

Location Specific Mitigation Measures

- 7.4 The assessment contained within the Environmental Appraisal (Traffic and Transport Chapter 12) identified a need for mitigation measures at a number of locations within the Study Area.
- 7.5 Table 7-2 presents the location-specific mitigation proposed during the construction phase of the Proposed Project, to reduce impacts and potential environmental effects arising as a result of the forecast increases in traffic volumes.

Table 7-2: Proposed Mitigation During Construction

Link Ref	Location	Location Specific Mitigation Proposed	Reference
2	A497	Traffic management to be agreed with Highways Authority on the approach to the A497/NCR8 junction. This would include, if required, a temporary speed limit reduction, introduction of high-friction surfacing, and advanced warning signage.	5,2,6
3	NCR8	Carriageway widening along route to tunnel head house access to provide passing places/ total carriageway width of 6.0m minimum (Figure 2.1). Traffic management along route to include a temporary speed limit reduction, and advanced warning signage. The use of traffic marshals located at tunnel head house access and A497/ NCR8 to communicate presence of walkers and cyclists or to hold release of HGVs from site compound. Typical HGVs used for the construction of the Proposed Project would be to the required Euro Class and could have additional cycle friendly measures such as cameras, sideguards, full length door windows, blind spot warning systems and additional mirrors (Class V and Vi).	2,5,6,7,12,14
11a	A496N	Traffic management along route to include advanced warning signage and temporary speed reduction to 30mph from Pont Briwet /A496 junction to site access. Where long distance walking routes (LDWRs) and cyclists cross the link, additional signage would be located to alert drivers to the presence of crossing pedestrians and cyclists.	5,6

- 7.6 It should be noted that in addition to those measures listed above the contractor(s), in agreement with the Highway Authority and National Grid, may identify a need to implement additional measures. Section 8 sets out how the CTMP is expected to be implemented during the construction phase.

8. Monitoring and Review

Communication

- 8.1 As a 'live' document, the management and mitigation measures included in the Outline CTMP would be developed during the construction programme within the detailed CTMP.
- 8.2 The Traffic Safety and Control Officer (TSCO), would be expected to continually engage with key stakeholders and the community as necessary and relevant. This could include a regular dial-in between stakeholders including the emergency services, North Wales Police and Highway Authority, for example.
- 8.3 It would be the role of the TSCO to act as an intermediary between National Grid, the contractor and key stakeholders to maintain open and regular channels of communication so that any effects on the transportation network associated with the Proposed Project may be addressed as soon as reasonably practicable.
- 8.4 Through effective and regular communication between National Grid, the appointed contractor(s), and stakeholders, the TSCO will:
- *Communicate and monitor the CTMP and its mitigation measures;*
 - *Ensure records of HGV movements are maintained and reported;*
 - *Act as the first point of contact for the public, stakeholders and contractors;*
 - *Hold regular update meetings with Highway Authority and relevant stakeholders;*
 - *Record near misses, incidents and hazards and resolve issues as informed by contractors, stakeholders and the public; and*
 - *Monitor, review and improve, where necessary, the CTMP and associated mitigation measures.*

Compliance, Enforcement, and Corrective Measures

- 8.5 The detailed CTMP, developed on appointment of the principal contractor and following the planning process, would include specific measures describing how the contractor will ensure adherence to the mitigation measures proposed.
- 8.6 This would include details around the following:
- *The Traffic Safety and Control Officer's role and responsibilities;*
 - *The Delivery Management System;*
 - *HGV identification and tracking technology; and*
 - *A highway inspection, monitoring and repair strategy, to be deployed during the construction of the Proposed Project.*
- 8.7 Continued stakeholder engagement by National Grid and the appointed contractor(s) would help to ensure that any issues are recorded, addressed and that appropriate corrective measures are implemented in accordance with the CTMP objectives.

Annex A: AIL Report

Nunn, Clive

Subject: FW: A487 Bontnewydd Bridge

From: Daisy Gosling [mailto:daisy.gosling@wynnslimited.com]
Sent: 02 April 2019 10:34
To: Nunn, Clive <Clive.Nunn@wsp.com>
Cc: Andy Pearce <andy.pearce@wynnslimited.com>
Subject: FW: A487 Bontnewydd Bridge

Good morning Clive,

Hope you are well.

Following Andy's email of 31.08.18, please see below email from North Mid Wales Trunk Road Agency ref Glaslyn and Snowdonia loads (highlighted in yellow).

This latest update we have been chasing for some time, regarding the problem structure on the A487, and now means that your loads can access your sites in North Wales.

If you require any further clarification, please do not hesitate to contact us.

Best regards,
Daisy

From: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Sent: 26 February 2019 14:32
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Daisy

The loadings from the vehicles given with your e-mail below have been checked and the results are as given below:

Assessments of the four proposed vehicles have been undertaken as requested and all can pass, although some need to have additional control measures to movement.:

Snowdonia Cutting Head - Dwg No 18-954.TC01	Vehicle can pass over bridge
Glaslyn Cable Drum – Dwg No 18-953.TC01	Vehicle can pass over bridge
115te Transformer 3.0m Width – Dwg No FH-Ffest18-TC01	Vehicle can only pass at speeds less than 10mph and should follow East kerbline (Southbound Carriageway).
115te Transformer 2.7m Width – Dwg No FH-Ffest18-TC02	Vehicle can only pass at speeds less than 10mph and should follow East kerbline (Southbound Carriageway).

At present Bont Newydd has had intrusive investigations which have confirmed the presence of grouted backing to the bridge arch which can be accepted to extend up to 1.5m above the arch springing. The analysis and results above have been carried out based on this level of backing.

Due to high water levels in the river the current investigations had to be limited. However there is an intention to undertake further investigations to determine if the backing actually extends higher than the known location of 1.5m above the arch springing. If there is backing higher than current investigations this will provide further improvements to the structure capacity.

It should be noted that should additional depth of structural backing be found, the two 115te Transformer vehicles will be able to pass over the bridge without additional control measures; it would therefore be worth checking vehicles again in the future if this influences your study.

If any further information or clarification is required do let me know. I trust this information meets your needs.

Regards

Martin Jackson

Prif Reolwr Strwythurau / Principal Structures Manager

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru

North & Mid Wales Trunk Road Agent

Automobile Palace, Temple Street, Llandrindod Wells, Powys, LD1 5HU

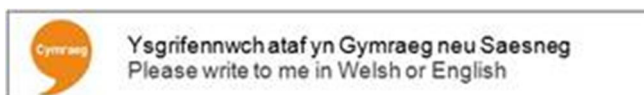
' 01597 829581

' 07789 654014

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Yn gweithio ar ran Llywodraeth Cymru

Working on behalf of the Welsh Government



Bydd y ddwy iaith yn cael eu trin yn gyfartal o dan bob amgylchiadau / Both languages will be treated equally in all circumstances.

From: Daisy Gosling <daisy.gosling@wynnslimited.com>

Sent: 22 February 2019 15:31

To: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>

Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales

Subject: RE: A487 Bontnewydd Bridge

Hi Martin,

Thanks for getting back to me so quickly.

Apologies for that – our mistake!

Please see attached 42te tractor unit that matches the axle loads in the load table of our drawing. Please note that tractor and draw bars are interchangeable, and these are indicative dimensions only.

Hope that clarifies.

Best regards,
Daisy

From: Jackson Martin (CEFNTFYRDD) <MartinJackson@nmwtra.org.uk>
Sent: 22 February 2019 15:23
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNTFYRDD) <StevenKing@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Daisy

I thank you for your e-mail below dated 19th February. I can confirm that Gwynedd should have time to look at the loadings of the various AILs potentially crossing A487 Bontnewydd Bridge in the next week.

However they have looked through the load information provided and they think it may be missing the appropriate axle spacing for the 115te transformer loads. I hope you can assist with resolving a couple of queries. In the attached they have circled the axles and loads of the tractor unit, there appears to be three indicated in the elevation and four in the table. Can you confirm this information please? Can the number of wheels and spacings on the tractor unit axles also be confirmed please?

Regards

Martin Jackson
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Working on behalf of the Welsh Government



Bydd y ddwy iaith yn cael eu trin yn gyfartal o dan bob amgylchiadau / Both languages will be treated equally in all circumstances.

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 19 February 2019 17:10
To: Wright Nic (CEFNTFYRDD) <NicWright@nmwtra.org.uk>
Cc: King Steven Gruffudd (CEFNTFYRDD) <StevenKing@nmwtra.org.uk>; Jackson Martin (CEFNTFYRDD) <MartinJackson@nmwtra.org.uk>; Andy Pearce <andy.pearce@wynnslimited.com>; Alun.W.Jones@gov.wales
Subject: RE: A487 Bontnewydd Bridge

Hi Nic,

Thanks for getting back to me.

Oh, some good news!

Please see the attached loads that I provided to Steven on the original email of this thread.

Let me know if you require any additional information.

Best regards,
Daisy

From: Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Sent: 19 February 2019 16:59
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>
Subject: RE: A487 Bontnewydd Bridge

Daisy,

The recent concerns over the bridge due to the initial assessment for AIL loading have been alleviated following further examination and re-assessment.

If you can provide details of exceptional loads now would be a good time to check them.

Regards,

Nic

Nic Wright

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Yn gweithio ar ran Llywodraeth Cymru

Working on behalf of the Welsh Government

From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 15 February 2019 14:37
To: Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>
Cc: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Alun.W.Jones@gov.wales; Andy Pearce <andy.pearce@wynnslimited.com>
Subject: RE: A487 Bontnewydd Bridge

Good afternoon Nic,

Hope you are well.

I've just tried to chase an update from Steven regarding the below, however I have been told he is on leave for a week from today.

Is this something you could provide an update on in his absence?

Best regards,
Daisy

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 08 February 2019 11:20
To: Daisy Gosling <daisy.gosling@wynnslimited.com>
Cc: Alun.W.Jones@gov.wales; Andy Pearce <andy.pearce@wynnslimited.com>
Subject: RE: A487 Bontnewydd Bridge

Hi Daisy,

Thank you for your email. This is just a holding response whilst I consult with structures. I will be back in touch with a response.

Kind regards
Steve

Steven Gruffudd King LLB PGDip

Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
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From: Daisy Gosling <daisy.gosling@wynnslimited.com>
Sent: 06 February 2019 12:44
To: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Cc: Alun.W.Jones@gov.wales; Andrew Pearce <Andy.Pearce@wynnslimited.com>
Subject: A487 Bontnewydd Bridge

Good afternoon Steven,

Hope you are well.

Following the ongoing discussions regarding Bontnewydd Bridge, south of Caernarfon, we are still seeking confirmation of the structure's suitability for various loads required in North Wales.

Please find attached proposed loadings for your consideration, detailing the following;

Glaslyn & Snowdonia Projects

- Drawing Number 18-953.TC01 (43.35te Cable Drum) - 4 axle goose neck low bed trailer at 81.35te gross weight

- Drawing Number 18-954.TC01 (50te Tunnel Boring Machine Cutterhead) - 4 axle steerable step frame trailer at 79te gross weight (5m wide)

Ffestiniog Power Station (115te Transformer)

- 10 axle flat top trailer at 147.5te gross at 3m width
- 10 axle flat top trailer at 146te gross at 2.7m width

If you could please get back to me with an update regarding Bontnewydd Bridge only in this instance, we would be most grateful.

Trust this makes sense.

Please let me know if you require any further information or clarification.

Best regards,
Daisy



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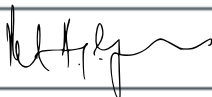


Abnormal Indivisible Load Access Study - Transportation of Tunnel Boring Machines to proposed locations for Snowdonia Visual Impact Provision

Prepared for WSP





NAME		SIGNATURE	DATE
Prepared by:	Daisy Wynn		06.09.18
Checked by:	Peter Wynn		07.09.18
Approved by:	Andy Pearce		10.09.18

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Issue	Date	Details
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2		



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Executive Summary

The contents of this report include land transport feasibility investigations into achieving access to two sites in North Wales where National Grid are planning to deliver Tunnel Boring Machines (TBMs) as part of a future development scheme known as the Snowdonia Visual Impact Provision (AIP) works to reduce the amount of overhead electricity wires by installation of underground cables. These sites are located on the east and west banks of the Afon Dwyryd estuary east of Porthmadog, Gwynedd, North Wales.

North Mid Wales Trunk Road Agency (NMWTRA), working as managing agents on behalf of Welsh Government, have advised that at present, there is no route for the proposed AILs from the A55 to the Porthmadog area due to the river bridge on the A487 at Bontnewydd being recently assessed and down rated for no vehicles above Construction and Use traffic (44 tonnes). As the Secretary to the MAWR companies (Movement Along Welsh Roads), Wynns have written to NMWTRA and Welsh Government to highlight this issue. As the A487 is part of the strategic trunk road network, the capacity reduction will be a significant issue for ongoing access to the Porthmadog area. It is not clear if there are any suitable alternative routes which could be used to avoid the Bontnewydd issues and work to identify if such exists will be on going.

Wynns have also requested if the Bontnewydd structure can be temporarily bridged over and await a response from NMWTRA on this matter. It is most likely that an operation to lift in bridge rafting equipment would require a road closure and as such, Wynns will report under separate cover once these investigations have been able to clarify if this may be possible in principle.

The above is the main issue to report which of significant concern for AIL access to the locations being considered for the delivery of TBMs.

The two sites were inspected for route negotiability in August of this year, and for the purposes of this investigation have been labelled as VIP Site East and West. These locations can be found in Map 1 attached to Appendix 1 of this report.

Structural clearance has been provided for the local access from the A487 to both sites, notwithstanding the failure at Bontnewydd Bridge on the A487 which is common to both locations.

Road access to the Western site will require the use of the internal haul road which has been identified by National Grid as the preferred site access to the site compound at approx. OS Grid Reference SH 5939 3862.

Site access for the Eastern site is recommended to be from the A487 at Penrhyndeudraeth via the Pont Briwet Bridge which has been upgraded in recent years to provide access to the A496. Although a potential alternative that approaches from the north east from the A487 at Maentwrog could be utilised this is not considered as suitable for access for TBMs due to the narrow section of the A496 south to the delivery site when alternatives exist.

The routes are considered negotiable to both sites. However, as the loads are 5m in width there will be sections throughout the route where full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required. This will require more detailed discussions with North Wales Police, NMWTRA and Gwynedd County Council prior to delivery by the appointed haulage contractors.



No specific consideration of the internal haul road providing access between various laydown areas in the development area has been included and it is assumed that the developer will design this to be able to accommodate the AILs required. A detailed appraisal of the technical requirements for handling components on-site will be required as the scheme progresses in the future.

There has been no specific consideration of onsite access within the sites themselves with all route investigations ceasing at the point at which the public road access to the site is proposed to be constructed.

The report is intended to be a summary of the Abnormal Indivisible Load (AIL) route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.



1. Introduction

- 1.1. The contents of this report include land transport feasibility investigations into achieving access to two sites in North Wales where National Grid (NG) are planning to deliver Tunnel Boring Machines (TMBs) as part of a future development scheme known as the Snowdonia Visual Impact Provision (AIP) works to reduce the amount of overhead electricity wires by installation of underground cables. These sites are located on the east and west banks of the Glaslyn estuary east of Porthmadog, Gwynedd. The TMBs will be Abnormal Indivisible Loads (AIL) in terms of the transportation requirements on the public road network.
- 1.2. This will see TBM deliveries to the east and west sites that are being proposed as construction site access areas. The TMBs could be delivered via any UK port and transported to North Wales by road.
- 1.3. This report is a summary of the status of the current AIL access investigations and seeks to present the situation as it currently stands. The issues highlighted in this report as risks to achieving AIL access in the future, will need to be revisited and progressed as the scheme develops.
- 1.4. This investigation considers the potential land transport routes from the England/Wales Border via the A55 trunk road based on the assumption that movements will take place under Special Types General Order (STGO) Regulations.
- 1.5. No consideration of site access or the internal haul roads in the development site is included and the route surveys end at the point at which site access is proposed to exit the public highway. A detailed appraisal of the technical requirements for handling components on-site will be required as the scheme progresses in the future.
- 1.6. The report is intended to be a summary of the AIL route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.
- 1.7. The report considers access in terms of AIL transportation only. No allowance is made for Construction and Use and general traffic requirements including traffic management plans that may be associated with the wider development plan.

2. Historical Information

2.1. *Movement Along Welsh Routes (MAWR)*

- 2.1.1. The Movement Along Welsh Routes (MAWR) Group is a group consisting of companies with a requirement to move AILs in the North Wales area. Member companies include First Hydro Company, National Grid and Magnox. Each of these companies has a requirement for heavy load access to their associated power stations and substations in North Wales. MAWR meets every year, with representatives of the Welsh Government and local authority highway departments also in attendance, with a remit to discuss issues impacting on heavy load access to power stations and substations. This applies to routes that require AIL access and as such are regarded as being strategically important by MAWR. AIL movement requirements are infrequent but access needs to be maintained at all times to



enable expedient movement in the event of a system failure at a power station or substation resulting in the need for an emergency AIL movement.

- 2.1.2. It is recommended that as the VIP Project proceeds that representatives from National Grid continue to attend MAWR meetings to update relevant interested parties of future AIL requirements.

2.2. *Porthmadog and Trawsfynydd Power Station & Substation*

- 2.2.1. Porthmadog was originally used as the marine access port when Trawsfynydd Nuclear Power Station was constructed in the 1950/60's. This involved the construction of a dockside crane by the Central Electricity Generating Board (CEGB). This was located to the south of the harbour and is no longer in place, having been removed post construction of the power station. The crane was designed to lift loads from coastal vessels onto awaiting road transport. Once the power station had been commissioned, the crane was taken down and the harbour redeveloped and for any future heavy load movements, a barge berth was created at Pen-y-Cei (also known as The Green), with an associated license agreement for future use.

- 2.2.2. Since the early 1980s there has been an understanding from CEGB and its successor companies (National Grid and First Hydro) that any heavy AILs to be delivered via Porthmadog would take place via the area identified as "The Green" within the harbour itself.

- 2.2.3. National Grid retains the former CEGB access agreement with Gwynedd County Council to maintain access for heavy loads at Porthmadog. In principle it is understood that the area at The Green is to be protected to enable future AIL access. This is however an event that has taken place only two times since the agreement was put in place in the early 1980's and is not a regular operation. There remain logistical issues to resolve to enable access. However, as is discussed in Section 3, Special Order AILs are not required for this project and therefore the focus is on the delivery of items to North Wales by road from the wider UK motorway and trunk road network.

- 2.2.4. The access to Trawsfynydd from Porthmadog has traditionally been maintained by National Grid in order to enable future delivery of transformers with nett transport weights of up to circa 210te.

- 2.2.5. Available records indicate that the last movement to Trawsfynydd Substation of Special Order category) took place in 1987. This was for the delivery of a transformer of circa 210te nett weight which was transported on a 14 axle girder frame trailer from Porthmadog at a gross weight of 295te with axle weights of 21.07te.

2.3. *Ffestiniog Power Station*

- 2.3.1. In addition to the Trawsfynydd substation delivery detailed previously, Porthmadog has also been used to deliver Special Order loads to Ffestiniog Power Station, and the first part of the route is common to that used for Trawsfynydd. Available records indicate that the last movement to Ffestiniog Power Station of Special Order category took place in 1993. This was for the delivery of a transformer of circa 115te nett which was transported on a 12 axle flattop trailer from a flattop barge at Porthmadog. This vehicle had a gross weight of 158.2te.

- 2.3.2. Since the 1993 movement deliveries have been undertaken to Ffestiniog by road from Liverpool for transformers of 114te nett weight and below. This has been possible due to road improvements in the last 20 years to the A55 and A487 which have enabled road routing for STGO loads below 150te gross with the most recent delivery of a transformer being in 2009 at a gross weight of 147te gross transported on a 10 axle flattop trailer. This therefore avoids the need for expensive coastal shipping by enabling a road route to be utilised where available.



Library Photograph 1

1993 movement of a 115te transformer to Ffestiniog Power Station about to cross over The Cob at Porthmadog.

2.4. *Pentir Substation*

- 2.4.1. Recent deliveries (March 2014) have been undertaken to Pentir Substation by road from Liverpool for reactors of 112te nett weight and below and have not required Special Order permissions. These have been delivered into the region via the A55, A5, and A4244. Pentir Substation does however have SGTs that would be expected to be moved at Special Order category and as such requires that access is maintained from Port Penrhyn.

2.5. *Maentwrog Power Station*

- 2.5.1. The most recent delivery (2016) undertaken to Maentwrog Power Station by road for a transformer of 75te nett weight at 109te gross weight which have not required Special Order permissions. This was delivered into the region via the A55, A5, and A4244 to avoid Caernarfon and involved crossing Bontnewydd Bridge which is discussed in Section 7.1 as a structural limitation at present. Maentwrog Power Station is located to the north of the VIP East site on the A496.

3. Highways England Agreement in Principle and Legislative Requirements

3.1. *Definition of Abnormal Indivisible Load (AIL)*

3.1.1. The Department for Transport, of which Highways England (HE), formally the Highways Agency (HA), is a government-owned company with responsibility for managing the core road network in England, state that the strict definition of an AIL refers to a load which cannot, without undue expense or risk of damage, be divided into two or more loads for the purpose of carriage on roads and which, owing to its dimensions or weight, cannot be carried on a vehicle which complies in all respects with the 'standard vehicle regulations' these are:

- The Road Vehicles (Construction and Use) Regulations 1986 (as amended)
- The Road Vehicles (Authorised Weight) Regulations 1998 (as amended)
- The Road Vehicles Lighting Regulations 1989 (as amended).

3.1.2. All equipment should be stripped of their ancillaries before they are transported. HE will only accept that further dismantling is not required where it cannot be economically achieved due to the requirement for its construction within specific factory environments or where extremely high tolerances have to be maintained.

3.2. *Legislation*

3.2.1. Conventional heavy goods vehicles have an operating weight limit of 44 tonnes. The category known as abnormal indivisible loads (AIL) covers those vehicles where the gross weight exceeds 44 tonnes. An Abnormal Load is defined as that which cannot be carried under Construction and Use (C&U) Regulations. Items which, when loaded on the load carrying vehicle exceed the weights encompassed by the C&U Regulations, but do not exceed Special Order Permission Limits, are governed by Special Types General Order (STGO) categories 1 to 3 depending on size. Where dimensions exceed 6.1m in width, 30m in rigid length or 150 tonnes gross weight, Special Order from HE is required. Highways England have issued an aide memoir that explains notification requirements in more detail. This document has been attached as Appendix 3.

3.2.2. Special Order category AIL movements are authorised by the HE Abnormal Loads team, based in Birmingham.

3.2.3. STGO loads orders grant consent for loads that satisfy the following criteria:

<u>Category 1 weight</u>	44 – 50 tonnes and 11.5te axle weights
<u>Category 2 weight</u>	50 – 80 tonnes and 12.5te axle weights
<u>Category 3 weight</u>	80 – 150 tonnes and 16.5te axle weights
<u>Width Restriction</u>	3.0m (C&U) – 5m (VR1 Required) – 6.1m (SO Required)
<u>Length Restriction</u>	18.65m (C&U) – 30.0m (SO Required)

3.2.4. The TBMs considered within these investigations are expected to be transported at STGO Category 3. Such loads are required to provide two clear working weekdays notice to be given to the Police forces on the proposed route and are required to provide 5 clear working weekdays notice together with an indemnity to the highway and bridge authorities on the route.



3.2.5. As the loads considered in these investigations are within STGO and therefore no specific consideration of Special Order requirements, including the Department for Transport (DfT) Water Preferred Policy for AILs is considered necessary and no specific marine access investigations are included.

3.3. As the loads are not restricted to Special Order requirements they will not necessarily be delivered to a North Wales Port and could arrive via any UK port and travel to the motorway and trunk road network to enter Wales on the A55 trunk road subject to route approval at the time of requirement. It was assumed at the commencement of investigations that this will be feasible without difficulty for the proposed loads as has been the case for STGO loads to Pentir Substation and Ffestiniog Power Station in recent years. The final approach to the sites from the A55 England/Wales border is discussed in terms of structural clearance in Section 7.

4. **Abnormal Indivisible Load Movements - Highways Act 1980**

4.1. *Recovery of Excessive Maintenance Costs - Section 59 Agreements*

4.1.1. Section 59 of the Highways Act 1980 allows the highways authority to raise a charge against a user of the highway to cover repair works necessitated by excessively heavy or unusual loads being carried on the road by that user. This provision is typically used where the passage of heavy lorries to and from industrial premises or building sites causes excessive damage to the road, requiring expensive remedial works by the Council. Under Section 59, the Council may charge on such costs to the organisation responsible for the damage, the amount payable being calculated as the excess cost of repair compared to normal maintenance costs for the road. Rather than wait to be charged such excessive repair costs, the Council and the third party may enter into an agreement under Section 59 whereby the third party accepts liability and makes payment of an agreed sum to the Council to cover the excessive repair costs.

4.2. *The Removal and Replacement of Street Furniture*

4.2.1. Where the removal and replacement of street furniture is required for the mobilisation of out of gauge vehicles into existing sites then these are generally managed under Temporary Traffic Regulation Order (TTRO) and Street Works Legislation. These are normally, but not necessarily, organised by the haulage contractor. These requirements are generally to ensure that the supervisors and operatives are competent and that the works will be carried out to a prescribe standard with the appropriate traffic management in place. In some circumstance the Highway Authority or LA will insist that their preferred contractors will carry out such work.

5. Plant Dimensions Included within Study Work

- 5.1. The information included within this report is based around a selection of different manufacturing contractor's potential equipment which has been made available to Wynns. All details of possible transport dimensions should be treated with caution and be understood to be in need of clarification as the scheme progresses.
- 5.2. Table 1 shows dimensions of the TBMs that has been included within the study for initial feasibility assessment work. These dimensions have been used to derive indicative transport arrangement drawings for presentation to highway and structural authorities as detailed in Section 7. A 200te mobile crane has also been included as it is expected that this will be required on site also.

Table 1. Selected Items to be considered.

Item	Weight	Diameter/ Width	Length/Depth	Notes
Cutterhead	50te	5m	0.3m	
1 st Shield Section	30te	5m	5m	
2nd Shield Section	20te	5m	5m	Could potentially be moved within C&U under 44te gross.
200te Mobile Crane	60te	3m	15.282m	

Note: It is assumed that the diameters of 5m are maximum and will not be exceeded. If loads exceed 5m then VR1 permissions will be required.

6. Transport Configurations

6.1. Tunnel Boring Machines

- 6.1.1. The dimensions of the TBM components expected to require delivery to the sites considered in these investigations is detailed in Table 1 previously discussed. Due to the size of the components it is not possible to transport them under the regulations governing Construction and Use (C&U) vehicles (44 tonne gross, 18.65m long and 2.9m wide). It is therefore necessary to transport within the Special Types General Order (STGO) regulations as previously discussed.
- 6.1.2. There are numerous haulage contractors with equipment able to carry the TBM components within STGO Category 2 or 3 (between 50-80te or 80te-150te gross) and these have been used to inform and produce the conceptual transport drawing considered within this report. As various haulage contractors are available, competitive tendering for the transport of cable drums is viable. For the general purposes of this investigative work we have produced a transport arrangement considerate of a maximum 50te nett cutter head section at 5m width and the 200te mobile crane as worst case anticipated transport dimensions.

