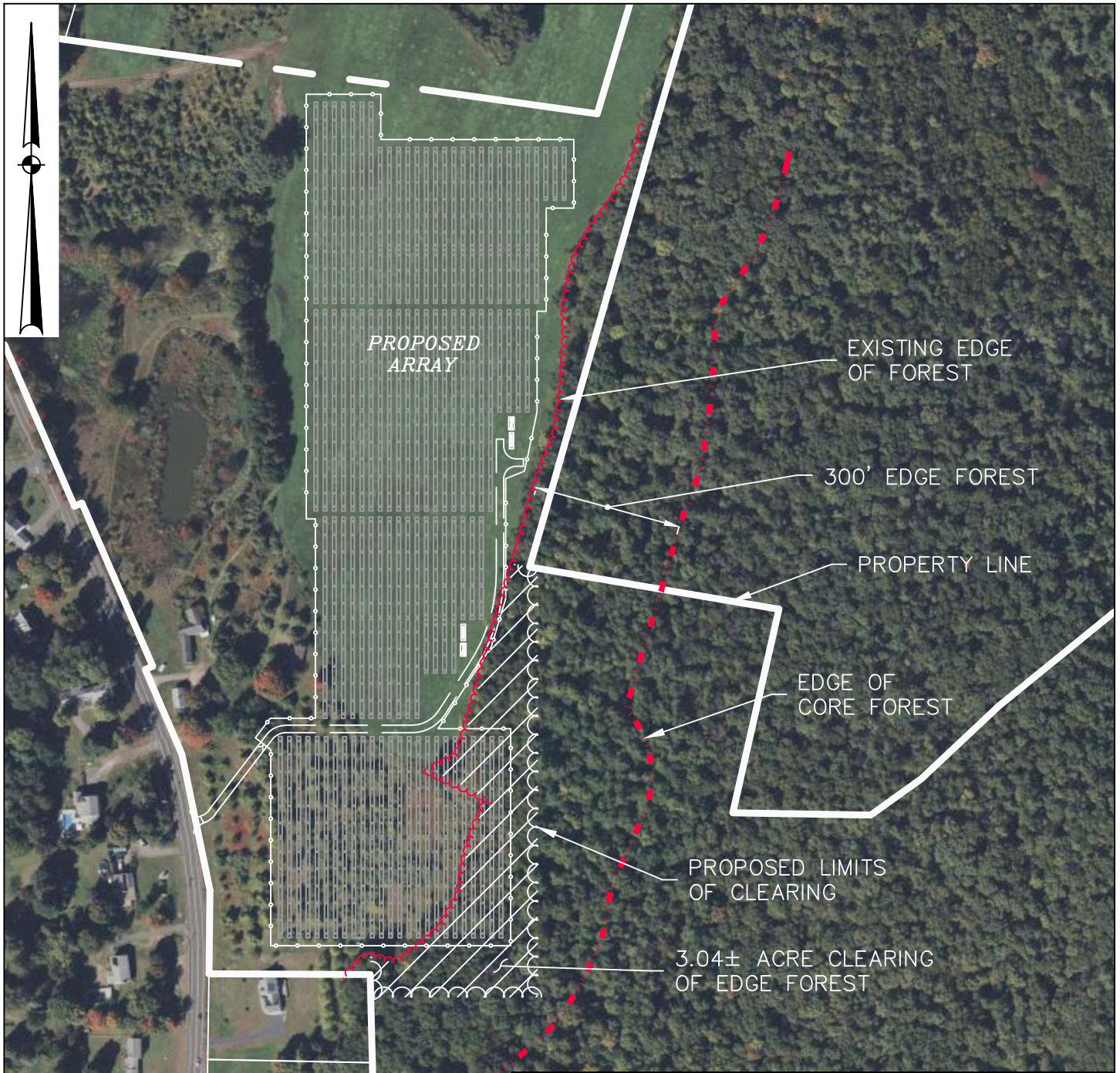
The Underhill Trail provides the opportunity for a shorter one-mile loop although the trail is rougher under foot since it does not follow a pre-existing woods road. Highlights of this trail are a section along a beautiful old stone wall and another section along the base of some large ledges (hence the name Underhill). Deer are often spotted in this section of Whitakers.

The Overhill Trail creates a slightly longer loop than staying on the Old Forest Loop. Like the Underhill Trail it passes along an impressive section of stone wall at its eastern end. It then follows a broad ridge which includes the highest elevation in Whitaker Woods then descends along the top of the same ledges seen from the Underhill Trail. At a couple of look-outs you can see the Underhill Trail in the trees below you. It then circles around and eventually descends a small ravine before rejoining the Old Forest Loop.

The longest loop in Whitaker Woods at 2.5-miles combines the Upper Shady Brook Trail with the Old Forest Loop. The Upper Shady Brook Trail starts just past the long climb on the western side of the Old Forest Loop and passes through some beautiful stands of white pine before reaching a bridge over Shady Brook. The bridge is interesting since it pre-dates the trail by several years. It was built as an Eagle Scout project in anticipation of NCLT creating the trail. About half way around the upper Shady Brook Trail the short Spur Trail climbs a hill to the west leaving NCLT property and connecting to the Forest View Trail which continues to Mountain View Road. The Upper Shady Brook Trail again crosses Shady Brook on stepping stones before eventually rejoining the Old Forest Loop.

The Somers Recreation Department would like to thank the dedicated organizations and passionate volunteers including the Northern Connecticut Land Trust and Somers Open Space & Trails Committee for their tremendous efforts in the preservation and maintenance of the trail networks outlined within.

ATTACHMENT 6
Core Forest Identification Map



CORE FOREST

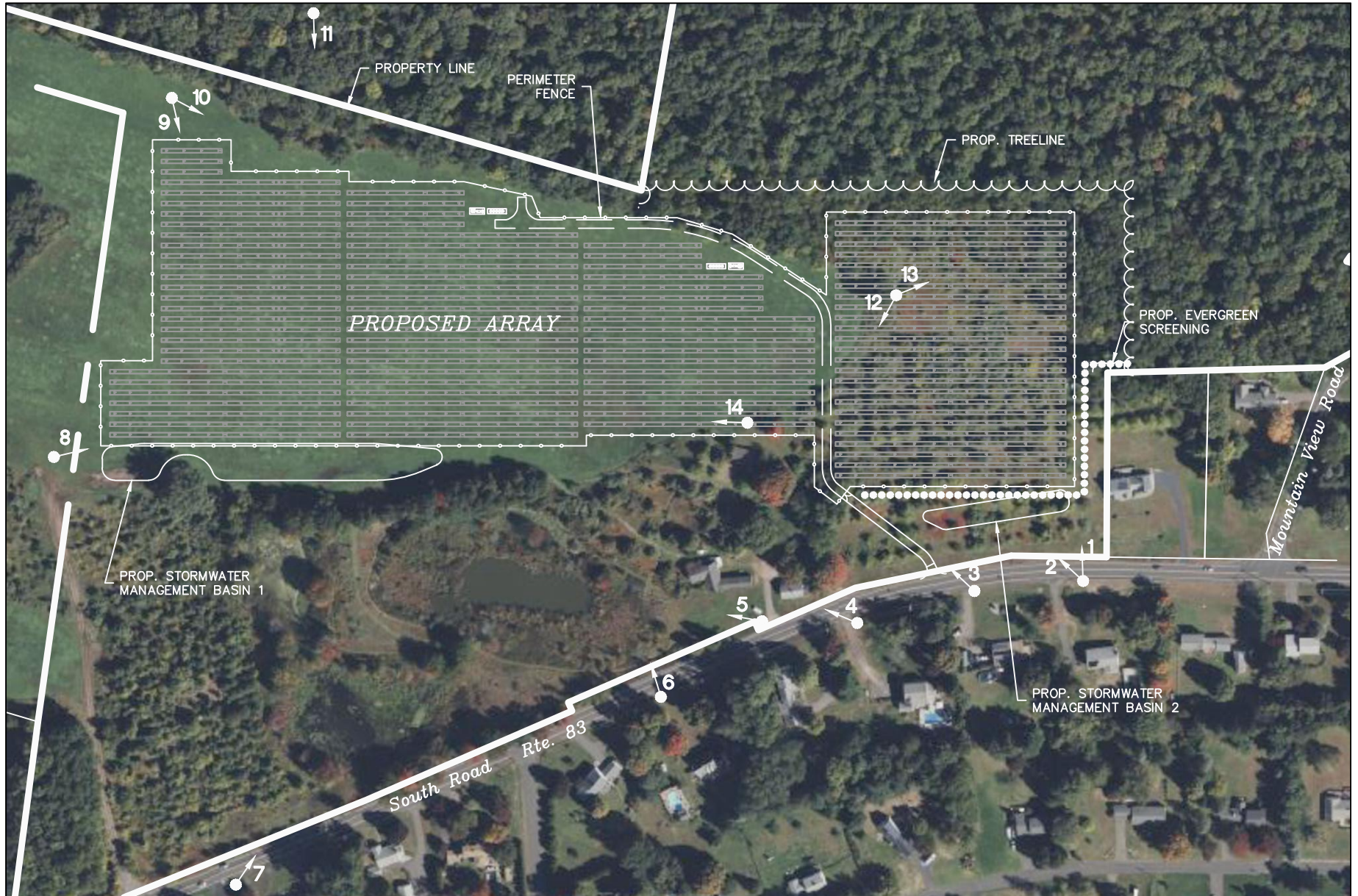
Somers Solar
Louth Callan Renewables, LLC
 159 South Road
 Somers, Connecticut



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DATE	12-13-2023
SCALE	1"=300'
JOB NUMBER	2023-001
SHEET	ATTACHMENT 6

ATTACHMENT 7
Photo Exhibit



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PHOTO EXHIBIT KEY MAP

Somers Solar
Louth Callan Renewables, LLC
 159 South Road
 Somers, Connecticut

DATE
 12-14-2023

SCALE
 1"=250'

