AN SUIDHE SUBSTATION ENVIRONMENTAL APPRAISAL

ANNEX O

PEAT LANDSLIDE HAZARD AND RISK ASSESSMENT

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

Arcus Consultancy Services Ltd (Arcus) was commissioned by ERM on behalf of SSEN Transmission Ltd (the Applicant) to carry out a Peat Landslide Hazard Risk Assessment (PLHRA) to support an Environmental Assessment (EA) for a new 275 kV electricity substation and overhead line (OHL) Tie-Ins (hereby known as 'the Project') in the vicinity of the existing An Suidhe substation, located at National Grid Ref. 204861, 705524.

The new proposed substation, Temporary Works Area (TWA), Sustainable Urban Drainage System (SUDS) attenuation pond and permanent access tracks (hereby known as the Proposed Development) will be subject to Town and Country Planning, while the OHL Tie-Ins and accompanying towers (hereby known as the Associated Development) will be submitted for Section 37 consent. The Site Layout Plan is shown on **Figure 1** in **Appendix A**.

It should be noted that the Project's construction schedules will be aligned. Therefore, peat excavation and re-use will be considered within the wider scope of the Project.

This PLHRA has been prepared to inform Argyll & Bute Council (ABC) and statutory consultees of the prevalence of peat across the Proposed Development and Associated Development as well as highlighting any potential risk of peat slide.

This PLHRA has been undertaken to Scottish Government Guidance 'Proposed electricity generation developments: peat landslide hazard best practice guide'[1].

The PLHRA is accompanied by the following appendices:

- Appendix A: Figures;
- Appendix B: Site Photographs;
- Appendix C: Hazard Rank Calculations; and
- Appendix D: Peat Coring Records

1.2 Scope and Purpose

The scope of this PLHRA is to:

- Review available desk-based information on the Site;
- Undertake a site walkover survey and peat probe surveys to characterise the prevailing ground conditions and identify existing or potential peat instability;
- Report on the findings of the survey and assess the potential instability risk and estimate the hazard from any potential peat slide; and
- Recommend mitigation measures and specific construction methodologies that should be considered during the construction period, if required.

This PLHRA provides factual information on the peat survey results relating to the Proposed Development and Associated Development. The desk-based information and site surveys have been utilised to assess the potential risk of any peat slide. The methodology adopted, and details on the assessment, are outlined in **Sections 3, 4** and **5** of this PLHRA. The assessment has been undertaken in accordance with Scottish Government Guidance in assessing the likelihood, and consequence, of peat slide.

[1] Scottish Government (2017) Proposed electricity generation developments: peat landslide hazard best practice guide Proposed electricity generation developments: peat landslide hazard best practice guide - gov.scot (www.gov.scot) (Accessed 16/05/2022)

1.3 Project team

Team Member	Job Title	Qualifications	No. Years Experience
Gregor Hirst	Senior Engineer	BSc (Hons)	6 Years
David Ballentyne	Principal Engineer	BSc (Hons)	18 Years
Tomos Ap Tomos	Technical Director	BEng (Hons) MCIHT	25 Years

This assessment was undertaken by Gregor Hirst (BSc Hons), a Geo-Environmental Engineer of 6 years, and was supported by David Ballentyne a Geo-Environmental Civil Engineer with for over 18 years of experience in ground condition assessment. This Chapter has been technically reviewed by Tomos Ap Tomos, Technical Director of Engineering.

2 SITE INFORMATION AND DESK STUDY

2.1 Site Description and Topography

The land which the Project occupies (the Site) is located approximately 5 km south west of Inveraray covering an area of approximately 42 hectares (ha). The Site is located within the administrative boundary of ABC. The Site extends north east to south west, making use of the existing access track to An Suidhe Substation which connects to the A83, approximately 6.45 km south west of Inveraray.

The topography of the Site and immediate vicinity is relatively complex. The elevation of the Site approximately ranges from 190 metres (m) Above Ordnance Survey Datum (AOD) and falls to around 160 m AOD towards the north eastern boundary of the Site. There is one notable hilltop at the centre of the Site named Tom nam-Buachaillean.

2.2 Site Walkover

The purpose of the desk study and site visit was to gain a thorough understanding of the condition of the Site including topography, geology, existing peat instability and hydrology. The outcome of this stage of the study was to determine which areas required detailed intrusive survey (by peat probing) and ultimately provide data for the assessment of PLHRA.

Aerial and satellite photography was reviewed ahead of a number of site visits, undertaken as part of the overall EA process between November 2021 and February 2022. The Site was examined for evidence of peatlands, presence of landslip and localised hagging. Geological mapping and details of proposed infrastructure were pre-loaded to a handheld device for reference during the site walkover. Following a review of these in parallel with the initial site walkover, the desk study aimed to identify and or verify the following:

- The general condition of peat deposits;
- Evidence of any previous peat instability;
- The presence of low lying wet/peat lands; and
- Watercourses and other potential receptors.

2.2.1 Site Conditions

The Project is located in an area of commercial forestry at varying stages of development. The majority of the Proposed Development is within a deforested area where long grasses and shrubs now dominate in hummocky ground. A strip of mature forestry is present within the south eastern area of the Proposed Development.

The majority of the Associated Development is also in deforested areas other than in the southern area where mature forestry is present, with the exception of the extreme south west which is also deforested. Evidence of artificial drainage associated with the forestry plantations was observed and may have resulted in the dewatering of any peat present in these areas of the Site.

Neither mining or quarry activities are known to have taken place at the Site.

The Geomorphology Map is presented as **Figure 4** in **Appendix A,** while site photographs taken during the site walkover are included in **Appendix B**.

2.3 Published Geology

2.3.1 Superficial Soils

Published British Geological Survey (BGS)[2] data information on superficial soils indicates that superficial soils are not present across a majority of the Site. Where superficial deposits are recorded, they comprise glacial deposits of Till within the northern area of the Site, in the location of the proposed substation and temporary construction compound.

Figure 2 illustrates the 'Superficial Soils' map included in **Appendix A.**

2.3.2 Solid Geology

Published BGS mapping information on solid geology indicates the majority of the Site to be underlain by a mix of Semipelite and Metagabro rock. A metamorphic bedrock, which was formerly sedimentary belonging to the Ardrishaig Formation is present in the northern area of the Site, in close proximity to the proposed substation and Temporary Works Area (TWA). Metamorphic bedrock belonging to the Dalradian Supergroup comprising Metagabbro and Metamicrogabbro is present throughout the central area of the Site, in close proximity to the proposed tower infrastructure. Large bands of igneous intrusions (late Silurian to early Devonian) and minor igneous intrusions of the Mull Dyke Swarm (Palaeogene) are also present within the Site.

Figure 3 illustrates the 'Solid Geology' included in **Appendix A**.

Published BGS Geosure mapping[3] indicates that no faulting exists on-site with the nearest linear feature recorded approximately 1.5 km to the north west of the infrastructure, running in a south west- north east orientation.

2.4 Hydrology and Hydrogeology

The groundwater units underlying the Site are identified by Scotland's Environment mapping service as the Oban and Kintyre body[4]. These units have an overall SEPA classification of 'Good', with a low productivity in which groundwater "flow is virtually all through fractures and other discontinuities".

Based on SEPA mapping [5], the Project is located within the sub-catchments of Allt Tom a' Challtuinne to the north west and Allt Garbh to the south, part of the wider catchment of the Douglas Water. The Douglas Water is classified under the Water Framework Directive (WFD) as Poor (SEPA ID 10226). The Douglas Water flows from the north and passes the eastern aspect of the Proposed Development before flowing south-east and discharging into Loch Fyne. Several unnamed watercourses drain across the Project area and flow north east and east into Douglas Water. In the south, several unnamed watercourses flow south from the Development area across the existing access track and A83 road into the Allt Garbh. Allt Garbh then flows north east before intersecting with Douglas Water.

Figure 4, illustrating the Geomorphology of the Site is included in **Appendix A**.

2.5 Historical Landslip and Geomorphology

No historical landslides are recorded on the site or in the surrounding area using the online BGS GeoIndex [6]

[2] BGS (2019): http://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed 17/05/22)

[3] BGS (2019): https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 17/05/22)

[4] SEPA (undated) Groundwater classification [Online] Available at: https://map.environment.gov.scot/sewebmap/ (Accessed: 17/05/22)

[5] SEPA (2014) Water Environment Hub [online] Available at https://www.sepa.org.uk/data-visualisation/water-environment-hub/ (Accessed 17/05/22)

[6] GeoIndex - British Geological Survey (bgs.ac.uk) (Accessed 17/05/22)

No evidence of historic peat hagging or localised slippage was noted during the Site walkover and topsoil, where undisturbed generally appeared to be in good condition. Extensive forestry plantations are present across the Site, the majority of which have been subject to felling and it is possible that properties of any peat deposits may have been altered due to these historical activities. Nonetheless, the possibility of instability within peat soils cannot be discounted, especially where there are significant topographic variances and the presence of watercourses.

3 SITE SURVEYS AND RESULTS

3.1 Investigations

Preliminary peat probing was undertaken as part of the initial site optioneering, which was superseded by phases of detailed peat probing focussing on the proposed site infrastructure.

Peat depths have been determined within areas of proposed infrastructure through peat probe surveys undertaken as recommended in the NatureScot (formerly Scottish Natural Heritage (SNH)), Scottish Government and James Hutton Institute guidance for investigating peat. The survey was initiated to inform the EA and design work while supporting the PLHRA. The survey comprised of the following:

- Infrastructure focussed probing comprising 50 m centres along OHL with perpendicular probes between 10 m and 25 m either side of line;
- 10 m x 10 m grid across proposed substation footprint; and
- 10 m x 10 m grid covering an area of 50 m^2 at proposed towers.

Peat probing surveys were undertaken across a series of visits between November 2021 and February 2022. The probe positions for these visits were focussed on the Proposed infrastructure including the substation, permanent access tracks and other 'Temporary Works Areas'. Peat depths were measured along the proposed access tracks at 50 m centres with offsets of 25 m on either side of the centre line where possible, while an intense 10 m grid provided detailed peat information at the proposed substation and a 25 m grid was adopted to cover the TWA. Furthermore, regarding the Associated Development six tower positions were covered at 10 m spacing to a 25 – 30 m distance in all directions to allow for potential micrositing and proposed temporary access tracks were covered in a similar methodology to the permanent tracks.

It should be acknowledged that natural variations in peat depth/thickness could occur between probe positions, although areas of infrastructure have undergone intensely spaced probing meaning that variations are less likely.

3.2 Summary of Peat Depths

Throughout the peat surveys a total of 470 probes were progressed with over 95% of probes recording peat depths of 1.0 m or less. Thick peat (where the depth was greater than >1.0 m) was recorded at 4.7% of probe locations. The majority of thick peat was recorded at depths between 1.0 m – 2.0 m with only eight probes recording depths in excess of 2.0 m.

Proposed infrastructure within the Associated Development, including a tower and a section of temporary access track are located in the vicinity of the deep peat near the periphery of the forestry in the west of the Site. Micro-siting may be required to re-locate it to an area of shallower peat, if possible.

The Proposed Development infrastructure including proposed substation and temporary works area are located in a deforested area (spruce plantation) with overgrown grasses and discarded wood cutting recorded during the walkover. The area has a very shallow peat profile, with only one probe recording a peat depth greater than 1.0 m on the southern edge of the substation, while all probes in the TWA recorded peat depths less than 1.0 m.

The Permanent Access Track (Proposed Development) linking the substation to the existing track generally lies on shallow peat, however one reading of 1.4 m was recorded on the centre line and may require some micro-siting to avoid. The Permanent Access Tracks in the east connecting two towers to the existing track were recorded to be in areas of peat less than 0.5 m.

Table 1 summarises the recorded peat depths.

Table 1: Peat Depth Summary

Peat Depth Range (m)	No of peat probes	Percentage of Total (%)
0.00 - 0.50	408	86.8
0.51 - 1.00	40	8.5
1.01 - 1.50	7	1.5
1.51 - 2.00	7	1.5
2.01 - 2.50	5	1.1
2.51 - 3.00	2	<1.0
3.01 – 3.50	0	0.0
3.51 – 4.00	1	<1.0

The peat probe locations and depths are shown on **Figure 5** appended with this PLHRA, and detailed probing records are included in **Appendix C**. The Interpolated Peat Depths were determined using the Inverse Distance Weighting (IDW) method of interpolation to a resolution of 5 m and are illustrated on **Figure 6**.

3.3 Peat Cores

Peat cores were also obtained from selected areas of the Site where peat probing had identified areas of deep peat, in order to further characterise the peatland. The methodology in which the peat coring was undertaken was guided by the Peatland Survey (2017) *Guidance on Developments on Peatland* [7], commissioned by the Scottish Government, Scottish National Heritage (now NatureScot) and SEPA. An outline of the methodology along with photographs and characterisation of the peat cores are presented in the Peat Coring Records in **Appendix D**.

Humification of peat is determined using the Von Post scale which indicates the degree to which peat has undergone humification or, more correctly, a type of decomposition which includes breakdown under anaerobic conditions. The Von Post Scale (H) ranges from 1 to 10, the higher the number the higher the degree of humification.

The core samples were obtained to depths ranging from 1.0 m to 3.0 m and humification values ranged between 4 and 8, generally becoming more humified with depth, as presented in the Peat Coring Records along with definitions of the Von Post values in **Appendix D**.

[7] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. *Guidance on Developments on Peatland*,

4 GUIDANCE AND METHODOLOGY

4.1 Overview of Guidance and Peat Failure Mechanisms

4.1.1 Peat Depth and Slope

The Scottish Government guidance divides peat instability into two categories: 'peat slides' and 'bog bursts'. The guidance states that peat slides have a greater risk of occurrence in areas where:

- Peat is encountered at or near to ground surface level;
- The thicknesses are recorded in the region of 2.0 m (above which, in general terms, peat instability would increase with peat thickness); and
- The slope gradients are steep (between 5° and 15°).

Bog bursts are considered to have a greater risk of occurrence in areas where:

- Peat depth is greater than 1.5 m; and
- Slope gradients are shallow (between 2° and 10°).

It should be noted however that peat instability events, although uncommon, can occur out with these limits. Reports of bog bursts are generally restricted to the Republic and Northern Ireland.

Further to the general guidance above, in relation to peat depth, it is considered that the extent and depth of peat is controlled to a degree by rainfall and elevation, giving rise to three common types of peat (Boylan et al. 2008[8]):

- Upland Blanket Bog: Blanket bogs are typically about 3 m thick however, they can be up to 5 m thick. Generally thinning at greater elevations;
- Raised Bog: Raised bogs generally tend to be 3-12 m thick, averaging 7 m with their growth occurring above the water table; and
- Lowland Blanket Bog: Much the same as the upland version; however, they form around sea level in areas of very high rainfall.

Generally, the potential for peat instability increases with peat depth, however other instability indicators need to be considered, namely slope and substrate.

4.1.2 Substrate

Peat slide failures tend to occur at the interface of the peat and underlying substrate therefore, understanding the nature of the underlying substrate can provide a key factor when considering the risk stability.

Using the peat probe refusal, an estimation of the underlying materials can be determined based on:

- Gradual refusal – Clay;
- Crunching/Gritty – Weathered Rock/Sand and Gravel; or
- Abrupt Refusal/Hard – Rock.

Where sand and/or gravel is recorded, the interface is considered to be the best-case scenario with the highest friction value.

Where clay is recorded, the upper horizons of the clay are typically softened through poor drainage in this soil group with low shear strengths expected. While rock substrate provides a high strength, the surface being smooth can lead to a weak interface, with similar risk to that of a clay substrate.

[8] Boylan et al (2008) Peat Slope Failure in Ireland

The presence of slip material, or evidence of peat instability would represent the worst-case scenario for the assessment of substrate.

The substrate parameters are included in the Hazard and Exposure Assessment in **Section 5** of this PLHRA.

4.1.3 Other Considerations

Preparatory factors which effect the stability of peat slopes in the short to medium-term include:

- Loss of surface vegetation (deforestation);
- Changes in sub-surface hydrology;
- Increase in the mass of peat through accumulation, increase in water content and growth of tree planting; or
- Reduction in shear strength of peat or substrate due to chemical or physical weathering, progressive creep and tension cracking.

Triggering factors which can have immediate effect on peat stability and act on susceptible slopes include:

- Intensive rainfall or snow melt causing pressures along existing or potential peat/substrate interfaces;
- Snow melt;
- Alterations to drainage patterns, both surface and sub-surface;
- Peat extraction at the toe of the slope reducing the support of the upslope material;
- Peat loading (commonly due to stockpiling) causing an increase in shear stress; and
- Earthquakes or rapid ground accelerations such as due to blasting or mechanical movement.

Consideration of peat stability should form an integral part of development design. While peat does not wholly provide a development constraint, areas of deep peat or peat deposits on steep slope should be either avoided through design and micro-siting; or mitigation measures should be designed to avoid instability and movement.

4.2 Methodology

Despite The Proposed Development being an application under the Town and Country Planning (Scotland) Act 1997[9] and the Associated Development is to be submitted for Section 37 consent, the PLHRA has been carried out in accordance with the Energy Consents Unit, Scottish Government guidance of 2017 titled "Peat Landslide Hazard and Risk Assessments - Best Practice Guide for Proposed Electricity Generation Developments"[10].

In June 2014, Scottish Planning Policy[11] (SPP) and National Planning Framework (NPF3)[12] were published. In relation to peat and the assessment of effects on resource, NPF3 references Scotland's National Peatland Plan[13]. These policy, framework and guidance documents are considered in this PLHRA. The PLHRA undertaken is based on:

- Desk based assessment;

[9] Scottish Government (1997) Town and Country Planning (Scotland) Act 1997 [Online] Available at: http://www.legislation.gov.uk/ukpga/1997/8/contents (Accessed 17/05/22)

[10] Scottish Government (2017) Peat Landslide Hazard and Risk Assessment: Best Practice Guide for Proposed Electricity Generation Development [Online] Available at: https://www.gov.scot/Publications/2017/04/8868 (Accessed 17/05/22)

[11] Scottish Government (2014) Scottish Planning Policy [Online] Available at: http://www.scotland.gov.uk/Topics/Built-Environment/planning/Policy (Accessed 17/05/22)

[12] Scottish Government (2014) National Planning Framework 3 [Online] Available at: http://scotland.gov.uk/Resource/0045/00453683.pdf (Accessed 17/05/22)

[13] SNH (2015) Scotland's National Peatland Plan [Online] Available at: https://www.nature.scot/climate-change/taking-action/carbon-management/restoring-scotlands-peatlands/scotlands-national-peatland-plan (Accessed 17/05/22)

- Site Walkover;
- An initial Phase 1 Probing scheme;
- Phase 2 Probing comprising infrastructure specific probing; and
- A hazard and risk ranking assessment.

The area of the Site subject to assessment was determined by the emerging development layout which considered both anticipated peat deposits as well as other physical and environmental constraints.

4.2.1 Development of Hazard Rank

The early stages of the PLHRA including the desk study, site visit and peat probing were carried out in parallel with the assessment of wider constraints to inform the layout of the Project. Following identification of peat depths within the Site, the assessment has determined the potential effects on the peat resource from construction activities which would include:

- Construction of tracks;
- Excavation of infrastructure bases;
- Foundation construction;
- Construction of hardstanding; and
- Temporary storage of peat and soils.

An assessment of the peat probing data and a review against desk study information was undertaken and a hazard rank was calculated for different zones across the Site reflecting risk of peat instability/constraint to construction.

Where practical, the Project design would be progressed to avoid areas of a risk score above 'low'. Where this has would not be achievable, areas affected would be discussed in both the EA as having significant effect, with relative mitigation measures proposed to reduce this, and recorded on a risk register which sets out specific mitigation measures which are considered necessary to reduce the risk of inducing instability.

Details of the hazard and risk ranking assessment is included in **Sections 5** and **6** of this PLHRA.

5 HAZARD AND EXPOSURE ASSESSMENT

5.1 Background

A 'Hazard Ranking' system has been applied across the Site based on the analysis of risk of peat slide as outlined in the Scottish Government guidance. This is applied on the principle:

Hazard Ranking = Hazard x Exposure

Where 'Hazard' represents the likelihood of any peat slide event occurring and 'Exposure' being the impact or consequences that a peat slide may have on sensitive receptors that exist on and around the Site.

5.2 Methodology

The determination of Hazard and Exposure values is based on a number of variables which impact the likelihood of a peat slide (the Hazard), and the relative importance of these variables specific to the Site.

Similarly, the consequences or Exposure to receptors is dependent on variables including the particular scale of a peat slide, the distance it will travel and the sensitivity of the receptor.

In the absence of a predefined system, the approach to determining and categorising Hazard and Exposure is determined on a site-by-site basis. The particular system adopted for the Development PLHRA assessment is outlined in the following sub sections.

5.3 Hazard Assessment

The potential for a peat slide to occur during the construction of a electricity substation and OHL Tie-Ins depends on several factors, the importance of which can vary by site. The factors requiring considerations would typically include:

- Peat depth;
- Slope gradient;
- Substrate material;
- Evidence of instability or potential instability;
- Vegetation cover; and
- Hydrology.

Of these, peat depth and slope gradient are considered to be principal factors. Without a sufficient peat depth and a prevailing slope, peat slide hazard would be negligible.

The Slope Gradient has been established using a Digital Terrain Model (DTM) to a resolution of 5 m which is illustrated in **Figure 7**. For the Proposed Development and Associated Development, the substrate material is also considered a relevant factor in relation to slide.

