HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

Horizon's Deadline 5 Responses to actions set in Issue Specific Hearing on 10 January 2019

PINS Reference Number: EN010007

12 February 2019

Revision 1.0
Examination Deadline 5

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-HZDCO-PAC-REP-00188

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Appendices

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1 Horizon's Deadline 5 Responses to actions set in Issue Specific Hearing on 10 January 2019

1.1 Introduction

1.1.1 This document contains Horizon Nuclear Power Wylfa Limited's ("Horizon") responses to actions outlined by the Hearing Action Points issued by the Examining Authority [OD-007] on 25th January 2019.

1.1.2 It also contains Horizon's responses to actions it recorded during the Issue Specific Hearing on 10th January 2019 and committed to responding to in its Deadline 4 submission [REP4-009].

1.1.3 A summary of other actions set at the Issue Specific Hearing on 10th January 2019 provided at Deadline 4 or planned for subsequent deadlines is also provided.

1.2 List of responses to actions provided at Deadline 4

1.2.1 Evidence of tern colony abandonment as presented in the NRW Written Representation [REP2-235]

1.2.2 In-combination effects: North Wales Connection Project and the Cemlyn Bay SAC

1.2.3 Breakwater design and options considered

1.2.4 Additional National Marine Fisheries Service modelling results

1.2.5 Update on other consents and licences

1.3 Hearing Action points

1.3.1 The below table outlines the status of responses to actions recorded by the Examining Authority in document reference OD-005.

Table 1-1 Status of actions assigned to 'Applicant'

Ref	Action	Deadline	Status
2	How Tern monitoring arrangements and any adjustments after reactive monitoring are secured in the draft Development Consent Order (dDCO).	Deadline 4	Responded to NRW's concerns with reference to Terns at Deadline 4 in REP4-009 Appendix 1-1. Further response provided in Appendix 1-4 of this document.
4	Consider using Code of Construction Practice's (CoCPs) to refer back to Requirements on the face of	Deadline 5	Summary of response provided in section 1.4.

Ref	Action	Deadline	Status
	the dDCO and provide a compendium of requirements, standards, monitoring, etc. for each site.		
5	Reinstate Habitat Regulation Assessment (HRA) Requirements PW5 and PW6 and all other environmental related Requirements into the dDCO.	Deadline 5	Requirements PW5 and PW6 have been reinstated in the Deadline 5 update of the draft DCO (Revision 4.0).
6	Analysis of potential in-combination effects of the North Wales Connector with regard to Cemlyn Bay Special Area of Conservation (SAC).	Deadline 5	Responded at Deadline 4 in REP4-009 Appendix 1-2.
8	Provide an information note on proposed visitor centre.	Deadline 5	This is a repeat of an action regarding the visitor centre set in the Issue Specific Hearing on 7th January 2019. Horizon has therefore responded to that action.
9	Response in relation to sediment transport into the dredged shipping channel and potential return into Cemlyn Bay.	Deadline 5	Provided in Appendix 1-5 of this document.
10	Report on testing of revised criteria for water borne noise assessment – to go to NRW and eNGOs.	Deadline 4	Responded at Deadline 4 in REP4-009 Appendix 1-4.
11	Note on the requirements of Article 47 Water Framework Directive for Anglesey North water body for submission to NRW.	Deadline 5	Response provided in section 1.4.
13	Report on benthic invertebrates to be provided to eNGOs.	Post hearing	Responded at Deadline 4 as part of REP4-023.
14	Further information on saline intrusion to Ynys Môn minor ground water body in relation to dewatering.	Deadline 6	Horizon plan to respond at Deadline 6.

Ref	Action	Deadline	Status
15	To submit a revised Marine Mitigation and Enhancement Plan.	Deadline 4	Responded at Deadline 4 in REP4-023.
16	Further report on ground water impacts and mitigation at Tre'r Gof Site of Special Scientific Interest (SSSI).	Deadline 6	Horizon plan to respond at Deadline 6.
17	Further report on drainage and dewatering quality at Tre'r Gof SSSI.	Deadline 5	Provided in Appendix 1-6 of this document.
18	Report on survey validation in respect of A5025 Off-line Highway Works.	Deadline 5	Provided in Appendix 1-7 of this document.
19	Report on baseline hydrological data at Cors Gwawr and Cae Canol-dydd.	Deadline 6	Horizon plan to respond at Deadline 6.
20	Further report on the implications of hydrological and soil monitoring information and how the sites might be taken forward.	Deadline 6	Horizon plan to respond at Deadline 6.
21	PHN on consents, licences and other agreements.	Deadline 4	Responded at Deadline 4 in REP4-026.

1.4 Additional detail on action responses

Action 4

1.4.2 Horizon has reconsidered this request and come to the conclusion that accommodating this i.e. putting more 'requirements' on the face of the DCO rather than in control documents would require a fundamental change in the structure of our DCO, control documents and all other documents which refer to these securing mechanisms. This will involve a significant re-write/ restructure of our entire submission and is likely to be confusing for all our stakeholders, more than half way through Examination. A DCO can be structured in a number of ways and it is Horizon's opinion that the structure we have provided is effective. It should be noted that Horizon is equally committed to DCO Requirements (on the face of the DCO) as well as any commitments in the control documents.

1.4.3 A compendium of requirements, standards and monitoring measures is already included in the DCO submission; titled the Mitigation Route Map (MRM) [REP02-038] which acts as a navigational tool between the assessments (the source of the mitigation) and control documents (where they are secured). The tables in the MRM are structured as per Project Wide

mitigation followed by site-specific mitigation. At Deadline 2 Horizon also provided an excel version of the MRM which can be filtered by topic, site or assessment to make the navigation easier.

Action 11

Note on the requirements of Article 4(7) of the Water Framework Directive for Anglesey North water body for submission to NRW.

1.4.4 During the Issue Specific Hearing for biodiversity, the relevance of Article 4(7) of the Water Framework Directive (WFD) was raised for the Anglesey North water body. An action has been placed upon Horizon to outline its position with respect to the requirements on this issue.

1.4.5 This note presents Horizon's position. In summary, the WFD Compliance Assessment prepared by Horizon does not identify any activities that would lead to the deterioration in the status of the Anglesey North water body, nor prevent it from achieving good status. These conclusions have been reinforced by the findings of further analyses undertaken to answer questions posed by NRW and the Examining Authority during the examination of the DCO. Consequently, Horizon does not intend to prepare materials to inform a derogation under Article 4(7) of the WFD.

Hydromorphology.

1.4.6 The Wylfa Newydd Project includes the construction of the cooling water outfall and the operational cooling water discharge that may affect the hydromorphology of the Anglesey North water body. The Anglesey North water body is not currently of High Status (unlike The Skerries water body). Consequently, hydromorphological changes that will arise through the construction and operation of the Wylfa Newydd Project do not need to be considered within the WFD Compliance Assessment except where they may prevent the ecological quality elements from achieving good status.

Benthic invertebrates.

1.4.7 In Horizon's response to the Examining Authority's First Written Questions, cumulative effects of the Wylfa Newydd Project upon benthic invertebrates were considered. It is Horizon's opinion that the magnitude of change and combined effect on benthic habitats is negligible and will not affect compliance for the Anglesey North water body.

Specific pollutants.

1.4.8 The Anglesey North WFD water body is currently failing for mercury. Further information has been requested to assess the impact on load and distribution of additional/concentrated mercury due to the cooling water discharge. Where an element comprising surface water chemical status is already in the lowest status class, then any further deterioration (within class) is considered a deterioration of the waterbody. Any negative change must be measurable and meaningful at a water body scale in order for it to be considered deterioration.

1.4.9 Horizon has reviewed the data available and confirms that mercury is present in the potable water supplied to the site. However, the negative change in mercury would not be measurable, with average increases in the operational batch discharge are in the order of 0.000002 µg/L at a waterbody scale, from both a measurement location and laboratory detection aspect (LOD is 0.01 µg/L).

1.5 Summary of Deadline 5 responses to actions recorded by Horizon

Technical clarification regarding mercury contamination

1.5.2 A technical note in response to the Examining Authority request for clarification on mercury contamination as result of the Wylfa Newydd DCO Project.

Supplementary modelling of underwater noise from concurrent marine works

1.5.3 This document provides a response to the Examining Authority request during the Issue Specific Hearing for clarification on the effect of concurrent marine works on underwater noise. Specific questions were raised over the fact that two drilling rigs were used as the basis of assessment of underwater noise.

Effect of CW discharge on tidal vectors

1.5.4 A technical note setting out Horizon's position further to a request from the Examining Authority for clarification on the effect of the cooling water discharge on the tidal vectors and velocity.

1.6 Action responses planned for subsequent Examination Deadlines

1.6.1 The following is planned for Deadline 6 submission in addition to those noted in section 1.3:

> *A note on the establishment process/times and mechanisms for management of the ecological compensation sites.*

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Appendix 1-1 Technical Clarification regarding Mercury Contamination

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1 Technical Clarification regarding Mercury Contamination

1.1 Background

1.1.1 This technical note contains Horizon Nuclear Power Wylfa Limited's ("Horizon's") response to actions set by the Examining Authority during the Issue Specific Hearing on 10 January 2019

1.1.2 The Examining Authority requested clarification on mercury contamination as result of the Wylfa Newydd DCO Project.

1.1.3 Furthermore, in Natural Resources Wales' (NRW's) Written Representation [REP2-325, paragraph 7.4.13] further information was requested regarding the source and assessment of mercury. Specifically, NRW requested *'Further information is required to assess the impact on load and distribution of additional/concentrated mercury due to the cooling water discharge. Where an element comprising surface water chemical status is already in the lowest status class, then any further deterioration (within class) is considered a deterioration of the water body* [Anglesey North]*. Any negative change must be measurable and meaningful at a water body scale in order for it to be considered deterioration. Further analysis provided by the Applicant should be presented in this context'.*

1.1.4 This technical note sets out Horizon's position on this matter.

1.2 Technical response

1.2.1 Low levels of mercury would be present in the potable water supplied to the site by Dwr Cymru – Welsh Water (DCWW). This water would be processed during the power station operational phase by the 'make-up water treatment plant' and the mercury removed would be concentrated at ten times the original concentration as supplied. The resultant mercury would then be discharged as a batch discharge via the cooling water outfall.

1.2.2 The cooling water discharge was subject to an H1 environmental risk assessment. The H1 assessment process enables calculation of the impact of proposed substances released to various media. The H1 assessment screens out the need for detailed assessment of those discharges to liquid effluent streams described as insignificant in comparison to the relevant Environmental Quality Standards (EQS). Horizon's H1 assessment and modelling of the cooling water discharge is presented in Appendix D13-11 [APP-229].

1.2.3 The cooling water discharge was subject to an H1 assessment where it was compared to the relevant EQS and mercury was screened out at this stage as the concentration did not exceed those EQS thresholds (0.055 and 0.07 µg/L for average and maximum concentrations, respectively) (based on Predicted No Effect Concentrations (PNEC) [RD1] and those thresholds stipulated by DEFRA and the Environment Agency as per substances listed in the Estuaries

and Coastal Waters Priority Hazardous Substances, Priority Substances and other pollutants dataset [RD2]).

1.2.4 The concentrations of mercury discharged would be extremely low (e.g. average increases in the operational batch discharge are in the order of 0.000002 µg/L over background concentrations) and would be below the laboratory Limit of Detection (0.01 µg/L). Therefore, these concentrations would not be detectable at the scale of the Anglesey North waterbody.

1.2.5 As a result of the above, the concentrations of mercury discharged via the cooling water outfall are not considered meaningful at a waterbody scale and would not contribute towards a deterioration of any quality elements in the Anglesey North waterbody in terms of the Water Framework Directive.

2 References

Table 2-1 Schedule of references

ID	Reference
RD1	Defra and Environment Agency, 2018. *Estuaries and coastal waters priority hazardous substances, priority substances and other pollutants*. [Available at: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit]. Accessed: 22/01/2019
RD2	OSPAR, 2014. *Establishment of a list of Predicted No Effect Concentrations (PNECs) for naturally occurring substances in produced water* (OSPAR Agreement 2014-05). OSPAR Commission Background Document. 87 pp. [Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/361476/OSPAR_RBA_Predicted_No_Effect_Concentrations_PNECs_Background_Document.pdf] Accessed: 22/01/2019

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Appendix 1-2 Supplementary Modelling of Underwater Noise from Concurrent Marine Works

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1 Supplementary Modelling of Underwater Noise from Concurrent Marine Works

1.1 Background

1.1.1 This technical note contains Horizon Nuclear Power Wylfa Limited's ("Horizon's") response to actions set by the Examining Authority during the Issue Specific Hearing on 10 January 2019.

1.1.2 The Examining Authority requested clarification on the effect of concurrent marine works on underwater noise. Specific questions were raised over the fact that two drilling rigs were used as the basis of assessment of underwater noise.

1.1.3 This technical note sets out Horizon's position on this matter.

1.2 Information provided in the DCO application

1.2.1 The assessments of underwater noise impacts on marine receptors is presented in chapter D13 of the Environmental Statement [APP-132] and were based on underwater noise modelling work presented in appendix D13-9 (Underwater Noise Baseline and Modelling), [APP-227].

1.2.2 Modelling was undertaken using the RAMSGeo acoustic model to assess the possible noise impacts to marine fauna resulting from the various marine construction activities. These included:

- rock breaking (or peckering);
- rock cutting;
- dredging (suction and backhoe);
- drilling (percussive and rotary); and
- associated vessel noise.

1.2.3 The modelling was undertaken to examine each of the marine construction activities in isolation as the Phasing Strategy [REP4-014] for the Marine Works showed that construction activities were unlikely to occur concurrently.

1.2.4 Included in the assessment was the potential effect of using two drilling rigs concurrently within the marine environment, owing for the potential for more than one drilling rig to be used at any one time. Within the wetted marine environment, the activities that will include the use of underwater drilling are restricted to the construction of the MOLF; with the majority of drilling confined to the dry behind the cofferdams. Horizon is able to confirm that a maximum of two drilling rigs will be in operation at any one time in the marine environment (i.e. outside of the coffer dam) and the assessment presented in chapter D13 remains valid.

1.2.5 The assessments made within chapter D13 concluded that underwater noise would not have a significant effect on marine receptors. The modelling showed that for all fish receptors the potential injury and mortality zones from marine

construction were in very close proximity to the works (within metres) and that effects of behavioural disturbance would result in temporary displacement of species away from the area. For fish, there is sufficient available habitat outside of the zone of influence of noise, therefore the effect was considered as negligible for all fish receptors. For marine mammals the assessment also concluded that there was no potential for mortality or auditory injury and showed behavioural disturbance of species. The densities of marine mammals in the area are considered low and it was concluded that there would be a minor adverse impact both on marine mammal species, and also on designated sites where they are a qualifying feature.

1.2.6 These assessments included the effect of rock breaking which generates a larger level of underwater noise than other planned marine construction activities.

1.3 Supplementary information

1.3.1 Supplementary underwater noise modelling was undertaken to examine the potential cumulative effects if construction activities were to occur concurrently. The resulting sound levels were examined in the same way as those within the original modelling and were compared against published criteria for marine mammals and fish.

1.3.2 Vessel movements and the marine construction methods of dredging, drilling and rock cutting are considered to produce continuous sounds; whereas rock breaking is considered to produce a multiple pulse sound. The sound signal generated from rock breaking is much louder than continuous sources and therefore concurrent noise with rock breaking in operation would not change the results presented in chapter D13 of the Environmental Statement [APP-132]. Consequently, the results for the multiple pulse sound are not considered within the cumulative noise modelling. The additional results examine the effects of the continuous noise sources, combined to generate a single source level which was then compared against published guidelines.

1.3.3 The noise levels for fish receptors are provided in Table 1-1 below and show that effects are localised to the sound source. Recoverable injury from concurrent noise is limited to within 16m of the sound source, and Temporary Threshold Shift (TTS) is limited within 118m. These ranges of effect for concurrent noise are comparative to those concluded in chapter D13 of the Environmental Statement [APP-132] for the DCO application.