JOB NUMBER
 2023-001

SHEET
 ATTACHMENT 7



PHOTO 1 – NEAREST RESIDENCE FROM SOUTH ROAD



LOCATION OF PROPOSED
STORMWATER
MANAGEMENT BASIN 2

PHOTO 2 – VIEW OF PROPOSED STORMWATER MANAGEMENT BASIN 2 AREA FROM SOUTH ROAD



PHOTO 3 – VIEW OF PROPOSED ACCESS DRIVE LOCATION FROM SOUTH ROAD



PHOTO 4 – VIEW OF EXISTING ON-SITE RESIDENCE & OUTBUILDINGS TO REMAIN FROM SOUTH ROAD



EXISTING ON-SITE
FARM POND AND
SURROUNDING
WETLAND

PHOTO 5 – VIEW OF ONSITE WETLAND FROM EDGE OF SOUTH ROAD



EXISTING ON-SITE
WETLAND

PROPOSED ARRAY
LOCATION IN FIELD AREA
TO REAR OF PROPERTY

EXISTING BARN AT
159 SOUTH ROAD TO
REMAIN

PHOTO 6 – VIEW OF PROJECT SITE OVER WETLAND FROM SOUTH ROAD



PHOTO 7 – VIEW OF PROJECT SITE OVER WETLAND FROM SOUTH ROAD

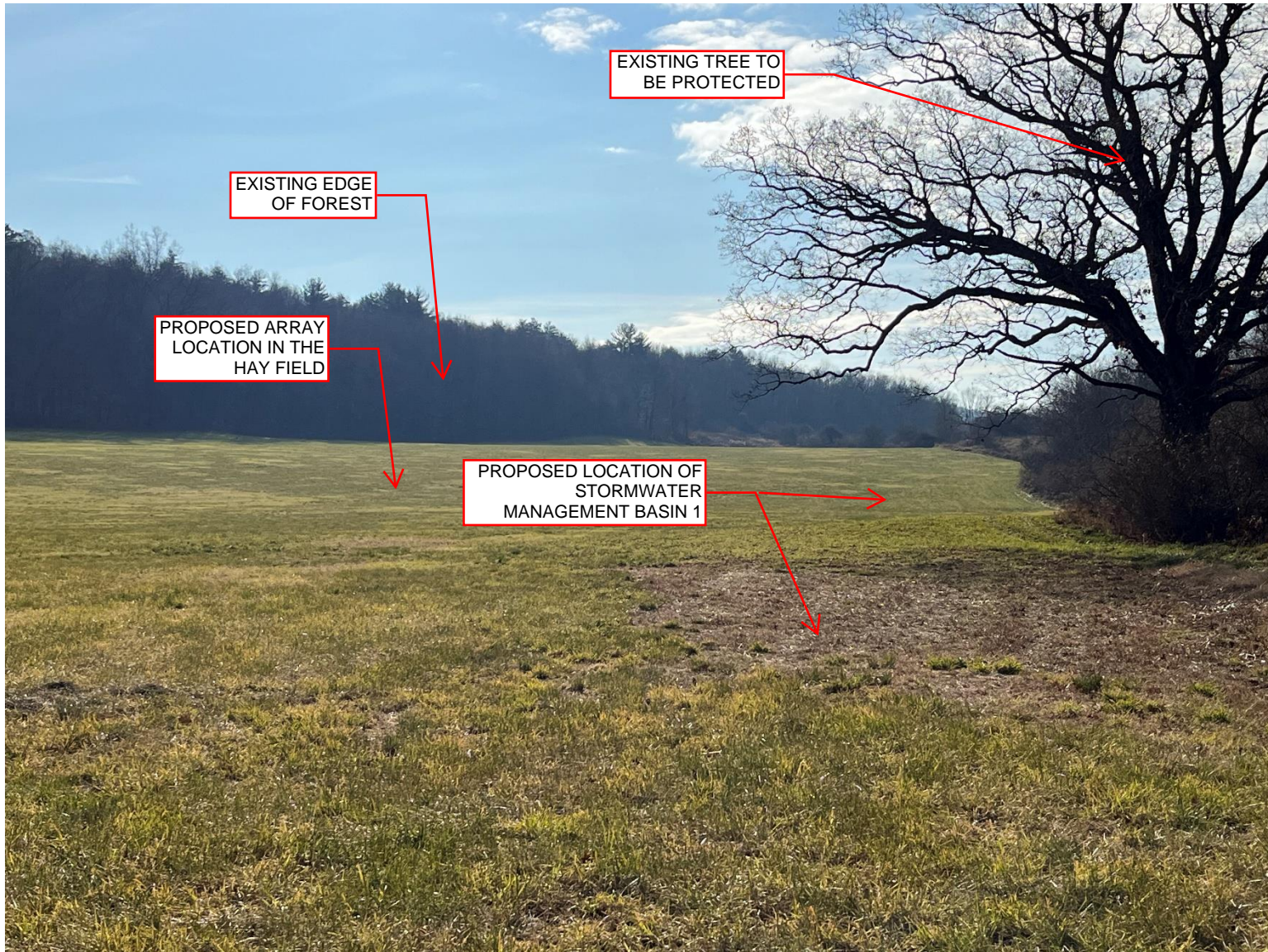


PHOTO 8 – VIEW LOOKING SOUTH FROM NORTHWEST CORNER OF PROJECT SITE

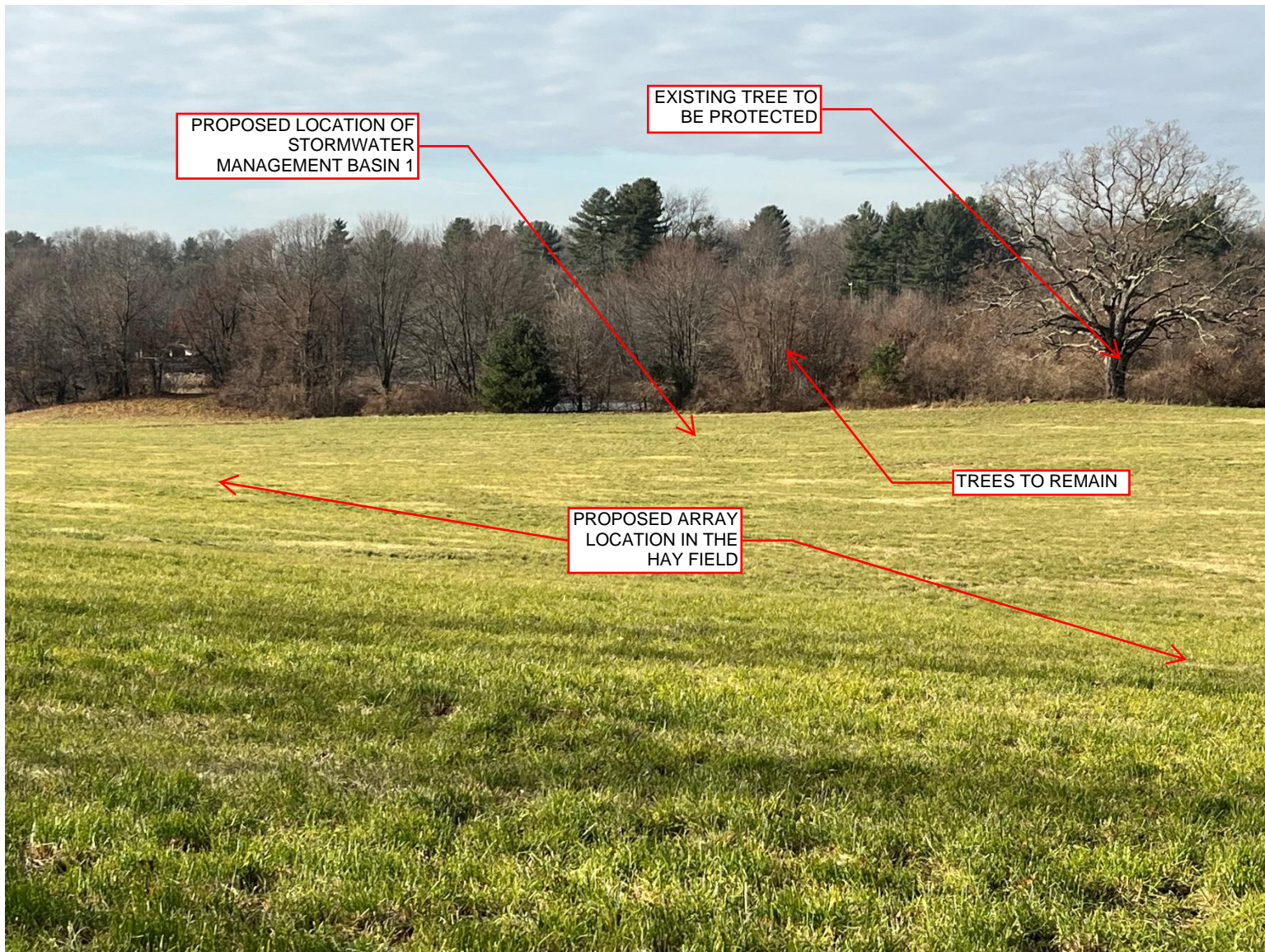


PHOTO 9 – VIEW LOOKING WEST TOWARD SOUTH ROAD FROM NORTHEAST CORNER OF PROJECT SITE



PHOTO 10 – VIEW LOOKING SOUTH FROM NORTHEAST CORNER OF PROJECT SITE



PHOTO 11 – VIEW OF PROJECT SITE THROUGH THE WOODS FROM THE WALKING TRAIL ON ADJACENT LAND TRUST PROPERTY

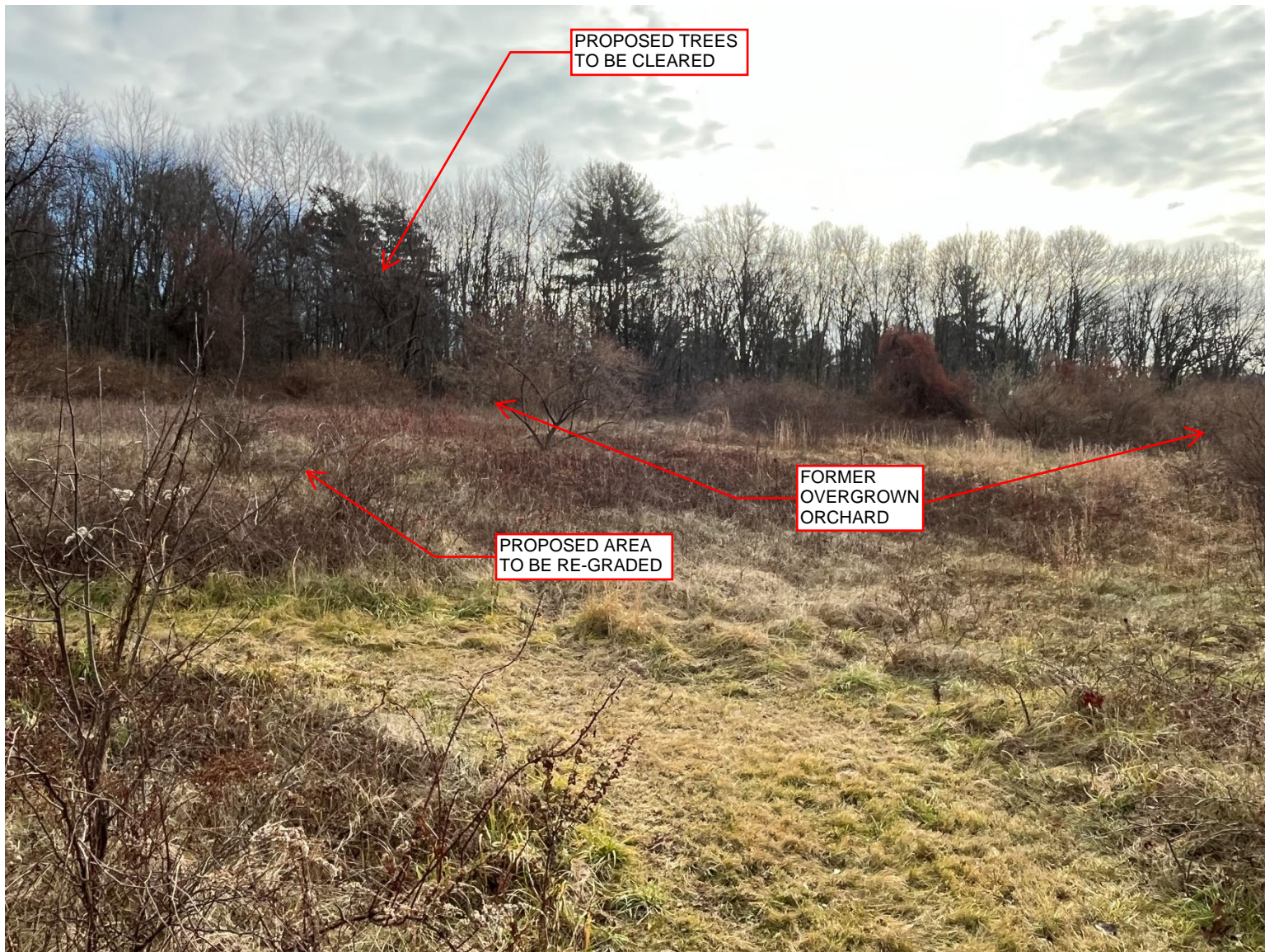
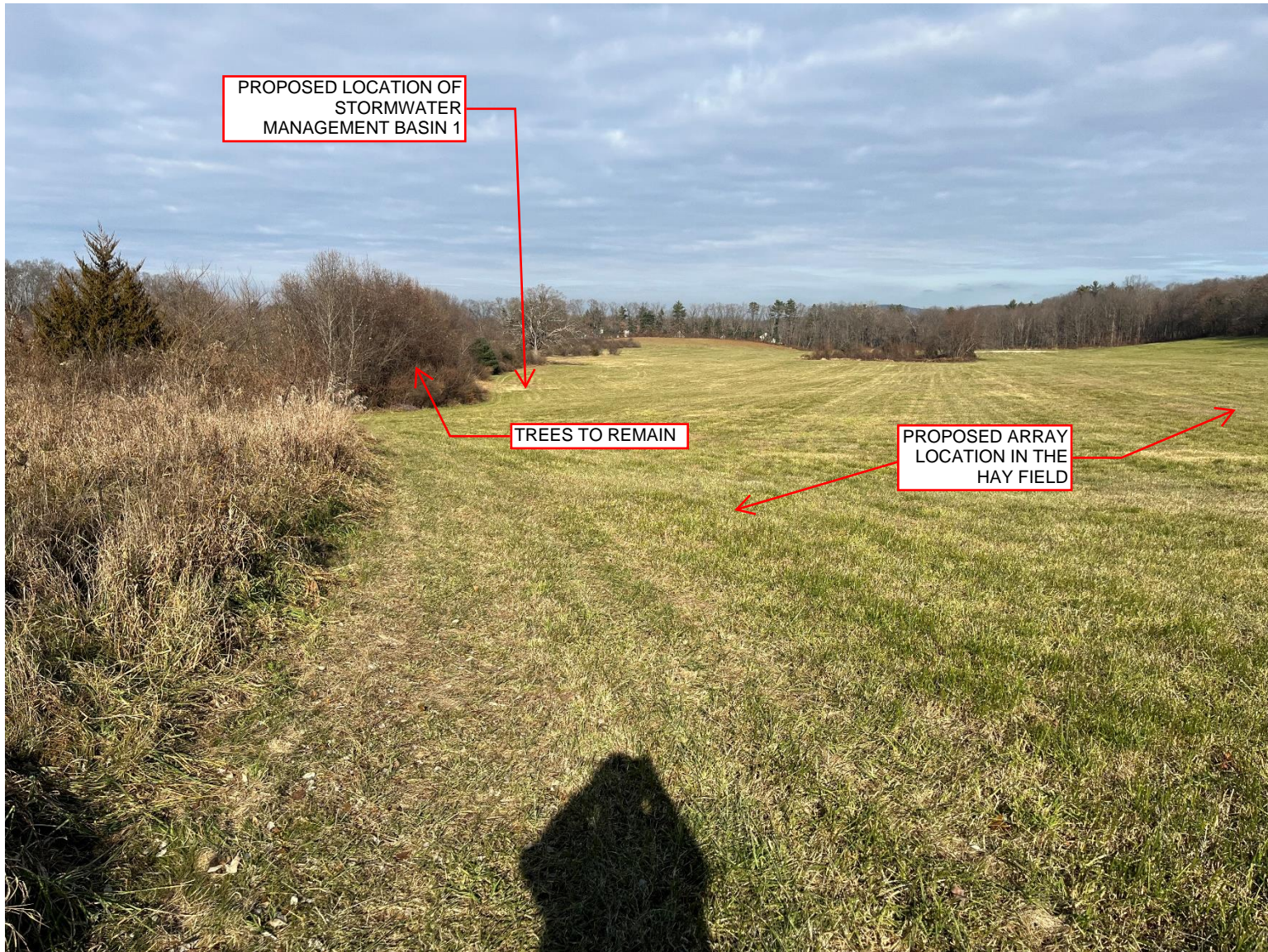


PHOTO 12 – VIEW OF SOUTHEAST CORNER OF PROJECT SITE WHERE TREE CLEARING AND RE-GRADING SLOPES IS PROPOSED



PHOTO 13 – VIEW LOOKING WEST TOWARD SOUTH ROAD



PROPOSED LOCATION OF
STORMWATER
MANAGEMENT BASIN 1

TREES TO REMAIN

PROPOSED ARRAY
LOCATION IN THE
HAY FIELD

PHOTO 14 – VIEW OF PROJECT SITE LOOKING NORTH

ATTACHMENT 8
Spill Response Plan

Spill Response and Control Plan

The purpose of this section is to define practices and procedures for the prevention, containment and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material managed as a result of the remedial project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

Prevention

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.
- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site: oil sorbent booms, rolls and pillows, universal towels and sheets and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container shall be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

Mobile equipment shall have drip protection (e.g., drip pan, absorbent pad / diaper, poly sheeting, etc.) provided beneath the equipment at all times when the equipment is parked. Mobile equipment shall have spill kits, absorbent pads / diapers, or similar materials on or inside the equipment at all times.

Louth Callan Renewables, LLC shall train personnel assigned to the Project on spill prevention requirements, location and use of spill kits and containment measures, reporting expectations for leaks, spills, and chemical releases, and maintenance of

additional environmental protection measures (e.g., silt fencing, berms, catch basins, and storm drain protection).

Portable equipment (e.g., lights plants, generators, welding machines, and air compressors) shall have drip protection and containment provided at all times beneath the equipment. Stored equipment, tanks, and containers with hazardous chemicals or petroleum products shall have a spill containment system in place to prevent any spilled or leaked fluid from reaching storm drainage, runoff, or water bodies.

All containments shall be evaluated for evidence of product (i.e., sheen) prior to being drained or emptied of rain water. Louth Callan Renewables, LLC shall notify the Owner's environmental specialist or designated person prior to emptying or draining containments.

Reporting

All spills will be reported immediately to appropriate field and office management personnel. The sequence of all spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or Site Designated Site Safety Representative.
- The Project Superintendent or Designated Site Safety Representative will immediately notify the Client Representative regardless of the size of the spill.
- Louth Callan Renewables, LLC, and the Client Representative will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- The Client Representative will have primary responsibility for notifying the regulatory agencies. Louth Callan Renewables, LLC will have follow-up responsibility to verify that the notification is made in a timely manner.
- If a reportable spill occurs and the COR cannot be immediately reached, Louth Callan Renewables, LLC will have primary responsibility to report the spill to the regulators within two hours of the incident and a spill number obtained).
- A full list of emergency contacts and telephone numbers is included in this plan. This list includes Louth Callan Renewables, LLC personnel as well as federal, state and local authorities. This list will be posted in all trailers on-site.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Client Representative within 24 hours of the incident.

Confinement and Containment

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The Designated Site Safety Representative will determine the level of protection required for response

activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking, and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision should be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, shall be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, Hypalon) should be implemented.

Cleanup

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment if feasible. Supervisory personnel will determine the appropriate cleanup methods. The Site Designated Site Safety Representative will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area and sampled and analyzed for waste characterization and disposal.
- Once containerized, Louth Callan Renewables, LLC will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles and manifests will be provided to the Construction Representative for review. The generator shall review and sign off on disposal documentation for both hazardous and non-hazardous materials.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-remedial sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved Site Safety and Health Plan.

Louth Callan Renewables, LLC is responsible for the cleanup and proper handling, collection, containerizing, and removal of regulated wastes, as defined by the EPA



and state or local regulations.

Louth Callan Renewables, LLC shall handle, store, and manage all regulated wastes in accordance with federal, state, and local laws and regulations and the Owner's requirements, which may vary depending on the state, county, local municipality, and Owner's facility. Regulated waste, including to but not limited to, hazardous waste, used oil, oily debris, universal waste, and non-hazardous waste shall be disposed by the responsible party as stated in the terms and conditions of the contract. Louth Callan Renewables, LLC shall use only Owner-approved vendors and landfills for the disposal of regulated wastes, including to but not limited to, used oil, oily debris, universal waste, and non-hazardous waste.