Vegetation cover and evidence of instability or potential instability were assessed during site surveys and, alongside satellite photography, informed the Geomorphology Map presented in **Figure 4**. This information was also considered during the adoption of hazard zones across the Site, which are presented in **Figure 9: Hazard Rank Zonation Plan**.

Due to the nature of the assessment and number of data points used to establish hazard ranking, gathering hydrological data at each probe point through the use of groundwater boreholes and a subsequent monitoring period is considered impractical. Therefore, an assumption on groundwater levels has been adopted for the assessment that 90% of the

peat at each probe location is below the water table. As such, it is assumed that the water table across the Site is relatively high.

5.4 Hazard Rating

When several factors may impact on the Hazard potential, a relative ranking process is applied attributing different weighting to each factor as shown below.

Table 4: Coefficients for Slope Gradients

Slope Angle (degrees)	Slope Angle Coefficients
Slope < 2°	1
2° < Slope < 4°	2
4° < Slope < 8°	4
8° < Slope < 15°	6
Slope >15°	8

Table 5: Coefficients for Peat Thickness and ground conditions

Peat Thickness	Ground Conditions Coefficients
Peaty or organic soil (<0.5 m)	1
Thin Peat (0.5 – 1.0 m)	2
Deep Peat (>1.0 m)	3*
Deep Peat (>3.0 m)	8

* - Note that thicker peat generally occurs in areas of shallow gradient and records and research indicate that thick peat does not generally occur on the steeper gradients.

Table 6: Coefficients for Substrate

Substrate Material	Substrate Coefficients
Sand/gravel	1
Rock	1.5
Clay	2
Not proven	2
Slip material (Existing materials)	5

The Hazard Rating Coefficient for a particular location is calculated using the following equation:

Hazard Rating Coefficient = Slope Gradient x Peat Thickness x Substrate

From the Hazard Rating Coefficient, the risk to stability can be ranked as set out in Table 7.

Table 7: Hazard Rating

Hazard Rating Co-efficient	Potential Stability Risk (Pre-Mitigation)
<5	Negligible
5 to 15	Low
16 to 30	Medium
31 to 50	High
> 50	Very High

5.5 Peat Stability Assessment

The likelihood of a particular slope or hillside failing can be expressed as a Factor of Safety. For any potential failure surface, there is a balance between the weight of the potential landslide (driving force or shear force) and the inherent strength of the soil or rock within the hillside (shear resistance).

The guidance states that the 'Infinite Slope' method of analysis, after Skempton and DeLory (1957), is the most well established and commonly applied method for the assessment of peat slope stability. The stability of a slope can be assessed by calculating the factor of safety F, which is the ratio of the sum of resisting forces (shear strength) and the sum of the destabilising forces (shear stress):

$$F = \frac{c' + (\gamma - m\gamma_w) z \cos^2 \beta \tan \phi'}{\gamma z \sin \beta \cos \beta}$$

Where c' is the effective cohesion, γ is the bulk unit weight of saturated peat, γ_w is the unit weight of water, m is the height of the water table as a fraction of the peat depth, z is the peat depth in the direction of normal stress, β is the angle of the slope to the horizontal and ϕ' is the effective angle of internal friction. Values of F < 1 indicate a slope would have undergone failure under the conditions modelled; values of F > 1 suggest conditions of stability.

In the absence of any historical hydrological monitoring, an assumption on groundwater levels has been adopted for the assessment, that 90% of the peat column at each probe location is below the water table, an overall conservative approach. While the assessment considers the recorded data at each of the peat probes to establish hazard ranking for the purposes of the peat stability analysis, groundwater depth is conservatively assumed to be within close proximity of the surface, based on the understanding of peat and its hydrological properties that it can consist of up to 90% water by volume.

Assumed geotechnical parameters have been utilised in the formula to inform the stability assessment, based on literature values to inform the stability analysis, as included in **Table 8**.

Table 8: Literature for Geotechnical Parameters of Peat

Reference	Effective Cohesion C' (kPa)	Effective Angle of Friction ϕ (°)	Unit Weight Y' (kN/m²)	Comments
Hanrahan et al (1967)[14]	5.5 – 6.1	36.6 - 43.5	-	Remoulded H4 Sphagnum peat
Hollingshead and Raymond (1972)[15]	4.0	34	-	-
Hollingshead and Raymond (1972)	2.4 – 4.7	27.1 – 35.4	-	Sphagnum peat (H3, mainly fibrous)
Carling (1986)[16]	6.52	0	10	-

[14] Hanrahan et al (1967) - Hanrahan, E.T., Dunne, J.M., and Sodha, V.G. 1967. Shear strength of peat. Proceedings Geotechnical Conference, Oslo, Vol. 1, pp. 193–198.

[15] Hollingshead and Raymond (1972) - Hollingshead, G.W., and Raymond, G.P. 1972. Field loading tests on Muskeg, Canadian Geotechnical Journal, 9(3): 278–289.

[16] Carling (1986) - Peat slides in Teesdale and Weardale, northern pennines, july 1983: Description and failure mechanisms

Kirk (2001)[17]	2.7 – 8.2	26.1 – 30.4		Ombrotrophic blanket peat
Warburton et al (2003)[18]	5.0	23	9.68	Basal Peat
Warburton et al (2003)	8.74	21.6	9.68	Fibrous Peat
Dykes and Kirk (2006)	3.2	30.4	9.61	Acrotelm
Dykes and Kirk (2006)	4.0	28.8	9.71	Catotelm

C′ – effective cohesion (kPa), typically ranging from 2.5 to 8.5 therefore 5.0 has been adopted for the purposes of the assessment.

ϕ – effective angle of friction (°), typically ranging from 21.6 to 43.5 therefore 23 has been adopted for the purposes of the assessment.

Y' – unit weight (kN/m^2), typically ranging from 9.61 to 10, therefore 10 has been adopted for the purposes of the assessment.

In accordance with the best practice method, F values of <1.0 indicate slopes that would experience failure under the modelled conditions and as such are considered areas of high risk. However, Boylan et al (2008) indicate that a relatively high value of F=1.4 should be used to identify slopes with the potential for instability. Adopting this approach, 'high' risk areas area indicated where F is <1.0, 'medium' risk areas are indicated as 1.01 to 1.50 and >1.5 are 'low' risk.

Using digital terrain modelling and GPS co-ordinates of each peat probe, a Factor of Safety (FoS) has been calculated for each probe locations which has been interpolated through ArcGIS Spatial Analyst tools. In this instance, the Inverse Distance Weighting (IDW) method of interpolation was used with a resolution of 5 m The FoS Assessment provides a sense check of the ranking based system, providing an absolute approach to the 'Factor of Safety Plan' is shown on **Figure 8**.

The results of the FoS calculations indicate that the lowest value point at the Site is 1.67 and therefore all the points are 'low' risk in regards to FoS.

5.6 Exposure Assessment

The main Exposure receptors identified within the Site and surrounding area which could potentially be affected in the event of a peat slide were important habitats (blanket bog), watercourses and associated tributaries.

The impact of a peat slide on receptors can be assessed on a relative scale based on the potential for loss of habitat, a historical feature or disruption/danger to the public. To effectively assess the impact, the assessment of Exposure effect must also consider the distance between the hazard and the receptor, and the relative elevation between the two.

5.7 Exposure Rating

Similar to the Hazard Rating, the Exposure Ratings were determined using relative ranking process by attributing the different weighting systems to each factor as shown in Tables 9 - 11:

[17] Kirk (2001) - Initiation of a multiple peat slide on Cuilcagh Mountain, Northern Ireland

[18] Warburton et al (2003) - Anatomy of a Pennine peat slide, Northern England

Table 9: Coefficients for Receptor Type

Receptor	Receptor Coefficients
Road, path or track	3
Minor water feature	6
Site infrastructure	6
Dwelling	8
Major water feature	8
Blanket bog	8

Table 10: Coefficients for Distance from Receptor

Distance from Receptor	Distance Coefficients
> 1 km	1
100 m to 1 km	2
10 m to 100 m	3
<10 m	4

Table 11: Coefficients for Receptor Elevation

Receptor Elevation	Elevation Coefficients
< 10 m	1
10 m to 50 m	2
50 m to 100 m	3
> 100 m	4

The Exposure Rating Coefficient for a particular location is calculated using the following equation:

Exposure Rating Coefficient = Receptor x Distance x Elevation

From the Exposure Rating Coefficient, the risk to stability can be ranked as set out in **Table 12**.

Table 12: Exposure Rating

Exposure Rating Co-efficient	Potential Stability Risk (Pre-Mitigation)
<6	Very Low
6 to12	Low
13 to 24	High
24 to 30	Very High
>30	Extremely High

5.8 Rating Normalisation

In order to achieve an overall Hazard Ranking in accordance with the Scottish Government Guidance, the Hazard and Exposure Rating Coefficient derived from the coefficient tables are normalised as shown in **Table 13**.

Table 13: Rating Normalisation

Hazard Rating	Exposure Rating

Current Scale	Normalised Scale	Current Scale	Normalised Scale
< 5 Negligible	1	<6 Very Low	1
5 to 15 Low	2	6 to 12 Low	2
15 to 30 Medium	3	13 to 24 High	3
30 to 50 High	4	25 to 30 Very High	4
>50 Very high	5	>30 Extremely High	5

The record of the Hazard Rank Assessment is included in **Appendix C** of this PLHRA.

6 HAZARD RANKING

Having identified the rating coefficients in **Section 5** of this PLHRA, it is possible to categorise areas of the Site with a Hazard Ranking by multiplying the Hazard and Exposure Rating. Hazard Ranking and associated suggested actions matrix are shown in **Tables 14** and **15** below.

Table 14: Hazard Ranking and Suggested Actions

Hazard Ranking		Action Suggested in the Scottish Executive Guidance
17-25	High	Avoid project development at these locations.
11-16	Medium	Project should not proceed unless hazard can be avoided or mitigated at these locations, without significant environmental impact, in order to reduce hazard ranking to low or less
5-10	Low	Project may proceed pending further investigation to refine assessment. Mitigation of hazards maybe required through micro-siting or re-design at these locations.
1-4	Negligible	Project should proceed with monitoring and mitigation of peat landslide hazards at these locations as appropriate.

Table 15: Hazard Ranking Matrix

Hazard Rating						
	5	Low	Low	Medium	High	High
	4	Negligible	Low	Medium	Medium	High
	3	Negligible	Low	Low	Medium	Medium
	2	Negligible	Negligible	Low	Low	Low
	1	Negligible	Negligible	Negligible	Negligible	Low
		1	2	3	4	5
		Exposure Rating				

Receptor exposure was assessed for each of the five hazard zones using the approach in **Section 5**. A summary of the Hazard Ranking result for each identified area is summarised in **Table 16** and is presented in **Figure 9: Hazard Ranking Zonation Plan**. The zonation is based on a combination of considerations including calculated hazard result, peat depth, topography, receptors and land uses.

7 SLIDE RISK AND MITIGATION

7.1 General

The PLHRA has shown the Site to be generally of 'negligible' hazard ranking, with an isolated area of 'low' hazard ranking. These hazard rankings are a result of limited peat cover across much of the site leading to negligible hazard across much of the site and just a localised area of deep peat recorded beneath the proposed substation platform which has informed a Low rank area.

No Medium or High risk areas have been identified within the Proposed Development or Associated Development and therefore a significant risk of peat slide is not considered to present based on the Hazard Ranking assessment. Nonetheless, a risk from peat slide may still exist and mitigation measures as outlined in **Section 7.3** of this PLHRA should be applied to minimise any risk.

Where the hazard ranking has been lowered through mitigation measures, the original ranking will remain in the overall hazard zoning plan. It should be acknowledged that the hazard zonation plan is based on the pre-mitigation status.

While specific recommended mitigation in 'low' ranked areas are proposed, other mitigation is embedded in the design. It is also necessary for detailed design and construction of the Proposed Development and Associated Development to be undertaken in a competent and controlled manner.

The embedded mitigation and good practice measures are set out in **Section 7.2** and **Section 7.3** of this PLHRA. It should be noted that the mitigation measures defined are not exclusive and other forms of mitigation may well be required and should be implemented during construction of the Proposed Development and Associated Development.

Table 16: Hazard Ranking

Hazard Area and Infrastructure		**Unmitigated Hazard**		**Mitigated Hazard**	
Hazard Area	**Infrastructure Affected**	**Ranking**	**Key Aspects**	**Specific Actions**	**Ranking**
H1	Proposed towers and temporary tracks	Negligible	Location and topography: South western section of the Site within the Associated Development. Hydrology: None Peat Depth: 0.0 m - 3.9 m. Generally, <0.5 m Slope Gradient: 0° to <30° Exposure: Proposed infrastructure	Best practice measures in relation to drainage prior to and during construction will be implemented as outlined in **Annex J: Water Construction Environmental Management Plan (WCEMP)** and management of peat and peaty soils as outlined in **Annex N: Peat Management Plan (PMP).**	Negligible
H2	TWA and permanent tracks	Negligible	Location and topography: Central western sector of the Site spanning the south western area of the Proposed Development and central area of the Associated Development. Hydrology: Allt Tom a'Challtuinne runs through the north western sector of this area, running north east towards Douglas Water	Micro-siting in to areas of thinner peat where required. Best practice measures in relation to drainage prior to and during construction will be implemented as outlined in **Annex J: WCEMP** and management of peat and peaty soils as outlined in **Annex N: PMP.**	Negligible

Hazard Area and Infrastructure		Unmitigated Hazard		Mitigated Hazard	
			Peat Depth: 0.0 m - 1.4 m. Generally, <0.5 m Slope Gradient: 0° to <15° Proposed infrastructure and minor watercourse		
H3	TWA, proposed substation and permanent tracks	Low	Location and topography: Central area of the Site spanning both the Proposed Development and Associated Development. Hydrology: Unnamed tributary to Douglas Water runs through this area Peat Depth: 0.0 m - 1.1 m. Generally, <0.5 m Slope Gradient: 0° to <15° Exposure: Proposed infrastructure and minor watercourse	Best practice measures in relation to drainage prior to and during construction will be implemented as outlined in **Annex J: WCEMP** and management of peat and peaty soils as outlined in **Annex N: PMP.** During construction visual inspections and monitoring in areas with the potential for peat slide risk should take place.	Negligible
H4	Proposed substation, permanent access tracks and SUDS attenuation pond.	Negligible	Location and topography: Northern sector of the Site comprising the north eastern sector of the Proposed Development Hydrology: Allt Tom a'Challtuinne runs through the north western sector of this area, running north east towards Douglas Water Peat Depth: 0.00 m - 0.8 m. Generally, <0.5 m	Best practice measures in relation to drainage prior to and during construction will be implemented as outlined in **Annex J: WCEMP** and management of peat and peaty soils as outlined in **Annex N: PMP.**	Negligible

Hazard Area and Infrastructure		Unmitigated Hazard		Mitigated Hazard	
			Slope Gradient: 0° to <10° Exposure: Proposed infrastructure and minor watercourse		
H5	Proposed towers and proposed permanent tracks	Negligible	Location and topography: Eastern and north eastern site area within the Associated Development. Hydrology: Unnamed tributary to Douglas Water runs through this area Peat Depth: 0.0 m - 0.6 m. Generally, <0.5 m Slope Gradient: 0° to <15° Exposure: Proposed infrastructure and minor watercourse	Best practice measures in relation to drainage prior to and during construction will be implemented as outlined in **Annex J: WCEMP** and management of peat and peaty soils as outlined in **Annex N: PMP**.	Negligible

7.2 Embedded Mitigation

Embedded mitigation includes measures taken during design of the Project to reduce the potential for peat slide risk. In summary the principal measures that have been taken are:

- Locating infrastructure on shallower slopes, where possible; and
- Locating infrastructure on areas of shallow peat (or no peat) where possible.

7.3 Peat Slide Mitigation Recommendations

The following mitigation measures should be adopted post-consent stage and pre-construction to validate the PLHRA and influence the detailed design of the Project, including:

- Ground investigations prior to detailed design, including additional peat depth surveys;
- Update the PLHRA as necessary following detailed ground investigations;
- Identification of areas sensitive to changes in drainage regime prior to detailed design;
- Development of a drainage strategy that will not create areas of concentrated flow and will not affect the current peatland hydrology;
- Design of a Development drainage system for tracks and hardstanding that will require minimal ongoing maintenance during the operation of the substation;
- Inspection and maintenance of the drainage systems during construction and operation;

- Identification of suitable areas for stockpiling material during construction prior to commencement of works; and
- Consideration of specific construction methods appropriate for infrastructure in peat land (i.e., geogrids) as part of design Development.

During the construction stage, toolbox talks should be delivered to site personnel, which should contain but not be limited to the following information:

- Peat slide risks and associated indicators;
- Best practise techniques when working in the peatland environment; and
- Discussion on being careful not to disrupt or disturb the natural drainage on slopes.

8 CONCLUSIONS

This PLHRA has been undertaken for the Project in accordance with best practice, as detailed in **Section 4.2** of this PLHRA. The assessment included a desk study followed by completion of an intensive probing exercise across the proposed infrastructure and surrounding areas at the Proposed Development and Associated Development. The information gathered during this investigation was used to develop a Hazard Ranking across the Site.

The findings of the probing indicate that the vast majority of the Project is underlain by peat less than 0.5 m in thickness, although pockets of deep peat were recorded across the wider site area with depths up to 3.9 m encountered in the south western area.

Based on the scope of the study, the PLHRA has indicated that the majority of the Site is generally of 'negligible' hazard ranking with two areas also highlighted as 'low' hazard ranking. Therefore, a significant risk of peat slide does not exist and it is considered that following the implementation of mitigation measures outlined in **Section 7.3** of this PLHRA, the maximum residual hazard posed to the Development will be 'negligible'.

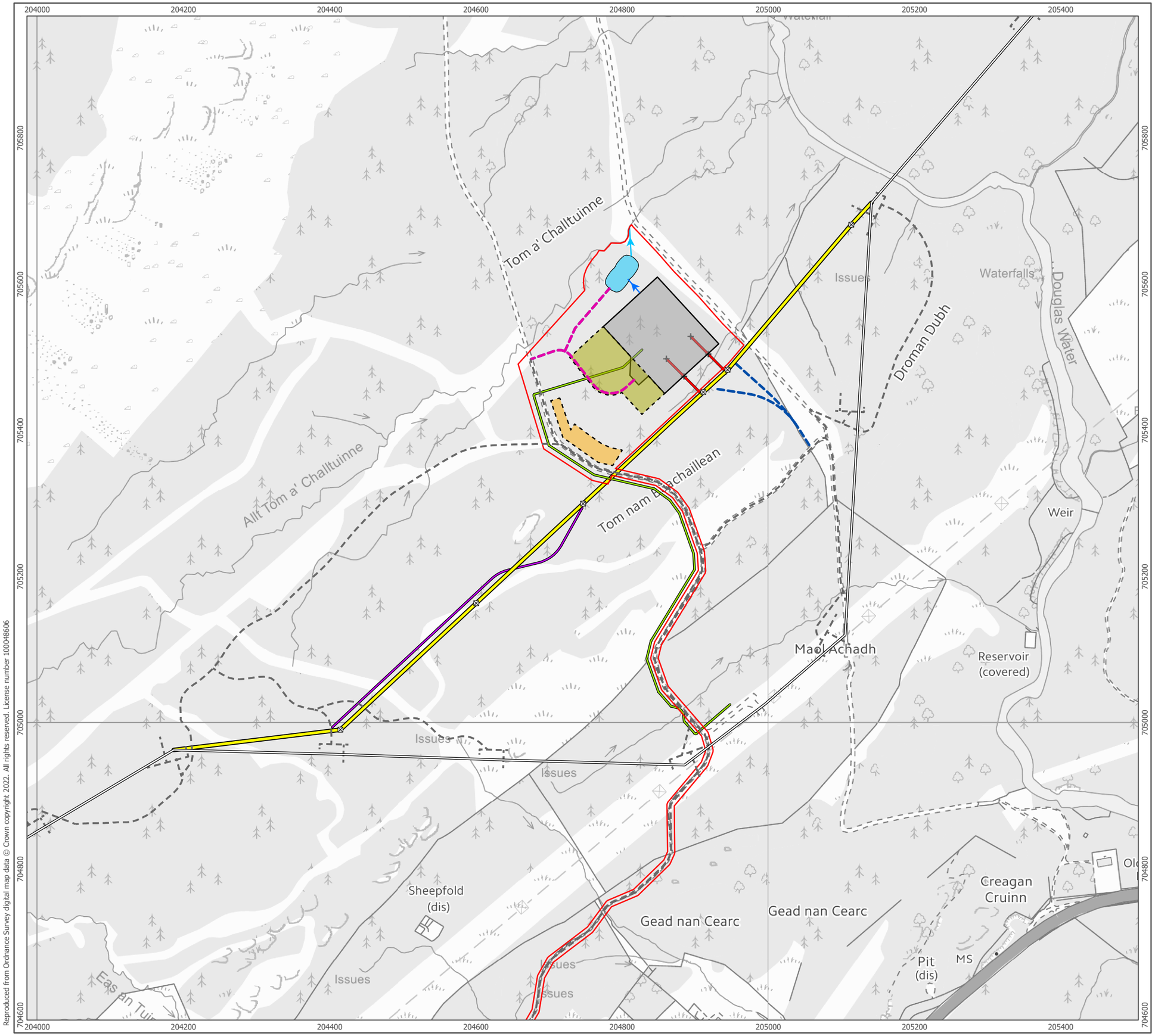
Notwithstanding the findings of the PLHRA, the final design of infrastructure should be carefully sited and micro-siting adopted if required in order to maintain the design objective of avoiding any potential peat slide risk.

