Curraghinalt Project
County Tyrone

Prepared for Dalradian Gold Limited

Environmental Statement - Volume 3

B8 Peat Management Plan

November 2017

DALRADIAN
GOLD

PROPOSED INFRASTRUCTURE SITE PEAT MANAGEMENT PLAN FOR THE CURRAGHINALT GOLD PROJECT, COUNTY TYRONE, NORTHERN IRELAND

Prepared for Dalradian Gold Limited

DALRADIAN GOLD

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SLR

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1.0 NON TECHNICAL SUMMARY

The purpose of this Peat Management Plan (PMP) is to ensure that there has been systematic consideration of peat management and a quantitative assessment throughout the construction activities associated with the proposed mine infrastructure development. This plan includes all peat at the proposed infrastructure site Area A.

The PMP report prepared here is a Stage 1 Report prepared for the Environmental Impact Assessment (EIA) stage of the mine development forming part of the Curraghinalt Project.

The best management option with regard to peat is to minimise potential surplus peat by reducing its production; therefore, the design of the development has aimed to minimise peat excavation where possible.

This PMP has been prepared in accordance with the principles in the guidance for Stage 1 and proposes that prevention and reuse are the most appropriate means of managing peat excavated during construction at this site. Excess or surplus peat will be required to be stored on site in the medium term and reused on a phased basis in restoration as a topsoil medium.

This report details the methodologies required to assess all potential surplus materials and presents preliminary estimates of the expected volume of excavated peat and required reuse volumes for habitat enhancement, dressing, landscaping and use in restoration and as a topsoil medium for use in the restoration of the Dry Stack Facility (DSF).

The total peat volume to be excavated at the site is estimated to be approximately 165,500 m^3 and this is comprised of approximately 88,200 m^3 of acrotelmic peat and approximately 77,300 m^3 of catotelmic peat. There will be a surplus of peat from construction which will require storage, however following restoration of the DSF it is anticipated that there will be no surplus of peat at the site.

Excavated peat will be reused for habitat enhancement and for dressing and restoration of construction works around the site and will either be used immediately or stored on a temporary basis. Where peat is to be reused for restoration as a topsoil medium on the DSF it will be stored in the medium term and will be reused on a phased basis on the DSF minimising the length of time stored.

The onsite storage of peat is addressed in the Curraghinalt Project - Mine Waste Management Plan (MWMP) which has been prepared by SRK.

The proposed areas for peat habitat enhancement and the medium term storage of peat before reuse in restoration will require engineering assessment and design to ensure their stability.

The assessment undertaken here indicates that all peat excavated at the site can be reused in habitat enhancement or will be reused for restoration of the DSF on a phased basis. There will be no excess peat at the site which will require removal off site.

2.0 INTRODUCTION

This Peat Management Plan (PMP) report has been prepared by SLR Consulting Ltd. (SLR) on behalf of Dalradian Gold Limited (DGL) and forms part of the planning application for the development of a mine as part of the Curraghinalt Project, Co. Tyrone.

The purpose of this PMP is to ensure that there has been systematic consideration of peat management and a quantitative assessment throughout the construction activities associated with the proposed mine infrastructure. This plan includes all peat at the proposed infrastructure site, i.e. the above ground development, which is to be excavated as part of the construction process for the mine development.

Thee are no other peat looses associated with the proposed development across other parts of the scheme. This is explained in the Ecological Impact Assessment (EcIA) and in Chapter 8 of the Environmental Statement (ES) Section 8.11.5, which covers the ecological impacts of surface disturbance.

The proposed infrastructure site is located on the southern side of a Crocknamoghil hill. The proposed infrastructure site includes the surface portal to the underground decline; stockpiles; crushing facility; process plant building; a Dry Stack Facility (DSF); water management infrastructure (including drainage infrastructure, ponds and a water treatment system); ancillary buildings (such as offices, laboratories, warehouses); and perimeter fencing.

Peat has been identified within the proposed infrastructure site and the ecology and depth of peat has been investigated and characterised; the findings of the peat survey are included in the SLR Peat Characterisation Survey Report[1]. The depth, nature and extent of peat has been investigated through peat depth probing, peat cores and trial pits undertaken through a number of surveys at the site.

The proposed mine development is resource tied, in so far as the identified gold deposit has been proven at a specific location at Curraghinalt, Co. Tyrone. Therefore, the location of the mine and associated surface infrastructure is tied to this area.

In the siting of the proposed above ground infrastructure development a number of factors, including peat, were considered by DGL and the project team. The assessment of alternative sites for the mine infrastructure is described in Chapter 5 of the Curraghinalt Project Environmental Statement (ES) Chapter - Chapter 5: Project ES which was prepared by SRK Consulting on behalf of DGL.

The PMP report prepared here is a Stage 1 Report prepared for the Environmental Impact Assessment (EIA) stage of the mine development forming part of the Curraghinalt Project.

2.1 Aims and Objectives

This Stage 1 Peat Management Plan (PMP) considers the excavation of peat and soil across the site as a result of construction of the proposed above ground mine development. It considers the potential for minimising excavation and disturbance in order to reduce any unnecessary surplus of peat which will require management at the site.

[1] Peat Characterisation Survey Report, Draft Version 4, October 2016.

The best management option with regard to minimising the potential for surplus peat is to reduce its production; therefore, the design of the infrastructure layout aimed to minimise peat excavation where possible.

The Scottish Environmental Protection Agency (SEPA guidance 2010[2], SEPA 2012[3]) provides a hierarchy of management approaches through which the effectiveness of the approach to peat management is optimised at development sites and is summarised below:

- **prevention:** avoiding generating excess peat during construction (e.g. by avoiding peat areas or by using construction methods that do not require excavation such as floating tracks);
- **reuse:** use peat produced on site in restoration of hard standings or landscaping, provided that its use is fully justified and suitable;
- **recycling/recovery/treatment:** modify peat produced on site for use as fuel, or as a compost/soil conditioner, or dewater peat to improve its mechanical properties in support of reuse;
- **storage:** temporarily store peat on-site (for example, during short periods in the construction phase) and then reuse.

The guidance identifies three main stages in the development process and describes what data should be gathered and assessed at each to inform a site specific PMP:

- **Stage 1:** Environmental Impact Assessment (EIA);
- **Stage 2:** Post-consent / pre-construction; and
- **Stage 3:** Construction.

This PMP has been prepared in accordance with the principles in the guidance for Stage 1 and proposes that **prevention** and **reuse** are the most appropriate means of managing peat excavated during construction at this site. Excess or surplus peat will be required to be stored on site before it can be used on a phased basis in restoration or as a topsoil medium.

This report details the methodologies required to assess all potential surplus materials and presents preliminary estimates of the expected volume of excavated peat and required reuse volumes for habitat enhancement, dressing following construction, landscaping and use in restoration and as a topsoil medium for use in the restoration of the DSF.

In particular, this report considers the construction of the mine surface infrastructure, including the DSF, that will result in the excavation of peat.

The site of the proposed infrastructure was selected based on a number of criteria and an assessment of project alternatives, refer to Project Alternatives chapter (Chapter 5) in the ES. Critical factors in the layout of the proposed infrastructure were landscape sensitivity, visual impacts and the requirement to avoid, as far as possible, areas of active blanket bog Annex I Priority Habitat on the ridge.

This report includes estimates of the volume of peat generated during the construction phase for the site infrastructure and identifies potential areas where peat can be reused at the site and also stored. Where peat

[2] Good Practice During Wind Farm Construction. Joint publication between Scottish Renewables, Scottish Natural Heritage, Scottish Environmental Protection Agency and Forestry Commission Scotland, 2010.

[3] Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste. Joint Publication between Scottish Renewables and Scottish Environmental Protection Agency, 2012.

cannot be reused in the short term at the site it will have to be stored before it can be reused on a phased basis in ongoing restoration as a topsoil medium.

2.2 Guidance

Relevant peat management guidance in the UK has been primarily developed in Scotland for wind farm projects and also forestry, by the Scottish regulatory authorities and in particular the Scottish Environmental Protection Agency (SEPA). In the absence of any specific Northern Ireland (NI) relevant guidance statutory bodies typically use the SEPA guidance.

There is currently no guidance available in Northern Ireland peat for development in areas of peat. In the absence of such guidance the SEPA guidance is regarded as the best available, and has been used here where relevant.

This PMP has been prepared based on the following relevant guidance:

- SEPA Regulatory Position Statement - Developments on Peat (SEPA, February 2010);
- Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables and SEPA, January 2012);
- Floating Roads on Peat - Scottish Natural Heritage and The Forestry Commission Scotland (August 2010); and
- SEPA Restoration Techniques using Peat Spoil from Construction Works (July 2011).

