**Client: Laing O'Rourke**

# 2488240 - Margam Substation

## Margam Substation Extension – Peat Management Plan

**Prepared By:** RSK Group

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Margam Substation Extension – Peat Management Plan

S3 – For Review and Comment

**08/08/2025**

Laing O'Rourke

# Margam Substation Extension

## Peat Management Plan

2880542

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# WRc GENERAL NOTES

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# 1 INTRODUCTION

This report provides a Peat Soil Management Plan for the proposed Margam Substation extension.

This report forms part of the planning application for the Margam Substation extension and should be read in conjunction with the main planning application documents. This document addresses the requirement to excavate peat soil as part of the Proposed Development Construction, following careful consideration of the siting, design and methods of construction to minimise impacts on peat within the soil horizons. The Peat Management Plan calculates the total volumes of peat soils that need to be excavated and sets out the plans in place for storage and reburial of the excavated peat soils. Guidance on management and handling of excavated peat soils is also provided.

## 1.1 Site Location

The Proposed Development lies to the south of Margam, a suburb of the coastal industrial town of Port Talbot in the Welsh county borough of Neath Port Talbot, approximately 14 km east of Swansea. The existing Port Talbot Steelworks is present to the west of the site. The construction of the substation is part of a wider transition to a greener steel making process, together with the installation of the Electric Arc Furnace at the Port Talbot Site.

The proposed site covers an area of 1.358 ha, and includes the proposed substation extension at Margam. The site lies within the Junction 38 Wetland Complex Site of Importance for Nature Conservation (SINC), designated for its complex of wetland habitats and woodland, with the footprint of the proposed development being dominated by reedbed and willow/birch scrub.

Land use in the wider area includes industrial, residential and commercial property, open field hills, moorland and reservoirs. Morfa beach and the Bristol channel run parallel to the west of the Proposed Development.

## 1.2 Development Proposals

The construction phase of the Proposed Development would involve a number of different elements which are subject to planning application. Full planning application for the extension of the Margam 275 kV substation including the erection of a gas insulated switchgear hall (GIS hall) and the demolition of the existing control and amenities buildings to enable the erection of a new amenities building. Works to include earthworks, surface water management and drainage infrastructure, lighting, CCTV, boundary treatment, car parking, ecological improvements including a wildlife tower and gabion baskets, improved internal access roads, diesel generator and hardstanding, storage building and water storage tank, flood defence wall including flood gates and appropriate landscaping and other associated engineering operations. A detailed overview of the proposed works to the existing Margam 275 kV substation compound is provided below:

- Construction of a GIS hall to house 275 kV electrical switchgear and ancillary equipment;
- The GIS hall to include 12 bays with the provision of 3 spare bays;
- Mechanically Switched Capacitor with Damping Network;

- Realignment of the existing downleads and Super Grid Transformer circuits to new bays within the GIS hall;
- New amenities building to include welfare facilities, meeting room and ancillary office space;
- One diesel generator to be used in a backup situation only and hardstanding for a replacement freestanding diesel generator;
- Security fencing;
- Surface water management and drainage infrastructure including internal drainage systems;
- Flood defence wall (1150mm high and depth 1000mm) and flood gates at existing access points into the existing substation;
- Water storage tank (6m high and 6.1m diameter);
- CCTV;
- Lighting to include 6m medium duty, tilt down tubular steel constructure (exact location to be agreed), 27no. 'label C', 18no. 'label E' and 13no. 'label EX1), dark sky approved;
- Creation of new designated car parking area (four standard bays and two accessible bays), and;
- Landscaping to incorporate native planting / wildflowers. Ecological mitigation to include a wildlife tower and gabion baskets.

These elements are all shown on Drawing MARPT-BHK-01-ZZ-DG-A-130023 Site Plan.

# 2 PEAT SOIL CONDITION

## 2.1 Policy Background

Under Planning Policy Wales Edition 12 (2024[1]) (known as PPW), peat is accorded a high value as a result of its functions as a carbon sink and long-term carbon store. PPW states: "*Peat soils are extremely fragile and if compromised put at risk the resilience of the ecosystems they support. Peatland habitats cover only 3-4% of Wales yet store in the region of 20-25% of all soil carbon*."

