



THE PROJECT

The handover process of solar farms known as Professional Acceptance Certificate (PAC), requires verification of the earthing system.

TESL INVOLVEMENT

- Earthing bonding checks between Inverter Stations/Security Fence /CCTV and Earthing System
- Conductor sizing review
- Visual inspection to confirm earth bonds are made between earthing system and equipment as per design
- Cable Avoidance Tool (CAT) and Genny radio-detection scanning at a sample of locations to confirm below ground conductor locations

PROJECT DATES

Project Start Date: Nov 2017
 Submission Date: Dec 2017

CLIENT

Foresight Group Ltd

PROJECT OUTCOMES

As part of the Final Acceptance Certificate (FAC) process, solar farm developers need to ensure that the installed solar farm meets the design requirements, before handing over to the owner.

The earthing system forms part of these requirements where an investigation is needed to ensure the earthing system has been installed, as per the design. A significant amount of the earthing system is installed below the ground, so without testing there is no way to ensure that the correct below ground earthing has been correctly installed.

PERFORMANCE

As part of the contract, TESL was asked to audit the earthing installation at four solar farms. Based on site location, TESL were able to combine two of the sites during one test trip.

This resulted in considerable savings in travel time and overall project cost which were passed onto the client.

Due to the urgency of the compliance testing, TESL were able to submit the quote and arrange to attend the first site for testing, within three days. The other three sites were tested within the next fortnight to meet the clients' needs. This enabled TESL to expedite the delivery of the reports.

Calculations were performed based on the cross sectional area and length of the earthing conductors, to determine an acceptable point to point bonding threshold. This threshold was compared to the point to point bonding measurements which confirmed the adequacy of the bond. A map based on the measurement GPS locations was included into the report so that the tests could be repeated and compared to during future inspections.

TESL also advised the client on 5 yearly and 10 yearly inspection schedules and earth resistance measurement plans to adhere to relevant British standards.

SPECIFIC REQUIREMENTS

Performing a Fall-of-Potential (FOP) is an effective way to determine the site resistance so that it can be compared against the design, however, normally the design only accounts for the below ground earthing conductors and does not account for the effect of the earthed solar panel earthed structures.

Therefore, if areas of the below ground earthing conductors are missing, this could go undetected in the FOP test, as the difference would be made up from the effect of the earthed solar panel structures. By utilising correct CAT and Genny testing methods, the below ground conductors can be detected and confirmed against design drawings. This process is useful for detecting the important below ground earthing links between grouped arrays and ring electrodes around the substations/inverter stations.

Point to point bonding checks are an affective way to ensure that the structures are adequately bonded to the earthing systems. By utilising all four poles of the DET2/2 earth tester, the resistance of the leads can be neglected giving greater accuracy to the bonding measurement.