3.0 METHODOLOGY

This PMP has been prepared for Stage 1 in the development process and the methodology as set out in the SEPA (2012) guidance. The guidance on peat management indicates five stages in the assessment of peat:

i. Collate and interpret all gathered data;
ii. Calculate preliminary estimated volumes of excavated materials and potential reuse volume requirements based on initial site design / layout;
iii. Determine whether there is likely to be negative or positive overall peat balance, and whether the generation of excess material will be avoided, and if not, where reductions in the volumes of excavated materials may be achieved;
iv. In the context of the overall environmental, human health, economic and social impacts, refine site layout to reduce volumes of excavated material and reduce carbon impacts of the project construction activities; and
v. Prepare a draft Peat Management Plan.

This PMP assesses the volumes of excavated material from the site, to calculate site specific volumes based on factors including:

- excavations for the site DSF - what peat materials would be reused immediately, how would they be used and what volume needs to be stored before they can be reused; and
- other infrastructure excavations – can peat materials be reused for habitat enhancement and dressing during reinstatement works following construction and what volume needs to be stored before they can be reused.

An assessment of the peat balance has been undertaken to determine the volume of peat material available on site for use in reinstatement including dressing immediately following construction, and also for habitat creation / enhancement, and that material which will require storage before reuse, at the site.

4.0 SITE PEAT CHARACTERISTICS

4.1 Available Environmental Data

This PMP is based on site specific environmental information for the proposed infrastructure site, including the following survey information gatered by SLR:

- Peat depths;
- The physical characteristics of the peat; and
- Peat ecology and habitats.

The Project Engineers and Project Environmental Team have provided the following information to SLR to assist in the preparation of this PMP:

- The infrastructure layout;
- The engineering cut and fill balance for peat for the site including acrotelm and catotelm volumes; and
- A copy of the SRK Ground Investigation factual and interpretative report (Specialist Report C1 Supporting Docment E).

4.2 Peat Depth Investigation

Peat depths across the proposed infrastructure site were determined from a number of surveys including the ecological survey, the soil sampling survey and Peat Landslide Hazard Risk Assessment (PLHRA) survey.

A number of peat surveys have been undertaken at Curraghinalt and at the proposed infrastructure site since 2012, these included a Phase 1 and Phase 2 peat survey, undertaken in 2012 and 2015 respectively, which were primarily for ecological purposes and included peat depth and characterisation surveys. A specific reconnaissance walkover survey and peat depth survey was undertaken in March 2017 for the PLHRA.

A survey (Phase 1) to characterise the peats on the topographic ridge separating the Owenkillew and Owenreagh Rivers commenced in 2012 as part of an environmental baseline study for DGL's underground exploration programme. In 2015, the peat characterisation survey area (Phase 2) was extended to encompass the proposed infrastructure site which was not previously surveyed in 2012.

Peat depths have been determined by probing peatland at predetermined locations. In 2012, the probing was undertaken at 100 m intervals across the ridge. In 2015, the probing was undertaken at 50 m intervals and focused on the proposed infrastructure site, but also extended to parts of the application site not previously surveyed.

The proposed infrastructure site was covered by the Phase 1 Peat Survey. The Phase 2 survey focused on the proposed infrastructure area and the detailed probing as part of the PLHRA was focussed on the areas where the proposed infrastructure area is to be located.

The Phase 1 Peat Probing site survey included a total of 248 probes was undertaken, a further 1,378 probes were undertaken as part of the Phase 2 Peat Probing site survey and a final 137 were completed as part of the PLHRA.

In addition to peat probing, soil samples were taken from peatland habitats within the proposed infrastructure site in January 2016, to provide a better understanding of the peat in the infrastructure area. The sampling provided additional information on peat depths at the site. Each soil sample was taken by hand auger through the peats to the underlying subsoil where a sample was taken. A record of any peat layers and the physical

nature of the peat in any such layer was taken on site and an estimate made of water content was also made to further assist in the classification of the peats. These subsoil samples (beneath the peat soils) were taken at approximately 100m intervals.

The peat depths across the site are shown in Figure 1. Peat depths in excess of 5m were identified at the site in the Valley Mire along the eastern edge of the site.

4.3 Peat Volumes

The volumes of peat at the site have been provided by the project engineers, Hoy Dorman, based on a cut and fill model of the site. Theese volumes are included in Appendix B.

4.4 Site Ground Investigation

A geotechnical Ground Investigation (GI) was undertaken in the proposed infrastructure area in December 2015 and January 2016 by SRK. The purpose of the geotechnical investigation was to determine ground conditions in the infrastructure areas.

The GI program comprised a total of twelve boreholes to a maximum depth of 16m below ground level and twenty three trial pits to a maximum depth of 4.5m below ground level. In situ geotechnical testing was undertaken at the site, including Standard Penetration Tests (SPT's), Pocket Penetrometer tests, and Torvane Shear tests. Soil and weathered bedrock samples from the trial pits and boreholes were taken for geotechnical laboratory testing.

The typical stratigraphy at the proposed mine infrastructure site was classified by SRK from the GI logs and is reproduced in Table 1 below.

Table 1 -
Generalised stratigraphy at proposed infrastructure area

Average depth (mbgl)	Stratigraphic Description
0 to 0.5	Topsoil/Peat in some locations
0.5 to 3.1	Gravelly Sand or Silty Sand
3.1 to 6.3	Weathered Schist bedrock
6.3 to 18	Fractured Schist

The GI was designed to investigate areas where the proposed infrastructure will be located and as the infrastructure layout was designed to avoid areas of peat where possible, the GI only encountered peat at three of the exploratory locations. Only three trial pits encountered peat material >0.5m in thickness, they were Trial Pits TP05, TP16 and TP18.

4.5 Site Peat Characterisation

The peat has been classified using the Von Post[4] Classification which is an International Standard for the classification of peat. The Von Post classification is based on a scale of humification ranging from H1 (no decomposition) to H10 (highly decomposed), see Appendix A. Generally the H1-H2 represents the acrotelmic layers, H3-H6 the catotelmic upper layer and H7-H10 the catotelmic lower levels.

The water content of the peat was estimated on a scale from 1 (dry) to 5 (very high), designated as B_1 to B_5 as detailed in Appendix A.

The peats in the main mire area on the slope of Crocknamoghil are typically uniform in their physical structure comprising a shallow fibrous acrotelmic layer varying between 0.1 to 0.4 m in depth and a pseudo fibrous catotelmic upper layer between the acrotelmic layer and the mineral soils with humification ranging from H1 to H6 / H7 but with H9 recorded at SS121. The water content of the peats is dependent upon the levels of rainfall but typically range from B_2 to B_1 but with pockets of deeper peat where water content may reach B_3.

The peat in the valley mire area at the head of the Pollanroe Burn Valley is very similar in structure to that found in the main mire area on the slope of Crocknamoghil. The valley mire peat is quite variable, which is reflected in the complex mosaic of mire vegetation communities present in this area. The peat has an acrotelmic layer that can range up to 0.5m in depth in places and a pseudo fibrous catotelmic upper layer that in places extends to a depth of 2.4m. Although at deeper depths the peat tends to become darker and black in places it is not always possible to distinguish where any pseudo fibrous catotelmic upper layer ends and an amorphous catotelmic lower layer begins. The humification ranges from H2 to H7 but is generally in the region of H4 to H6. The water content of the peats ranges from B_3 to B_1 except in the very deepest peat where these were assessed as being B_5 to B_4.

4.6 Ecology - Peat Vegetation

4.6.1 Main Mire Area - Crocknamoghil

The main mire area on the slope of Crocknamoghil support blanket bog habitat that consist predominantly of M19a *Calluna vulgaris-Eriophorum vaginatum* blanket bog *Erica tetralix* sub-community and M15d *Scirpus cespitosus-Erica tetralix* wet heath *Vaccinium myrtillus* sub-community but with some patches of M17c *Scirpus cespitosus-Eriophorum vaginatum* blanket bog *Juncus squarrosus-Rhytidiadelphus loreus* sub-community also present. The distribution of the blanket bog communities generally reflects changes in ground conditions. M19a is typically found on deeper areas of peat on the uppermost slopes and towards the top of the ridgeline, M15d is generally found on areas of shallower peats and M17c on the lower slopes of the extent of blanket bog and in areas with impeded drainage and deeper peats.

Runnels and other drainage channels typically support a M2 *Sphagnum cuspidatum/recurvum* bog pool community whilst small temporary shallow pools where present support a M1 *Sphagnum auriculatum* bog pool community.

As a hydrological peat unit, the peat in the main mire area on the slope of Crocknamoghil is assessed as 'active'.