The Step-Wise Approach sets out five key stages which have to be followed for developments:

- Step 1 – Avoidance: The first step involves identifying and avoiding areas of high ecological value, like peat and sensitive peatland habitats, wherever possible.
- Step 2 – Minimisation: If avoidance is not feasible, developers should minimize the impact of the development on biodiversity, ensuring retained habitats remain well-connected and protected.
- Step 3 – Mitigate/Restore: Where impacts are unavoidable, mitigation measures are implemented to repair damaged habitats or restore disrobed species.
- Step 4 – Compensate on site/Compensate off site: If mitigation is insufficient, developers may need to compensate for unavoidable losses, preferably on-site, but off-site compensation is considered as a last resort.
- Step 5 – Provide biodiversity enhancement and a long-term management plan.

Of these, Step 1 has the highest priority and requires implementing first. Developments should also provide biodiversity enhancement and a Long-Term Management Plan (Step 5)[1]. This applies particularly to peat soils with active surface vegetation as a result of their combined carbon sink and carbon store status.

The situation relating to peat soils that are buried some metres below ground and no longer have an actively accumulating vegetation layer is less common. Peat soil in this situation can no longer act as a carbon sink, but remains a carbon store, and therefore has a lower sensitivity than surface peat soil. If it is not possible to avoid buried peat soil, the key management strategy would therefore be to minimise any excavation of buried peat soil and to ensure that any peat soil that requires excavation is reburied in a suitable location within the site in order to maximise the stored carbon within the peat soil deposit in the long term.

Siting studies, closely considering the Step-Wise approach, were undertaken for the development proposals at alternative locations. Results from the siting studies found that the current location option was deemed the most suitable.

## 2.2 Peat Soil at the Site

The peat soil at the Margam site is buried at a variety of depths, with areas of shallow peat starting from 0.2 m below ground level (bgl), with the deepest records at 3 m bgl. This

[1] Planning Policy Wales Edition 12, 2024. Welsh Government. Available at: https://www.gov.wales/planning-policy-wales

situation means that none of the peat deposits present are ‘active’ and are not actively sequestering carbon as they have no active vegetation layer present. Buried peat such as this remains a carbon store while kept waterlogged and not in contact with oxygen in the atmosphere.

The below activities are required as part of the substation extension project that have potential to interact with peat soils:

- Excavation is required within the Substation Footprint to install working platforms. The working platform is required for plant and equipment necessary to undertake the substation construction.
- Excavation of a diversion ditch to redirect surface water runoff. The excavated channel is necessary to prevent erosion and flooding, as well as controlling silt laden run from leaving the site.
- Excavation and construction of the sustainable drainage system (SuDS) detention basin. The basin is excavated to create a depression capable of holding a specified volume of water. Construction may involve the use of impermeable liners to prevent water loss, inlet and outlet headwalls and low-flow pathways to manage flow and graded slopes to ensure stability and allow for establishment of vegetation.

**Auger Continuous Flight Auger (CFA) Piling**

- CFA piling involves drilling into the ground with a continuous flight auger. Concrete is pumped through the hollow stem as the auger is withdrawn, forming the pile without leaving an open hole.
- Preferred near existing substations where ground displacement must be minimised. This method avoids lateral soil movement, reducing risk to nearby foundations.

**Auger Displacement Piling (ADP)**

- ADP uses a displacement auger to laterally displace soil while forming the pile, minimising spoil generation.
- Favoured for general site works, especially in peat management, as it reduces arisings and the need for spoil disposal. However, not recommended near existing structures due to potential ground displacement affecting foundation stability.

ADP requires boring of the pile locations, resulting in limited excavation of the substrate.

Both piling methods chosen involve substantially lower ground disturbance than conventional excavated foundations. ADP will be used across the majority of the site, further reducing the volume of excavated peat soil. CFA piling will be used where displacement of the ground may have an impact on surrounding existing foundations, for example alongside the existing substation.

For ADP, some peat soil is likely to be brought to the surface during the boring process and would need to be stored and disposed of at a later stage in the construction phase of works. The total volume of peat soil disturbed would be similar for both forms of piling and is expected to be minor within the context of peat soils present at the site.

The excavation depth required to install the working platform is shallow, up to 1 m in depth.