6.1.3. It is assumed that road transport configuration would utilise a bed trailer or low bed type configuration. The following transport drawing has been submitted to structural authorities for comment.

- Drawing No 18-954, TC01 – 4 axle stepframe trailer at 79te gross
- Drawing No 18-954, TC02 – 200te mobile crane at 60te gross

6.2. The physical negotiability of these vehicles is discussed in further detail in Section 8.

6.3. The trailer arrangements provided to the structural authorities for consideration in this investigation have been produced to be considerate and representative of those available in the UK heavy haulage market in terms of their suitability on the potential access route from the A55 to site. The responses to these investigations are discussed in Section 7.

7. Structural Route Information

7.1. Tunnel Boring Machine Access

7.1.1. As the loads are not restricted to Special Order requirements, the cable drums could arrive via any UK port and travel to the A55 by way of the motorway and trunk road network. It is assumed that this will be feasible without difficulty for the proposed loads. The final approach to the Porthmadog study area from the English Border at the A55 Chester bypass has been considered which is a recognised heavy load route, and the routes to the two east and west sites from the main A487 are detailed below.

Preferred Route to TBM West Site

From English Border continue A55 westbound to A5/A55 junction

Turn left onto A5

Turn right A4244

Bear left at Pentir roundabout on A4244

Turn right A4086

Turn left Class 3 at approx. OS Ref. SH 513 632

Straight ahead at roundabout at Caeathro

Turn left on to A487 at Bontnewydd

Note 1: We are aware from previous experience that the masonry arch section of the bridge at Bontnewydd (OS grid reference SH 482 598) is unsuitable for AIL movements but the reinforced concrete extension at the northern side is expected to be adequate. Loads must travel on the downstream side of the bridge.

Continue A487 to Penmorfa

Continue A487 at Tremadog Roundabout

Continue A487 Porthmadog Roundabout

Continue A487 via Porthmadog bypass to Minffordd Roundabout

Turn right High Street

Turn right unclassified road at OS Grid Ref. SH 5872 3811

Turn left unclassified road at proposed new site access at approx. OS Grid Ref. SH 5939 3862

Preferred Route to TBM East Site

Same as route 1 to Minffordd Roundabout

Turn left A487 Eryri Terrace

Turn right Cambrian View

Continue Penrhyndeudraeth Bridge (Pont Briwet)

Turn left A496

Turn right at proposed site access at approx. OS Grid Ref. SH 6242 3795

Maentwrog Diversion to East Site

Same as route 1 to A487 Eryri Terrace

Continue A487

Turn right A496 to Maentwrog

Continue A496

Turn left at proposed site access at approx. OS Grid Ref. SH 6242 3795

Note: At Maentwrog it may be necessary depending on the final size of load to contraflow the one way system enabling access to A496.

7.1.2. The routes have been cleared by the structural authorities detailed below.

- Canal & Rivers Trust
- Highways England Historic Railways Estate
- Network Rail
- Gwynedd County Council

7.1.3. North Mid Wales Trunk Road Agency (NMWTRA) have advised (emails 29.8.18) that the A487 Bontnewydd Bridge has recently been down rated to Construction and use (44te) loads only at present, although this remains under review. This causes significant concerns in terms of getting AILs into the area on what has long been regarded as the most suitable heavy load route from the north whether via the A487 in full or via the diversion from the A55 at Banger Services on the A5, A4244 and A4086. Such a significant restriction will be a major concern to many organisations in the region as it will impact on much smaller STGO AILs and is not solely an issue for the heavier end of the electricity supply industry.

7.1.4. Traditionally it has always been understood that it is necessary for heavy AILs to avoid the old masonry arch section and to travel on the reinforced concrete extension at the northern side with the loads on the downstream side of the bridge and this has been the basis of route clearance work and actual notifications over the years.

7.1.5. For the high end STGO loads there would initially appear very little scope for alternative routes to sites that approach from the south and east although this could be investigated further and clarification has been sought from Welsh Government, North Wales Police and NMWTRA as to the suitability of potential diversion routes to avoid the problem for STGO loads.

7.1.6. Wynns have significant interest in the A487 heavy load route in our role as consultants to clients in the electricity supply industry and also as the Secretary of the of Movement Along Welsh Routes (MAWR) Group. We aware from informal discussions over the time since the last meeting of MAWR in November 2017 that there has been an assessment taking place over recent months which is what we presume has led to this significant weight restriction being imposed. We have asked for confirmation that within this assessment potential remedial measures for AILs such as travelling at crawl speed, no stopping, certain alignment requirements, no HA loading, have been considered.

7.1.7. It may be prudent to also discuss potential temporary measures such as bridging units, propping etc. These would be subject to detailed engineering proposals technically and would also have an impact on other road users due to the potential need to carry out such works under a road closure and further information is being sought from NMWTRA and Welsh Government on this option. The possible solutions would depend on the bridge length of span and method of support. Available records indicate that the bridge has a 15m span and we have experience of bridging structures in excess of this.



7.1.8. Of specific concern are the following sites and projects that our clients require AIL access to in addition to this specific cable drum project:

- Ffestiniog Power Station (First Hydro Company) – Transformer access at top end STGO for transformers in excess of 100te nett weight. Also other items that would be moved more generally at STGO.
- Trawsfynydd Substation (National Grid) – Although Special Order transformers in excess of 150te nett may be expected to be delivered via Porthmadog this is not without difficulty. In addition, other STGO loads may need to route via A487.
- Potential new SMR Power Station at Trawsfynydd (Welsh Government/Snowdonia Enterprise Zone development project) – Although Special Order loads of various components may be expected to be delivered via Porthmadog this is not without difficulty. In addition, other STGO loads may need to route via A487.
- Proposed Bryncir Substation (National Grid) – Although Special Order transformers may be expected to be delivered via Porthmadog this is not without difficulty and it may be easier and preferable to deliver them from Port Penrhyn, subject to route. In addition, other STGO loads may need to route via A487.
- Maentwrog Power Station (Magnox) – STGO loads. Most recent was 75te nett transformer in approximately 2016.
- Glaslyn Cable Feed Project (National Grid via consultants WSP) – Cable drums at STGO.
- Snowdonia Visual Impact Provision (National Grid via consultants WSP) – Tunnel Boring Machines (TBM)

7.1.9. Wynns and MAWR would hope that this is a serious enough issue to be a priority for NMWTRA and Welsh Government but it may take a period of time for permanent design of and facilitation of remedial works to be agreed and carried out. We have requested that MAWR are consulted on any future permanent strengthening schemes that may be proposed and will continue to monitor the situation but at present there is not access to loads in excess of 44te gross to the Porthmadog area.

7.1.10. The preferred route identified is a recognised diversion via the A5, A4244 and A4086 that avoids the A487 Caernarfon. North Wales Police have historically requested that loads avoid Caernarfon due to the narrow nature of some of the A487 and the need to use the one way system. The proposed diversion route is acceptable for the cable drum loads and therefore the Caernarfon option is not discussed further in this report but it could be utilised for the proposed loads with approval from NMWTRA and North Wales Police if necessary.

7.1.11. The proposed A487 Caernarfon to Bontnewydd Bypass is planned in forthcoming years which may assist in the future for access into the region. However, for current purposes the status of the route as it is now has been considered.

7.1.12. MAWR have previously highlighted required loadings for the existing Ffestiniog Power Station requirements should be included in the new bypass and it is understood the new road will be accommodating of this.

7.1.13. It is noted that both Gwynedd County Council and Network Rail have confirmed the routes are structurally acceptable. However, there is some confusion over who is responsible for the Minffordd Rail Bridge (OS Ref SH 5996 3852) on the A497 which is on the proposed route to the west site. Network Rail have advised that this is not their structure but Wynns are the view based on previous movements in the area that it is a Network Rail structure and clarification of this is being sought. This has been a recurring issue over recent years

and no significant problems are expected structurally in terms of the bridge which has been crossed by heavy loads in the past but ownership does need to be clarified.

- 7.1.14. In addition Network Rail have cautioned that they regularly inspect and assess bridges and occasionally have to revise the permitted load carrying capacity, as such, it would be advisable to contact Network Rail again closer to the movement date to ensure that their bridges are still adequate. It will therefore be necessary to engage further with Network Rail in respect to access over Minffordd Rail Bridge as the project progresses when routing to the west TBM delivery location.
- 7.1.15. The potential use of the new by-pass would open up route options from the north and Port Penrhyn that are currently restricted due to physical dimensions which present concerns to North Wales Police.
- 7.1.16. North Wales Police have been approached for comment on the proposed routes submitted for consultation and have yet to provide a formal response.

8. Route Negotiability

8.1. *Route to TBM West Site*

- 8.1.1. The proposed route from the A55/A5 junction to the West Site is detailed in Section 7 and illustrated on the maps provided in appendix 1 of this report. The negotiability of the proposed routes is discussed in the following notes and photographs.
- 8.1.2. The route via Pentir to Bontnewydd has been described as the preferred route from the A55 to the general site area. This is also an established heavy load route and has been used for the delivery of much larger abnormal loads to Ffestiniog Power Station and also in part for Pentir substation and Dinorwig Power Station.
- 8.1.3. The route was inspected from the A55 during August 2018.



Photograph 1

Vehicle moves away from camera. Exiting A55 on to the A5 roundabout.



Photograph 2

Reverse of A5/A4244 roundabout. Vehicle moves towards camera. Negotiable.



Photograph 3

A4244/A4086 Junction. Vehicle moves away from camera and turns right on to the A4086. Negotiable.



Photograph 4

A4086/A4244 Junction. Vehicle enters photo from A4244, turns right on to the A4086 and exits behind camera.



Photograph 5

A4086 and unclassified road junction at Pont-rug. Vehicle moves away from camera, turns left unclassified road. No negotiability issues foreseen.



Photograph 6

Reverse angle of left turns on to unclassified road at Pont-rug. Negotiable.



Photograph 7

A4085 roundabout in Caeathro. Vehicle moves away from camera, and travels straight over roundabout continuing on the unclassified road. Negotiable.



Photograph 8

Unclassified road in to Bontnewydd. Vehicle moves away from camera.



Photograph 9

Unclassified road/Pwllheli Road roundabout in Bontnewydd. Vehicle moves away from camera, turns left at roundabout on to A487. Negotiable.



Photograph 10

A487/A499 Roundabout. Vehicle moves away from camera. Negotiable.



Photograph 11

A487/ Lôn Cefn Glyn Roundabout. Vehicle moves away from camera. Negotiable.



Photograph 12

East on A487. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 13

East on A487. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 14

Approaching A487/A498 roundabout. Vehicle moves away from camera, continues A487.



Photograph 15

A487/High Street roundabout. Vehicle moves away from camera continues A487.



Photograph 16

East on A487 Porthmadog Bypass. Vehicle moves away from camera.



Photograph 17

Minffordd Roundabout. Vehicle moves away from camera, turns right High Street.



Photograph 18

Reverse of A487/High Street Roundabout. Vehicle moves towards camera upon exiting roundabout.



Photograph 19

A497 West on High Street. Vehicle moves towards camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 20

A497 Right turn at OS Grid Ref. SH 5872 3811. Vehicle moves away from camera and turns right.

- 8.1.4. The surveyor has recommended a swept path assessment be carried out to confirm negotiability of the right turn from the A497 to the unclassified road that leads to the final approach to VIP Site West. If this is not considered feasible then the surveyor recommends driving past the junction and reversing on to the unclassified road to the proposed new site access approximately 700 meters. This would avoid the need to travel via Porthmadog town centre.



Photograph 21

Unclassified road. Vehicle moves away from camera.



Photograph 22

Vehicle moves away from camera. Full occupation of the highway necessary. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 23

Potential new site access for TBM West Site at approx. OS Grid Reference SH 5939 3862.

8.1.5. It is understood from consideration of sketch number PDD-33494-TUN-SK01-001 (attached in Appendix 2) that the TBM proposed construction laydown area is to be accessed via a new internal haul road to be constructed from the point shown in photograph 23 above. It is assumed that the developer will design the internal haul road to be able to accommodate the AILs required. The transport arrangement drawings provided in Appendix 2 can be used for indicative ground loadings and turning circles that are required.

8.2. *Route to TBM East Site*

8.2.1. The proposed route from the A55/A5 junction to the East Site is detailed in Section 7 and illustrated on the maps provided in appendix 1 of this report. The negotiability of the proposed route is discussed in the following notes and photographs. The preferred route is to exit the A487 trunk road at Penrhyndeudraeth and approach the development site from the south west on the A496 at Trem-y-Garth.



Photograph 24

Minffordd Roundabout. Vehicle moves away from camera, continues left onto A487. Negotiable.



Photograph 25

A487/Cambrian View. Vehicle moves away from camera, turns right Cambrian View.



Photograph 26

A487/Cambrian View. Vehicle moves away from camera, turns right Cambrian View. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 27

East on Pont Briwet. Vehicle moves away from camera.



Photograph 28

East on Pont Briwet. Vehicle moves away from camera.

- 8.2.2. The bridge at Pont Briwet has been significantly upgraded in recent years and confirmed as structurally acceptable by Gwynedd County Council who also advised at the commencement of the investigations that they considered this the most suitable access route to the proposed TBM delivery location on the A496.



Photograph 29

Reverse angle of Pont Briwet/A496 Junction. Vehicle enters junction middle right, turns left, exits behind camera. No negotiability issues foreseen.



Photograph 30

North East on the A496. Vehicle moves away from camera. Negotiable although full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required.



Photograph 31

North East on the A496. Vehicle moves away from camera.



Photograph 32

Proposed TBM East Site Access. Site access to be designed to accommodate proposed AIL delivery vehicles.

- 8.2.3. An alternative route was looked at via Maentwrog although this is deemed unsuitable due to the turn from the A487 to the A494 at Maentwrog which has a restricted left turn adjacent to a property.



Photograph 33

A487/A496 junction. Left turn will not be negotiable for AIL delivery vehicles.

- 8.2.4. It may be feasible to avoid the left turn highlighted by contraflowing the old bridge at the junction. Although Maentwrog has been accessed via this route in the past the section south on the A496 to the proposed TBM delivery location is narrow with multiple bends. Although the route could be considered if absolutely necessary it is not as suitable as that described in 8.1 that approaches from the south and therefore it is recommended that it is not considered further at this stage.

9. Summary and Conclusions

- 9.1. As the loads will be moved under STGO Category 3 legislation it is assumed that the road route to the A55/A5 junction will be accessible from a suitable UK port of delivery.
- 9.2. At present there is no access to the development area due to a significant downgrading of Bontnewydd Bridge on the A487 to C&U traffic only (44te gross). This has been advised by NMWTRA and Wynns are in discussions with them to find a way forward as this is a strategic route affecting many sites in North Wales. The restriction is on an established heavy load route and the importance of this has been highlighted to NMWTRA and Welsh Government.
- 9.3. Notwithstanding the Bontnewydd Bridge restriction, the proposed routes have been structurally cleared for all loads from the A487 to the two development sites where TBMs are required to be delivered in terms of both East and West sites in terms of local access requirements.
- 9.4. The route surveys carried out have found that access is possible to both the East and West sites in terms of physical negotiability, although the West site will require the delivery vehicles to use new site access points and use of the proposed internal haul road.
- 9.5. There are no major problems with access to the East site although the new site access points will need to be carefully considered.

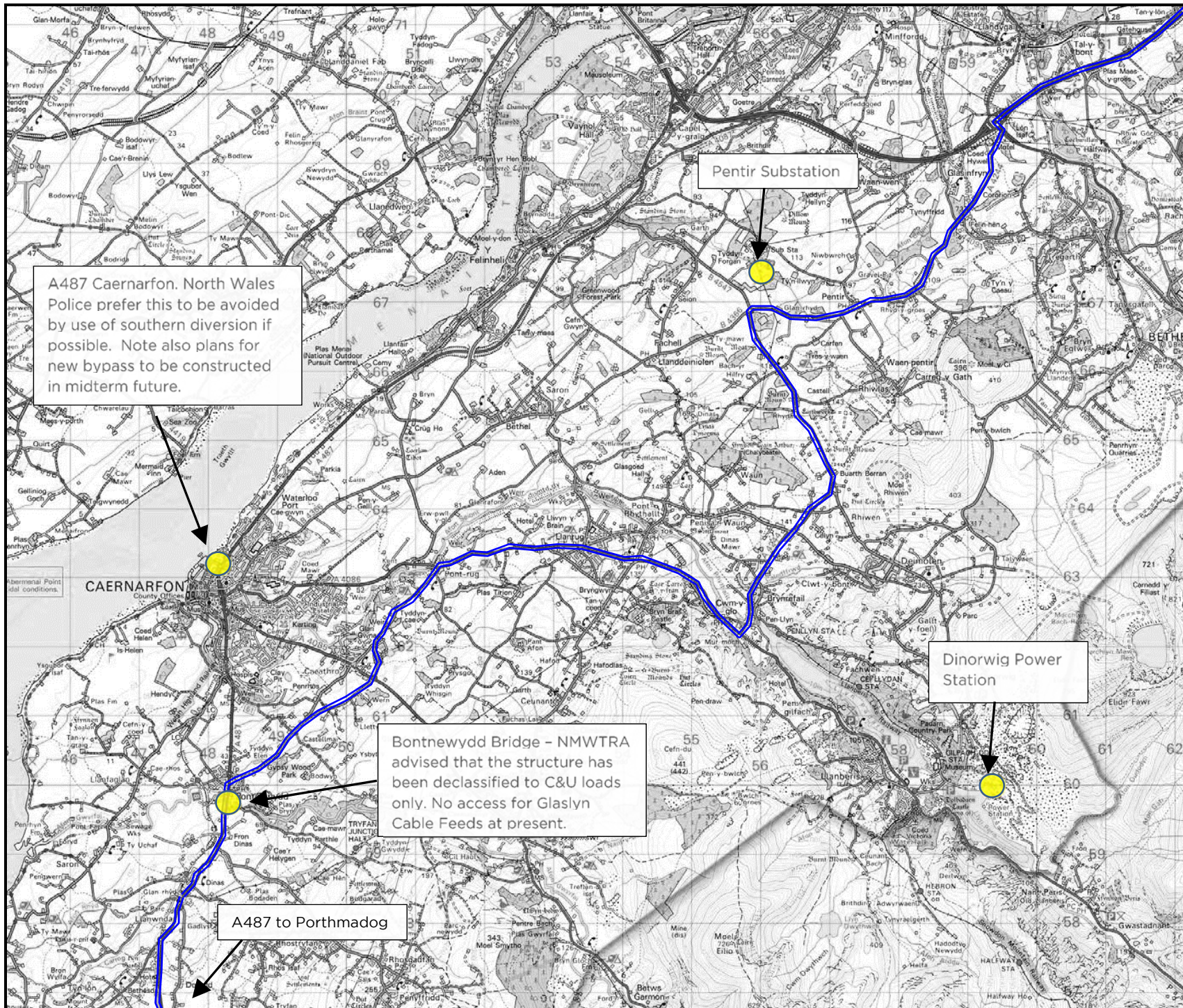


- 9.6. As the loads are 5m in width there will be sections throughout the route where full occupation of the highway will be required and careful consideration of escort requirements including movement times and traffic management will be required. This will require more detailed discussions with North Wales Police, NMWTRA and Gwynedd County Council prior to delivery by the appointed haulage contractors.
- 9.7. The route investigations detailed are a view of the current status of the proposed heavy load route options only and do not consider any other components or traffic to the site.
- 9.8. The report is intended to be a summary of the AIL route access at the current time and is not a guarantee that the route will be cleared in the future. Specific movements will need to be assessed at the time on an individual basis. If any further information is required, it is available on request.



Appendix 1

Maps



A487 Caernarfon. North Wales Police prefer this to be avoided by use of southern diversion if possible. Note also plans for new bypass to be constructed in midterm future.

Bontnewydd Bridge - NMWTRA advised that the structure has been declassified to C&U loads only. No access for Glaslyn Cable Feeds at present.

A487 to Porthmadog

Key

Route to TBM West Site A

Route to TBM East Site B

Maentwrog Diversion

Point of Interest

Proposed Laydown Areas

B		
A		
O	06.09.18	First Issue
Rev	Date	Amendments:

Revisions



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Client:

Manchester Technology
Centre,
Oxford Road,
Manchester,
M1 7ED

Project:

Snowdonia Visual Impact Provision

Title:

Map 1 – Routes to Proposed Site
Locations

Drawing Status:

Final Report

Scale (A4):

Drawn by:

Checked by:

NTS

DMW

ARP

Ref No.:

Sheet:

Rev.:

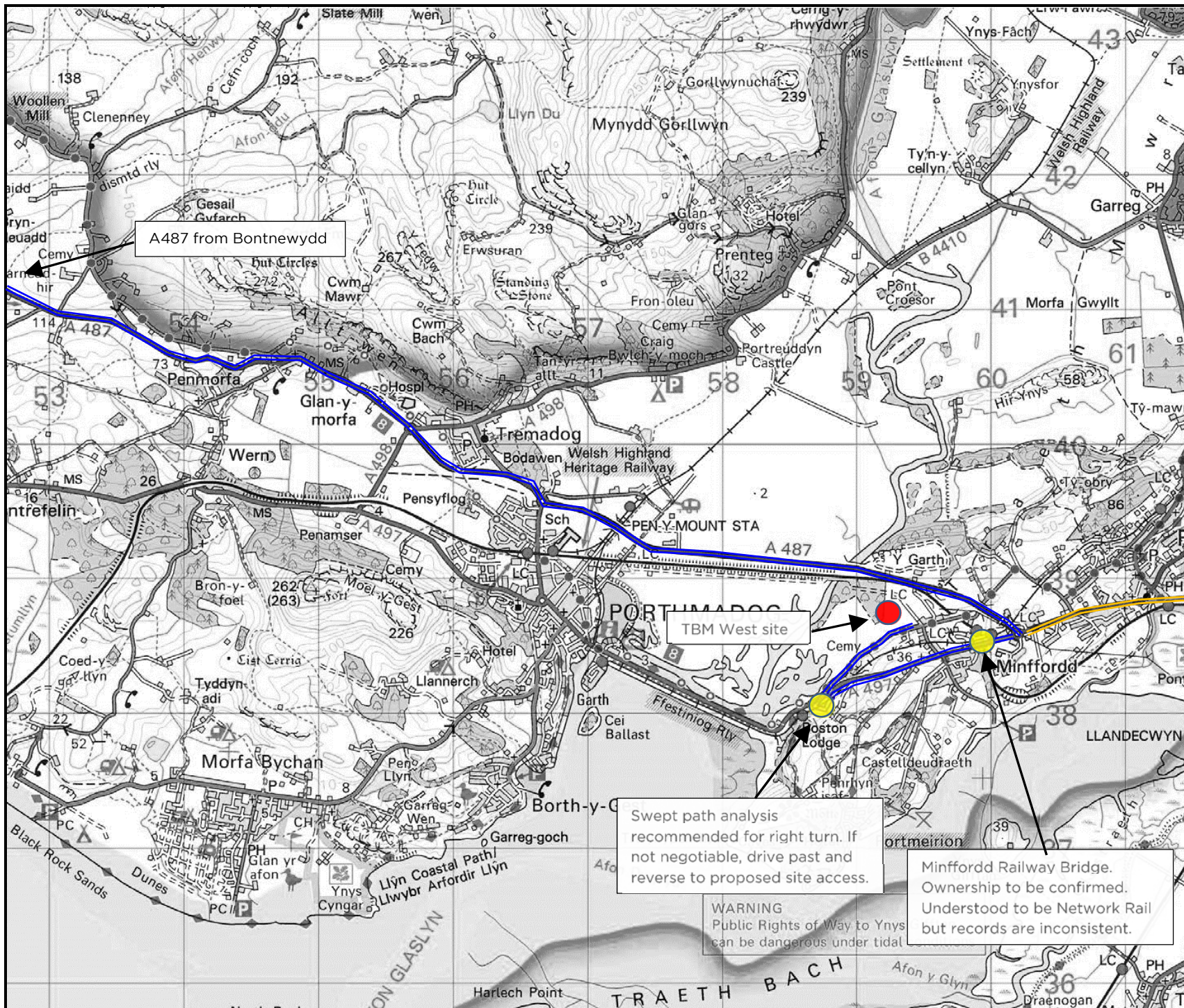
WSP-VS-Map1

1 of 3

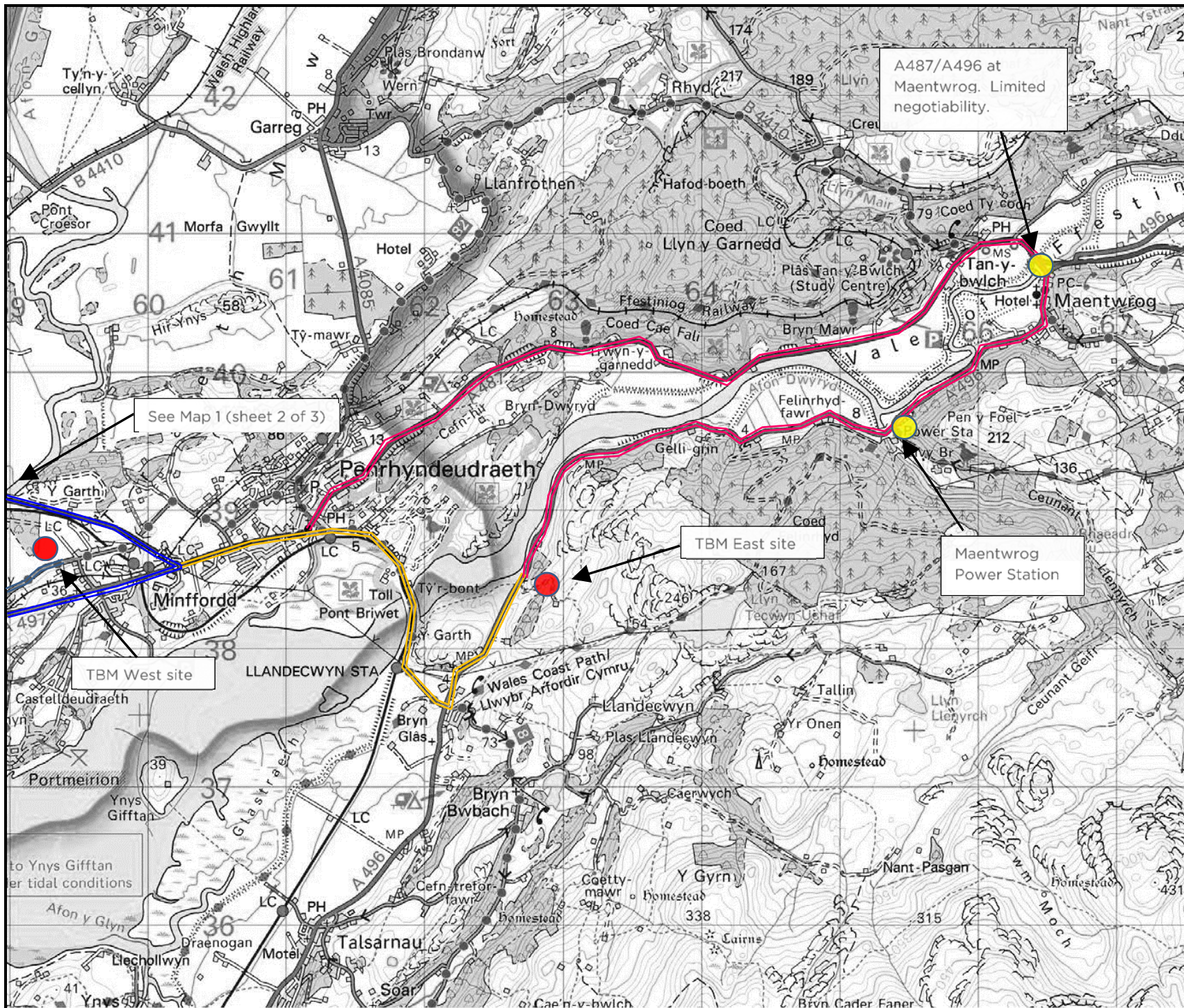
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Key		
	Route to TBM West Site A	
	Route to TBM East Site B	
	Maentwrog Diversion	
	Point of Interest	
	Proposed Laydown Areas	
B		
A		
O	06.09.18	First Issue
Rev	Date	Amendments:
Revisions		
 Wynns Ltd. Independent Transportation Engineers Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ. Tel: (01785) 850411		
Client:	 Manchester Technology Centre, Oxford Road, Manchester, M1 7ED	
Project:	Snowdonia Visual Impact Provision	
Title:	Map 1 – Routes to Proposed Site Locations	
Drawing Status:	Final Report	
Scale (A4): NTS	Drawn by: DMW	Checked by: ARP
Ref No.: WSP-VP-Map1	Sheet: 2 of 3	Rev.: 0
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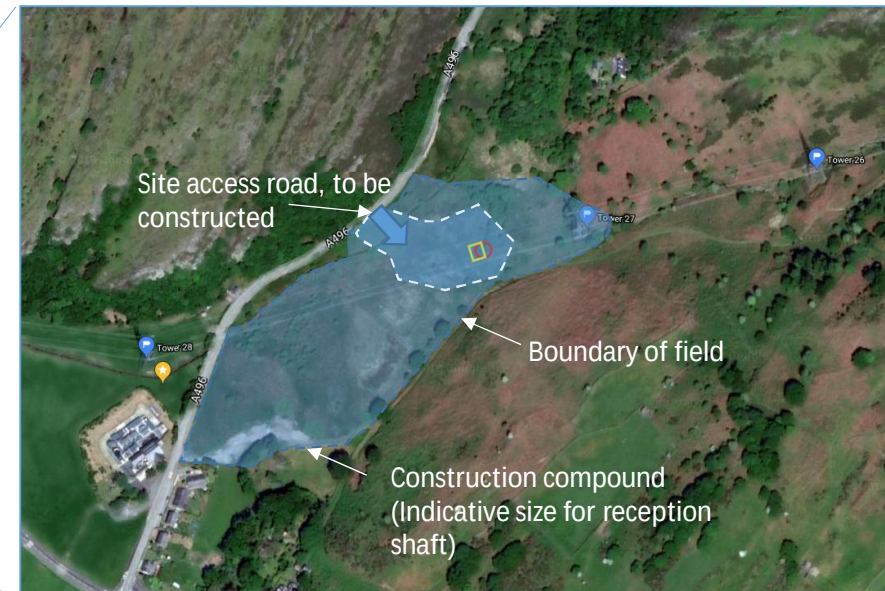
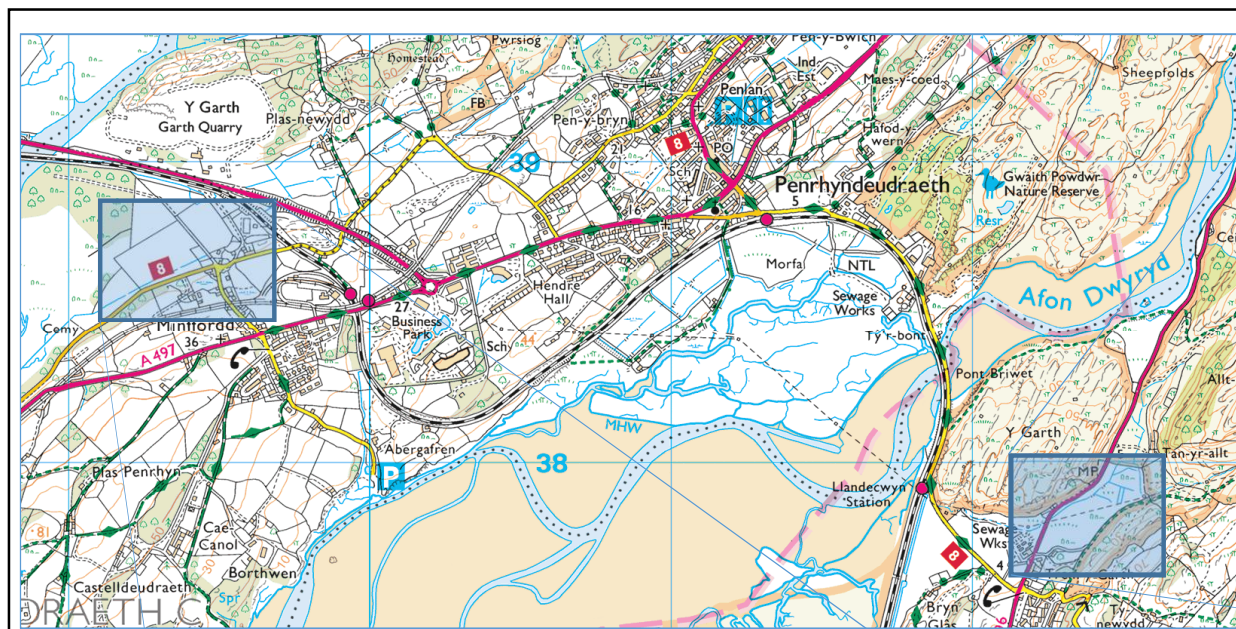


Key		
	Route to TBM West Site A	
	Route to TBM East Site B	
	Maentwrog Diversion	
	Point of Interest	
	Proposed Laydown Areas	
B		
A		
O	06.09.18	First Issue
Rev	Date	Amendments:
Revisions		
 Wynns Ltd. Independent Transportation Engineers Shaftesbury House, 2 High Street, Eccleshall, Stafford, ST21 6BZ. Tel: (01785) 850411		
Client:	 Manchester Technology Centre, Oxford Road, Manchester, M1 7ED	
Project:	Snowdonia Visual Impact Provision	
Title:	Map 1 – Routes to Proposed Site Locations	
Drawing Status:	Final Report	
Scale (A4):	Drawn by:	Checked by:
NTS	DMW	ARP
Ref No.:	Sheet:	Rev.:
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Appendix 2

Drawings & Transport Configurations



- Shaft (12.5m diameter)
- Headhouse



- Shaft (15m diameter)
- Headhouse

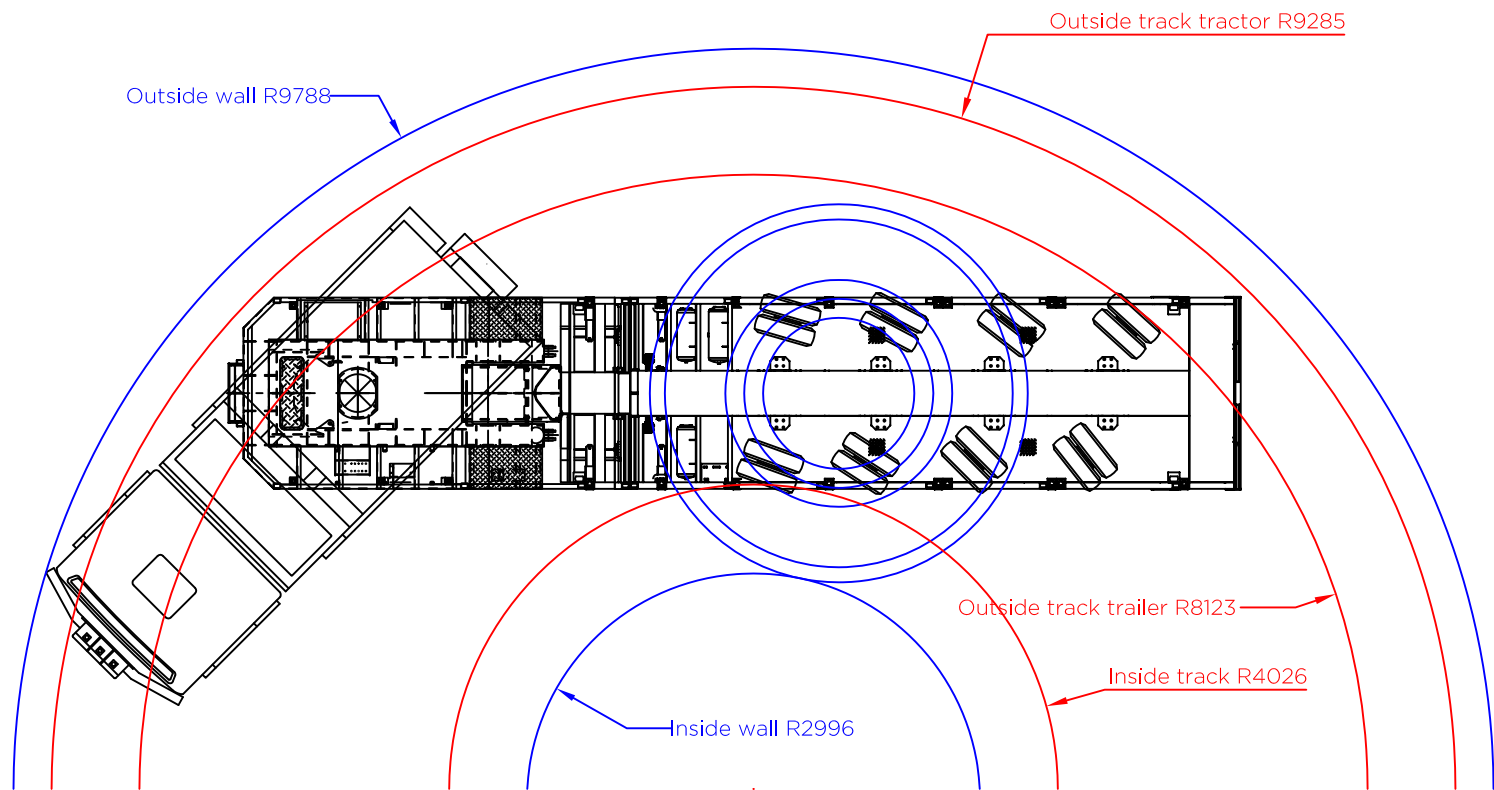
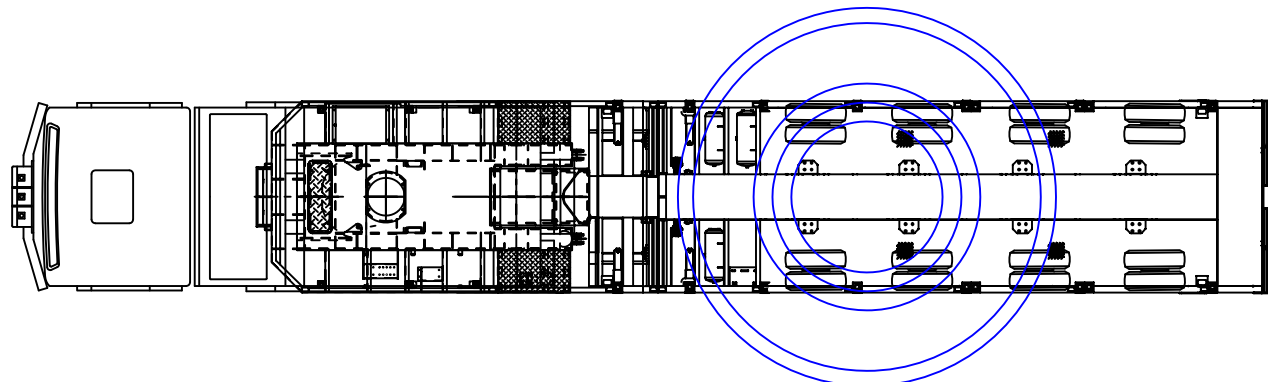
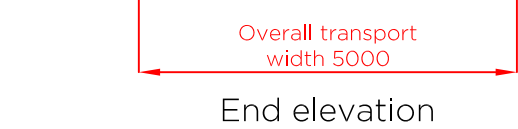
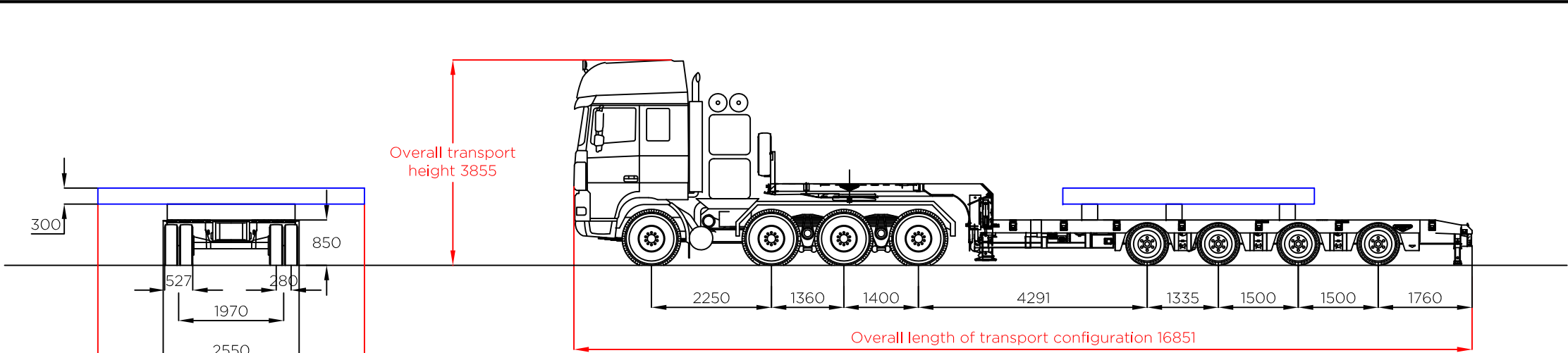


Snowdonia Visual Impact Provision

Provisional Shaft Locations & Construction Compounds

Sketch for information only

PDD-33494-TUN-SK01-001 AJW – 06/03/2018



Load Table	
4 axle steerable stepframe	
Self weight of load	50.0 te
Self weight of trailer	15.0 te
Self weight of tractor	14.0 te
Total combined weight	79.0 te
Load per axle line	9.88 te
Load per wheel (4 per axle)	2.47 te
Overall ground bearing pressure	3.32 te/m²
Tractor (14 te)	
Front axle	6.0 te
Second steer	8.0 te
Rear axle	9.17 te
Rear axle	9.17 te

- Notes:-
- [1] The figures shown above are representative of the transport configuration portrayed. However as tractor and trailer arrangements can vary then the loads and dimensions indicated should be treated as probable values.
- [2] Actual dimensions including axle spacing and mean running height may vary slightly depending on manufacturer of trailer deployed.
- [3] All linear measures in millimetres unless stated otherwise.
- [4] Drawing of cutting head indicative only.

1		
0	16.07.18	Issued for comment
Rev.	Date	Amendments

Revisions

Prepared By:

 Shaftesbury House, 2 High Street, Eccleshall, Stafford ST21 6BZ Tel: (01785) 850411

Independent Transportation Engineers

Client:

 WSP Global Manchester Technology Centre Oxford Road Manchester M1 7ED

Project:

Snowdonia

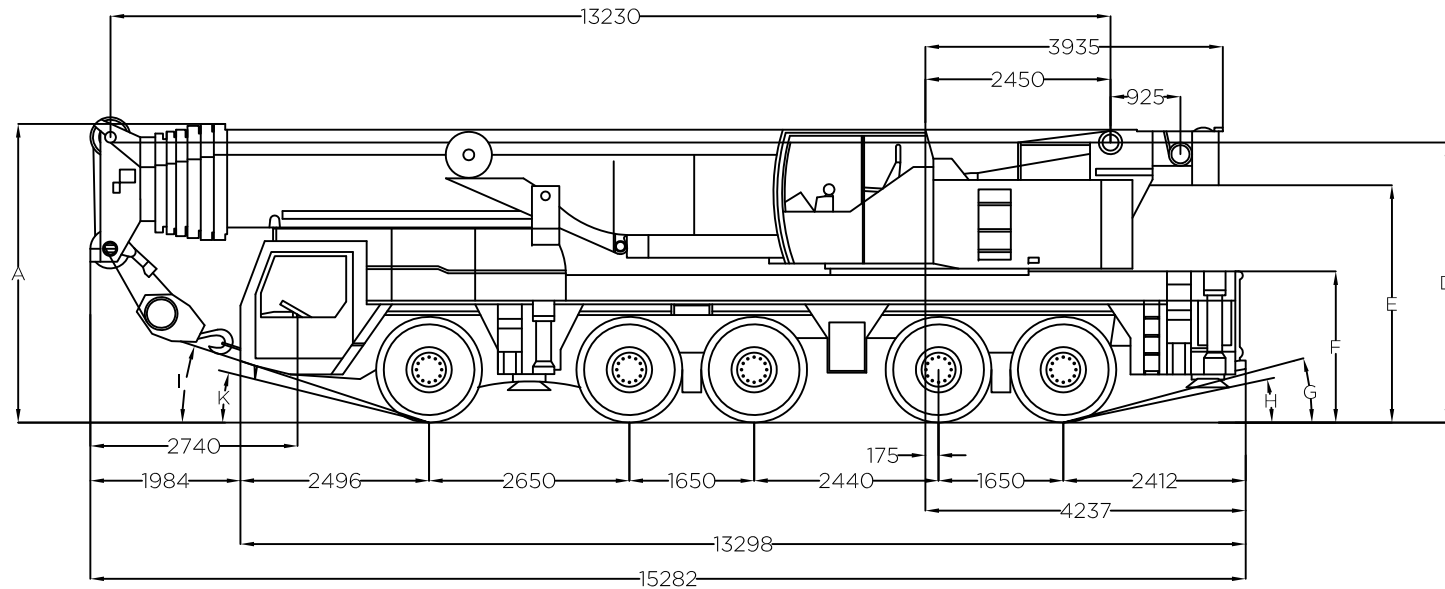
Title:

Indicative Transport Configuration for delivery of 5.0 m Dia 50 te cutting head shown on 4 axle steerable stepframe trailer and articulated tractor

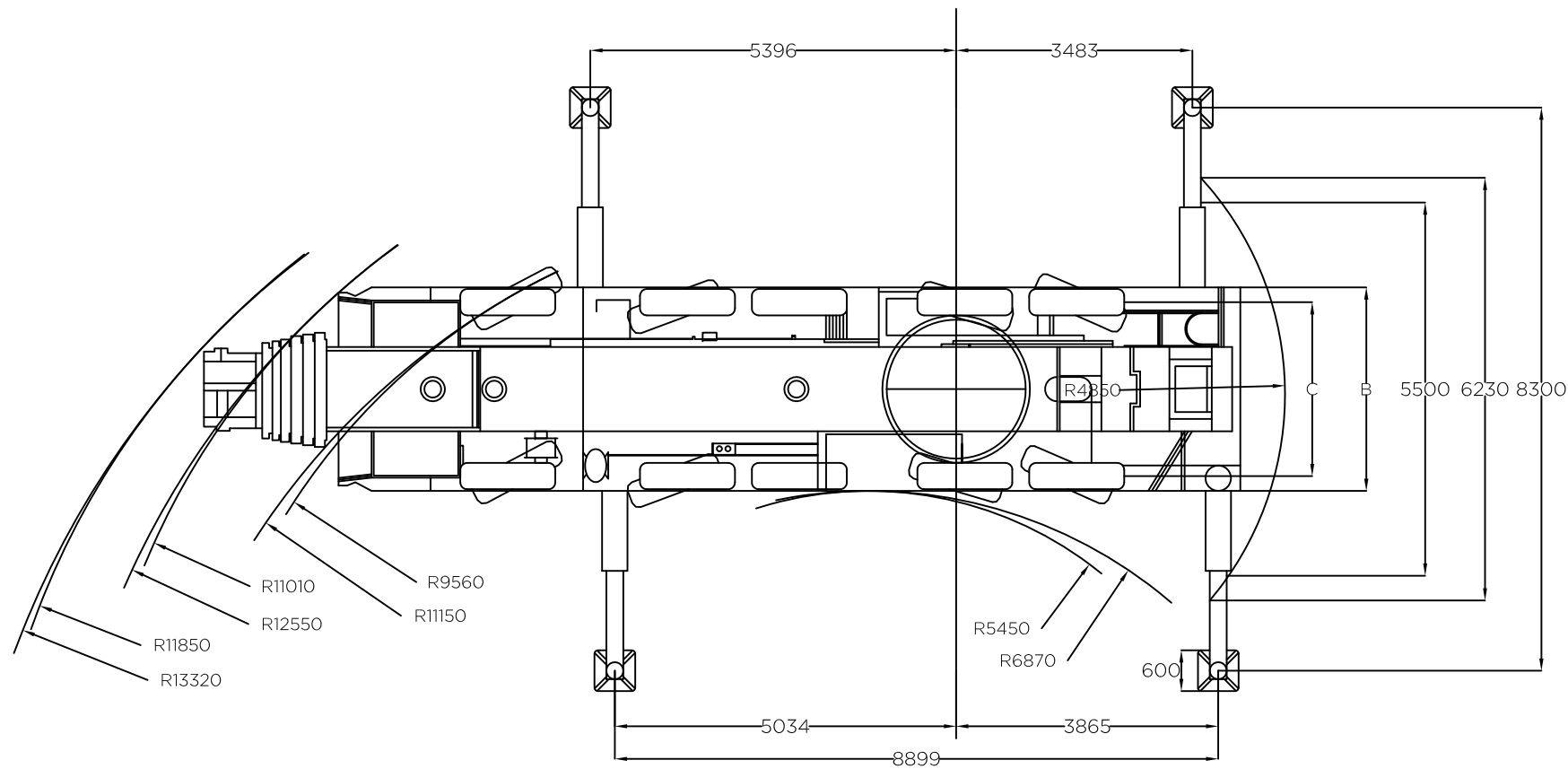
Drawing Status:

Final report

Scale (A3):	Drawn By:	Checked By:
1:100	SJW	AP
DWG. No:	Sheet:	Rev:
18-954.TC01	1 of 1	0



Side elevation - 200 te mobile crane



Plan view - 200 te mobile crane

	Dimensions mm										
	A	A 150mm	B	C	D	E	F	G	H	I	K
14.00 R 25	3950	3800	3000	2563	3704	3139	2000	15°	12°	18°	14°
16.00 R 25	4000	3850	3000	2551	3754	3189	2050	17°	14°	20°	16°
20.5 R 25	4000	3850	3100	2573	3754	3189	2050	17°	14°	20°	16°

Load Table

200 te mobile crane - axle loads

Axle 1	12.0 te
Axle 2	12.0 te
Axle 3	12.0 te
Axle 4	12.0 te
Axle 5	12.0 te
Minimum gross load	60.0 te

Notes:-
[1] The figures shown above are representative of the transport configuration portrayed. However as transport arrangements can vary then the loads and dimensions indicated should be treated as probable values.

[2] Actual dimensions including axle spacing and mean running height may vary slightly depending on manufacturer of trailer deployed.

[3] All linear measures in millimetres unless stated otherwise.

1		
0	16.07.18	Issued for comment
Rev.	Date	Amendments

Revisions

Prepared By:



Shaftesbury House, 2 High Street,
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Tel: (01785) 850411

Independent Transportation Engineers

Client:



WSP Global
Manchester Technology Centre
Oxford Road
Manchester
M1 7ED

Project:

Snowdonia

Title:

200 te mobile crane
Negotiability and set up arrangements

Drawing Status:

Final report

Scale (A3): 1:100	Drawn By: SJW	Checked By: AP
DWG. No: 18-954.TC02	Sheet: 1 of 1	Rev: 0

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Appendix 3

Highways England Aid Memoir

Aide Memoire for notification requirements for the movement of Abnormal Indivisible Loads or vehicles by road when not complying with The Road Vehicles (Construction and Use) Regulations 1986 (commonly known as C & U)

Weight

Gross weight of vehicle carrying the load exceeding C & U limits up to 80,000kgs (78.74 tons)	2 clear days notice with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 80,000kgs up to 150,000kgs (147.63 tons)	2 clear days notice to Police and 5 clear days with indemnity to Road and Bridge Authorities.
Gross weight of vehicle carrying the load exceeding 150,000kgs (147.63 tons)	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Width

C & U loads:- width exceeding 2.9m (9ft 6ins) up to 4.3m (14ft 1 ins)	2 clear days notice to Police
STGO loads:- width exceeding 3.0m (9ft 10ins) up to 5.0m (16ft 5ins)	
Width exceeding 5.0m (16ft 5ins) up to 6.1m (20ft)	Highways England form VR1** plus 2 clear days notice to Police
Width exceeding 6.1m (20ft)	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities

Length

C&U loads:- length exceeding 18.65m (61ft 2in) up to 27.4m (90ft) - See C&U Regulations 1986 for definition of length	2 clear days notice to Police
STGO loads:- length exceeding 18.75m (61ft 6 ins) - See part 2, article 12 of the Road Vehicles (Authorisation of Special Types) (General) Order 2003 (Commonly known as STGO) for definition of length	
Overall length of a part 2 vehicle-combination exceeding 25.9m (85ft)	2 clear days notice to Police
Maximum length exceeding 30.0m (98ft 5ins) – see STGO Schedule 1, part 4, paragraph 25 for definition of maximum length	Highways England Special Order* plus 5 clear days notice to Police and 5 clear days notice with indemnity to Road and Bridge Authorities.
NB For some very light loads, such as yacht masts, that are moved on conventional motor vehicles not exceeding 12 tonnes gross weight or trailers not exceeding 10 tonnes gross weight, a Highways England Special Order* will be required if the rigid length exceeds 27.4m (89ft 11ins)	

NOTE 1 "Clear days Notice" excludes Saturdays, Sundays or a public holiday in any part of Great Britain in relation to movements authorised by the Special Types General Order only, there being no such exclusion in Special Orders unless specifically stated.

NOTE 2 There is no statutory limit governing the overall height of a load, however, when applying for a Special Order or VR1 it should, wherever possible, not exceed 4.95m (16ft 3ins) in order that the maximum use can be made of the motorway and trunk road network.

NOTE 3 The notification requirements for mobile cranes can be found in the Road Vehicles (Authorisation of Special Types) (General) Order 2003, statutory instrument number 1998 (Part 2 Articles 10 to 18), which is available on the OPSI website:
<http://www.legislation.gov.uk/ukSI/2003/1998/contents/made>

NOTE 4 Application to move Special Types or Special Purpose vehicles, such as very large agricultural vehicles, that may not be fully permitted by the Construction & Use (C&U) Regulations or fall outside the scope of the Special Types General Order should be made to the Vehicle Certification Agency (VCA). Their website is at <http://www.dft.gov.uk/vca/>

*A Special Order application can be completed and submitted online at www.highways.gov.uk/esdal. The Special Order application form BE16 can also be downloaded and e-mailed to the address below. Approval is not automatic and is at the discretion of the Highways England abnormal loads team acting on behalf of the Secretary of State for Transport. To ensure that the necessary clearances can be obtained in good time from the Police, Highway and Bridge Authorities, you should request permission for the move by returning the completed form 10 weeks prior to the scheduled date of the move. In fact you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

** A VR1 application can be completed and submitted online at www.highways.gov.uk/esdal. The form can also be downloaded but must not be e-mailed or faxed because the VR1 form is a legal document and so we must receive the original signed form. Approval is not automatic and is at the discretion of the Highways England abnormal loads team acting on behalf of The Secretary of State for Transport. To ensure that the necessary formalities can be completed in good time, you should request permission for the move by posting the completed form 2 weeks prior to the date of the scheduled move. Again, you cannot apply too early and we invite manufacturers or hauliers to contact us at pre tender stage, before making a financial commitment to supply the load, to check whether permission would be granted.