4.6.2 Valley Mire Area – Head of Pollanroe Burn

The mire area at the head of Pollanroe Burn valley typically supports wet heath / acid grassland mosaic habitat with affinities to M15d *Scirpus cespitosus-Erica tetralix* wet heath *Vaccinium myrtillus* sub-community which in

[4] Von Post, L. and Grunland, E. (1926). *Sodra Sveriges Torvillganger I (Peat Resources in Southern Sweden I).* Sverges Geol. Unders. Avh, C335, 1-127.

places shows a transition to H10a *Calluna vulgaris-Erica cinerea* heath typical sub-community on very shallow peats and free draining slopes. M19 blanket bog is present at the head of the valley and which extends out over the adjacent ridgeline.

As a hydrological peat unit, it is assessed that the peat in mire area at the head of the Pollanroe Burn valley is largely 'active'.

The mire along the upper Pollanroe Burn valley, classified as valley mire habitat, supports a complex mosaic of habitat types including: M21 *Narthecio-Sphagnetum* valley mire as well as M23a *Juncus effusus/acutiflorus-Galium palustre* rush pasture *Juncus acutiflorus* sub-community; M23b *Juncus effusus/acutiflorus-Galium palustre* rush pasture *Juncus effusus* sub-community; M15d *Scirpus cespitosus-Erica tetralix* wet heath *Vaccinium myrtillus* sub-community; M17c *Scirpus cespitosus-Eriophorum vaginatum* blanket bog *Juncus squarrosus-Rhytidiadelphus loreus* sub-community, and M25 *Molinia caerulea-Potentilla erecta* mire.

As a hydrological peat unit, the peat in mire area along the upper Pollanroe Burn is assessed as both 'active' and 'inactive' in different parts. Where the peat has been assessed as being 'inactive' it is capable of regeneration if appropriately managed.

4.6.3 Other Smaller Peatland Areas

Further small areas of peatland include: an area of land adjacent to a section of a small tributary of the Pollanroe Burn dominated by species-rich M23a *Juncus effusus/acutiflorus-Galium palustre* rush pasture *Juncus acutiflorus* sub-community; and a low-lying peat filled depression which typically shows affinities to M25a *Molinia caerulea-Potentilla erecta* mire *Anthoxanthum odoratum* sub-community that grades into M15d *Scirpus cespitosus-Erica tetralix* wet heath *Vaccinium myrtillus* sub-community to the south east; an area comprising two interconnected ponds east of Pollan Rua holiday cottage with marshy grassland and an area of M17c *Scirpus cespitosus-Eriophorum vaginatum* blanket bog *Juncus squarrosus-Rhytidiadelphus loreus* sub-community; a mosaic of M25 *Molinia caerulea-Potentilla erecta* mire, M15d *Scirpus cespitosus-Erica tetralix* wet heath *Vaccinium myrtillus* sub-community and M23b *Juncus effusus/acutiflorus-Galium palustre* rush pasture *Juncus effusus* sub-community adjacent left bank of the Pollanroe Burn; a number of other remnant pockets of peat supporting a variety of mire habitat-types.

As hydrological peat units, the majority of the smaller peatland areas are assessed as 'inactive' as they are impacted by a number of environmental pressures, but where environmental pressures on these peats can be reduced then these areas will typically support sphagnum and cotton grass species again.

4.7 Estimate of Peat Volumes

The proposed infrastructure design has been developed by the Project Engineering team and has been provided to SLR by SRK. The infrastructure area is shown on the peat depth map in Figure 2.

The project engineers (Hoy Dorman) calculated the peat volumes at the site based on a 3D model of the site and peat depths provided by SLR. The peat volumes at the site are included in Appendix B and summary volumes are shown in Table 2 and Table 3 below.

The infrastructure footprints and estimated peat volumes in each area to be excavated are shown in Table 2, below. The total peat volume which will require excavation at the site is estimated to be c. 165,500m^3.

Table 2 -
Summary of Infrastructure Areas and Peat Volumes (Source: Hoy Dorman)

ID	Infrastructure Area	Peat Volume (m^3)
1	Site Access Road	10,879.99
2	New Road to the south and west of the site	5,341.22
3	Internal Road	10,819.72
4	West Pond Access Road	2,034.69
5	East Pond Access Road	287.80
6	Water Treatment Plant Access Road	0.00
7	Process Plant Pad	258.73
8	Crusher / Covered Stockpile Pad	136.27
9	Warehouse / Mine Dry / Office Pad / Car Park	5,470.08
10	Laydown Pad Area	1,209.84
11	Water Treatment Pad	0.00
12	Dry Stack Facility – All Cells	87,250.47
13	Clean Water Pond	12,316.07
14	Lower and Upper East Ponds	14,503.03
15	West Pond	4,843.68
16	North Berm	5,060.21
17	East Diversion Ditch	4,072.97
18	West Diversion Ditch	1,084.81
	Total	**165,569.56**

Based on the data in the peat characterisation report, see Section 4.5 above, the volumes of peat have been divided into the acrotelmic and catotelmic peats, see Table 3. The acrotelmic layer has been identified as being between 0.1 and a maximum of 0.4m in thickness in the Peat Characterisation Report, and an average thickness of 0.2m has been used here for the acrotelmic thickness.

The total volume of acrotelmic peat is estimated to be approximately 88,200 m^3 and the total remaining volume of catotelmic peat is estimated to be approximately 77,300 m^3.

Table 3 -
Estimated Infrastructure Area Acrotelmic and Catotelmic Peat Volumes

ID	Infrastructure Area	Acrotelmic Peat Volume (m^3)	Catotelmic Peat Volume (m^3)
1	Site Access Road	3,720.39	7,159.6
2	New Road to the south and west of the site	2,757.21	2,584.00
3	Internal Road	6,608.64	4,211.08
4	West Pond Access Road	652.55	1,382.14
5	East Pond Access Road	85.89	201.90
6	Water Treatment Plant Access Road	0.00	0.00
7	Process Plant Pad	258.73	0.00
8	Crusher / Covered Stockpile Pad	136.27	0.00
9	Warehouse / Mine Dry / Office Pad / Car Park	2,146.23	3,323.85
10	Laydown Pad Area	313.01	896.82
11	Water Treatment Pad	0.00	0.00
12	Dry Stack Facility – All Cells	54,710.51	32,539.95
13	Clean Water Pond	3,392.43	8,923.64
14	Lower and Upper East Ponds	4,858.17	9,644.86
15	West Pond	3,664	1,179.68
16	North Berm	2,744.82	2,315.40
17	East Diversion Ditch	1,746.60	2,326.37
18	West Diversion Ditch	450.77	634.03
	Totals	**88,246.23**	**77,323.33**

5.0 SITE AND INFRASTRUCTURE LAYOUT - PEAT IMPACTS

The proposed mine development is resource tied, in so far as the identified gold deposit has been proven at a specific location, at Curraghinalt, Co. Tyrone. Therefore, the location of the mine and associated surface infrastructure required for a mine is tied to the general area around Curraghinalt.

Due to site and layout constraints it is not possible to move the DSF and site infrastructure to avoid the areas of peat. The constraints are detailed in the DSF design report (Section 5.3 - Facility Location and Layout) and are shown here.

5.1 DSF Facility Location

The main factors considered in the selection of potential DSF sites were:

- Proximity to the orebody to minimize traffic and noise and maximize project economics;
- Offset from the Owenkillew and Owenreagh Rivers;
- Landscape and visual impacts;
- Peat deposits; and
- Storage efficiency.

5.2 DSF Layout

The main factors considered in the layout of the DSF were:

- property lines; and
- natural topography.

5.3 Site Infrastructure and Layout

The following constraints were considered for site infrastructure and layout:

- the topographic and site visual considerations, i.e. visual landscape impacts and the designated Area of Outstanding Natural Beauty;
- the mine access requirements via the proposed portal entrance;
- geotechnical considerations for the infrastructure; and
- the distribution of peat across the site.

The site infrastructure layout has been designed to avoid peat where possible, as outlined above, and located on areas where peat has been excavated / removed in the past as a local fuel source, where possible, in order to reduce the volume of peat generated. However, given the site location and layout constraints, as outlined above it has not been possible to avoid all areas of peat within the site, see Figure 2.

5.4 Construction Environmental Management Plan

An outline Construction Environmental Management Plan[5] (CEMP) has been prepared by SRK and incorporates mitigation management measures. The purpose of the outline CEMP is to describe the construction methodology for the Curraghinalt Project and present management measures that will be implemented in the construction stage to prevent or mitigate environmental impacts.

[5] Outline Construction Environmental Management Plan for the Curraghinalt Gold Project, Co. Tyrone, Northern Ireland. Prepared by SRK Consulting (September 2017)

The outline CEMP specify the peat wich will be excavated and how it will be managed and reused. The outline CEMP will be developed further at the post consent stage in the project and will inform the project construction phase; the final plan will be given to the contractor.