# 3 PEAT SOIL EXCAVATION

## 3.1 Methodology and Assumptions

National Grid have consulted with NRW, who have been unable to offer a pre-application service at this stage, and Welsh Government who confirmed the Peat Management Plan was clear and covers the points Welsh Government would look for. National Grid has also consulted Hebneb in relation to the Historic Environment Desk Based Assessment which discusses the peat on site.

An Inverse Distance Weighting (IDW) Interpolation has been carried out on borehole and trial pit data to estimate the depth at which peat layers begin and end. This interpolation enables the calculation of excavated volumes at any given area within the site.

Excavation depths for each element of the proposed development have been provided and used in conjunction with the peat soil layers within these areas to calculate total volumes.

## 3.2 Calculated Peat Soil Excavation Volumes

The construction and foundation methods for the required infrastructure within the planning application area have been cross-checked with the ground investigation borehole and trial pit logs to determine where there is potential for required groundworks to interact with buried peat soil horizons.

CFA piling will be utilised adjacent to the existing substation due to its non-displacement nature, which is critical in protecting nearby foundations. This method involves drilling with a continuous flight auger and pumping concrete through the hollow stem as the auger is withdrawn, forming the pile without leaving an open borehole. The process ensures minimal ground disturbance, making it ideal in sensitive areas where lateral soil movement could compromise the integrity of existing infrastructure. Its controlled installation reduces vibration and ground heave, further safeguarding adjacent assets.

ADP is the preferred method across the wider site, particularly for managing peat and soft soil conditions. This technique displaces soil laterally during installation, significantly reducing spoil generation and the need for off-site disposal—an important advantage in peat-heavy areas. By compacting surrounding soils, ADP enhances ground stability and load-bearing capacity. However, due to its displacement effect, it is not suitable near existing structures like substations, where it could alter ground conditions and impact foundation performance. Its efficiency and environmental benefits make it the optimal choice for general site works.

The substation footprint will involve bulk excavation to a depth of 1 m below ground to create a working platform for plant and equipment.

Excavation calculations have also accounted for the interactions between other permanent works and peat soils, specifically proposed SuDS detention basin and ditch realignment. These drainage solutions are proposed in the periphery of the substation extension.

A flood wall will be required as part of the construction, although details are not available at present. Once construction details are available for the flood wall, a re-assessment will be undertaken to determine if peat soil excavation would be required and, if so, revised calculations would be provided.

The calculated peat soil excavation volumes expected to be generated from the substation extension and associated works are provided in **Table 1**.

**Table 1: Peat soil excavation volumes**

| Development element | Total ($m^3$) |
|---|---|
| Continuous Flight Auger piles | 54 |
| Bulk excavation of substation area | 1,741 |
| Detention Basin | 172 |
| Ditch Diversion | 43 |
| **Total** | **2,010** |

The excavation volume calculations have made use of the following assumptions:

- A row of CFA piles to be installed against the entire length of the Margam substation, totalling approximately 138 m.
- CFA pile diameter of 0.90 m.
- CFA pile spacing of 3.00 m.
- An excavation depth of 1.00 m for the substation area.
- An average excavation depth of 2.00 m for the detention basin.
- An excavation depth of 1.20 m for the ditch diversion.

## 3.3 Plans for Storage and Reburial

The peat soil arisings from the CFA piling operations will be blended with other soil and rock materials and will not therefore be suitable for reburial. This material will need to be removed from site for disposal as waste at a suitably licensed facility.

The excavated peat soil from the main substation footprint will require temporary storage if immediate reburial is not possible.

Two reburial locations have been identified within close proximity to the proposed Margam substation and are shown on **Figure 1**. Excavated peat soils would be stored immediately adjacent to the reburial location if it is not possible to rebury the material immediately. There is no fixed statutory time limit on how long excavated peat can be stored before reburial; however, best practice guidance indicates that peat soils should be stored for only a short period of time to prevent drying, oxidation and carbon loss[2][3]; professional experience suggests 'a short period of time' should be no more than 4 to 6 weeks. The key guiding principle is to only re-use peat where it is suitable for the identified and required use. Long-

[2] Developments on Peat and Off-Site Uses of Waste Peat, 2017. Scottish Environment Protection Agency. Available at:. https://www.sepa.org.uk/media/287064/wst-g-052-developments-on-peat-and-off-site-uses-of-waste-peat.pdf.