Forms and enquiries to:
Highways England
Abnormal loads team
9th Floor, The Cube
199 Wharfside Street
Birmingham B1 1RN

E-mail: abnormal.loads@highwaysengland.co.uk
Tel: 0300 470 3004



Appendix 4

Selected Correspondence

Daisy Wynn

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 29 August 2018 10:19
To: Daisy Wynn
Cc: Jackson Martin (CEFNFFYRDD); Wright Nic (CEFNFFYRDD); Abnormalloads
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Daisy,

Sorry for any delay.

At this point in time I have the following comments:

The A487T north of Caernarfon is a North Wales Police prohibited route so you will need to contact them regarding this.

Even if the A487T north of Caernarfon is avoided, then A487T Bontnewydd bridge is currently a prohibited structure and I have no information on any works in the pipeline to rectify this.

The Bontnewydd / Caernarfon bypass could be underway or completed.

As the loads are up to 5m wide then cars will need to be moved at Penmorfa village and at the eastern end of Penrhyndeudraeth. We will need to apply for an order 12 weeks beforehand.

Traffic will need to be stopped at the pinch point just to the west of the Oakley Arms, Maentwrog.

The presumption is that a police escort will be used.

Thanks

Steve

Steven Gruffudd King LLB PGDip

Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru

North & Mid Wales Trunk Road Agent

Neuadd y Sir, Aberaeron SA46 0AT

☎ 01545 571960

✉ stevenking@nmwtra.org.uk



From: Daisy Wynn <Daisy.Wynn@wynnslimited.com>
Sent: 24 August 2018 16:11
To: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>

Cc: Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>; Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>

Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Hi Steve,

I've just tried to get hold of you regarding the below enquiry I sent at the end of last month.

Have you managed to give this anymore consideration?

We are hoping to complete our reporting next week so would appreciate if you could get something over to me as soon as possible.

Hope you have a great weekend.

Best wishes,
Daisy

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>

Sent: 31 July 2018 14:01

To: Daisy Wynn <Daisy.Wynn@wynnslimited.com>; RSGBRB@jacobs.com; Lisa Wheelwright-Brown (Lisa.Wheelwright-Brown@canalrivertrust.org.uk) <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>; Abnormal Loads Officer (abnormal.loads@NetworkRail.co.uk) <abnormal.loads@NetworkRail.co.uk>; Jackson Martin (CEFNFFYRDD) <MartinJackson@nmwtra.org.uk>; Wright Nic (CEFNFFYRDD) <NicWright@nmwtra.org.uk>; Susan Jones (abnormalloads@nthwales.pnn.police.uk) <abnormalloads@nthwales.pnn.police.uk>

Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Hi Daisy,

Just a little note to say that we are considering this. At a first glance the two main issues you have are the A487T north of Caernarfon and the A487T at Bontnewydd Bridge. I am not sure what state Caernarfon bypass will be at the time of your movements – hopefully completed but will get back to you when I have more info.

Thanks

Steve

Steven Gruffudd King LLB PGDip

Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru

North & Mid Wales Trunk Road Agent

Neuadd y Sir, Aberaeron SA46 0AT

☎ 01545 571960

✉ stevenking@nmwtra.org.uk



From: Daisy Wynn <Daisy.Wynn@wynnslimited.com>

Sent: 25 July 2018 15:21

Daisy Wynn

From: King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>
Sent: 29 August 2018 12:44
To: Andrew Pearce; Daisy Wynn
Subject: A487T Bontnewydd Bridge, south of Caernarfon

Hi Andy,

As requested:

The A487T Bontnewydd bridge is 'Pen y Bont Bridge' located at SH 48279 59866.

It was assessed recently as only suitable for C&U only, but this is being reviewed.

Thanks

Steve

Steven Gruffudd King LLB PGDip

Swyddog Meddiannaeth y Rhwydwaith a Llwythau Annormal /
Network Occupancy and Abnormal Loads Officer

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru

North & Mid Wales Trunk Road Agent

Neuadd y Sir, Aberaeron SA46 0AT

☎ 01545 571960

✉ stevenking@nmwtra.org.uk



Daisy Wynn

From: Chapman Jonathan (YGC) <jonathanchapman@gwynedd.llyw.cymru>
Sent: 03 August 2018 11:29
To: Andrew Pearce
Cc: Daisy Wynn; Jones Owen Rhys (YGC)
Subject: RE: AIL Access via Pen y Mount Level Crossing
Attachments: Cable Drum B - Hiway Extent.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Morning Andrew,

I have marked up the attached indicating the extent of the public rights of way around the Cable Drum B location. On the alternative route past the football ground, just after turning of the Porthmadog Bypass, the road passes over a twin box culvert. This structure was built as part of the bypass around 2011 and so will be able to carry the proposed loads.

With regards to all other routes off the trunk road network there is only one structure on Drum Route D. This structure is adequate to carry the proposed vehicles.

Cofion/Regards,

Jonathan Chapman, MEng CEng MICE
Prif Beiriannydd / Principal Engineer



Swyddfa'r Cngor, Stryd y Jêl, Caernarfon, Gwynedd, LL55 1SH
t: 34481 | 01341 424 481 (Dolgellau) / 32311 | 01286 679 243 (Caernarfon)
e: JonathanChapman@gwynedd.llyw.cymru

From: Andrew Pearce <Andy.Pearce@wynnslimited.com>
Sent: 02 August 2018 12:23
To: Chapman Jonathan (YGC) <jonathanchapman@gwynedd.llyw.cymru>
Cc: Daisy Wynn <Daisy.Wynn@wynnslimited.com>; Jones Owen Rhys (YGC) <owenrhysjones@gwynedd.llyw.cymru>
Subject: AIL Access via Pen y Mount Level Crossing

Jon,

Thank you for your time during our telephone conversation on this today. You will no doubt get the cable drum and tunnel boring machine loads that my colleague Daisy has sent to authorities for consideration only last week via the formal channels but for info please see a copy of that sent to Rhys on this current project.

In the meantime can you clarify the extent of the public highway on the route labelled Cable Drum B Route as attached as we discussed? I also attached an extract of mapping data from my client detailing the potential site access points we are looking at. My understanding is that the public highway ends to the west of the level crossing at approximate OS Ref SH 5739 3963. Therefore for the loads to use the remainder of the road/bridleway and the level crossing the each private land owner would need to be contacted. We are already in discussions with the Welsh Highland railway/Ffestiniog Railway Company on the issue of using the level crossing.

Daisy Wynn

From: Nicholson Katie <Katie.Nicholson@networkrail.co.uk> on behalf of Network Rail Abnormal Loads <NetworkRailAbnormalLoads@networkrail.co.uk>
Sent: 27 July 2018 09:31
To: Daisy Wynn
Subject: RE: Q-652 AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Completed

Hi Daisy,

Your proposed routes do not affect any Network Rail owned road over rail bridges or tunnels therefore we have no objection to them.

Please note we only check the load carrying capacity of Network Rail owned road over rail bridges affected we do not check anything else including:

- Load carrying capacity of level crossings
- Clearance to bridge parapets
- Clearance under a rail bridge
- Clearance to overhead wires at level crossings

Just so you are aware, one of your sites is very near the structure below, so if the route changes to cross this, we will need to be notified.

Structure: DJP/B/117-73.25

Road Name: Road From Osmond Terrace Passing Syenite Terrace And Erw Wen To Bwlch Bryn Road, Penrhyndeudraeth ([View Map](#))

Indicative capacities:

STGO 1: 50

STGO 2: 80

STGO 3: 120

Crane Cat A: 36

Crane Cat B: 63

Crane Cat C: 67

If you have any further questions please let us know.

Many Thanks

Katie Nicholson

Abnormal Loads Assistant

Abnormal Loads Help Desk: 01908 783 140



Abnormal Loads | National Records Group | Route Services

The Quadrant | Elder Gate | Milton Keynes | MK9 1EN

W <http://www.networkrail.co.uk/abnormal-indivisible-road-loads/>

Daisy Wynn

From: Howell, Tania <Tania.Howell@jacobs.com>
Sent: 26 July 2018 11:56
To: Daisy Wynn
Subject: RE: AIL Access to Glaslyn and Snowdonia Sites

Follow Up Flag: Follow up
Flag Status: Completed

Hi Daisy,

Wow – you’ve certainly made me earn my keep with this one!!

I’ve looked at all the options.....

There’s a twin-bore tunnel passing beneath the A487 (at an oblique angle) about 2/3 of the way between the A55 and the A4087/B4547/A487 roundabout. The portals for this are a long way off the road, and there appears to be plenty of fill above them, so they should be OK for the specified vehicles.

I have nothing else on any of the other roads specified.

Cheers for now
Tania

Tania Howell
Abnormal Loads Officer
Jacobs
DDI: 0118 946 8911

If your mail concerns abnormal load movements, please reply to RSGBRB@jacobs.com

From: Daisy Wynn [mailto:Daisy.Wynn@wynnslimited.com]
Sent: 25 July 2018 15:21
To: RSGBRB@jacobs.com; Lisa Wheelwright-Brown (Lisa.Wheelwright-Brown@canalrivertrust.org.uk) <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>; Abnormal Loads Officer (abnormal.loads@NetworkRail.co.uk) <abnormal.loads@NetworkRail.co.uk>; Martin Jackson (martinjackson@nmwtra.org.uk) <martinjackson@nmwtra.org.uk>; Nic Wright (NicWright@nmwtra.org.uk) <NicWright@nmwtra.org.uk>; King Steven Gruffudd (CEFNFFYRDD) <StevenKing@nmwtra.org.uk>; Susan Jones (abnormalloads@nthwales.pnn.police.uk) <abnormalloads@nthwales.pnn.police.uk>
Subject: [EXTERNAL] AIL Access to Glaslyn and Snowdonia Sites

Dear All,

I’m writing with regard to a new route enquiry for several locations in North Wales requiring the delivery of cable drums, tunnel boring machine components and a mobile crane.

These deliveries are related to two separate projects; Glaslyn Cable Feed and Snowdonia Visual Impact Provision.

Daisy Wynn

From: Lisa Wheelwright-Brown <Lisa.Wheelwright-Brown@canalrivertrust.org.uk>
Sent: 31 July 2018 08:13
To: Daisy Wynn
Subject: FW: AIL Access to Glaslyn and Snowdonia Sites
Attachments: 0081-25.07.18 - AIL Access Study - Snowdonia and Glaslyn Projects, North Wales.pdf

Hi Daisy

Hope you are well?

The proposed routes attached do not affect the Canal & River Trust's infrastructure.

Kind Regards

Lisa Wheelwright-Brown

Technical Administrator

T 0113 2005759 (6259)

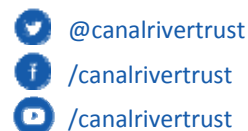
E lisa.wheelwright-brown@canalrivertrust.org.uk



Canal & River Trust

Fearns Wharf, Neptune Street, Leeds, LS9 8PB

canalrivertrust.org.uk



From: Lisa Wheelwright-Brown
Sent: 30 July 2018 11:58
To: Abnormal Loads <Abnormal.Loads@canalrivertrust.org.uk>
Subject: FW: AIL Access to Glaslyn and Snowdonia Sites

Appendix 5:

Biosecurity Risk Assessment



National Grid

Visual Impact Provision (VIP), Snowdonia Project

Biosecurity Risk Assessment

660952

SEPTEMBER 2019

RSK

RSK GENERAL NOTES

Project No.: 660952

Title: VIP, Snowdonia – Biosecurity Risk Assessment

Client: National Grid

Date: September 2019

Office: Helsby

Status: Rev01

Author	<u>Will Holden</u>	Technical reviewer	<u>Tom Smith</u>
			
Signature		Signature	
Date:	<u>16 September 2019</u>	Date:	<u>18 September 2019</u>

RSK Environment (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment.

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1 INTRODUCTION

1.1 Purpose of this Method Statement

The Visual Impact Provision (VIP) represents a major opportunity to conserve and enhance the natural beauty, wildlife and environmental heritage within protected landscapes. The project will make use of a £500 m allocation by Ofgem to carry out work to help reduce the impact of existing transmission lines in English and Welsh Areas of Outstanding Natural Beauty (AONBs) and National Parks.

The VIP Snowdonia Project in the Snowdonia National Park aims to reduce the visual impact of National Grid's 4ZC overhead line (OHL) across the Dwyrdd Estuary near Penrhyndeudraeth, Gwynedd by relocating a section of the OHL below ground.

Surveys of the proposed construction area and access routes undertaken by RSK Environment Ltd in 2018 (RSK, 2018) recorded large stands of *Reynoutria japonica* (Japanese Knotweed) as well as smaller stands of *Crassula helmsii* (New Zealand Pigmyweed), *Crocodymia x crocosmiiflora* (Montbretia) and *Parthenocissus quinquefolia* (Virginia-creeper). The location of the invasive species within the vicinity are shown on *Figure 1*.

This Biosecurity Risk Assessment focusing on the management of invasive species relates to construction of the access routes, works compounds, tunnel head houses and sealing end compounds as well as removal of overhead lines that are close to any areas of invasive non-native species.

This is a working document that should be reviewed and maintained throughout the construction period as a record of activities. It details measures to prevent the spread of invasive non-native plant species into the surrounding environment as a result of the construction works being undertaken. It also provides advice on the process of eradicating non-native invasive plant species in the area of permanent structures.

2 INVASIVE NON-NATIVE SPECIES LOCATIONS

The confirmed locations of invasive plant species are shown on *Figure 1*. A description of the invasive species present at each location on *Figure 1* is given in detail in the botanical survey report (RSK, 2018).

A summary of the species present at each location on *Figure 1* is provided below:

Location	Species	Notes
1	Japanese Knotweed	15 m x 10 m in woodland.
2	Japanese Knotweed	4 m x 2 m in corner of residential garden and smaller stands c.1 m x 1 m along access road.
3	Japanese Knotweed	1 m x 1 m adjacent to access track.
4	Japanese Knotweed	25 m x 15 m adjacent to lay by and access road.
5	Japanese Knotweed; Montbretia	Japanese Knotweed and Montbretia c.5 m x 1 m scattered throughout area of Bramble.
6	Japanese Knotweed	15 m x 20 m adjacent to lay by and access track.
7	Japanese Knotweed	4 m x 1 m in an area of Bracken.
8	Japanese Knotweed	20 m x 10 m on railway embankment next to road bridge.
9	Japanese Knotweed	Remnants of treated Japanese Knotweed root stocks c.2 m x 5 m. Some re-growth around 5 cm high adjacent to field gate.
10	Japanese Knotweed	Remnants of treated Japanese Knotweed root stocks c.10 m x 10 m. Some re-growth around 5 cm high at the base of pylon.
11	Virginia-creeper; Japanese Knotweed	Virginia-creeper - c. 10 m x 5 m alongside railway embankment and small stand of Japanese Knotweed c. 0.5 m x 0.5 m adjacent to farm access track.
12	Japanese Knotweed	40 m x 3 m alongside road and railway embankment.
13	New Zealand Pigmyweed	At northern margin of pond.
14	Montbretia	5 m x 1 m in a single patch amongst ruderal herbs.
15	Japanese Knotweed	1 m x 2 m at the base of an earth bund.
16	Japanese Knotweed	1 m x 2 m adjacent to the entrance to the compound.

Please note, botanical survey to record the presence of invasive species are non-intrusive. While they can record visible plant species, they can not record the presence of species under the ground or contamination of spoil where no above ground growth is observed.

The information regarding the presence of invasive species, contained within this method statement, was recorded in summer 2018. It is possible that stands of invasive species have spread or appeared since the most recent survey was completed.

3 CHARACTERISTICS AND ECOLOGY

3.1 Japanese Knotweed

Japanese Knotweed (*Reynoutria japonica*), a rhizomatous perennial, was introduced from Asia to Europe in the mid-nineteenth century as an ornamental and fodder plant. It is an aggressive species growing to a height of 2-3 m, with bamboo-like stems, arching branches and clusters of creamy white flowers appearing late in the season. The orange to brown coloured, woody, dead stems persist erect throughout the winter and new shoots, produced from the extensive rhizome system, grow up amongst these the following spring to form dense thickets. The dead stems and leaf litter decompose very slowly and form a deep organic layer which prevents native seeds from germinating. Once present at a site, Japanese Knotweed increases in area very rapidly and soon forms monoculture stands.

Reproduction is primarily by vegetative regeneration from any fragment of the plant, but especially the rhizomes and fresh stems. The rhizome system may extend from a parent plant up to 7 m laterally and to a depth of 3 m. Very small fragments of rhizome (as little as 0.7 g) give rise to new plants. Fresh stems produce shoots and roots when buried in a soil medium or floated in water. Stems in water may produce viable plants within six days.

Japanese Knotweed thrives on disturbance and is spread by natural means and by human activity. In the past, fly-tipping and transportation of soil containing rhizome fragments have been a major cause of spread, particularly in the urban environment.

3.2 Montbretia

Crocasmia species are easily recognised when in flower by the distinct shape and colour of their flower heads. All are non-native in the UK. The hybrid called Montbretia, with relatively short stems and orange flowers, is the main species to have escaped into the wild; however, a number of other ornamental *Crocasmia* species are grown in gardens and other landscaped areas.

Montbretia was originally created in France from parent plants of South African origin. Introduced to the UK in 1880 as a garden plant, it escaped by 1911 both naturally and through the disposal of garden waste, and spread rapidly across the UK in the latter part of the 20th century.

Montbretia can completely dominate habitat where it grows, sometimes excluding native plant species. It spreads mainly by rhizomes and culms (bulb-like structures), rarely by seed.

3.3 New Zealand Pigmyweed

New Zealand Pigmyweed is a submerged, emergent and terrestrial plant. It is a perennial with yellowish-green opposite; succulent leaves around 20 mm long and solitary white or pale pink flowers. It is readily recognisable when growing at the edges of water bodies by its fleshy leaves. Submerged leaves are less easy to see and recognise. It reproduces from very small stem fragments but does not produce viable seed in the UK.

Originally introduced in 1911 as an oxygenating plant for ponds and, since the 1970s, has spread rapidly. It forms dense mats and can impede drainage, causing flooding as well as displacing other aquatic plant species and reducing amenity use of the waterbody. It can cause oxygen depletion of the underlying water leading to a decline in invertebrates, frogs, newts and fish.

3.4 Virginia-creeper

Virginia-creeper is a deciduous perennial woody climber that can grow 15 m or more over trees or up walls and structures. It climbs by means of cup-like adhesive shoot tips borne on branched tendrils. It has stalked five-lobed leaves which turn crimson before falling in the autumn. Each leaflet is 3-15 cm long with toothed margins. Inconspicuous small white-green flowers are borne on loose clusters and berries are rounded, 4-6 mm in diameter and blue-black when ripe.

It is most typically found in man-made habitats such as urban railway embankments, old walls and buildings and road verges but it also invades scrub and hedgerows.

3.5 Legislation

Japanese Knotweed, Montbretia, New Zealand Pigmyweed and Virginia-creeper are non-native invasive plant species and are listed under *Schedule 9* to the *Wildlife and Countryside Act 1981* with respect to England and Wales. It is an offence to plant or otherwise allow these species to grow in the wild.

Japanese Knotweed is very easily spread from cut stems and particularly through fragments of rhizomes (underground stems). Due to the invasive nature of the plant and the ease at which it can spread, Japanese Knotweed can cause serious problems if left unchecked, getting into brickwork, foundations, services, drains, walls and easily pushing through tarmac surfaces.

Montbretia is spread by the disturbance or distribution of rhizomes and corms in excavated contaminated spoil.

New Zealand Pigmyweed dispersal in the UK is by vegetative fragments, of which even a single node on 10 mm of stem can root to form a new plant. It is spread by movement

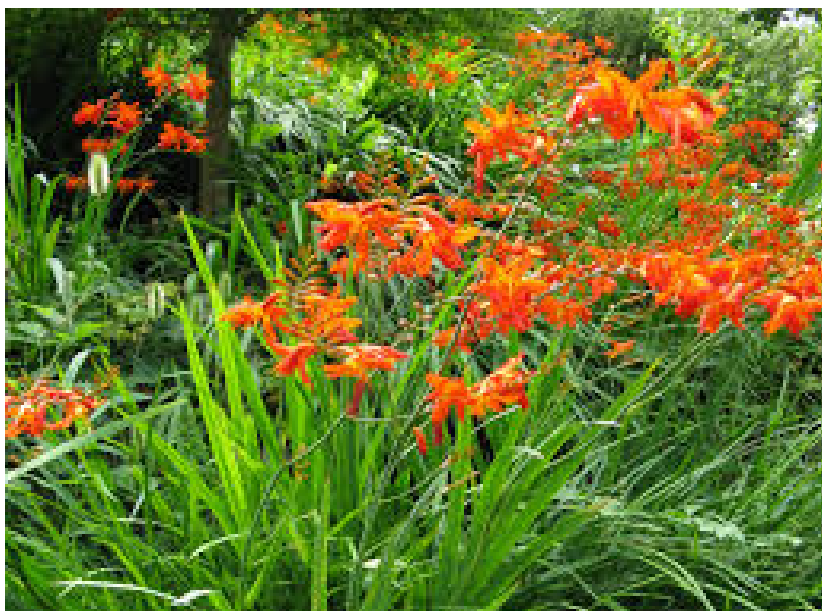
of vegetative fragments on boats, machinery used to manage water bodies, clothing and possibly wildfowl.

Virginia-creeper grows from seed and usually spreads by rooting wherever stems touch the ground. It is likely to reproduce vegetatively, either by rooting at nodes wherever stems are in contact with the ground or from a creeping rootstock which throws up new shoots at intervals. It can regenerate from root fragments discarded in garden waste.

Japanese Knotweed



Montbretia



New Zealand Pigmyweed



Virginia-creeper



4 METHOD STATEMENT

4.1 Overview

The methods outlined below are the most effective for the control of non-native invasive species at each location. The types of work that will take place include:

- temporary impacts at temporary access routes, cable installation, construction compounds and removal of overhead power lines, where land will be returned to the landowner on completion of the project; and
- permanent impacts where a permanent construction footprint will remain (including tunnel head houses, sealing end compounds and permanent access routes).

This Method Statement therefore considers methods for site access and works within 10m of any stands of the non-native invasive plant species. It also includes options for management of invasive species in permanent construction areas. Measures contained in relevant DEFRA and Environment Agency best practice guidance on the control and removal of invasive weed species will be implemented.

Long-term management is not covered in this method statement.

These methods are required for any works within 10 m of any stands of non-native invasive plant species (listed in *Section 2*). Distances should always be measured from the outermost visible plant stem. Although the method statement focusses on the works listed above, the principles should be applied to any other work undertaken close to any non-native invasive plant species

4.2 Temporary Development Areas

This section covers temporary works areas, such as temporary access routes, site compounds and open cut cable installation. This is only relevant for areas where eradication of invasive species is not required, but methods to prevent their spread are appropriate. It assumes that these works will take place in areas where, on completion, land will be returned to its previous use and condition.

4.2.1 Responsibilities and Timescales

Responsibilities and liabilities for the precautionary methods of works and site set up are to be agreed by National Grid and the site construction contractor prior to works commencing. All parties are to be made aware of the risks and control procedures for dealing with non-native invasive plant species.

Prior to and during any traffic entering the site, the following methods will be employed to prevent the spread of non-native invasive plant species.

4.2.2 Site Set Up – Access

- A suitable fence that can clearly be seen should mark out the areas of infestation with an exclusion zone of at least 7 m (preferably 10 m). Signs should warn people working there that there is Japanese Knotweed, Montbretia, New Zealand Pigmyweed or Virginia-creeper contamination.
- The barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- An ecological clerk of works responsible for overseeing the Method Statement will be identified and will brief all site staff.
- Any site access tracks within 10 m of any non-native invasive plant species should be lined with root barrier membrane to prevent the transport or spillage of contaminated material on to the site. The barrier membrane should be covered with hardcore stone to prevent it becoming punctured. Once works have been completed, the root barrier material should be classed as contaminated and be disposed of to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier (if relevant) and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Vehicles with caterpillar tracks should not be used within the infested areas but may use trackway installed over the top of infested areas..
- Vehicles carrying contaminated spoil, which are leaving the area, should be covered to prevent contaminated material escaping, and either be confined to access routes protected by root barrier membranes, or be pressure washed *in situ*.
- A boot brush and wash will be provided for the cleaning of footwear when leaving the contaminated area.
- All machinery, equipment, footwear and clothing working in areas of invasive species infestation should be checked and washed down *in situ* to remove all plant fragments before leaving the site.

4.2.3 Temporary Construction Works

- A root barrier membrane should be placed around the site of the proposed works in areas which are within 10 m of any stands of non-native invasive plant species.
- All temporary construction works should only be carried out under direction of the ecological clerk of works responsible for overseeing the works.
- Excavated materials from areas that are contaminated (any areas within 7 m of a stand of non-native invasive plant species) should be placed on a root barrier membrane to prevent cross-contamination of the site.
- The excavated material should be covered and cordoned off from the rest of the site with appropriate signage in place.
- Stockpiled contaminated material and barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- Machinery used to excavate material must be cleaned *in situ* to prevent the accidental spread of contaminated material from the site.
- All contaminated spoil must remain on the site and should be returned to the same excavation from which it has been removed when the works are completed.
- Any soil samples removed from the site for testing should be disposed of as contaminated waste.
- Once construction works have been completed, all root barrier membranes from the works area and access tracks must be disposed of as contaminated waste to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Following completion of the works construction areas should be inspected by the ecological clerk of works for any evidence of spilt contaminated material.

4.3 Permanent Development Areas

This section covers permanent works areas, such as permanent access routes and tunnel head house locations and sealing end compounds. This is relevant for areas where eradication of invasive species is required and methods to prevent their spread are appropriate.

Although there are a number of options available for the control and treatment of invasive species, the majority require a number of years to be effective. The methods outlined below are those that may be most appropriate given the level of infestation and the timescales involved.

These methods are required for any works within 10m of any invasive species. The principals should be applied to any other work undertaken in close proximity of any non-native invasive plant species.

4.3.1 Responsibilities and Timescales

Responsibilities and liabilities for the treatment of invasive species at the site are to be agreed by the client, principal contractor and invasive-species contractor prior to treatment commencing. All parties are to be made aware of the risks and control procedures for dealing with invasive species on the site.

A programme of timescales for treatment and management as well as for construction of the project should also be agreed by the principal contractor, client and invasive-species contractor prior to works commencing.

4.4 Excavation and Disposal

Prior to and during any traffic entering the site, the following methods will be employed to prevent the spread of non-native invasive plant species.