The timing of the infrastructure development means that approximately 83% of the peat which requires excavation at the site will be excavated from the start of the project. Only the peat present in DSF Cells 2 and 3 will not require excavation at the start of the proposed project.

6.0 SITE MATERIALS BALANCE - PEAT REUSE AND STORAGE

A peat materials balance has been undertaken by the project engineers for the site to determine the volumes of peat which can be reused at the site in landscaping, dressing and habitat enhancement and the volume of peat which will require longer term storage at the site in designed engineered cells before it can be re used in phased basis for restoration.

The total peat volumes requiring excavation at the site and the breakdown of peat volume by materials for the acrotelmic layer and the catotelmic layer are shown in Table 2 and Table 3 above.

It is anticipated that all the peat excavated at site will be reused in dressing immediately following construction, for habitat enhancement and for restoration as a topsoil medium for the dry stack area and other areas where required on a phased basis.

The peat to be reused immediately will be stored on a temporary basis, i.e. less than 2 months, at the site subject to the measures outlined in Section 7.1.4 below.

It is not envisaged that there will be a surplus of peat material at the site. The peat material is not used in habitat enhancement will be stored in the DSF area in the short to medium term before being reused on an ongoing phased basis in progressive restoration as a top soil medium.

The peat reuse volumes for Habitat Enhancement, dressing of construction works and for storage prior to blending and reuse as a top soil medium in restoration, are outlined in Table 4 below.

The peat balance at the site is outlined in Table 4 above. Four peat storage areas have been identified at the site from walkover and ecological surveys, these include areas for habitat enhancement, adjacent to existing peat at the site, and areas within the footprint of the DSF for the storage of peat before it is reused on a phased basis for progressive restoration as a topsoil medium. The four potential peat areas are referred to as Peat Storage Cells 1, 2 and 3 for habitat enhancement, and 'spoil' storage areas 4a, 4b, 4c and 4d on Figure 3.

After the habitat enhancement areas have been established, the remaining acrotelmic peat, the acrotelmic peat from the valley mire and the catotelmic peat will be stored in the DSF for reuse in restoration and as a topsoil medium.

Table 4 -
Excavated Materials: Summary Peat Balance Volumes

Peat Reuse	Peat material for reuse	Available storage volume (m^3)	Excavated volume (m^3)
Habitat enhancement across Peat Storage Cells 1, 2 and 3.	Acrotelmic peat (60% - excludes valley mire)	102,761	52,947
Landscape dressing following construction	Acrotelmic peat (12%)	10,500	10,500
Short to medium term storage for reuse and restoration in Peat Storage areas 4a, 4b, 4c and 4d in DSF footprint	Acrotelmic (28% is valley mire) and Catotelmic peat	102,121	102,121
	Total	**165,568**	**165,568**

6.1 Peat Reuse

Excavated peat will be reused at the site for habitat enhancement and for landscaping on berms and the dressing of construction areas immediately following construction where soils and peat have been damaged. This material will be primarily the acrotelmic peat where suitable. The remainder of the peat will be stored in storage areas 4a, 4b, 4c and 4d of the DSF before being reused in the medium term for restoration on the DSF on a phased basis. These storage areas will require engineering design.

Peat reuse and the assessment of suitability is outlined in Table 5 below. Approximately 60% of the acrotelmic peat can be reused in habitat enhancement, while the remainder 40%, which is from the valley mire will be reused in dressing and restoration as a topsoil medium.

The reuse of peat for habitat enhancement has been identified across three areas at the site, see Figure 3. The peat for reuse in these areas has been subject to an ecological assessment to ensure that the peat being used for enhancement is of similar ecological assemblage. In the habitat enhancement areas the placed peat will comprise c. 0.5m of catotelmic peat at the base with c. 1m of acrotelmic peat giving a total of 1.5m thickness of peat, this is in line with the measures in the Ecological Mitigation and Management Plan[6] (EcMMP).

The areas selected for habitat enhancement are located around the edge of the existing peat at the site and the selection of these sites provides for the spatial extension of existing peats. The selection of these sites for peat reuse provides for ecological continuity with existing peat habitats and also the visual continuity of the peat landscape at the site.

[6] SLR Ecological Mitigation and Management Plan submitted as part of the Environmental Statement.

Acrotelmic peat can be used in dressing of construction areas immediately following consruction, inpartiular berms and cut/fill slopes can be dressed with peat materila. Based on the site infrastructure layout (Rev J), SLR estimate that with a dressing thickness of 0.2m approximately 10,500 m^3 of acrotelmic peat can be reused at the site. Cut slopes to drains and ponds at the site were not deemed suitable for dressing with peat and therefore were not included in the assessment of dressing volumes required.

The peat stored in the DSF Cells 2 and 3 will be reused on a phased basis as required on Cell 1 of the DSF. It is anticipated that this peat will be reused in restoration as soon as practically possible but on a phased basis for restoration.

The peat can be blended with granular material (mineral soil or rock aggregate)[3] to be used in reinstatement as a topsoil medium over the DSF.

Dressing with peat is referred to here as works undertaken immediately following construction works to repair any surfaces, generally small, which may have been damaged during the construction process. Restoration is considered to be more formal long term to enhance and bring back larger areas to a set condition, such as cover on the DSF.

It is considered that some of the materials can be reused on site in peat 'blanket bog' habitat enhancement where the vegetation communities between the donor site and receptor sites are similar. However the remainder of the peat materials (acrotelmic) particularly from the Valley Mire are unlikely to be suitable for reuse for blanket bog habitat enhancement as the vegetation communities are complex and sufficiently different from the existing blanket bog communities.

6.1.1 Valley Mire Peat

Based on the ecological assessment the valley mire peat cannot be reused at the site for habitat enhancement as the vegetation assemblages of the valley mire are different to those of the main mire habitats on Crocknamoghill. Therefore, this peat will be used in restoration and as a top soil medium at the site only.

Table 5 -
Excavated Materials: Peat Reuse and Assessment of Suitability

Excavated Peat Type	Peat location	Indicative Volume on site by % excavated Peat	Suitable Material for Reuse	Is the material required on site for reuse	Reuse on site
Acrotelmic Peat. Estimated thickness 0.2m with H1-H2	Valley Mire peat	40 %	Yes	Yes	Immediate dressing of construction works. Topsoil Medium for DSF restoration
	Peat across remainder of site	60 %	Yes	Yes	Habitat enhancement
		100%			
Catotelmic Peat. Estimated remainder of peats with H3-H10	All excavated catotelmic peat	100 %	Yes	Yes	Requirement for base peat in habitat enhancement area; and Topsoil Medium for DSF restoration and other restoration as required

7.0 MITIGATION DURING CONSTRUCTION

Environmental mitigation measures for peat during the construction of the infrastructure at the site are included in the CEMP. This section details construction stage mitigation measures for the excavation, transport, and storage of peat at the site.

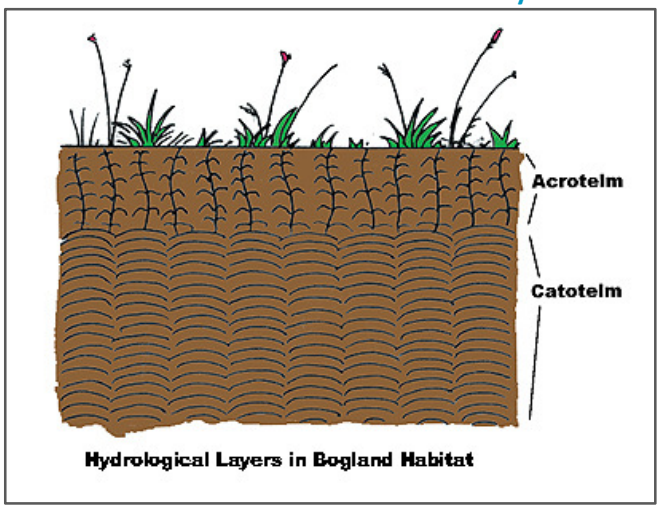
7.1 Peat Excavation, Transport and Storage

Where peat material is to be reused with the intention that its supported habitat continues to be viable (habitat enhancement), the following good practice applies.

7.1.1 Excavation

Excavate intact full depth acrotelmic layers from the top surface of the peat deposit. This technique will maintain connectivity between the surface vegetation and the partially decomposed upper layers of the catotelmic peat. The acrotelmic and catotelmic peat layers are shown in Diagram 1 below.

Diagram 1 -
Acrotelmic and Catotelmic Peat Layers



The excavated peat will be excavated as turves, including the acrotelmic (surface vegetation) and a layer of adjoining catotelmic (more humified peat) up to 200mm thick in total, and the catotelmic peat will be excavated as blocks where possible. The following measures are to be implemented for excavation of the peat:

- the acrotelmic should not be separated from its underlying peat;
- the turves should be as large as possible to minimise desiccation during storage;
- contamination of excavated peat with substrate materials will be avoided as far as is possible; and
- avoid excavation during very wet weather and the multiple handling of materials to minimise the likelihood of excavated peat losing structural integrity.