[3] Good Practice during Wind Farm Construction, 2024. Scottish Renewables and others. Available at:. https://www.nature.scot/doc/good-practice-during-wind-farm-construction.

term storage (>1 year) of peat material is not a recommended option due to the higher incidence of drying, oxidation, carbon loss and risk of siltation from particulate materials.

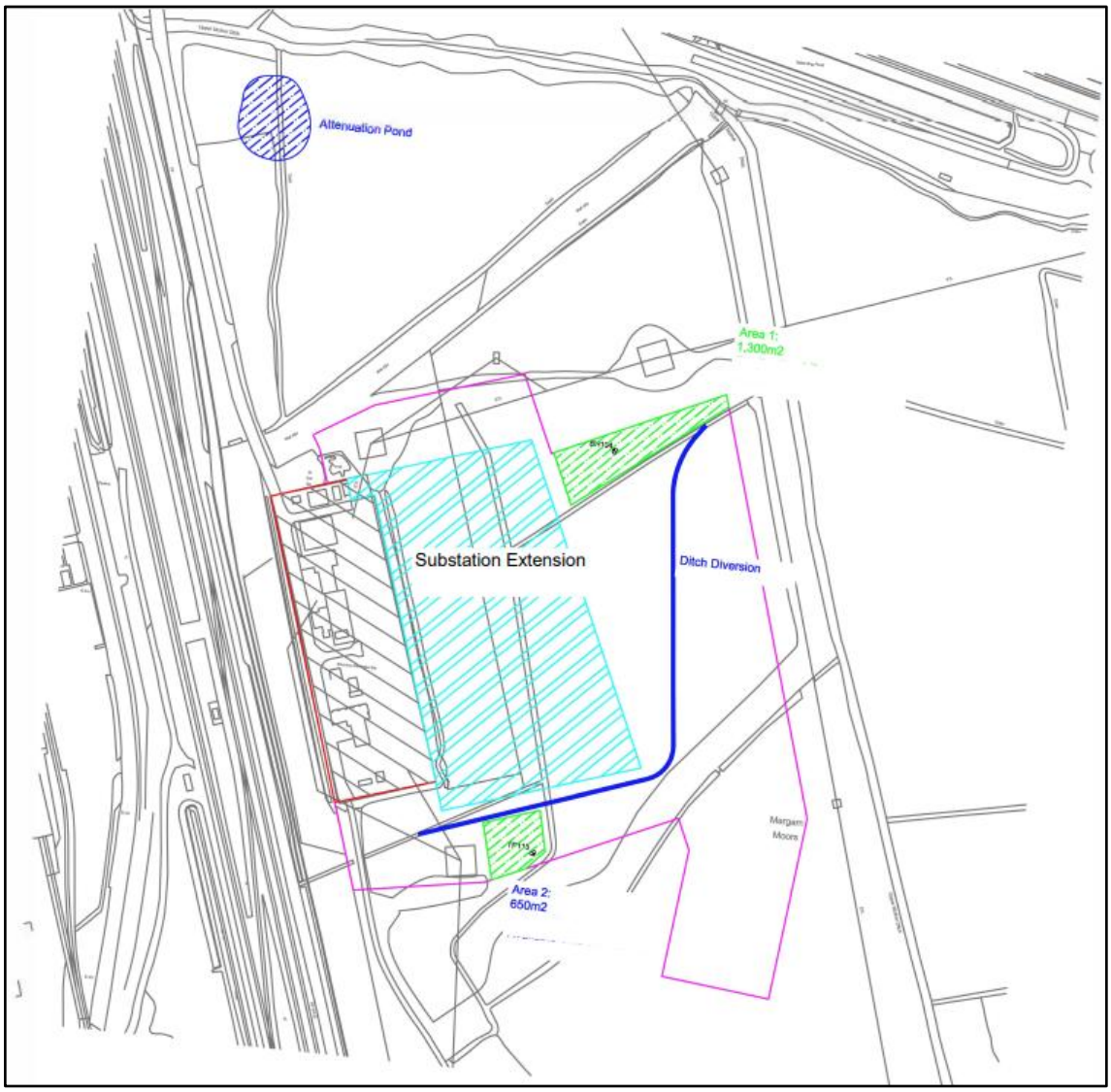


**Figure 1: Proposed peat reburial locations (green hatch)**

The excavation for reburial will be of sufficient depth to ensure that the peat soils are located below the water table. The reburial sites have a combined footprint of up to 1,950 $m^2$ and a proposed maximum depth of 1.7 m to avoid disturbance of peat below this level. This would permit reburial of approximately 2,340 $m^3$ of peat soil assuming a reburial thickness of up to 1.2 m with a capping layer of 0.5 m to prevent drying of the peat soil.