ATTACHMENT 9
Operation & Maintenance Plan



OPERATIONS AND MAINTENANCE MANUAL

SOMERS SOLAR FACILITY

Operations and Maintenance Manual

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INTRODUCTION

This manual describes the operation and maintenance of the Somers Solar photovoltaic (PV) facility located at 159 South Road, Somers, CT 06071.

This is a 4,790.50 kWDC / 3,850.00 kWAC project. The array has been designed as follows. Please note that the site “as built” may vary from the initial design below.

Equipment	Model
Modules (solarpanels)	VSUN, VSUN550-144BMH-DG550W panels or equivalent
Transformers	Eaton or equivalent
Solar Inverters	Chint Power, CPS SCH275KTL-DO/US-800
Racking	Nextracker

The solar PV facility is comprised of PV modules, associated wiring components, and string inverters. During operation, the DC power produced by the solar array is converted to three-phase AC power by the inverters. The inverters are connected to a step up transformer, which converts the voltage to the distribution line voltage. The power passes through a series of customer and utility owned poles before being injected into the grid.

In the event of a power failure, the facility will automatically shut down when a loss of AC power occurs per UL 1741 and IEEE 1547 to protect utility personnel from injury while repairing the utility system.

This manual provides a description of the facility, procedures for basic operations, maintenance and troubleshooting of the system and important safety information.

RESPONSIBLE PARTIES

Land Owner:

Dianne Lenti
41 Haystack Road
Manchester, CT 06040
Tel:
Email:

Nancy Edgar
11 Mountain View Road
Somers, CT 06071
Tel:
Email:

Site Operator (Lessee):

Santa Fuel, Inc
154 Admiral S, Bridgeport, CT 06605
Tel: (203) 367-3661
Email:

A Ground Lease Agreement has been executed between the Landowner (Lessor) and Santa Fuel, Inc. (Lessee/Site Operator).

Santa Fuel, Inc. is the operator of the solar project at the site, and is the responsible party for the following solar operations and maintenance activities on the Site:

- Grounds maintenance and maintenance of vegetation within the limits of the leased area, which shall include all solar generation equipment and a buffer surrounding such equipment, to be determined based on topography and site conditions.
- Stormwater management basin and stormwater controls (if any) within the limits of the leased area
- Access ways within the leased area

USE OF THIS DOCUMENT

This document packet is provided for informational purposes only. No one but the Operator and its Agents should attempt to operate any equipment on site.

This document is not intended to provide comprehensive site safety instructions, nor detailed operational guidance.

SITE SAFETY INFORMATION

FOR SITE EMERGENCIES

- For any life or property-threatening emergencies, **please dial 911**
- To report site issues, or speak to a Santa Fuel, Inc. representative, please contact **(203) 367-3661**
- Santa Fuel, Inc. welcomes the opportunity to train Town safety officials and operations staff on emergency procedures concerning the installation and operation of the solarsystem. Shortly after system start up and commissioning and in coordination with Town personnel, Santa Fuel, Inc. can provide on-site training to applicable personnel on emergency operations and maintenance of the system and in all aspects concerning safety precautions, considering the high voltages and currents within the array structure and power equipment. Santa Fuel, Inc. can also provide a short training course on the web-based Data Acquisition System for data monitoring.

EMERGENCY PV SHUTDOWN PROCEDURE

The following steps are required to shut the system down in an emergency:

- 1 Turn the AC Disconnect Switch to the "OFF" position.
- 2 Turn the DC Disconnect Switch to the "OFF" position.

These steps will power off the inverters; however, AC power from the grid and DC power from the array will still be present in the inverter wire termination section.

The next steps will disconnect power from the array and the utility transformer to the inverters:

- 1 Open DC PV array disconnect switches located on the inverter pad.
- 2 Open the main overhead disconnect switch or disconnect the individual inverter circuit breakers located inside the switchboards within the site.

Please refer to the as-built drawings or prominently displayed signage for switch location.

IMPORTANT NOTES:

WHILE THE ABOVE STEPS ISOLATE THE PV ARRAY CIRCUITS FROM THE INVERTERS, ALL CIRCUITS BETWEEN THE PV MODULES AND THE DISCONNECT SWITCHES WILL BE ENERGIZED DURING DAYLIGHT HOURS. HIGH VOLTAGE WILL BE PRESENT EVEN AT LOW LEVELS OF SUNLIGHT.

IT IS IMPERATIVE TO FOLLOW SAFE WORK PRACTICES AND USE PROPER SAFETY EQUIPMENT DURING ANY EMERGENCY OPERATIONS, WHICH INVOLVE ANY PORTION OF THE PV ARRAY.

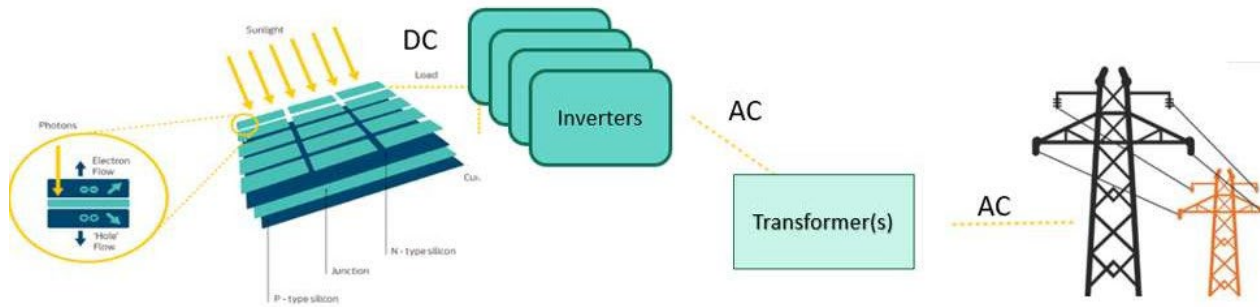
GENERAL PV SAFETY PRECAUTIONS

The system has been designed for safe and reliable operation. However, it is critically important that any personnel who operate or maintain the system observe the proper safety precautions. Listed below are some of the most critical safety considerations:

- 1 ONLY LICENSED, QUALIFIED, EXPERIENCED AND TRAINED PERSONNEL SHOULD PERFORM REPAIR WORK ON ANY ELECTRICAL COMPONENTS OF THE SYSTEMS.
- 2 DANGEROUS VOLTAGE LEVELS ARE PRESENT IN EACH SYSTEM – VOLTAGES UP TO 1,000 VOLTS DIRECT CURRENT (DC) AND 23,000 VOLTS AC CAN BE FOUND UNDER PARTICULAR OPERATING CONDITIONS. IT SHOULD BE NOTED THAT HIGH VOLTAGE SYSTEMS REQUIRE SPECIAL SAFETY PRECAUTIONS DURING MAINTENANCE OR REPAIR OPERATIONS.
- 3 PV MODULES PRODUCE VOLTAGE WHENEVER THEY ARE EXPOSED TO SUNLIGHT. AT ANY TIME DURING DAYLIGHT HOURS, (INCLUDING MINIMAL SUNLIGHT CONDITIONS) THERE IS AN ELECTRICAL SHOCK HAZARD IF ANY PERSONNEL SHOULD CONTACT EXPOSED PV ARRAY ELECTRICAL CIRCUIT COMPONENTS.
- 4 BROKEN OR CRACKED PV MODULE GLASS CAN INCREASE RISK OF SHOCK HAZARD, ESPECIALLY WHEN WET. IMMEDIATELY CONTACT QUALIFIED PERSONNEL FOR REPLACEMENT SERVICES IF ANY BROKEN PV MODULE GLASS IS NOTICED.

SYSTEM DESCRIPTION

Solar sites are remarkably simple, consisting of a handful of major equipment types.



PV ARRAY

The ground-mount photovoltaic arrays consist of PV modules, which convert sunlight directly into electricity for utilization by a load such as a utility interconnected inverter. Each module is a sealed, solid-state device with an expected performance life well in excess of 25 years.

Electrically, the PV modules are wired into groups, which are referred to as strings or source circuits. Each source circuit is comprised of individual PV modules wired in a series configuration. Individual source circuits are then grouped together in combiner boxes forming sub-arrays.

For the PV modules to produce their full electrical output, they must be clean and free of shade. Shadows cast by nearby objects such as antennas, air conditioning equipment, trees, overhead wires, etc. will significantly reduce a module's current and voltage output. Because each module is electrically interconnected with other modules, reducing the output of a single module effectively reduces the energy production for the entire source circuit.

The solar modules are mounted using a rack mounting system, with a steel frame to secure the solar array at a uniform tilt angle to minimize shading, while optimizing use of array area.

INVERTERS

The inverters act as a fully automatic power-conditioning interface between the PV array and the utility system. The inverter will utilize solid-state power and control components to maximize power production from the PV array while meeting power quality and safety standards set forth by utilities under Underwriters Laboratories Safety Standards.

An LED display associated with the Ground Fault Detection and Interrupt Circuit (GFDI) on the face of the inverter will indicate the operating status of the unit along with other pertinent data. Please refer to the Inverter O&M manual for more details on the design and operation of the inverter.

To operate efficiently, the inverter circuit components must be kept free of excessive dust and dirt. In addition, the cooling fans and the blower impellers must be kept clean for efficient air movement. Dirt accumulating on circuit boards and electrical equipment leads to higher component operating temperatures and shorter life.

TRANSFORMERS AND ELECTRICAL SYSTEM

Transformers regulate and condition power prior to injection to the grid, and they are often custom-made to meet the specialized electrical requirements of both the array and the grid.

The system electrical circuitry transfers electrical energy from the PV arrays to the inverters and then from the inverters to the transformer and finally, to the point of utility interconnection. The components utilized in the system design are standard electrical components and can be serviced by any qualified electrical contractor who is thoroughly familiar with photovoltaic power systems.

DATA ACQUISITION SYSTEM

This Photovoltaic power system is equipped with a Data Acquisition System (DAS) manufactured by Also Energy (The global leader in Energy DAS) to monitor the energy production of the system.

The DAS consists of an environmental weather monitoring system, and various energy measurement components, which are both connected to an Internet Broadcast Device. The central DAS components and environmental components are located together within the site.

An environmental instrument package measures solar insolation, wind speed, and ambient temperature while the energy monitoring system measures power and the electrical energy produced by the system.

Information gathered by the DAS is broadcast to a web site for processing and monitoring purposes. This service not only gathers energy production data, but also issues alerts to system administrators when the system's projected performance falls below expected values.

In some cases the DAS can be configured to allow remote site diagnostics and operational control. Please contact the Site Operator for additional information.

SYSTEM COMPONENT SAFETY

PV ARRAYS– REPAIR BY SITE OPERATOR ONLY

The solid-state nature of the PV array greatly reduces the amount of maintenance required when compared to traditional mechanical generating systems. Unless a portion of the PV array becomes physically damaged, the system will be safe and reliable for its service life. In the event that repair or maintenance work must be undertaken, please be aware of the following precautions:

- Only qualified personnel should be allowed access to the internal or energized components of the PV array junction boxes, inverters, switchboards, transformers, disconnect switches or fieldwiring.
- The PV array will always be electrically energized during all daylight conditions; so proper training, experience and precautions are required to ensure personnel safety.
- Before attempting any maintenance or washing operations, carefully inspect the entire PV array for modules with broken glass. A qualified contractor must replace broken PV Modules before any array washing or other maintenance work is attempted.
- In order to disconnect the entire PV array from the inverters, secure the operating handles of all mounted PV Array disconnect switches in the "Off" position.
- To disconnect a single PV array source circuit from the inverter, secure the operating handle of its associated PV Array disconnect switch in the "Off" position.
- Verify that all components undergoing maintenance or repair are disconnected from the inverter before servicing.
- Do not remove any fuses, or disconnect any PV module wiring while the array is electrically connected to the inverter.
- Physical damage to components and hazardous conditions will result if any individual PV Array component is opened under load.
- Do not attempt to access the junction boxes on the back of the PV modules. There are no user serviceable components in the module junction boxes.
- Always follow safe work practices and use proper safety equipment during maintenance or repair operations on the PV array.

INVERTERS – REPAIR BY SITE OPERATOR ONLY

When compared to historical rotary inverter technology, the solid-state design utilized in the Inverters greatly reduces maintenance requirements while maximizing system-operating efficiency. Before

undertaking any routine maintenance or repair work, please read the Inverter manual and pay close attention to the following precautions:

- To shut down an inverter, turn the AC and DC Disconnect Switches, on the front of the inverter, to the "OFF" position. These switches can be used to shut down an inverter whenever there is a question regarding personal safety or the operation of either inverter.
- The appropriate AC breaker in the main switchboard for the respective inverter must be secured in the "OFF" position in order to ensure that the inverter is not energized by utility during routine maintenance operations.
- Only qualified, experienced and trained personnel should perform repairs on the electronic and electrically energized components inside the inverters.
- Because the interior of the inverter cabinet contains exposed high voltage components, the cabinet door should remain closed at all times. Qualified, maintenance or repair personnel should only open the cabinet to perform maintenance or service work after the inverter has been completely disconnected from all electrical energy sources and the capacitors have fully discharged.
- To reduce the risk of electric shock, do not perform any maintenance work other than that specified in the Inverter manual.
- Only SMA factory personnel or their designated agents should perform any service work on the inverter's power conditioning or control components.
- Do not open the inverter cabinet doors during wet or inclement weather conditions. Introducing rain or moisture into the cabinet interior could result in hazardous conditions or damage to electrical components. For further information on the inverter, please refer to the appropriate inverter manual.
- Be sure to follow safe work practices and use proper safety equipment during maintenance or repair operations on the inverters.

SYSTEM OPERATION – REPAIR BY SITE OPERATOR ONLY

During normal operation, the inverters will act as fully automatic power-conditioning devices. The inverter will start to process power whenever there is sufficient energy available from the PV array. During the generation process, the inverter will utilize peak power tracking technology to maximize the energy production from the array. This function is achieved by varying the peak voltage and current point on the power curve for the photovoltaic array as operating conditions vary throughout the day.

Under basic operation, the PV array generates direct current (DC) and supplies it to the inverter. The inverter processes and conditions the direct current obtained from the PV array into 800 volt three-phase alternating current (AC), which is then stepped up to 23,000 volts via the transformers to the utility voltage at the site. In addition, the inverter synchronizes the phase characteristics and frequency to match that of the utility system.

In the event that the quality of the utility power falls outside a set of pre-specified parameters, the inverter will automatically shut down in a fault mode. After stable utility power becomes available again, the inverters will automatically restart and continue to process power. In the total absence of utility power, the inverter will not operate.

Whenever the PV array produces insufficient energy to efficiently operate the inverter, the inverter will automatically go into a low power "sleep" mode. The inverter will then sample the PV array for available power and resume power processing functions when sufficient levels of electrical energy are once again available from the array.

The inverter will also shut down whenever an operating problem is detected with the PV array, utility power quality or an internal operating parameter. Under such conditions, a fault code will be displayed on the front user interface panel. The fault code can then be matched to a detailed list of fault codes found in the Inverter O&M manual.

ACTIVATING OR STARTING THE SYSTEM – BY SITE OPERATOR ONLY

Before attempting to operate the inverters, refer to the Inverter O&M manual for initial turn-on procedures. The O&M manual also contains a detailed list of inverter fault codes, safety procedures, and other pertinent information.

The following describes normal steps taken to turn the inverter on or off. Refer to the as-built drawings for identification of components.