DGL and the appointed construction/earthworks contractors will ensure that the peat excavation works are designed and carried out in a manner that does not impact on the stability of the area. For example peat will be excavated at a shallow angle, excavated peat will not be placed on peat, surface water in the peat will be controlled (cut off drains) where required and prevent ponding of water. Other factors in excavation of peat include appointment of an experienced contractor to undertake works, ongoing supervision of excavation,

identification of contingency measures and the provision adequate time/programme flexability in excavatoin to take account of weather, drainage requirements and contingency measures.

7.1.2 Transport

When transporting peat to be reused for habitat enhancement at the site the following measures will be taken:

- The movement of turves will be kept to a minimum once excavated, and therefore peat planned for translocation and reinstatement should be transported to its destination at the time of excavation; and
- If HGVs used for transporting non-peat materials at the site are also used for transporting peat materials then they will be cleaned first to ensure no cross contamination cross-contamination of the excavated peat with other materials at the site.

7.1.3 Handling - Peat Volumes

The CEMP will include estimates of peat volumes of be excavated as part of the earthworks contract at each part of the infrastructure site development, based on the volume split if acrotelmic and catotelmic peat detailed in Table 3 above. The CEMP will include:

- estimate of excavation volumes at each infrastructure location (including peat volumes split into area / volume of 'acrotelm' or 'turve', and volume of catotelm);
- volume to be stored locally and volume to be transferred directly on excavation to the habitat enhancement areas at the site in order to minimise handling;
- location and size of habitat enhancement areas and storage area relative to peat source areas and timing of peat excavation;
- irrigation requirements and methods to minimise desiccation of excavated peat during short term storage to be used in dressing and landscaping.

7.1.4 Peat Reuse and Storage

The following measures will be implemented for the reuse and storage of all peat excavated across the site:

- peat turves will be stored in wet conditions or irrigated in order to prevent desiccation, once dried, peat will not rewet;
- any temporary stockpiling of peat will be in volumes sufficient to minimise exposure to wind and sun (and desiccation), but with due consideration for slope stability;
- excavated peat stored on a temporary basis will be stored to a maximum of 1m thickness;
- any short term stores of non-turf (catotelmic) peat will be bladed off to reduce the surface area and desiccation of the stored peat; and
- peat storage areas will be visually inspected during periods of very wet weather or during snowmelt, to identify any early signs of peat instability if present.

Storage for habitat enhancement and reuse

Peat storage for habitat enhancement and the storage of peat prior to reuse in restoration will be in engineered peat retention cells with retaining structures. The design of the cell retaining structures by the engineering design team will have regard to the geotechnical design measures for the retention cells in Section 8.0 below.

For storage pending reuse, particularly for catotelmic peats, the following best practice in handling will apply:

- peat generated from the valley mire location and other catotelmic peat should be transported directly to its allocated storage location in engineered cells, to minimise the volume being stockpiled with the possibility of drying out, failing, being eroded by wind/water or entering a watercourse;
- stores of catotelmic peat should be bladed off to reduce their surface area and minimise desiccation if there is a delay/pause in its placement in the storage area;

- where transportation cannot be undertaken immediately, stored peat should be irrigated to limit drying and stored on a geotextile mat to promote stability; and
- peat storage areas will be visually inspected during periods of very wet weather or during snowmelt, to identify any early signs of peat instability if present.

Short term storage for reuse in dressing for landscaping

Where peat will be reused in dressing and for landscaping of construction areas around the site then it may require temporary short term storage, i.e. less than two months.

Where peat cannot be transferred immediately to an appropriate landscaping / dressing area, the following good practice applies for any short term storage:

- Peat will not be stored on peat;
- peat will be stored at sufficient distance from the cut face to prevent overburden induced failure;
- local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes will be avoided for peat storage;
- stored upper turves (incorporating vegetation) will be organised and identified according to National Vegetation Classification (NVC) community (assisted by the Ecological Clerk of Works, ECoW) for reinstatement adjacent to like communities in the intact surrounding peat blanket;
- Ideally any cut turves should be laid immediately and the operation should occur in the late autumn period when the vegetation is dormant; and
- drying of stored peat will be avoided by irrigation (although this is unlikely to be a significant issue for peat materials stored less than 2 months).

7.2 Roads and Access Tracks in Peat

Peat material beneath roads or access tracks within the proposed infrastructure area (Area A) will be excavated. Mitigation measures for the excavation of access tracks and roads in peat within the proposed infrastructure area (Area A) are set out here. No floating tracks or roads on peat are proposed witin the infrastructure area (Area A).

Roads and access tracks will require the complete excavation of peat to the competent substrate beneath. Good practice guidance[2 7] references drainage in association with excavated roads and tracks. Drainage mitigation measures are:

- trackside ditches will be dug to capture and divert any surface water (within the acrotelmic peat) before it reaches the road;
- any interceptor drains will be shallow and flat bottomed (and preferably entirely within the acrotelm to limit drawdown of the water table) in adjoining peats;
- any stripped peat turves will be placed on the downgradient side of the ditch to assist regeneration; and
- culverts and cross drains will be installed under excavated tracks to maintain subsurface drainage pathways (such as natural soil pipes or flushes). Discharge from constructed drainage will allow for as much diffuse dispersion of clean (silt free) water as possible while minimising disturbance to existing peat and as far as possible. Silt mitigation measures will be required during construction for water quality purposes.

Following excavation there is a possibility of minor slippage from the cut face of the peat mass; therefore, the following measures will be put in place:

[7] Constructed Tracks in the Scottish Uplands. Scottish Natural Heritage 2nd Edition,Updated September 2015.

- free faces will be inspected for evidence of instability (cracking, bulging, excessive discharge of water or sudden cessation in discharge); and
- where significant depths of peat are stored adjacent to an excavation, stability analysis should be conducted to determine Factor of Safety (FoS) and an acceptable FoS adopted for loaded areas.

Monitoring will be undertaken post-construction to ensure that hydrological pathways from the peat and around roads / tracks and the track integrity are being suitably maintained.

7.3 Excavation of Ditches in Peat

The proposed infrastructure site requires a number of cut off ditches to be constructed around the site. The purpose of the ditches is to intercept surface water runoff and direct it around the site and to provide for surface water management at the site. The ditches will be engineered, and where they are in peat, measures will be taken, similar to those for roads and access tracks.

The proposed mitigation measures for the excavation of drains and channels at the site include:

- interceptor ditches in peat will be dug to capture and divert any surface water within the acrotelmic layer;
- interceptor ditches in peat will be shallow and flat bottomed and preferably entirely within the acrotelm to limit drawdown of the water table in adjoining peats; and
- any stripped peat turves will be placed on the downgradient side of the ditch to assist regeneration.

Following excavation there is a possibility of minor slippage from the cut face of the peat mass; therefore, the following measures will be put in place:

- free faces will be inspected for evidence of instability (cracking, bulging, excessive discharge of water or sudden cessation in discharge);
- where significant depths of peat are to be stored adjacent to an excavation, stability analysis will be conducted to determine Factor of Safety (FoS) and an acceptable FoS adopted for loaded areas; and
- monitoring will be undertaken post-construction to ensure that hydrological pathways from the peat are maintained.

7.4 Storage of Peat Before Reuse

The peat material which cannot be reused on site for habitat enhancement or dressing will be stored in engineered cells at the site within DSF (Storage Areas 4a, 4b, 4c and 4d). The principles behind the construction of the cell(s) is outlined in Section 8.0 below. The peat which is reused for habitat enhancement will also be placed in engineered cells to ensure its stability in the long term; these cells will be designed to the same engineering standard to ensure long term stability.

The detailed engineering design of the habitat enhancement peat storage areas and storage areas in the DSF Cells 2 and 3 will be undertaken by the project engineers.

8.0 GEOTECHNICAL CONSIDERATIONS FOR STORAGE OF PEAT

The proposed areas for peat habitat enhancement and the storage of peat before reuse in restoration requires an engineering assessment and design to ensure their stability.

The long-term re-use of peat for habitat enhancement requires engineered repositories with perimeter retention berm structures which are keyed into the underlying substrate to ensure stability.

The storage of the peat for reuse in restoration on a phased basis requires engineered repositories with perimeter retention berm structures which are keyed into the underlying substrate to ensure stability.

The detailed engineering design of the peat storage areas at the identified locations, has not been undertaken in advance of preparing this PMP, and will be undertaken by the project engineers.