9 SOURCES OF INFORMATION

The following sources of information were used as part of the desk study investigations:

- British Geological Survey - Online GeoIndex;
- Ordnance Survey (OS) topographical information;
- Aerial and Satellite photography.
- Soil Survey of Scotland - MacAulay Institute for Soil Research (1984);
- Soil Survey of Scotland - Scottish Peat Surveys (1964);
- Scottish Government - Peat Landslide Hazard and Risk Assessments (2017);
- Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey, Guidance on Developments on Peatland;
- The Scottish Government - Scotland's Third National Planning Framework (2014);
- The Scottish Government - Scottish Planning Policy (2014);
- Assessments by other technical specialists (specifically hydrology and ecology for data on sensitive receptors); and
- Scotland's Environment Interactive Map.

APPENDIX A - FIGURES



Y:\Arcus\GIS-CAD\GIS\Engineering\Projects\4534 Argyll Substations\4534 An Suidhe Reports.aprx\4534-REP-006 Fig01 Site Layout Plan

Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

1:5,000 Scale @ A3

0 125 250 m

NORTH

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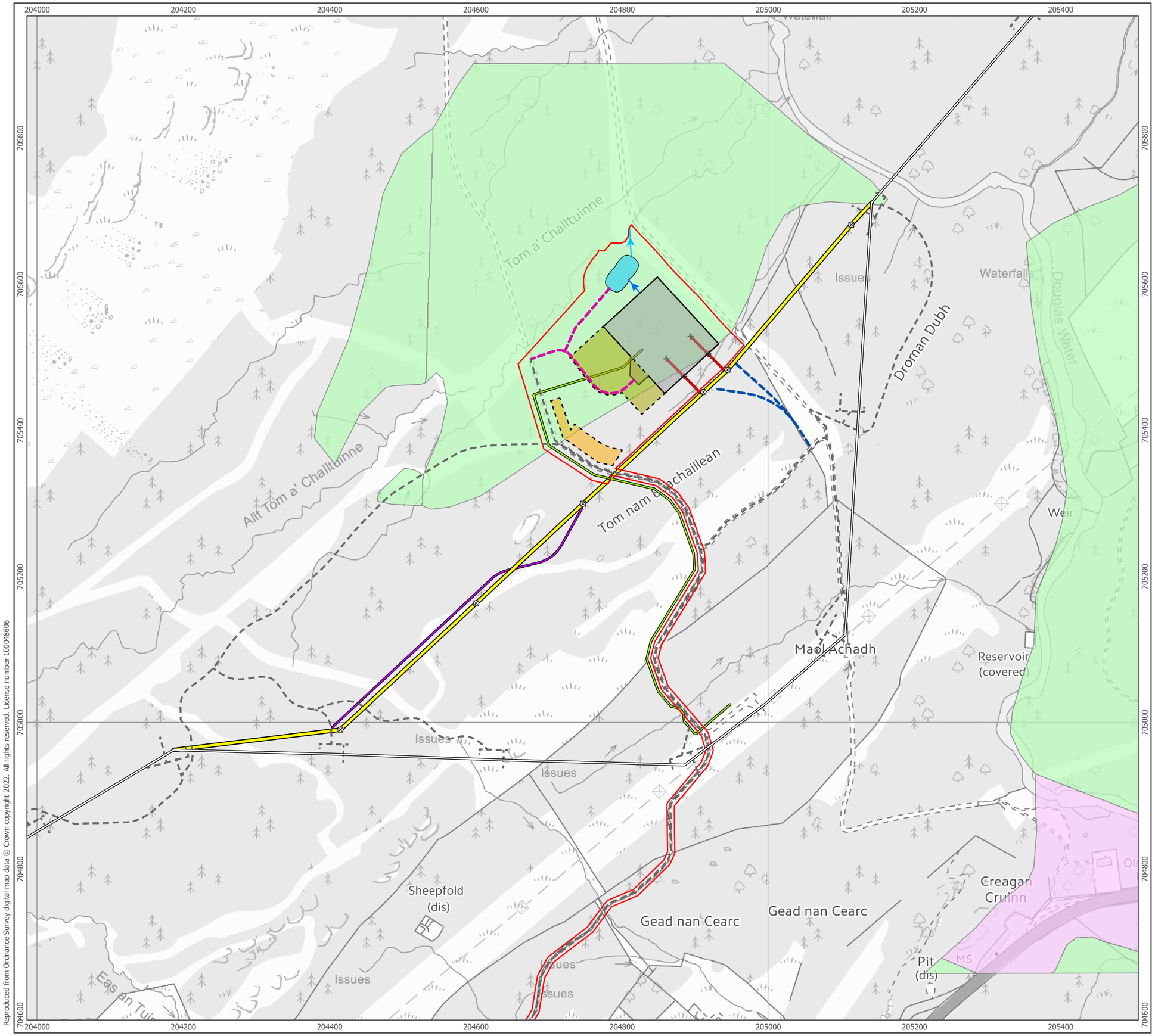
Checked By: SC	Date: 24/11/2022

Site Layout Plan
Figure O.1

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



Y:\Arcus\GIS-CAD\GIS\Engineering\Projects\4534 Argyll Substations\4534 An Suidhe Reports.aprx\4534-REP-007 Fig02 Superficial Soils

Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Superficial Soils

- Alluvium
- Till, Devensian

1:5,000 Scale @ A3

0 125 250 m NORTH

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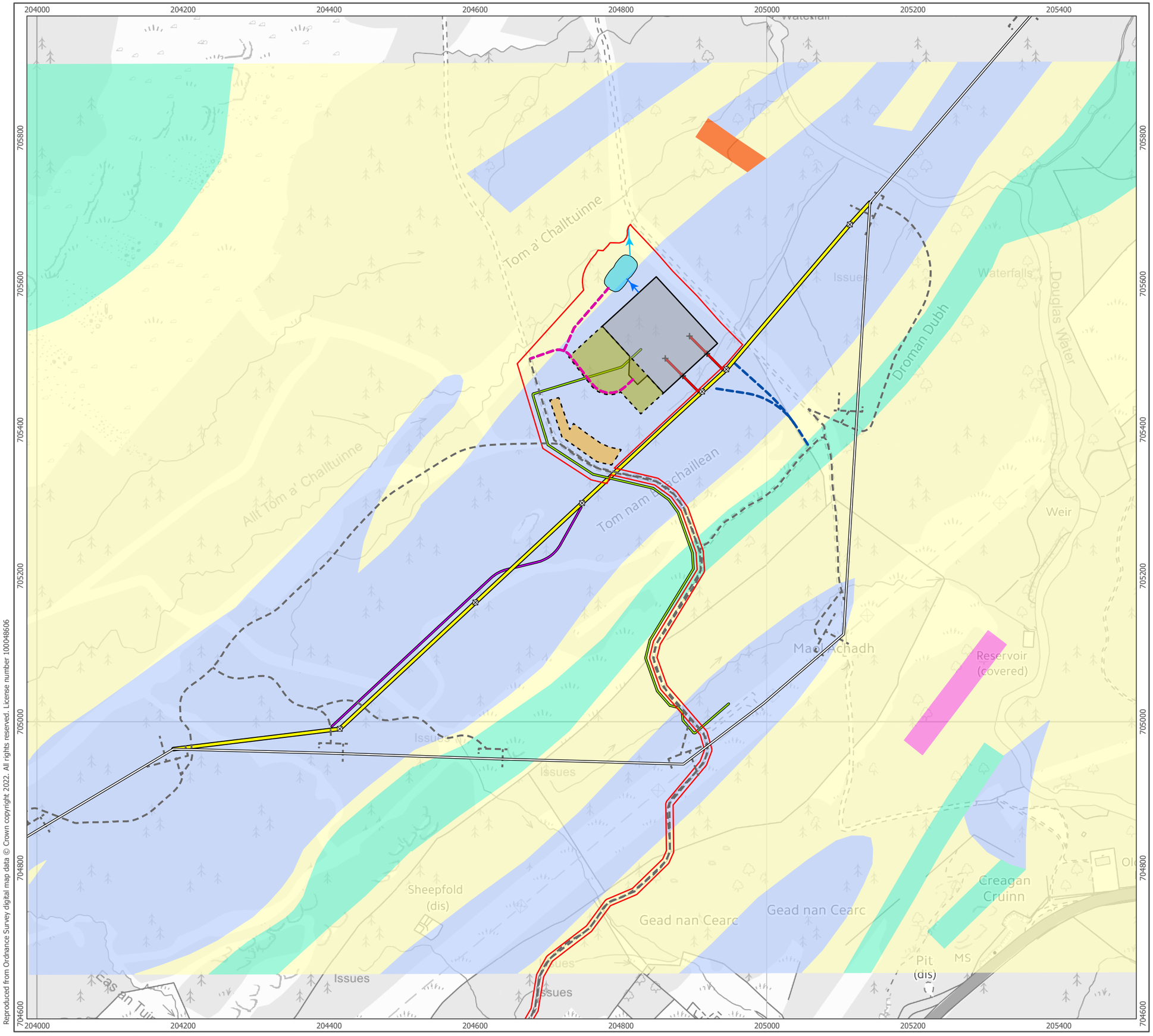
Checked By: SC	Date: 24/11/2022

Superficial Soils
Figure O.2

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Bedrock Geology

- Ardrishaig Phyllite Formation
- Argyll Group
- Dalradian Supergroup
- Mull Dyke-Swarm
- Scottish Highland Siluro-Devonian Calc-Alkaline Minor Intrusion Suite (Other Than Dykes)

1:5,000 Scale @ A3

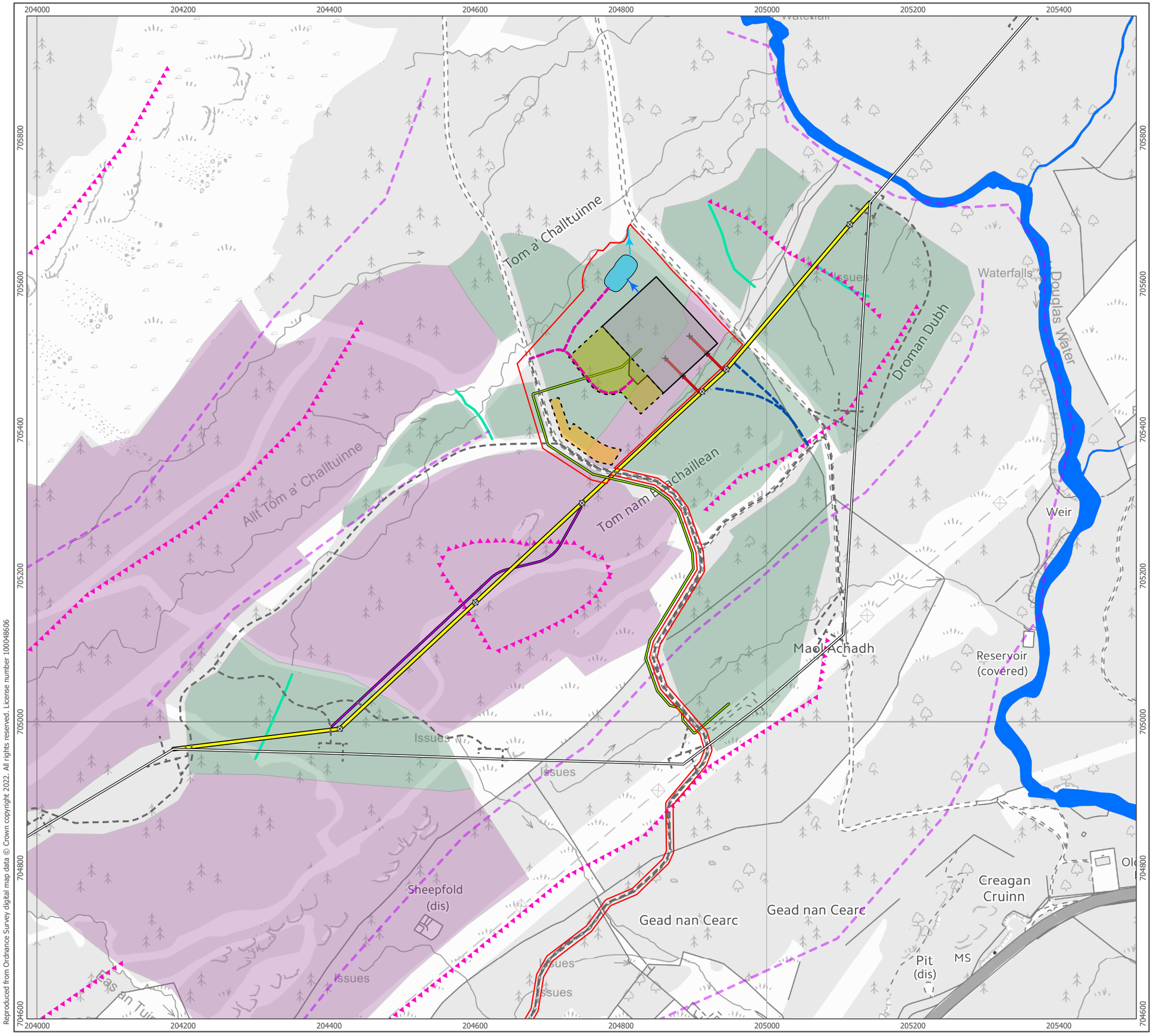
0 125 250 m

NORTH

Produced By: BM	Ref: 4534-REP-008
Checked By: SC	Date: 24/11/2022

Bedrock Geology
Figure O.3

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Geomorphology

- Top of Slope
- Bottom of Slope
- Artificial Drainage
- Major Watercourses
- Mature Forestry
- Deforested Area

1:5,000 Scale @ A3

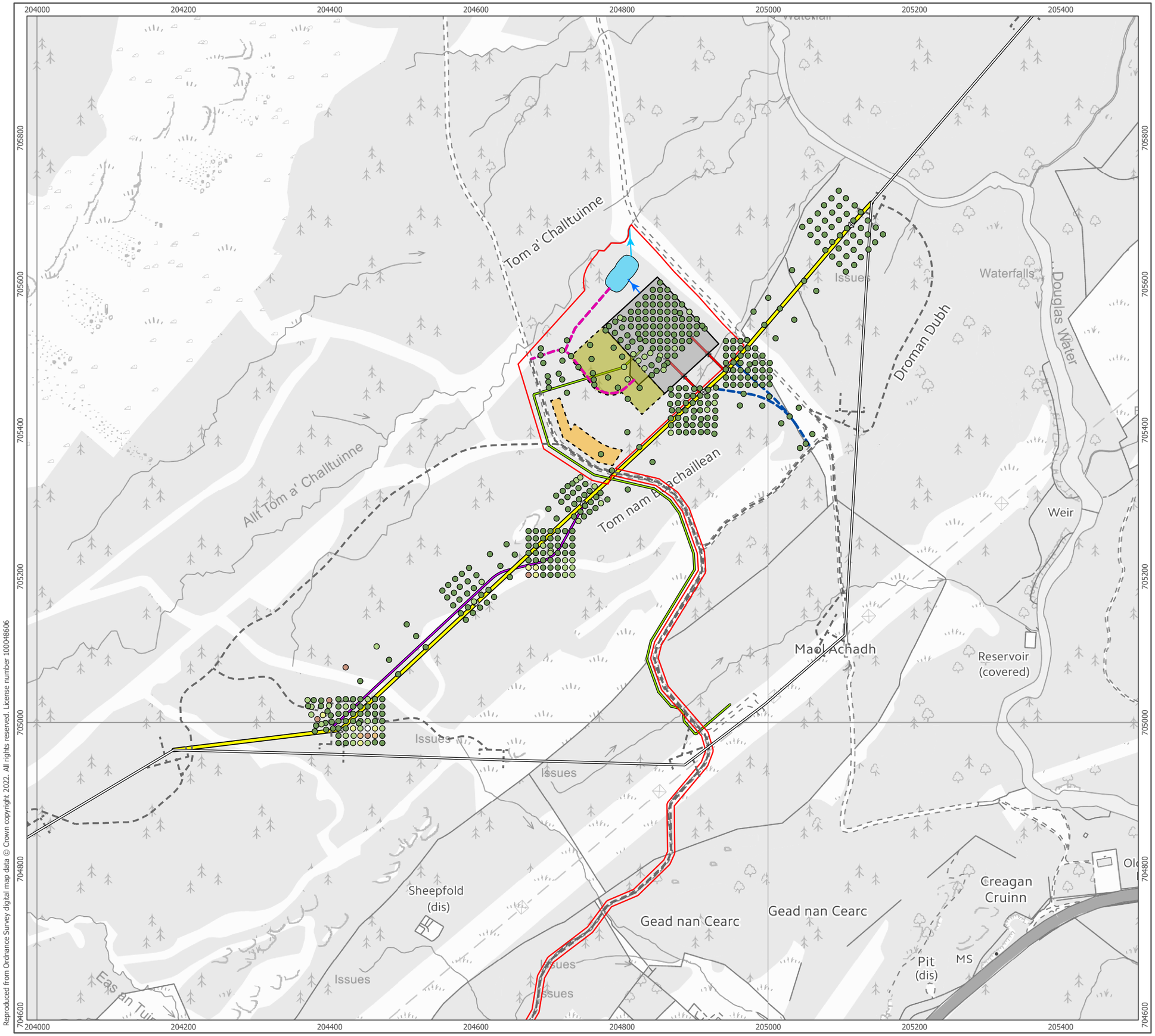
0 125 250 m

NORTH

Produced By: BM	Ref: 4534-REP-009
Checked By: SC	Date: 24/11/2022

Geomorphology Map
Figure O.4

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Recorded Peat Depths (m)

- 0.01 - 0.50
- 0.51 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00

1:5,000 Scale @ A3

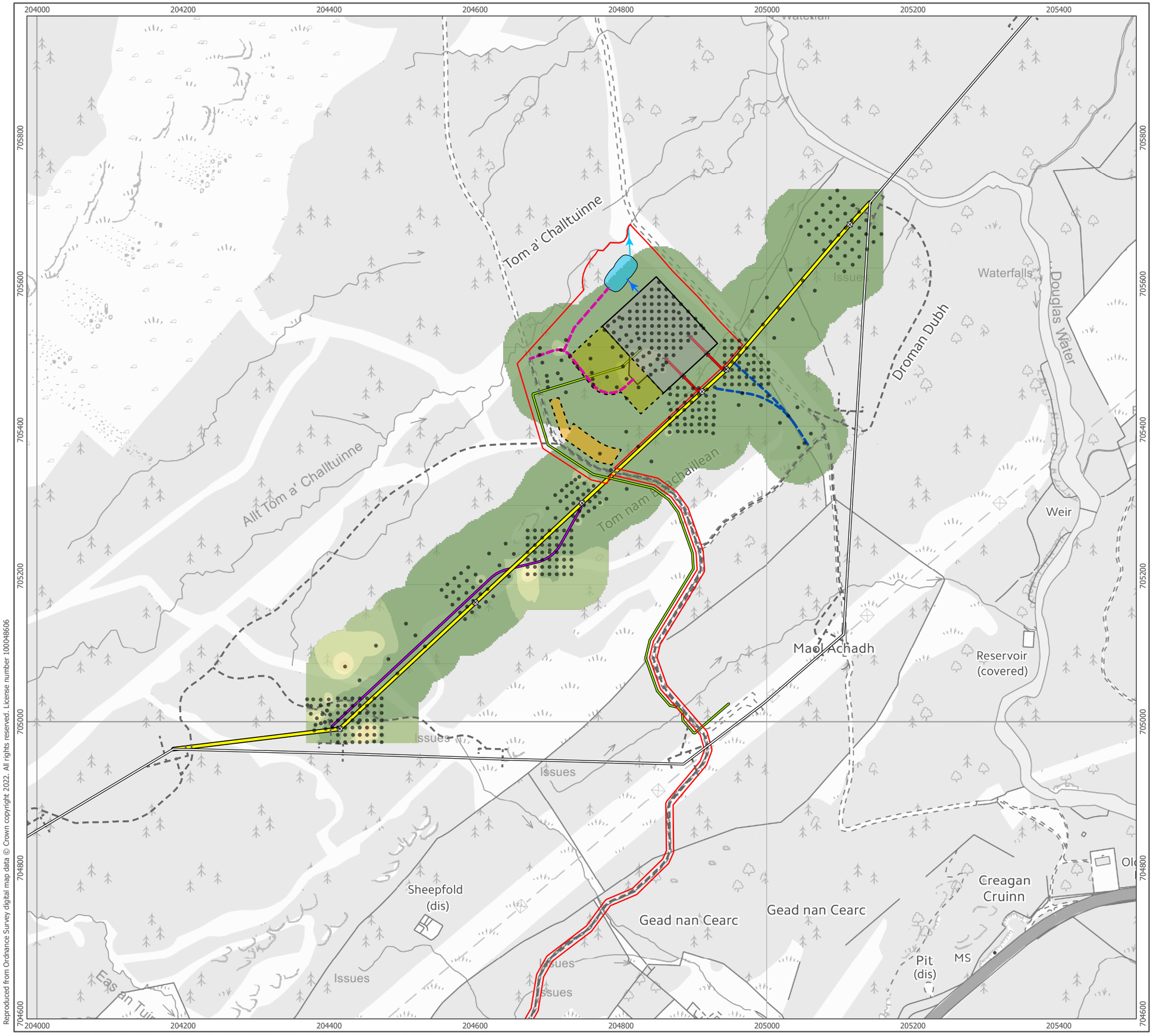
0 125 250 m

NORTH

Produced By: BM	Ref: 4534-REP-010
Checked By: SC	Date: 24/11/2022

Recorded Peat Depths
Figure O.5

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Interpolated Peat Depths (m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50
- 4.51 - 5.00
- 5.01 - 5.50
- 5.51 - 6.00
- Peat Probe Location