The start-up operations listed below should be followed in the sequence listed (for each inverter):

- 1 Remove any lockout devices on the disconnect switches after confirming that any repairs or maintenance operations have been completed and that no personnel are still working on the system.
- 2 Make sure that the inverter cabinet doors and DC disconnect doors are all closed and locked.
- 3 Turn on the dedicated 3-phase (dedicated) circuit breaker on the electrical panel.
- 4 Verify the proper clockwise phase sequence at the "line" side terminals (top) of the AC disconnect. Do not turn on until clockwise phase sequence has been verified.
- 5 Turn on the Inverter's 3-phase AC disconnect.
- 6 Turn on the Inverter's DC disconnect.
- 7 Watch the LED indicators for initialization (green and red LEDs on), then slow blinking green LED followed by faster blinking green LED. Watch the LCD display for prompts and system status.
- 8 Listen for contactor clunk (inverter on-line).
- 9 Listen for slight 60Hz hum (transformer on-line).
- 10 Following the blinking green LED and high frequency switching sound you should see a solid green LED (inverter on-line and beginning to feed power into 3-phase circuit). This confirms that the inverter is operating normally. The LCD display will show the AC Power, Energy, current and voltage as well as DC voltage.
- 11 If the unit fails to power on, use the troubleshooting information provided in the user manual. If those steps do not resolve the problem, contact the Site Operator or Inverter Manufacturer.

MAINTENANCE

STORMWATER AND VEGETATIVE MAINTENANCE

We will comply with all state and local orders and conditions pertaining to stormwater management and site feature inspection. We use generally accepted maintenance standards for solar arrays, typically focused on guaranteeing insolation and the health of any landscaped plantings or features.

MAINTENANCE PRECAUTIONS

The Site Operator and its highly trained Agents are the only parties who should undertake any maintenance or repair to the system. Before doing so, Site Operator staff will follow the shutdown procedure described in the previous sections.

- 1 Review and understand all safety precautions and maintenance operations described in both this document and the Inverter Manual.
- 2 Only qualified individuals should perform or supervise any maintenance procedures.
- 3 Install appropriate lock out devices on all system disconnecting means to protect personnel performing maintenance operations on the system from electrical shock hazards.
- 4 Do not open the inverter cabinet door for any reason, only SMA personnel are permitted to perform maintenance or inspections.
- 5 Contact Site Operator if there are any questions regarding operation or maintenance procedure for the PV array.

Note: The PV array circuits, array combiner boxes, the array disconnect switches and all associated wiring will remain energized as long as there is sunlight. Hazardous DC voltage levels will be present in all these components even during very low daylight conditions.

DAILY AND PERIODIC REMOTE OPERATIONS AND MONITORING

The Operator’s Asset Management staff have the ability to monitor site equipment remotely, performing a suite of daily operational checks to verify site status and performance. In some cases, real time remote diagnostics allow O&M staff to analyze and correct common equipment issues through the same on-line interface. Comprehensive remote diagnostics and operations are new to solar, and have allowed Operators to perform deeper analysis and understand subtle performance issues without visiting the site.

On site cameras allow Asset Management staff to get a real time and historical view of site conditions, to assess vegetation, soiling, weather, and major equipment housings.

Web based performance-monitoring mini sites can be provided to municipalities interested in following solar performance in real time.

PV Array Monitoring Procedures

Description	Action
1. Daily and intraday review of site alerts and equipment notifications	Daily: Coordinate O&M team site visits as necessary, and insure that issues are corrected expeditiously
2. Review site video camera as necessary to establish real-time site conditions	Daily: Review
3. Verify inverter and meter performance to expected	Daily: Coordinate investigation of any unexplained variance to expected
4. Verify total site output to expected	Daily: Coordinate investigation of any variance to expected
5. Periodically analyze string, combiner, and inverter performance on a comparative basis, site-wide to identify underperformance related to blown fuses and other subtle performance issues	Periodically: Coordinate investigation of any variance to expected

PROCEDURES FOR ALL SITE VISITS

Remote monitoring and diagnostics do not displace on-site maintenance. The Operations and Maintenance staff will be on site periodically to investigate and correct issues. These visits are irregular but represent an opportunity to conduct a routine inspection and validate site conditions as thoroughly as possible. On average, Operations and Maintenance staff visit sites monthly to attend to on-site maintenance issues.

Description	Action
1. Validate integrity of fencing	Coordinate O&M team site visits as necessary, and assure that issues are corrected expeditiously
2. Evaluate general condition of vegetation, shading	Recommend maintenance
3. Verify the integrity of major drainage features/erosion/settling	Recommend maintenance/additional evaluation
4. Verify the integrity and check soil levels of visible panels	Recommend maintenance
5. Note obvious wire maintenance issues, if any	Recommend maintenance
6. Perform equipment-specific or site-specific checks as necessary, on both the PV array and the DSS	As required

ANNUAL MAINTENANCE PROCEDURES FOR THE PV ARRAY

At least once annually (more often if conditions warrant) Operations and Maintenance staff will conduct a thorough walk-through of the site, to perform preventative maintenance and diagnostics on all major equipment. This generally takes place in Spring.

Thermal imaging of major equipment, including a sample of panels, is conducted annually in addition to the below visual inspection. This data is collected and analyzed to uncover issues prior to equipment failure and/or degraded performance. Some array components may require more frequent cleaning depending on age and model; the elements below represent minimum annual activity.

Site inspection and video photography via drone is also performed on an annual or bi-annual basis.

Annual Maintenance Procedures

Components & Equipment	Description	Action
PV Modules	Check for dust & debris on module surface	Wash or wipe clean with water
	Check for physical damage on all PV modules	Replace damaged PV modules
	Check for loose or disconnected cable terminations between PV module wiring	Retighten or reconnect wiring
	Check cable condition	Replace worn cables if necessary
	Check for shading obstructions on all PV modules	Identify source and remove
	Check for fading/discoloration, burn marks, seal condition, frame damage or rust	Log and report conditions to Site Operator
PV Inverters	Check functionality – e.g. auto disconnect upon loss of grid power supply, error & ground fault LED indicators	Consult inverter manufacturer for repair or replacement parts
	Check ventilation condition	Clear dirt, dust or debris from ventilation system
	Check for abnormal operating temperature	Consult inverter manufacturer for repair or replacement parts
	Check for abnormal noises – i.e. irregular humming or rattling	Consult inverter manufacturer for repair
	Inspect inverter structure(s) and enclosure(s) (seals, rust, damage, door condition, switch/handle condition, locks)	Log and report conditions to Site Operator
Cables	Check for cable conditions – i.e. wear and tear	Replace worn cables if necessary
	Check cable terminals for burnt marks, hot spots or loose connections	Tighten connections or replace if necessary
Combiner Boxes	Check cable terminals – e.g. wear and tear, loose connections or burn marks	Tighten or replace if necessary
	Check for placards and signage	Replace if necessary
	Check for physical damage	Replace if necessary
	Check for blown fuses inside the Combiner Box	Replace blown fuses
	Check for water leaks inside the Combiner Box	Replace combiner box or repair to prevent future water leaks
Bonding & Grounding	Check grounding cable and bonding connection conditions	Replace worn cables if necessary
	Check the physical grounding/bonding connection	Retighten connection if necessary
	Check continuity of grounding and bonding conductors	Troubleshoot or replace if necessary
Disconnect Switches	Check functionality	Replace or repair as necessary
PV Module Racking System	Check for corrosion	Treat corroded areas or consult racking manufacturer/installer
	Check for damage to racking system	Replace or repair damaged parts
	Check for settlement	If settlement is detected within the solar array area it will be assessed in conjunction with the Owner, as applicable, and an

Components & Equipment	Description	Action
		appropriate response action will be selected
Pole Mounted Equipment	Check for damage or irregularities – e.g. damage from weather related incidents, blown fuses, lightning marks, etc.	Replace or repair damaged equipment
Transformers	<p>Operator will be responsible for attending the site to check the terminations, etc. for the main transformer</p> <p>Any alarms raised by the public or the DAS should be immediately forwarded directly to Site Operator for action</p> <p>Check fluid levels</p>	Log and report conditions to Site Operator
General/ Vegetation	<p>Check vegetation control to maintain optimal performance of PV system</p> <p>Check fence/gate security</p> <p>Check internal access-ways/signage integrity</p> <p>Check for erosion</p> <p>Check for settlement</p>	<p>Mowing of grassy areas as necessary to maintain solar generation efficiency.</p> <p>Pruning of trees/bushes on property, or overhanging property that cause shading of the PV panels or potential damage to fencing/equipment in compliance with any conditions of the land lease</p> <p>Site Operator to carry out repair/replacement of fence and security systems as appropriate, as well as general erosion control.</p>

SITE ACCESS

Sites are locked via metal chain threaded through the site gate, secured with a combination or key lock. In an emergency, bolt cutters can be used to gain access to the site. The site combination is changed from time to time.

Towns may prefer to have “daisy chain” or Knox Box access, where multi user access is preferred.

In a daisy chain scenario, the entrant need only know one of the combinations in order to gain access. Knox boxes, example pictured below, offer master key access to the site key.



LOCK-INS

Anyone operating in and around the solar site needs to be cognizant of lock-ins, and the danger they pose.

When maintenance staff enter the site they will leave the gate unlocked in the unlikely event that first responders and emergency vehicles need to respond to an accident quickly. For this reason, the site should not be locked if it appears to be unlocked.

Please contact Asset Management at Santa Fuel, Inc. at our toll-free number: **(203) 367-3661** before locking a gate that appears to have been left open. Santa Fuel, Inc. will verify that O&M staff are not inside before the gate should be secured.

Santa Fuel, Inc. will promptly investigate why the gate was left unlocked.

SITE SIGNAGE

Signage can include markings on particular pieces of equipment, exterior gates, or surrounding fences; NFPA/NEC rules dictate what markings are required on particular pieces of equipment.

Santa Fuels, Inc. tailors exterior signage to the preferences and the needs of local authorities.

Generally, Santa Fuels, Inc. requires OSHA compliant exterior signage that:

- Firmly discourages trespassing
- Advises “who to call” to report an emergency or issue
- Lets first responders know where critical site shutoff facilities are
- Provides QR code that links to an application that tracks site entry and exit

Finally, signage, unlike many other site features, is flexible: if preferences change, Santa Fuels, Inc. will work stakeholders to accommodate reasonable requests.



During construction, the contractor may be listed as primary contact



Typical Exterior Signage

Site disconnect map, telling emergency personnel how to shut down the site

General Trespassing and safety warning

Typical Transformer Signage/ NFPA



Site disconnect map

Typical Inverter Signage /NFPA



Check in and Check Out Policy

All site visitors are required to check in and check out via an on line application that tracks site entry and exit, and collects basic personal and site condition information.

COMMON MAINTENANCE PROCEDURES

The following section outlines basic maintenance procedures, for the reader's information. No procedure should be attempted by anyone except the Operator or its Agents.

PV MODULE REPLACEMENT PROCEDURE

WARNING: ONLY QUALIFIED PERSONNEL SHOULD WORK ON THIS SYSTEM. PHOTOVOLTAIC MODULES ARE ALWAYS ENERGIZED WHEN EXPOSED TO LIGHT.

Perform module replacement operations in the order described below:

- Refer to the string wiring diagram to locate which inverter and DC disconnect the module is associated with.
- Put in the OFF position and lock out all PV Array Disconnect (inverter DC disconnect and panelboard AC disconnect) switches associated with the inverter prior to starting replacement operation.
- Open all circuit fuses that the module is associated with.
- **WARNING:** Do not open fuses until the DC disconnects have been turned off. Pulling fuses under load is an unsafe practice and a fire hazard, doing so could cause damage to PV wire, fuse holder, and combiner box.
- Cover the module with a blank out mat with steel spring clamp.
- Use PV disconnect tool to disconnect positive and negative leads of the broken module.
- **WARNING:** Do not disconnect modules until the fuses have been pulled. Disconnecting modules under load is an unsafe practice and a fire hazard, doing so could cause damage to PV module, connector, and wire.
- Loosen the four 5/16" bolts that attach PV module to racking.
- Replace broken module with new module.
- Replace the four 5/16" bolts and torque to 12 ft-lbs.
- Check module leads for any damage, and then connect positive and negative leads.

- Replace tie wraps for wire management.
- Close all fuses that is associated with the module.

INVERTER IS NOT OPERATING

In the event that the inverter is not running as expected during daylight hours with a clear sky and strong sunlight, please check the following:

- 1 Contact the Site Operator.
- 2 Verify that the facility is receiving power from the utility connection and that an electrical outage has not occurred within the last 10 minutes.
- 3 Make sure that the inverter doors are closed and locked.

If the inverter does not begin countdown to operation after a 300 second delay once step three is complete, look for lockout devices on the disconnect switches listed below.

Important Note: The switches listed below may also be found unlocked in the "OFF" position for a specific reason. Do not close any switches without first verifying that no personnel or property are at risk if the switch is closed.

- 1 Utility AC Disconnect.
- 2 Inverter AC Disconnect.
- 3 Array Disconnects.

After establishing that it is safe to do so, close the switches in the following sequence:

- 1 Close the DC Disconnect switches.
- 2 Close the main disconnect switch and close the individual inverter specific breakers in the switchboard cabinets.
- 3 Close the DC PV array disconnect switches located on the switchboard pad.

If the inverter still does not operate after completing the sequence described above, then a fault condition likely exists. Please refer to the following section for recommendations on further actions.

INVERTER IS IN FAULT MODE

The inverters have a set of internally monitored operating conditions that must be met for safe and reliable operation. If any of these conditions is not met, the inverter shuts down and goes into what is known as a "Fault" mode. The inverter will remain in off in the Fault mode until the condition is corrected.

Many operating conditions may change temporarily during normal system operation. Temporary fault conditions such as momentary sags in utility line frequency or voltages are transient, so the inverter will automatically restart after the operating conditions return to normal.

If the fault condition is not temporary the inverter will remain out of operation until the fault condition is corrected. In the event that an inverter has been off for several hours with uninterrupted electric utility service and clear sunny skies, then a more prevalent type of fault condition is likely preventing the inverter from operating.

To identify the fault condition, please refer to the Inverter Installation and Operation manual for a description of how identify fault codes and how to do a soft restart as well as a hard restart of the inverter. The menu will indicate the present fault condition, which should recorded, be reported to facility operations manager for evaluation and correction.

LOW ENERGY PRODUCTION REPORTED BY THE DAS

Some common causes of system underperformance are:

- Heavy dirt, debris, dust accumulation, or shading on the PV array.
- Damaged PV modules.
- Compromised electrical system components such as damaged conduit or wiring.
- Open fuses in the PV array combiner boxes or open disconnect switches.

FAQs

What are the common site issues?

The operator should be contacted immediately if abnormalities are discovered on or around the site. The most common issues are weather related; with storm damage from trees the most common problem.

Contact Santa Fuels, Inc. at (203) 367-3661.

How are the sites managed?

Cameras allow remote staff to see the site for security purposes, as well as to confirm snow and other debris. Santa Fuel, Inc. monitors individual pieces of equipment to benchmark performances over time: in addition, some site functions are remotely controlled. Weather equipment tracks how strong the sun is at minute intervals: other tools track electrical generation down to the inverter and string level.

How do seasons and weather affect solar production?

Snow covered panels do not operate well. Snow typically slides off quickly. Although snow and ice reduce productivity in the short term, they provide a valuable “scouring” effect that removes grime and dust. High ambient temperatures reduce solar production; hot August days are less productive than cool May days, even with the same amount of Sun. When the utility loses power, solar arrays stop producing as a safety measure.

Appendix A

Emergency Response

DRAFT EMERGENCY RESPONSE PLAN

Somers Solar Project

Santa Fuels, Inc.