SLR has undertaken a high level review of the geotechnical requirements for the storage of peat at the site to inform this PMP and has made engineering design recommendations to be included in the detailed engineering design of proposed peat storage infrastructure at the site.

The engineering design recommendations from the geotechnical review of peat storage requirements are set out here:

- habitat enhancement areas will have a maximum peat depth of c. 1.5m (0.5m catotelmic peat and 1m of acrotelmic peat;
- storage areas for peat to be reused on site will have a peat depth of c. 1.6m;
- the habitat enhancement area and storage areas are not located upslope of each other to avoid a cascade effect in the event of a failure or immediately adjacent other land where third parties are likely to be affected in the event of failure;
- the habitat restoration areas will comprise internal cells to provide additional stability in the long term; and
- a 20m stand off to rivers or streams will be provided for.

A Peat Landslide Hazard and Risk Assessment (PLHRA) was undertaken in 2017 at the site and identified areas of Negligible, Low and Medium risk at the proposed infrastructure site (Area A) without any infrastructure development. There were only two small areas identified as being of medium risk and they are located in the north east corner of the site. No areas of high risk were identified in the assessment. The PLHRA was undertaken for peat at the existing site without any infrastructure development.

The critical geotechnical elements that must be incorporated into the engineering design to ensure stability of the stored peat at the development site are discussed here.

8.1 General

A PLHRA has been undertaken at the proposed infrastructure site. This covers the presence / occurrence of several potential risk factors for peat instability which were ranked on the basis of the available topographic survey data (ground slope), ground profile data (peat depth and nature of underlying substrate) and site mapping (disturbed areas, proximity to hydrological features etc.). The outcome of this assessment of the existing peat at the site without any infrastructure development identified areas of negligible to low risk across the proposed infrastructure site for peat slope instability with two small areas of medium risk close to the pond in the north east corner of the site.

The existing peat stability was assessed in the PLHRA. The four proposed Peat Cell storage areas are shown on the peat stability risk rating map on Figure 4. The peat cell areas and storage area are located in areas assessed as being of negligible or low peat stability risk rating.

8.2 Habitat Enhancement

It is considered that excavated turves principally comprising the upper peat layer (acrotelm) and some catotelmic peat will be used for habitat enhancement on the downslope periphery of the active blanket peat, where the peat stability risk assessment and deterministic analyses identify areas having low instability risk. Such areas will be located

- on slopes with a slope angle of < 2-4°;
- on peat having well established acrotelm layer;
- on peat with no underlying weak / sensitive soil;
- away from a break in (convex) slope;
- away from observable tension cracks / machine cutting;
- away from mapped watercourses / flushes / peat pipes; and
- away from previously slipped / disturbed zones.

Care will be taken to ensure that the placement of the peat does not impede established surface / subsurface water flow in the surrounding peat. If any existing drainage features in the peat are impeded, it is likely to lead to a build of excess water pressures in the peat and consequent instability. Where there is drainage, external drains will be constructed around the areas of peat.

Where necessary, shallow cut-off drains will be installed within the acrotelm layer immediately upslope of peat storage areas to intercept and divert any surface water run-off to existing hydrological features nearby. This will help prevent the build-up of run-off / water pressures immediately behind and upslope of the turves.

8.3 Short to Medium Term Peat Storage for Use in Restoration

In view of the less fibrous / more humified nature of the deeper peat (catolelm), its higher moisture content, lower shear strength and sensitivity to disturbance (loss of strength and structural integrity), it will require careful storage in bunded cells before it can be reused in restoration as a topsoil medium. The peat material for reuse will be stored in bunded cells within the footprint of the DSF in storage areas 4a, 4b, 4c and 4d. The PLHRA has assessed the existing peat at the storage areas at the DSF as being of negligible to low stability risk rating.

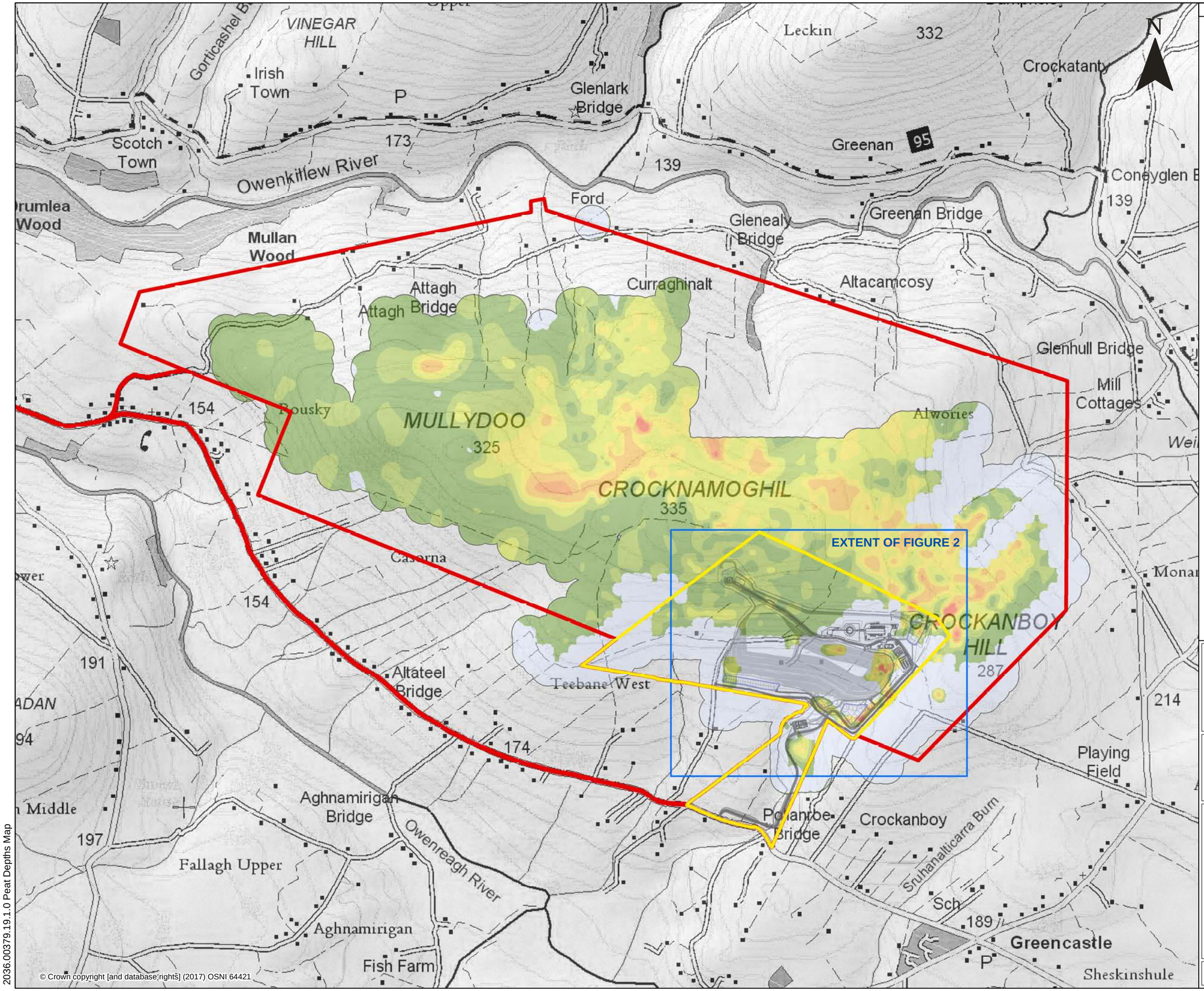
The bunded cell repositories will be founded directly onto mineral soils / weathered rock, of suitable mineral soils (or rock fill) with moisture content, grading, plasticity, strength and compaction properties complying with the requirements of a recognised earthworks specification. The earthworks will be handled, placed and compacted in accordance with a standard specification. The planning and phasing of the bund construction works will, insofar as possible, accommodate slow, gradual back filling with excavated peat and prevent rapid loading and failure in any underlying peat or mineral soil strata.

The following measures will be in place not to alter or impede established surface or subsurface water flow in the surrounding peat/soils, either during the short-term construction and peat placement period or over the storage period. The top surface of the backfilled peat will be graded and/or drained in a manner which limits the generation of concentrated over ground flows which could potentially erode the stored peat into surrounding watercourses. Shallow cut-off drains will be installed within the acrotelm layer immediately upslope of the

bunded repositories to divert surface water run-off away from the stored peat and into existing hydrological features nearby.

The peat has been assigned a non-hazadous inert material classification in the Mine Waste Management Plan (MWMP). Peat has been assigned an European Waste Catalogue (EWC) code 17 05 04 in the MWMP, which covers Soils and stones other than those mentioned in 17 05 03.