1:5,000 Scale @ A3

0 125 250 m

NORTH

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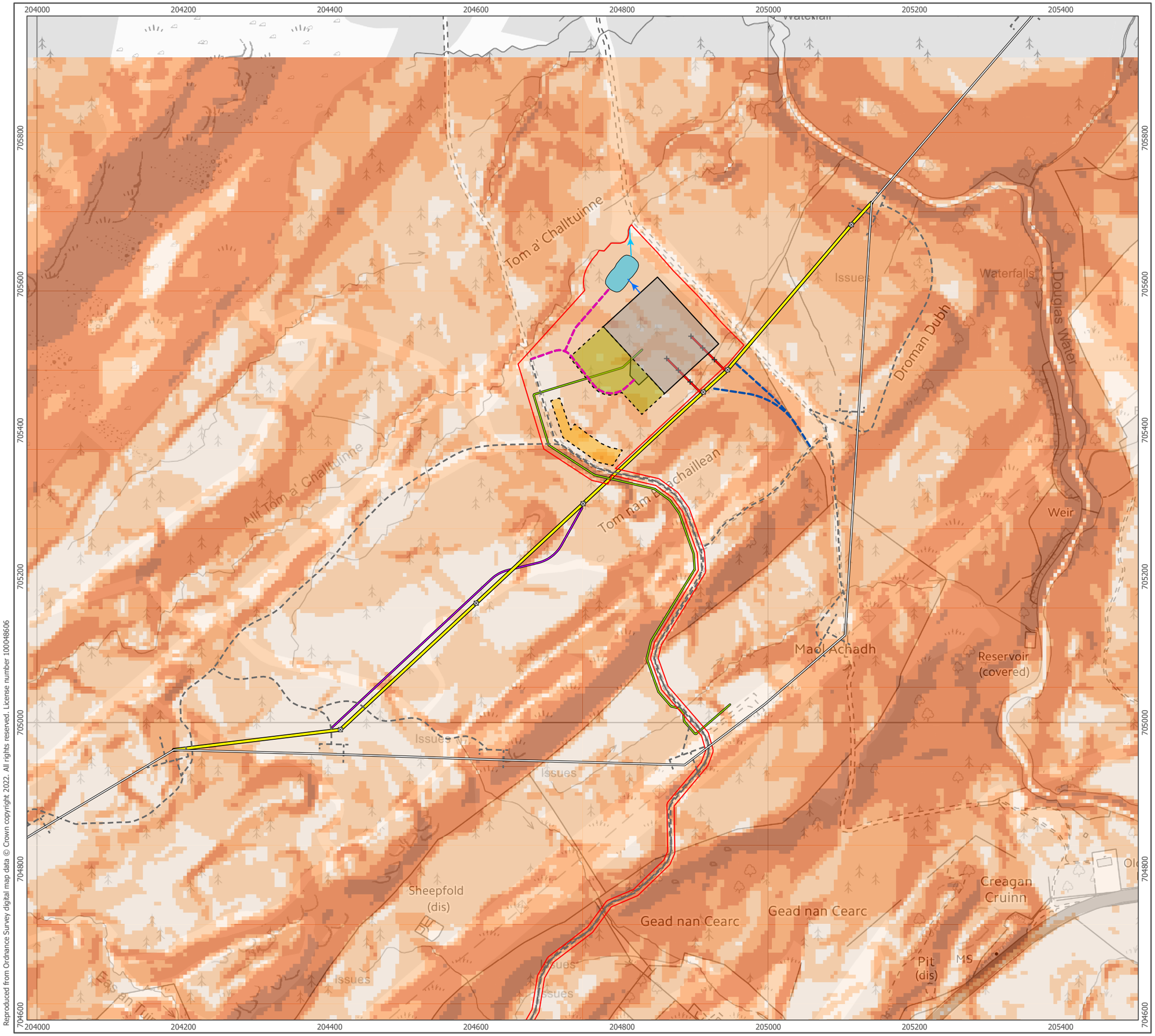
Checked By: SC	Date: 24/11/2022

Site Layout Plan
Figure O.6

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



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Scottish & Southern Electricity Networks
TRANSMISSION
ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Slope (degrees)

- < 5
- 5 - 10
- 10 - 15
- 15 - 30
- > 30

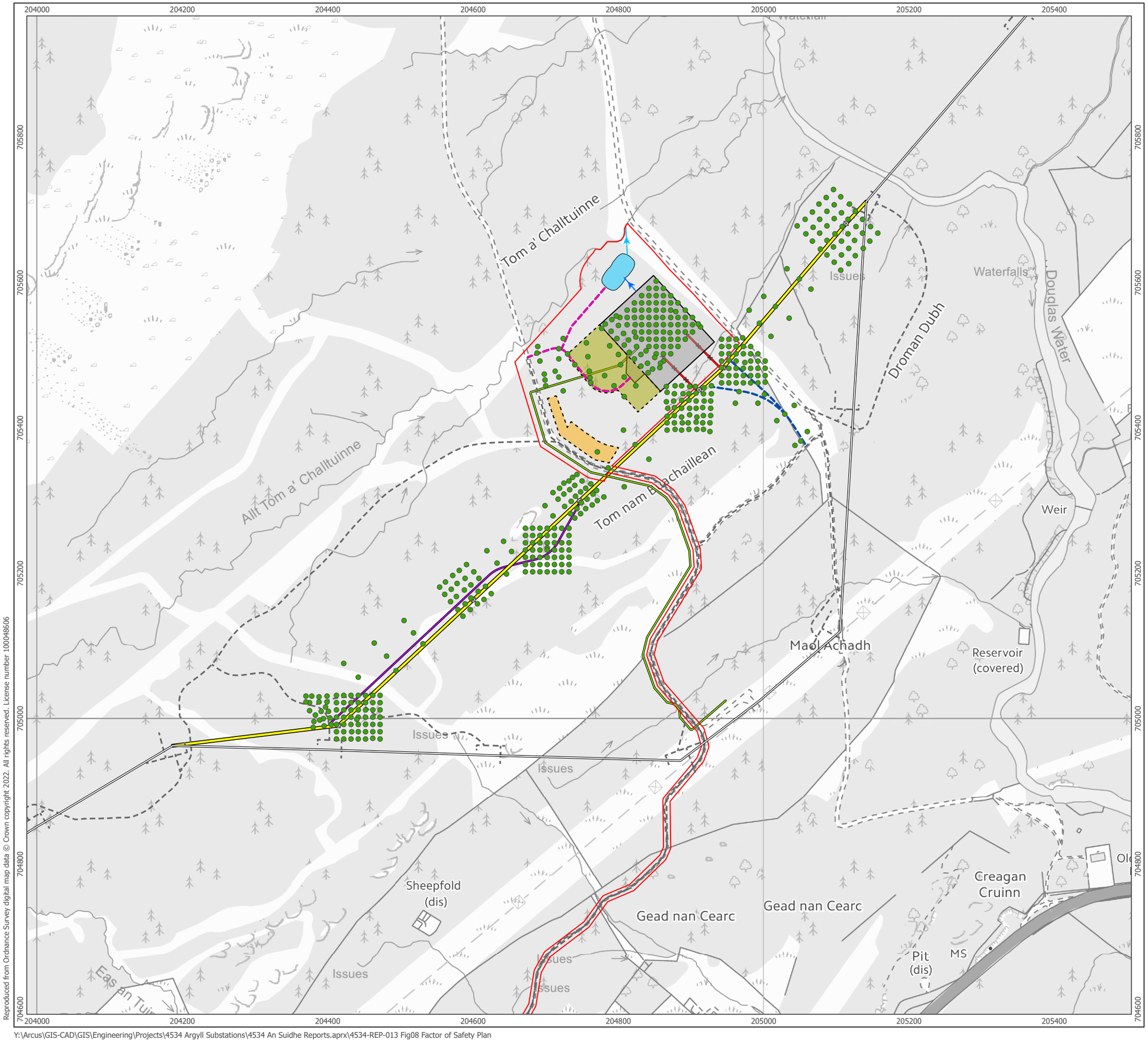
1:5,000 Scale @ A3

0 125 250 m NORTH

Produced By: BM	Ref: 4534-REP-012
Checked By: SC	Date: 24/11/2022

Slope Map
Figure O.7

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment



Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track

SUDs Outfall Pipeline

Description

- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Factor of Safety

- Low Risk

1:5,000 Scale @ A3

0 125 250 m

NORTH

Produced By: BM	Ref: 4534-REP-013
Checked By: SC	Date: 24/11/2022

Factor of Safety
Figure O.8

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment

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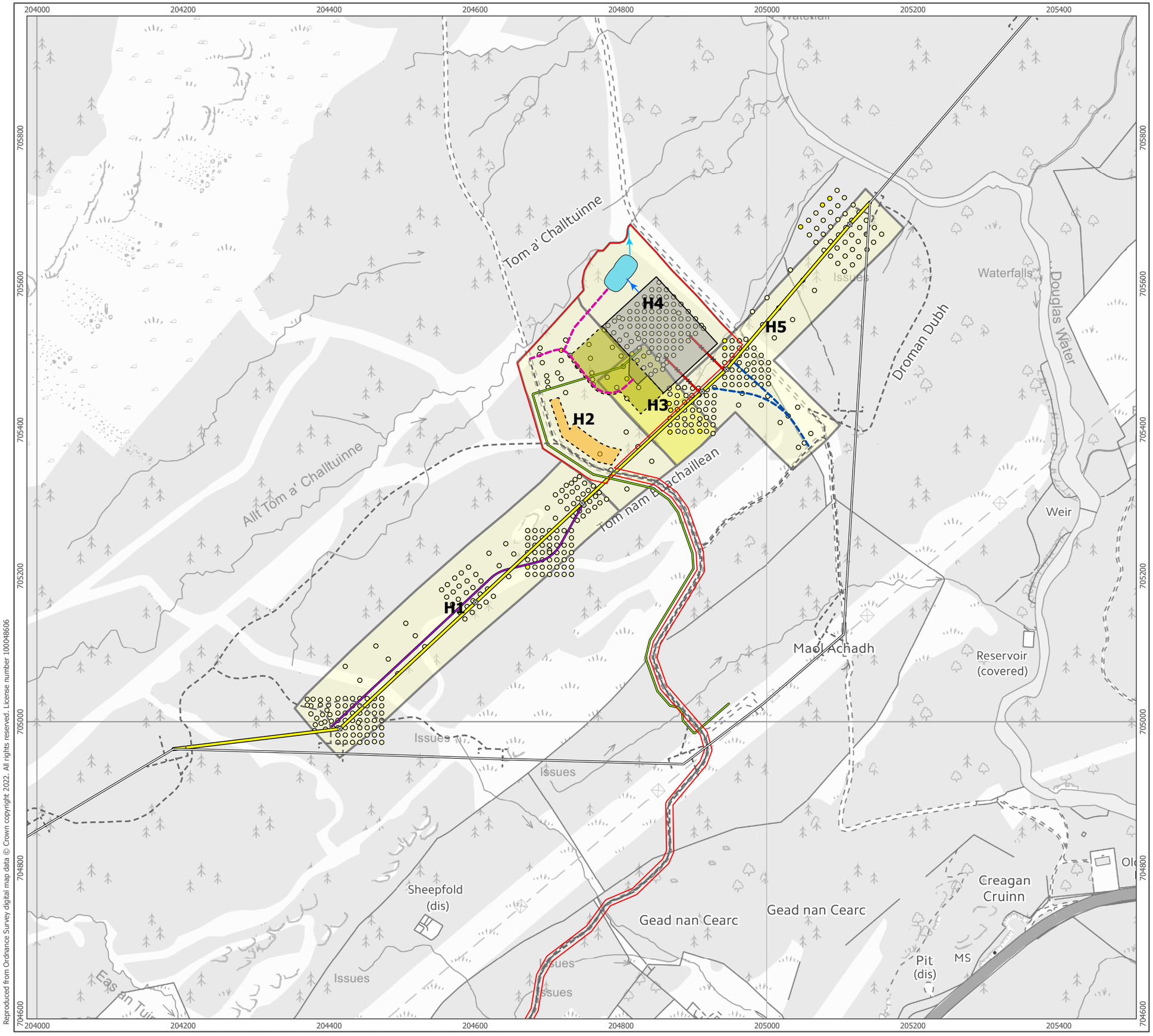

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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track

Description

- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Permitted Development:

- 33kV Interconnector Cable Route

Associated Development:

- Proposed Tower Location
- Proposed OHL Alignment
- OHL Downleads
- Proposed Permanent Access Track
- Temporary Access Track

