Malachy Walsh and Partners

Engineering & Environmental Consultants

Cork | Tralee | Limerick | London

Tullabeg 110kV Substation
Drainage Proposals

Client:
H&MV Engineering Ltd,
Unit B10,
Kingswood Business Park,
Clondalkin,
Dublin 22
D22 C7XO

Project No:	Revision:	Prepared By:	Approved By:	Date:
20609-6001	E	J. O'Leary/D Toomey	J. O'Leary	October 2019

TABLE OF CONTENTS

Tullabeg 110kV Substation
Co Wexford

Drainage Proposals

1 INTRODUCTION

The purpose of this document is to outline the envisaged drainage scheme for the 110kV/33kV substation development associated with a solar farm at Tullabeg, Medophall, Medophall Demense and Ballyclogh, Co Wexford. Terra Solar II Limited are seeking a 10-year planning permission for development at Tullabeg, Camolin, Co. Wexford comprising a 110kV 4-bay C-type electricity substation (with 33kV customer compound) (including two control buildings, lightning protection, perimeter security fencing, security lighting, drainage infrastructure, temporary construction compound) to connect to and serve a proposed solar farm (under Wexford County Council Reg. Ref. 20191272); associated loop-in infrastructure to tie into an existing 110kV overhead transmission line including underground 110kV cabling and 2 No. new end masts with 110kV line diversion cabling; vehicular entrance and access track from public road; all associated site development works including formation of berms and landscaping.

The purpose of the substation and grid connection is to serve a solar farm development in the townlands of Ballyclogh, Tullabeg, Medophall and Medophall Demesne. The application for planning permission for the solar panels, support infrastructure and associated ancillary development works has been made to Wexford County Council as part of a dual consent process. The applicant for that proposed development is also Terra Solar II Limited. Notwithstanding this dual consent process, this report considers the full combined development for the purposes of completing a robust assessment of the entire project.

The proposed development of the 110 kV / 33kV Electrical AIS substation will include two buildings to house electrical equipment and an electrical transformer bund within a fenced off compound with internal concrete roadways and the remaining area surfaced with permeable single size clean stone. There will be new private access tracks provided to the gates of the compounds – the IPP compound and Eirgrid compounds require separate accesses. The roof surfaces and the bunded plinths are the only areas within the compound that require drainage assessment. All other areas are free draining.

The substation will be an unmanned facility in the operational phase, but will require welfare facilities for staff visiting the substation for inspections, routine maintenance and extraordinary maintenance as the need arises. These welfare facilities, which include toilets (WC), wash and basin (WHB) and sinks, will

have a water demand and generate wastewater.

2 SURFACE WATER DRAINAGE

Surface water drainage proposals for the development have been developed to mimic the natural drainage patterns of the site and thereby be in accordance with the Best Management Practices (BMPs) of Sustainable Drainage Systems (SuDS).

The attainment of this aspiration is easily achieved when the following parameters are considered:

- The compound construction is formed with permeable stone thus mimicking a soakaway scenario. ESB compound stone is single sized for the first 150mm for safety purposes. It then changes to a graded 6F2 material. The area of this permeable surface is 14,145m².
- The area to be drained includes the roofs and the bunded plinths. These equate to 645m² and are very modest in themselves and in comparison to the overall compound area.
- Assuming even the most basic of infiltration rates down through the permeable compound stone, it is clear that the existing greenfield situation is easily maintained.

The surface water generated in the bunded areas will discharge to the existing drainage via a Class 1 Full Retention Oil Separator. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network. The Class 1 Full Retention Oil Separator will provide a second level of defence.

3 FOUL SEWER DRAINAGE

There are no existing foul sewer water drains on the site or near the site. The dispersed settlement pattern of the surrounding area suggests that the individual farm dwellings use standalone private foul treatment and disposal systems.

The foul drainage proposal must cater for the wastewater generated in the welfare facilities of the proposed development. These welfare facilities include for a toilet and wash hand basin in each of the two buildings and a sink within a small canteen or mess room. The stations will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

Onsite treatment and disposal of foul waste was considered by using a suitable septic tank and intermittent filter system and polishing unit or packaged wastewater treatment system and polishing unit. This will be subject to the results of the site characteristic testing as part of the site investigations which are to be carried out. However, the low volumes of foul waste that will be generated and consequently the low biological loading may impact on the successful continual operation of a treatment

system reliant on bacterial action. For this reason, an alternative of a foul holding tank to be emptied periodically is proposed. Foul holding tanks are normally used in ESB substations.

The foul drainage proposed will have a capacity of 5m^3 which is a multiple of the foul water generated over three months of normal operation of the station. The foul holding tank will also be inspected by a suitably qualified and indemnified person at these intervals and records of inspections will be held on site for inspection by the local authority. A freeboard of 300mm will be provided for and the foul holding tank will be fitted with a high-level alarm. This alarm will be connected to a manned control station via the stations Supervisory Control and Data Acquisition (SCADA) telecom relay system. This will allow for non-scheduled maintenance and emptying of the tank between the regular three monthly intervals in the very unlikely event that this is required. The foul holding tank will also be vented to the atmosphere to avoid the buildup of noxious and dangerous gases.

The proposed station will be unmanned and as such will generate small quantities of foul waste. There will be visits to the station for scheduled and unscheduled visits for inspections, maintenance and repairs as necessary. It is anticipated that this will result in a contribution of 60 litres of foul waste per week. In the very unlikely event that such a high visitation rate would be extrapolated throughout the year, this would result in 6,323 litres per annum. While such a consistently high visitation is improbable, there is the possibility of increased numbers of staff being present on site for short durations during the commissioning of electrical elements of the station from time to time. It is envisaged that these extraordinary occurrences would balance out with the ordinary operation of the unmanned station to produce foul flows no greater than the 6.323 litres per annum as a “worst-case” scenario.

It is common for much lower usage of the facilities on unmanned stations and therefore a much lower foul loading. A common problem on such unmanned stations is odours in the toilet areas due to the drying out of the water trap in the WC through evaporation resulting from the lack of use. For this reason, it is proposed to use self-flushing toilets in the station, which would flush automatically twice a week. The station will include two 6 litre flush WC’s so a minimum weekly foul flow of 24 litres can be expected. The self-flushing WC’s will therefore contribute 1,248 litres per annum.

Combining the automatic flush and maximum user demand figures would result in a maximum annual generation of 7,571 litres(7.5m^3) of foul sewer water waste. The 5m^3 tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

4 PROPOSED WATER SUPPLY SYSTEM

There is currently no water within the main body of the site of the proposed electrical substation compound. The proposed substation is remote from the public roadway and the public water supply system. It is proposed to provide the required potable water demand of the station with a bored well on the site. The potable water demand within the site will be low as the proposed station is to be

unmanned. To avoid problems like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WC's within the station.

The water demand within the proposed development will be low and will be similar to the figures for foul sewer water generation as set out above in this report. Although, the water demand will be slightly higher than the figure for the foul flow allowing for consumption within the tea making station or mess room located within one of the buildings in the proposed development.