FIGURES



LEGEND

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- SURFACE INFRASTRUCTURE LAYOUT

PEAT DEPTH (m)

- ROCK / SOIL EXTENT
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3

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APPENDIX B8:
PEAT MANAGEMENT PLAN

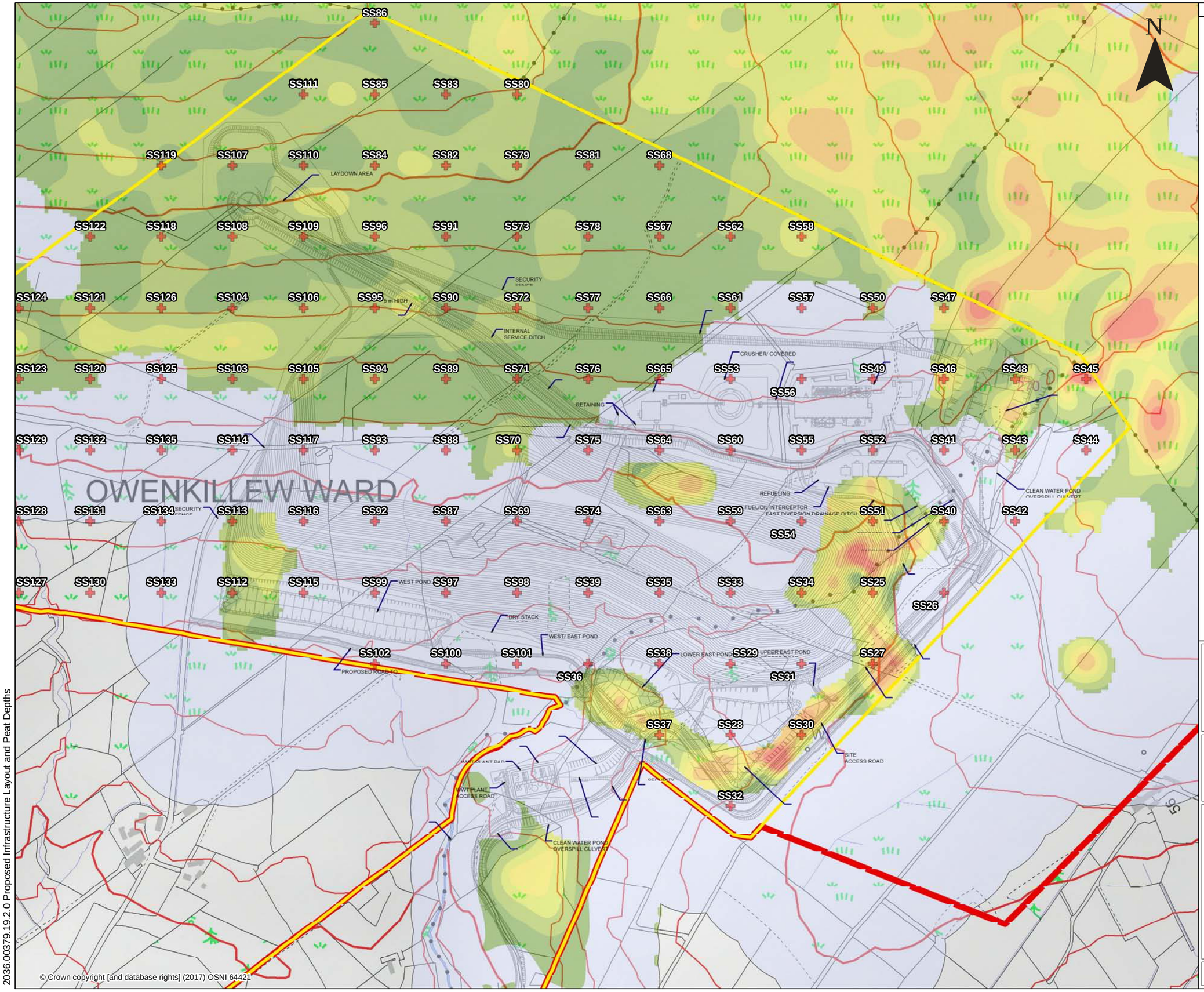
PEAT DEPTHS MAP

FIGURE 1

Scale: 1:20,000 @ A3

Date: SEPTEMBER 2017

2036.00379.19.1.0 Peat Depths Map



LEGEND

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- SOIL SAMPLE LOCATION
- SURFACE INFRASTRUCTURE LAYOUT

PEAT DEPTH (m)

- ROCK / SOIL EXTENT
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3

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APPENDIX B8:
PEAT MANAGEMENT PLAN

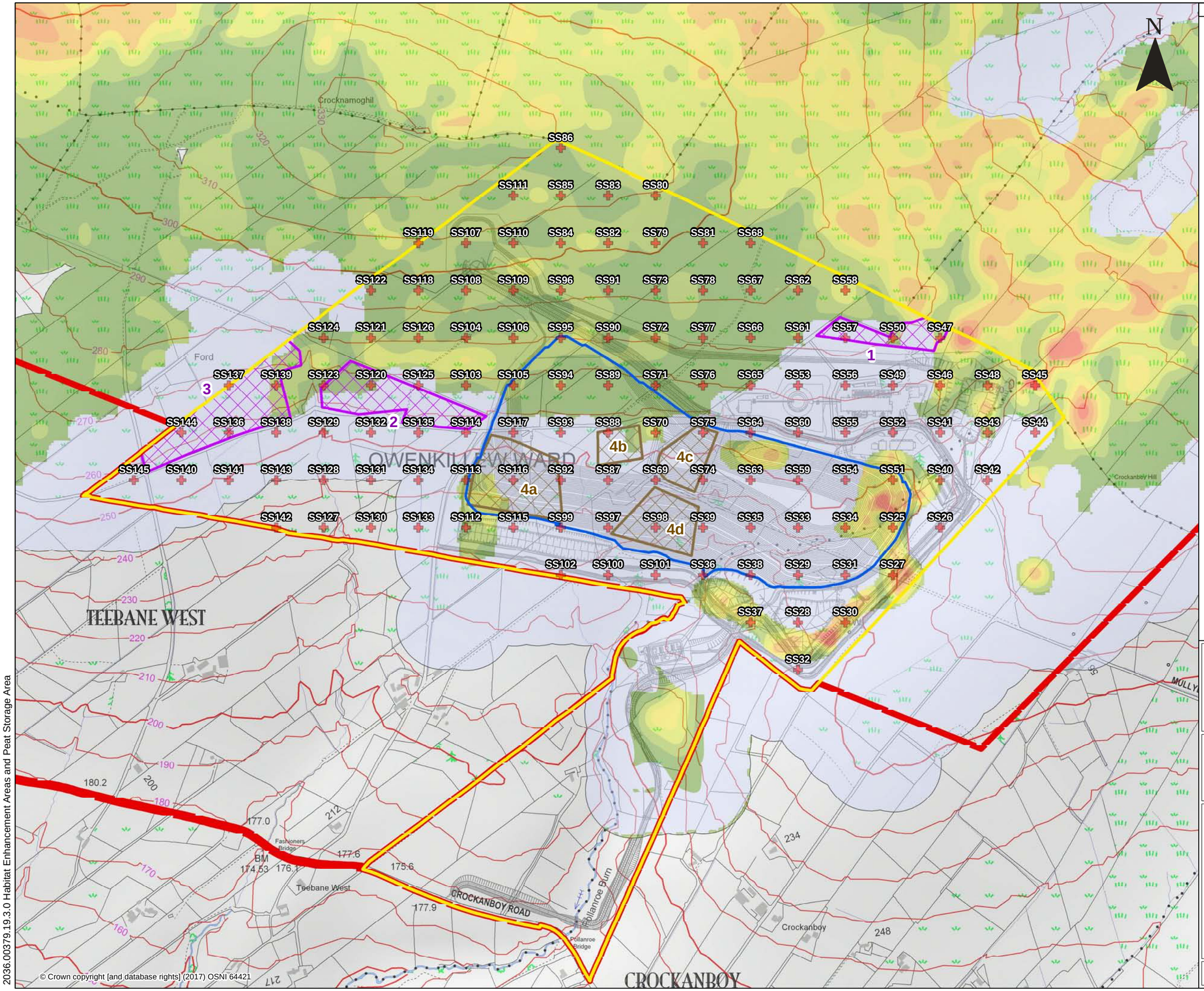
PROPOSED INFRASTRUCTURE LAYOUT AND PEAT DEPTHS

FIGURE 2

Scale: 1:5,000 @ A3

Date: SEPTEMBER 2017

2036.00379.19.2.0 Proposed Infrastructure Layout and Peat Depths



LEGEND

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- SOIL SAMPLE LOCATION
- SPOIL STORAGE AREAS
- PEAT CELL LOCATIONS - HABITAT ENHANCEMENT AREAS
- SURFACE INFRASTRUCTURE LAYOUT
- DSF