Hazard Rank

- Negligible
- Low

Hazard Rank Zonation

- Low
- Negligible

1:5,000 Scale @ A3

0 125 250 m

NORTH

Produced By: BM	Ref: 4534-REP-010
Checked By: SC	Date: 24/11/2022

Recorded Peat Depths
Figure O.9

An Suidhe
Annex O: Peat Landslide Hazard and Risk Assessment

APPENDIX B - SITE PHOTOGRAPHS

Photograph 1 – View east in area of proposed substation, TWA and track

Photograph 2 – View north east from central Site area

Photograph 3 – View north west from central Site area

Photograph 4 – View west from proposed tower location within area of forestry

Photograph 5 – View north west from the southern area of the Site

Photograph 6 – View north west of existing track network in southern Site area

APPENDIX C – HAZARD RANK ASSESSMENT RECORDS

4534 - Argyll Substations - PSRA - Tabulated Peat Probe Data - May 2022

ID	X	Y	Z	SLOPE	Slope Co-efficient	PEAT DEPTH	Peat Level	Peat Co-efficient	Gen Substrate	Substrate Co-eff.	Risk Rating Coefficient	Risk Rating Normalisation	Receptor	Receptor Co-eff.	Z Receptor	Distance	Receptor Dist Co-eff.	Z Difference (remove =/-)	Receptor elevation Co-eff	Impact Rating	Impact Rating Normalisation	Hazard Ranking
1	204812	705542	172.378996	8.66036	6	0.1	172.278996	1	G	1	6	2	Site Infrastructure	3	172.350751	0.941166	4	0.028245	1	12	2	4
2	204812	705552	171.338244	6.529077	4	0.1	171.238244	1	G	1	4	1	Site Infrastructure	3	171.272739	0.941166	4	0.065505	1	12	2	2
3	204802	705552	171.476987	6.906545	4	0.01	171.466987	1	R	1.5	6	2	Site Infrastructure	3	171.412738	0.941166	4	0.064249	1	12	2	4
4	204812	705562	170.140631	8.083706	6	0.01	170.130631	1	G	1	6	2	Site Infrastructure	3	170.069662	0.941166	4	0.070969	1	12	2	4
5	204822	705562	168.958913	14.339202	6	0.01	168.948913	1	G	1	6	2	Site Infrastructure	3	168.978223	0.941166	4	-0.01931	1	12	2	4
6	204822	705572	167.445387	8.217377	6	0.4	167.045387	1	G	1	6	2	Site Infrastructure	3	167.409447	0.941166	4	0.03594	1	12	2	4
7	204832	705572	166.873458	6.98659	4	0.3	166.573458	1	G	1	4	1	Site Infrastructure	3	166.840189	0.941166	4	0.033269	1	12	2	2
8	204832	705582	165.792897	6.936375	4	0.4	165.392897	1	G	1	4	1	Site Infrastructure	3	165.760188	0.941166	4	0.032709	1	12	2	2
9	204842	705582	165.214737	7.58783	4	0.1	165.114737	1	G	1	4	1	Site Infrastructure	3	165.185231	0.941166	4	0.029506	1	12	2	2
10	204842	705592	164.136346	7.293161	4	0.01	164.126346	1	G	1	4	1	Site Infrastructure	3	164.107764	0.941166	4	0.028582	1	12	2	2
11	204852	705592	163.129866	8.840747	6	0.01	163.119866	1	G	1	6	2	Site Infrastructure	3	163.152569	0.941166	4	-0.022703	1	12	2	4
12	204852	705602	162.175136	8.415193	6	0.01	162.165136	1	G	1	6	2	Site Infrastructure	3	162.179591	0.941166	4	-0.004455	1	12	2	4
13	204862	705592	161.877643	8.895748	6	0.4	161.477643	1	G	1	6	2	Site Infrastructure	3	161.901738	0.941166	4	-0.024095	1	12	2	4
14	204872	705582	162.422889	10.674632	6	0.1	162.322889	1	G	1	6	2	Site Infrastructure	3	162.362483	0.941166	4	0.060406	1	12	2	4
15	204882	705572	163.33851	10.25821	6	0.01	163.32851	1	G	1	6	2	Site Infrastructure	3	163.281557	0.941166	4	0.056953	1	12	2	4
16	204892	705562	164.284609	12.180694	6	0.6	163.684609	2	G	1	12	2	Site Infrastructure	3	164.591885	1.506653	4	-0.307276	1	12	2	4
17	204902	705552	164.442695	13.912623	6	0.01	164.432695	1	G	1	6	2	Site Infrastructure	3	164.772957	1.506653	4	-0.330262	1	12	2	4
18	204913	705539	164.043422	10.509693	6	0.01	164.033422	1	G	1	6	2	Site Infrastructure	3	164.397685	1.602447	4	-0.354263	1	12	2	4
19	204910	705543	164.184742	11.776155	6	0.01	164.174742	1	G	1	6	2	Site Infrastructure	3	164.277493	0.392808	4	-0.092751	1	12	2	4
20	204902	705532	167.179539	10.465202	6	0.01	167.169539	1	G	1	6	2	Site Infrastructure	3	167.231677	0.941166	4	-0.052138	1	12	2	4
21	204902	705542	165.912393	14.081486	6	0.2	165.712393	1	G	1	6	2	Site Infrastructure	3	165.964356	0.941166	4	-0.051963	1	12	2	4
22	204892	705542	167.885501	11.34047	6	0.01	167.875501	1	G	1	6	2	Site Infrastructure	3	167.839307	0.941166	4	0.046194	1	12	2	4
23	204892	705552	166.094619	12.379823	6	0.2	165.894619	1	G	1	6	2	Site Infrastructure	3	166.038641	0.941166	4	0.055978	1	12	2	4
24	204882	705552	166.816617	9.948948	6	0.4	166.416617	1	R	1.5	9	2	Site Infrastructure	3	166.729537	0.941166	4	0.08708	1	12	2	4
25	204872	705552	167.182296	8.933842	6	0.2	166.982296	1	G	1	6	2	Site Infrastructure	3	167.116919	0.941166	4	0.065377	1	12	2	4
26	204879	705560	165.51455	10.270567	6	0.01	165.50455	1	G	1	6	2	Site Infrastructure	3	165.428288	0.467434	4	0.086262	1	12	2	4
27	204872	705562	165.685443	9.698876	6	0.01	165.675443	1	G	1	6	2	Site Infrastructure	3	165.635014	0.941166	4	0.050429	1	12	2	4
28	204872	705572	164.068508	10.059103	6	0.01	164.058508	1	G	1	6	2	Site Infrastructure	3	164.013235	0.941166	4	0.055273	1	12	2	4
29	204862	705572	164.818508	10.122621	6	0.01	164.808508	1	G	1	6	2	Site Infrastructure	3	164.762116	0.941166	4	0.056392	1	12	2	4
30	204862	705582	163.188582	10.222409	6	0.01	163.178582	1	G	1	6	2	Site Infrastructure	3	163.133099	0.941166	4	0.055483	1	12	2	4
31	204852	705582	164.080734	9.035432	6	0.01	164.070734	1	G	1	6	2	Site Infrastructure	3	164.093704	0.941166	4	-0.01297	1	12	2	4
32	204842	705572	166.291345	7.943515	4	0.01	166.281345	1	G	1	4	1	Site Infrastructure	3	166.257758	0.941166	4	0.033587	1	12	2	2
33	204852	705572	165.558795	9.862873	6	0.01	165.548795	1	G	1	6	2	Site Infrastructure	3	165.505768	0.941166	4	0.053027	1	12	2	4
34	204852	705562	167.035313	8.422224	6	0.01	167.025313	1	G	1	6	2	Site Infrastructure	3	166.989244	0.941166	4	0.046069	1	12	2	4
35	204862	705562	166.377132	9.064448	6	0.2	166.177132	1	G	1	6	2	Site Infrastructure	3	166.327091	0.941166	4	0.050041	1	12	2	4
36	204872	705542	168.734227	9.235144	6	0.5	168.234227	1	G	1	6	2	Site Infrastructure	3	168.654481	0.941166	4	0.079746	1	12	2	4
37	204882	705542	168.383546	9.013339	6	0.2	168.183546	1	G	1	6	2	Site Infrastructure	3	168.306169	0.941166	4	0.077377	1	12	2	4
38	204892	705532	168.615658	8.104836	6	0.01	168.605658	1	G	1	6	2	Site Infrastructure	3	168.698738	0.941166	4	-0.08308	1	12	2	4
39	204892	705522	168.703994	7.849173	4	0.2	168.503994	1	G	1	4	1	Site Infrastructure	3	168.793544	0.941166	4	-0.08955	1	12	2	2
40	204882	705522	170.078042	7.581199	4	0.01	170.068042	1	G	1	4	1	Site Infrastructure	3	170.156916	0.941166	4	-0.078874	1	12	2	2
41	204882	705512	170.511465	10.72491	6	0.2	170.311465	1	G	1	6	2	Site Infrastructure	3	170.568673	0.941166	4	-0.057208	1	12	2	4
42	204872	705522	171.367567	7.924791	4	0.2	171.167567	1	G	1	4	1	Site Infrastructure	3	171.430496	0.941166	4	-0.062929	1	12	2	2
43	204882	705532	169.930057	7.040597	4	0.01	169.920057	1	G	1	4	1	Site Infrastructure	3	169.904256	0.941166	4	0.025801	1	12	2	2
44	204871	705531	170.728897	9.325453	6	0.5	170.228897	1	R	1.5	9	2	Site Infrastructure	3	170.718506	0.258757	4	0.010391	1	12	2	4
45	204862	705532	170.817538	10.549449	6	0.01	170.807538	1	G	1	6	2	Site Infrastructure	3	170.667414	0.941166	4	0.150124	1	12	2	4
46	204862	705542	169.130929	7.987209	4	0.01	169.120929	1	G	1	4	1	Site Infrastructure	3	169.072904	0.941166	4	0.058025	1	12	2	2
47	204861	705552	167.866959	8.578797	6	0.2	167.666959	1	R	1.5	9	2	Site Infrastructure	3	167.987567	0.824826	4	-0.120608	1	12	2	4
48	204852	705552	168.351684	7.493015	4	0.1	168.251684	1	R	1.5	6	2	Site Infrastructure	3	168.292829	0.941166	4	0.058855	1	12	2	4
49	204842	705562	167.502845	7.098904	4	0.01	167.492845	1	G	1	4	1	Site Infrastructure	3	167.449459	0.941166	4	0.053386	1	12	2	2
50	204832	705562	167.964303	7.774929	4	0.2	167.764303	1	R	1.5	6	2	Site Infrastructure	3	167.930186	0.941166	4	0.034117	1	12	2	4
51	204822	705552	171.208815	9.942301	6	0.4	170.808815	1	G	1	6	2	Site Infrastructure	3	171.129578	0.941166	4	0.079237	1	12	2	4
52	204832	705552	169.268151	15.015323	8	0.5	168.768151	1	G	1	8	2	Site Infrastructure	3	169.321215	0.941166	4	-0.053064	1	12	2	4
53	204842	705552	168.679345	6.834806	4	0.01	168.669345	1	G	1	4	1	Site Infrastructure	3	168.62871	1.115739	4	0.050635	1	12	2	2
54	204842	705542	169.48775	9.361284	6	0.2	169.28775	1	G	1	6	2	Site Infrastructure	3	169.391254	1.040807	4	0.096496	1	12	2	4
55	204852	705542	169.411737	4.417091	4	0.01	169.401737	1	R	1.5	6	2	Site Infrastructure	3	169.364837	0.941166	4	0.0469	1	12	2	4
56	204852	705532	170.412529	11.027946	6	0.01	170.402529	1	G	1	6	2	Site Infrastructure	3	170.294684	0.941166	4	0.117845	1	12	2	4
57	204862	705522	172.61564	9.478349	6	0.5	172.11564	1	G	1	6	2	Site Infrastructure	3	172.502511	0.941166	4	0.113129	1	12	2	4
58	204872	705512	172.301471	12.397336	6	0.6	171.701471	2	G	1	12	2	Site Infrastructure	3	172.335888	0.941166	4	-0.034417	1	12	2	4
59	204872	705502	173.587878	11.321474	6	0.3	173.287878	1	R	1.5	9	2	Site Infrastructure	3	173.626659	0.941166	4	-0.038781	1	12	2	4
60	204862	705492	175.819556	8.709323	6	0.2	175.619556	1	R	1.5	9	2	Site Infrastructure	3	175.864546	0.941166	4	-0.04499	1	12	2	4
61	204862	705512	174.06376	11.49886	6	0.5	173.56376	1	R	1.5	9	2	Site Infrastructure	3	174.058189	0.941166	4	0.005571	1	12	2	4
62	204862	705502	175.090119	9.120417	6	0.4	174.690119	1	R	1.5	9	2	Site Infrastructure	3	175.132871	0.941166	4	-0.042752	1	12	2	4
63	204858	705489	176.677902	8.454091	6	0.5	176.177902	1	G	1	6	2	Site Infrastructure	3	176.693266	0.35461	4	-0.015364	1	12	2	4
64	204852	705502	176.276603	7.293532	4	0.8	175.476603	2	G	1	8	2	Site Infrastructure	3	176.278465	0.941166	4	-0.001862	1	12	2	4
65	204842	705512	175.514167	11.795979	6	0.4	175.114167	1	G	1	6	2	Site Infrastructure	3	175.321487	0.941166	4	0.19268	1	12	2	4
66	204852	705512	174.993135	11.294171	6	0.2	174.793135	1	R	1.5	9	2	Site Infrastructure	3	174.90182	0.941166	4	0.091315	1	12	2	4
67	204852	705522	172.761053	12.92998	6	0.4	172.361053	1	R	1.5	9	2	Site Infrastructure	3	172.643475	0.941166	4	0.117578	1	12	2	4
68	204842	705522	173.002907	14.10215	6	0.2	172.802907	1	R	1.5	9	2	Site Infrastructure	3	172.835388	0.941166	4	0.167519	1	12	2	4
69	204832	705522	172.597427	9.12378	6	0.01	172.587427	1	G	1	6	2	Site Infrastructure	3	172.526061	0.941166	4	0.071366	1	12	2	4
70	204842	705532	170.710034	8.335133	6	0.3	170.410034	1	R	1.5	9	2	Site Infrastructure	3	170.719999	0.941166	4	-0.009965	1	12	2	4
71	204822	705532	172.690818	5.776568	4	0.01	172.680818	1	G	1	4	1	Site Infrastructure	3	172.713947	0.941166	4	-0.023129	1	12	2	2
72	204832	705532	171.763873	5.705563	4	0.01	171.753873	1	G	1	4	1	Site Infrastructure	3	171.798451	0.941166	4	-0.034578	1	12	2	2
73	204832	705542	171.481854	8.908987	6	0.2	171.281854	1	G	1	6	2	Site Infrastructure	3	171.490999	0.941166	4	-0.009145	1	12	2	4
74	204823	705542	172.177551	4.515243	4	0.01	172.167551	1	R	1.5	6	2	Site Infrastructure	3	172.179322	0.774663	4	-0.001771	1	12	2	4
75	204797	705554	171.304861	7.400509	4	0.8	170.504861	2	G	1	8	2	Site Infrastructure	3	171.228737	0.655464	4	0.076124	1	12	2	4
76	204824	705525	172.843619	6.920337	4	0.1	172.743619	1	R	1.5	6	2	Site Infrastructure	3	172.921228	0.838969	4	-0.077609	1	12	2	4
77	204838	705506	176.625344	11.107404	6	0.8	175.825344	2	G	1	12	2	Site Infrastructure	3	176.789909	1.147813	4	-0.164565	1	12	2	4
78	204850	705497	176.926615	7.281492	4	0.4	176.526615	1	R	1.5	6	2	Site Infrastructure	3	176.975126	0.621114	4	-0.048511	1	12	2	4
79	204857	705483	177.217682	8.441084	6	0.7	176.517682	2	G	1	12	2	Site Infrastructure	3	177.125893	0.657057	4	0.091789	1	12	2	4
80	204808	705470	182.726332	9.043008	6	0.7	182.026332	2	R	1.5	18	3	Site Infrastructure	3	182.864355	0.895796	4	-0.138023	1	12	2	6
81	204803	705487	180.787831	8.460814	6	0.8	179.987831	2	R	1.5	18	3	Site Infrastructure	3	180.739969	0.627159	4	0.047862	1	12	2	6
82	204800	705501	177.638083	11.437239	6	0.01	177.628083	1	G	1	6	2	Site Infrastructure	3	177.647948	0.847327	4	-0.009865	1	12	2	4
83	204788	705513	177.049589	6.400202	4	0.5	176.549589	1	G	1	4	1	Site Infrastructure	3	177.00372	0.903539	4	0.045869	1	12	2	2
84	204756	705517	179.276775	5.398507	4	0.01	179.266775	1	R	1.5	6	2	Site Infrastructure	3	179.331477	0.940447	4	-0.054702	1	12	2	4
85	204777	705537	176.465639	8.741072	6	0.2	176.265639	1	G	1	6	2	Site Infrastructure	3	176.456047	0.14647	4	0.009592	1	12	2	4
86	204758	705498	180.338627	5.886997	4	0.01	180.328627	1	R	1.5	6	2	Site Infrastructure	3	180.456414	1.14488	4	-0.117787	1	12	2	4
87	204760	705478	182.215504	9.259937	6	0.01	182.205504	1	C	2	12	2	Site Infrastructure	3	182.203532	0.994624	4	0.011972	1	12	2	4
88	204762	705462	184.067751	7.848714	4	0.1	183.967751	1	C	2	8	2	Site Infrastructure	3	184.057529	0.941165	4	0.010222	1	12	2	4
89	204724	705451	187.732926	5.924109	4	0.01	187.722926	1	C	2	8	2	Site Infrastructure	3	188.751009	32.319817	3	-1.018083	1	9	1	2
90	204718	705470	186.770783	5.915384	4	0.3	186.470783	1	G	1	4	1	Site Infrastructure	3	183.279524	27.277954	3	3.491259	1	9	1	1
91	204713	705478	186.485852	5.924143	4	0.3	186.185852	1	G	1	4	1	Site Infrastructure	3	182.896274	26.420642	3	3.589578	1	9	1	1
92	204699	705466	187.58204	3.173001	2	0.01	187.57204	1	G	1	2	1	Roads and Tracks	3	187.593748	11.944055	3	-0.011708	1	9	1	1
93	204700	705458	188.015721	3.176215	2	0.01	188.005721	1	G	1	2	1	Roads and Tracks	3	187.893175	10.459309	3	0.122546	1	9	1	1
94	204698	705474	187.149092	3.178211	2	0.2	186.949092	1	R	1.5	3	1	Site Infrastructure	3	187.508893	13.284369	3	-0.359801	1	9	1	1
95	205137	705647	127.426197	10.221849	6	0.01	127.416197	1	G	1	6	2	Site Infrastructure	3	124.641394	19.485197	3	2.784803	1	9	1	2
96	205146	705657	124.690219	13.663247	6	0.01	124.680219	1	G	1	6	2	Site Infrastructure	3	124.641394	12.946187	3	0.048825	1	9	1	2
97	205157	705668	120.533054	18.175326	8	0.01	120.523054	1	G	1	8	2	Site Infrastructure	3	124.318361	19.504917	3	-3.785307	1	9	1	2
98	205125	705658	127.243139	11.434621	6	0.01	127.233139	1	R	1.5	9	2	Site Infrastructure	3	124.932278	11.850737	3	2.310861	1	9	1	2
99	205136	705668	124.558654	11.536484	6	0.01	124.548654	1	G	1	6	2	Site Infrastructure	3	124.444771	1.125274	4	0.113883	1	12	2	4
100	205147	705677	120.337312	19.891646	8	0.01	120.327312	1	G	1	8	2	Site Infrastructure	3	124.318361	12.904614	3	-3.981049	1	9	1	2
101	205116	705667	127.22785	13.357805	6	0.01	127.21785	1	G	1	6	2	Site Infrastructure	3	124.838094	9.593904	4	2.389756	1	12	2	4
102	205127	705677	123.334254	14.653326	6	0.01	123.324254	1	G	1	6	2	Site Infrastructure	3	123.978247	2.340164	4	-0.643993	1	12	2	4
103	205136	705687	119.74297	18.38014	8	0.01	119.73297	1	G	1	8	2	Site Infrastructure	3	123.983244	15.697908	3	-4.240274	1	9	1	2
104	205108	705677	126.347422	14.955623	6	0.01	126.337422	1	G	1	6	2	Site Infrastructure	3	125.569994	2.849626	4	0.777428	1	12	2	4
105	205116	705687	122.007453	17.589543	8	0.01	121.997453	1	G	1	8	2	Site Infrastructure	3	122.831772	2.393346	4	-0.824319	1	12	2	4
106	205126	705698	117.802305	16.615156	8	0.01	117.792305	1	G	1	8	2	Site Infrastructure	3	122.831772	17.408607	3	-5.029467	1	9	1	2
107	205107	705657	130.114251	11.636498	6	0.01	130.104251	1	G	1	6	2	Site Infrastructure	3	125.774481	20.464834	3	4.33977	1	9	1	2
108	205098	705667	129.750351	13.946557	6	0.01	129.740351	1	G	1	6	2	Site Infrastructure	3	125.569994	16.638154	3	4.180357	1	9	1	2
109	205087	705658	132.919317	10.981884	6	0.01	132.909317	1	G	1	6	2	Site Infrastructure	3	125.569994	30.502942	3	7.349323	1	9	1	2
110	205096	705649	132.885814	11.458094	6	0.01	132.875814	1	G	1	6	2	Site Infrastructure	3	125.774481	31.812517	3	7.111333	1	9	1	2
111	205117	705647	130.117791	11.705602	6	0.01	130.107791	1	G	1	6	2	Site Infrastructure	3	124.932278	25.357643	3	5.185513	1	9	1	2
112	205107	705638	132.818297	11.766959	6	0.01	132.808297	1	G	1	6	2	Site Infrastructure	3	124.962664	37.465228	3	7.855633	1	9	1	2
113	205126	705637	130.149751	11.326668	6	0.01	130.139751	1	G	1	6	2	Site Infrastructure	3	124.929395	30.654251	3	5.220356	1	9	1	2
114	205117	705626	133.092993	11.970405	6	0.01	133.082993	1	G	1	6	2	Minor Water Feature	6	129.299872	43.394788	3	3.793121	1	18	2	4
115	205106	705617	136.199128	12.100841	6	0.01	136.189128	1	G	1	6	2	Minor Water Feature	6	129.299872	53.409592	3	6.899256	1	18	2	4
116	205097	705628	135.864719	12.112344	6	0.01	135.854719	1	G	1	6	2	Site Infrastructure	3	125.774481	51.144897	3	10.090238	2	18	2	4
117	205087	705638	135.54592	10.671028	6	0.01	135.53592	1	G	1	6	2	Site Infrastructure	3	125.774481	45.855227	3	9.771439	1	9	1	2
118	205078	705646	135.402098	9.669524	6	0.01	135.392098	1	G	1	6	2	Site Infrastructure	3	125.569994	45.082699	3	9.832104	1	9	1	2
119	205046	705678	134.953486	10.267967	6	0.01	134.943486	1	G	1	6	2	Minor Water Feature	6	134.246119	9.669132	4	0.707367	1	24	3	6
120	205058	705667	135.1659	9.869047	6	0.01	135.1559	1	G	1	6	2	Minor Water Feature	6	135.438125	25.144426	3	-0.272225	1	18	2	4
121	205067	705657	135.257818	9.296733	6	0.01	135.247818	1	G	1	6	2	Minor Water Feature	6	137.180017	37.582102	3	-1.922199	1	18	2	4
122	205057	705687	132.59672	13.068337	6	0.1	132.49672	1	G	1	6	2	Minor Water Feature	6	132.696628	14.830636	3	-0.099908	1	18	2	4
123	205068	705676	132.778523	12.677452	6	0.01	132.768523	1	G	1	6	2	Minor Water Feature	6	133.536071	29.384385	3	-0.757548	1	18	2	4
124	205077	705668	132.793814	12.645466	6	0.1	132.693814	1	G	1	6	2	Site Infrastructure	3	125.569994	34.225796	3	7.22382	1	9	1	2
125	205067	705697	128.029372	17.735809	8	0.1	127.929372	1	G	1	8	2	Minor Water Feature	6	128.627664	22.868873	3	-0.598292	1	18	2	4
126	205077	705687	128.351513	16.117211	8	0.1	128.251513	1	G	1	8	2	Site Infrastructure	3	124.53774	32.168097	3	3.813773	1	9	1	2
127	205087	705678	128.880107	14.456396	6	0.1	128.780107	1	G	1	6	2	Site Infrastructure	3	125.569994	22.715379	3	3.310113	1	9	1	2
128	205076	705708	123.661669	17.988175	8	0.1	123.561669	1	C	2	16	3	Minor Water Feature	6	126.976555	25.351953	3	-3.314886	1	18	2	6
129	205087	705698	124.385602	17.80961	8	0.1	124.285602	1	C	2	16	3	Site Infrastructure	3	124.53774	26.676445	3	-0.152138	1	9	1	3
130	205097	705688	125.454856	16.550311	8	0.1	125.354856	1	C	2	16	3	Site Infrastructure	3	124.53774	13.63434	3	0.917116	1	9	1	3
131	205086	705717	119.235218	17.165289	8	0.1	119.135218	1	C	2	16	3	Minor Water Feature	6	117.240475	26.903867	3	1.994743	1	18	2	6
132	205097	705707	119.902706	19.218296	8	0.1	119.802706	1	C	2	16	3	Site Infrastructure	3	123.582449	26.254961	3	-3.679743	1	9	1	3
133	205107	705696	121.092484	19.108164	8	0.1	120.992484	1	C	2	16	3	Site Infrastructure	3	123.582449	12.006592	3	-2.489965	1	9	1	3
134	205096	705728	114.822809	15.489473	8	0.01	114.812809	1	G	1	8	2	Minor Water Feature	6	115.996471	25.538627	3	-1.173662	1	18	2	4
135	205106	705718	115.216532	17.706886	8	0.1	115.116532	1	G	1	8	2	Site Infrastructure	3	123.582449	33.055588	3	-8.365917	1	9	1	2
136	205118	705708	116.004628	17.168922	8	0.01	115.994628	1	G	1	8	2	Site Infrastructure	3	122.831772	23.04209	3	-6.827144	1	9	1	2
137	205002	705492	159.829902	0.789964	1	0.01	159.819902	1	G	1	1	1	Roads and Tracks	3	159.765639	2.996181	4	0.064263	1	12	2	2
138	204992	705502	159.96604	1.968334	1	0.01	159.95604	1	G	1	1	1	Roads and Tracks	3	159.92581	1.506654	4	0.04023	1	12	2	2
139	204982	705512	159.362865	2.743727	2	0.01	159.352865	1	G	1	2	1	Roads and Tracks	3	159.500218	1.506654	4	-0.137353	1	12	2	2
140	204971	705524	159.068452	4.62788	4	0.01	159.058452	1	G	1	4	1	Roads and Tracks	3	158.997939	1.737633	4	0.070513	1	12	2	2
141	204972	705512	160.508055	14.783113	6	0.1	160.408055	1	G	1	6	2	Roads and Tracks	3	159.707994	2.965185	4	0.800061	1	12	2	4
142	204962	705522	160.079703	14.44448	6	0.01	160.069703	1	R	1.5	9	2	Roads and Tracks	3	159.307292	2.965185	4	0.772411	1	12	2	4
143	204942	705522	163.609226	11.963002	6	0.2	163.409226	1	G	1	6	2	Minor Water Feature	6	163.983207	2.755518	4	-0.373981	1	24	3	6
144	204952	705522	161.831971	13.377775	6	0.1	161.731971	1	G	1	6	2	Roads and Tracks	3	159.21433	9.893807	4	2.617641	1	12	2	4
145	204942	705492	166.485907	10.608174	6	0.1	166.385907	1	G	1	6	2	Site Infrastructure	3	167.255757	5.506994	4	-0.76985	1	12	2	4
146	204942	705502	164.732152	8.208152	6	0.1	164.632152	1	G	1	6	2	Minor Water Feature	6	165.664927	12.579792	3	-0.932775	1	18	2	4
147	204942	705512	164.099363	8.315041	6	0.2	163.899363	1	G	1	6	2	Minor Water Feature	6	164.998187	7.184601	4	-0.898824	1	24	3	6
148	204942	705483	167.961683	10.937132	6	0.3	167.661683	1	G	1	6	2	Site Infrastructure	3	168.114784	0.791628	4	-0.153101	1	12	2	4
149	204942	705472	169.795424	10.933753	6	0.3	169.495424	1	G	1	6	2	Site Infrastructure	3	168.773236	6.687797	4	1.022188	1	12	2	4
150	204942	705462	171.403668	10.504146	6	0.3	171.103668	1	G	1	6	2	Site Infrastructure	3	172.481038	5.978482	4	-1.07737	1	12	2	4
151	204952	705462	170.37263	10.657215	6	0.5	169.87263	1	G	1	6	2	Site Infrastructure	3	171.616175	7.376728	4	-1.243545	1	12	2	4
152	204952	705472	168.756585	11.036484	6	0.4	168.356585	1	G	1	6	2	Site Infrastructure	3	168.151763	8.132633	4	0.604822	1	12	2	4
153	204952	705482	167.116586	11.51287	6	0.2	166.916586	1	G	1	6	2	Site Infrastructure	3	167.495758	4.722169	4	-0.379172	1	12	2	4
154	204952	705493	165.229353	12.121841	6	0.1	165.129353	1	G	1	6	2	Site Infrastructure	3	165.178209	3.56734	4	0.051144	1	12	2	4
155	204952	705502	163.80601	8.34171	6	0.1	163.70601	1	G	1	6	2	Site Infrastructure	3	165.178209	11.8219	3	-1.372199	1	9	1	2
156	204962	705512	162.234776	10.655972	6	0.1	162.134776	1	R	1.5	9	2	Roads and Tracks	3	159.587477	9.893807	4	2.647299	1	12	2	4
157	204952	705512	162.816275	7.173511	4	0.1	162.716275	1	G	1	4	1	Minor Water Feature	6	164.534823	16.113764	3	-1.718548	1	18	2	2
158	204962	705502	163.172387	5.774575	4	0.1	163.072387	1	G	1	4	1	Site Infrastructure	3	164.89021	12.271424	3	-1.717823	1	9	1	1
159	204972	705502	162.574057	9.919022	6	0.1	162.474057	1	R	1.5	9	2	Roads and Tracks	3	159.963973	9.893808	4	2.610084	1	12	2	4