Table 1-1 Summary of the predicted root mean square sound pressure level (SPL_{RMS}) impact ranges from Popper *et al*. [RD1] for continuous sounds, based on concurrent noise sources. Numbers in brackets are provided as the worst case assessed in the DCO application

Activity	Range to effect	
	Recoverable injury (fish with swim bladders involved in hearing) (48h) 170 dB re 1 µPa (SPLRMS)	TTS (fish with swim bladders involved in hearing) (12h) 158 dB re 1 µPa (SPLRMS)
Concurrent noise effects	16m (13m)	118m (100m)

1.3.4 The noise levels for marine mammal receptors are provided in Table 1-2 below and show that the risk of Permanent Threshold Shift (PTS) is localised to the sound source for harbour porpoise and bottlenose dolphin and is limited to within 100m of the source for pinnipeds. Behavioural effects are shown to extend out to hundreds of meters for harbour porpoise and bottlenose dolphin and kilometres for pinnipeds. These ranges of effect for concurrent noise sources are comparative to those concluded in chapter D13 of the Environmental Statement [APP-132] for the DCO application.

Table 1-2 Summary of the predicted single strike sound exposure level (SELss) impact ranges for continuous sounds, based on concurrent noise sources. Numbers in brackets are provided as the worst case assessed in the DCO application

Harbour porpoise [RD2] [RD3], [RD4]		
Range to PTS 180 dB re 1 μPa^2s (SELss)	Range to TTS 165 dB re 1 μPa^2s (SELss)	Range to minor behavioural effect 145 dB re 1 μPa^2s (SELss)
7m (3m)	29m (36m)	580m (530m)

Bottlenose dolphin [RD5] [RD6]		
Range to PTS 215 dB re 1 µPa²s Southall *et al*. [RD5]	**Range to TTS**	**Range to minor behavioural effect 145 dB re 1 µPa²s (SELss) Finneran and Jenkins [RD6]**
8m (4m)	No TTS criteria exists in literature	690m (620m)
Pinnipeds		
Range to PTS 203 dB re 1 µPa²s Southall *et al*. [RD5]	**Range to TTS**	**Range to minor behavioural effect 145 dB re 1 µPa²s (SELss) Finneran and Jenkins [RD6]**
100m (71m)	No TTS criteria exists in literature	6.4km (5.9km)

1.3.5 The assessment of effects from underwater noise presented in chapter D13 [APP-132] of the Environmental Statement concluded a negligible effect as a result of marine construction. Furthermore, the Shadow Habitats Regulations Assessment [APP-050] also found no adverse effects on designated sites and qualifying features related to underwater noise.

1.3.6 As demonstrated in Section 1.2, the initial underwater noise modelling presented in the DCO application was based on marine construction activities happening in isolation based on the current understanding of the construction phasing.

1.3.7 Supplementary information presented in Section 1.3 provides results of the additional modelling which considers potential cumulative effects if construction activities were to occur concurrently and shows there is very little difference in the impact ranges compared to those presented and assessed in the DCO application. This additional evidence, therefore supports the DCO application such that the quantitative assessment of underwater noise on marine environment receptors, and on designated sites and qualifying features identified within the Shadow Habitats Regulations Assessment Report [APP 050], remains valid for concurrent marine works.

1.3.8 Despite Horizon's conclusion of no significant effects without mitigation Horizon will apply good practice mitigation to drilling and rock breaking in the marine environment. Mitigation will follow the best practice measures provided by JNCC [RD7] for pilling, where relevant and this is secured in the Marine Works sub Code of Construction Practice [REP2-033].

2 References

Table 2-1 Schedule of references

ID	Reference
RD1	Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D.A., Bartol, A., Carlson, T.J., Coombs, S., Ellison, W.T., Gentry, R.L., Halvorsen, M.B., Lokkeborg, S., Rogers, P.H., Southall, B.L., Zeddies, D.G. and Tavolga, W.N. 2014. *Sound Exposure Guidelines for Fishes and Sea Turtles*: A Technical Report prepared by ANSI – Accredited Standards Committee S3/SC1 and registered with ANSI. Springer Briefs in Oceanography, ASA S3/SC1.4TR-2024.
RD2	Nehls, H., Mueller-Blenkle, C., Dorsch, M., Girardello, M., Gauger, M., Laczny, M., Meyer-Löbbecke, A., Wengst, N. 2014. Horns Rev 3 Offshore Wind Farm – *Marine Mammals.* Report by Energinet.dk for Orbison A/S. [Online]. [Accessed: October 2016]. Available from: https://ens.dk/sites/ens.dk/files/Vindenergi/noise_offshore_v3.pdf
RD3	Kastelein, R.A., Gransier, R., Hoek, L. and Olthuis, J. 2012. *Temporary threshold shifts and recovery in a harbour porpoise (Phocoena phocoena) after octave-band noise at 4 kHz*. Journal of the Acoustical Society of America. 132(5), pp.3525-3537.
RD4	Lucke, K., Lepper, P.A. and Blanchet, M. 2009. *Temporary shift in masked hearing thresholds in a harbour porpoise (Phocoena phocoena) after exposure to seismic airgun stimuli.* Journal of the Acoustical Society of America. 125(6), pp.4060–4070.
RD5	Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, L., Greene, C.R., Kastak, D., Ketten, D., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A. and Tyack, P.L. 2007. *Marine mammal noise exposure criteria: Initial scientific recommendations.* Aquatic Mammals. 33(4), pp.411-521.
RD6	Finneran, J.J. and Jenkins, A.K, 2012. *Criteria and thresholds for US Navy acoustic and explosive effects analysis.* SSC Pacific Technical Report, April 2012.
RD7	Joint Nature Conservation Committee. 2010. *Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise*. [Online] [Accessed: 13 July 2017] Available from: http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf.

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Appendix 1-3 Effect of Cooling Water Discharge on Tidal Vectors

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1 Effect of Cooling Water Discharge on Tidal Vectors

1.1 Background

1.1.1 This technical note contains Horizon Nuclear Power Wylfa Limited's ("Horizon's") response to actions set by the Examining Authority during the Issue Specific Hearing on 10 January 2019. It also seeks to summarise the position regarding the links of the hydromorphological effects in benthic communities.

1.1.2 The Examining Authority requested clarification the effect of the Cooling Water (CW) discharge on the tidal vectors and velocity.

1.1.3 Furthermore, in Natural Resources Wales (NRW's) Written Representation [REP2-325, paragraph 7.4.8] it was stated that "*The application does not provide an assessment of the impact of the operational cooling water discharge upon coastal processes. It is unclear whether the water discharge velocities and volumes over the water column could affect the local dynamics, stratification, scour and sediment movement sufficiently to risk causing deterioration in quality elements* [Anglesey North]"*.*

1.1.4 A supplementary technical note was developed in response to this [REP2-007] and was entered into examination at Deadline 2 (4 December 2018) to explain the impact of the CW discharge on coastal processes. The note specifically covered the elements of scour and sediment movement from a coastal processes perspective. The effect of CW discharge on stratification is presented in appendix D13-8 [APP-226] of the DCO application, however a gap remained around the effect on tidal vectors.

1.1.5 This technical note sets out Horizon's position on this matter. The position with respect to potential effects on The Skerries and Anglesey North waterbodies in terms of both hydromorphological and biological elements will be provided in the updated WFD Compliance assessment and Article 4(7) derogation reports being submitted at Deadline 6 (19 February).

1.2 Supplementary information

Tidal vectors

1.2.2 Horizon's Wylfa hydrodynamic model was used to examine the effect of the CW flow on the tidal vectors in the vicinity of the CW outfall as well as the wider environment. The worst-case magnitude of the change in the predicted flow field for the case with the Marine Works and the 99%ile winter wave can be seen in Figure 1-1 and Figure 1-2. In these figures the flow conditions with the CW flow on are shown in red and without the CW flow in blue.

1.2.3 Figure 1-1 shows the plotted depth averaged mid flood velocity on a spring tide. Results show a small increase in velocity near the outfall with the CW flow included. There are also some differences north of Cemlyn Bay in the wave induced flow towards the southern end of the breakwater. In general, the differences on the flood tide are fairly localised and the inclusion of the CW

flow doesn't change the overall pattern of the tidal flow with the Marine Works in place and a 99%ile winter wave.

1.2.4 Figure 1-2 shows the mid ebb spring tide 99%ile winter wave developed case. The influence of the CW discharge on an ebb tide shows a change in predicted current direction around the outfall and in a line west from the outfall past the north of the western breakwater. There is some change to the detail of the predicted flow pattern in Cemlyn Bay but not to the overall picture of a counter clockwise flow. The inclusion of the CW flow does not change the overall pattern of the counter rotating flows in Cemaes Bay.

1.2.5 It is apparent from the figures presented that any changes to the flow field are localised and are not large enough to change the overall patterns within the Anglesey North waterbody, nor the Skerries waterbody. The natural gyres seen within Cemaes Bay and Cemlyn Bay are unaffected by the CW discharge and the assessments made within chapter D13 of the Environmental Statement [APP-132] and the Water Framework Directive Compliance Assessment [APP-444] remain valid.

Scour

1.2.6 A full assessment of the effects of scour are presented in chapters D13 [APP-132] and D12 [APP-131] of the Environmental Statement. The levels of bed shear stress predicted are broadly comparable to baseline and where changes do occur they generally manifest as small differences and a reduction in bed shear stress.

1.2.7 The greatest increases in bed shear stress from baseline occurred in extremely localised areas of seabed dominated by bedrock and were almost all confined to either the winter, but more usually, the high north wave conditions modelled. These areas included bedrock areas at Cerrig Brith, Trwy Cemlyn and an area to the west of the CW discharge.

1.2.8 The generally small changes in bed shear stress predicted by the modelling are judged to generate no more than minor differences in terms of the transportable sediment fraction for both sands and gravels. Far larger differences in bed shear stress are required to generate significant changes to mobilisation of these grain sizes. Furthermore, in chapter D12 [APP-131], based on the potential changes in bed shear stress modelled (spatial distribution, magnitude and extent) and acknowledging the type of substrata present, the significance of the effect on the seabed from bed shear stress was assessed as negligible.

1.2.9 Further details on the effect of the marine structures on bed shear stress and scour are provided in a supplementary note submitted into examination at deadline 2 [REP2-007].

Stratification

1.2.10 The effects of the operation the CW discharge have been assessed fully within chapter D13 [APP-132]. In summary the thermal effects of benthic fauna are considered to be localised to the outfall and assessed as being of minor significance.

1.3 Benthic

1.3.1 It is acknowledged that there are number of pathways by which the changes in coastal processes could affect benthic habitats.

Scour

1.3.2 The effects of scour resulting from the presence of the marine structures are shown to be comparatively small changes from the baseline environment with greatest increases occurring in areas dominated by bedrock tide-swept communities. Where sedimentary habitat is predicted to be effected the change in shear stress is less than 0.5N/m^2.

1.3.3 Chapter D13 [APP-132] examined the effects of scour on the benthic communities. The main biotope present in the areas identified as being susceptible to scour is dominated by brittle star beds (‘*Ophiothrix fragilis* and/or *Ophiocomina nigra* brittle star beds on sublittoral mixed sediments’) which according to the Marine Evidence Based Sensitivity Assessment (MarESA) benchmark has a medium sensitivity to abrasion. Given the very small changes predicted by the modelling (usually less than 0.5N/m^2) in an area already characterised by strong tidal flows it is not considered that the changes in bed shear stress would result in any detectable effect in benthic communities from scour.

1.3.4 Beyond the predicted extent of much of the changes in bed shear stress modelled, there may also be some overlap with the widely occurring biotope *Abra alba* and *Nucula nitidosa* in circalittoral muddy sand. This biotope is not considered sensitive to the MarESA benchmark changes in water flows and, by virtue of its resistance and resilience, has a low sensitivity to abrasive activities such as scour.

1.3.5 The rocky habitats that overlap with the predicted changes in bed shear stress are characterised by communities well adapted to strong tidal flows and reasonably tolerant of sediment scour. Bearing in mind the comparatively small increases to bed shear stress predicted even at the rocky headlands i.e. Trwyn Cemlyn, Cerrig Brith and, to a lesser extent, Wylfa Head; it is not considered that the changes in bed shear stress would result in any detectable effect to the communities.

1.3.6 The effects through operation are considered to be the same as the assessments provided above however it is acknowledged that there is a small area of scour that is caused (on a northerly wave, only) to the west of the CW discharge.

1.3.7 Acknowledging the small changes in tidal flows and therefore bed shear stress predicted by the modelling, the spatial distribution of these changes, the types of communities present within the extent of the changes and the wide occurrence of these communities along the north Anglesey coastline the effect of scour on habitats and communities (including habitats and communities of conservation importance) was assessed as not significant.

CW discharge

1.3.8 As shown in section 1.2.10 above, the effect of the CW discharge on benthic habitats is considered to be localised to the outfall location owing to the buoyant nature of the thermal plume and the directional design of the outfall structure.

1.3.9 Impacts around the outfall are considered to be confined to within 300m of the outfall. The habitat within this area that could be considered Annex 1 rocky reef covers 0.3ha, however owing to the localised scale of effect the assessment considered this as minor adverse effect.

1.3.10 A similar assessment was made for subtidal habitats with an area of 4.2ha predicted to be affected; though this area is not considered to be of conservation importance. The extent of effect was considered small and habitats affected are considered common along the coastline.

Tidal vectors

1.3.11 The effect of the CW discharge on tidal vectors have been shown to result in localised changes in the flow field with at most, small increases in the flow field local to the discharge location. The effects of these changes have been reviewed and assessed under the effects of scour and therefore no additional effects are predicted.

1.4 Cumulative benthic assessment

1.4.1 The assessment of loss of benthic communities has been examined in detail with respect to both the habitats considered to be permanently lost from the marine environment, as well as those considered as temporary effects through operation and physical disturbance.

1.4.2 The areas predicted to be affected from changes to coastal processes fall within those already assessed as direct loss and therefore the effect on the benthic receptors are considered.

1.4.3 The cumulative assessment undertaken for the project has been provided through responses to written representations [REP3-035] and concluded that the cumulative effect on benthic habitats was not significant.