Given the estimated total excavation volume of peat soil is 1,956 $m^3$, the proposed reburial location is suitable for the expected volume of peat soil and provides a contingency volume to allow for bulking or identification of previously unknown peat soil horizons in the construction area.

# 4 GUIDANCE FOR PEAT SOIL HANDLING, STORAGE AND DISPOSAL

## 4.1 Peat Soil Excavation

During construction of the required infrastructure, the excavation of some buried peat soil is unavoidable. The Contractor will adopt the following good practice guidelines with relation to peat soil excavation, handling, storage and reburial:

- Excavated materials would be classified depending on their composition as far as possible, and each type would be stored separately. It is recognised that the augering process will lead to some mixing of soil types.
- A topsoil strip will be undertaken to preserve reusable soils for landscaping, with excavated materials considered surplus and subject to removal unless reused on site for engineered fill or restoration.
- Excavated peat soils would be transported to the planned storage location as soon as practicable after excavation.

Although some peat soil will be excavated as part of the piling operations, this would be mixed with other soil and rock materials. As a result, it would not be possible to separate out the peat soil for separate reburial. The mixed arisings would be removed from the site for disposal at a suitably licensed facility.

## 4.2 Temporary Storage

In the event that peat soils require to be stored, an area adjacent to the reburial location has been assigned for temporary storage. The following outline best practice would be applied to the peat soil storage area:

- If possible, peat soils should be placed in the reburial location immediately rather than stored separately.
- Above-ground storage should be for as short a time as possible to minimise drying of the excavated peat soil, with a 6-week reinstatement objective and maximum storage of three months.
- Stockpiles should be kept covered with a geotextile or equivalent material to minimise drying from sun or wind.
- During periods of dry weather, light spraying of the temporary peat soil stores would be applied in order to minimise drying.
- Silt fencing or equivalent silt management measures would be established on the downslope side of the stockpiles to minimise silt transfer into the drainage network.

# 5 SUMMARY

This Construction Peat Management Plan provides an assessment of the expected volumes of peat soils that will require excavation during the construction of the Margam Substation extension. The assessment has included consideration of all the proposed excavation works that have potential to encounter peat soils during the construction process.

In accordance with the Step-Wise Approach outlined in Planning Policy Wales (Edition 12, 2024), a comprehensive Siting Study was undertaken to identify a preferred location for the proposed 275 kV GIS substation[4]. The study assessed ten potential sites, with five shortlisted for detailed appraisal. Each site was evaluated against environmental, technical and socio-economic criteria, including proximity to designated ecological sites, landscape sensitivity, access and integration with existing infrastructure.

Various options for the design of the substation location were considered. The primary aim of the design considerations was to minimise the footprint of the Proposed Development, such that permanent impacts on the SINC would be minimised; this includes implementing construction methods that minimise impact on peat, such as Auger Displacement Piling. The scheme design has also included consideration of elements of the design to minimise impacts beyond the footprint of the substation itself on the retained area of the site. Further details in relation to the siting study is available within the Planning Statement supporting this planning application.

The PMP assessment indicates that 2,010 $m^3$ peat soil will be excavated as a result of infrastructure development, of which 1,956 $m^3$ would be suitable for reburial. This peat soil will be reburied at the identified locations near the proposed Margam substation. The proposed material storage area is in excess of the expected excavation volumes, providing a level of contingency in the event that more peat soil is encountered and to allow for bulking of the peat soil as it is likely to be mixed with other soil materials during construction operations.

Approximately 54 $m^3$ peat soil is expected to be excavated as a result of augered piling operations. As a result of the augering process, this peat soil will be mixed with other soil and rock materials and it will not be possible to separate out the peat soils from these other materials. The mixed arisings will be removed from site for disposal at a suitably licensed facility.

The immediate reburial or careful storage and reburial of excavated peat soils will help to minimise carbon loss during the excavation process and to prevent long-term carbon loss once the peat soil is reburied and capped.

[4] Stantec, 2025. *Port Talbot Connection Substation - Siting Study – Revision 2.*