4.4.1 Site Set Up – Access

- A suitable fence that can clearly be seen should mark out the areas of infestation. Signs should warn people working there that there is Japanese Knotweed, Montbretia, New Zealand Pigmyweed or Virginia-creeper contamination.
- An ecological clerk of works responsible for overseeing the Method Statement will be identified and will brief all site staff;
- Any site access tracks within 10m of any non-native invasive plant species should be lined with root barrier membrane to prevent the transport or spillage of contaminated material on to the site. The barrier membrane should be covered with hardcore stone to prevent it becoming punctured. Once works have been completed, the root barrier material should be classed as contaminated and be disposed of to a suitably licenced landfill site in accordance with waste Duty of Care. The waste carrier (if relevant) and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste.
- Vehicles with caterpillar tracks should not be used within the infested areas, unless confined to suitable access trackway.
- Vehicles leaving the area should either be confined to access routes protected by root barrier membranes, or be pressure washed *in situ*.
- A boot wash will be provided for the cleaning of footwear when leaving the contaminated area.
- All machinery, equipment, footwear and clothing working in areas of invasive species infestation should be checked and washed down *in situ* to remove all plant fragments before leaving the site.

4.4.2 Excavation

- Excavation of contaminated soil should include all areas within 7 m of the nearest above ground growth of any invasive non native plant species.
- Machinery used to excavate material must be cleaned *in situ* to prevent the accidental spread of contaminated material from the site.
- Stockpiled contaminated material and barrier fencing will be inspected daily to check suitability for use and any defects address immediately.
- Excavation should be to c. 3m depth for Japanese Knotweed and c. 0.5 m depth for all other invasive species, although in some cases, particularly for established stands, deeper excavations will be required. Final excavation depths should be agreed by the invasive species contractor in consultation with the principal contractor and ecological clerk of works.
- Following completion of the works construction areas should be inspected by the ecological clerk of works for any evidence of spilt contaminated material.

4.4.3 Disposal to Landfill

Contaminated waste taken off site must be taken by a licensed waste carrier to a suitably authorised landfill site (as per the Environmental Protection Act). The waste carrier and landfill site should be contacted several days in advance to check that they have the necessary facilities to transport and accept the waste. An experienced clerk of works will supervise excavation and disposal ensuring that the work is undertaken under controlled conditions and that appropriate health and safety measures are implemented.

4.5 Post-development Works

A programme of treatment may be required following completion of the works to prevent the spread of invasive species onto the site from untreated areas adjacent to the construction site. This should be conducted until no regrowth is observed. Discussion with the landowners for the adjacent land will be required to gain agreement for the treatment programme. It is the responsibility of National Grid to ensure post-construction treatment is carried out.

Treatment options include spraying the plants with an appropriate herbicide, but this may affect non-target plant species. The treatment chemical and most appropriate timescales for application should be identified by the invasive species contractor in consultation with the client and ecological clerk of works. These works should be carried out before the plants flower or set seed and may be required for up to or more than five years for successful control to be established.

Invasive plant species are susceptible to a range of herbicides including glyphosate, the active ingredient in products such as 'Roundup biactive' and 'Glyphos biactive'. While the more persistent chemicals containing active ingredients, such as Icade, are also effective, glyphosate has many properties which make it more suitable for use as part of this treatment programme. Many formulations of glyphosate are currently suitable for use in or near water; the product is deactivated by micro-organisms in soil; it doesn't

leach and it has low toxicity to animals. The biactive formulations of glyphosate are generally regarded as the most suitable.

Care must be taken to avoid drift onto non-target plants and lawns, and to apply the herbicide during suitable weather conditions. If there is risk to other plants, a weed wiper or stem injection should be used instead of a spray.

Natural Resource Wales must be contacted before using any herbicide in or near a stream or river to consult regarding any necessary approvals that may be required.

The person undertaking the spraying must hold a Certificate of Competence for herbicide use or should work under the direct supervision of a certificate holder. A COSHH assessment must be carried out for all activities involving herbicides.

Contractor qualifications and insurances should be obtained prior to works commencing and appended to this method statement. In addition, monitoring records (including photographs) should also be appended to this method statement to track the progress of the treatment at the site.

5 METHOD STATEMENT SIGN OFF

Declaration – by signing this document, I confirm that I have read and understood this document, and that I will comply with all measures detailed above.

NAME (PRINT)	ORGANISATION	SIGNATURE	DATE

6 REFERENCES

Defra (2013). Environmental management – guidance Prevent harmful weeds and invasive non-native plants spreading. <https://www.gov.uk/japanese-knotweedgiant-hogweed-and-other-invasive-plant>.

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RSK Environment Ltd (2018). *National Grid – Snowdonia Botanical Report REV01*

GB Non-native species secretariat ID guides:

Japanese Knotweed

<https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=369>

Japanese Knotweed (Welsh)

<https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=1231>

Montbretia

<https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=362>

New Zealand Pigmyweed

<https://secure.fera.defra.gov.uk/nonnativespecies/downloadDocument.cfm?id=360>

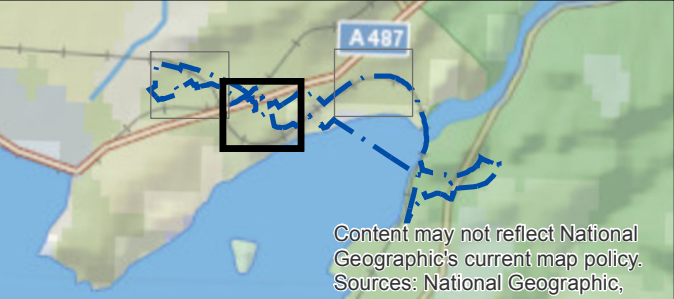
7 FIGURES

Figure 1 – Invasive Species Location Map



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Overview



Legend

- Ecological Survey Area
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Existing National Grid Pylon to be Removed
- Invasive Plant Species Areas

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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00	First Draft	NH	WH	SR	20/09/2019
Rev	Description	Cre'd	Chk'd	App'd	Date

nationalgrid

Master Scheme No:	Sub-Scheme No:	Site:
-	-	Snowdonia VIP

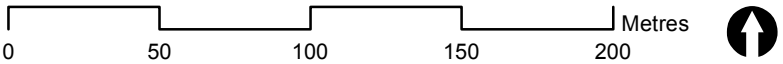
Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

Document Title:

Figure 1:
Invasive Species Location Map

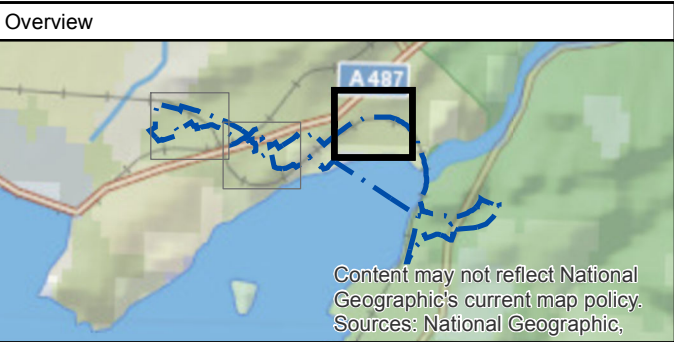
Created by:	Date:	Checked by:	Date:	Approved by:	Date:
N.Hogben	20/09/2019	W.Holden	20/09/2019	S.Rotherham	20/09/2019
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National Grid Document Number:
-
FEED Document Number:
-





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



- Legend**
- Ecological Survey Area
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Existing National Grid Pylon to be Removed
 - Invasive Plant Species Areas

Source:
Ecology: RSK, 2016.
Study Area: AECOM, 2015, edited Mott MacDonald March 2016.

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00	First Draft	NH	WH	SR	20/09/2019
Rev	Description	Cre'd	Chk'd	App'd	Date

Master Scheme No:	Sub-Scheme No:	Site:
-	-	Snowdonia VIP

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

Document Title:
Figure 1:
Invasive Species Location Map

Created by:	Date:	Checked by:	Date:	Approved by:	Date:
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Development Eng:	Document Type:	Scale:	Format:	Sheet(s):	Rev:
-	.mxd	1:2,500	A3	3 of 3	00

National Grid Document Number:
-

FEED Document Number:
-

Appendix 6:

Outline Peat Management Plan

VISUAL IMPACT PROVISION (VIP) PROJECT - SNOWDONIA

Peat Depth Survey

DECEMBER 2019



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VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
01	13 February 2019	Bruce Lascelles			
02	02 December 2019	Bruce Lascelles			Updated based on additional survey results

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2	METHODOLOGY	2
3	RESULTS	2
4	SUMMARY	4

FIGURES

Figure 1: Ditch network plan
Figure 2: Peat depth plan
Figure 3: Total soft sediment depth plan

APPENDICES

APPENDIX A

Peat depth data

APPENDIX B

Auger descriptions and images

1 Introduction

- 1.1 Following the results of a landscape and visual impact assessment in 2014, covering all of the overhead line (OHL) within the scope of the Visual Impact Provision (VIP) Project, those sections of OHL which had the greatest visual impact on the surrounding landscape were identified.
- 1.2 This includes a section in Snowdonia (OHL 4ZC) which runs from National Grid's existing Garth Sealing End Compound (SEC) near Minffordd (to the east of Porthmadog) across the Dwyryd Estuary where it enters the western edge of the Snowdonia National Park. It then continues past the small settlement of Cilfor. This section is approximately 3km in length.
- 1.3 At the eastern end the land is predominantly under agricultural use. To the west of the A496 the land is under improved pasture. To the east of the road the land is significantly wetter in the low-lying areas and is under rough grazing.
- 1.4 Initial site investigation work undertaken identified the presence of peat to the east of the A496 in BH124/125 and TP105/106/107 as shown in the map extract below. These will correspond approximately to the locations highlighted on the aerial photograph below.



- 1.5 In BH124 peat to a depth of 1.4m was recorded. In BH125 the peat depth recorded was 1.2m. In the trial pits the recorded depth was approximately 0.7m. The peat was described as soft dark brown and fibrous with frequent plant roots and plant fibres visible.
- 1.6 It is anticipated that the A496, which runs on a raised causeway, is likely to be affecting groundwater levels to the east of the road and may at least in part a causation factor in the accumulation of peat at this location.
- 1.7 A site walkover undertaken confirmed that the extent of the peat body will also be constrained on the southern, eastern and north-western sides by rising ground levels.
- 1.8 In order to assess the full extent and depth of peat and support the development of appropriate mitigation measures a peat depth survey was undertaken as detailed below.

2 Methodology

- 2.1 An initial peat depth survey was undertaken in January 2019. The information collected was used to inform aspects of the design, in particular the proposed access route. Following a site meeting with consultees on the 30th September 2019 further information on peat depth was requested for the proposed tunnel head house footprint and the proposed access track footprint. A further peat depth survey was undertaken in November 2019 focused on recording peat depth. The results of both surveys are presented together in this report.
- 2.2 The thickness of the peat was assessed using a graduated glass fibre peat probe which could be extended to up to 5m depth. The probe was pushed vertically into the ground and the depth of peat recorded.
- 2.3 The coordinates of each probe point were collected using a handheld Global Positioning System instrument (GPS).
- 2.4 The actual peat depth was determined through the feel of the probe as it is pushed through the ground. The base of the peat, and the nature of the underlying material, was recorded based on the following scenarios:
 - Solid and abrupt refusal – rock;
 - Solid but less abrupt refusal with grinding or crunching sound – sand or gravel;
 - Rapid and firm refusal – clay; and
 - Gradual refusal – dense peat or soft clay
- 2.5 Peat probing locations are shown on Figure 2 (each dot representing a probe location). There were a number of limitations to where probing could be undertaken as follows:
 - Limited probing was permitted underneath or within 10m of the OHL (note on Figure 2 the aerial is not from directly above and so points appear to be under the OHL);
 - There were areas of dense vegetation which restricted access;
 - In some locations the ground was too soft to safely continue; and
 - No crossing of the ditches was permitted and routes around had to be determined.
- 2.6 In addition, because of the presence of soft mineral sediment underlying the peat it was not always possible to feel the peat base accurately. As such, at each probe location the auger was also used to provide a visual check of the actual thickness of the peat layer. Where the auger did not reach the peat base and it was not possible to accurately determine peat depth through probing the thickness of the peat layer was recorded as >1m.
- 2.7 It is considered that sufficient coverage was achieved to provide an understanding of the ground conditions across the survey area.
- 2.8 The survey was undertaken by two surveyors so there was no lone working. A full Risk Assessment Method Statement was produced in advance of the works being undertaken.
- 2.9 The site and associated ditch network is shown on Figure 1. Figure 2 shows the peat depth readings and an interpolated plot of peat depths across the site. Figure 3 shows the total depths of soft sediment (i.e. peat and mineral sediments) present. The interpolations were undertaken using the topo to raster function within ArcMap.

3 Results

- 3.1 The survey area comprises flat, low lying land bounded to the west by the A496 and by rising ground to the east and south. This can be seen in Image 1 below.

3.2 The flat ground is likely to have been part of the wider estuary in the past and the Site Investigation work mapped the sediments as tidal flat deposits.

3.3 In these environments the sediment stratigraphy can be complex, relating to differing phases of sediment deposition. As flow paths through the estuary change some areas may become relatively stable (low energy), with sediment deposition occurring and vegetation establishment. If the area remains stable for long enough peat can then build up.

3.4 There is also the potential for remobilisation of materials and mixing of organic and mineral materials. As detailed below it is notable that some of the mineral sediments are dark in colour due to a higher organic matter content.

3.5 The nature of the catchment upstream (upland with likely highly variable flows and sediment erosion and transport) is likely to have resulted in significant quantities of mineral material being available for deposition in this estuary and will explain the recording from the Site Investigation of thick deposits of clay, silt and sand.



Image 1: view to the north-east across the site

3.6 The flat areas include a number of drainage ditches (shown on Figure 1), which were all flooded at the time of the survey. It is assumed these were dug in attempts to lower groundwater levels across the site. However, it is likely that the A496, which runs on a raised bund at its lowest point, is to some extent a restriction on drainage, with the main water flow to the west being via the main stream and the culvert under the road. As such, the current invert of the culvert will be an important controlling factor in relation to water levels across the wetland area.

3.7 Within the central area of the site (where there is tree and scrub growth) there was extensive surface water present at the time of the survey. Whilst the survey was undertaken in winter it was during a relatively dry period, suggesting that this area does not drain rapidly.

3.8 Figure 2 shows the mapped distribution of peat across the survey area. The greatest depths of peat were found along the southern, eastern and northern extents of the survey area, with peat becoming progressively shallower towards the stream running parallel to the road (to the north) and as the land rises to the south and south-east.

3.9 As expected, peat becomes shallower and disappears as the topography rises (see Image 1 above). The linear nature of the deeper deposits is potentially explained by this being an old flow path which, once water started to flow along a different path became a stable environment for the built up of peat. The inclusion of organic-rich mineral sediments below the surface peat potentially represents flood events resulting in the deposition of mineral material and mixing with the peat during the build up of sediments in these locations.

3.10 The most extensive area of peat is located in the northern part of the survey area where the valley narrows, with peat depths of >1m recorded more continuously with a few exceptions.

3.11 Using the peat depth data, the volumes of peat potentially lying under the footprint of the eastern tunnel head house have been calculated and are shown on Figure 2. This shows there is potentially

approximately 4,230m³ of peat present underneath the footprint. This is based on point data and interpolation; actual volumes will only be known once the peat has been excavated.

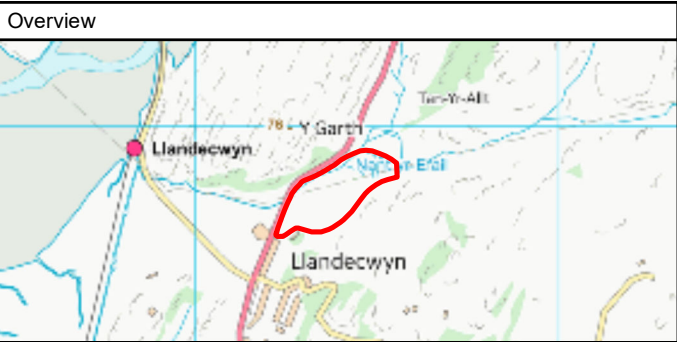
- 3.12 Figure 3 presents details of the total depth of soft sediment recorded. As discussed above there will have been an accumulation of mineral sediments across the estuary comprising sand, silt and clay. The augering confirmed the presence of organic-rich silts overlying clay. The probing indicated the likely presence of coarser sediments underlying some of the silts and clays as was expected from the Site Investigation results.

4 Summary

- 4.1 The peat and sediment depth survey undertaken has provided a greater understanding of the distribution and depth of the peat resource and of the underlying material.
- 4.2 The extent of peat is limited to a linear feature running parallel with the southern and eastern boundary of the survey area, potentially representing an old channel within which peat has built up. Elsewhere the peat is very shallow overlying mineral sediments (generally silt and clay overlying sands).
- 4.3 The fine nature of the sediments present, the flat topography and the restricted drainage towards the estuary result in an area of wetland that is likely to remain wet for large parts of the year. A significant control on water levels is likely to be the current invert level of the culvert under the A496.
- 4.4 Potential volumes of peat underlying proposed construction footprints have been calculated based on the survey data. It should be noted that the actual volumes may differ and will only be known once the peat has been excavated.

FIGURES

Figure 1: Ditch network plan



Legend

- Survey Area
- Overhead_Powerline
- Existing Ditches
- Stream
- Wetland Area

Source:
ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

P01	FOR INFORMATION	RG	PC	EH	30/01/2019
Rev	Description	Cre'd	Chk'd	App'd	Date



Master Scheme No:	Sub-Scheme No:	Site:
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Scheme Name:
400kV Visual Impact Provision - Snowdonia

Document Title:
Figure 1: Ditch network locations

Created by: R.Grubb	Date: 30/01/2019	Checked by: P.Cox	Date: 30/01/2019	Approved by: E.Hargreaves	Date: 30/01/2019
Development Eng: C. Carr	Document Type: -	Scale: 1:1,250	Format: A3	Sheet(s): 1 of 1	Rev: P01

National Grid Document Number:
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XX

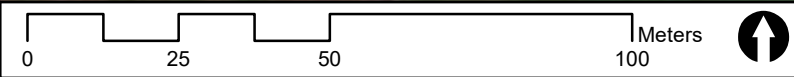
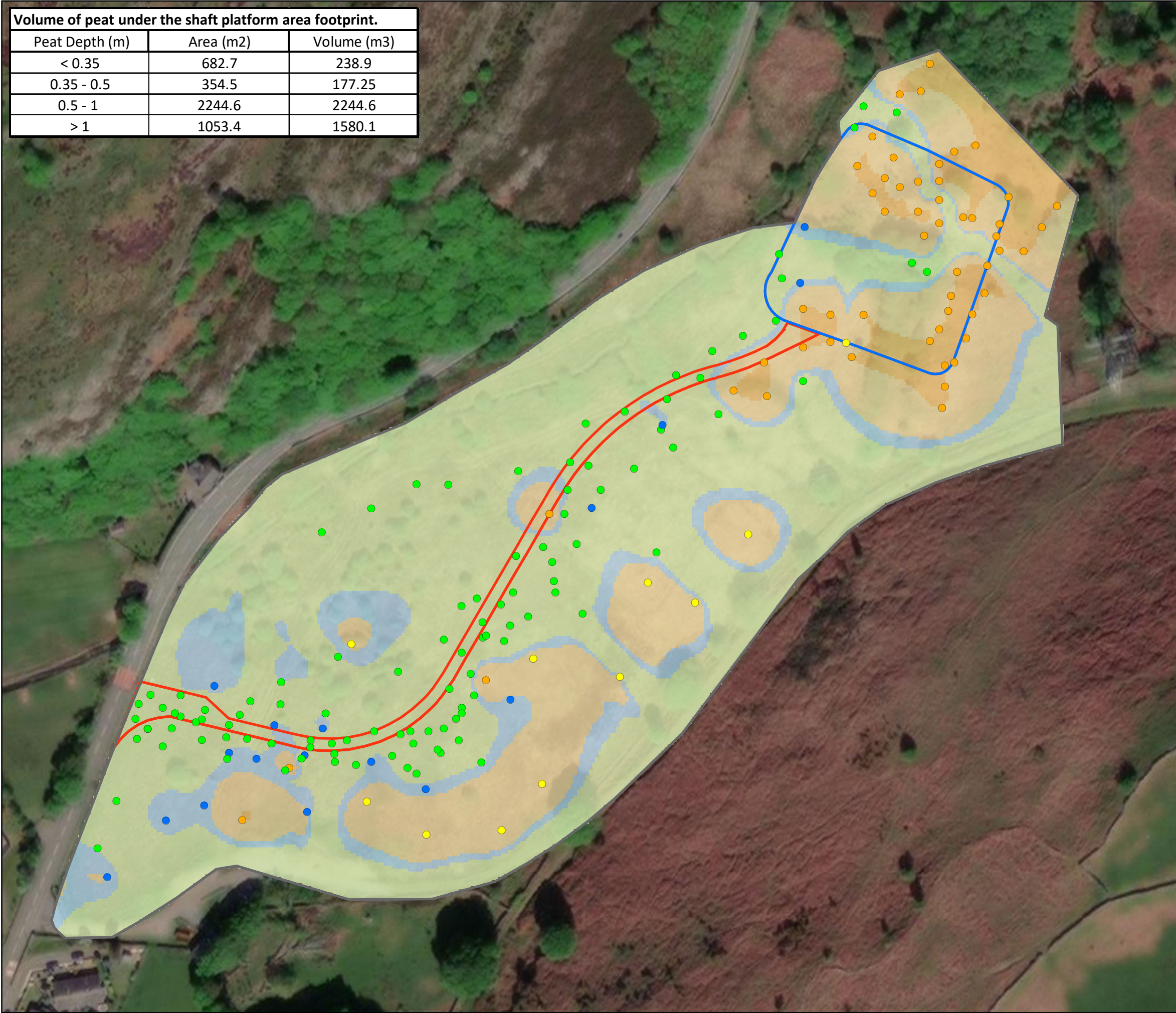
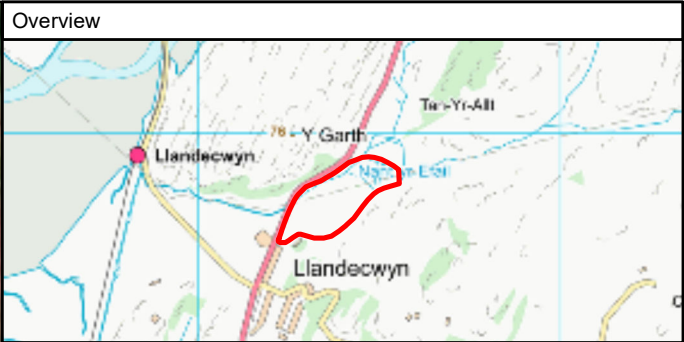


Figure 2: Peat depth plan



Volume of peat under the shaft platform area footprint.		
Peat Depth (m)	Area (m2)	Volume (m3)
< 0.35	682.7	238.9
0.35 - 0.5	354.5	177.25
0.5 - 1	2244.6	2244.6
> 1	1053.4	1580.1



Legend

Shaft Platform Area

Access Track

Peat Depth

0 - 35cm

36 - 50cm

51 - 100cm

> 100cm

Peat Depth (m)<0.35m0.35 - 0.5m0.5 - 1m>1mSource:
ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User CommunityService Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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P01	FOR INFORMATION	AH	EH	BL	29/11/2019
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Master Scheme No:	Sub-Scheme No:	Site:
-	-	-

Scheme Name:
400kV Visual Impact Provision - Snowdonia

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Figure 2: Peat Depth Plan

Created by: A.Hankinson	Date: 29/11/2019	Checked by: E.Hargreaves	Date: 29/11/2019	Approved by: B.Lascelles	Date: 29/11/2019
Development Eng: C. Carr	Document Type: -	Scale: 1:1,255	Format: A3	Sheet(s): 1 of 1	Rev: P01

National Grid Document Number:
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FEED Document Number:
XX

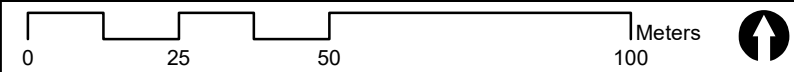
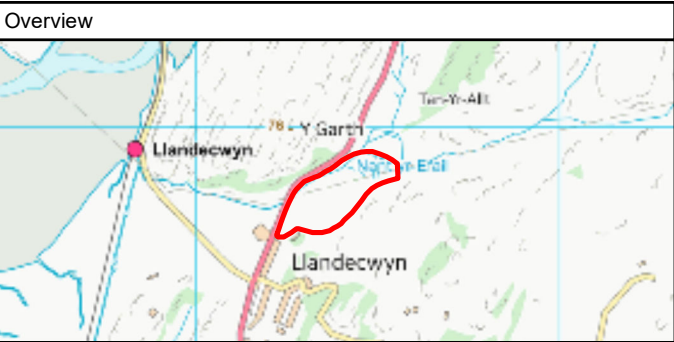


Figure 3: Total soft sediment depth plan



Legend

Survey Area

Depth Locations - Total Soft Sediment Depth

- 0 - 35cm
- 36 - 50cm
- 51 - 100cm
- 101 - 150cm
- 151 - 300cm

Source:
ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

P01	FOR INFORMATION	RG	PC	EH	30/01/2019
Rev	Description	Cre'd	Chk'd	App'd	Date



Master Scheme No:	Sub-Scheme No:	Site:
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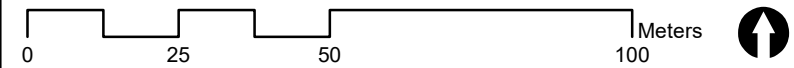
Scheme Name:
400kV Visual Impact Provision - Snowdonia

Document Title:
Figure 3: Total Soft Sediment Depth Plan

Created by: R.Grubb	Date: 30/01/2019	Checked by: P.Cox	Date: 30/01/2019	Approved by: E.Hargreaves	Date: 30/01/2019
Development Eng: C. Carr	Document Type: -	Scale: 1:1,250	Format: A3	Sheet(s): 1 of 1	Rev: P01