159 South Rd, Somers, CT 06071

In the case of an emergency, responders will access the array from the South Road entrance where there is a gated access point. One Knox box will be installed at the entrance gate to the solar array during construction to provide the Fire Department with access to the site. Electrical equipment and disconnects are located at the entry point to the solar array. Responders can readily access the electrical equipment. The location of the electrical equipment will be clearly marked on signage at the gates and the disconnect switches will be clearly labeled.

A numbering system will identify individual rows of the PV panels to assist emergency responders with finding a specific location in the event of an emergency. The row labeling will be finalized during the construction phase of the project. As-Built drawings depicting the row labeling will be provided to the Fire Department.

This emergency response plan will be filed with local emergency responders and updated as necessary. Emergency response information may also be posted on the access gates. Contact information is included below.

EMERGENCY CONTACT DETAILS

24-hour Emergency Contact:

Santa Fuel, Inc.
154 Admiral Street
Bridgeport, CT 06605
Tel: (203) 367-3661
Email:

Landowner Contact:

Nancy Edgar
11 Mountain View Road
Somers, CT 06071
Tel:
Email:

Dianne Lenti
41 Haystack Road
Manchester, CT 06040
Tel:
Email:

Somers Police Department: In an emergency dial 9-1-1

Connecticut State Police Department
451 Main St
Somers, Ct 06071
Tel: (860) 749-4955

Somers Fire Department: In an emergency dial 9-1-1

Somers Fire Department
400 Main Street
Somers, CT 06071
Tel: (860) 749-7626

EMERGENCY SHUTDOWN PROCEDURE

In an emergency, the ON/OFF switch on each inverter should be manually turned to the OFF position. This will internally shut off both the AC and DC switches inside the inverter. After the system has been turned off the DC Disconnect Switch should be turned off and a lock should be placed on it to keep it from being reenergized.

Now that the system is off, follow normal shut down procedures below to turn off remaining closed switches.

Note – Disconnecting the AC and DC switches will stop current flow and isolate the solar system from the utility distribution system, however DC wiring from the panels to the inverters remains potentially energized and hazardous.

Simple System Shutdown and Startup Procedures

Any work done on the solar electric system must be approved in writing by Santa Fuel, Inc. and performed by an authorized electrician. To work on the DC side of the solar system when the system is running properly or to reset the inverter, use the following steps to shut down and restart the system.

Inverter Shutdown

Use the following procedures for system shutdown.

- Turn off the ON/OFF switch on the inverter/switchboards
- Turn the DC disconnect off
- Turn the AC disconnect off
- Install lockout devices on the disconnects
- Turn off DC-Fused Combiner Box switches

Inverter Start / Restart

Use the following procedures for system start-up and restart:

- Turn on DC-Fused Combiner Box switches after verifying the following:
 - Inverter is off
 - The AC and DC disconnects are off
- Remove any lockout devices on AC and DC disconnects
- Make sure all combiner fuses are closed
- Close the AC disconnect
- Close the DC disconnect

After a short initialization period, the inverter will transition to “waking up” provided that the PV voltage is greater than the PV voltage start set point. After another short period (typically 5 minutes) the system will start up. The inverter cuts itself off when either AC or DC power is removed. It is best to remove both sources of power and you must do this before attempting to service the unit.

SITE SAFETY PROCEDURES

GENERAL WARNINGS!

- The equipment contains lethal AC and DC voltages!
- Site access is intended for authorized personnel only!
- These servicing instructions are for use by qualified personnel only!
- Equipment is supplied from multiple sources!

DO NOT VIOLATE SITE SAFETY AND OPERATION PROCEDURES

The installation, adjustment, repairs or testing of the Photovoltaic System involves possible contact with potentially lethal voltages and currents. No attempt to install or service the system should be made by anyone who is not qualified, trained technician familiar with SMA equipment.

Hazardous Locations

The following are deemed hazardous locations:

- Inverters and Disconnects: For hazardous locations within the inverter, refer to the Inverter Operations and Maintenance Manual.
- Vicinity of the Solar Electric Photovoltaic System.
- Field wiring and all electrical boxes associated with the system.

Precautions While in the Vicinity of the Solar Electric System

- Safety glasses and electrical insulating gloves must be worn when handling or working near the array, modules, electrical boxes, or wiring.
- It is recommended to always have at least two persons present when working on the array or handling modules. Do not attempt to service or adjust unless another person capable of rendering first aid and cardiopulmonary resuscitation (CPR) is also present.
- Any accidents should be immediately reported to a Supervisor, who should then report to Santa Fuel, Inc.
- The Photovoltaic Modules are made of glass and can be broken. Dropping or banging the modules may cause them to break, as may impact with sharp, hard or heavy objects. Along with electrical hazard, sharp edges or broken glass can cause injury. Be careful not to break modules and take care to properly handle and dispose of modules if they are cracked or broken.
- Any crack in the module can expose the person touching it to the full voltage and current of the array. If the module is wet, touching a cracked module anywhere may expose the person to the full voltage and current of the array. Do not touch the modules when they are exposed to the sun without wearing electrical insulating gloves. Do not touch a wet, cracked module without wearing electrical insulating gloves.
- A module may contain an unknown crack or connector failure at any time. Do not touch, handle or carry any wet module without wearing electrical insulating gloves.

ATTACHMENT 10
Inverter and Transformer Noise Profile Information

250/275kW, 1500Vdc String Inverters for North America



CPS SCH275KTL-DO/US-800

The 250/275kW high power CPS three phase string inverters are designed for ground mount applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiencies, wide operating voltages, broad temperature ranges and NEMA Type 4X enclosure enable this inverter platform to operate at high performance across many applications. The SCH275KTL inverters include a selectable Active Power of either 250kW or 275kW (factory default) with 12 MPPTs and are available with either 36 fused PV string inputs or 24 unfused PV string inputs. The CPS FlexOM solution enables communication, controls and remote product upgrades.

Key Features

- NFPA 70, NEC 2017 compliant
- Touch safe DC Fuse holders adds convenience and safety
- CPS FlexOM Gateway enables remote FW upgrades
- Integrated DC disconnect switch
- Protection Functions for enhanced reliability and safety
- Selectable Max AC Active Power of 250kW or 275kW
- 12 MPPTs with 36 fused inputs or 24 unfused inputs
- Copper and Aluminum compatible AC connections
- NEMA Type 4X outdoor rated, tough tested enclosure
- Full power capacity up to 42°C
- Standard 5 year warranty with extensions to 20 years
- Supported comm protocols (Modbus RTU, TCP/IP, PLC, CAN)

Model Name	CPS SCH275KTL-DO/US-800-36	CPS SCH275KTL-DO/US-800-24
DC Input		
Max. DC Input Voltage	1500V	
Operating DC Input Voltage Range	500-1450Vdc	
Start-up DC Input Voltage / Power	550Vdc / 500W	
MPPT Voltage Range @ PF>0.99 ¹	900-1300Vdc	
Number of MPP Trackers	12	12
Max. PV Input Current	26A per MPPT	30A per MPPT
Max. PV Short-Circuit Current	600A, 50A per MPPT	600A, 50A per MPPT
Number of DC Inputs	36 Fused Inputs, 3 per MPPT	24 Non-Fused Inputs
DC Disconnection Type	Load-rated DC switches	
DC Surge Protection	Type II	
AC Output		
Max AC Output Power (Selectable) @ PF>0.99	250kW / 275kW	
Max. AC Apparent Power	275kVA	
Rated Output Voltage	800Vac	
Output Voltage Range ²	704-880Vac	
Grid Connection Type	3-Phase / PE	
Max. AC Output Current @800Vac	198.5A	
Rated Output Frequency	60Hz	
Output Frequency Range ²	57 - 63Hz	
Power Factor	>0.99 (±0.8 adjustable)	
Current THD @ Rated Load	<3%	
Max. Fault Current Contribution (1 Cycle RMS)	215.2A	
Max. OCPD Rating	300A	
AC Surge Protection	Type II	
System and Performance		
Max. Efficiency	99.0%	
CEC Efficiency	98.5%	
Stand-by / Night Consumption	5W	
Environment		
Enclosure Protection Degree	NEMA Type 4X	
Cooling Method	Variable speed cooling fans	
Operating Temperature Range ³	-22°F to +140°F / -30°C to +60°C (derating from +107°F / +42°C)	
Operating Humidity	0 to 100%	
Operating Altitude	8202ft / 2500m (no derating)	
Audible Noise	<80dBA @ 1m and 25°C	
Display and Communication		
User Interface and Display	LED indicators, WiFi + APP	
Inverter Monitoring	Modbus RS485 / Ethernet TCP/IP / PLC / CAN	
Site Level Monitoring	CPS FlexOM (1 per 32 inverters)	
Modbus Data Mapping	SunSpec / CPS	
Remote Diagnostics / FW Upgrade Functions	Standard / (with FlexOM Gateway)	
Mechanical		
Dimensions (HxWxD)	27.2 x 41.3 x 15.7in (690 x 1050 x 400mm)	
Weight	Approx. 262lbs / 119kg	
Mounting / Installation Angle	Vertical installation	
AC Termination	Stud Type Terminal (Wire range: 3/0AWG – 600kcmil AL/CU, Lugs not supplied)	
DC Termination	36 Fused Input: Screw Clamp Fuse Holder (Wire range: #14 - #6 AWG CU) 24 Non-Fused Input: Screw Clamp Terminal (Wire range: #14 - #8 and #6 - #4 AWG CU)	
Fused String Inputs (3 per MPPT) ⁴	20A fuses provided (Fuse values up to 30A acceptable)	
Safety		
Certifications and Standards	UL1741-SA Ed. 2, CSA-22.2 NO.107.1-16, IEEE1547-2018, FCC PART15	
Selectable Grid Standard	IEEE 1547a-2014, CA Rule 21, ISO-NE	
Smart-Grid Features	Volt-RideThru, Freq-RideThru, Ramp-Rate, Specified-PF, Volt-Var, Freq-Watt, Volt-Watt	
Protection Functions		
Reactive Power at Night	Yes	
IV Curve Tracing	Yes	
Insulation Resistance Monitoring	Yes	
Onboard Fault Oscillography	Yes	
PV String Current Monitoring	Yes	
Residual Current Monitoring	Yes	
Input Reverse Polarity Protection	Yes	
Output Overcurrent Protection	Yes	
Output Short-Circuit Protection	Yes	
Output Overvoltage Protection	Yes	
Warranty		
Standard	5 Years	
Extended Terms	10, 15 and 20 years	

1) See user manual for further information regarding MPPT Voltage Range when operating at non-unity PF

2) The "Output Voltage Range" and "Output Frequency Range" may differ according to the specific grid standard.

3) See user manual for further requirements regarding non-operating conditions.

4) Fused string inputs only applicable to the SCH275KTL 36 input model.

Inspection and Detection 检验检测报告 Inspection and Detection Report Report

No : (2022) SJSXW-WT1020

Name of Sample Grid Support Utility Interactive PV Inverter (Non-Isolated)

Party being tested _____

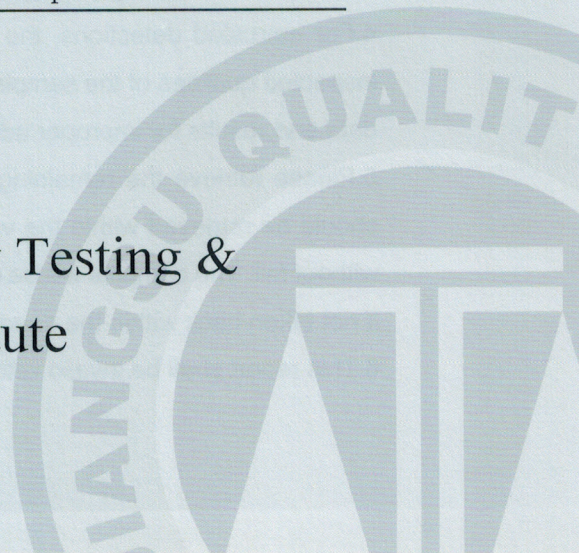
Manufacturer _____

Consigner SHANGHAI CHINT POWER SYSTEMS CO., LTD.

Inspection and
Detection Kind Entrusted Inspection



Jiangsu Product Quality Testing &
Inspection Institute



Inspection Institute

Inspection and Detection Report

No.:(2022)SJSXW-WT1020

Page 1 of 8

Name of Sample	Grid Support Utility Interactive PV Inverter (Non-Isolated)		Type and Specifications	CPS SCH275KTL-DO/US-800	
Producing Date\Batch No.	\		Trademark	—	
Consigner\Add\Tel\PC	SHANGHAI CHINT POWER SYSTEMS CO., LTD.\ #4, 3255 Sixian Road, Songjiang District, Shanghai 201614, China\ —\ —				
Manufacturer\Add\Tel\PC	—				
Party being tested\Add\Tel\PC	—				
Inspection and Detection kind	Entrusted Inspection	Task from/Task NO.	—	Sampling List	—
Quantity of Sample	1pcs	Batch of Sample	—	Numbered of Sample	(2022)SJSXW-WT1020
Sampling Date	—	Sampling Staff	—	Sampling Location	—
Grade	—	Quantity & Location of Backup Samples	—	Sealing State	—
Arrival Date of Sample	2022-12-06	Description of Sample	Match Test Requirement	Checking of Sealing Sample	—
Inspection and Detection Date	2022-12-06		Inspection and Detection Add.	No. 1368, Wuzhongdadao Avenue, Suzhou, China	
Inspection and Detection Standard(s)	ISO 3746:2010<Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane>				
Decision Criterion	—				
Test Conclusion	No judgment.				
Note	—				



(The Special Seal for Inspection and Detection)
Signature Date: 2023-01-06

Approval 梁学俊

梁学俊

roofreader 彭彦伟

彭彦伟

Majortester 鞠伟刚

鞠伟刚

Summary of Test Results

No.	Test Item	Test Standard	Result	Judgment
1	Noise Testing	ISO 3746:2010	See more details at 1.5 and 1.6	No judgment

Remark



Description of Equipment Under Test

0 Basic Information of EUT:

0.1 EUT

Product Name:	Grid Support Utility Interactive PV Inverter (Non-Isolated)
Specifications:	CPS SCH275KTL-DO/US-800

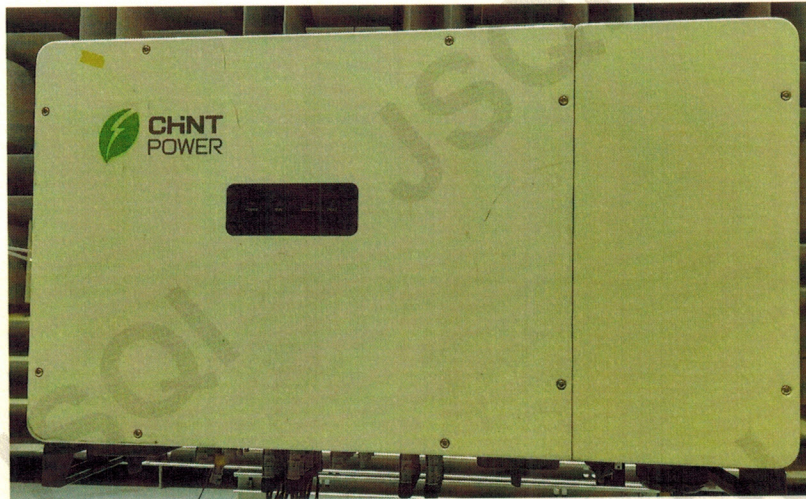



Photo 1: Appearance of sample




**CHNT
POWER**


**Grid Support Utility Interactive PV
Inverter (Non-Isolated)**


*This inverter is factory set at 275kW DEFAULT. Contact CPS to enable 250kW setting.