Figure 1-1 Worst-case effect of CW flow on tidal vectors during spring tide mid-flood with 99%ile winter wave

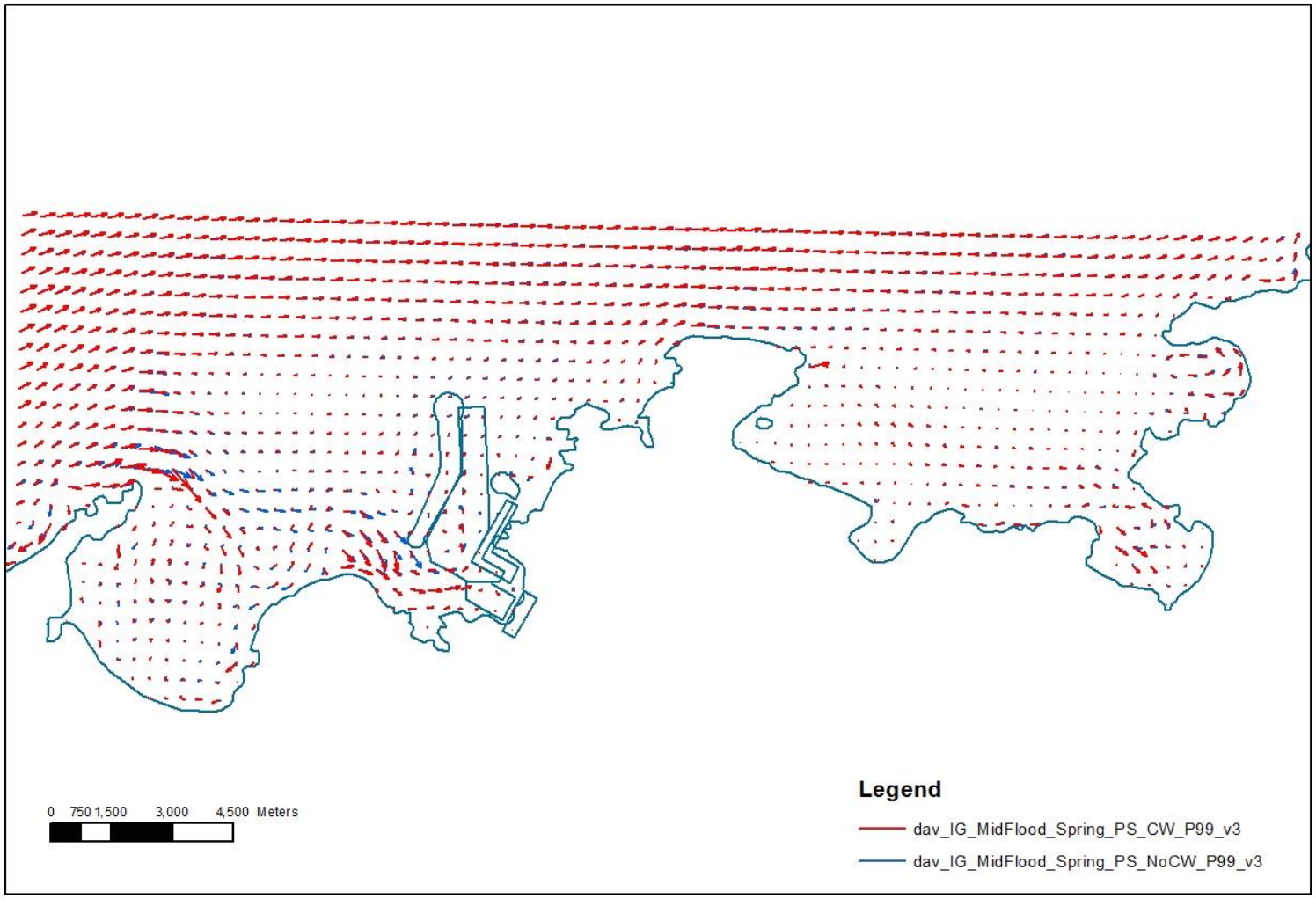
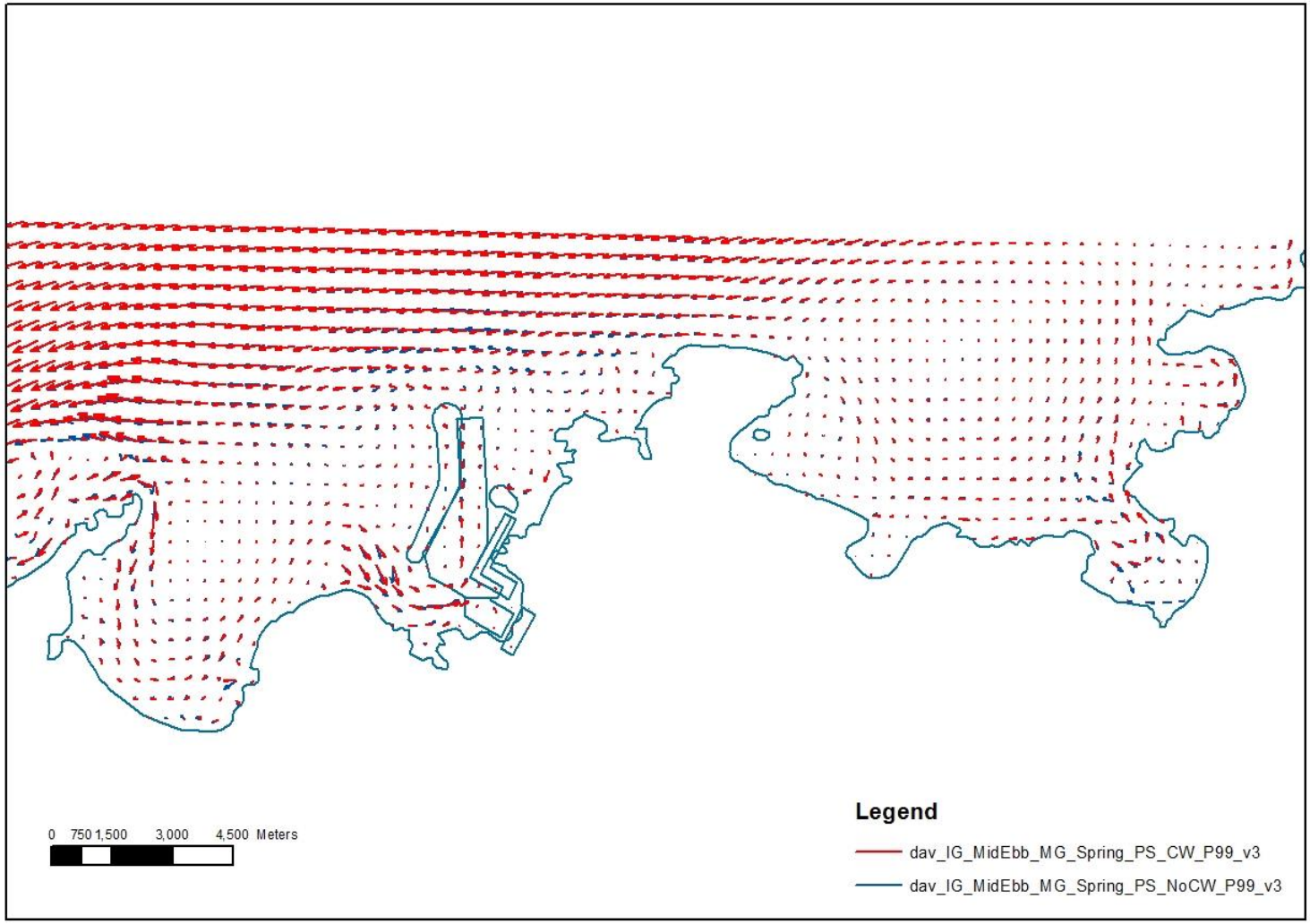


Figure 1-2 Worst-case effect of CW flow on tidal vectors during spring tide mid-ebb with 99%ile winter wave



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WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

Appendix 1-4 Security of Tern Mitigation and Adjustments following Reactive Monitoring

PINS Reference Number: EN010007

12 February 2019

Revision 1.0
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Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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Contents

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1 Horizon Deadline 5 responses to actions set in the first Biodiversity Issue Specific Hearing on 10 January 2019

1.1 Summary of Deadline 5 responses

Security of tern mitigation and adjustments following reactive monitoring

1.1.2 Action 2 from the first Biodiversity ISH requested confirmation from Horizon on how tern monitoring arrangements and any adjustments after reactive monitoring are secured in the draft Development Consent Order (dDCO).

1.1.3 Controls on construction activities that may impact the terns (e.g. blasting), monitoring arrangements, and mechanisms to adjust construction activities where there are observed reactions from the terns, are set out in the Main Power Station Site sub-CoCP (Section 11.4) and the Marine Works sub-CoCP (Section 11.6) (refer to Deadline 5 versions of these control documents (Revision 3.0)).

1.1.4 Compliance with sub-CoCPs are secured through dDCO Requirements WN1 and WN24 which require Horizon to comply with both these documents during construction of the Wylfa Newydd DCO Project, unless otherwise agreed with the Isle of Anglesey County Council or, in the case of WN24, Natural Resources Wales. (Refer to the latest version of the dDCO submitted at Deadline 5 (Revision 4.0).) .

1.1.5 Failure to comply with the sub-CoCPs would constitute a breach of the terms of the DCO (that is, Requirements WN1 and WN24 and a certified control document), which is a criminal offence under section 161 of the Planning Act 2008.

1.1.6 As noted by Horizon's Counsel at the second DCO ISH on 9 January 2019 [REP4-009], the fact that tern mitigation measures are within a control document, rather than a specific requirement, does not make them any less secured or enforceable. Horizon has utilised control documents in this way to avoid the need for long and complicated requirements and to ensure that the contractor has all controls within one document.

1.1.7 As the sub-CoCPs will be certified documents through the DCO (as identified in article 76 and Schedule 18 (Certified Documents)), they will form part of the DCO itself which will mean they are just as secure as a requirement that specifically details all the controls within Schedule 3.

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Appendi 1-5 Technical Clarification regard ing Dredging and Sediment Resuspension

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List of Tables

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1 Technical clarification regarding dredging and sediment resuspension

1.1 Background

1.1.1 This technical note contains Horizon Nuclear Power Wylfa Limited's ("Horizon's") response to actions set by the Examining Authority during the Issue Specific Hearing on 10 January 2019

1.1.2 Dr Rod Jones a representative of the eNGO's raised questions regarding maintenance dredging activities during the Marine Works.

1.1.3 Clarification was sought concerning the effect of:

- the dredge pockets acting as a sink for superficial soft sediment;
- the effect of re-suspension of sediment from vessel wash; and,
- the removal of sediment from the local area and disposal at Holyhead North Disposal Site during maintenance dredging rather than disposal within the vicinity of the Marine Works.

1.1.4 This technical note sets out Horizon's position on the three aspects raised in paragraph 1.1.3.

1.2 Information provided in the DCO application

1.2.1 Chapter D13 [APP-132] of the Environmental Statement sets out the design basis for dredging of the outer harbour. Paragraph 13.5.31 states '*The superficial soft sediment (mainly sands and gravels) would be removed by conventional dredging plant such as a backhoe dredger, cutter suction dredger or trailing suction hopper. For the purpose of the assessment and modelling the worst case upper limit of soft sediment that would be dredged is a bulked volume of 242,000m3 (equating to a saturated density of approximately 352,000 wet tonnes, based on a specific gravity of 1.6), although the values are likely to be considerably less*'.

1.2.2 Paragraph 13.5.37 of chapter D13 [APP-132] states that the disposal of superficial soft sediment would be at Holyhead North Disposal Site (ISO043).

1.2.3 Assessments contained within chapter D13 [APP-132] examine the effect of resuspension and deposition of suspended solids from dredging activities on marine water quality, plankton, benthic habitats, fish, marine mammals, seabirds and on designated sites.

1.2.4 In all cases the assessments conclude that there would be no significant effects from dredging.

1.2.5 Chapter D12 [APP-131], appendix D12-2 [APP-217] and chapter D13 [APP-132] presents data describing the lack of superficial soft sediment that currently exists within the Wylfa Newydd Development Area. This situation is not expected to change as a result of the Wylfa Newydd DCO Project.

1.3 Supplementary information

1.3.1 Recent modelling work completed for engineering purposes [RD1] examined sediment transport in the vicinity of the cooling water intake and marine component of the Wylfa Newydd Development Area. The study concluded that tidal currents alone were insufficient for the transport of material within the Wylfa Newydd Development Area (that is to be dredged during construction); and wave-induced bed shear stress is required in order to bring sediment into suspension and for transport.

1.3.2 This supplementary modelling supports the findings contained within appendix D12-2 (Sediment Regime) [APP-217] of the Environmental Statement which concludes that cohesive fine grained muddy sediments (silts and clays) are not a significant part of the seabed surface sediment in this high-energy environment.

Clarification: Dredge pockets act as a sink

1.3.3 It is evident from the background suspended solid concentrations (see appendix D13-1 (Water Quality and Plankton Surveys Report)) [APP-219] that suspended sediment concentrations (predominantly fine-grained material i.e. silt and clay) are low within the vicinity of the Wylfa Newydd Development Area, typically 6.1mg/l. Therefore, the likelihood of significant accumulations of fine-grained material in the MOLF dredge pockets or outer harbour after the capital dredge is considered to be low.

1.3.4 Furthermore, hydrodynamic and wave modelling shows that there will be continuous flushing flow within the outer harbour which would limit significant accumulation of fine-grained material over the long term as the constant flushing (by tides) and frequent agitation (by waves) would act to remobilise accumulations, which would be transported away and dispersed by these same conditions.

1.3.5 While maintenance dredging may be required during the construction phase of the Wylfa Newydd DCO Project, the expectation is that this would be infrequent and consist of small volumes if it were to be required. The total volumes of superficial soft sediment requiring disposal quoted in the DCO application would not be exceeded from the capital and maintenance dredging during the construction phase.

Clarification: Effect of vessel wash on re-suspension

1.3.6 The limited amount of fine-grained material in marine waters along the north Anglesey coast and on the sea bed within the Wylfa Newydd Development Area means that limited resuspension of fine-grained material is predicted from vessel propeller wash. Further accumulations as fine-grained material is predicted to be limited as described in paragraphs 1.3.3 to 1.3.5.

1.3.7 It is anticipated that any sediment that may be resuspended, will be coarse-grained (sand and/or gravel) material, and if suspended it will be deposited rapidly and in close proximity (within metres) to where it was remobilised,

either once away from the source of the 'wash' or once the source of the 'wash' was removed (i.e. the vessel has departed/powered down engines).

1.3.8 Following capital dredging, it is considered that much of the remaining coarse-grained material will remain within the marine part of the Wylfa Newydd Development Area and will not be mobilised into the wider local coastal and marine environment.

Clarification: Maintenance dredging disposal at Holyhead North rather than within the vicinity of the Marine Works

1.3.9 Marine dredging and disposal is strictly regulated through the licensing requirements of the Marine and Coastal Access Act 2009. Natural Resources Wales (NRW) is responsible for licensing the disposal of dredged material at sea around Wales. Disposal from capital and maintenance dredging can only be undertaken at a licenced disposal site and for the Wylfa Newydd Project Holyhead North Disposal Site (IS043) has been selected.

1.3.10 An assessment of the potential for re-use of dredged material has been undertaken and information is presented within the Waste Framework Strategy Assessment submitted to NRW as part of Horizon's Marine Licence Application. The assessment of re-use is in accordance with relevant plans and policy i.e. the Draft Welsh National Marine Plan, and the Marine Policy Statement.

1.3.11 In consultation with NRW, advice received states that superficial soft sediment from capital and maintenance dredging from the outer harbour should remain in the marine environment. Accordingly, Horizon has selected the nearest ~~licenced~~ disposal site to dispose of the sediment, to ensure that there is no loss to the wider sediment budget source.

1.3.12 Due to disposal being strictly regulated, disposing of sediment within the vicinity of the Marine Works (i.e. within the area between Cemlyn and Cemaes Bays) would not be possible as it would be out-with a licenced disposal site.

2 References

Table 2-1 Schedule of references

ID	Reference
RD1	HR Wallingford (2018) Wylfa Newydd Nuclear Power Station Marine Works: Sediment transport study. DKR5837-RT005-R02-00. Report No: RT005. Report for Bechtel Management Company

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Appendix 1-6 Further Report on Drainage and Dewatering Quality at Tre'r Gof SSSI

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1 Further Report on Drainage and Dewatering Quality at Tre'r Gof SSSI

1.1 Further report on drainage and dewatering quality at Tre'r Gof SSSI

1.1.1 Tre'r Gof SSSI is a seasonal, groundwater-dependent terrestrial ecosystem (GWDTE). The inflow of groundwater in the soils, superficial deposits and bedrock brings mineral enriched water into the SSSI via a series of small springs, seeps and flushes, with calcium concentrations being particularly important, supporting conditions for the plant communities within the SSSI.

1.1.2 The essential lime content of the water supplying the wetland may derive from contact of infiltrating water with the calcareous Irish Sea Lodgement Till, but potentially from other sources that may include bedrock. The low permeability and low hydraulic gradient in the peat soils within the fen play an important role in preventing water from being flushed rapidly through the soils. The retention time of water in the peat allows ion exchange to occur resulting in the build-up of calcium and bicarbonate/carbonate ions which calcicolous plant species require.

1.1.3 D8 - Surface water and groundwater [APP-127] concluded that there could be significant effects due to changes to surface water/ shallow groundwater inflows at seeps and flushes affecting water availability and quality at Tre'r Gof SSSI due to a managed drainage system. These effects were assessed as small during construction and medium during operation with the resulting significance of effect being moderate adverse and major adverse respectively. These effects remain even after mitigation, due to uncertainty as to the source of the calcium in the SSSI water.

1.1.4 The assessment of effects on Tre'r Gof SSSI presented in chapter D9 for ecology concluded a major adverse effect, as a precautionary approach, under the circumstance where the drainage design cannot fully mitigate adverse effects on the SSSI from changes in hydrological conditions.

1.1.5 D8 - Surface water and groundwater [APP-127] concluded that there would be a minor adverse effect from dewatering on the quality of water at Tre'r Gof SSSI.