National Grid Document Number:
XX

FEED Document Number:
XX



APPENDIX A

Peat depth data

ID	GPS_ID	X	Y	Stop_depth	Clay_depth	Probing comments	Auger comments
103	GS0103	262235.6	337722.7	2.5	0.5	0 -1.75m firm and smooth. 1.75-2.5m more resistance, gritty/silty	
104	GS0104	262255.1	337741.4	1.8	0.5	0-1.6m firm and smooth. 1.6-1.8m more resistance, gritty/silty	
105	GS0105	262275.4	337761.9	1.9	0.35	0-1.0m firm and smooth. 1.0-1.9m more resistance, gritty/silty	
106	GS0106	262271.1	337786.0	1.75	0.4	0-0.7m firm and smooth. 0.7-1.75m more resistance, gritty/silty	
107	GS0107	262316.5	337799.8	1.7	0.55	0-1.0m firm and smooth. 1.0-1.7m very resistance, gritty/silty	
108	GS0108	262352.9	337812.4	1.6	0.2	0-1.3m firm and smooth. 1.3-1.6m more resistance, gritty/silty	
109	GS0109	262383.5	337820.6	1.6	0.35	Firm silty stop	0-0.35m mostly organic matter with lots of fibrous materials. 0.35-1.0m grey - predominantly clay
110	GS0110	262417.5	337830.2	1.6	0.3	Firm silty stop	0-0.3m drier organic material (past the gully). 0.30-1.0m smooth grey predominantly clay with some fibrous material
111	GS0111	262447.8	337836.1	2.25	0.9	Firm silty stop	Core is much drier with a band of light brown soil between 0.15-0.3m. 0-0.9m predominantly organic material, then clay 0.9-1.0m. 0.75-0.9 transitional material between clay and brown organic matter
112	GS0112	262430.2	337813.5	1.7	0.7		0-0.25m dark brown, predominantly organic material. 0.25-0.7 core transitions into clay with a lighter brown material with more clay texture. 0.7-1.0m grey clay. Less vegetation and fibrous material present
127	GS0127	262379.5	337753.5	2	0.9		0-0.9m predominatly organic matter, core was dark brown in colour with fibrous materials throughout and a band of reddish soil. 0.9-.0m grey clay.
128	GS0128	262366.2	337738.2	2	0.9		0.0.9m dark brown material with lots of reeds, grass and fibrous materials. At 0.7m large chunks of wood. 0.9-1.0m clay
129	GS0129	262341.3	337736.8	1.9	0.9	Silty layer at 1.9	0-0.9 dark organic matter. 0.9-1.0m clay
130	GS0130	262321.6	337747.6	2	0.7		0-0.25m dark brown organic matter with roots.0.25-0.7m large band of mixed organic matter and clay - pale brown. 0.7-1.0m pale grey clay
131	GS0131	262301.8	337744.2	2.3	0.5	Land had been altered and flattened.	0-0.3m dark organic matter, 0-0.1m compact and dry. 0.3-0.5m transitional clay and organic matter mix. 0.5-1.0m predominatly clay
132	GS0132	262280.4	337741.6	1.2	1	Vegetation changed - patches of dead bracken and the remains of 2 dead sheep. Lots of rocks near the surface. Next to attempted access track.	0-0.1 dark wet organic matter. 0.1-0.3 band of clay. 0.3-0.4 dark organic matter, not clay. 0.4-0.7 transitional material, mixture of organic matter and clay
141	GS0141	262267.7	337746.4	2.8	0.4		
142	GS0142	262294.6	337757.9	1.8	0.25	1.6m silt	Large transition between mostly organic matter to clay. 0.75m vey pale grey clay
143	GS0143	262310.8	337763.5	1.9	0.25		
144	GS0144	262332.7	337769.9	2.3	0.3	Very wet area	
145	GS0145	262351.1	337775.0	1.9	0.3		
146	GS0146	262369.1	337781.4	2	0.4	1.35m resistant band of silt	
147	GS0147	262376.7	337795.0	1.8	0.65	Silt at approx. 1.2m	
148	GS0148	262359.9	337807.0	1.9	0.2		
149	GS0149	262347.0	337801.3	1.8	0.28	1.0m resistant band	
150	GS0150	262332.0	337790.6	1.9	0.15	Surrounded by trees. 1.5m silt	
151	GS0151	262312.0	337795.5	1.9	0.3	Surrounded by trees in an open grassy area 1.5m silt	
152	GS0152	262293.2	337787.1	1.85	0.35	Edge of trees. 1.5m silt	Sharp boundary between mud and clay
153	GS0153	262279.5	337776.3	2.15	0.3	Open area. 1.5m silt	
154	GS0154	262306.7	337836.8	>3.0	0.05	Drier ground. 1.9m silt	All clay, not much vegetation or fibrous matter within core
155	GS0155	262323.1	337844.7	1.4	0.05	More vegetation present within the core. At 20cm the materials were foul smelling - suspected man made material (building aggregate?)	0-0.05m predominantley organic matter. 0.05-0.1 grey clay. 0.1-0.15 predominately organic matter. 0.15-0.35 clay. Core couldn't be taken any deeper - ground too firm. Fibrous materials present throughout core
156	GS0156	262348.5	337852.6	2	0.1	Wetter ground with reeds and grass	0-0.1 clay. 0.1-1.0m organic soil with some fibrous materials and roots (vegetation not as dense as previous core
157	GS0157	262338.0	337852.8	1.3	0.25	1.0 resistant layer. 0.25 foul smelling material - suspected building aggregate, possibly associated with pylon or road construction	0-0.25 predominatley organic material. 0.25-0.50 clay (foul smelling). Core could not be taken past 0.5 - ground too firm
158	GS0158	262371.7	337857.1	1.9	0.25	Ground was dry with grass and some reeds. When peat probe was pulled out it had very watery clay residue on it	0-0.25 organic material. 0.25-0.5m foul smelling clay. Core could not be taken past 0.5 - ground too firm
159	GS0159	262388.9	337860.0	2	0.25	Dry ground	Sharp boundary between mud and clay
160	GS0160	262419.5	337872.3	2.55	0.4	Wet ground	Sharp boundary between mud and clay
165	GS0165	262238.7	337748.0	1.6	0.15		Large clay transition area
166	GS0166	262232.5	337732.2	1.6	0.35		
167	GS0167	262245.5	337768.5	1.9	0.2		
168	GS0168	262281.9	337768.5	1.65	0.3		
169	GS0169	262302.9	337765.7	1.9	0.2		
170	GS0170	262330.0	337762.8	2.7	0.3	Surface layer of moss and reeds floating on a vet/unstable layer below	
171	GS0171	262341.1	337751.8	3	0.4	In rectangular access track. Ground was wet and firm	
174	GS0174	262359.5	337760.7	1.85	0.35	Ponded area with leafy vegetation	
175	GS0175	262361.1	337802.7	1.5	0.2	Waterlogged ground with reeds and fresh shoots	
176	GS0176	262393.0	337809.9	2.2	0.25	Sphagnum moss, reeds and a small tree (within approx. 3m)	Large transition between mostly organic matter to clay

178	GS0178	262405.4	337788.9	3	0.55	Sphagnum moss in area surrounded by bushes. Sulphurous smell when probed and cored.	
179	GS0179	262414.6	337820.2	1.9	0.8	Drier ground - past the gully	
181	GS0181	262466.5	337937.9	1	0.5	Building aggregate at 1.0m	
182	GS0182	262465.1	337919.4	1	0.4	Building aggregate at 1.0m	
183	GS0183	262480.2	337899.5	2.7	0.7		
	GPS0003	262246	337780	2.3	0.2		
	GPS0004	262245	337775	1.3	0.15		
	GPS0005	262250	337783	0.6	0.15		
	GPS0006	262254	337766	1.75	0.1		
	GPS0007	262257	337772	0.7	0.22		
	GPS0008	262258	337777	1.75	0.19		
	GPS0009	262265	337774	1.5	0.08		
	GPS0010	262268	337778	1.8	0.13		
	GPS0011	262267	337768	1.65	0.08		
	GPS0012	262276	337773	1.8	0.11		
	GPS0013	262275	337769	1.65	0.1		
	GPS0014	262283	337781	2.2	0.11		
	GPS0015	262293	337780	1.7	0.1		
	GPS0016	262291	337773	1.65	0.4		
	GPS0017	262290	337767	1.7	0.3		
	GPS0018	262301	337763	2	0.45		
	GPS0019	262303	337768	1.6	0.12		
	GPS0020	262307	337772	1.8	0.4		
	GPS0021	262308	337777	1.8	0.32		
	GPS0022	262300	337762	2.3	0.1		
	GPS0023	262310	337767	2.85	0.15		
	GPS0024	262315	337768	1.9	0.05		
	GPS0025	262318	337760	1.6	0.14		
	GPS0026	262324	337771	1.6	0.15		
	GPS0027	262337	337767	1.9	0.08		
	GPS0028	262338	337757	1.5	0.21		
	GPS0029	262336	337771	1.9	0.2		
	GPS0030	262342	337771	1.95	0.27		
	GPS0031	262345	337765	1.85	0.12		
	GPS0032	262347	337772	1.7	0.15		
	GPS0033	262352	337768	1.8	0.07		
	GPS0034	262353	337777	2.1	0.09		
	GPS0035	262349	337785	1.7	0.1		
	GPS0036	262356	337790	1.5	0.2		
	GPS0037	262353	337797	1.4	0.06		
	GPS0038	262360	337802	1.5	0.08		
	GPS0039	262358	337815	1.9	0.18		
	GPS0040	262366	337813	2	0.11		
	GPS0041	262369	337806	1.5	0		
	GPS0042	262370	337817	1.6	0.19		
	GPS0043	262371	337829	2.1	0.03		
	GPS0044	262383	337827	1.55	0.21		
	GPS0045	262380	337832	2.2	0.05		
	GPS0046	262382	337843	1.8	>1		
	GPS0047	262388	337851	2	0.35		
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	GPS0062	262475	337900	1.6	>1		
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	GPS0064	262459	337921	2.45	0.15		
	GPS0065	262458	337929	1.2	0		
	GPS0066	262466	337887	2.9	0.21		
	GPS0067	262454	337882	0.07	>1		
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GPS0097	262496	337961	2.1	>1
GPS0098	262504	337953	2.4	>1
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GPS0105	262539	337930	2.9	>1
GPS0106	262545	337938	2.8	>1
GPS0107	262550	337945	2.5	>1
GPS0108	262534	337948	3	>1
GPS0109	262531	337939	3.1	>1
GPS0110	262531	337930	3.2	>1
GPS0111	262527	337925	3.1	>1
GPS0112	262526	337916	1.9	>1
GPS0113	262522	337909	2.1	>1
GPS0114	262520	337901	1	>1
GPS0115	262516	337893	2	>1
GPS0116	262513	337885	2.5	>1
GPS0117	262512	337878	1	>1
GPS0118	262513	337892	3.3	>1
GPS0119	262508	337900	2	>1
GPS0120	262511	337904	1.35	>1
GPS0121	262514	337910	3	>1
GPS0122	262515	337915	2.8	>1
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GPS0127	262511	337939	2.6	>1
GPS0128	262504	337943	2	>1
GPS0129	262493	337943	3	>1
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GPS0131	262484	337958	1.5	>1
GPS0132	262493	337954	2.4	>1
GPS0133	262498	337951	3	>1
GPS0134	262511	337953	2.8	>1
GPS0135	262519	337941	3.2	>1
GPS0136	262466	337898	2.5	>1
GPS0137	262453	337893	1.5	>1
GPS0138	262443	337884	2.2	>1
GPS0139	262249	337772	2.4	0.27
GPS0140	262249	337772	1.5	0.12
GPS0141	262260	337783	1.9	0.32
GS0103	262235.6	337722.7	2.5	0.5
GS0104	262255.1	337741.4	1.8	0.5
GS0105	262275.4	337761.9	1.9	0.35
GS0106	262271.1	337786	1.75	0.4
GS0107	262316.5	337799.8	1.7	0.55
GS0108	262352.9	337812.4	1.6	0.2
GS0109	262383.5	337820.6	1.6	0.35
GS0110	262417.5	337830.2	1.6	0.3
GS0111	262447.8	337836.1	2.25	0.9
GS0112	262430.2	337813.5	1.7	0.7
GS0127	262379.5	337753.5	2	0.9
GS0128	262366.2	337738.2	2	0.9
GS0129	262341.3	337736.8	1.9	0.9
GS0130	262321.6	337747.6	2	0.7
GS0131	262301.8	337744.2	2.3	0.5
GS0132	262280.4	337741.6	1.2	>1
GS0141	262267.7	337746.4	2.8	0.4
GS0142	262294.6	337757.9	1.8	0.25
GS0143	262310.8	337763.5	1.9	0.25
GS0144	262332.7	337769.9	2.3	0.3
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GS0146	262369.1	337781.4	2	0.4
GS0147	262376.7	337795	1.8	0.65
GS0148	262359.9	337807	1.9	0.2
GS0149	262347	337801.3	1.8	0.28
GS0150	262332	337790.6	1.9	0.15
GS0151	262312	337795.5	1.9	0.3
GS0152	262293.2	337787.1	1.85	0.35
GS0153	262279.5	337776.3	2.15	0.3
GS0154	262306.7	337836.8	>3.0	0.05
GS0155	262323.1	337844.7	1.4	0.05
GS0156	262348.5	337852.6	2	0.1
GS0157	262338	337852.8	1.3	0.25
GS0158	262371.7	337857.1	1.9	0.25
GS0159	262388.9	337860	2	0.25
GS0160	262419.5	337872.3	2.55	0.4
GS0165	262238.7	337748	1.6	0.15
GS0166	262232.5	337732.2	1.6	0.35
GS0167	262245.5	337768.5	1.9	0.2
GS0168	262281.9	337768.5	1.65	0.3
GS0169	262302.9	337765.7	1.9	0.2

	GS0170	262330	337762.8	2.7	0.3		
	GS0171	262341.1	337751.8	3	0.4		
	GS0174	262359.5	337760.7	1.85	0.35		
	GS0175	262361.1	337802.7	1.5	0.2		
	GS0176	262393	337809.9	2.2	0.25		
	GS0178	262405.4	337788.9	3	0.55		
	GS0179	262414.6	337820.2	1.9	0.8		
	GS0181	262466.5	337937.9	1	0.5		
	GS0182	262465.1	337919.4	1	0.4		
	GS0183	262480.2	337899.5	2.7	0.7		

APPENDIX B

Auger descriptions and images

PEAT STRATIGRAPHY RECORDING

ID	A1				
Vegetation present (height / type)	Reeds - approx. 80cm and patches of sphagnum moss.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Roots, grass, reeds	Light brown		
10	Y	Reeds, roots, grass	Reddish brown		
25	Y	Mostly fibres and roots.	Red-dark brown		
50	Y	Mostly fibres and roots.	Grey brown		
65	Y	Fibrous material.	Grey		Predominantly clay
95					

ID	A2				
GPS reading					
Vegetation present (height / type)	Predominantly grass with patches of Sphagnum moss and reeds.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Reeds, roots, grass	Dark brown		Unconsolidated. Moist - when squeezed brown water came out
10	Y	Reeds, roots, grass	Lighter brown	Fragment of slate	
30	Y	Mostly fibres and roots	Brown		
50	Y	Fibrous material	Grey -brown		A mixture of organic and mineral material - similar texture to clay

ID	A3				
Vegetation present (height / type)	Reeds - approx. 80cm with small areas of grass.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Dense amount of - reeds, roots, small amount of bark and grass.	Brown soil		More organic matter (fibers, reeds and roots) than other locations
25	Y	Reeds and roots.	Grey-brown		Denser - a transitional layer with a mixture of organic and mineral material
35	Y	Mostly fibres and roots.	Grey		Predominantly clay, dark streaks of mineral matter within the pale clay

ID	A4				
Vegetation present (height / type)	Reeds, grass and small patches of sphagnum moss. Leaf litter.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Very dense - reeds, roots and grass	Dark brown		Very moist
10	Y	Very dense - reeds and roots.	Brown		Predominately organic material with some mineral matter, considerably firmer than the first layer
40	Y	Less dense than the top 40cm, still containing reeds and roots.	Pale grey		Clay

ID	A5				
Vegetation present (height / type)	Reeds, grass and leaf litter.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Dense (progressively less in the lower layers) - reeds, roots and grass	Dark brown		
30	Y	Mostly fibres and roots.	Grey-brown		Transitional layer of a mixture of organic materials and clay
55	Y	Less dense - mostly fibrous material	Pale grey		Clay
80					Bottom 20cm of core was lost when extracting

ID	A6				
Vegetation present (height / type)					
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	High density of roots, fibers and reeds	Dark brown		Moist, soft, unconsolidated.
5	Y	Mostly fibres and roots	Brown		Tranistional material with a mixture of organic and mineral materials.
20	Y	Lower density - mostly fibres and roots	Pale brownny-grey		Predominatly mineral matter. Very wet at the bottom of the layer
55	Y	Fibres	Light brown		Very wet
65					Last 35cm were not recoverable

ID	A7				
Vegetation present (height / type)	Dry long grass (approx. 50cm) and some reeds				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Lots of fibrous materials - reeds and roots	Dark brown		Damp, more consendebds top layer than other cores
15	Y	Lots of fibrous materials	Browny red		Drier
30	Y	Some fibrous materials			
70	Y	Lower density of fibrous materials	Dark brown-grey		Texture of clay, however much darker and browner than other clay layers at similar depths

ID	A8				
Vegetation present (height / type)	Dry long grass/reeds (approx. 50cm) and some reeds.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Fibrous materials and roots	Dark brown		Drier, dense layer of organic material
30	Y	Fibrous material	Brown		Intermediate layer - brown in colour but with the texture of clay
70	Y	Lower density of fibrous material	Pale grey-brown		

GPS reading	A9				
Vegetation present (height / type)	Sphagnum moss, grass and a mixture of live and dry reeds.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	Lots of fibrous material and roots throughout the 90cm. At 70cm there was a high density of woody vegetation	Dark brown		Damp
90					Last 10cm could not be cored, suspected change in material from probing at approx 1m (clay)

ID	A10				
Vegetation present (height / type)	Predominantly grass, surrounded by reeds.				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	High density of fibrous materials and roots	Dark brown		
25	Y	Low density of fine roots	Pale brown		Band of dense clay
30	Y	Fibrous materials and roots	Brownish-grey		Transitional layer between organic material and clay/mineral material
70	Y	Lower density of fibrous materials and roots	Pale grey		Predominantly clay, with streaks of darker mineral matter

ID	A11				
Vegetation present (height / type)	Dried/dead bracken area with small patches of grass and sphagnum moss and dried reeds				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
0	Y	High density of roots and fibrous materials	Dark brown		Compacted/dense and dry
10	Y	Roots and fibrous materials	Brown - mixed darker and lighter areas		Compact - organic materials
30	Y	Roots and fibrous materials	Light brown		Transitional layer with a mixture of organic and mineral materials
75	Y	Lower density - fibrous materials	Dark grey		Predominantly mineral/clay - darker grey than other mineral layers at similar depths

ID	A12				
Vegetation present (height / type)	Reeds				
Depth below ground surface the layer starts (cm)	Plant remains visible (Y/N)	Description of what is visible (e.g. leaves, stems, fibrous material)	Colour description	Any other materials visible (e.g. beetle wing cases, wood fragments) - description	Comments
5	Y	Fibrous materials, reeds and roots	Brown		Organic material
10	N		Pale grey		Mineral/clay material
15	Y	Roots and fibrous materials.	Brown		At 20cm foul smelling material - suspected building aggregate
35					Couldn't retrieve the rest of the core, ground too firm

A3



A7



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Appendix 7:

Dust Risk Assessment

VISUAL IMPACT PROVISION (VIP) SNOWDONIA PROJECT

Dust Risk Assessment

FEBRUARY 2020



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VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
V1	21/11/2019	E.Hassall	H.Dennett	Kate Tomos	

This report dated 11 October 2019 has been prepared for National Grid (the “Client”) in accordance with the terms and conditions of appointment dated 08 February 2018(the “Appointment”) between the Client and **Arcadis (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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1 Introduction

Arcadis was commissioned to undertake a dust risk assessment for the National Grid Visual Impact Provision (VIP) Snowdonia Project (hereon referred to as the “Proposed Project”) to determine site specific mitigation measures to mitigate potential dust effects associated with the construction of the Proposed Project.

National Grid is proposing to underground a section of the 4ZC overhead line (OHL) within a tunnel, aiming to mitigate the visual impact of existing electricity infrastructure within Snowdonia National Park, near Minffordd.

There are two above ground compounds from which shaft and tunnel construction will take place. Access to the western construction compound is from a B road from the A497 to the west of Minffordd; access to the eastern end is via the A496.

A full project description is provided in Chapter 2 of the Environmental Appraisal prepared for the Proposed Project in support of an application for planning permission.

The Proposed Project is not located in an Air Quality Management Area (AQMA) and there are no AQMAs within the surrounding area of Gwynedd.

2 Legislation

When of sufficient scale and frequency, dust may become a statutory nuisance. The relevant legislation dealing with statutory nuisance is given in Part III of the Environmental Protection Act 1990 (Ref 1). A statutory nuisance in relation to dust and deposits is defined under Section 79 of the act as follows:

“...any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance” or “any accumulation or deposit, which is prejudicial to health or a nuisance...”

Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Local Authority is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

3 Methodology

There is the potential for fugitive dust emissions to occur as a result of construction phase activities associated with the Proposed Project. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management’s (IAQM) ‘Guidance on the Assessment of Dust from Demolition and Construction’ (Ref 2).

Activities associated with the construction phase of the Proposed Project have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and,
- Trackout.

The potential for dust emissions have been assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to particulate matter less than 10 microns in diameter (PM₁₀).

The assessment steps are detailed below.

Step 1- screens the requirement for a more detailed assessment. Should human receptors be identified within 350m of the Site Boundary or 50m from the construction vehicle route (up to 500m from the Site entrance for large sites, 200m from medium sites and 50m from small sites), then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the Site Boundary or 50m from the construction vehicle route (up to 500m from the Site entrance for large sites, 200m from medium sites and 50m from small sites), then the assessment also proceeds to Step 2.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Step 2- assesses the risk of potential dust impacts. A Proposed Project is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

Step 3- requires the identification of site-specific mitigation measures within the guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with negligible risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4- Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be not significant. This has been described as negligible within this report to provide continuity between assessment terminologies.

4 Dust Risk Assessment

Step 1

The undertaking of activities such as demolition, excavation, ground works, cutting, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from highway surfaces. Due to the nature of the Proposed Project, dust generating activities would generally be limited to the compounds either side of the tunnel; the Western Compound and the Eastern Compound. As such, these two Compounds have been the focus of the assessment.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

A desk-study identified a number of sensitive receptors within 350m of the Site Boundary of the two Compounds. A detailed assessment of potential dust impacts was therefore required.

There are five ecological statutory designated sites potentially sensitive to dust within 50m of the Site Boundary or trackout boundary. The trackout boundary is defined as the local road network used by construction vehicles up to 500m from the site entrances/exits. The ecological sites considered within the assessment are:

- Ysbyty Bron y Garth - Site of Special Scientific Interest (Wales)

- Glaslyn - Site of Special Scientific Interest (Wales)
- Coedydd Derw a Safleoedd Ystlumod Meirion / Meirionnydd Oakwoods and Bat Sites - Special Area of Conservation (Wales)
- Morfa Harlech - Site of Special Scientific Interest (Wales)
- Pen Llyn a'r Sarnau / Llyn Peninsula and the Sarnau - Special Area of Conservation (Wales)

As such, ecological impacts have been assessed further.

Step 2A

Demolition

There are no demolition activities associated with the Proposed Project other than the deconstruction of 10 pylons which are not anticipated to be a dust generating activity. Therefore, the potential dust emissions from demolition has not been considered further in the assessment.

Earthworks

Earthworks associated with the Proposed Project will primarily involve the excavation of material during shaft and tunnel construction and will mostly be limited to the two Compounds. The total area of these Compounds is estimated to be greater than 10,000 m² and there is expected to be more than 100,000 tonnes of potentially dusty soil type moved. As such, the magnitude of potential dust emissions from earthworks is classified as large.

Construction

There is likely to be temporary construction of above ground storage units during the construction period, for the storage of materials and equipment, as well as the construction of tunnel head houses. The total building volume is expected to be within the IAQM construction category of below 25,000 m³ (Ref 2). As such, the magnitude of potential dust emissions from construction is classified as small.

Trackout

The peak construction activity in terms of traffic generation is expected to relate to the excavation of rock and soil during tunnelling. Current forecasts indicate that tunnelling will generate in the order of 30 loads per day, (60 two-way HGV movements) undertaken by vehicles with a load carrying capacity of 15m³. During this period, worst-case forecasts indicate that tunnelling activities could generate 160 two-way Light Goods Vehicles (LGV) movements spread across three shifts. Tunnelling works are expected to take place for approximately 17 months. There is the potential for moderately dusty surface material, therefore the magnitude of potential dust emissions from trackout is classified as medium.

The dust emission magnitude for each dust generating activity for the Proposed Project is summarised in Table 1.

Table 1 - Dust Emission Magnitude Summary

Activity	Dust emission magnitude
Demolition	n/a
Earthworks	Large
Construction	Small
Trackout	Medium

Step 2B

Receptors sensitive to potential dust impacts during earthworks and construction were approximated from a desktop study. A Study Area up to 350m from the Site Boundary was used for human receptors and up to 50m was used for ecological receptors. The number of sensitive human and ecological receptors potentially affected by the Proposed Project are summarised in Table 2.

Table 2 - Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	1 – 10	1
Less than 50	10 – 100	3
Less than 100	10 – 100	-
Less than 200	10 – 100	-
Less than 350	10 – 100	-

The number of receptors sensitive to potential dust impacts during trackout were approximated from a desktop study. A trackout study area consisting of a 50m buffer from the road network used by construction vehicles. As the magnitude of potential dust released was classified as medium, the trackout study area included roads up to 500m of the entrances/exits to the Compounds. The approximate number of receptors identified within the trackout study area are summarised in Table 3.

Table 3 - Trackout Dust Sensitive Receptors

Distance from Trackout Roads (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	3
Less than 50	10 - 100	3

The background PM¹⁰ concentration is used to assign what category is selected to determine sensitivity. In order to determine the sensitivity of the receiving environment, the average PM₁₀ background concentration for the two Compound areas (UK Grid Squares XY: 259500,338500 and 262500,337500) was obtained from the DEFRA website (Ref 3) and identified as being 7.05µg/m³ for 2019. Therefore, in accordance with IAQM guidance (Ref 2), health impacts should be determined based on the criteria within the less than 24µg/m³ category.

In accordance with the IAQM guidance (Ref 2), the highest level of sensitivity should be recorded from the criteria outlined in guidance. As the human receptors include residential properties and ecological receptors listed on the citations of statutory designated sites, the sensitivity of the receiving environment to potential dust impacts is considered to be high for both human and ecological receptors.

The sensitivity of the receiving environment to specific dust impacts, based on high sensitivity receptors within the less than 24µg/m³ category, in accordance with the IAQM guidance (Ref 2) is summarised in Table 4.

Table 4 - Summary of the Sensitivity of the Area

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	n/a	Medium	Medium	High
Human health	n/a	Low	Low	Low
Ecological	n/a	High	High	High

Step 2C

The risk of effects in the absence of environmental mitigation measures was then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each dust generating activity. The risk of dust effects was determined, as presented in Table 5.

Table 5 - Summary of the Risk of Dust Effects

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	n/a	Medium Risk	Low Risk	Medium Risk
Human health	n/a	Low Risk	Negligible	Low Risk
Ecological	n/a	High Risk	Low Risk	Medium Risk

Table 5 presents that the assessment has indicated the maximum risk of dust effects as high, as a worst case.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the Site Boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

The IAQM guidance (Ref 2) on the assessment of dust from demolition and construction provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the Proposed Project based on the risk of dust effects (Table 5) and are summarised in Table 6. The mitigation measures identified have been incorporated into the CEMP.