Product series:	CPS SCH275KTL-DO/US-800
Nominal input power:	285kWstcr/260KWstc
Number of inputs:	3 x 6 / 2 x 12 / 3 x 12
Max. input voltage:	1500Vdc
Operating input voltage range:	500—1450Vdc
MPPT voltage range:	900—1300Vdc
Max. input current:	60A x 6 / 30A x 12 / 30A x 12
Max. input short circuit current:	90A x 6 / 50A x 12 / 50A x 12
Max. Active power:	275kW / 250kW
Max. Apparent power:	275kVA
Nominal AC voltage:	800Vac / 704—880Vac 3Ø
Nominal power frequency:	60Hz
Nominal AC current:	198.5A / 180.4A
Max. AC current:	198.5A
AC current THD:	<3%
Power factor:	>0.99(adj.±0.8)
Max. efficiency:	99.0%
CEC efficiency:	98.5%
Operating temperature range:	-30°C—+60°C (>42°C derating)
Ingress protection:	TYPE 4X
Made in xxx	



This device complies with part 15 of the FCC Rules





Serial Number

Photo 2: Nameplate of sample

Test Requirements and Results

1 Noise Testing

1.1 Limiting Value of Noise

No limiting value.

1.2 Test Setup

The noise test of EUT proceeds in a semi-anechoic chamber. The measurement surface is a parallelepiped with five microphone positions, as specified in Figure 1. The preferred value of the measurement distance d is 1m.

The results are tested by the five microphones in 60s in the frequency between 20Hz to 20kHz of noise.

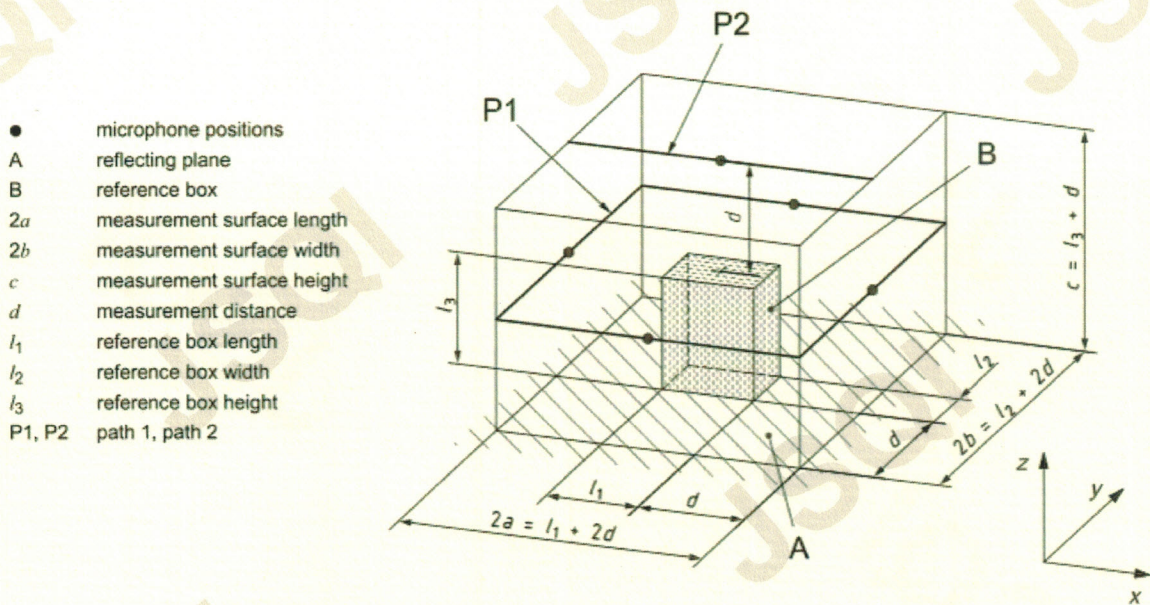


Figure 1 – Measurement surface – parallelepiped – with key microphone positions

Test Setup Photos:



Test Requirements and Results

1.3 Test Condition

Environment temperature: 14 °C; Relative humidity: 60 %RH; Atmospheric pressure: 101k Pa

1.4 Test Status

Connect the EUT to the power supply and start the test after running for 30 minutes.

1.5 Test Data

Test item information	Value						
Weighting	A-weighting						
Octave	One third octave						
Distance	1m						
Uncertainties $U_{rel} (k=2)$	0.7dB						
Inherent noise(dB(A))	16.2						
Load	Frequency(Hz)	Acoustic Noise(SPL)(dB(A))					
		Front	Left	Rear	Right	Bottom	Average
275kW	20	-21.6	-23.3	-20.4	-23	30.7	23.71
	25	-15.6	-18.3	-16	-17.9	34.1	27.11
	31.5	-10.7	-11.4	-10.2	-11.3	38.9	31.91
	40	-8.1	-6.2	-6.2	-7	40	33.01
	50	0.2	2.2	1.7	2.7	45.5	38.51
	63	9.6	7.4	10.3	7.7	47.4	40.41
	80	29.7	26.6	30.2	25.6	48.4	41.58
	100	9.4	13.2	13.8	12.4	50.9	43.91
	125	28.5	22.6	36	26.3	51.8	44.96
	160	23.2	21.9	27.9	21.4	51.6	44.64
	200	23.3	27.1	35	26.2	51	44.16
	250	31.3	35.6	43.5	36.9	50.2	44.38
	315	34.4	41.2	44.2	40.3	48.4	43.88
	400	40.2	44.1	47.1	43.7	46	44.79
	500	44.2	50.1	50	50.5	47.4	48.98
	630	58.5	61	60.4	55.7	58.7	59.22
	800	47.3	45.9	51.3	47	44.9	47.9
	1000	47.9	48.3	52.8	49.4	47.8	49.71
	1250	51.1	52	51.9	51	48.9	51.11
	1600	51.4	45.7	51.9	47.9	45.4	49.31
2000	55.1	48.4	55.5	51.6	47.6	52.79	
2500	53	47.9	53.4	49	49.1	51.08	
3150	52.8	50.6	54.6	52.7	50.2	52.48	
4000	53.3	53.4	54.2	51.9	49.5	52.74	

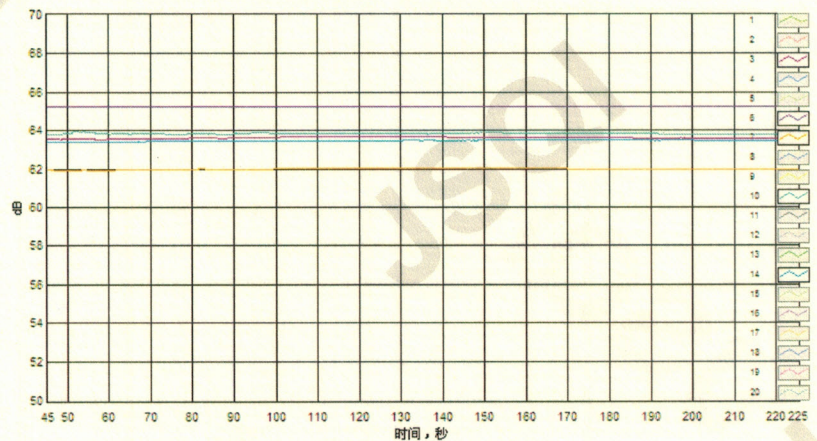
Test Requirements and Results

	5000	51.1	50.6	52.5	50.4	47.1	50.66
	6300	47.9	47.2	48.8	45.8	45.9	47.27
	8000	42.4	41.9	45.1	41.9	41.9	42.84
	10000	41.3	39.6	41.9	40	38.2	40.39
	12500	36.7	35.9	37.9	35.3	32.8	36.03
	16000	29.7	30.2	40.7	32.1	30.6	35.18
	20000	20.8	19.9	24.7	21	18.2	21.48
	Aggregate	63.6	63.7	65.3	62	63.8	63.8
Time domain curve of 275kW							
275kW	20	-20	-22.4	-20.1	-21.7	30.8	23.81
	25	-14	-17.6	-15.6	-16.7	34.4	27.41
	31.5	-9.5	-11.2	-9.9	-11.3	39.4	32.41
	40	-7.3	-5.7	-5.6	-6.6	40.4	33.41
	50	0.6	2.9	1.8	3.4	45.5	38.51
	63	9	7.4	10.3	7.7	47.5	40.51
	80	29.2	26.7	30.5	25.8	48.5	41.68
	100	9.6	13.2	13.8	12.3	51.2	44.21
	125	27.7	21.6	35.9	26.7	52.1	45.24
	160	23.3	22.1	27.8	21.6	52.1	45.14
	200	23.6	27.1	35	26.4	51.5	44.64
	250	31.9	35.7	43.6	37.4	50.5	44.65
	315	34.4	41.4	44.2	40.5	49	44.27
	400	40.3	44.2	47.2	43.7	46.5	44.99
	500	44.2	50.1	50	50.4	47.3	48.94
	630	58.1	60.7	60.4	55.6	58.3	58.98
	800	47.2	45.8	51.3	47	44.9	47.87
	1000	48	47.8	52.1	49.2	48	49.36
	1250	51	51.9	51.8	51	48.9	51.04

Test Requirements and Results

1600	51.5	45.7	51.9	48	44.9	49.32
2000	55	48.7	55.3	51.5	47.3	52.67
2500	52.9	47.6	53.4	48.9	49	50.99
3150	52.8	50.5	54.6	52.6	50	52.42
4000	53.2	53.5	54.1	51.9	49.3	52.69
5000	51.1	50.6	52.5	50.5	47	50.67
6300	47.8	47.2	48.8	45.8	45.8	47.24
8000	42.4	41.9	45.1	41.9	41.8	42.83
10000	41.2	39.6	41.9	40	38	40.34
12500	36.6	35.9	37.9	35.3	32.6	35.98
16000	29.6	31.1	42.7	33	36	37.29
20000	20.9	19.9	24.7	20.9	18	21.46
Aggregate	63.4	63.6	65.2	62	63.8	63.72

Time domain curve of 275kW



1.6 Test Result

No judgment.

Equipment List

No.	Instrument	Model No.	Serial No.	Valid Date	Used
1	Free Field Microphone	MP201+MA231	NTIe-511-020-04-C	2023-02-24	<input checked="" type="checkbox"/>
2	Free Field Microphone	MP201+MA231	NTIe-511-020-05-C	2023-02-24	<input checked="" type="checkbox"/>
3	Free Field Microphone	MP201+MA231	NTIe-511-020-06-C	2023-02-24	<input checked="" type="checkbox"/>
4	Free Field Microphone	MP201+MA231	NTIe-511-020-07-C	2023-02-24	<input checked="" type="checkbox"/>
5	Free Field Microphone	MP201+MA231	NTIe-511-020-08-C	2023-02-24	<input checked="" type="checkbox"/>
6	Acoustic Analyzer	PXI4498	NTIe-511-020-02-C	2023-03-11	<input checked="" type="checkbox"/>
7	Semi-anechoic Room	AN01	NTIe-511-076-00-C	2026-02-22	<input checked="" type="checkbox"/>
8	Acoustic Calibrator	BK 4231	NTIe-511-020-24-C	2023-03-11	<input checked="" type="checkbox"/>
9	Steel Tap	3m	NTIe-510-206-00-P	2023-03-11	<input checked="" type="checkbox"/>

Remark: stands for the equipments used in this test.

(End of Report)

简介

江苏省产品质量监督检验研究院是隶属于江苏省质量技术监督局的全额拨款公益性事业单位，是江苏省从事综合性、专业性产品质量监督检验的机构，于一九八二年二月经江苏省编制委员会批准成立。下设七个国家中心，分别是：

- **国家化妆品产品质量监督检验中心** 业务电话：025-84470308；传真：025-84470257；地址：南京市光华东街5号；邮编：210007
- **国家农药产品质量监督检验中心(南京)** 业务电话：025-84470312、84470252、84470324；传真：025-84470312；地址：南京市光华东街5号；邮编：210007
- **国家工程复合材料产品监督检验中心** 业务电话：冶金中心025-84470294、025-84470291/化建中心025-84470296、025-84470289；传真：冶金中心025-84470293 / 化建中心025-84470297；地址：南京市光华东街5号；邮编：210007
- **国家电线电缆产品质量监督检验中心(江苏)** 业务电话：0510-80713730(宜兴)0510-80713755(宜兴) / 0516-83641910(徐州)； 传真0510-80713799(南京) / 0516-85610125(徐州)；地址：宜兴市绿园路500号/徐州市新城区产业园区商聚路；邮编：214205(宜兴) / 221000(徐州)
- **国家食品包装产品质量监督检验中心** 业务电话：025-84470318；传真：025-84470263；地址：南京市光华东街5号；邮编：210007
- **国家信息网络产品质量监督检验中心(江苏)** 业务电话：0512-66591853；传真：0512-65252771；地址：苏州市吴中区吴中大道1368号吴中科技园B楼；邮编：215104

Profile

Jiangsu Product Quality Supervision and Inspection Institute (JPQSII), is specialized in product testing, quality certification, technical development and technical consultation, under the authorization from China General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and Jiangsu Quality and Technical Supervision Bureau. JPQSII now is consisted of 7 country-level product quality testing centers:

- National Quality Supervision & Testing Center for Cosmetics / National Quality Supervision & Testing Center for Pesticide (Nanjing) / National Quality Supervision & Testing Center for Engineering Composite Materials / National Quality Supervision & Testing Center for Food Packaging (Jiangsu)

Address: 5 Guanghua East Road, Nanjing; Vocational Tel: 025-84470235

- National Quality Supervision & Testing Center For Cables And Wires (JiangSu)

Address: 500 Luyuan Road, Yixing / 66 Hubei Road, Quanshan, Xuzhou; Vocational Tel: 0510-8071 3755 (Yi) / 0516-85610125 (Xu)

- National Quality Supervision & Testing Center for Information Network (Jiangsu)

Address: No.1368, Wuzhong Avenue, Suzhou; Vocational Tel: 0512-66591837

Three-phase pad-mounted compartmental type transformer



General

At Eaton, we are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality, most reliable transformers. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. In order to drive this innovation, we have invested both time and money in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Such revolutionary products as distribution-class UltraSIL™ Polymer-Housed Evolution™ surge arresters and Envirotemp™ FR3™ fluid have been developed at our Franksville lab.

With transformer sizes ranging from 45 kVA to 12 MVA and high voltages ranging from 2400 V to 46 kV, Eaton has you covered. From fabrication of the tanks and cabinets to winding of the cores and coils, to production of arresters, switches, tap changers, expulsion fuses, current limit fuses, bushings (live and dead) and molded rubber goods, Eaton does it all. Eaton's Cooper Power series transformers are available with electrical grade mineral oil or Envirotemp™ FR3™ fluid, a less-flammable and bio-degradable fluid. Electrical codes recognize the advantages of using Envirotemp™ FR3™ fluid both indoors and outdoors for fire sensitive applications. The bio-based fluid meets Occupational Safety and Health Administration (OSHA) and Section 450.23 NEC Requirements.