1 TO 4	Negligible
5 TO10	Low
11 TO 16	Medium
17 TO 25	High

160	204982	705502	160.655298	12.901299	6	0.1	160.555298	1	R	1.5	9	2	Roads and Tracks	3	159.975203	2.965185	4	0.680095	1	12	2	4
161	204982	705492	161.773646	12.294113	6	0.2	161.573646	1	G	1	6	2	Roads and Tracks	3	160.033666	9.692717	4	1.73998	1	12	2	4
162	204992	705492	159.984218	5.99943	4	0.3	159.684218	1	G	1	4	1	Roads and Tracks	3	159.873907	1.475676	4	0.110311	1	12	2	2
163	204992	705482	161.15503	12.702371	6	0.1	161.05503	1	G	1	6	2	Roads and Tracks	3	159.679526	8.520497	4	1.475504	1	12	2	4
164	205002	705482	159.533132	5.452921	4	0.1	159.433132	1	G	1	4	1	Roads and Tracks	3	159.459007	1.475676	4	0.074125	1	12	2	2
165	205002	705472	161.139761	13.531975	6	0.2	160.939761	1	G	1	6	2	Roads and Tracks	3	159.477726	8.520498	4	1.662035	1	12	2	4
166	205002	705463	162.76645	13.819376	6	0.1	162.66645	1	G	1	6	2	Site Infrastructure	3	165.037835	8.807497	4	-2.271385	1	12	2	4
167	204992	705462	164.585245	14.858995	6	0.4	164.185245	1	G	1	6	2	Site Infrastructure	3	164.990674	1.506654	4	-0.405429	1	12	2	4
168	204992	705472	162.875031	13.518006	6	0.1	162.775031	1	G	1	6	2	Site Infrastructure	3	164.886311	8.552964	4	-2.01128	1	12	2	4
169	204982	705462	166.222172	15.58024	8	0.3	165.922172	1	G	1	8	2	Site Infrastructure	3	165.538404	2.965185	4	0.683768	1	12	2	4
170	204982	705472	164.527582	13.12879	6	0.4	164.127582	1	G	1	6	2	Site Infrastructure	3	165.170701	2.99618	4	-0.643119	1	12	2	4
171	204972	705472	166.096485	12.953064	6	0.01	166.086485	1	G	1	6	2	Site Infrastructure	3	165.779833	1.475676	4	0.316652	1	12	2	4
172	204972	705462	167.912391	15.98115	8	0.01	167.902391	1	G	1	8	2	Site Infrastructure	3	165.505309	9.893808	4	2.407082	1	12	2	4
173	204982	705482	162.823725	12.552631	6	0.3	162.523725	1	G	1	6	2	Site Infrastructure	3	165.12881	9.926437	4	-2.305085	1	12	2	4
174	204974	705490	163.165016	8.531952	6	0.3	162.865016	1	R	1.5	9	2	Site Infrastructure	3	164.900203	10.258587	3	-1.735187	1	9	1	2
175	204962	705492	163.983261	9.852597	6	0.2	163.783261	1	R	1.5	9	2	Site Infrastructure	3	164.68169	3.413668	4	-0.698429	1	12	2	4
176	204962	705482	165.783316	12.914764	6	0.2	165.583316	1	G	1	6	2	Site Infrastructure	3	165.476204	1.475676	4	0.307112	1	12	2	4
177	204972	705482	164.344429	11.541451	6	0.5	163.844429	1	G	1	6	2	Site Infrastructure	3	164.972209	2.99618	4	-0.62778	1	12	2	4
178	204962	705472	167.580395	12.596787	6	0.4	167.180395	1	G	1	6	2	Site Infrastructure	3	165.620209	8.520496	4	1.960186	1	12	2	4
179	204962	705462	169.448469	12.462708	6	0.2	169.248469	1	G	1	6	2	Site Infrastructure	3	171.221918	9.369951	4	-1.773449	1	12	2	4
180	204867	705397	184.741946	16.229155	8	0.7	184.041946	2	R	1.5	24	3	Minor Water Feature	6	180.158983	28.315769	3	4.582963	1	18	2	6
181	204867	705407	182.478992	10.828977	6	0.5	181.978992	1	R	1.5	9	2	Minor Water Feature	6	180.158983	18.407775	3	2.320009	1	18	2	4
182	204867	705416	180.916314	9.51449	6	0.5	180.416314	1	G	1	6	2	Minor Water Feature	6	180.158983	9.093388	4	0.757331	1	24	3	6
183	204868	705427	179.397	8.178662	6	0.4	178.997	1	G	1	6	2	Minor Water Feature	6	179.345731	1.622152	4	0.051269	1	24	3	6
184	204867	705449	178.210118	5.344295	4	0.3	177.910118	1	R	1.5	6	2	Site Infrastructure	3	178.539692	8.699225	4	-0.329574	1	12	2	4
185	204866	705436	178.827781	6.966574	4	0.4	178.427781	1	R	1.5	6	2	Minor Water Feature	6	178.942864	6.453462	4	-0.115083	1	24	3	6
186	204878	705458	176.836466	6.137394	4	0.01	176.826466	1	G	1	4	1	Site Infrastructure	3	177.255034	8.210915	4	-0.418568	1	12	2	2
187	204866	705457	178.000491	5.90314	4	0.4	177.600491	1	G	1	4	1	Site Infrastructure	3	177.818384	2.401303	4	0.182107	1	12	2	2
188	204877	705447	177.331979	6.068488	4	0.01	177.321979	1	G	1	4	1	Minor Water Feature	6	176.911746	7.681468	4	0.420233	1	24	3	3
189	204876	705437	177.792428	5.966771	4	0.3	177.492428	1	G	1	4	1	Minor Water Feature	6	177.739262	0.902474	4	0.053166	1	24	3	3
190	204877	705428	178.480533	8.917007	6	0.3	178.180533	1	G	1	6	2	Minor Water Feature	6	178.336906	6.537714	4	0.143627	1	24	3	6
191	204877	705417	180.417893	11.138427	6	0.1	180.317893	1	R	1.5	9	2	Minor Water Feature	6	178.732164	14.766636	3	1.685729	1	18	2	4
192	204887	705415	181.094763	16.404122	8	0.01	181.084763	1	G	1	8	2	Minor Water Feature	6	178.732164	22.207994	3	2.362599	1	18	2	4
193	204877	705407	182.505468	15.833746	8	0.4	182.105468	1	G	1	8	2	Minor Water Feature	6	180.158983	22.258279	3	2.346485	1	18	2	4
194	204878	705398	185.739352	19.903426	8	0.1	185.639352	1	G	1	8	2	Minor Water Feature	6	180.158983	30.595305	3	5.580369	1	18	2	4
195	204887	705397	187.241563	19.210808	8	0.1	187.141563	1	G	1	8	2	Minor Water Feature	6	180.158983	36.740026	3	7.08258	1	18	2	4
196	204888	705407	183.819466	19.505348	8	0.1	183.719466	1	R	1.5	12	2	Minor Water Feature	6	178.732164	28.683354	3	5.087302	1	18	2	4
197	204897	705398	187.693153	18.027488	8	0.3	187.393153	1	G	1	8	2	Minor Water Feature	6	178.732164	42.182036	3	8.960989	1	18	2	4
198	204896	705407	184.613764	17.949513	8	0.3	184.313764	1	G	1	8	2	Minor Water Feature	6	178.732164	34.520612	3	5.8816	1	18	2	4
199	204908	705398	188.326954	17.099747	8	0.2	188.126954	1	G	1	8	2	Minor Water Feature	6	177.268605	49.06414	3	11.058349	2	36	4	8
200	204917	705398	189.011948	12.609446	6	0.4	188.611948	1	G	1	6	2	Site Infrastructure	3	174.943367	50.971602	3	14.068581	2	18	2	4
201	204926	705395	189.240746	11.152933	6	0.3	188.940746	1	G	1	6	2	Site Infrastructure	3	174.943367	55.059868	3	14.297379	2	18	2	4
202	204926	705407	186.292084	18.448058	8	0.1	186.192084	1	G	1	8	2	Site Infrastructure	3	174.943367	44.008832	3	11.348717	2	18	2	4
203	204916	705407	186.894302	16.427288	8	0.1	186.794302	1	G	1	8	2	Site Infrastructure	3	174.943367	41.490894	3	11.950935	2	18	2	4
204	204907	705408	185.534379	17.636453	8	0.1	185.434379	1	R	1.5	12	2	Minor Water Feature	6	177.268605	40.542726	3	8.265774	1	18	2	4
205	204908	705415	183.335107	19.980988	8	0.4	182.935107	1	G	1	8	2	Site Infrastructure	3	175.402437	33.426575	3	7.93267	1	9	1	2
206	204898	705418	181.334878	18.20446	8	0.1	181.234878	1	G	1	8	2	Minor Water Feature	6	177.268605	26.840043	3	4.066273	1	18	2	4
207	204917	705417	183.366988	20.898872	8	0.1	183.266988	1	R	1.5	12	2	Site Infrastructure	3	174.943367	31.977978	3	8.423621	1	9	1	2
208	204927	705417	182.943351	18.941239	8	0.1	182.843351	1	R	1.5	12	2	Site Infrastructure	3	174.943367	34.910688	3	7.999984	1	9	1	2
209	204927	705427	180.163897	15.854649	8	0.1	180.063897	1	G	1	8	2	Site Infrastructure	3	174.943367	26.117113	3	5.22053	1	9	1	2
210	204916	705428	179.315603	17.541852	8	0.6	178.715603	2	R	1.5	24	3	Site Infrastructure	3	174.943367	20.986583	3	4.372236	1	9	1	3
211	204907	705427	178.823979	16.351317	8	0.2	178.623979	1	G	1	8	2	Site Infrastructure	3	175.402437	21.555382	3	3.421542	1	9	1	2
212	204898	705427	178.727663	14.109327	6	0.2	178.527663	1	G	1	6	2	Minor Water Feature	6	177.000774	20.455927	3	1.726889	1	18	2	4
213	204887	705427	178.417805	11.272443	6	0.1	178.317805	1	G	1	6	2	Minor Water Feature	6	177.268605	12.780845	3	1.1492	1	18	2	4
214	204887	705438	176.902969	4.987698	4	0.1	176.802969	1	R	1.5	6	2	Minor Water Feature	6	177.000774	5.114395	4	-0.097805	1	24	3	6
215	204889	705447	176.243803	5.273409	4	0.2	176.043803	1	G	1	4	1	Minor Water Feature	6	176.343559	1.318507	4	-0.099756	1	24	3	3
216	204887	705458	175.93021	6.092391	4	0.4	175.53021	1	G	1	4	1	Minor Water Feature	6	175.828241	8.087955	4	0.101969	1	24	3	3
217	204898	705457	175.092484	6.096679	4	0.4	174.692484	1	G	1	4	1	Minor Water Feature	6	175.084731	0.765093	4	0.007753	1	24	3	3
218	204906	705457	174.347989	12.92592	6	0.4	173.947989	1	G	1	6	2	Site Infrastructure	3	174.769181	2.649272	4	-0.421192	1	12	2	4
219	204918	705455	173.550124	9.997098	6	0.3	173.250124	1	G	1	6	2	Site Infrastructure	3	173.712556	2.477705	4	-0.162432	1	12	2	4
220	204928	705458	173.030543	8.753574	6	0.3	172.730543	1	R	1.5	9	2	Site Infrastructure	3	172.999687	1.064814	4	0.030856	1	12	2	4
221	204928	705447	174.639544	10.010185	6	0.2	174.439544	1	R	1.5	9	2	Site Infrastructure	3	173.45441	8.431521	4	1.185134	1	12	2	4
222	204927	705437	176.925735	17.015975	8	0.6	176.325735	2	G	1	16	3	Site Infrastructure	3	174.943367	17.481737	3	1.982368	1	9	1	3
223	204918	705437	177.209848	13.786159	6	0.3	176.909848	1	R	1.5	9	2	Site Infrastructure	3	174.943367	12.916096	3	2.266481	1	9	1	2
224	204917	705447	175.130937	9.962272	6	0.2	174.930937	1	G	1	6	2	Site Infrastructure	3	174.943367	3.898494	4	0.18757	1	12	2	4
225	204907	705448	175.736103	6.893543	4	0.2	175.536103	1	R	1.5	6	2	Site Infrastructure	3	175.402437	2.688875	4	0.333666	1	12	2	4
226	204907	705437	176.648755	8.508843	6	0.2	176.448755	1	R	1.5	9	2	Site Infrastructure	3	175.402437	11.707051	3	1.246318	1	9	1	2
227	204897	705438	176.720652	6.618887	4	0.1	176.620652	1	R	1.5	6	2	Minor Water Feature	6	176.431351	11.756795	3	0.289301	1	18	2	4
228	204897	705447	175.928035	4.777192	4	0.2	175.728035	1	G	1	4	1	Minor Water Feature	6	175.704491	5.312288	4	0.223544	1	24	3	3
229	204412	704972	225.682798	3.838114	2	0.5	225.182798	1	R	1.5	3	1	Site Infrastructure	3	226.262611	14.668495	3	-0.579813	1	9	1	1
230	204422	704972	225.089227	2.53762	2	0.4	224.689227	1	R	1.5	3	1	Site Infrastructure	3	226.043215	15.381084	3	-0.953988	1	9	1	1
231	204432	704972	224.937806	2.745189	2	1	223.937806	2	G	1	4	1	Site Infrastructure	3	226.043215	20.738623	3	-1.105409	1	9	1	1
232	204442	704972	224.74865	5.987983	4	1.8	222.94865	3	R	1.5	18	3	Site Infrastructure	3	226.043215	28.697997	3	-1.294565	1	9	1	3
233	204433	704982	225.194047	4.654675	4	0.7	224.494047	2	G	1	8	2	Site Infrastructure	3	226.043215	16.172921	3	-0.849168	1	9	1	2
234	204422	704982	225.879117	3.419621	2	1	224.879117	2	G	1	4	1	Site Infrastructure	3	226.043215	6.597498	4	-0.164098	1	12	2	2
235	204412	704982	226.255823	2.748206	2	0.1	226.155823	1	G	1	2	1	Site Infrastructure	3	226.262611	4.702552	4	-0.006788	1	12	2	2
236	204412	704992	226.211107	1.997445	1	0.2	226.011107	1	R	1.5	1.5	1	Site Infrastructure	3	226.231938	0.941164	4	-0.020831	1	12	2	2
237	204412	705002	226.189245	1.935182	1	0.2	225.989245	1	R	1.5	1.5	1	Site Infrastructure	3	226.209043	0.941164	4	-0.019798	1	12	2	2
238	204422	705002	225.840981	1.983272	1	0.2	225.640981	1	R	1.5	1.5	1	Site Infrastructure	3	225.922123	5.368524	4	-0.081142	1	12	2	2
239	204422	704992	225.870421	1.973866	1	0.2	225.670421	1	R	1.5	1.5	1	Site Infrastructure	3	226.028129	4.722157	4	-0.157708	1	12	2	2
240	204412	705012	226.160414	1.963336	1	0.3	225.860414	1	G	1	1	1	Site Infrastructure	3	225.986123	6.286902	4	0.174291	1	12	2	2
241	204422	705012	225.812071	1.996346	1	0.2	225.612071	1	R	1.5	1.5	1	Site Infrastructure	3	225.834454	0.941164	4	-0.022383	1	12	2	2
242	204422	705022	225.815432	1.781789	1	1	224.815432	2	R	1.5	3	1	Site Infrastructure	3	225.760122	7.463756	4	0.05531	1	12	2	2
243	204412	705022	226.132077	1.912997	1	0.5	225.632077	1	R	1.5	1.5	1	Site Infrastructure	3	225.834454	13.200126	3	0.297623	1	9	1	1
244	204422	705032	225.934164	1.668867	1	0.3	225.634164	1	G	1	1	1	Site Infrastructure	3	225.502324	14.680924	3	0.43184	1	9	1	1
245	204412	705032	226.223003	1.566936	1	0.3	225.923003	1	G	1	1	1	Site Infrastructure	3	225.760122	20.713208	3	0.462881	1	9	1	1
246	204432	705032	225.652996	1.550936	1	0.5	225.152996	1	G	1	1	1	Site Infrastructure	3	225.430315	7.543679	4	0.222681	1	12	2	2
247	204442	705022	225.259672	1.487352	1	0.4	224.859672	1	G	1	1	1	Site Infrastructure	3	225.360055	3.769285	4	-0.100383	1	12	2	2
248	204432	705022	225.532572	1.813299	1	0.3	225.232572	1	G	1	1	1	Site Infrastructure	3	225.502324	1.475672	4	0.030248	1	12	2	2
249	204442	705032	225.423338	1.768722	1	0.2	225.223338	1	G	1	1	1	Site Infrastructure	3	225.427053	1.475672	4	-0.003715	1	12	2	2
250	204452	705032	225.334814	2.159196	2	0.8	224.534814	2	G	1	4	1	Site Infrastructure	3	225.460936	3.769286	4	-0.126122	1	12	2	2
251	204462	705032	225.27176	2.735769	2	0.2	225.07176	1	G	1	2	1	Site Infrastructure	3	225.685289	10.92957	3	-0.413529	1	9	1	1
252	204472	705032	225.180046	6.317982	4	0.1	225.080046	1	G	1	4	1	Site Infrastructure	3	225.865975	16.555391	3	-0.685929	1	9	1	1
253	204472	705022	224.527245	5.14812	4	0.1	224.427245	1	G	1	4	1	Site Infrastructure	3	225.685289	25.020037	3	-1.158044	1	9	1	1
254	204472	705012	224.076174	3.983191	2	0.5	223.576174	1	R	1.5	3	1	Site Infrastructure	3	225.460936	32.051537	3	-1.384762	1	9	1	1
255	204472	705002	223.396595	4.072486	4	0.3	223.096595	1	R	1.5	6	2	Site Infrastructure	3	225.358002	39.147065	3	-1.961407	1	9	1	2
256	204472	704992	222.751901	1.461657	1	0.7	222.051901	2	R	1.5	3	1	Site Infrastructure	3	225.360055	46.192675	3	-2.608154	1	9	1	1
257	204472	704982	222.763442	2.732812	2	0.1	222.663442	1	G	1	2	1	Site Infrastructure	3	225.41685	53.28158	3	-2.653408	1	9	1	1
258	204472	704972	222.341008	3.866926	2	0.4	221.941008	1	G	1	2	1	Site Infrastructure	3	226.043215	56.60265	3	-3.702207	1	9	1	1
259	204462	704973	223.159813	5.34431	4	0.2	222.959813	1	G	1	4	1	Site Infrastructure	3	226.043215	46.575559	3	-2.883402	1	9	1	1
260	204452	704972	224.203859	6.446484	4	1.1	223.103859	3	G	1	12	2	Site Infrastructure	3	226.043215	37.643478	3	-1.839356	1	9	1	2
261	204442	704982	224.531015	4.410172	4	2.9	221.631015	3	G	1	12	2	Site Infrastructure	3	226.043215	25.110242	3	-1.5122	1	9	1	2
262	204452	704982	223.780197	4.531429	4	2.5	221.280197	3	G	1	12	2	Site Infrastructure	3	226.043215	34.985435	3	-2.263018	1	9	1	2
263	204462	704982	223.039566	3.076682	2	2.8	220.239566	3	G	1	6	2	Site Infrastructure	3	226.043215	44.915575	3	-3.003649	1	9	1	2
264	204462	704992	223.220004	4.28087	4	1.7	221.520004	3	G	1	12	2	Site Infrastructure	3	225.41685	39.147063	3	-2.196846	1	9	1	2
265	204462	705002	223.73623	4.492708	4	0.1	223.63623	1	R	1.5	6	2	Site Infrastructure	3	225.360055	32.051535	3	-1.623825	1	9	1	2
266	204462	705012	224.423852	4.47228	4	0.2	224.223852	1	R	1.5	6	2	Site Infrastructure	3	225.358002	25.020036	3	-0.93415	1	9	1	2
267	204462	705022	224.938765	2.122988	2	0.1	224.838765	1	R	1.5	3	1	Site Infrastructure	3	225.460936	17.910398	3	-0.522171	1	9	1	1
268	204452	705022	225.094802	1.350794	1	0.1	224.994802	1	R	1.5	1.5	1	Site Infrastructure	3	225.358002	10.92957	3	-0.2632	1	9	1	1
269	204452	705012	224.831498	3.440479	2	0.1	224.731498	1	R	1.5	3	1	Site Infrastructure	3	225.360055	17.910398	3	-0.528557	1	9	1	1
270	204442	705012	225.12882	2.014117	2	0.1	225.02882	1	R	1.5	3	1	Site Infrastructure	3	225.41685	10.929569	3	-0.28803	1	9	1	1
271	204432	705012	225.470412	1.925979	1	0.1	225.370412	1	G	1	1	1	Site Infrastructure	3	225.555167	5.368524	4	-0.084755	1	12	2	2
272	204432	705002	225.492078	2.089698	2	0.1	225.392078	1	R	1.5	3	1	Site Infrastructure	3	225.770891	12.253944	3	-0.278813	1	9	1	1
273	204442	705002	225.037121	3.775624	2	0.2	224.837121	1	G	1	2	1	Site Infrastructure	3	225.448141	18.777461	3	-0.41102	1	9	1	1
274	204440	704999	225.105504	3.704045	2	0.2	224.905504	1	R	1.5	3	1	Site Infrastructure	3	225.69612	20.019906	3	-0.590616	1	9	1	1
275	204452	705002	224.270007	4.446494	4	0.6	223.670007	2	R	1.5	12	2	Site Infrastructure	3	225.41685	25.020035	3	-1.146843	1	9	1	2
276	204452	704992	224.029455	4.790691	4	3.9	220.129455	8	G	1	32	4	Site Infrastructure	3	225.448141	32.543994	3	-1.418686	1	9	1	4
277	204442	704992	224.78644	4.408586	4	1	223.78644	2	R	1.5	12	2	Site Infrastructure	3	226.028129	24.683922	3	-1.241689	1	9	1	2
278	204432	704992	225.505841	3.190333	2	1.8	223.705841	3	R	1.5	9	2	Site Infrastructure	3	226.028129	14.690524	3	-0.522288	1	9	1	2
279	204732	705262	213.301715	4.297938	4	0.5	212.801715	1	G	1	4	1	Site Infrastructure	3	213.170751	2.7387	4	0.130964	1	12	2	2
280	204732	705252	213.957355	5.290648	4	0.4	213.557355	1	R	1.5	6	2	Site Infrastructure	3	213.808522	7.184594	4	0.148833	1	12	2	4
281	204732	705242	214.820233	5.877273	4	0.2	214.620233	1	G	1	4	1	Site Infrastructure	3	214.723917	11.646389	3	0.096316	1	9	1	1
282	204732	705232	215.621582	4.916324	4	0.1	215.521582	1	R	1.5	6	2	Site Infrastructure	3	215.54752	17.037142	3	0.074062	1	9	1	2
283	204732	705222	215.957153	2.254132	2	1	214.957153	2	R	1.5	6	2	Site Infrastructure	3	216.045206	22.198897	3	-0.088053	1	9	1	2
284	204722	705242	215.205773	6.361823	4	0.1	215.105773	1	R	1.5	6	2	Site Infrastructure	3	215.021244	3.769291	4	0.184529	1	12	2	4
285	204722	705222	216.311103	1.85182	1	1.1	215.211103	3	G	1	3	1	Site Infrastructure	3	216.508934	15.082191	3	-0.197831	1	9	1	1
286	204722	705232	216.17597	3.684664	2	0.3	215.87597	1	G	1	2	1	Site Infrastructure	3	216.045206	8.138302	4	0.130764	1	12	2	2
287	204712	705222	216.539343	0.993073	1	0.4	216.139343	1	G	1	1	1	Site Infrastructure	3	216.604038	8.132624	4	-0.064695	1	12	2	2
288	204722	705212	216.389908	1.085541	1	0.6	215.789908	2	R	1.5	3	1	Site Infrastructure	3	216.604038	22.196815	3	-0.21413	1	9	1	1
289	204722	705202	216.399902	0.82155	1	0.8	215.599902	2	G	1	2	1	Site Infrastructure	3	216.636861	29.762639	3	-0.236959	1	9	1	1
290	204732	705202	216.232202	1.508546	1	1	215.232202	2	G	1	2	1	Site Infrastructure	3	216.604038	36.320826	3	-0.371836	1	9	1	1
291	204732	705212	216.176304	1.678834	1	1	215.176304	2	G	1	2	1	Site Infrastructure	3	216.508934	29.223345	3	-0.33263	1	9	1	1
292	204712	705212	216.549337	0.889818	1	0.5	216.049337	1	G	1	1	1	Site Infrastructure	3	216.636861	16.102275	3	-0.087524	1	9	1	1
293	204712	705202	216.559347	0.889875	1	0.3	216.259347	1	R	1.5	1.5	1	Site Infrastructure	3	216.73217	24.232389	3	-0.172823	1	9	1	1
294	204702	705212	216.699906	0.889891	1	0.2	216.499906	1	G	1	1	1	Site Infrastructure	3	216.797954	10.929583	3	-0.098048	1	9	1	1
295	204702	705202	216.709901	0.889836	1	0.5	216.209901	1	R	1.5	1.5	1	Site Infrastructure	3	216.860173	19.781217	3	-0.150272	1	9	1	1
296	204692	705212	216.859349	0.889813	1	0.3	216.559349	1	G	1	1	1	Site Infrastructure	3	216.860173	6.687789	4	-0.000824	1	12	2	2
297	204692	705202	216.869345	0.88987	1	0.1	216.769345	1	G	1	1	1	Site Infrastructure	3	216.95686	16.102273	3	-0.087515	1	9	1	1
298	204682	705202	217.019898	0.894405	1	2	215.019898	3	G	1	3	1	Site Infrastructure	3	217.340698	14.306472	3	-0.3208	1	9	1	1
299	204682	705212	217.009903	1.313683	1	2	215.009903	3	R	1.5	4.5	1	Site Infrastructure	3	217.057685	4.702558	4	-0.047782	1	12	2	2
300	204672	705202	217.219823	4.52892	4	2.2	215.019823	3	G	1	12	2	Site Infrastructure	3	218.813183	11.634481	3	-1.59336	1	9	1	2
301	204672	705212	217.567857	10.212298	6	2	215.567857	3	G	1	18	3	Site Infrastructure	3	217.901258	2.738699	4	-0.333401	1	12	2	6
302	204672	705222	218.56631	22.104204	8	0.5	218.06631	1	G	1	8	2	Site Infrastructure	3	218.028496	5.388422	4	0.537814	1	12	2	4
303	204672	705232	222.326661	15.24941	8	0.2	222.126661	1	G	1	8	2	Site Infrastructure	3	217.346992	14.367467	3	4.979669	1	9	1	2
304	204682	705222	217.11514	4.864262	4	0.3	216.81514	1	R	1.5	6	2	Site Infrastructure	3	217.094769	3.413664	4	0.020371	1	12	2	4
305	204672	705242	223.571619	6.798626	4	0.1	223.471619	1	G	1	4	1	Site Infrastructure	3	217.346992	23.943585	3	6.224627	1	9	1	1
306	204682	705242	221.666442	15.535098	8	0.2	221.466442	1	R	1.5	12	2	Site Infrastructure	3	216.859425	21.473846	3	4.807017	1	9	1	2
307	204672	705252	224.825561	10.71431	6	0.1	224.725561	1	R	FALSE	0	1	Site Infrastructure	3	217.346992	33.76594	3	7.478569	1	9	1	1
308	204682	705252	224.063229	13.03078	6	0.5	223.563229	1	G	1	6	2	Site Infrastructure	3	216.73217	30.698219	3	7.331059	1	9	1	2
309	204682	705262	224.715007	10.182117	6	0.2	224.515007	1	G	1	6	2	Site Infrastructure	3	214.869676	38.509894	3	9.845331	1	9	1	2
310	204672	705262	225.358594	8.838116	6	0.1	225.258594	1	R	1.5	9	2	Site Infrastructure	3	216.977539	43.43663	3	8.381055	1	9	1	2
311	204682	705232	219.752258	23.685576	8	0.4	219.352258	1	R	1.5	12	2	Site Infrastructure	3	216.977539	11.821885	3	2.774719	1	9	1	2
312	204692	705252	221.237446	22.649876	8	0.1	221.137446	1	R	1.5	12	2	Site Infrastructure	3	216.383474	24.513065	3	4.853972	1	9	1	2
313	204692	705262	222.254949	17.276253	8	0.1	222.154949	1	R	1.5	12	2	Site Infrastructure	3	214.347419	29.583091	3	7.90753	1	9	1	2
314	204702	705262	219.00966	17.919014	8	0.1	218.90966	1	R	1.5	12	2	Site Infrastructure	3	214.347419	20.706546	3	4.662241	1	9	1	2
315	204702	705252	217.750697	23.080568	8	0.1	217.650697	1	R	1.5	12	2	Site Infrastructure	3	214.869676	16.227714	3	2.881021	1	9	1	2
316	204712	705262	216.25966	17.379757	8	0.1	216.15966	1	R	1.5	12	2	Site Infrastructure	3	213.820928	12.520761	3	2.438732	1	9	1	2
317	204712	705252	214.928669	13.894467	6	0.2	214.728669	1	R	1.5	9	2	Site Infrastructure	3	214.347419	7.445176	4	0.58125	1	12	2	4
318	204722	705262	213.527988	8.524586	6	0.5	213.027988	1	R	1.5	9	2	Site Infrastructure	3	213.471639	3.585044	4	0.056349	1	12	2	4
319	204712	705242	215.570369	6.68434	4	0.1	215.470369	1	R	1.5	6	2	Site Infrastructure	3	215.389684	3.386492	4	0.180685	1	12	2	4
320	204702	705242	216.076273	12.806431	6	0.2	215.876273	1	R	1.5	9	2	Site Infrastructure	3	216.383474	10.371916	3	-0.307201	1	9	1	2
321	204692	705242	219.45572	18.660736	8	0.6	218.85572	2	G	1	16	3	Site Infrastructure	3	216.73217	17.00262	3	2.72355	1	9	1	3
322	204712	705232	216.529348	2.71566	2	0.4	216.129348	1	R	1.5	3	1	Site Infrastructure	3	216.508934	0.941165	4	0.020414	1	12	2	2
323	204702	705235	216.767194	5.563338	4	0.6	216.167194	2	R	1.5	12	2	Site Infrastructure	3	216.633126	5.247445	4	0.134068	1	12	2	4
324	204702	705232	216.692031	3.157857	2	0.6	216.092031	2	R	1.5	6	2	Site Infrastructure	3	216.633126	3.585043	4	0.058905	1	12	2	4