1.1.6 The impacts from dewatering were re-considered in the ES Addendum section 5.7, to be submitted at Deadline 6 (19 February 2019), following a revision of the Tre'r Gof conceptual groundwater model. This increased the minor adverse effect from dewatering to a moderate adverse effect. Accordingly, Horizon made provision for further additional mitigation of groundwater around Tre'r Gôf if groundwater monitoring identifies an effect on the qualifying groundwater dependent terrestrial ecosystems (GWDTE). This is detailed in the ES Addendum 5.7 Groundwater and secured in the revised Construction Method Statement and Main Power Station Site sub-CoCP Section 10.4 (both to be submitted at Deadline 5 (12 February 2019)). With the further mitigation, the moderate adverse effect returned to residual minor adverse effect.

1.1.7 Horizon responded to the Examining Authority's Written Question 2.0.16 [REP2-375] with further detail on the effects on Tre'r Gof SSSI of the drainage system and addressed the effectiveness of further mitigation, including the adaptive water management mitigation strategy built around the monitoring of flows and water quality.

1.1.8 APP-127 identified the aim of the drainage system as to maintain the status quo for water availability and water quality to the Tre'r Gof SSSI and to reduce impacts from the proposed development activities. The drainage system is designed to reduce construction effects of sediment loading to sensitive surface water features, prevent deterioration of surface waters and ensure baseline water quality is not exceeded.

1.1.9 A preliminary design for construction surface water drainage was provided in Appendix D8-8 [APP-167]. Requirements for the final design are set out in the Main Power Station Site sub-CoCP [APP-415] and the Design and Access Statements [APP-408 and APP-409]. These note that the drainage system has been designed to incorporate as much flexibility as possible so that changes can be made to drainage water treatment as well as the volume of water being released. Monitoring data will be used during the detailed design stage to refine the drainage system to reduce effects if any are observed.

1.1.10 Secured mitigation relevant to drainage and dewatering at Tre'r Gof in the Main Power Station Site sub-CoCP submitted at Deadline 5 (12 February 2019) includes:

- Installation of drainage around the north, south, east and north-east of the SSSI to manage runoff from the landscape mounds. The drainage would seek to maintain the shallow groundwater flow to the SSSI.
- Appropriate monitoring to determine if there is an effect on Tre'r Gof SSSI;
- Additional mitigation, as agreed with the regulator, would include:
  - dosing using polyelectrolytes;
  - installation of additional treatment capacity;
  - greater manual intervention/management of the system;
  - new drainage channels;
  - new pumping systems;
  - Controlling water loss from the site to avoid drying and oxidation of the peat body; and
  - Groundwater recharge
- Passive engineered drainage system for the landform area to match baseline conditions as closely as practicable, as part of the final landform design.
- Monitoring and mitigation will be integrated with wider adaptive water management within the Tre'r Gof catchment.

1.1.11 The revised Construction Method statement (submitted at Deadline 5 (12 February 2019)) includes embedded mitigation such that the cooling water

tunnels within the Tre'r gof catchment will be lined post construction such that there will be no ingress or loss of water from the tunnel.

1.1.12 Mitigation in the form of a permeable drainage blanket made up of inert rock material beneath the Mound A to the south and east of Tre'r Gof SSSI is also set out in the Landscape and Habitat Management Strategy [APP-424]. The use of inert rock will seek to ensure that the shallow groundwater chemistry does not change appreciably from the baseline conditions. This Strategy notes that drainage design, as detailed above, would reduce potential effects on receiving water bodies and ecological receptors, most notably Tre'r Gof SSSI.

1.1.13 The design of dewatering and drainage mitigation to address adverse effects on water quality at Tre'r Gof will be addressed jointly as part of a wider adaptive Tre'r Gof water management mitigation strategy.

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Appendix 1-7 Phase 1 Validation Report Confirming why Baseline Data for A5025 is still considered robust

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Wylfa Newydd Project

Horizon Nuclear Power Ltd

Phase 1 Habitat Survey Validation

60PO80AG/TER/TM/007 | 1

November 2018

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Contents

1. Introduction

Horizon Nuclear Power Ltd commissioned Jacobs UK Ltd to carry out a 'walk-over' validation of the original Phase 1 habitat data collected for the Wylfa Newydd Project.

The validation survey was carried out in 2018 within the Order Limits sought in the DCO application for the Wylfa Newydd Development Area (WNDA), the Park and Ride site at Dalar Hir and the A5025 Off-line Highway Improvements, encompassing the Off-site Power Station Facilities site. The Logistics Centre was not included within the survey as Phase 1 habitat data available for this area was gathered more recently, in 2017 (Avian Ecology, 2017).

The original Phase 1 habitat data had been collated from the following surveys:

- WNDA Phase 1 habitat survey 2013 (Jacobs, 2013)
- Dalar Hir Park and Ride Site Phase 1 habitat survey 2013 (Jacobs, 2013b)
- A5025 Off-line Highway Improvements Phase 1 habitat survey 2013 and 2015 (Horizon Nuclear Power, 2018)
- Wylfa Newydd Project Aerial Imagery Classification and Validation 2017 (Jacobs, 2017)

1.1 Objectives

The objectives of the 2018 survey were to;

- identify any areas of change in habitat type between the collated data set and the current land use;
- to assess why these changes may have occurred; and,
- to determine whether these changes have the potential to result in material changes in the wider ecological baseline information which supports the application for development consent for the Wylfa Newydd Project.

2. Methodology

2.1 Field survey

The 2018 validation survey involved a rapid walk over of the following sites relevant to the Wylfa Newydd Project to record changes in Phase 1 habitat classification from the previous surveys:

- the WNDA
- the A5025 Off-line Highway Improvements
- the Park and Ride at Dalar Hir

The area covered by the survey is set out in Figures 1–3 in Appendix A. The survey was carried out over three weeks between 17 July and 17 August 2018. It used descriptions from the recognised guidelines: *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit; Joint Nature Conservation Committee* (JNCC, 2010) to classify habitats. During the survey, habitats and the dominant species present in them were recorded using an iPad with GPS to accurately pinpoint features (to within 10 metres).

When assigning Target Notes, a separate series of Target Notes was used for each of the three sites surveyed (i.e. there is a Target Note 1 for the WNDA, a Target Note 1 for the A5025 Off-line Highway Improvements and a Target Note 1 for Dalar Hir). The tables of Target Notes provide botanical species composition, occasionally using the DAFOR scale, of the habitat under consideration.

Any incidental observations of evidence of protected species/species of conservation interest were also recorded during the survey.

The Phase 1 habitat types recorded during the 2018 walk-over survey were compared to those originally recorded and where there were changes, these are listed in Tables 1 to 3. Where changes were noted, the area has been highlighted on Figures 1-3 in Appendix A and given a Target Note. Target Notes describing the habitats are provided in Appendix B in Tables 4 to 6.

Scientific and common names of plants are given after Stace (2010).

2.2 Limitations

The 2018 validation survey involved a rapid walk over of the above sites to note changes from the previous surveys and not a complete resurvey of all the land parcels. Where possible, all the land parcels within the Order Limits for the three areas were walked over by the surveyors, but there were occasions where access was not available the survey was conducted from an adjoining location and inspected using binoculars.

The presence of cattle at Dalar Hir prevented access to field parcels 6 and 11 (see figure 3), which were therefore viewed from the adjoining road; these parcels appeared to support the same habitat as previously recorded, but their botanical species compositions could not be closely inspected.

The boundary of the accessible area at WNDA is shown on Figure 1 and Figures 1.1 to 1.8 in Appendix A.

3. Results

3.1 WNDA

Overview Figure 1 and large-scale Figures 1.1 to 1.8 in Appendix A illustrate where the changes in the Phase 1 habitat classification have been highlighted for the WNDA. Table 1 summarises the significant changes shown on each of the figures.

Table 1: WNDA Summary of main changes observed. See Table 4, Appendix B for Target Notes.

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 1.1	TN8	Coastal grassland	No change	Dense scrub - western gorse
Fig 1.1	TN9	Coastal grassland	No change	Bracken
Fig 1.1	TN10	Semi-improved neutral grassland	No change	Tall ruderal vegetation
Fig 1.2	TN11	Semi-improved neutral grassland	No change	Bare earth -archaeological excavation
Fig 1.2	TN12	Mixed plantation woodland	No change	Broadleaved woodland
Fig 1.2	TN19	Semi-improved neutral grassland	Not recorded	Poor semi-improved grassland
Figs 1.2 and Fig 1.5	TN20	Arable	Not recorded	Bare earth -archaeological excavation
Figs 1.2 and Fig 1.5	TN21	Amenity grassland	Not recorded	Poor semi-improved grassland and tall ruderal
Fig 1.4	TN1	Marshy grassland	No change	Improved grassland
Fig 1.4 and Fig 1.7	TN2	Improved grassland	No change	Poor semi-improved grassland
Fig 1.4	TN3	Buildings	No change	Semi-improved neutral grassland and bare earth - following demolition of buildings.
Fig 1.4	TN4	Mixed plantation woodland	No change	Broadleaved semi-natural woodland and scattered coniferous trees - six mature monetary pine adjacent to wall along road
Fig 1.4	TN7	Improved grassland	No change	Mosaic of dense scrub, poor semi-improved grassland and tall ruderal vegetation
Fig 1.4	TN13	Amenity grassland	No change	Poor semi-improved grassland
Fig 1.4	TN14	Poor semi-improved grassland	No change	Marshy grassland
Fig 1.4	TN15	Improved grassland	No change	Poor semi-improved grassland
Fig 1.4	TN16	Poor semi-improved grassland	No change	Bare earth and hard standing compound
Fig 1.4	TN17	Poor semi-improved grassland	No change	Bare earth
Fig 1.4	TN18	Scattered scrub	No change	Neutral semi-improved grassland
Figs 1.4 and 1.5	TN23	Poor semi-improved grassland	No change	Improved grassland

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 1.4	TN25	Semi-improved grassland	No change	Marshy grassland
Fig 1.4	TN26	Poor semi-improved grassland	No change	Bare earth - archaeological excavation
Fig 1.4	TN27	Arable	Improved grassland	Improved grassland
Fig 1.4	TN28	Dense scrub	Poor semi-improved grassland	Poor semi-improved grassland
Fig 1.5	TN22	Poor semi-improved grassland	No change	Improved grassland
Fig 1.5	TN29	Amenity grassland	No change	Poor semi-improved grassland and tall ruderal mosaic
Fig 1.7	TN5	Marshy grassland	No change	Semi-improved grassland – reverting to this habitat.
Fig 1.7	TN6	Not surveyed	Scattered trees	Dense scrub and swamp
Fig 1.7	TN24	Improved grassland	Poor semi-improved grassland	Improved grassland

3.2 A5025 Off-line Highway Improvements

Figures 2.1 to 2.5 in Appendix A illustrate where the changes in the Phase 1 habitat classification have been highlighted for the A5025 Off-line Highway Improvements. Table 2 summarises the significant changes shown on each of the figures.

Table 2: A5025 Off-line Highway Improvements. Summary of main changes observed. See Table 5 Appendix B for Target Notes

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 2.1	TN1	Poor semi-improved grassland	No change	Semi-improved neutral grassland
Fig 2.1	TN2	Marshy grassland	No change	Semi-improved neutral grassland
Fig 2.1	TN3	Standing water	No change	Semi-improved neutral grassland
Fig 2.2	TN6	Poor semi-improved grassland	No change	Mosaic of dense scrub and poor semi-improved grassland, with semi-mature broadleaved trees along running water - the River Alaw.
Fig 2.2	TN7	Standing water	No change	Dry ditch – with riparian vegetation
Fig 2.2	TN8	Standing water	No change	Dry ditch
Figs 2.2 and 2.3	TN5	Poor semi-improved grassland	No change	Improved grassland
Fig 2.3	TN4	Standing water	No change	Bare earth – a poached, dried out pond
Fig 2.4	TN9	Semi-improved neutral grassland	Poor semi-improved grassland	Tall ruderal vegetation
Fig 2.4	TN10	Scattered coniferous trees over semi-improved neutral grassland.	Not recorded	Scattered broadleaved trees over poor semi-improved grassland

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 2.4	TN11	Broadleaved scattered trees.	Not recorded	Broadleaved woodland over semi-improved grassland clearing
Fig 2.4	TN12	Standing water	No change	Drying pond - no standing water but pond base damp
Fig 2.4	TN13	Marshy grassland	No change	Marshy grassland, improved grassland and bare earth - manure pile
Fig 2.4	TN14	Arable	Improved grassland	Improved grassland
Fig 2.4	TN15	Semi-improved neutral grassland	No change	Improved grassland
Fig 2.5	TN16	Semi-improved neutral grassland	No change	Improved grassland
Fig 2.5	TN17	Semi-improved neutral grassland	No change	Improved grassland
Fig 2.5	TN18	Semi-improved neutral grassland	No change	Broadleaved woodland
Fig 2.5	TN19	Semi-improved neutral grassland	No change	Marshy grassland
Fig 2.5	TN20	Standing water	No change	Broadleaved woodland – adjacent to running water

3.3 Dalar Hir

Figure 3 in Appendix A illustrates where the changes in the Phase 1 habitat classification have been highlighted for the Dalar Hir Park and Ride site. Table 3 summarises the significant changes shown on each of the figures.

Table 3: Dalar Hir: Summary of main changes observed. See Table 6, Appendix B for Target Notes

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 3	TN1	Improved grassland	Not recorded	Building
Fig 3	TN2	Arable	Not recorded	Improved grassland
Fig 3	TN3	Improved grassland	Not recorded	Bare earth
Fig 3	TN4	Improved grassland	Not recorded	Bare earth with recently sown crop
Fig 3	TN5	Not recorded	Not recorded	Semi-improved neutral grassland
Fig 3	TN6	Marshy grassland	No change	Marshy grassland remnant
Fig 3	TN7	Bare ground	No change	Tall ruderal/poor semi-improved grassland mosaic
Fig 3	TN8	Semi-improved grassland	No change	Marshy grassland
Fig 3	TN9	Improved grassland	No change	Poor semi-improved grassland
Fig 3	TN10	Improved grassland	No change	Marshy grassland
Fig 3	TN11	Improved grassland	No change	Marshy grassland
Fig 3	TN12	Poor semi-improved grassland	No change	Dense scrub

Figure (Appendix A)	Target Notes (Appendix B)	Phase 1 habitat type (2013)	Phase 1 habitat type (2017 Aerial Image Classification)	Phase 1 habitat type (summer 2018)
Fig 3	TN13	Poor semi-improved grassland	No change	Marshy grassland
Fig 3	TN14	Poor semi-improved grassland	No change	Tall ruderal vegetation
Fig 3	TN15	Improved grassland	No change	Semi-improved neutral grassland
Fig 3	TN16	Poor semi-improved grassland	No change	Semi-improved neutral grassland

4. Discussion

4.1 WNDA

The changes recorded at WNDA in the 2018 survey can be grouped into four types:

- works associated with WNDA, such as building abandonment, building demolition, archaeological excavation and road construction;
- changes in agricultural management;
- surveyor error/bias

4.1.1 Works associated with WNDA

Building abandonment occurred where properties were no longer inhabited, in preparation for demolition. Amenity grassland associated with these properties was reverting to poor-semi-improved grassland and/or tall ruderal vegetation, such as at TN21, and TN29. Where buildings had recently been abandoned the grassland associated with them was a closer approximation to amenity grassland than to poor-semi improved grassland to which it was reverting. The largest area of reverting amenity grassland occurred at TN13 where an amenity grassland previously used as a sports pitch was reverting to poor semi-improved grassland. At TN13 a building has already been demolished and now comprised bare ground and semi-improved grassland.

In 2018, a number of archaeological excavations were in progress, which were classified as bare earth. Such excavations were recorded at TN11, TN20 and TN26.

Road construction and hard standing areas for site investigation works were noted across the WNDA in 2018 which were not present in 2013 survey. New roads are shown on the large-scale figures (Figures 1.1 to 1.5), and in the 2017 validation, but are not listed separately in Table 1, as they are extensive and have changed the habitat present in 2013 to hard standing. In 2018, construction areas were recorded at TN16 and TN17.

4.1.2 Changes in agricultural management

Agricultural intensification appeared to be responsible for changes noted at TN1, TN5, TN7, TN8, TN19 and TN22, for example altering the habitat from poor semi-improved grassland to improved grassland. Intensification included two areas where marshy grassland was being improved: TN5 where the marshy grassland was in the process of being converted to improved grassland and at TN25 where the marshy grassland had already been converted to improved grassland

Agricultural extensification appeared to be responsible for changes noted at TN2, TN14, TN15, TN 25, for example where improved grassland has reverted to poor semi-improved grassland. Extensification included two areas of marshy grassland noted in 2018, which had not been recorded previously; one at TN1 and the other at TN15, which are likely be the result of a relaxation of farming practices allowing the re-growth of rushes in damp areas where they had previously been cut back.