PEAT DEPTH (m)

- ROCK / SOIL EXTENT
- 0 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- > 3

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APPENDIX B8:
PEAT MANAGEMENT PLAN

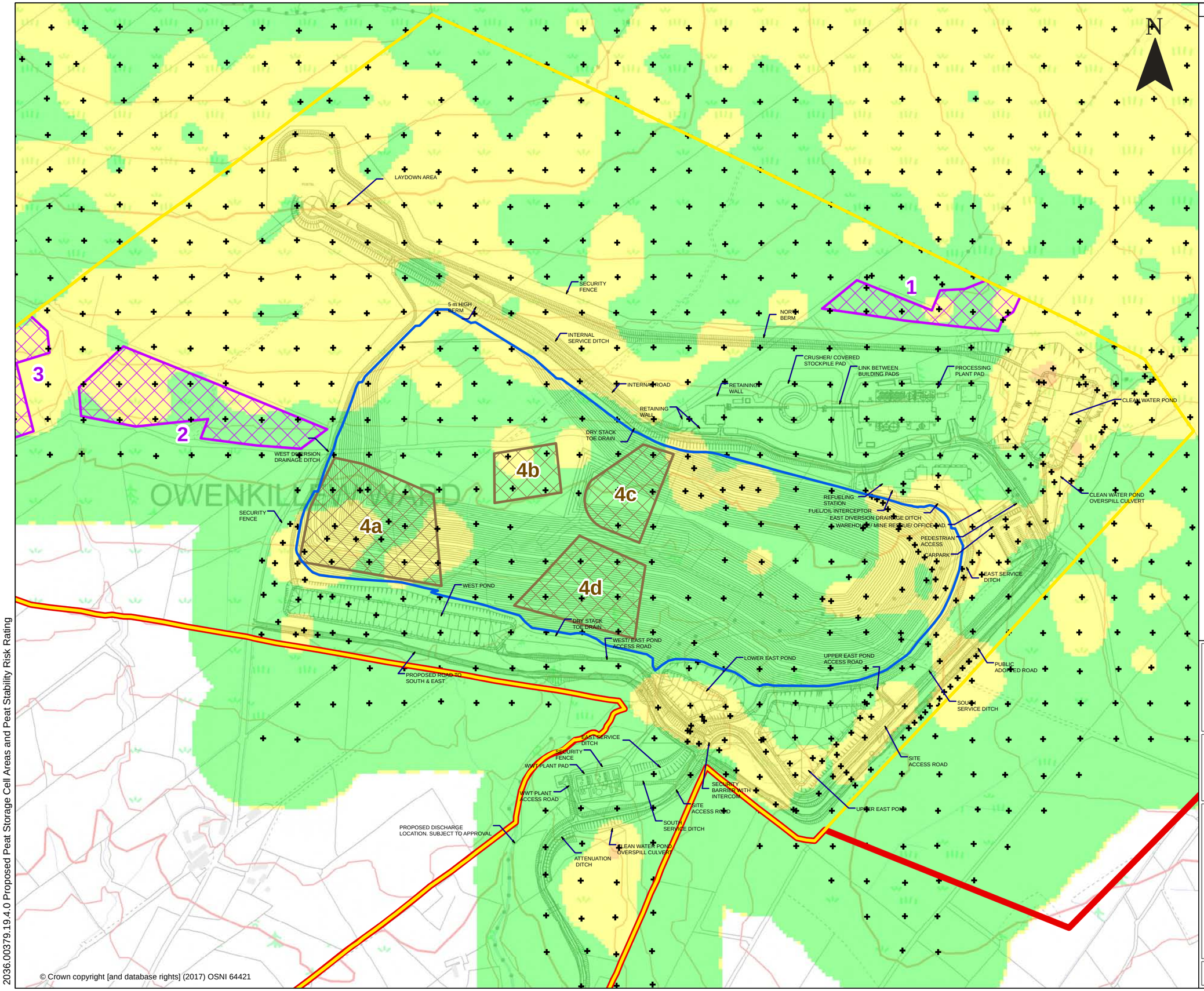
HABITAT ENHANCEMENT AREAS AND PEAT STORAGE AREA

FIGURE 3

Scale 1:7,500 @ A3

Date SEPTEMBER 2017

2036.00379.19.3.0 Habitat Enhancement Areas and Peat Storage Area



LEGEND

- APPLICATION BOUNDARY
- PROPOSED INFRASTRUCTURE SITE (AREA A)
- DSF
- SPOIL STORAGE AREAS
- PEAT CELL LOCATIONS - HABITAT ENHANCEMENT AREAS
- SURFACE INFRASTRUCTURE LAYOUT
- PEAT PROBE LOCATION

STABILITY RISK

- NEGLIGIBLE
- LOW
- MEDIUM
- HIGH

2036.00379.19.4.0 Proposed Peat Storage Cell Areas and Peat Stability Risk Rating

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APPENDIX B8:
PEAT MANAGEMENT PLAN

PROPOSED PEAT STORAGE CELL AREAS AND PEAT STABILITY RISK RATING

FIGURE 4

Scale 1:5,000 @ A3

Date SEPTEMBER 2017

APPENDICES

Appendix A -
Von Post Classification for Peat Humification and Classification of Water Content of Peats

Von Post Classification for Peat Humification

Degree of humification	Decomposition	Plant structure	Content of amorphous material	Material extruded on squeezing	Nature of residue
H1	None	Easily identified	None	Clear, colourless water	
H2	Insignificant	Easily identified	None	Yellowish water	
H3	Very slight	Still identifiable	Slight	Brown, muddy water; no peat	Not pasty
H4	Slight	Not easily identifiable	Some	Dark brown, muddy water; no peat	Somewhat pasty
H5	Moderate	Recognisable but vague	Considerable	Muddy water and some peat	Strongly pasty
H6	Moderately strong	Indistinct (more distinct after squeezing)	Considerable	About ⅓ peat squeezed out; water dark brown	Fibres and roots more resistant to decomposition
H7	Strong	Faintly recognisable	High	About ½ peat squeezed out; any water very dark brown	
H8	Very strong	Very indistinct	High	About ⅔ peat squeezed out; also some pasty water	
H9	Nearly complete	Almost unrecognisable	Nearly all the peat squeezed out as a uniform paste		
H10	Complete	Not discernible	All the peat passes between the fingers; no free water visible		

Classification of Water Content of Peats

Scale	Water Content
B_1	Dry
B_2	<500%
B_3	500 – 1000%
B_4	1000 – 2000%
B_5	>2000%

Appendix B -
HoyDorman Summary Peat Volume Calculations

HoyDorman	Job Title: DALRADIAN GOLDMINE	Job No.: 2016021
		Project No.:
		Client: DALRADIAN GOLD LTD

Peat Volumes

Volume Summary

Infrastucture Area	Cut Factor	2D Area (m^2)	Acrotelmic Peat Volume (m^3)	Catotelmic Peat Volume (m^3)	Total Peat Volume (m^3)	Assumptions Made
Site Access Road	1	18,601.93	3,720.39	7,159.60	10,879.99	0.2 m depth of Acrotelmic peat across the site area assumed
Public Adopted Road	1	13,786.06	2,757.21	2,584.00	5,341.22	
Internal Road	1	33,043.18	6,608.64	4,211.08	10,819.72	
West Pond Access Road	1	3,262.75	652.55	1,382.14	2,034.69	
East Pond Access Road	1	429.45	85.89	201.90	287.80	
Water Treatment Plant Access Road	1	391.041	0	0	0	
Process Plant Pad	1	13,399.28	258.73	0	258.73	
Crusher/ Covered Stockpile Pad	1	13,099.22	136.27	0	136.27	
Warehouse/ Mine Dry/ Office Pad + Car Park	1	10,731.16	2,146.23	3,323.85	5,470.08	
Laydown Area Pad	1	1,565.06	313.01	896.82	1,209.84	
Water Treatment Plant	1	2,706.00	0	0	0	
Waste Rock Storage Facility (All Cells)	1	273,552.57	54,710.51	32,539.95	87,250.47	
Clean Water Pond	1	16,962.17	3,392.43	8,923.64	12,316.07	
Lower and Upper East Ponds	1	24,290.83	4,858.17	9,644.86	14,503.03	
West Pond	1	18,320.01	3,664.00	1,179.68	4,843.68	
North Berm	1	13,724.08	2,744.82	2,315.40	5,060.21	
East Diversion Ditch	1	8,733.02	1,746.60	2,326.37	4,072.97	
West Diversion Ditch	1	2,253.87	450.77	634.03	1,084.81	
Total		468851.68	88246.23	77323.33	165569.56	

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