325	204702	705222	216.689897	0.88984	1	0.5	216.189897	1	R	1.5	1.5	1	Site Infrastructure	3	216.700169	2.7387	4	-0.010272	1	12	2	2
326	204692	705222	216.849341	0.91735	1	0.5	216.349341	1	R	1.5	1.5	1	Site Infrastructure	3	216.859425	0.941165	4	-0.010084	1	12	2	2
327	204692	705232	217.186389	10.298335	6	0.4	216.786389	1	R	1.5	9	2	Site Infrastructure	3	216.73217	9.066186	4	0.454219	1	12	2	4
328	204692	705492	186.243772	3.461982	2	0.2	186.043772	1	G	1	2	1	Site Infrastructure	3	185.99436	8.823482	4	0.249412	1	12	2	2
329	204688	705503	186.133135	5.65814	4	0.2	185.933135	1	R	1.5	6	2	Site Infrastructure	3	186.050991	0.882521	4	0.082144	1	12	2	4
330	204689	705512	184.532062	9.86918	6	0.1	184.432062	1	R	1.5	9	2	Site Infrastructure	3	185.717313	7.69676	4	-1.185251	1	12	2	4
331	204724	705523	181.518375	8.512082	6	0.3	181.218375	1	G	1	6	2	Site Infrastructure	3	183.047288	13.26797	3	-1.528913	1	9	1	2
332	204718	705509	183.298045	6.393013	4	1.4	181.898045	3	R	1.5	18	3	Site Infrastructure	3	183.367146	0.629019	4	-0.069101	1	12	2	6
333	204718	705495	184.487903	8.631372	6	0.2	184.287903	1	R	1.5	9	2	Site Infrastructure	3	182.933596	11.506595	3	1.554307	1	9	1	2
334	204782	705543	174.952218	14.588932	6	0.1	174.852218	1	G	1	6	2	Site Infrastructure	3	174.92184	0.813828	4	0.030378	1	12	2	4
335	204791	705549	172.525608	14.270526	6	0.1	172.425608	1	G	1	6	2	Site Infrastructure	3	172.428107	0.7456	4	0.097501	1	12	2	4
336	204800	705541	173.802554	12.031654	6	0.1	173.702554	1	R	1.5	9	2	Site Infrastructure	3	173.858705	0.652177	4	-0.056151	1	12	2	4
337	204790	705533	175.493914	6.491315	4	0.2	175.293914	1	R	1.5	6	2	Site Infrastructure	3	175.57956	0.941914	4	-0.085646	1	12	2	4
338	204798	705523	175.580244	6.013652	4	0.3	175.280244	1	G	1	4	1	Site Infrastructure	3	175.663846	0.825582	4	-0.083602	1	12	2	2
339	204807	705530	174.134806	7.656807	4	0.1	174.034806	1	G	1	4	1	Site Infrastructure	3	174.035805	0.951729	4	0.099001	1	12	2	2
340	204814	705521	174.326462	9.754021	6	0.2	174.126462	1	G	1	6	2	Site Infrastructure	3	174.513053	0.968466	4	-0.186591	1	12	2	4
341	204808	705514	175.76655	6.458433	4	0.01	175.75655	1	R	1.5	6	2	Site Infrastructure	3	175.745691	0.771261	4	0.020859	1	12	2	4
342	204815	705504	176.489897	11.81911	6	0.8	175.689897	2	R	1.5	18	3	Site Infrastructure	3	176.376911	0.638977	4	0.112986	1	12	2	6
343	204825	705512	174.347035	11.205251	6	0.2	174.147035	1	R	1.5	9	2	Site Infrastructure	3	174.250024	0.624471	4	0.097011	1	12	2	4
344	204831	705501	177.167077	13.878478	6	1.1	176.067077	3	G	1	18	3	Site Infrastructure	3	177.164575	0.681752	4	0.002502	1	12	2	6
345	204822	705495	178.706381	12.883164	6	1.1	177.606381	3	G	1	18	3	Site Infrastructure	3	178.763511	0.981154	4	-0.05713	1	12	2	6
346	204831	705485	179.533839	5.129	4	0.8	178.733839	2	G	1	8	2	Site Infrastructure	3	179.50118	0.738699	4	0.032659	1	12	2	4
347	204840	705489	178.45499	6.985879	4	0.5	177.95499	1	G	1	4	1	Site Infrastructure	3	178.555301	0.970955	4	-0.100311	1	12	2	2
348	204847	705481	178.465366	7.538624	4	0.1	178.365366	1	R	1.5	6	2	Site Infrastructure	3	178.485854	0.502237	4	-0.020488	1	12	2	4
349	204841	705476	179.55909	6.771552	4	0.2	179.35909	1	G	1	4	1	Site Infrastructure	3	179.563534	0.98352	4	-0.004444	1	12	2	2
350	204824	705458	182.426409	7.3779	4	0.3	182.126409	1	G	1	4	1	Site Infrastructure	3	182.497571	0.972101	4	-0.071162	1	12	2	2
351	204808	705443	185.809444	10.979637	6	0.2	185.609444	1	G	1	6	2	Site Infrastructure	3	185.576039	1.567803	4	0.233405	1	12	2	4
352	204794	705458	183.990848	8.740291	6	0.4	183.590848	1	G	1	6	2	Site Infrastructure	3	183.807813	1.004384	4	0.183035	1	12	2	4
353	204781	705472	182.685734	7.508017	4	0.1	182.585734	1	R	1.5	6	2	Site Infrastructure	3	182.616482	0.755633	4	0.069252	1	12	2	4
354	204761	705469	183.217785	8.815892	6	0.3	182.917785	1	C	2	12	2	Site Infrastructure	3	183.277533	0.528968	4	-0.059748	1	12	2	4
355	204740	705487	183.27463	9.541356	6	0.1	183.17463	1	R	1.5	9	2	Site Infrastructure	3	183.323524	0.944865	4	-0.048894	1	12	2	4
356	204730	705502	182.658584	6.774552	4	0.2	182.458584	1	G	1	4	1	Site Infrastructure	3	182.790118	1.117775	4	-0.131534	1	12	2	2
357	205065	705591	145.570824	6.634994	4	0.5	145.070824	1	G	1	4	1	Minor Water Feature	6	144.084612	67.972766	3	1.486212	1	18	2	2
358	205049	705605	144.896913	6.477145	4	0.2	144.696913	1	G	1	4	1	Minor Water Feature	6	144.084612	46.526897	3	0.812301	1	18	2	2
359	205032	705619	143.942417	8.967508	6	0.1	143.842417	1	G	1	6	2	Minor Water Feature	6	143.011167	24.800913	3	0.93125	1	18	2	4
360	205000	705581	150.321932	10.609557	6	0.2	150.121932	1	G	1	6	2	Minor Water Feature	6	150.976586	25.17119	3	-0.654654	1	18	2	4
361	205016	705567	151.655232	10.45597	6	0.01	151.645232	1	R	1.5	9	2	Minor Water Feature	6	152.274166	44.316772	3	-0.618934	1	18	2	4
362	205035	705551	151.717457	10.312068	6	0.1	151.617457	1	G	1	6	2	Minor Water Feature	6	154.047252	66.5063	3	-2.329795	1	18	2	4
363	205010	705526	156.688399	8.267145	6	0.4	156.288399	1	G	1	6	2	Roads and Tracks	3	159.527692	30.887707	3	-2.839293	1	9	1	2
364	204994	705544	157.044938	9.275001	6	0.1	156.944938	1	G	1	6	2	Minor Water Feature	6	156.136554	30.022606	3	0.908384	1	18	2	4
365	204980	705562	154.728884	9.391923	6	0.1	154.628884	1	G	1	6	2	Minor Water Feature	6	154.994194	10.504337	3	-0.26531	1	18	2	4
366	204842	705357	193.03416	14.916462	6	0.3	192.73416	1	R	1.5	9	2	Roads and Tracks	3	198.529382	22.24028	3	-5.495222	1	9	1	2
367	204823	705377	189.546249	8.445011	6	0.3	189.246249	1	G	1	6	2	Roads and Tracks	3	195.857503	38.649128	3	-6.311254	1	9	1	2
368	204807	705397	189.951865	7.876832	4	0.2	189.751865	1	R	1.5	6	2	Site Infrastructure	3	184.78489	32.46045	3	5.166975	1	9	1	2
369	204771	705367	195.652855	14.307263	6	0.2	195.452855	1	G	1	6	2	Site Infrastructure	3	197.319682	17.18612	3	-1.666827	1	9	1	2
370	204786	705345	196.273867	7.604005	4	0.01	196.263867	1	R	1.5	6	2	Site Infrastructure	3	196.369423	0.784497	4	-0.095556	1	12	2	4
371	204808	705319	202.521742	28.499824	8	0.01	202.511742	1	R	1.5	12	2	Roads and Tracks	3	195.969127	16.742152	3	6.552615	1	9	1	2
372	204780	705305	204.914219	5.97023	4	0.3	204.614219	1	G	1	4	1	Site Infrastructure	3	208.28895	30.973004	3	-3.374731	1	9	1	1
373	204762	705323	204.053053	7.760106	4	0.8	203.253053	2	G	1	8	2	Roads and Tracks	3	197.445312	22.150366	3	6.607741	1	9	1	2
374	204737	705332	205.135436	7.344002	4	0.8	204.335436	2	G	1	8	2	Roads and Tracks	3	196.970436	26.544918	3	8.165	1	9	1	2
375	204743	705336	204.314656	7.484639	4	0.7	203.614656	2	G	1	8	2	Roads and Tracks	3	196.970436	20.207046	3	7.34422	1	9	1	2
376	204732	705327	205.766665	7.369508	4	0.1	205.666665	1	G	1	4	1	Site Infrastructure	3	208.347266	26.840641	3	-2.580601	1	9	1	1
377	204725	705324	206.299443	9.400634	6	0.1	206.199443	1	G	1	6	2	Site Infrastructure	3	208.347266	27.332937	3	-2.047823	1	9	1	2
378	204719	705317	208.186001	10.118863	6	0.1	208.086001	1	G	1	6	2	Site Infrastructure	3	208.347266	28.291974	3	-0.161265	1	9	1	2
379	204710	705311	209.544304	6.921623	4	0.2	209.344304	1	R	1.5	6	2	Site Infrastructure	3	209.08938	33.637068	3	0.454924	1	9	1	2
380	204717	705302	209.896945	7.817711	4	0.4	209.496945	1	G	1	4	1	Site Infrastructure	3	209.08938	24.643141	3	0.807565	1	9	1	1
381	204725	705309	208.585536	8.381344	6	0.3	208.285536	1	G	1	6	2	Site Infrastructure	3	209.08938	18.796686	3	-0.503844	1	9	1	2
382	204733	705315	207.378355	7.707788	4	0.1	207.278355	1	R	1.5	6	2	Site Infrastructure	3	208.347266	15.779089	3	-0.968911	1	9	1	2
383	204740	705321	206.099003	7.687372	4	0.2	205.899003	1	R	1.5	6	2	Site Infrastructure	3	208.347266	18.341892	3	-2.248263	1	9	1	2
384	204750	705327	204.717639	7.731293	4	0.5	204.217639	1	G	1	4	1	Site Infrastructure	3	208.107263	23.876287	3	-3.389624	1	9	1	1
385	204755	705317	205.410573	8.894807	6	0.3	205.110573	1	G	1	6	2	Site Infrastructure	3	208.107263	16.276147	3	-2.69669	1	9	1	2
386	204748	705312	206.684616	9.273058	6	0.3	206.384616	1	G	1	6	2	Site Infrastructure	3	208.107263	8.78394	4	-1.422647	1	12	2	4
387	204741	705306	208.041279	9.357642	6	0.4	207.641279	1	R	1.5	9	2	Site Infrastructure	3	208.347266	3.658082	4	-0.305987	1	12	2	4
388	204735	705299	209.346121	8.642729	6	0.4	208.946121	1	G	1	6	2	Site Infrastructure	3	209.08938	6.699632	4	0.256741	1	12	2	4
389	204734	705282	211.705464	6.965467	4	0.2	211.505464	1	G	1	4	1	Site Infrastructure	3	211.364948	3.239324	4	0.340516	1	12	2	2
390	204726	705292	210.770804	8.399075	6	0.2	210.570804	1	G	1	6	2	Site Infrastructure	3	210.837843	14.33974	3	-0.067039	1	9	1	2
391	204743	705289	210.392884	7.17447	4	0.3	210.092884	1	G	1	4	1	Site Infrastructure	3	210.360641	0.29781	4	0.032243	1	12	2	2
392	204749	705297	208.922246	9.637276	6	0.2	208.722246	1	G	1	6	2	Site Infrastructure	3	208.897737	0.162926	4	0.024509	1	12	2	4
393	204757	705302	207.468165	9.848263	6	0.2	207.268165	1	G	1	6	2	Site Infrastructure	3	208.28895	7.898717	4	-0.820785	1	12	2	4
394	204765	705309	205.786029	9.586579	6	0.2	205.586029	1	G	1	6	2	Site Infrastructure	3	208.28895	17.179882	3	-2.502921	1	9	1	2
395	204770	705314	204.477434	7.057705	4	0.4	204.077434	1	G	1	4	1	Site Infrastructure	3	208.28895	25.089048	3	-3.811516	1	9	1	1
396	204771	705300	206.717631	13.184714	6	0.7	206.017631	2	G	1	12	2	Site Infrastructure	3	208.28895	21.807889	3	-1.571319	1	9	1	2
397	204764	705294	208.576008	9.328025	6	0.3	208.276008	1	G	1	6	2	Site Infrastructure	3	208.897737	14.647279	3	-0.321729	1	9	1	2
398	204755	705289	209.610842	6.515633	4	0.4	209.210842	1	G	1	4	1	Site Infrastructure	3	209.353944	10.336653	3	0.256898	1	9	1	1
399	204748	705282	210.604587	5.870508	4	0.5	210.104587	1	R	1.5	6	2	Site Infrastructure	3	210.569628	6.551466	4	0.034959	1	12	2	4
400	204740	705276	211.627652	6.21014	4	0.7	210.927652	2	G	1	8	2	Site Infrastructure	3	211.493068	3.091385	4	0.134584	1	12	2	4
401	204710	705279	213.608986	13.991247	6	0.4	213.208986	1	R	1.5	9	2	Site Infrastructure	3	213.094542	21.677885	3	0.514444	1	9	1	2
402	204699	705293	212.752308	17.619718	8	0.1	212.652308	1	R	1.5	12	2	Site Infrastructure	3	213.094542	38.377592	3	-0.342234	1	9	1	2
403	204653	705230	222.468782	4.829325	4	0.3	222.168782	1	G	1	4	1	Site Infrastructure	3	221.738486	17.12498	3	0.730296	1	9	1	1
404	204642	705244	221.73693	5.601156	4	0.5	221.23693	1	G	1	4	1	Site Infrastructure	3	221.738486	33.282413	3	-0.001556	1	9	1	1
405	204619	705231	220.462397	1.685876	1	0.5	219.962397	1	G	1	1	1	Site Infrastructure	3	221.425642	27.651232	3	-0.963245	1	9	1	1
406	204633	705214	221.732864	3.774776	2	0.4	221.332864	1	G	1	2	1	Site Infrastructure	3	221.457723	6.789581	4	0.275141	1	12	2	2
407	204646	705199	220.908925	3.840441	2	0.2	220.708925	1	R	1.5	3	1	Site Infrastructure	3	221.351524	8.261817	4	-0.442599	1	12	2	2
408	204591	705212	221.422202	3.207735	2	0.2	221.222202	1	G	1	2	1	Site Infrastructure	3	222.725256	30.820953	3	-1.303054	1	9	1	1
409	204581	705204	221.708064	3.197788	2	0.1	221.608064	1	G	1	2	1	Site Infrastructure	3	223.366179	30.964758	3	-1.658115	1	9	1	1
410	204572	705197	222.030082	4.335549	4	0.3	221.730082	1	G	1	4	1	Site Infrastructure	3	223.6865	32.205547	3	-1.656418	1	9	1	1
411	204554	705181	223.997841	4.312615	4	0.2	223.797841	1	R	1.5	6	2	Site Infrastructure	3	225.306198	33.283793	3	-1.308357	1	9	1	2
412	204562	705188	223.021523	6.493327	4	0.3	222.721523	1	G	1	4	1	Site Infrastructure	3	224.58381	33.041914	3	-1.562287	1	9	1	1
413	204561	705171	224.538626	4.007881	4	0.2	224.338626	1	R	1.5	6	2	Site Infrastructure	3	225.306198	22.010999	3	-0.767572	1	9	1	2
414	204570	705178	223.83778	5.942416	4	0.4	223.43778	1	G	1	4	1	Site Infrastructure	3	224.806376	20.023552	3	-0.968596	1	9	1	1
415	204578	705186	222.875624	4.696958	4	0.4	222.475624	1	G	1	4	1	Site Infrastructure	3	224.030874	20.081749	3	-1.15525	1	9	1	1
416	204589	705193	222.381461	3.318979	2	0.4	221.981461	1	R	1.5	3	1	Site Infrastructure	3	223.366179	17.932593	3	-0.984718	1	9	1	1
417	204601	705202	222.11133	3.203949	2	0.5	221.61133	1	G	1	2	1	Site Infrastructure	3	222.725256	16.683981	3	-0.613926	1	9	1	1
418	204608	705193	222.695365	3.104773	2	0.8	221.895365	2	G	1	4	1	Site Infrastructure	3	222.866337	5.182089	4	-0.170972	1	12	2	2
419	204597	705184	223.003864	3.543751	2	0.4	222.603864	1	G	1	2	1	Site Infrastructure	3	223.366179	5.757306	4	-0.362315	1	12	2	2
420	204588	705177	223.56827	4.657532	4	0.1	223.46827	1	G	1	4	1	Site Infrastructure	3	223.856989	6.474169	4	-0.288719	1	12	2	2
421	204577	705168	224.485588	5.056933	4	0.5	223.985588	1	G	1	4	1	Site Infrastructure	3	224.806376	8.046717	4	-0.320788	1	12	2	2
422	204569	705161	225.173283	4.078737	4	0.4	224.773283	1	G	1	4	1	Site Infrastructure	3	225.470202	8.537364	4	-0.296919	1	12	2	2
423	204579	705150	226.104727	8.720348	6	0.3	225.804727	1	R	1.5	9	2	Site Infrastructure	3	225.606204	5.07698	4	0.498523	1	12	2	4
424	204589	705158	224.984252	3.580704	2	0.1	224.884252	1	G	1	2	1	Site Infrastructure	3	224.910019	4.789778	4	0.074233	1	12	2	2
425	204597	705166	224.354278	3.326934	2	0.6	223.754278	2	R	1.5	6	2	Site Infrastructure	3	224.397285	0.902918	4	-0.043007	1	12	2	4
426	204607	705175	223.66974	3.039994	2	0.2	223.46974	1	G	1	2	1	Site Infrastructure	3	223.386131	5.627883	4	0.283609	1	12	2	2
427	204617	705182	223.158032	3.26936	2	0.1	223.058032	1	R	1.5	3	1	Site Infrastructure	3	222.950255	6.439305	4	0.207777	1	12	2	2
428	204625	705172	222.632932	5.632226	4	0.2	222.432932	1	G	1	4	1	Site Infrastructure	3	223.088324	18.626695	3	-0.455392	1	9	1	1
429	204615	705164	223.186947	5.248046	4	0.1	223.086947	1	R	1.5	6	2	Site Infrastructure	3	224.136585	11.675078	3	-0.949638	1	9	1	2
430	204606	705158	223.731554	4.940928	4	0.2	223.531554	1	G	1	4	1	Site Infrastructure	3	224.023812	4.123049	4	-0.292258	1	12	2	2
431	204596	705150	224.220956	5.31059	4	0.4	223.820956	1	G	1	4	1	Site Infrastructure	3	224.400615	8.708774	4	-0.179659	1	12	2	2
432	204586	705141	226.577714	12.017816	6	0.3	226.277714	1	G	1	6	2	Site Infrastructure	3	225.417678	15.715777	3	1.160036	1	9	1	2
433	204505	705135	224.776572	4.170724	4	0.4	224.376572	1	G	1	4	1	Site Infrastructure	3	227.018213	32.315598	3	-2.241641	1	9	1	1
434	204518	705118	226.168473	4.182239	4	0.2	225.968473	1	G	1	4	1	Site Infrastructure	3	227.018213	11.823483	3	-0.84974	1	9	1	1
435	204531	705103	227.536395	2.243839	2	0.1	227.436395	1	G	1	2	1	Site Infrastructure	3	227.154566	5.326901	4	0.381829	1	12	2	2
436	204464	705104	225.758384	3.843872	2	1.5	224.258384	3	R	1.5	9	2	Site Infrastructure	3	227.287334	38.614448	3	-1.52895	1	9	1	2
437	204481	705086	227.103186	2.745739	2	0.4	226.703186	1	G	1	2	1	Site Infrastructure	3	227.287334	13.639583	3	-0.184148	1	9	1	1
438	204494	705066	226.900736	5.23101	4	0.2	226.700736	1	G	1	4	1	Site Infrastructure	3	227.191329	6.986324	4	-0.290593	1	12	2	2
439	204442	705057	226.429402	5.177006	4	0.5	225.929402	1	G	1	4	1	Site Infrastructure	3	225.799733	18.19286	3	0.629669	1	9	1	1
440	204422	705076	225.803753	2.184912	2	2.4	223.403753	3	R	1.5	9	2	Site Infrastructure	3	225.799733	45.529941	3	0.00402	1	9	1	2
441	204399	705031	226.562549	4.335377	4	2.2	224.362549	3	R	1.5	18	3	Site Infrastructure	3	225.911776	28.116687	3	0.650773	1	9	1	3
442	204397	705016	226.652223	1.871975	1	0.2	226.452223	1	G	1	1	1	Site Infrastructure	3	226.209043	19.105473	3	0.44318	1	9	1	1
443	204401	705010	226.521494	1.919061	1	0.4	226.121494	1	R	1.5	1.5	1	Site Infrastructure	3	226.277602	11.968373	3	0.243892	1	9	1	1
444	204403	705001	226.495141	1.981054	1	0.4	226.095141	1	R	1.5	1.5	1	Site Infrastructure	3	226.419938	4.953377	4	0.075203	1	12	2	2
445	204405	704992	226.470644	2.082664	2	0.2	226.270644	1	G	1	2	1	Site Infrastructure	3	226.439557	1.058812	4	0.031087	1	12	2	2
446	204395	704990	226.830434	2.158842	2	0.1	226.730434	1	G	1	2	1	Site Infrastructure	3	226.511255	8.488169	4	0.319179	1	12	2	2
447	204394	705000	226.799531	2.085002	2	0.2	226.599531	1	G	1	2	1	Site Infrastructure	3	226.499847	10.227312	3	0.299684	1	9	1	1
448	204399	705023	226.56816	1.922384	1	0.8	225.76816	2	R	1.5	3	1	Site Infrastructure	3	226.058687	23.119967	3	0.509473	1	9	1	1
449	204388	705030	225.363767	6.992284	4	0.5	224.863767	1	R	1.5	6	2	Site Infrastructure	3	226.134597	35.545251	3	-0.77083	1	9	1	2
450	204388	705023	226.129354	7.876469	4	0.4	225.729354	1	R	1.5	6	2	Site Infrastructure	3	226.277602	30.485847	3	-0.148248	1	9	1	2
451	204391	705010	226.87811	1.905622	1	2	224.87811	3	R	1.5	4.5	1	Site Infrastructure	3	226.419938	19.949166	3	0.458172	1	9	1	1
452	204383	705005	227.164988	2.280003	2	2.5	224.664988	3	R	1.5	9	2	Site Infrastructure	3	226.499847	22.514962	3	0.665141	1	9	1	2
453	204389	704998	227.017609	2.073227	2	1	226.017609	2	G	1	4	1	Site Infrastructure	3	226.499847	14.953916	3	0.517762	1	9	1	1
454	204380	704988	227.331068	1.009557	1	0.4	226.931068	1	G	1	1	1	Site Infrastructure	3	226.511255	24.129702	3	0.819813	1	9	1	1
455	204381	704996	227.269887	1.509997	1	0.3	226.969887	1	G	1	1	1	Site Infrastructure	3	226.499847	21.985339	3	0.77004	1	9	1	1
456	204375	705011	226.300262	4.983631	4	1.2	225.100262	3	R	1.5	18	3	Site Infrastructure	3	226.499847	32.730888	3	-0.199585	1	9	1	3
457	204375	705022	225.702456	2.800129	2	0.8	224.902456	2	G	1	4	1	Site Infrastructure	3	226.499847	39.03532	3	-0.797391	1	9	1	1
458	204378	705031	225.272879	2.68522	2	0.5	224.772879	1	G	1	2	1	Site Infrastructure	3	226.277602	43.204848	3	-1.004723	1	9	1	1
459	204370	705031	225.323546	2.656934	2	0.7	224.623546	2	G	1	4	1	Site Infrastructure	3	226.419938	49.237284	3	-1.096392	1	9	1	1
460	204370	705023	225.685727	2.64051	2	0.5	225.185727	1	R	1.5	3	1	Site Infrastructure	3	226.499847	43.177213	3	-0.81412	1	9	1	1
461	205060	705395	163.661261	5.672877	4	0.2	163.461261	1	G	1	4	1	Site Infrastructure	3	163.852146	9.735182	4	-0.190885	1	12	2	2
462	205051	705382	164.839139	5.468524	4	0.1	164.739139	1	R	1.5	6	2	Site Infrastructure	3	164.966095	2.288595	4	-0.126956	1	12	2	4
463	205043	705376	165.755267	8.413564	6	0.2	165.555267	1	G	1	6	2	Roads and Tracks	3	166.494054	9.165689	4	-0.738787	1	12	2	4
464	205042	705431	161.7	12.869393	6	0.01	161.69	1	G	1	6	2	Roads and Tracks	3	160.242072	8.186043	4	1.457928	1	12	2	4
465	205018	705410	171.751991	22.614853	8	0.01	171.741991	1	R	1.5	12	2	Site Infrastructure	3	166.08077	13.333004	3	5.671221	1	9	1	2
466	205029	705419	165.673728	16.083031	8	0.01	165.663728	1	G	1	8	2	Site Infrastructure	3	165.657519	0.197905	4	0.016209	1	12	2	4
467	205001	705446	166.295908	19.503526	8	0.1	166.195908	1	G	1	8	2	Site Infrastructure	3	165.585227	2.183374	4	0.710681	1	12	2	4
468	204992	705434	172.022448	16.860247	8	0.3	171.722448	1	G	1	8	2	Site Infrastructure	3	168.73865	8.988556	4	3.283798	1	12	2	4
469	204961	705434	175.02548	12.755041	6	0.2	174.82548	1	G	1	6	2	Site Infrastructure	3	171.525916	16.145596	3	3.499564	1	9	1	2
470	204966	705450	171.402488	11.596569	6	0.1	171.302488	1	G	1	6	2	Site Infrastructure	3	171.301917	1.25159	4	0.100571	1	12	2	4