4.1.3 Survey error/bias

There were some instances where it was not feasible that habitats can change to the extent noted and this was assumed to be because of survey error/bias. Such instances occurred at TN12, TN4 and TN6, all of which related to woodland types classification. Such errors may have occurred if the woodland was viewed from a road or from a distance and this was likely to be as a result of access difficulties during the original field survey work.

Survey error/bias is also likely to have resulted in the mis-classification of habitats on the headland at the north west of the power station: more bracken and scrub was recorded in 2018 than had been previously recorded (TN8, TN9 and TN10). On the headland at south west of the power station (TN18), most of the habitat was semi-improved grassland in 2018, rather than scattered scrub recorded of previous surveys and this change

could have been as a result of increased grazing or potentially surveyor error/bias during the 2013 data collection visit.

4.2 A5025 Off-line Highway Improvements

The changes recorded within the A5025 Off-line Highway Improvement Order Limits in the 2018 survey can be grouped into the following types:

- changes in agricultural management;
- climatic conditions (2018 was unusually hot and dry); and
- surveyor error/bias

4.2.1 Changes in agricultural management

Agricultural intensification appeared to be responsible for the changes noted at TN5, TN4, TN15, TN16 and TN17, for example altering the habitat from semi-improved neutral grassland to improved grassland.

Agricultural extensification was recorded for the field at TN1 which had been previously classified as poor semi-improved grassland, but in 2018 was classified as semi-improved grassland. However, it is considered likely that this field was mis-classified in earlier surveys, rather than that agricultural practices have changed significantly since 2013, as the species composition of this grassland would take a few years to establish. Forbs present within the sward included mash pennywort (*Hydrocotyle vulgaris*), usually associated with bogs and fens, and lesser spearwort (*Ranunculus flammula*), also associated with marshes and wet places. It was noted at the time of survey that a light scattering of manure had been applied across this field, and that it had recently been cut, with cutting removed. The entire field was managed in the same way, including two slight depressions crossing the field (TN3) in the field that previous surveys had recorded as standing water, and which were now clearly part of the management of the entire field; this is illustrated by the close-up view of the vegetation in this field (Photograph 1) and a more distant view of one of the depressions in it (Photograph 2). . In the same field, an area previously recorded as marshy grassland in 2018 was recorded as semi-improved neutral grassland (Target Note 2 and Photograph 3).

Photographs illustrating the habitat at A5025 off-line locations at TN1 and TN3

Photograph 1 showing close-up of the semi-improved field at TN1

Photograph 2 showing slight depression (TN3) in the same field as TN1, showing how the depression is integrated into the field's management. Note the light covering over manure.

Photograph 3 showing habitat at TN2 now classified at semi-improved grassand, previously classifed as marshy grassland. The soft rushes appear recently cut, and the grassland in which they are growing is the same as the rest of the field.

The following changes in management were recorded at TN 7 and TN14. The 2018 survey recorded a dry ditch at TN7 which was previously recorded as standing water. This appeared to be as a result of the water being diverted, as evidence for this was found during the 2018 survey. A change in arable crop to improved grassland was recorded at TN14.

4.2.2 Climatic conditions

The 2018 survey took place during a period of unusually hot and dry weather, in which very little rainfall occurred over Anglesey or the UK for several weeks. The hot, dry weather is likely to have been a contributory factor to the dry ditch at TN8, the dry and poached pond at TN4 and the drying pond at TN12. It is unlikely that these changes in habitat would be permanent.

4.2.3 Survey error/bias

There were some instances where it was not feasible that habitats can change to the extent noted and this was assumed to be because of survey error/bias. Such instances occurred at TN6, TN10, TN11, TN18, and TN20 , all of which related to woodland types classification. Such errors may have occurred if the woodland was viewed from a road or from a distance and this was likely to be as a result of access difficulties during the original field survey work.

In the 2018 survey a species rich diverse area of marshy grassland was recorded at TN19 which had previously been recorded as semi-improved neutral grassland, which is considered to be due to survey error. At TN13 a smaller area of marshy grassland was recorded in 2018 than in 2013, also likely to be due to survey or mapping error.

4.3 Dalar Hir

The changes recorded at within the Dalar Hir Park and Ride Order limits in the 2018 survey can be grouped into the following types:

- change in agricultural management;
- natural succession and
- highway management

4.3.1 Change in agricultural management

Agricultural land use change was responsible for the changes noted at TN1, TN2, TN3 and TN4, and included construction of a new barn and conversion of arable to improved grassland.

Agricultural intensification was noted at TN6, where improved grassland had taken the place of marshy grassland.

A relaxation in agricultural management appears to be responsible for the changes notes at TN8, TN9, TN10 and TN11. They include two instances of the reversion of improved grassland to marshy grassland (TN10 and TN11).

4.3.2 Natural succession

An area of tall ruderal/poor semi-improved grassland was recorded at TN7 which had previously been recorded as bare earth. This change is likely due to the natural regeneration rather than planting.

4.3.3 Highway management

A strip of grassland, approximately 30m wide and 170m long was present between Holyhead Road (A5) and the North Wales Expressway (A55). In 2018, this strip was a botanically diverse semi-improved grassland, with patches of scrub and tall ruderal vegetation. Changes in this area are likely due to a combination of natural succession and cutting grassland as part of highways maintenance at TN13, TN14, TN15 and TN16.

5. Conclusion

5.1 WNDA

The 2018 survey of the WNDA has shown most habitats previously recorded remained the same. Where there have been some changes, these appeared to be as a result of changes in agricultural management; where agricultural pressure has increased, fields have become improved, and where they have decreased, fields have become more botanically diverse.

None of the changes in habitat type are considered to have resulted in change to the distribution of protected or notable species other than previously considered in the Environmental Statement supporting the Wylfa Newydd Project Development Consent Order application. The baseline data used to support the assessment of effects of the Wylfa Newydd Project on terrestrial and freshwater ecology are therefore considered to be robust in providing an appropriate representation of the ecological conditions present.

5.2 A5025 Off-line Highway Improvements

The 2018 survey recorded some changes which were likely to be related to changes in agricultural management. Overall, the changes recorded were small, and reductions in the ecological value in one area was balanced by an increase in another. Therefore, the changes are not considered likely to have resulted in a material change in the distribution of protected or notable species other than that already assumed within the Environmental Statement supporting the Wylfa Newydd Project Development Consent Order application. The baseline data used to support the assessment of effects of the Wylfa Newydd Project on terrestrial and freshwater ecology are therefore considered to be robust in providing an appropriate representation of the ecological conditions present.

5.3 Dalar Hir

Overall at Dalar Hir, there have been some changes in the location of marshy grassland, with a reduction in one area (Target Note 5) being met with an increase in another (Target Note 10 and 11). The strip of grassland between the A5 (Ffordd Caergybi) and the A55 included a more diverse area of neutral semi-improved grassland (at Target Note 15) than had previously been recorded. In other areas across the site the locations of marshy grassland and neutral semi-improved grassland remained similar.

The changes in habitats at Dalar Hir between 2018 and 2013 were slight and are not considered to have any material change in the distribution of protected or notable species other than that already assumed within the Environmental Statement supporting the Wylfa Newydd Project Development Consent Order application. The baseline data used to support the assessment of effects of the Wylfa Newydd Project on terrestrial and freshwater ecology are therefore considered to be robust in providing an appropriate representation of the ecological conditions present.

6. References

Avian Ecology, (2017). Parc Cybi – Logistics Centre. Extended Phase 1 Habitat Survey and Environmental DNA Report.

JNCC, (2010), *Handbook for Phase 1 habitat survey - a technique for environmental audit*, JNCC, Peterborough, UK, Available online at: http://jncc.defra.gov.uk/page-2468

Horizon Nuclear Power (2018). 6.7.23 Environmental Statement Volume 6. A5025 Off-line Highway Improvements App G9-2 – A5025 Terrestrial Ecology Factual Report 2014-2016

Jacobs (2013). Consultancy Report: A Phase 1 Habitat Survey. Horizon Nuclear Power (Wylfa) Ltd. [Main site]

Jacobs (2013b). Consultancy Report: Dalar Hir. Extended Phase 1 Habitat Survey and Great Crested Newt Habitat Suitability Assessment.

Jacobs (2017). Wylfa Newydd Project. Phase 1 Habitat Survey Validation. Horizon Nuclear Power Ltd

Stace, C., (2010), *New Flora of the British Isles, Third edition*, Cambridge University Press, Cambridge, UK.

Appendix A. Figures

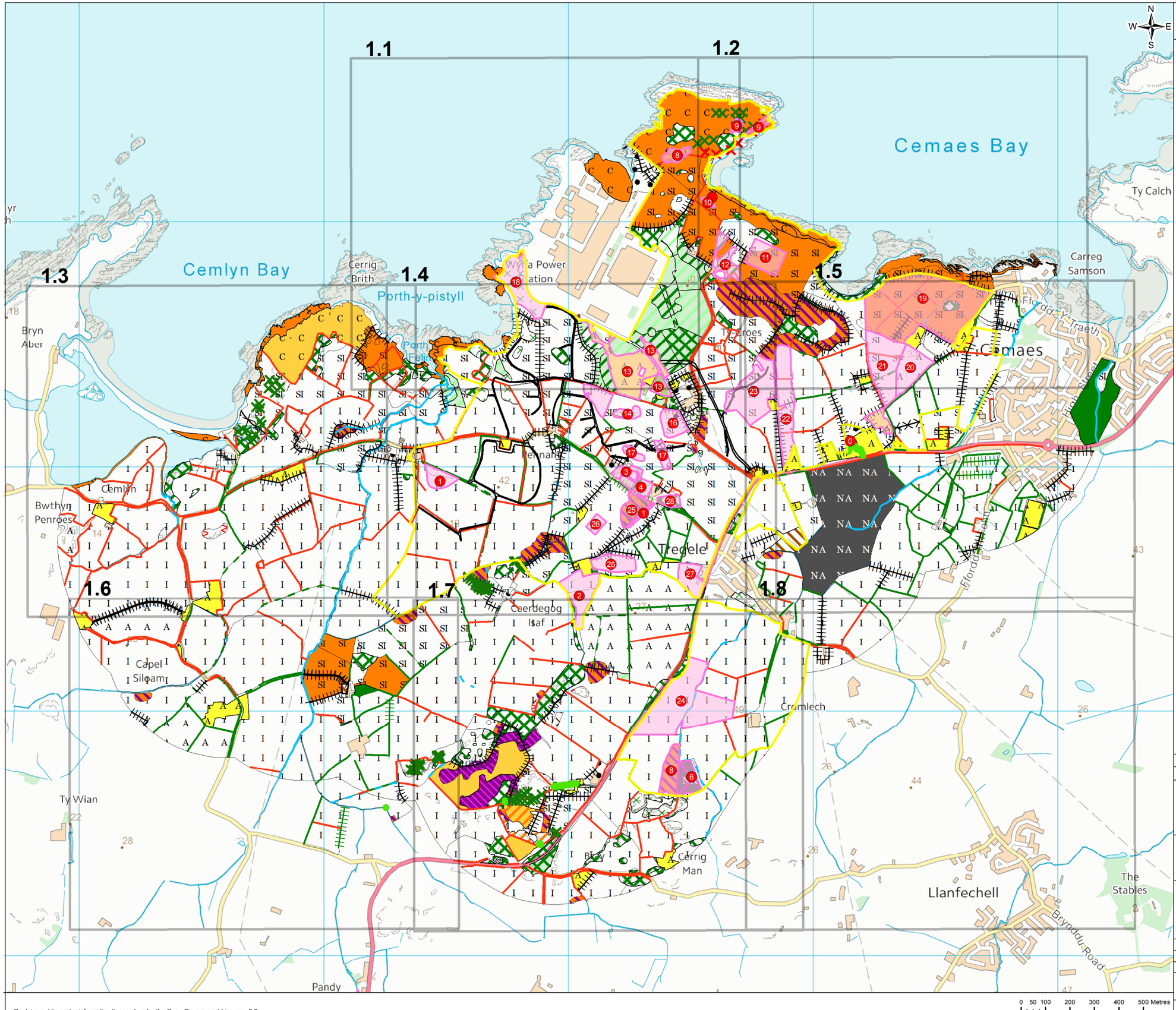
Figures 1 Phase 1 Habitat Validation 2018 WNDA Overview.

Figures 1.1 - 1.8 Changes detected in Phase 1 Habitat Survey of WNDA

Figures 2.1 - 2.5 Changes detected in Phase 1 Habitat Survey of A5025 Off-line Highway Improvements

Figure 3 Changes Detected in Phase 1 Habitat Survey at Dalar Hir

FIGURE 1



Legend

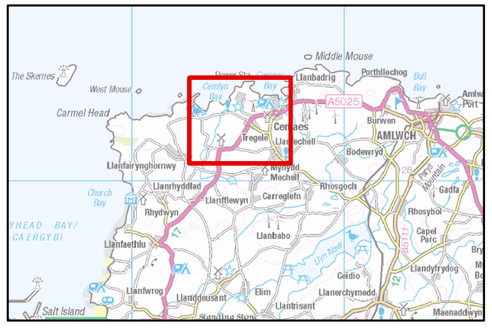
Phase 1 Habitats

- Coniferous scattered trees
- Scattered bracken
- Scattered scrub
- Boundary removed
- Defunct hedge (species-poor)
- Dry ditch
- Fence
- Intact hedge (species-poor)
- Running water
- Species-poor hedge with tree
- Wall
- Hardstanding
- Acid grassland
- Amenity grassland
- Arable
- Artifical mine
- Bare ground
- Broadleaved scattered trees
- Broadleaved woodland (plantation)
- Broadleaved woodland (semi-natural)
- Coastal heathland
- Coastal grassland
- Coniferous woodland (plantation)
- Dense scrub
- Dry dwarf shrub heath
- Dry heath/acid grassland
- Ephemeral/short perennial land
- Fen basin mire
- Improved grassland
- Marsh/marshy grassland
- Mixed woodland (plantation)
- Natural rock exposure
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- No access in 2013
- Poor semi-improved grassland
- Standing water
- Tall ruderal herbs

Boundary of accessible area 2018

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



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Project: WYLFA NEWYDD PROJECT

Drawing Title: PHASE 1 HABITAT VALIDATION 2018
WNDA OVERVIEW

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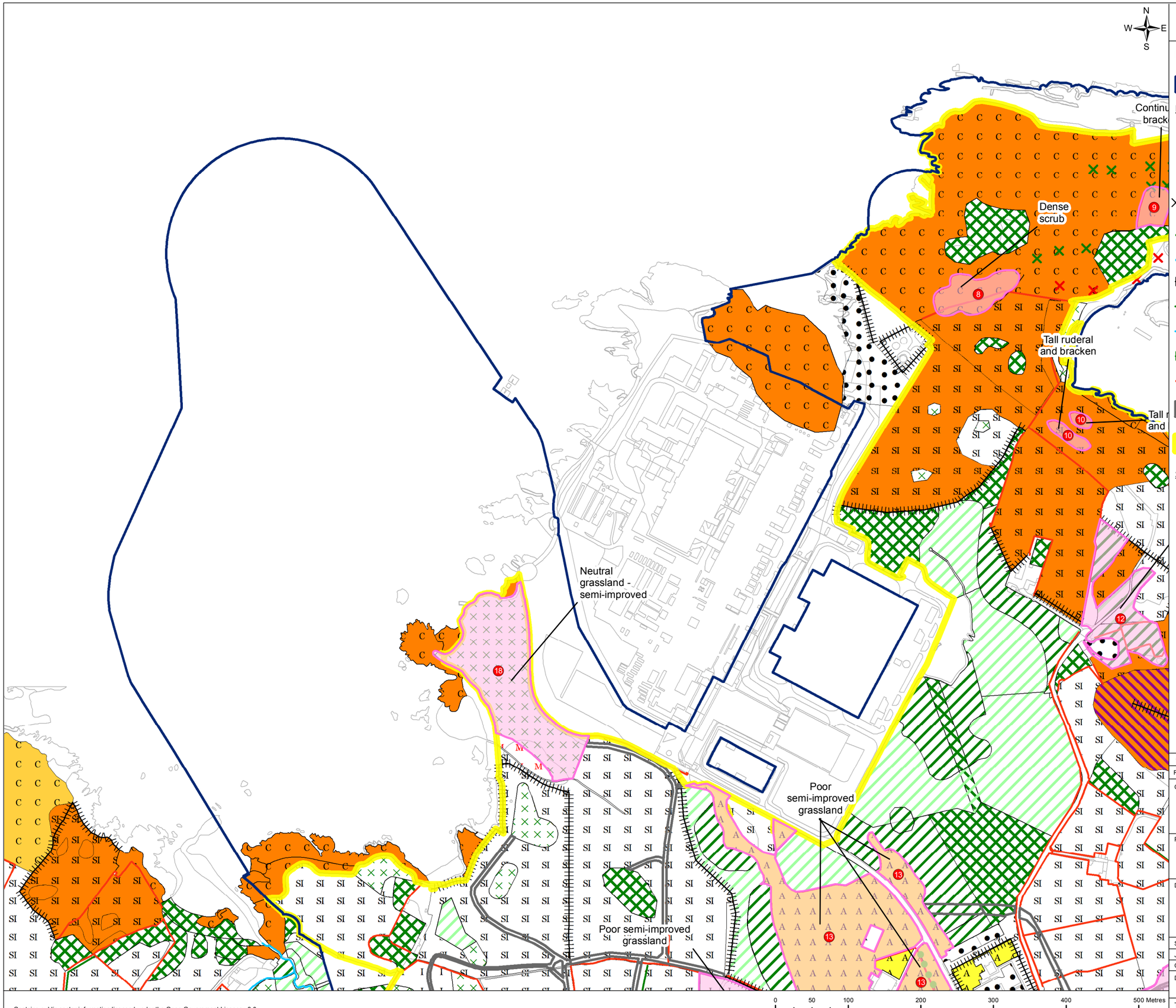
Client No.		