EATON

Powering Business Worldwide

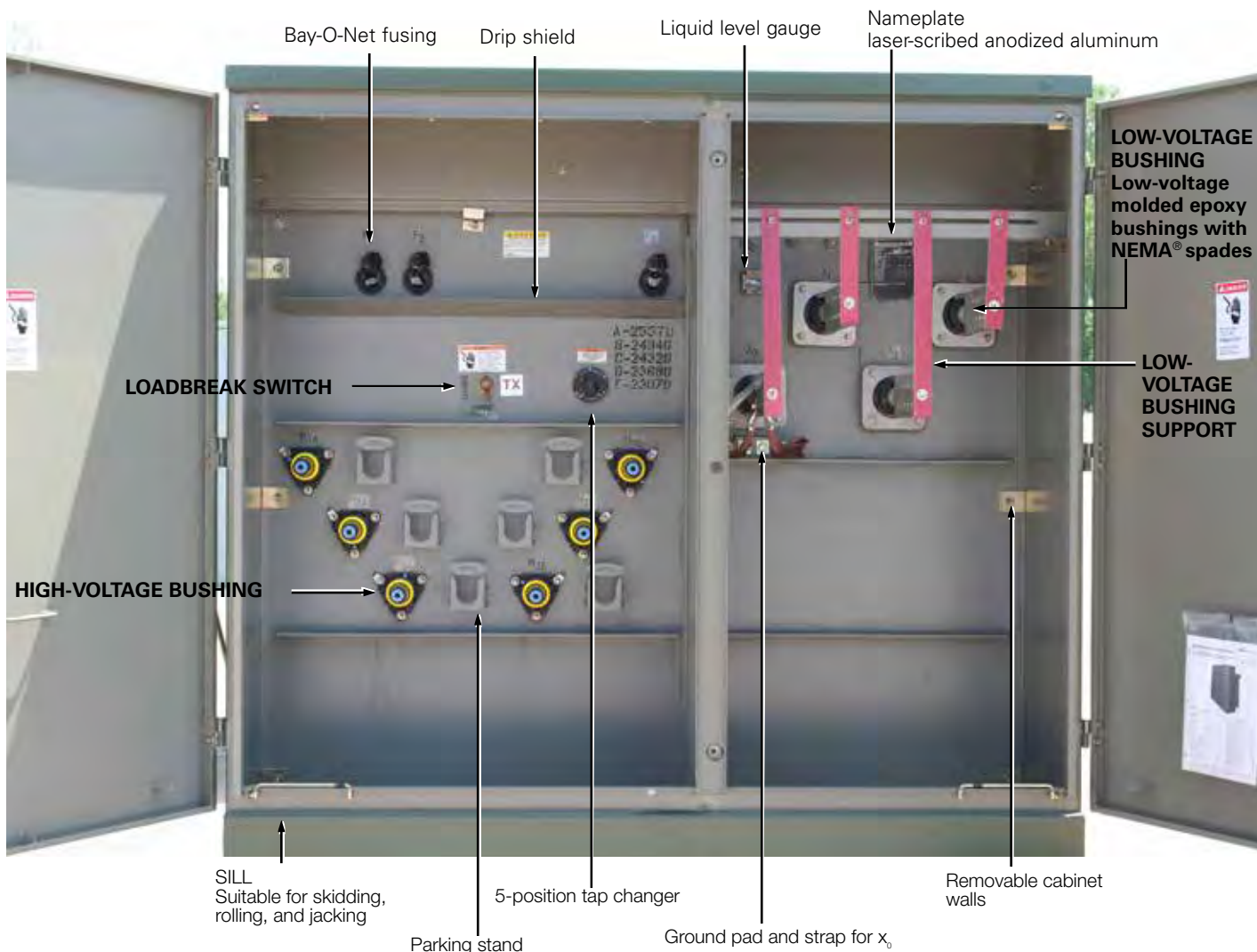


Figure 1. Three-phase pad-mounted compartmental type transformer.

Table 1. Product Scope

Type	Three Phase, 50 or 60 Hz, 65 °C Rise (55 °C, 55/65 °C), 65/75 °C, 75 °C
Fluid Type	Mineral oil or Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 10,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Vacuum Fault Interrupter (VFI)
	UL® Listed & Labeled and Classified
	Factory Mutual (FM) Approved®
	Solar/Wind Designs
	Differential Protection
Seismic Applications (including OSHPD)	
Hardened Data Center	

Table 2. Three-Phase Ratings

Three-Phase 50 or 60 Hz

kVA Available¹

45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000

¹Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

Table 3. Impedance Voltage

Rating (kVA)	Low-voltage rating		
	≤ 600 V	2400 Δ through 4800 Δ	6900 Δ through 13800GY/7970 or 13800 Δ
45-75	2.70-5.75	2.70-5.75	2.70-5.75
112.5-300	3.10-5.75	3.10-5.75	3.10-5.75
500	4.35-5.75	4.35-5.75	4.35-5.75
750-2500	5.75	5.75	5.75
3750	5.75	5.75	6.00
5000		6.00	6.50

Note: The standard tolerance is ± 7.5%

Table 4. Audible Sound Levels

Self-Cooled, Two Winding kVA Rating	NEMA® TR-1 Average
	Decibels (dB)
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-10000	68

Table 5. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	Twice Rated Voltage	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25		125	40
34.5		150	50

Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Standard	Optional
Unit Rating (Temperature Rise Winding)	65 °C	55 °C, 55/65 °C, 75 °C
Ambient Temperature Max	40 °C	50 °C
Ambient Temperature 24 Hour Average	30 °C	40 °C
Temperature Rise Hotspot	80 °C	65 °C

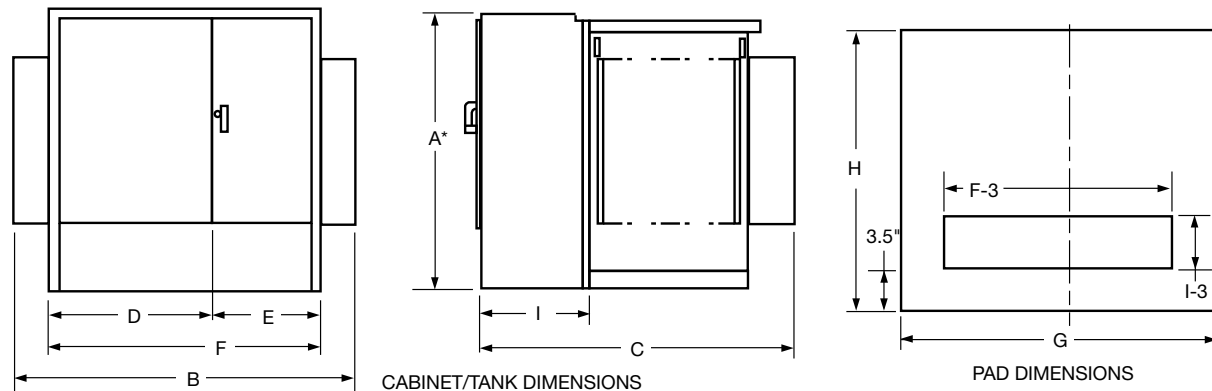


Figure 2. Transformer and pad dimensions.

* Add 9" for Bay-O-Net fusing.

Table 7. Fluid-filled—aluminum windings 55/65 °C Rise¹

65° Rise kVA Rating	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—ALUMINUM WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
	A*	B	C	D	E	F	G	H	I		
45	50	68	39	42	26	68	72	43	20	110	2,100
75	50	68	39	42	26	68	72	43	20	115	2,250
112.5	50	68	49	42	26	68	72	53	20	120	2,350
150	50	68	49	42	26	68	72	53	20	125	2,700
225	50	72	51	42	30	72	76	55	20	140	3,150
300	50	72	51	42	30	72	76	55	20	160	3,650
500	50	89	53	42	30	72	93	57	20	190	4,650
750	64	89	57	42	30	72	93	61	20	270	6,500
1000	64	89	59	42	30	72	93	63	20	350	8,200
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	490	12,500
2500	73	72	99	42	30	72	76	103	24	530	14,500
3000	73	84	99	46	37	84	88	103	24	620	16,700
3750	84	85	108	47	38	85	88	112	24	660	19,300
5000	84	96	108	48	48	96	100	112	24	930	25,000
7500	94	102	122	54	48	102	100	126	24	1,580	41,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Table 8. Fluid-Filled—Copper Windings 55/65 °C Rise¹

65° Rise kVA Rating	DEAD-FRONT—LOOP OR RADIAL FEED—BAY-O-NET FUSING OIL FILLED—COPPER WINDINGS									Gallons of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)										
	A*	B	C	D	E	F	G	H	I		
45	50	64	39	34	30	64	69	43	20	110	2,100
75	50	64	39	34	30	64	69	43	20	115	2,350
112.5	50	64	49	34	30	64	69	53	20	115	2,500
150	50	64	49	34	30	64	69	53	20	120	2,700
225	50	64	51	34	30	64	73	55	20	140	3,250
300	50	64	51	34	30	64	75	55	20	160	3,800
500	50	81	53	34	30	64	85	57	20	200	4,800
750	64	89	57	42	30	72	93	61	20	255	6,500
1000	64	89	59	42	30	72	93	63	20	300	7,800
1500	73	89	86	42	30	72	93	90	24	410	10,300
2000	73	72	87	42	30	72	76	91	24	420	11,600
2500	73	72	99	42	30	72	76	103	24	500	14,000
3000	73	84	99	46	37	84	88	103	24	720	18,700
3750	84	85	108	47	38	85	88	112	24	800	20,500
5000	84	96	108	48	48	96	100	112	24	850	25,000
7500	94	102	122	54	48	102	100	126	24	1,620	46,900

¹ Weights, gallons of fluid, and dimensions are for reference only and not for construction. Please contact Eaton for exact dimensions.

* Add 9" for Bay-O-Net fusing.

Standard features

Connections and neutral configurations

- Delta - Wye: Low voltage neutral shall be a fully insulated X0 bushing with removable ground strap.
- Grounded Wye-Wye: High voltage neutral shall be internally tied to the low voltage neutral and brought out as the H0X0 bushing in the secondary compartment with a removable ground strap.
- Delta-Delta: Transformer shall be provided without a neutral bushing.
- Wye-Wye: High voltage neutral shall be brought out as the H0 bushing in the primary compartment and the low voltage neutral shall be brought as the X0- bushing in the secondary compartment.
- Wye-Delta: High voltage neutral shall be brought out as the H0 bushing in the primary compartment. No ground strap shall be provided (line to line rated fusing is required).

High and low voltage bushings

- 200 A bushing wells (15, 25, and 35 kV)
- 200 A, 35 kV Large Interface
- 600 A (15, 25, and 35 kV) Integral bushings (dead-front)
- Electrical-grade wet-process porcelain bushings (live-front)

Tank/cabinet features

- Bolted cover for tank access (45-2500 kVA)
- Welded cover with hand hole (>2500 kVA)
- Three-point latching door for security
- Removable sill for easy installation
- Lifting lugs (4)
- Stainless steel cabinet hinges and mounting studs
- Steel divider between HV and LV compartment
- 20" Deep cabinet (45-1000 kVA)
- 24" Deep cabinet (1500-7500 kVA)
- 30" Deep cabinet (34.5/19.92 kV)
- Pentahead captive bolt
- Stainless steel 1-hole ground pads (45-500 kVA)
- Stainless steel 2-hole ground pads (750-10,000 kVA)
- Parking Stands (dead-front)

Valves/plugs

- One-inch upper filling plug
- One-inch drain plug (45-500 kVA)
- One-inch combination drain valve with sampling device in low voltage compartment (750-10,000 kVA)
- Automatic pressure relief valve

Nameplate

- Laser-scribed anodized aluminum nameplate



Figure 3. Drain valve with sampler.



Figure 4. Automatic Pressure relief valve.



Figure 5. Liquid level gauge.



Figure 6. External Gauges.



Figure 7. External visible break with gauges.

Optional features

High and low voltage bushings

- 200 A (15, 25 kV) bushing inserts
- 200 A (15, 25 kV) feed thru inserts
- 200 A (15, 25 kV) (HTN) bushing wells with removable studs
- High-voltage 600 A (15, 25, 35 kV) deadbreak one-piece bushings
- Low voltage 6-, 8-holes spade
- Low voltage 12-, 16-, 20-holes spade (750-2500 kVA)
- Low voltage bushing supports

Tank/cabinet features

- Stainless steel tank base and cabinet
- Stainless steel tank base, cabinet sides and sill
- 100% stainless steel unit
- Service entrance (2 inch) in sill or cabinet side
- Touch-up paint (domestic)
- Copper ground bus bar
- Kirk-Key provisions
- Nitrogen blanket
- Bus duct cutout

Special designs

- Factory Mutual (FM)
- UL® Classified
- Triplex
- High altitude
- K-Factors
- Step-up
- Critical application
- Modulation transformers
- Seismic applications (including OSHPD)

Switches

- One, two, or three On/Off loadbreak switches
- 4-position loadbreak V-blade switch or T-blade switch
- Delta-wye switch
- 3-position V-Blade selector switch
- 100 A, 150 A, 300 A tap changers
- Dual voltage switch
- Visible break with VFI interrupter interlock
- External visible break (15, 25, and 35 kV, up to 3 MVA)
- External visible break with gauges (15, 25, and 35 kV, up to 3 MVA)

Gauges and devices

- Liquid level gauge (optional contacts)
- Pressure vacuum gauge (optional contacts and bleeder)
- Dial-type thermometer (optional alarm contacts)
- Cover mounted pressure relief device (optional alarm contacts)
- Ground connectors
- Hexhead captive bolt
- Molded case circuit breaker mounting provisions
- External gauges in padlockable box

Overcurrent protection

- Bay-O-Net fusing (Current sensing, dual sensing, dual element, high amperage overload)
- Bay-O-Net expulsion fuse in series with a partial range under-oil ELSP current limiting fuse (below 23 kV)
- Cartridge fusing in series with a partial range under-oil ELSP current limiting fuse (above 23 kV)
- MagneX™ interrupter with ELSP current-limiting fuse
- Vacuum Fault Interrupter (VFI)
- Visible break window
- Fuse/switch interlock

Valves/plugs

- Drain/sampling valve in high-voltage compartment
- Globe type upper fill valve

Overvoltage protection

- Distribution-, intermediate-, or station-class surge arresters
- Elbow arresters (for dead-front connections)

Metering/fan/control

- Full metering package
- Current Transformers (CTs)
- Metering Socket
- NEMA® 4 control box (optional stainless steel)
- NEMA® 7 control box (explosion proof)
- Fan Packages

Testing

- Customer test witness
- Customer final inspection
- Zero Sequence Impedance Test
- Heat Run Test
- ANSI® Impulse Test
- Audible Sound Level Test
- RIV (Corona) Test
- Dissolved Gas Analysis (DGA) Test
- 8- or 24-Hour Leak Test

Coatings (paint)

- ANSI® Bell Green
- ANSI® #61 Light Gray
- ANSI® #70 Sky Gray
- Special paint available per request

Nameplate

- Stainless steel nameplate

Decals and labels

- High voltage warning signs
- Mr. Ouch
- Bi-lingual warning
- DOE compliant
- Customer stock code
- Customer stenciling
- Shock and arc flash warning decal
- Non-PCB decal

Construction

Core

The three-legged, step-lap mitered core construction is manufactured using a high-quality cutting machine. For maximum efficiency, cores are precisely stacked, virtually eliminating gaps in the corner joints.

Five-legged wound core or shell-type triplex designs are used for wye-wye connected transformers, and other special transformer designs.

Cores are manufactured with precision cut, burr-free, grain-oriented silicon steel. Many grades of core steel are available for optimizing core loss efficiency.

Coils

Pad-mounted transformers feature a rectangular coil configuration with wire-wound, high-voltage primaries and sheet-wound secondaries. The design minimizes axial stress developed by short circuits and provides for magnetic balancing of tap connections.

Coils are wound using the highest quality winding machines providing exacting tension control and conductor placement for superior short-circuit strength and maximum efficiency.