Table 6 - Proposed Dust Mitigation Measures based on IAQM Guidance (Ref 2)

Mitigation measure	H = Highly Recommended D = Desirable
Mitigation for all sites: Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
Display the head or regional office contact information.	H

Mitigation measure	H = Highly Recommended D = Desirable
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
Make the complaints log available to the local authority when asked.	H
Record any exceptional incidents that cause dust and/or air emissions, either on-site or off-site, and the action taken to resolve the situation in the logbook.	H
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, if applicable, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	H
Monitoring	
Undertake daily on-site and off-site visual inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of Site Boundary, with cleaning to be provided if necessary. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring and PM _{2.5} monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. It is suggested to propose dust deposition or dust flux monitoring using Frisbee Gauges or Fablon monitoring techniques rather than continuous automatic monitoring, subject to agreement with Local Authority. Baseline monitoring is suggested particularly at the west compound site due the presence of a quarry in close proximity to the site, to determine the presence of dust from existing sources. Further guidance is provided by IAQM on monitoring in the vicinity of demolition and construction sites (Ref 4).	H
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	H
Cover, seed or fence stockpiles to prevent wind whipping.	H
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	H
Produce a Construction Traffic Management Plan to manage the sustainable delivery of goods and materials and implement a travel plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	H
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and conveyors and covered skips.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	H

Mitigation measure	H = Highly Recommended D = Desirable
Waste management	
Avoid bonfires and burning of waste materials.	H
Measures specific to earthworks:	
Where the ecological objectives allow, re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
Only remove the cover in small areas during work and not all at once.	H
Measures specific to construction:	
Avoid scabbling (roughening of concrete surfaces) if possible.	D
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D
Measures specific to trackout:	
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	H
Avoid dry sweeping of large areas.	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	H
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	H
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	H
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	H
Access gates to be located at least 10 m from receptors where possible.	H

Step 4

Assuming the relevant mitigation measures outlined in Table 6 are implemented, the residual effect from all dust generating activities is predicted to be negligible.

5 References

Ref 1 - Environmental Protection Act (1990) Part III, Section 79 Statutory Nuisances and Clean Air

Ref 2 - Institute of Air Quality Management (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1

Ref 3 - Defra UK Air website. 2017-based background maps. Available online at: <https://uk-air.defra.gov.uk/data/laqm-background-home> [Accessed: 17/09/2019]

Ref 4 - Institute of Air Quality Management (2018) Guidance on Monitoring in the Vicinity of Demolition and Construction Sites Version 1.1

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Appendix 8:

Reptile Method Statement



National Grid

Visual Impact Provision (VIP) Snowdonia Project

Reptile Method Statement

Rev01

660952

DECEMBER 2019

RSK

RSK GENERAL NOTES

Project No.: 660952

Title: Visual Impact Provision (VIP) Snowdonia Project – Reptile Method Statement

Client: National Grid

Date: December 2019

Office: Helsby

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Date:	<u>16 September 2019</u>	Date:	<u>18 September 2019</u>

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment.

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1 INTRODUCTION

1.1 Purpose of this Method Statement

The Visual Impact Provision (VIP) Snowdonia Project, located within Snowdonia National Park aims to reduce the visual impact of National Grid's 4ZC overhead line (OHL) across the Dwyryd Estuary near Penrhyndeudraeth, Gwynedd by relocating a section of the OHL below ground in a cable tunnel. The project will make use of a £500 m allocation by Ofgem to carry out work to help reduce the impact of existing transmission lines in English and Welsh Areas of Outstanding Natural Beauty (AONBs) and National Parks.

Surveys of the proposed construction area and access routes undertaken by RSK Environment Ltd in 2016 and 2018 (RSK, 2018) recorded the presence of Common Lizard, Slow-worm, Adder and Grass Snake. The location of the areas in which the reptiles were recorded are shown on *Figure 1*. This method statement relates to construction of the access routes, works compounds, tunnel head houses and sealing end compounds as well as removal of overhead lines (OHL) that are close to any areas where reptiles are known to occur.

The construction of the tunnel head house and sealing end compound at Cilfor (the eastern end of the cable tunnel), as well as the removal of the existing pylon at this location, will be subject to a programme of fencing, trapping and translocation. This is discussed in *Section 5* and shown on *Figure 2*.

This method statement is a working document that should be reviewed and maintained throughout the construction period as a record of activities. It details measures to prevent killing or injuring reptiles as a result of the construction works being undertaken.

2 REPTILE LOCATIONS

The confirmed locations of reptiles are shown on *Figure 1*. Details of the surveys that have been carried out and the reptiles recorded in each area are given in the animal survey report (RSK, 2019). A summary (including both 2016 and 2018 survey results) of the species present at each location is provided below:

Survey Location (Figure 1)	Easting	Northing	Proposed Works	Reptile Species Present	Population Size
1	259542	338795	Area to be crossed by direct cable burial route	Common Lizard	Low
				Slow worm*	Low*
2	260205	338651	No works currently proposed. Possible compound area.	Slow-worm	Good
3	260327	338508	Crossed by OHL	Grass Snake	Exceptional
				Slow-worm	Exceptional
4	261089	338429	Crossed by OHL	Common Lizard	Good
5	262411	337830	Tunnel head house and sealing end compound location. Area to be fenced and trapped out. Any works outside of fenced area to be carried out under this method statement.	Common Lizard	Low
				Adder*	Low*
				Grass Snake	Low
				Slow-worm	Low

*Survey results from 2016. Presence of these species not recorded in 2018, however they are assumed still to be present in low numbers.

The information regarding the presence of reptiles, contained within this method statement, was recorded in spring and summer of 2016 and 2018. It is possible that populations may have grown, shrunk or moved to new areas since the most recent survey was completed. It should also be assumed, given the widespread presence of reptiles at the site, that reptiles are also present in areas of adjacent suitable habitat outside of the survey area.

3 IDENTIFICATION AND LEGISLATION

3.1 Identification

The plates below are to be used to aid the identification of reptiles found during the proposed works.

Common reptiles (Clockwise from Top Right: Common Lizard; Slow-worm; Adder; Grass Snake)



3.2 Legislation

Zootoca vivipara (Common Lizard), *Natrix* (Grass Snake), *Anguis fragilis* (Slow-worm), and *Vipera berus* (Adder) are listed under *Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)*, in respect of Section 9(5) and part of Section 9(1). This protection was extended by the CRow Act. Under this legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

4 METHOD STATEMENT – TEMPORARY WORKS

4.1 Overview

The methods outlined below will be the most effective for preventing the killing or injuring of reptiles, given the type of works that are proposed. This method statement applies to areas of temporary work which require only a small scale of habitat loss or disturbance (*Figure 1* – survey locations 1 – 4). This also applies to those areas at survey location 5, where small scale habitat loss (permanent or temporary) are required – such as for the erection of a new terminal pylon.

For the areas of the site that are suitable for reptiles, where large scale or permanent habitat loss is taking place (i.e. survey location 5 – *Figure 1*), a programme of fencing, trapping and translocation of reptiles will be required. This is discussed in *Section 5* below. The methods described in this section (*Section 4*) will apply to all areas of temporary or small-scale habitat loss outside of this fenced area.

The proposed works covered by this method statement will include temporary excavations, access roads, direct burial of cables and removal of OHL and pylons. Some of this work will take place in habitat that is suitable for reptiles and where populations of reptiles have been recorded.

This method statement therefore considers methods for site access and works within habitats suitable for reptiles. As the works are temporary and/or affect only a small proportion of the suitable habitat at any one location, reasonable avoidance measures are proposed. These methods are required for any works within habitat suitable for reptiles where reptiles have been recorded during surveys in 2016 or 2018. All other works at the site can take place without being required to follow this method statement.

4.2 Responsibilities and timescales

Responsibilities and liabilities for the precautionary methods of works and site set up are to be agreed by the client and principal contractor prior to works commencing. All parties are to be made aware of the risks and control procedures for dealing with reptile species on the site.

4.3 General construction works and pylon removal

Prior to and during any construction traffic entering the site, the following methods will be employed to prevent the killing or injuring of reptiles.

All site preparation works in suitable reptile areas (as identified in *Section 2*) can only be carried out during the reptile active period (April to September inclusive). No works should take place outside of this time.

- A clerk of works responsible for overseeing the method statement will be identified and will brief all site staff. The briefing will include information on the identification of the reptile species present and what to do if a reptile is found at the site. As Adders have been recorded in some areas, the briefing will include precautions which are to be followed in these areas.
- Vegetation which will be crossed by the Proposed Project will be cut to 15 cm under the supervision of the ecological clerk of works. This will be carried out a minimum of one week prior to the works commencing. The arisings will be removed from the site.
- Any suitable refuges (debris, piles of logs or brash) will be avoided where possible. If this is not possible, a destructive search of the refuges will be carried out. This will be supervised by the ecological clerk of works.
- Vehicles leaving the area should be confined to haulage routes which have previously been cleared of vegetation.
- Any materials or excavated spoil stored on the site should be stored on hard standing. If this is not possible, they should be stored on pallets to raise them off the ground. Alternatively topsoil or subsoil could be stored in compacted mounds and covered to prevent access by reptiles. Any waste material should be stored in a designated skip prior to removal from the site.
- Any excavations left open overnight should be covered with boards, flush to the ground and overlapping the sides of the excavation by a minimum of 0.5 m. The excavations should be checked for reptiles before work starts each morning.
- Areas with long-term temporary works (such as for the direct burial of cable) should have reptile fencing installed around the perimeter of the works to prevent reptiles accessing these areas. Installation of the fencing should be supervised by the ecological clerk of works and can only be carried out when the ecological clerk of works has confirmed that the area is free of reptiles.
- If any reptiles are found during the site works, all works must stop and a suitably qualified ecologist should be contacted.

4.4 Overhead line removal

The removal of OHL represents a temporary impact on any habitats suitable for reptiles. The work is likely to require the lowering of lines to ground level before being winched from the site onto an appropriate cable drum.

The following methods should be adhered to in order to reduce the likelihood of affecting any reptiles present.

- An ecological clerk of works responsible for overseeing the method statement will be identified and will brief all site staff. The briefing will include information on the

identification of the reptile species present and what to do if a reptile is found at the site. As Adders have been recorded in some areas, the briefing will include precautions which are to be followed in these areas.

- Vegetation which will be crossed by the overhead lines will be cut to 15 cm under the supervision of the ecological clerk of works. This will be carried out a minimum of one week prior to the works commencing. The arisings will be removed from the site.
- Any suitable refuges (debris, piles of logs or brash) will be avoided where possible. If this is not possible, a destructive search of the refuges will be carried out. This will be supervised by the ecological clerk of works.
- Vehicles leaving the area should either be confined to haulage routes which have previously been cleared of vegetation.
- If any reptiles are found during the site works, all works must stop and a suitably qualified ecologist should be contacted.

5 METHOD STATEMENT – REPTILE TRANSLOCATION

The construction of the tunnel head house, sealing end compound, construction compounds and access routes at the eastern end of the construction area, will result in the permanent loss of some habitats that contain reptiles (*survey location 5 – Figure 1*).

Surveys in this area have recorded low populations of Common Lizard, Slow-worm and Grass Snake in 2018 and a low population of Adder in 2016. As construction works will result in permanent development, it is proposed that a translocation of reptiles in this area is required. The translocations will follow the methods outlined below:

- Fence installation and translocation will only take place between late March and mid-October (subject to weather conditions), when reptiles are out of hibernation.
- A reptile proof fence will be installed around the perimeter of the construction area (*Figure 2*). To aid in the capture of reptiles, the site will also be separated into compartments with drift fencing.
- Prior to fence installation, vegetation along the route of the fence will be checked by an ecological clerk of works before being cut to 15 cm. This will be carried out a minimum of one week prior to the works commencing. The arisings will be removed from the site.
- Artificial refugia (typically 0.5m x 0.5 m bitumen roofing felt) will be placed in suitable areas of habitat within the fenced area. As snakes are known to be present, half of the refugia will be 1 m x 0.5 m corrugated roofing sheets. Refugia will be set at a density of 100 per hectare.
- Artificial refugia will be left in place for a minimum of two weeks before translocation takes place to allow them to bed in and reptiles to begin to use them.
- The refugia will be checked each day during suitable weather conditions. Any reptiles found will be placed in a cloth sack before being removed from the site and placed in the receptor habitat outside of the fenced area. As Adders are present, the surveyors will wear Adder proof gauntlet gloves. Each Adder caught will be placed in a separate bag.
- The site will be checked each morning and evening for a total of 30 suitable days. A period of 5 capture free days will be required at the end of this period for the site to be classed as reptile free.
- Any piles of debris that are suitable as refuges for reptiles will be dismantled and checked by hand, under the supervision of the ecological clerk of works, prior to removal from the site.
- Construction will only be allowed to start in each compartment once it has been declared as free of reptiles.

Following the completion of construction activities, the fence will be removed, under supervision of an ecological clerk of works. Reptiles that have been moved to areas of suitable habitat outside of the fenced area will then be able to return to the habitats within the construction area which have not been subject to permanent habitat loss.

Given the low population of all reptile species found at this area, and the relative size of the construction zone and proposed receptor habitats, it is not anticipated that an off-site receptor site is required. Indeed, it is considered that the translocation of reptiles from this area to an off-site receptor area would be detrimental to the survival of those reptiles and that the low numbers of animals expected to be caught would be more likely to survive if moved to unaffected habitat adjacent to the works area. It is proposed that habitat enhancements (such as log piles and hibernacula) are provided in the receptor areas to improve habitat quality and compensate for the loss of habitats.

6 METHOD STATEMENT SIGN OFF

Declaration – by signing this document, I confirm that I have read and understood this document, and that I will comply with all measures detailed above.

NAME (PRINT)	ORGANISATION	SIGNATURE	DATE

7 REFERENCES

RSK Environment Ltd (2016). *National Grid – Snowdonia Animal Report REV01*

RSK Environment Ltd (2019). *National Grid – Snowdonia Animal Report REV01*

8 FIGURES

Figure 1 – Reptile Location Map and construction layout

Figure 2 – Reptile Translocation Area



Overview



Legend

- Site Boundary
- Ecological Survey Area
- Existing National Grid Pylon to be Removed
- Existing National Grid Underground Cable
- Overhead Line to be Removed
- Existing National Grid Overhead Line
- Common Lizard
- Grass Snake & Slow Worm
- Slow Worm

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid, Marine Environment - NRW, Species Records - Cofnod

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Rev	Description	Cre'd	Chk'd	App'd	Date
02	Site boundary updated	AJ	WH	SR	12/02/2020
01	Site Boundary	NH	WH	WH	04/12/2019
00	First draft	NH	WH	WH	25/09/2019

nationalgrid

Master Scheme No:	Sub-Scheme No:	Site:
-	-	

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

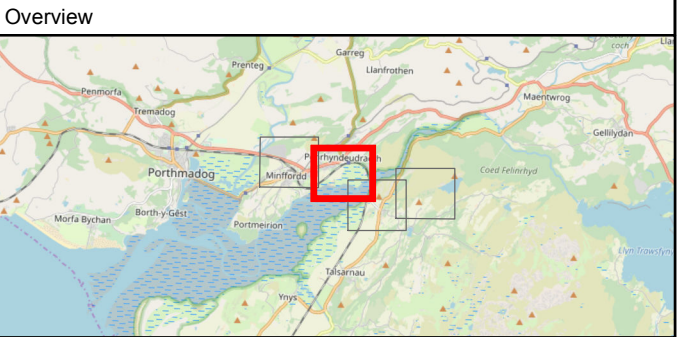
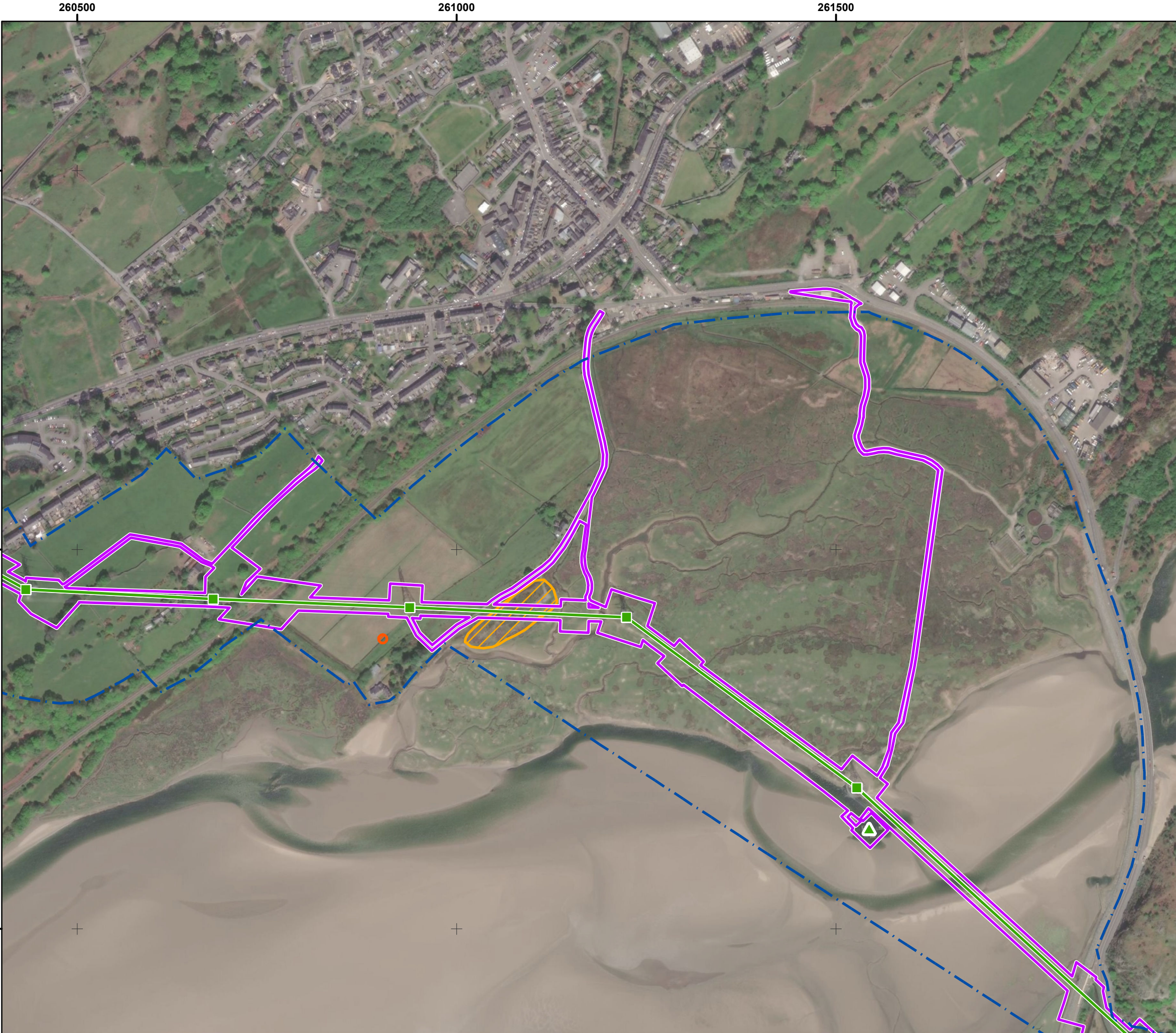
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**Figure 1:
Reptile Location Map
Map 1 of 4**

Created by: N.Hogben	Date: 12/02/2020	Checked by: W.Holden	Date: 12/02/2020	Approved by: W.Holden	Date: 12/02/2020
Development Eng: -	Document Type: -	Scale: 1:5,000	Format: A3	Sheet(s): 1 of 4	Rev: 02

National Grid Document Number:
-

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- Legend**
- Site Boundary
 - Ecological Survey Area
 - Foundation of Former Pylon 4ZC030 to be Removed
 - Existing National Grid Pylon to be Removed
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Common Lizard
 - Grass Snake

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid, Marine Environment - NRW, Species Records - Cofnod

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00	First draft	NH	WH	WH	25/09/2019

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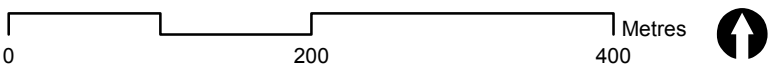
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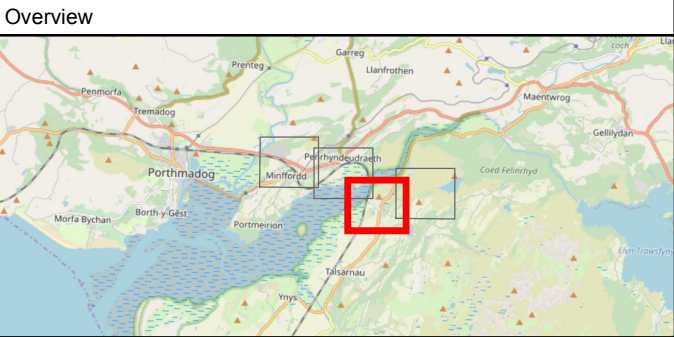
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Reptile Location Map
Map 2 of 4**

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Development Eng: -	Document Type: -	Scale: 1:5,000	Format: A3	Sheet(s): 2 of 4	Rev: 02

National Grid Document Number:
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FEED Document Number:
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- Legend**
- Site Boundary
 - Ecological Survey Area
 - Foundation of Former Pylon 4ZC030 to be Removed
 - Existing National Grid Pylon to be Removed
 - Existing National Grid Pylon to be Retained
 - Overhead Line to be Removed
 - Existing National Grid Overhead Line
 - Common Lizard, Slow Worm, Grass Snake

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid, Marine Environment - NRW, Species Records - Cofnod

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00	First draft	NH	WH	WH	25/09/2019

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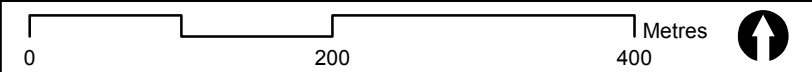
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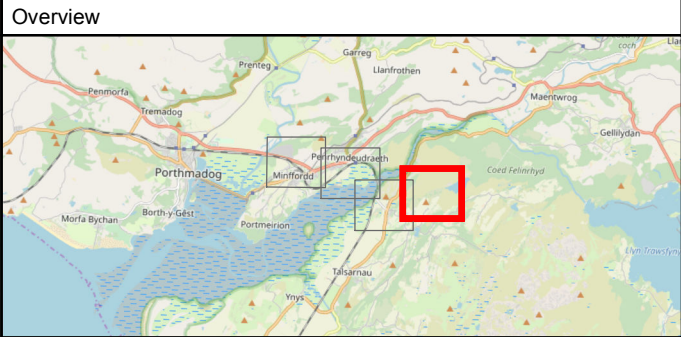
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Reptile Location Map
Map 3 of 4**

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Development Eng: -	Document Type: -	Scale: 1:5,000	Format: A3	Sheet(s): 3 of 4	Rev: 02

National Grid Document Number:
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FEED Document Number:
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Legend

- Site Boundary
- Ecological Survey Area
- Existing National Grid Pylon to be Removed
- Existing National Grid Pylon to be Retained
- Existing National Grid Overhead Line
- Common Lizard, Slow Worm, Grass Snake

Source: Study Area: P6 (with western extension) NG & RSK.Existing Infrastructure - National Grid, Marine Environment - NRW, Species Records - Cofnod

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02	Site boundary updated	AJ	WH	SR	12/02/2020
01	Site Boundary	NH	WH	WH	04/12/2019
00	First draft	NH	WH	WH	25/09/2019

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Scheme Name:
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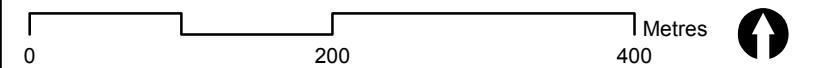
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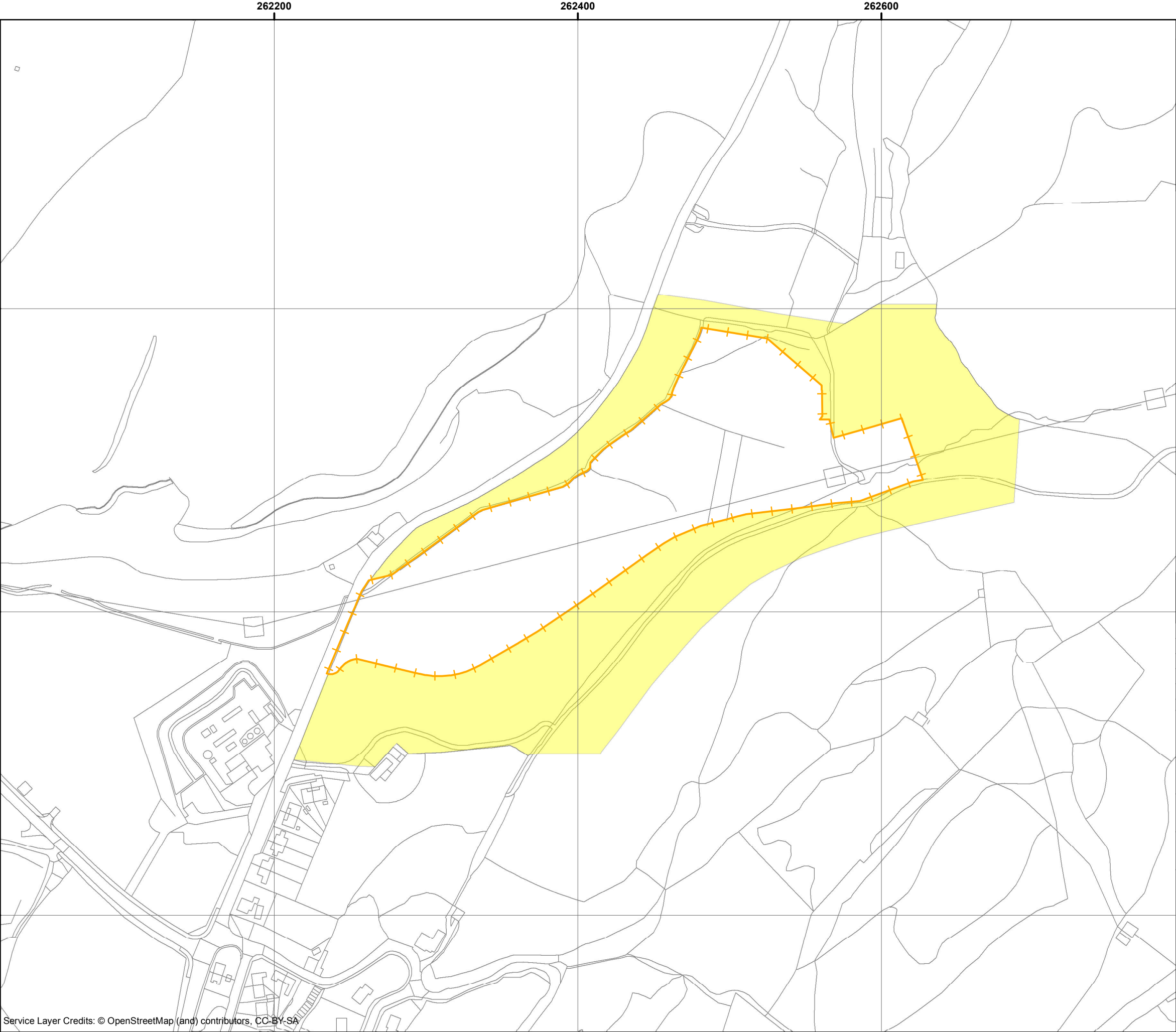
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Reptile Location Map
Map 4 of 4**

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Overview



Legend

- Reptile_Fencing
- Reptile Receptor Area

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04	Fencing updated	AJ	WH	SR	12/02/2020
03	Fig Number	NH	SR	SR	03/12/2019
02	Reptile Fence Change - S & NE	NH	SR	SR	26/11/2019
01	Reptile Fence Change	NH	SR	SR	25/11/2019
00	First Draft	NH	SR	SR	25/09/2019
Rev	Description	Cre'd	Chk'd	App'd	Date

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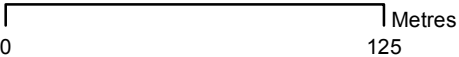
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Figure 2: Reptile Translocation Plan

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Development Eng: -	Document Type: -	Scale: 1:2,500	Format: A3	Sheet(s): 1 of 1	Rev: 04

National Grid Document Number:
-

FEED Document Number:
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Appendix 9:

Outline Habitat Management Plan



National Grid

Visual Impact Provision (VIP), Snowdonia Project

Outline Habitat Mitigation Plan

660952

FEBRUARY 2020



RSK GENERAL NOTES

Project No.: 660952

Title: Visual Impact Provision (VIP), Snowdonia Project
Outline Habitat Mitigation Plan

Client: National Grid

Date: February 2020

Office: Helsby

Status: Rev 03

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Date:	<u>25 February 2020</u>	Date:	<u>25 February 2020</u>
Project Manager	<u>Sally Rotherham</u>		
Signature			
Date:	<u>25 February 2020</u>		

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1 INTRODUCTION

1.1 Project Description

The Visual Impact Provision (VIP) Snowdonia Project will make use of a provision of £500 million for electricity transmission owners to mitigate the visual impact of existing electricity infrastructure in nationally protected landscapes in Great Britain. For National Grid, which is the transmission owner in England and Wales, this means mitigating the effects of existing infrastructure on the visual amenity and landscapes of National Parks and Areas of Outstanding Natural Beauty (AONBs). The Proposed Project seeks to underground an existing stretch of overhead line (OHL) within a cable tunnel beneath the Dwyryd Estuary. At both ends of the cable tunnel a tunnel head house will be required. On the eastern side of the Dwyryd Estuary the tunnel head house will be located at Cilfor within Snowdonia National Park and on the west near National Grids existing SEC at Garth.