Drawing No.: 60PO80AG_A8_P1V_MAINSITE

FIGURE 1.1



Legend

- Wylfa Newydd Development Area
- Boundary of accessible area 2018

Phase 1 Habitats

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2018 phase 1 validation

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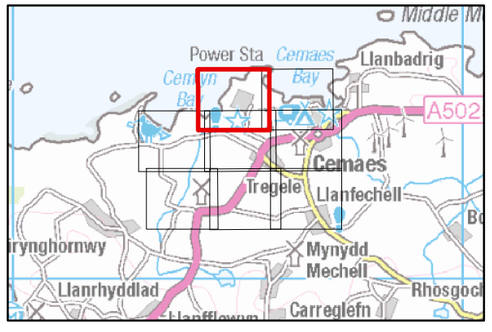
- Phase 1 polygon class updated



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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

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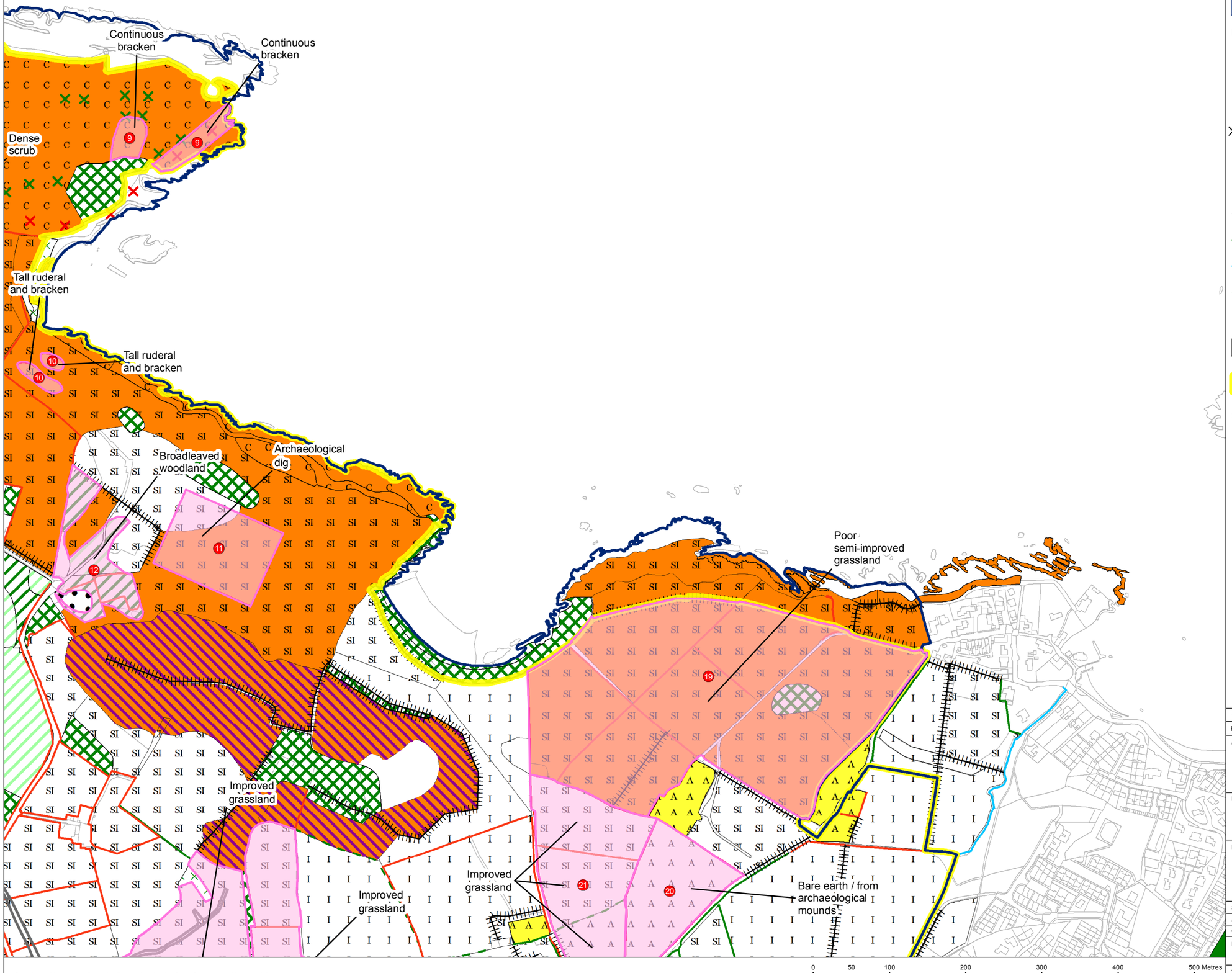
FIGURE 1.2



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Legend

- Wylfa Newydd Development Area
- **Phase 1 Habitats**
- Coniferous scattered trees
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- No access in 2013
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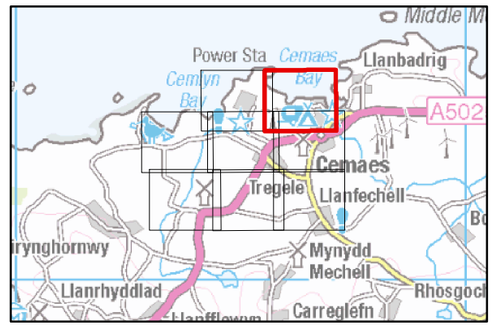
- Standing water
- Tall ruderal herbs
- Boundary of accessible area 2018
- **2018 phase 1 validation**
- Target notes
- Phase 1 polygon class updated



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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

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Client No.	
Drawing No.	60PO80AG_A8_P1V_MAINSITE_PHASE1 1.2

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FIGURE 1.3

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Legend

- Wylfa Newydd Development Area
- Boundary of accessible area 2018

Phase 1 Habitats

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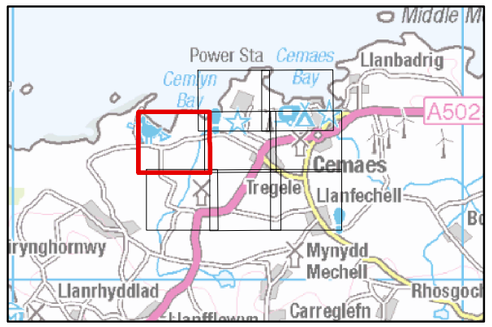
- Standing water
- Tall ruderal herbs

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



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Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

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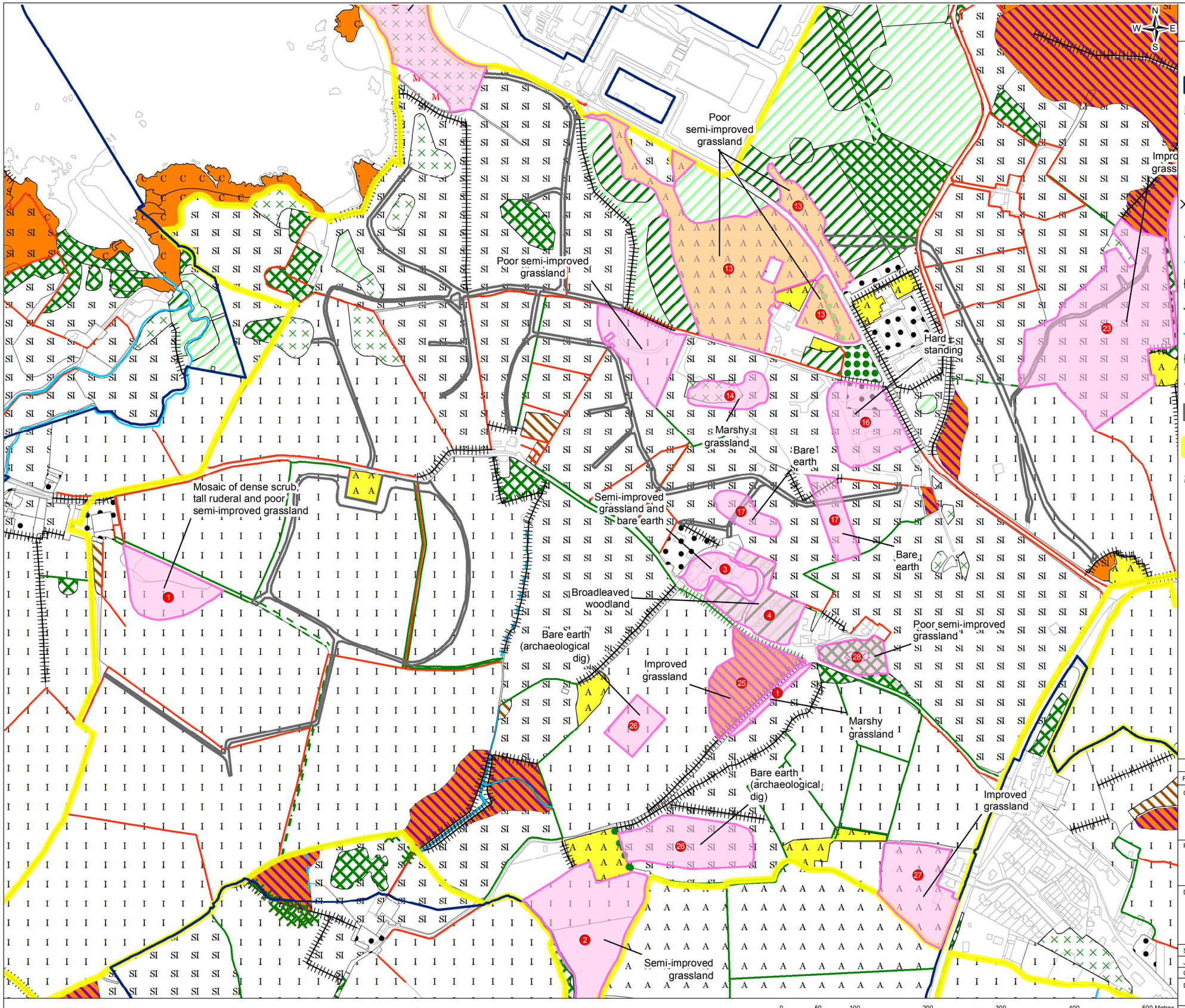

Legend

- Wylfa Newydd Development Area
- Boundary of accessible area 2018

Phase 1 Habitats

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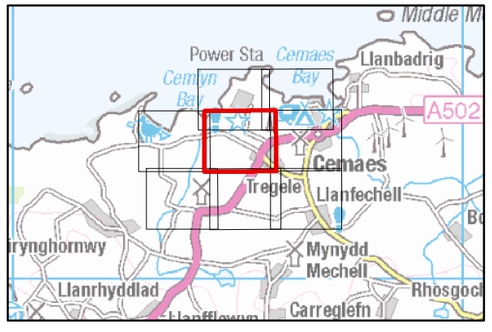
- Tall ruderal herbs

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



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Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

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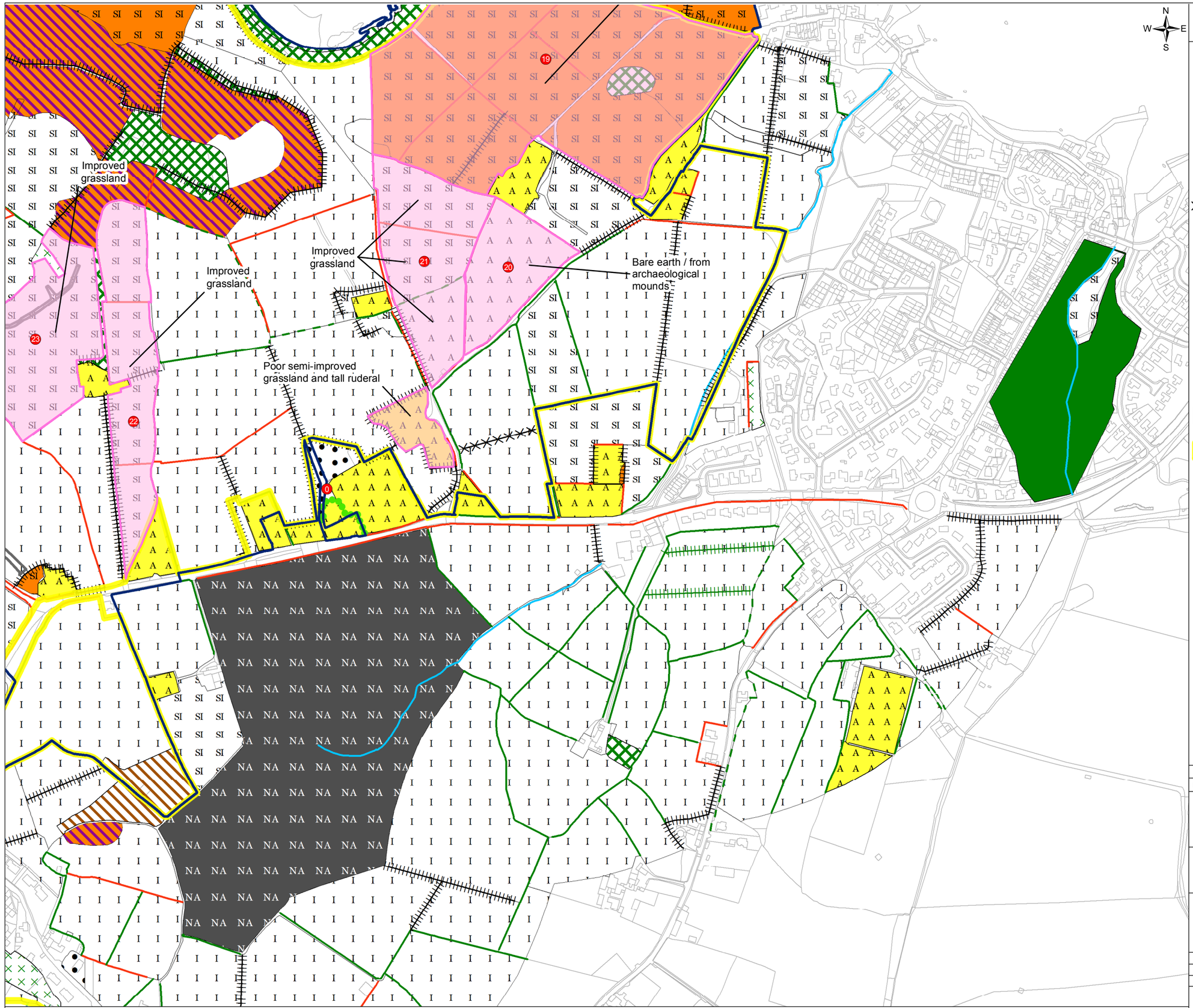
FIGURE 1.5