Extra mechanical strength is provided by diamond pattern, epoxy-coated paper insulation, used throughout the coil, with additional epoxy at heavy stress points. The diamond pattern distribution of the epoxy and carefully arranged ducts, provide a network of passages through which cooling fluid can freely circulate.

Coil assemblies are heat-cured under calculated hydraulic pressure to ensure performance against short-circuit forces.

Core and coil assemblies

Pad-mounted transformer core and coil assemblies are braced with heavy steel ends to prevent the rectangular coil from distorting under short-circuit conditions. Plates are clamped in place using presses, and welded or bolted to form a solid core and coil assembly. Core and coil assemblies exceed ANSI® and IEEE® requirements for short-circuit performance. Due to the rigidity of the design, impedance shift after short-circuit is comparable to that of circular wound assemblies.

Tanks

Transformer tanks are designed for high strength and ease of handling, installation, and maintenance. Tanks are welded using precision-cut, hot rolled, pickled and oiled steel. They are sealed to protect the insulating fluid and other internal components.

Transformer tanks are pressure-tested to withstand 7 psig without permanent distortion and 15 psig without rupture.

Tank finish

An advanced multi-stage finishing process exceeds IEEE Std C57.12.28™-2014 standards. The eight-stage pre-treatment process assures coating adhesion and retards corrosion. It converts tank surfaces to a nonmetallic, water insoluble iron phosphate coating.

The paint method consists of two distinct layers of paint. The first is an epoxy primer (E-coat) layer which provides a barrier against moisture, salt and corrosives. The two-component urethane final coat seals and adds ultraviolet protection.

Vacuum processing

Transformers are dried and filled with filtered insulating fluid under vacuum, while secondary windings are energized. Coils are heated to drive out moisture, ensuring maximum penetration of fluid into the coil insulation system.

Insulating fluid

Eaton's Cooper Power series transformers are available with electrical-grade mineral insulating oil or Envirotemp™ FR3™ fluid. The highly refined fluids are tested and degassed to assure a

chemically inert product with minimal acid ions. Special additives minimize oxygen absorption and inhibit oxidation. To ensure high dielectric strength, the fluid is re-tested for dryness and dielectric strength, refiltered, heated, dried, and stored under vacuum before being added to the completed transformer.

Eaton's Cooper Power series transformers filled with Envirotemp™ FR3™ fluid enjoy unique fire safety, environmental, electrical, and chemical advantages, including insulation life extending properties.

A bio-based, sustainable, natural ester dielectric coolant, Envirotemp™ FR3™ fluid quickly and thoroughly biodegrades in the environment and is non-toxic per acute aquatic and oral toxicity tests.

Building for Environmental and Economic Sustainability (BEES) total life cycle assessment software, utilized by the US Dept. of Commerce, reports its overall environmental performance impact score at 1/4th that reported for mineral oil. Envirotemp™ FR3™ fluid has also earned the EPA Environmental Technology Verification of transformer materials.

With a fire point of 360 °C, Envirotemp™ FR3™ fluid is FM Approved® and Underwriters Laboratories (UL®) Classified "Less-Flammable" per NEC® Article 450-23, fitting the definition of a Listed Product per NEC®.



Figure 8. VFI transformer with visible break.

Pad-mounted VFI transformer

Eaton's Cooper Power series VFI transformer combines a conventional distribution transformer with the proven Vacuum Fault Interrupter (VFI). This combination provides both voltage transformation and transformer over current protection in one space saving and money saving package. The pad-mounted VFI transformer protects the transformer and provides proper coordination with upstream protective devices. When a transformer fault or overload condition occurs, the VFI breaker trips and isolates the transformer.

The three-phase VFI breaker has independent single-phase initiation, but is three-phase mechanically gang-tripped. A trip signal on any phase will open all three phases. This feature eliminates single-phasing of three phase loads. It also enables the VFI breaker to be used as a three-phase load break switch.

Due to the resettable characteristics of the VFI breaker, restoring three-phase service is faster and easier.

The sealed visible break window and switch is an option that can be installed to provide visible break contact. This feature provides enhanced safety and allows an operator to see if the loadbreak switch contacts are in an open or closed position before performing maintenance.

Envirotran™ FM Approved special protection transformer

Eaton's Cooper Power series Envirotran™ transformer is FM Approved and suitable for indoor locations. Factory Mutual Research Corporation's (FMRC) approval of the Envirotran transformer line makes it easy to comply with and verify compliance with Section 450.23, 2008 NEC, Less-Flammable Liquid-Filled Transformer Requirements for both indoor and outdoor locations.

Envirotran FM Approved transformers offer the user the benefit of a transformer that can be easily specified to comply with NEC, and makes FM Safety Data Sheet compliance simpler, while also providing maximum safety and flexibility for both indoor and outdoor installations.

Because the "FM Approved" logo is readily visible on the transformer and its nameplate, NEC compliance is now easily verifiable by the inspector.

Envirotran FM Approved transformers are manufactured under strict compliance with FMRC Standard 3990 and are filled with FM Approved Envirotemp™ FR3™ fluid, a fire-resistant dielectric coolant.

**Special application transformers****Data Center transformer**

With focus rapidly shifting from simply maximizing uptime and supporting demand to improving energy utilization, the data center industry is continually looking for methods to increase its energy efficiency and reliability. Utilizing cutting edge technology, Eaton's Cooper Power series Hardened Data Center (HDC) transformers are the solution. Designed with special attention given to surge protection, HDC liquid-filled transformers provide superior performance under the harshest electrical environments. Contrary to traditional dry-type units, HDC transformers provide unsurpassed reliability, overloadability, operational life, efficiency, thermal loading and installed footprint. These units have reliably served more than 100 MW of critical data center capacity for a total of more than 6,000,000 hours without any reported downtime caused by a thermal or short-circuit coil failure.

The top priority in data center operations is uninterrupted service. Envirotran HDC transformers from Eaton, having substantially higher levels of insulation, are less susceptible to voltage surges. Eaton has experienced zero failures due to switching transients. The ANSI® and IEEE® standard impulse withstand ratings are higher for liquid-filled transformers, making them less susceptible to insulation failure. The Envirotran HDC transformer provides ultimate protection by increasing the BIL rating one level higher than standard liquid-filled transformer ratings. The cooling system of liquid-filled transformers provides better protection from severe overloads—overloads that can lead to significant loss of life or failure.

Data center design typically includes multiple layers of redundancy, ensuring maximum uptime for the critical IT load. When best in class transformer manufacturing lead times are typically weeks, not days, an unexpected transformer failure will adversely affect the facility's reliability and profitability. Therefore, the ability to determine the electrical and mechanical health of a transformer can reduce the probability of costly, unplanned downtime. Routine diagnostic tests, including key fluid properties and dissolved gas analysis (DGA), can help determine the health of a liquid-filled transformer. Although sampling is not required for safe operation, it will provide the user with valuable information, leading to scheduled repair or replacement, and minimizing the duration and expense of an outage. With a dry-type transformer, there is no reliable way to measure the health or likelihood of an impending failure.

Solar transformer

As a result of the increasing number of states that are adopting aggressive Renewable & Alternative Energy Portfolio Standards, the solar energy market is growing—nearly doubling year over year. Eaton, a key innovator and supplier in this expanding market, is proud to offer its Cooper Power series Envirotran transformers specifically designed for Solar Photovoltaic medium-voltage applications. Eaton is working with top solar photovoltaic developers, integrators and inverter manufacturers to evolve the industry and change the way we distribute power.

In accordance with this progressive stance, every Envirotran Solar transformer is filled with non-toxic, biodegradable Envirotemp™ FR3™ dielectric fluid, made from renewable seed oils. On top of its biodegradability, Envirotemp™ FR3™ fluid substantially extends the life of the transformer insulation, saving valuable resources. What better way to distribute green power than to use a green transformer. In fact, delaying conversion to Envirotran transformers places the burden of today's environmental issues onto tomorrow's generations. Eaton can help you create a customized transformer, based on site specific characteristics including: temperature profile, site altitude, solar profile and required system life. Some of the benefits gained from this custom rating include:

- Reduction in core losses
- Improved payback on investment
- Reduction in footprint
- Improved fire safety
- Reduced environmental impact

For the solar photovoltaic industry, Eaton is offering standard step up transformers and dual secondary designs, including 4-winding, 3-winding (Low-High-Low) and 3-winding (Low-Low-High) designs.

Wind transformer

Eaton is offering custom designs for renewable energy power generation. Eaton manufactures its Cooper Power series Generator Step-Up (GSU) transformers for installation at the base of every wind turbine. Additionally, grounding transformers are available for wind power generation.

DOE efficiency

The United States Department of Energy (DOE) has mandated efficiency values for most liquid type, medium voltage transformers. As a result, all applicable Eaton's Cooper Power series transformers 2500 kVA and below conform to efficiency levels as specified in the DOE ruling "10 CFR Part 431 Energy Conservation Program."

Underwriters Laboratories® (UL®) Listed and Labeled/Classified

The Envirotran transformer from Eaton can be specified as UL® Listed & Labeled, and/or UL® Classified. Underwriters Laboratories (UL®) listing is a verification of the design and construction of the transformer to the ANSI® and IEEE® standards. UL® listing generally is the most efficient, cost-effective solution for complying with relevant state and local electrical codes. UL® Combination Classification/Listing is another way in which to comply with Section 450.23, 2008 NEC® requirements. This combines the UL® listed transformer with a UL® Classified Less-Flammable Liquid and complies with the use restrictions found within the liquid Classification.



K-Factor transformer

With a drastic increase in the use of ferromagnetic devices, arcing devices, and electric power converters, higher frequency loads have increased significantly. This harmonic loading has the potential to generate higher heat levels within a transformer's windings and leads by as much as 300%. Harmonic loading has the potential to induce premature failure in standard-design distribution transformers.

In addition to standard UL® "K-Factor" ratings, transformers can be designed to customer-provided specifications detailing precise loading scenarios. Onsite measurements of magnitude and frequency, alongside harmonic analysis of the connected load can be performed by Eaton engineers or a third party consultant. These field measurements are used to determine exact customer needs and outline the transformer specifications.

Eaton will design harmonic-resistant transformers that will be subjected to the unique harmonic loads. These units are designed to maintain normal temperature rise under harmonic, full-load conditions. Standard UL® "K-Factor" designs can result in unnecessary costs when the "next-highest" K-Factor must be selected for a calculated design factor. To save the customer these unnecessary costs, Eaton can design the transformer to the specific harmonic spectrum used in the application. Eaton's Cooper Power series K-factor transformers are filled with mineral oil or Envirotemp™ FR3™ fluid and enjoy the added benefits of dielectric cooling such as higher efficiencies than dry-type transformers.

Modulation transformer

Bundled with an Outboard Modulation Unit (OMU) and a Control and Receiving Unit (CRU), a Modulation Transformer Unit (MTU) is designed to remotely achieve two way communication.

The use of an MTU reduces travel time and expense versus traditional meter reading performed by high voltage electricians. Additionally, with MTU it is possible to manage and evaluate energy consumption data, providing reduced metering costs and fewer tenant complaints.

An MTU utilizes existing utility infrastructure, therefore eliminating the need to engineer and construct a dedicated communication network.

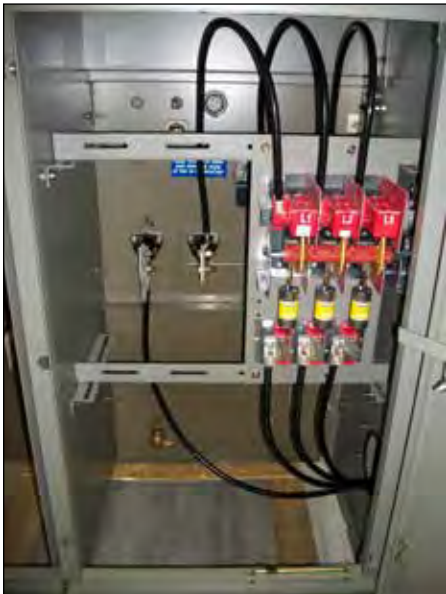


Figure 9. Modular transformer.

Inverter/rectifier bridge

Eaton complements its range of applications for transformers by offering dual winding designs. These designs are intended for connection to 12-pulse rectifier bridges.

Product attributes

To set us apart from other transformer manufactures, Eaton includes the following guarantees with every three-phase pad-mounted transformer.

Engineered to order (ETO)

Providing the customer with a well developed, cost-effective solution is the number one priority at Eaton. Using customer specifications, Eaton will work with the customer from the beginning to the end to develop a solution to fit their needs. Whether it is application specific, site specific, or a uniquely specified unit, Eaton will provide transformers with the best in class value and performance, saving the customer time and money.

Made in the U.S.A.

Eaton's three-phase pad-mounted transformers are produced right here in the United States of America. Our manufacturing facilities are positioned strategically for rapid shipment of products. Furthermore, should the need arise, Eaton has a broad network of authorized service repair shops throughout the United States.

Superior paint performance

Protecting transformers from nature's elements worldwide, Eaton's E-coat system provides unrivaled transformer paint life, and exceeds IEEE Std C57.12.28™-2014 and IEEE Std C57.12.29™-2005 standards. In addition to the outside of the unit, each transformer receives a gray E-coat covering in the interior of the tank and cabinet, providing superior rust resistance and greater visibility during service.

If the wide range of standard paint selections does not suit the customer's needs, Eaton will customize the paint color to meet their requirements.

Rectangular coil design

Eaton utilizes a rectangular coil design. This winding technique results in a smaller overall unit footprint as well as reducing the transformer weight. The smaller unit size does not hinder the transformer performance in the least. Units have proven short circuit withstand capabilities up to 10 MVA.

Testing

Eaton performs routing testing on each transformer manufactured including the following tests:

- **Insulation Power Factor:** This test verifies that vacuum processing has thoroughly dried the insulation system to required limits.
- **Ratio, Polarity, and Phase Relation:** Assures correct winding ratios and tap voltages; checks insulation of HV and LV circuits. Checks entire insulation system to verify all live-to-ground clearances.
- **Resistance:** This test verifies the integrity of internal high-voltage and low-voltage connections; provides data for loss upgrade calculations.
- **Routine Impulse Tests:** The most severe test, simulating a lightning surge. Applies one reduced wave and one full wave to verify the BIL rating.
- **Applied Potential:** Applied to both high-voltage and low-voltage windings, this test stresses the entire insulation system to verify all live-to-ground clearances.
- **Induced Potential:** 3.46 times normal plus 1000 volts for reduced neutral designs.
- **Loss Test:** These design verification tests are conducted to assure that guaranteed loss values are met and that test values are

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within design tolerances. Tests include no-load loss and excitation current along with impedance voltage and load loss.

- Leak Test: Pressurizing the tank to 7 psig assures a complete seal, with no weld or gasket leaks, to eliminate the possibility of moisture infiltration or fluid oxidation.

Design performance tests

The design performance tests include the following:

- Temperature Rise: Our automated heat run facility ensures that any design changes meet ANSI® and IEEE® temperature rise criteria.
- Audible Sound Level: Ensures compliance with NEMA® requirements.
- Lightning Impulse: To assure superior dielectric performance, this test consists of one reduced wave, two chopped waves and one full wave in sequence, precisely simulating the harshest conditions.

Thomas A Edison Research and Test Facility

We are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality transformer for the lowest cost. Eaton's Cooper Power series Transformer Products are ISO 9001 compliant, emphasizing process improvement in all phases of design, manufacture, and testing. We have invested millions of dollars in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin affirming our dedication to introducing new innovations and technologies to the transformer industry. This research facility is fully available for use by our customers to utilize our advanced electrical and chemical testing labs.

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For Eaton's Cooper Power series three-phase transformer product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.