At Cilfor (eastern end of the tunnel), the Proposed Project will include a temporary construction compound. The permanent works will include a floating access road, construction of a tunnel head house and sealing end compound (SEC), and a replacement terminal pylon. As detailed in the reptile method statement (RSK, 2019b), a reptile fence will be installed around the boundary of construction compound, encompassing all areas of permanent and temporary work. This fence will provide a barrier to movement of vehicles outside of this area, ensuring protection of the habitats outside of the fence.

At Garth (western end of the tunnel), the Proposed Project will include a temporary construction compound. The permanent works will include a new access, a tunnel head house and below ground cables connecting the proposed tunnel head house to the existing Garth SEC. A full description of the Proposed Project is provided in Chapter 2 of the Environmental Appraisal (RSK 2019c).

The areas of temporary land take are provided on *Figure 2.1* and the areas of permanent land take, including the latest landscape masterplan for the Proposed Project are shown on *Figure 2.2* of the Environmental Appraisal (RSK 2019c).

1.2 Purpose of the Report

Planning Policy Wales (PPW) 10 sets out that 'planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means that development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity'.

In direct relation to this policy, this document has been prepared by RSK to provide guidance for biodiversity mitigation, the creation of new habitats and long-term protection and management of retained habitats. This mitigation plan initially focuses on land surrounding the proposed Cilfor (eastern) tunnel head house and SEC (OS grid reference: SH 624 378) and the existing Gath SEC to identify habitat that will be temporarily and permanently lost to the Proposed Project and the mitigation and compensation measures that are proposed. This Outline Habitat Mitigation Plan will be

updated throughout the planning, landowner negotiation and detailed design process to include measures for the Proposed Project as a whole and include those areas of land agreed with the Local Planning Authority which will be improved to achieve a biodiversity net benefit. The Outline Habitat Mitigation Plan will be updated as more detailed information becomes available, a contractor is appointed, and methods can be prepared on how the Outline Habitat Mitigation Plan will be implemented and managed.

1.2.1 Achieving a Net Benefit

National Grid is committed to ensuring that the Proposed Project delivers a net benefit to biodiversity rather than only ensuring there is no net loss. National Grid have sought to work closely with Snowdonia National Park Authority, Gwynedd Council and Natural Resources Wales to explore and identify opportunities to compensate for habitat and species adversely impacted by the Proposed Project. National Grid appreciate the knowledgeable input and assistance of stakeholders received to date and commit to continuing to work collaboratively with all relevant stakeholders to deliver a net benefit.

Delivering a net benefit to biodiversity in accordance with national and local planning policy is a priority. Over and above that, National Grid will also seek opportunities to enhance existing habitat within the project boundary, or further afield. 'On site' options do include the restoration of habitats and mitigation but with limited opportunities to offset the net loss of habitats.

It is preferable for biodiversity net benefit opportunities to be as close as possible to the Proposed Project. Potential sites are therefore being carefully considered to make further improvements to biodiversity. These include the area owned by National Grid around the current Garth SEC. Other areas are privately owned so are subject to landowner agreement and ongoing land management practices. However, these areas offer opportunities to improve habitat distinctiveness and condition and therefore to contribute towards a benefit for biodiversity.

A net benefit calculation, based upon the published DEFRA Biodiversity Metric 2.0 approach, is being prepared to help quantify biodiversity impacts and inform the enhancement strategy. If suitable sites cannot be secured within the immediate proximity of the Proposed Project or within the wider area, for land rights, third party access or other reasons, National Grid is committed to supporting suitable alternative ecological improvement works in agreement with Snowdonia National Park Authority.

The benefits of the Proposed Project in landscape, visual and environmental terms cannot be underestimated. The removal of 3.5km of existing high voltage OHL including 9 pylons will bring about other environmental gains. These benefits will be felt by the wider National Park, residents and visitors alike. National Grid is committed to delivering improvements in the most environmentally sensitive way and will work with stakeholders to ensure a net benefit for biodiversity at the same time.

1.3 Site Description and Ecological Context

The location of the Cilfor site including the proposed permanent footprint and Phase 1 Habitat Survey information is shown in Figure 1.

At Cilfor, the proposed site is c.3.4 ha in size, containing valley mire habitat and areas of *Rubus fruticosus* agg. (Bramble) scrub, dense *Salix caprea* (Goat Willow) and *Pteridium aquilinum* (Bracken). There are several drainage ditches across the site. The areas of valley mire habitat extend further south and north from the site boundary, within the same land ownership. These areas also include dense scrub, bracken, tall ruderal vegetation and semi-improved grassland.

At Garth, the works are predominantly within agricultural fields. These are bordered by a mixture of stone walls and stock proof fencing. There is one hedgerow present and a single dry ditch. The below ground cables connecting the proposed tunnel head house to the existing SEC includes a bank of rough grassland and scrub with some stands of *Crocodymia x crocosmiiflora* (Montbretia) and *Fallopia japonica* close by. The field which contain the existing SEC is semi-improved grassland with stands of scrub and woodland along the adjacent railway embankment to the north-east.

2 BASELINE CONDITIONS

An ecological baseline has been recorded for the site, published in a preliminary ecological appraisal (PEA) report produced by AECOM, surveys were repeated in 2019 and 2016 by RSK Environment.

Botanical surveys of the site were completed by RSK Environment Ltd between 2016 and 2019 and are reported as an appendix of the Environmental Appraisal (RSK 2019c); however, results are summarised in this document below. The management of reptiles and invasive species are detailed in separate method statements (RSK 2019b and 2019d). This Outline Habitat Mitigation Plan is based on the results of these surveys.

2.1 Habitats and Plants

The existing Garth SEC site is formed predominantly of agricultural grassland. The east of the survey area, at Cilfor is predominantly valley mire and dense scrub. The PEA (RSK, 2019a) conducted at the site describes the following phase 1 habitats present:

- poor semi-improved grassland;
- hedgerow;
- valley mire and swamp;
- dense and scattered scrub;
- bracken; and,
- ditches.

In addition, immediately adjacent to the site boundary, are the following habitat types:

- valley mire and swamp;
- dense and scattered scrub;
- bracken;
- tall ruderal vegetation; and,
- semi-improved grassland.

The parts of the Proposed Project near the existing Garth SEC is within a series of poor-semi-improved and improved grassland fields between the proposed tunnel head house and the SEC. The swards are typically dense, between 5cm and 10cm high, and regularly grazed. At certain times of the year, the fields are left ungrazed to be harvested as hay. The sward in these fields therefore grows to be c.30cm high.

The fields are typically dominated by *Lolium perenne* (Perennial Rye-grass), although *Agrostis capillaris* (Common Bent), *Dactylis glomerata* (Cock's-foot), *Holcus lanatus* (Yorkshire-fog) were also frequently recorded. Some of the fields are waterlogged in places, and in these areas grasses such as *Alopecurus geniculatus* (Marsh Foxtail) and *Glyceria fluitans* (Floating Sweet-grass) are found.

These grasslands are species-poor, with infrequent forbs restricted to common and widespread species. Typical herb species include *Bellis perennis* (Daisy), *Cerastium fontanum* (Common Mouse-ear), *Ranunculus flammula* (Lesser Spearwort), *Ranunculus repens* (Creeping Buttercup) and *Trifolium repens* (White Clover), with other species such as *Cirsium palustre* (Marsh Thistle), *Galium palustre* (Common Marsh-bedstraw) and *Silene flos-cuculi* (Ragged-Robin) infrequently in marshier areas. The only hedgerow, to the east of the proposed tunnel head house at Garth, is species-poor and formed of *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn), *Prunus spinosa* (Blackthorn), *Rosa arvensis* (Field-rose) and *Salix* spp (Willows).

The majority of the site at Cilfor is a continuous but heterogeneous area of mire in a valley bottom. The substrate is consistently peaty with *Molinia caerulea* (Purple Moor-grass) forming dense tussocks alongside other graminoids such as *Agrostis canina* (Velvet Bent), *Agrostis capillaris* (Common Bent), *Carex echinata* (Star Sedge), *Carex nigra* (Common Sedge), *Eriophorum angustifolium* (Common Cottongrass). This area contains some standing water at the far east and here is dominated by *Phragmites australis* (Common Reed) swamp. The western end is more heavily dominated by rushes, including *Juncus acutiflorus* (Sharp-flowered Rush), *Juncus articulatus* (Jointed Rush) and *Juncus effusus* (Soft-rush). Diverse wetland broad-leaved herbs throughout include *Cirsium palustre* (Marsh Thistle), *Epilobium palustre* (Marsh Willowherb), *Galium palustre* (Common Marsh-bedstraw), *Hydrocotyle vulgaris* (Marsh Pennywort), *Lythrum salicaria* (Purple-loosestrife), *Ranunculus flammula* (Lesser Spearwort) and *Viola palustris* (Marsh Violet). At the edges are areas of bracken and bramble scrub as well as some dense areas of scrub dominated by *Salix* sp (Willows).

The mire habitat is included in the upland flushes, fens and swamps UK priority habitat and is also included on the Snowdonia local BAP under blanket mire and purple moor grass and rush pastures. The botanical appraisal of the site concluded the habitat is in moderate condition with the presence of artificial drainage (ditches) being a factor contribution to the habitat not meeting good condition.

2.2 Non-native Invasive Species

There are many stands of invasive species around the north- western area of the Proposed Project. The location of invasive species stands is shown within the Botanical report (RSK, 2019a). Species present close to the proposed works area at Garth include *Fallopia japonica* (Japanese Knotweed) and *Crocsmia crocosmiiflora* (Montbretia).

There are no non-native invasive plant species at Cilfor.

2.3 Protected Species

Baseline animal surveys have recorded the use of the site by foraging and commuting bat species. No roosting locations for bats were found at the site.

The surveys also recorded low populations of Common Lizard, Slow-worm, Grass Snake and Adder at the site. A separate reptile method statement has been prepared (RSK 2019b) for reptile species.

3 MITIGATION HIERARCHY

Construction of the tunnel head house, SEC and floating access road at Cilfor has followed the mitigation hierarchy in order to reduce, as much as possible, the impacts on the sensitive and important habitats recorded during the baseline ecological surveys.

Avoidance: The position of the tunnel head houses and SEC has been designed to predominantly affect lower quality habitats such as poor semi-improved grassland, dense scrub and bracken and avoid the more sensitive and valuable mire habitat. Following peat surveys, the permanent access track has been sited to avoid the areas of deepest peat.

Minimisation: The initial construction compound footprint has been significantly reduced so that it now affects a much smaller proportion of the mire habitat than in previous design iterations. Areas of mire habitat to the north and south of the compound will be retained and will be safeguarded from construction activities by reptile fencing which will provide a barrier to construction activities. A floating road has been proposed for the permanent access to retain as much peat in situ as possible. Where possible, areas of land temporarily used for construction activities will have a trackway surface to retain seedbank and peat in situ.

Rehabilitation/restoration: This document outlines measures to restore those habitats that would be temporarily lost to the Proposed Project.

Offset: This document outlines measures to enhance those habitats that would be temporarily lost and subsequently restored to the Proposed Project and enhance those habitats outside of the site boundary that are being retained. Further habitat enhancements will be undertaken to achieve a net benefit to biodiversity as discussed in Section 1.2.1 above.

Compensation: As discussed in Section 1.2.1 above, if suitable sites cannot be secured to achieve a biodiversity benefit within the immediate proximity of the Proposed Project or within the wider area (for land rights, third party access or other reasons), National Grid is committed to supporting suitable alternative ecological improvement works in agreement with Snowdonia National Park Authority.

4 HABITAT MANAGEMENT, RESTORATION AND ENHANCEMENT

4.1 Habitat Restoration

All habitats that are to be temporarily lost to construction compounds will be restored to the original condition or an improved condition, where possible.

The valley mire habitat present at the Cilfor site has been assessed as being of moderate condition. The presence of drainage ditches across this habitat is a major factor reducing the quality of this habitat.

In line with the Outline Peat Management Plan (Arcadis, 2019, Appendix 2A of the Environmental Appraisal), restoration of this habitat will include the reuse of peat in drainage ditches, this will help to retain water in the mire habitat. As well as reusing peat within drainage ditches (by the construction of small weirs), the ditches will be filled with peat overlaid with turves of valley mire that have been excavated for the tunnel head house and SEC construction.

The aim is not only to improve the condition of the restored valley mire to good condition, but also to increase the coverage of valley mire habitat overall, through infilling of ditches.

Where possible, at the construction compound (outside of the tunnel head house construction area and shown on Figure 2.1) it is proposed to use aluminium trackway and bog mats to store construction materials, rather than through the use of imported stone, with the turf layer being left intact. It is anticipated that following removal of the trackway and matting, recovery of the peat substrate (from compression) and the recovery of the plants will take place within 10 years.

4.2 On Site Enhancement

A landscaping plan has been produced that includes screening planting around the new tunnel head houses and SEC. The planting will primarily take place on areas of low quality habitat, including existing areas of poor semi-improved grassland, dense scrub and *Pteridium aquilinum* (Bracken).

The screening planting will include a range of native species that are suitable for the ground conditions and local area. They will improve the diversity and quality of the habitats present by replacing low quality habitats with more valuable woodland habitat.

Following stakeholder correspondence, the areas around the Garth THH and SEC are proposed to include planting with a mixture of scrub (c. 12%) and species rich grassland (c. 88%).

4.3 Off Site Mitigation and Enhancement

The areas of valley mire that are present in the same land ownership, but which are outside of the construction footprint, will be subject to improved management and enhancement.

The reuse of peat within drainage ditches to improve water retention will go towards improvement of this habitat from moderate to good condition. The improvement is expected to take between 10 to 15 years.

In addition, the boundaries of these areas include lower quality habitats, such as dense scrub, *Pteridium aquilinum* (bracken) and semi-improved grassland. These habitats will be cut back and the surface excavated to remove roots and seed-bank. The excavation will aim to reach the ground water level where possible (as areas of bracken are likely to be on drier ground and more mineral soils the hydrological regime will need to be taken into account and the ground may need to be lowered).

The excavated areas will then be filled with peat overlaid with turves of valley mire that have been excavated for the tunnel head house and SEC construction. The aim is to improve the quality and increase the coverage of valley mire habitat immediately adjacent to the construction areas. Establishment of new valley mire habitat is anticipated to take 5 – 10 years.

Management of ecological features and mitigation areas, together with habitat enhancement at the site, will help lead to an improvement in the quality of retained habitats at the site.

4.4 Other Enhancement Features

Aims and Objectives: To improve the general suitability of the site for birds, bats and reptiles.

Bat and bird boxes, positioned at suitable heights and aspects, will be provided to increase the roosting and nesting provision for local bat and bird populations. The location of the boxes, on new buildings or mature trees, will be agreed with landowners and consultees.

As part of the reptile mitigation works, log piles will be constructed to improve the availability of refuges and hibernation sites for these species.

4.4.1 Bat Box Installation

Bat box placement will consider a range of aspects and conditions from south-west to south-east and must be 3m to 5m from the ground to prevent predation and human interference. All models of bat box and tubes should be in keeping with the specifications in *Appendix 1*. It is recommended that the following are installed:

- four boxes (Schwegler 2F) suitable for smaller crevice dwellers such as Common Pipistrelle (*Pipistrellus pipistrellus*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*), on retained trees; and
- two bat boxes (Ibstock Enclosed Bat Box C) or bat bricks.

Bat boxes should be inspected annually for signs of significant damage or missing boxes. Bat boxes are generally low maintenance and do not require regular cleaning, they should not be opened unless done so by a suitably licenced ecologist.

4.4.2 Bird Box Installation

A variety of bird boxes will be installed to provide additional nesting habitat for breeding birds. Bird boxes should consider placement on the north to east aspect of structures so as to avoid direct sunlight and overheating of boxes. Open-fronted boxes will be erected at 2m height, and hole-fronted boxes will be installed at 3m height. They should be installed during the autumn to give birds the opportunity to find them prior to the breeding season commencing. All models of bird box and tubes should be in keeping with the specifications in Appendix 1.

It is recommended that the following bird boxes are installed:

- Two House Sparrow (*Passer domesticus*) terrace nest boxes (Schwegler 1SP);
- Four 26mm hole-fronted bird boxes (Schwegler 1B) on retained trees, not obscured by vegetation, for use by Blue Tit (*Cyanistes caeruleus*) and Great Tit (*Parus major*).
- Two Swift nest boxes (Schwegler 17A) at 6m to 7m high should a suitable building be identified.

Bird boxes should be monitored for signs of significant damage or missing boxes. Bird boxes are generally low maintenance but will require cleaning-out outside of the breeding bird season (March and August inclusive) in order to reduce incidences of persistent diseases and parasites.

4.5 Management

Management of the enhanced and reinstated habitats will be required to ensure that the target habitat type is achieved and maintained. This will be required to prevent natural succession.

Management options are subject to agreement with the relevant tenant farmers. In addition, the type and timing of management will be dependent on the target habitat types and the results of soil nutrient testing which is currently being carried out on parts of the Proposed Project.

Short- and long-term management will be confirmed in the detailed Habitat Mitigation Plan and may include the following measures:

- Initial period where grazing is prohibited to allow successful reinstatement and establishment of target habitat types;
- Weed control to remove the initial flush of species such as Nettles and Docks;
- Prescriptive grazing timings and densities following successful establishment of habitats;
- A regime of cutting of grasslands in addition to or instead of livestock grazing;
- Scrub management through cutting or application of herbicide to prevent succession;

- For areas where scrub is proposed, planting areas should be kept clear of weeds by a combination of herbicides and mechanical control methods;
- Rolling, flailing or cutting of invading Bracken.

5 MONITORING

All habitats will be monitored for a period of time which will be agreed with consultees to check that habitats are establishing themselves effectively.

The Outline Habitat Mitigation Plan recommendations are for general guidance and are subject to ongoing discussions with consultees.

6 TIMESCALES

Current proposals are for site clearance works and pre-construction mitigation to commence following the grant of planning, expected November 2020. Construction is due to commence in March 2021.

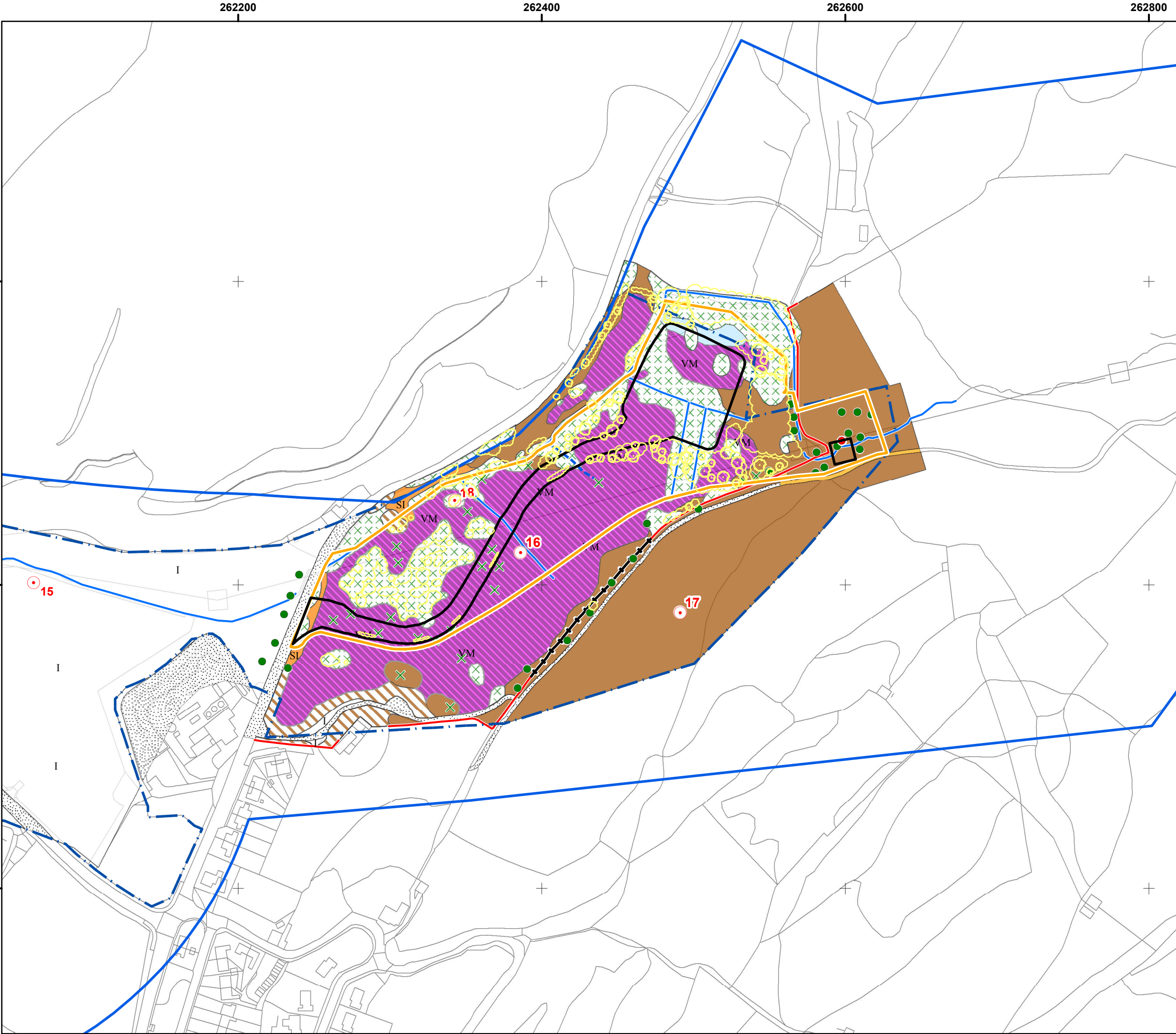
Habitat creation works, including the erection of bat and bird boxes on the trees, should be carried out before the relevant habitats for which they are mitigating, are lost.

Mitigation measures will be agreed with the council prior to construction commencement and timescales for mitigation will be agreed at this point.

Timescales for mitigation and remediation, as well as habitat creation, will be subject to change and this should be seen as a working document to be updated as the project progresses.

7 FIGURES

Figure 1 – Site Location Plan and Phase 1 Habitat Map



Legend

- Permanent Development Footprint
- Permanent Development – Landscape Planting
- Temporary Development Area
- Area of Search for Permanent and Temporary Works
- Ecological Area of Search
- New National Grid Pylon

Phase 1 Habitat Survey

- Scattered Scrub
- Scattered-Broad-leaved Tree
- Target Note
- Dry Ditch
- Fence
- Running Water
- Wall
- Bracken
- Dense / Continuous Scrub
- Hardstanding/Bare Ground
- Improved Grassland
- SI Rough Grassland
- SI Semi-improved Grassland
- Semi-improved Neutral Grassland
- Swamp
- Tall Ruderal
- Valley Mire

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01	Boundary updates	AJ	WH	WH	12/02/2020
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Master Scheme No:	Sub-Scheme No:	Site:
-	-	

Scheme Name:
Visual Impact Provision (VIP) Snowdonia Project

Document Title:
**Figure 1:
Habitat Management Plan**

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APPENDIX 1: BAT & BIRD BOX SPECIFICATIONS

Model	Suitability	Specification
Schwegler 2F 	Smaller British bats	Height: 33 cm Diameter: 16 cm Weight: 4 kg Material: Schwegler Woodcrete Colour: Black with grey front panel. The 2F is manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects. Woodcrete is breathable and maintains a stable temperature inside the box and the 2F is painted black to absorb warmth. It also provides a rough surface for bats to cling to and climb up.
Schwegler 1FF 	Pipistrelles and Noctule	Dimensions: 43 x 27 x 14 cm Entrance hole dimensions: 12 cm x 24 cm Weight: 9.5 kg Material: Schwegler Woodcrete Colour: Black with stable hard-wearing wooden insert The 1FF is manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects. Woodcrete is breathable and maintains a stable temperature inside the box and the 1FF is painted black to absorb warmth. It also provides a good rough surface for bats to cling on to and climb. To compensate for fluctuations in temperature in spring and autumn, the 1FF is provided with a roughened rear panel made of hard-wearing wood.
Ibstock Enclosed Bat Box 'C' 	All bats which roost in buildings	Height: 21.5 cm Width: 21.5 cm Depth: 10.5 cm Weight: 9.2 kg The Enclosed Bat Box 'C' from Ibstock is designed for the pipistrelle bat. It is ideal for new builds as it can be integrated directly into the brickwork to produce a discrete but attractive home for bats. The inside of the box is designed to create several roosting zones which are ideal for crevice dwelling bats such as the pipistrelle. The bottom entrance means that no maintenance is required as droppings will simply fall out the bottom.

Model	Suitability	Specification
Schwegler 1SP Sparrow  Terrace	Sparrows	Brood chamber dimensions: Height: 16 cm Width: 10.5 cm Depth: 15 cm External dimensions: Height: 24.5 cm Width: 43 cm Depth: 20 cm Weight: 15 kg Material: Woodcrete
Schwegler 17A Swift Box 	Swift	Height: 15 cm Width: 90 cm Depth: 15 cm Material: Woodcrete
Schwegler 2H Robin Box 	Robin and other small species	Height: 20 cm Width: 15 cm Depth: 20 cm Interior diameter: 12 cm Weight: 2.5 kg Material: Woodcrete

Model	Suitability	Specification
Schwegler 1B Nest Box 	Various	Height: 23 cm Diameter: 16 cm Weight: 3.6 kg Material: Woodcrete Entrance hole sizes: 26 mm or 32 mm