Legend

- Wylfa Newydd Development Area
- Boundary of accessible area 2018

Phase 1 Habitats

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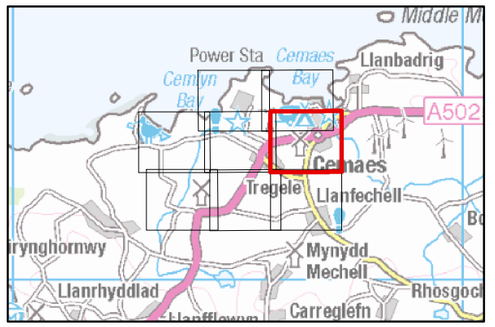
- Coniferous woodland (plantation)
- Dense/continuous scrub
- Dry dwarf shrub heath
- Dry heath/acid grassland
- Ephemeral/short perennial land
- Fen basin mire
- Improved grassland
- Marsh/marshy grassland
- Mixed woodland (plantation)
- Natural rock exposure
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- No access in 2013
- Poor semi-improved grassland
- Standing water
- Tall ruderal herbs

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	OCT 18	PHASE 1 VALIDATION	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_MAINSITE_PHASE1 1.5

0 50 100 200 300 400 500 Metres

FIGURE 1.6

Legend

Wylfa Newydd Development Area

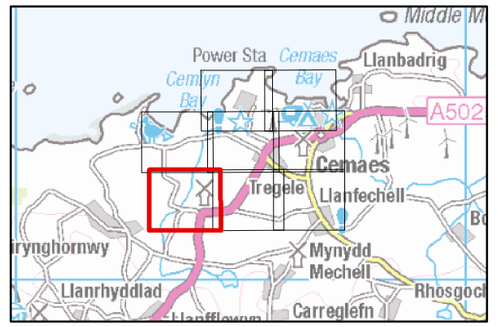
Phase 1 Habitats

- Coniferous scattered trees
- Scattered bracken
- Scattered scrub
- Boundary removed
- Defunct hedge (species-poor)
- Dry ditch
- Fence
- Intact hedge (species-poor)
- Running water
- Species-poor hedge with tree
- Wall
- Hardstanding (site roads)
- Acid grassland
- Amenity grassland
- Arable
- Artifical mine
- Bare ground
- Broadleaved scattered trees
- Broadleaved woodland (plantation)
- Broadleaved woodland (semi-natural)
- Coastal heathland
- Coastal grassland
- Coniferous woodland (plantation)
- Dense/continuous scrub
- Dry dwarf shrub heath
- Dry heath/acid grassland
- Ephemeral/short perennial land
- Fen basin mire
- Improved grassland
- Marsh/marshy grassland
- Mixed woodland (plantation)
- Natural rock exposure
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- No access in 2013
- Poor semi-improved grassland
- Standing water
- Tall ruderal herbs

Boundary of accessible area 2018

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

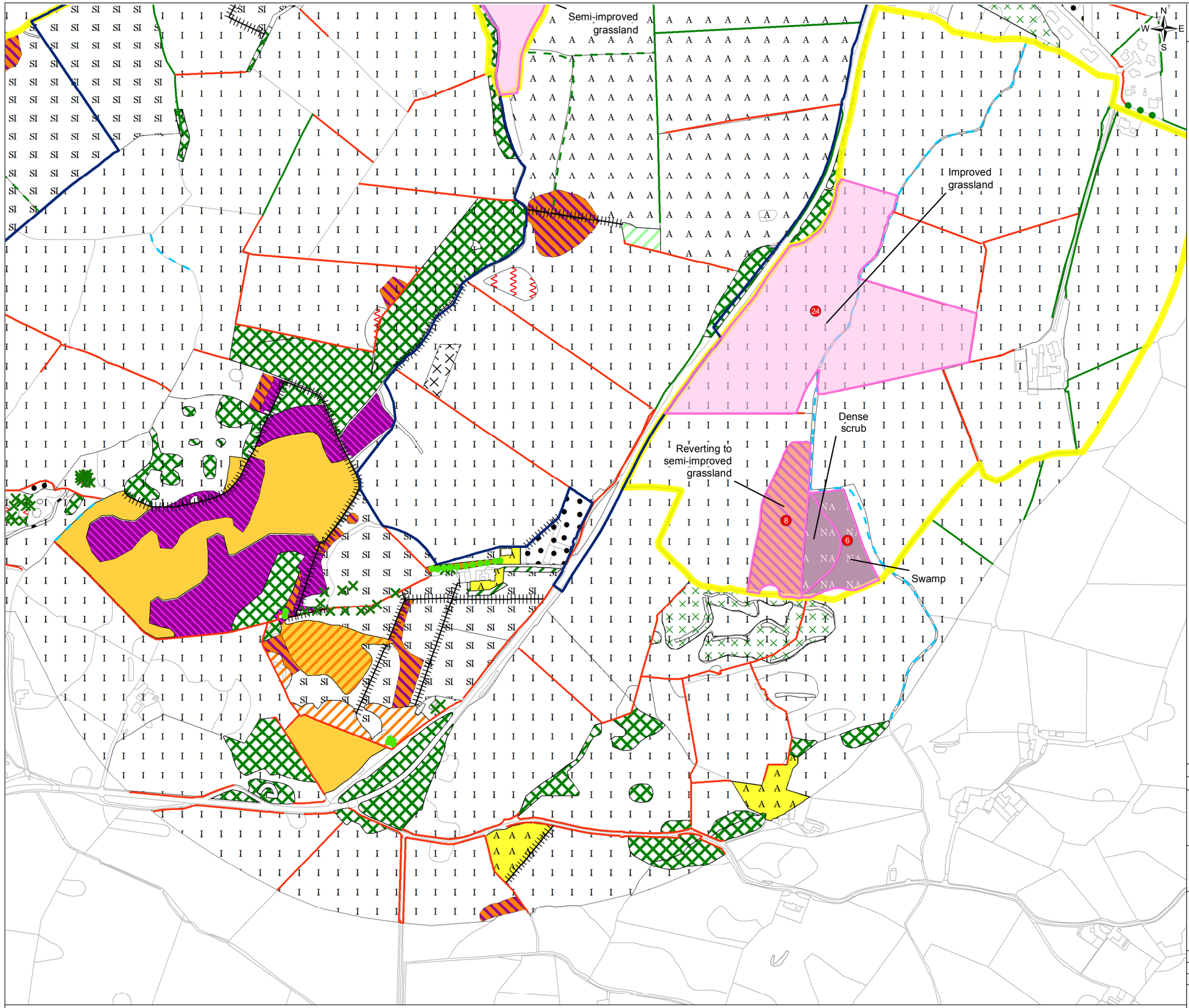
Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_MAINSITE_PHASE1 1.6

0 50 100 200 300 400 500 Metres

FIGURE 1.7



Legend

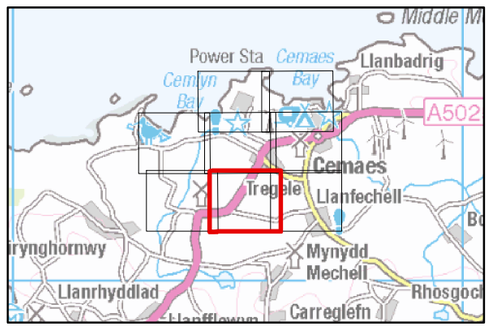
- Wylfa Newydd Development Area
- Boundary of accessible area 2018

Phase 1 Habitats

- Coniferous scattered trees
- Scattered bracken
- Scattered scrub
- Boundary removed
- Defunct hedge (species-poor)
- Dry ditch
- Fence
- Intact hedge (species-poor)
- Running water
- Species-poor hedge with tree
- Wall
- Hardstanding (site roads)
- Acid grassland
- Amenity grassland
- Arable
- Artifical mine
- Bare ground
- Broadleaved scattered trees
- Broadleaved woodland (plantation)
- Broadleaved woodland (semi-natural)
- Coastal heathland
- Coastal grassland
- Coniferous woodland (plantation)
- Dense/continuous scrub
- Dry dwarf shrub heath
- Dry heath/acid grassland
- Ephemeral/short perennial land
- Fen basin mire
- Improved grassland
- Marsh/marshy grassland
- Mixed woodland (plantation)
- Natural rock exposure
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- No access in 2013
- Poor semi-improved grassland
- Standing water
- Tall ruderal herbs

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	OCT 18	PHASE 1 VALIDATION	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_MAINSITE_PHASE1 1.7

0 50 100 200 300 400 500 Metres

FIGURE 1.8

N
W E
S

Legend

Wylfa Newydd Development Area

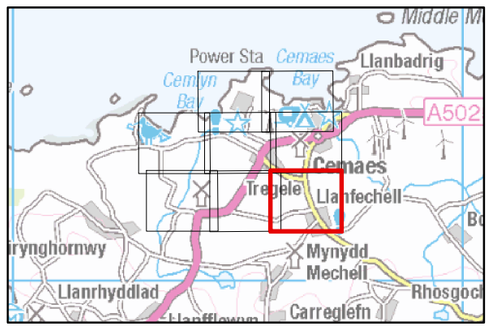
Phase 1 Habitats

- Coniferous scattered trees
- Scattered bracken
- Scattered scrub
- Boundary removed
- Defunct hedge (species-poor)
- Dry ditch
- Fence
- Intact hedge (species-poor)
- Running water
- Species-poor hedge with tree
- Wall
- Hardstanding (site roads)
- Acid grassland
- Amenity grassland
- Arable
- Artifical mine
- Bare ground
- Broadleaved scattered trees
- Broadleaved woodland (plantation)
- Broadleaved woodland (semi-natural)
- Coastal heathland
- Coastal grassland
- Coniferous woodland (plantation)
- Dense/continuous scrub
- Dry dwarf shrub heath
- Dry heath/acid grassland
- Ephemeral/short perennial land
- Fen basin mire
- Improved grassland
- Marsh/marshy grassland
- Mixed woodland (plantation)
- Natural rock exposure
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- No access in 2013
- Poor semi-improved grassland
- Standing water
- Tall ruderal herbs

Boundary of accessible area 2018

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

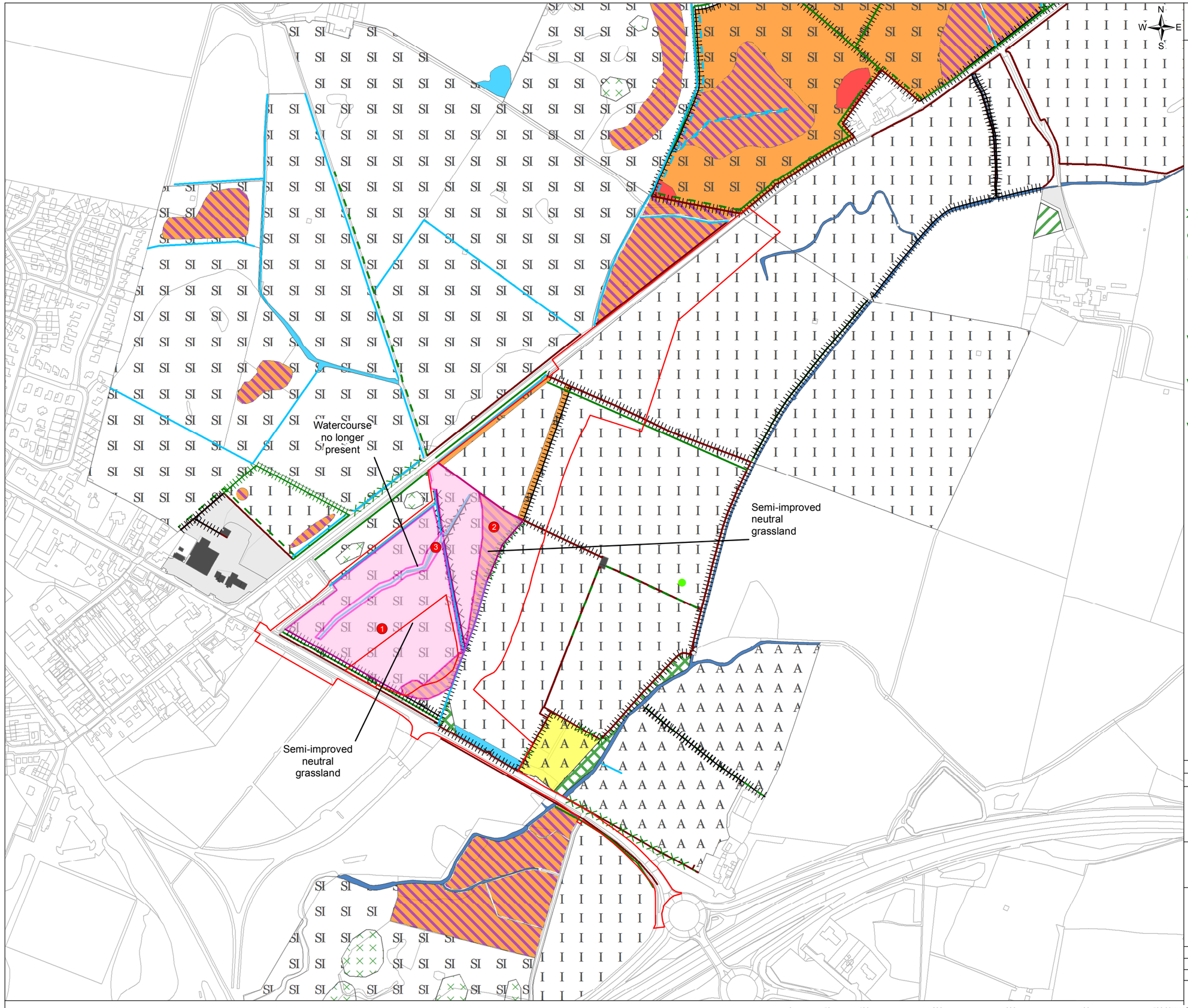
Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF THE WNDA

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_MAINSITE_PHASE1 1.8

0 50 100 200 300 400 500 Metres

FIGURE 2.1



Legend

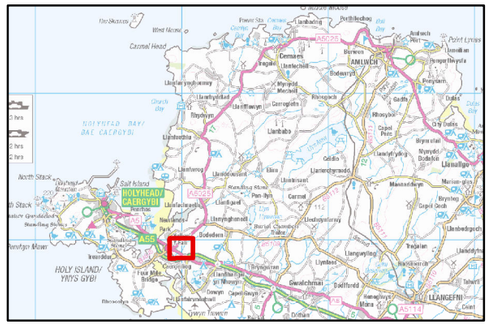
- Site boundary in which 2018 validation took place

Phase 1 habitats

- Broadleaved pakland/scattered trees
- Coniferous parkland/scattered trees
- Bracken - scattered
- Scrub - scattered
- Scattered scrub - linear
- Scattered broadleaved trees - linear
- Scattered coniferous trees - linear
- Scattered mixed trees - linear
- Upland species-rich ledges
- Running water
- Intact hedge - species rich
- Intact hedge - species poor
- Defunct hedge - species rich
- Defunct hedge - species poor
- Hedge with trees - species rich
- Hedge with trees - species poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank
- Broadleaved semi-natural woodland
- Broadleaved plantation woodland
- Coniferous plantation woodland
- Mixed semi-natural woodland
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Unimproved calcareous grassland
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid dry dwarf shrub heath
- Dry heath/acid grassland
- Fen
- Fen - basin mire
- Swamp
- Inundation vegetation
- Standing water
- Running water
- Coastal grassland
- Coastal heathland
- Hard standing
- Inland cliff
- Scree
- Other exposure - acid/neutral
- Other exposure - basic
- Quarry
- Spoil
- Arable
- Amenity grassland
- Ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Other