Slope Angles		**Co-eff.**
0	2.0	1.0
2	4.0	2.0
4	8.0	4.0
8	15.0	6.0
15	35.0	8.0

Peat depths		**Co-eff.**
0	0.5	1.0
0.51	1.0	2.0
1.01	3.0	3.0
3.01	6.0	8.0

Substrate	**Co-eff.**
G	1.0
R	1.5

C			2.0
not proven			2.0
slip material			5.0
Receptor		**Co-eff**	
Roads and Tracks			3.0
Minor Water Feature			6.0
Dwelling			6.0
Major Watercourse			8.0
Site Infrastructure			3.0
Important Habitat			8.0
Receptor Dist.		**Co-eff.**	
	0	10.0	4.0
	10	100.0	3.0
	100	1000.0	2.0
	1000	2000.0	1.0
Receptor Elev.		**Co-eff.**	
	0	10.0	1.0
	10	50.0	2.0
	50	100.0	3.0
	100	200.0	4.0
risk rating normalisation			
	0	5.0	1.0
	5	15.0	2.0
	15	31.0	3.0
	31	50.0	4.0
	50	100.0	5.0
impact rating normalisation			
	0	10.0	1.0
	10	20.0	2.0
	20	30.0	3.0
	30	50.0	4.0
	50	100.0	5.0

APPENDIX D – PEAT CORING RECORDS

Background

Peat cores were obtained from selected locations at the proposed An Suidhe Substation and associated infrastructure in March 2022. Cores were advanced in areas of the Site where peat probing had identified the presence of deep peat to characterise the properties of the peatland in accordance with the *Peatland Survey. Guidance on Developments on Peatland (2017).* The document, which was published jointly by the Scottish Government, Scottish Natural Heritage (NatureScot) and SEPA, defines a consistent sampling methodology to quantify and qualify the peat material on site. It also provides advice on how to publish peat surveys as part of wider site investigations for development management applications, with a particular focus on wind farm developments.

The parameters used to determine the characteristics of the peat materials are outlined below.

i. Surface firmness estimation

An average man standing on one foot applies a pressure to the ground of between 5 and 6 lbs / p.s.i. and this fact is used to estimate the bearing capacity. The following symbols are used to denote the pressure the ground will stand.

Firmness of surface (P)

PO = Surface too soft to walk on

P1 = Surface just passable

P2 = Surface fairly firm

P3 = Surface firm

ii. Observations on the vegetation

The Site has been subject to commercial forestry at varying stages of development with a majority of the Proposed Development in a felled area where long grasses and shrubs now dominate.

iii. Observations on the peat

a. Botanical observations
Botanical observations of peat samples identified that Carex species are likely to make up a significant proportion of the organic material in the lower horizons where catotelmic peat is typically found.

b. Degree of humification - von POST SCALE
The degree of humification of peat samples is estimated in the field according to the method devised by the Swedish botanist L. von Post by squeezing a small amount of peat in the hand and the water and / or peat exuded indicates, by its colour and consistency, the degree to which the peat has undergone humification or, more correctly, a type of decomposition which includes breakdown under anaerobic conditions. The von Post scale ranges from 1 to 10, the higher the number the higher the degree of humification. The full scale is as follows:

Von Post Scale (H)	
H1	Completely undecomposed peat free of amorphous material. On squeezing, clear colourless water is pressed out.
H2	Nearly undecomposed peat, free of amorphous material, yielding only yellowish brown water on pressing.

H3	Very slightly decomposed peat, containing a little amorphous material. On squeezing, muddy brown water but no peat passes between the fingers. Residue is not pasty.
H4	Slightly decomposed peat containing some amorphous material. Strongly muddy brown water but no peat passes between the fingers. Residue is somewhat pasty.
H5	Moderately decomposed peat containing a fair amount of amorphous material. Plant structure recognisable though somewhat vague. On squeezing, some peat but mainly muddy water issues. Residue is strongly pasty.
H6	Moderately decomposed peat with a fair amount of amorphous material and indistinct plant structure. On pressing, about one third of the peat passes between the fingers. Residue is strongly pasty, but shows the plant structure more distinctly than in unsqueezed peat.
H7	Strongly decomposed peat with much amorphous material and faintly recognisable plant structure. On squeezing, about one half of the peat is extruded. The water is very dark in colour.
H8	Strongly decomposed peat with much amorphous material and very indistinct plant structure. On squeezing, two thirds of the peat and some water passes between the fingers. Residue consists of plant tissues capable of resisting decomposition (roots, fibres, wood, etc.).
H9	Practically fully decomposed peat with almost no recognisable plant structure. Nearly all the peat squeezed between the fingers as a uniform paste.
H10	Completely decomposed peat with no discernible plant structure. On squeezing, all the peat, without water, passes between the fingers.

iv. Fibre

The fibre content of each peat sample is estimated visually and the amounts of the two types (classified 'fine' or 'coarse') are noted on a scale ranging from 0 to 3 as shown below.

Fine fibres, mainly derived from *Eriophorum spp*. (F)

F0 = Nil
Fl = Low content
F2 = Moderate content
F3 = High content

Coarse fibres, mainly rootlets (R)

R0 = Nil
Rl = Low content
R2 = Moderate content
R3 = High content

v. Wood

Wood remains, especially if they are large and resistant, may conceivably cause a certain amount of difficulty during the exploitation of a bog. An attempt is therefore made when sampling to assess the extent of wood. It is estimated on a scale ranging from 0 to 3 as detailed below.

Wood remains (W)
W0= Nil
Wl = Low content
W2 = Moderate content

W3 = High content

vi. Other observations

When peat is freshly sampled and before it darkens by oxidation, note is taken of its colour, stratification, the presence of visible mineral matter and any other features of interest.

Photographs of the peat cores obtained from An Suidhe along with information relating to the parameters outlined above are presented overleaf with a summary of the information gathered during the peat coring process presented in the main body of text of the Peat Landslide Hazard and Risk Assessment (PLHRA)

Core 1		
Core Samples	Detail	Surrounding Environment
		

Location	Depth (m)	Firmness of Surface (P)	Von Post (H)	Fine Fibres (F)	Coarse Fibres (R)	Wood Remains (W)	Other Observations (Colour)
E204781, N705476	0.0-0.5	3	6	1	1	2	Dark Brown
	0.5-1.0		8	1	0	1	Dark Brown

Core 2		
Core Samples	Detail	Surrounding Environment
		

Location	Depth (m)	Firmness of Surface (P)	Von Post (H)	Fine Fibres (F)	Coarse Fibres (R)	Wood Remains (W)	Other Observations (Colour)
	0.0-0.5	2	4	2	3	1	Light Brown
	0.5-1.0		5	1	2	1	Brown
	1.0-1.5		7	1	1	2	Brown
	1.5-2.0		8	1	1	3	Brown
	2.0-2.5		7	0	1	3	Brown
	2.5-3.0		7	0	1	3	Brown