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

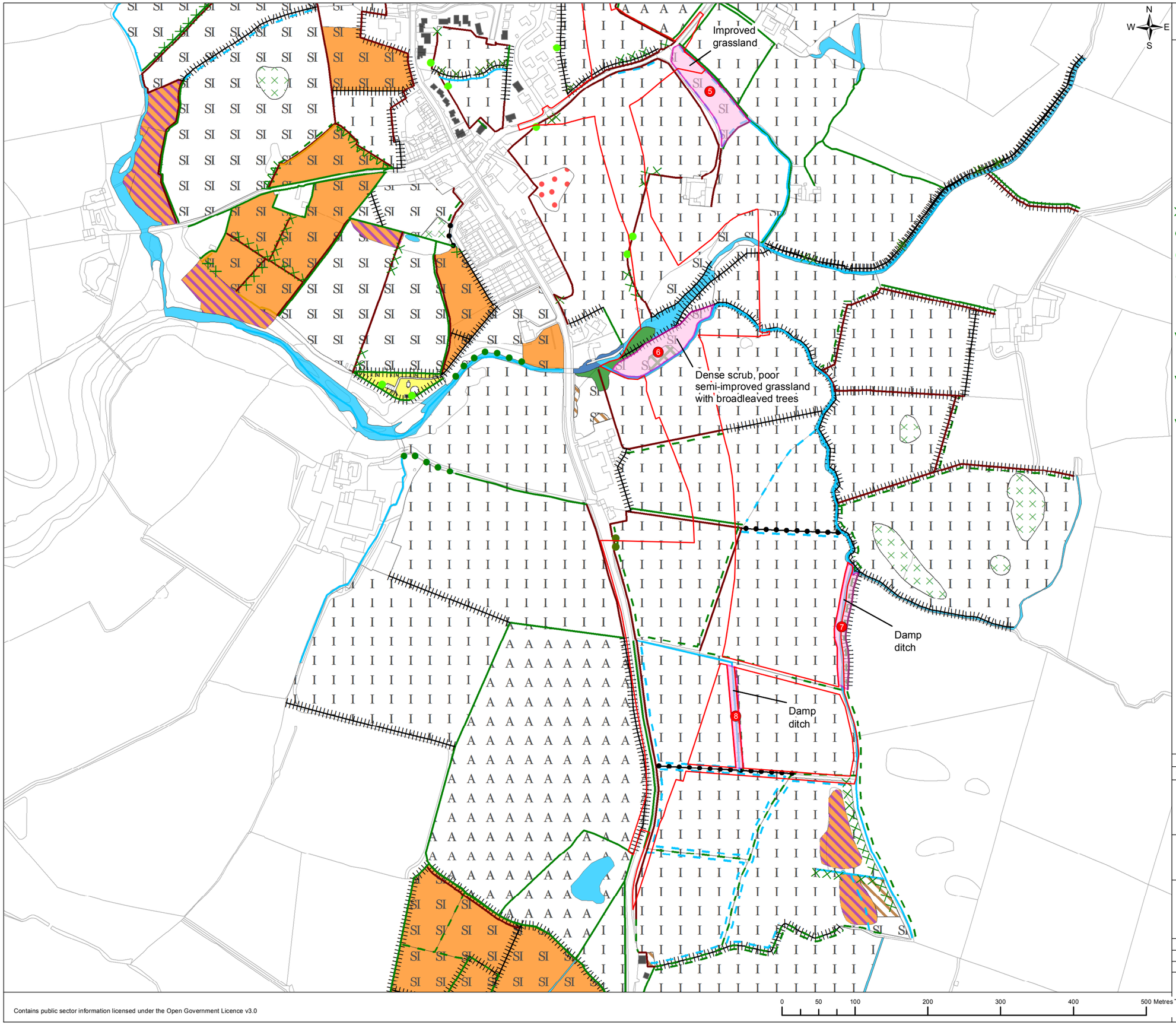
Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF A5025 OFF-LINE HIGHWAY IMPROVEMENTS

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_A5025OFFLINE 2.1

0 50 100 200 300 400 500 Metres

FIGURE 2.2



Legend

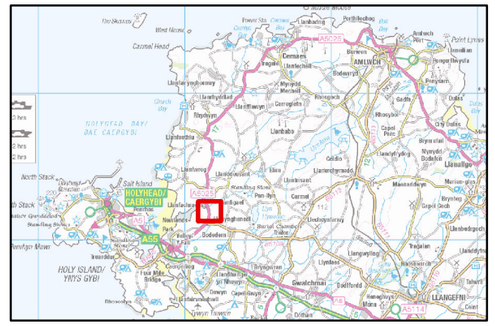
- Site boundary in which 2018 validation took place

Phase 1 habitats

- Broadleaved parkland/scattered trees
- Coniferous parkland/scattered trees
- Bracken - scattered
- Scrub - scattered
- Scattered scrub - linear
- Scattered broadleaved trees - linear
- Scattered coniferous trees - linear
- Scattered mixed trees - linear
- Upland species-rich ledges
- Running water
- Intact hedge - species rich
- Intact hedge - species poor
- Defunct hedge - species rich
- Defunct hedge - species poor
- Hedge with trees - species rich
- Hedge with trees - species poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank
- Broadleaved semi-natural woodland
- Broadleaved plantation woodland
- Coniferous plantation woodland
- Mixed semi-natural woodland
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Unimproved calcareous grassland
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid dry dwarf shrub heath
- Dry heath/acid grassland
- Fen
- Fen - basin mire
- Swamp
- Inundation vegetation
- Standing water
- Running water
- Coastal grassland
- Coastal heathland
- Hard standing
- Inland cliff
- Scree
- Other exposure - acid/neutral
- Other exposure - basic
- Quarry
- Spoil
- Arable
- Amenity grassland
- Ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Other

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



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Client: HORIZON NUCLEAR POWER

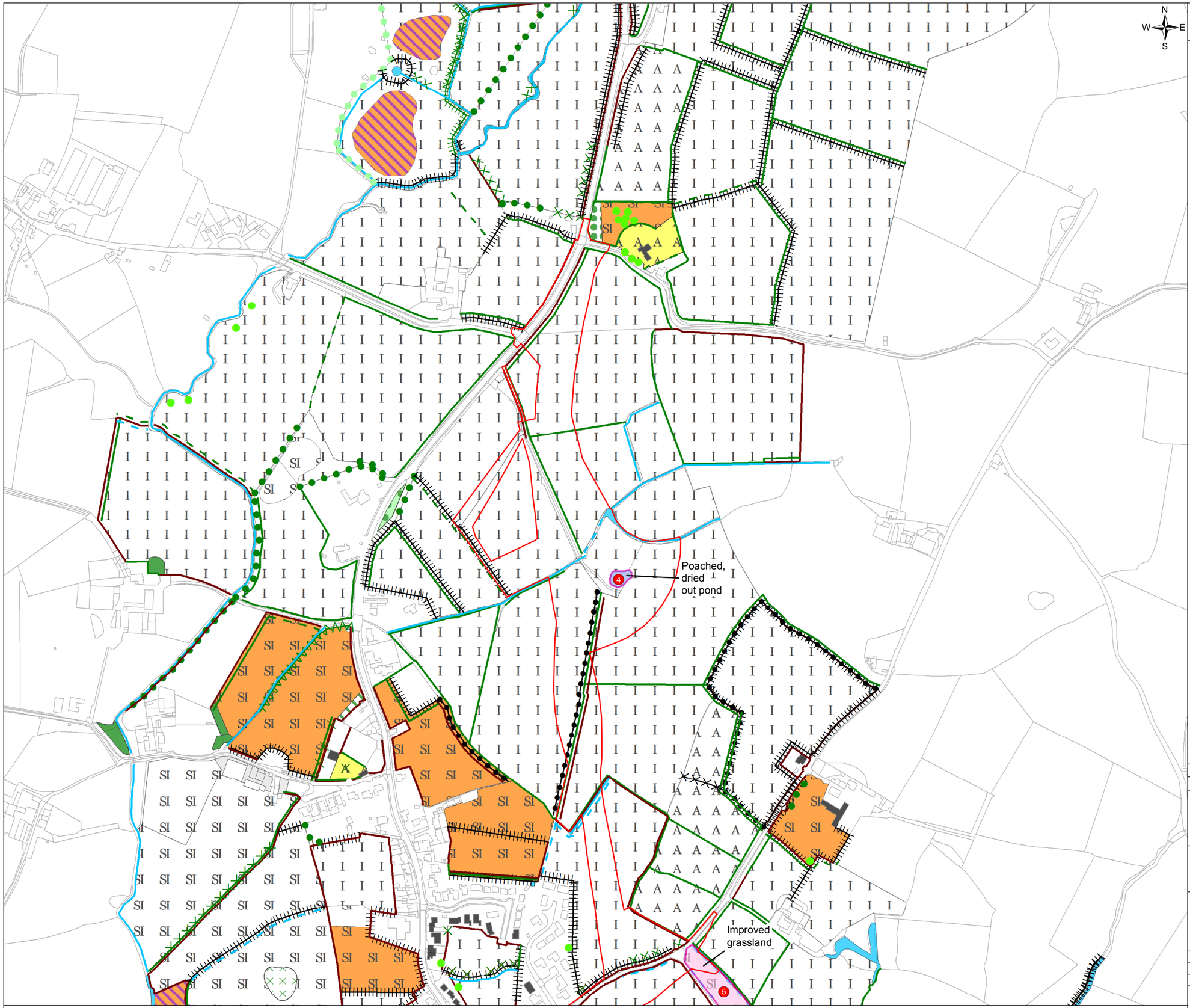
Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF A5025 OFF-LINE HIGHWAY IMPROVEMENTS

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_A5025OFFLINE 2.2

FIGURE 2.3



Legend

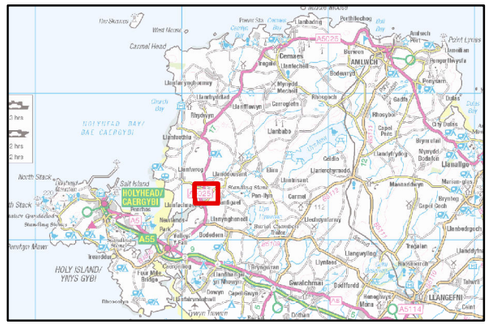
- Site boundary in which 2018 validation took place

Phase 1 habitats

- Broadleaved pakland/scattered trees
- Coniferous parkland/scattered trees
- Bracken - scattered
- Scrub - scattered
- Scattered scrub - linear
- Scattered broadleaved trees - linear
- Scattered coniferous trees - linear
- Scattered mixed trees - linear
- Upland species-rich ledges
- Running water
- Intact hedge - species rich
- Intact hedge - species poor
- Defunct hedge - species rich
- Defunct hedge - species poor
- Hedge with trees - species rich
- Hedge with trees - species poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank
- Broadleaved semi-natural woodland
- Broadleaved plantation woodland
- Coniferous plantation woodland
- Mixed semi-natural woodland
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Unimproved calcareous grassland
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid dry dwarf shrub heath
- Dry heath/acid grassland
- Fen
- Fen - basin mire
- Swamp
- Inundation vegetation
- Standing water
- Running water
- Coastal grassland
- Coastal heathland
- Hard standing
- Inland cliff
- Scree
- Other exposure - acid/neutral
- Other exposure - basic
- Quarry
- Spoil
- Arable
- Amenity grassland
- Ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Other

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

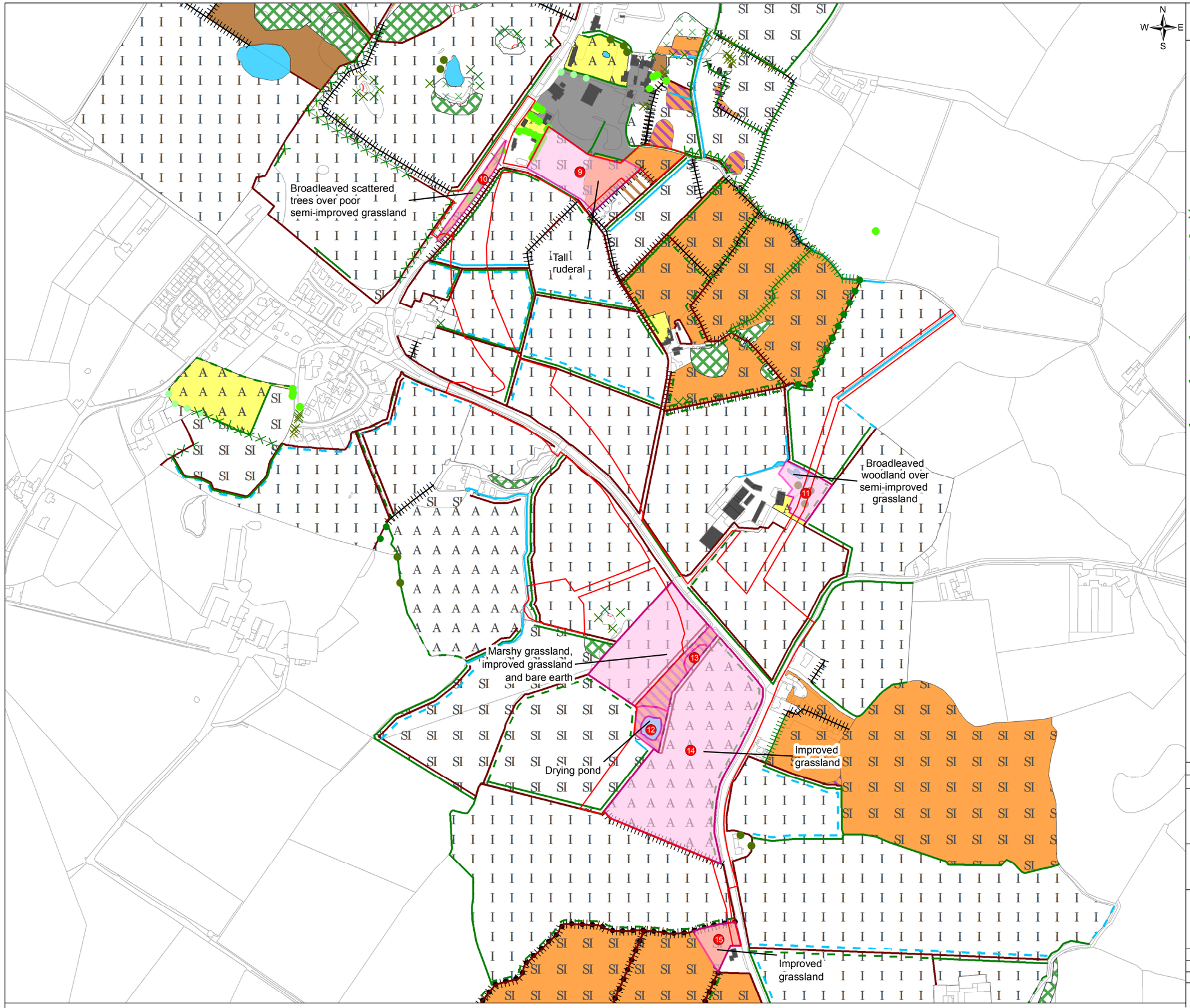
Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF A5025 OFF-LINE HIGHWAY IMPROVEMENTS

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_A5025OFFLINE 2.3

0 50 100 200 300 400 500 Metres

FIGURE 2.4



Legend

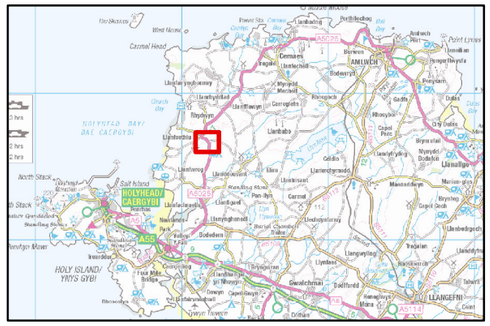
- Site boundary in which 2018 validation took place

Phase 1 habitats

- Broadleaved pakland/scattered trees
- Coniferous parkland/scattered trees
- Bracken - scattered
- Scrub - scattered
- Scattered scrub - linear
- Scattered broadleaved trees - linear
- Scattered coniferous trees - linear
- Scattered mixed trees - linear
- Upland species-rich ledges
- Running water
- Intact hedge - species rich
- Intact hedge - species poor
- Defunct hedge - species rich
- Defunct hedge - species poor
- Hedge with trees - species rich
- Hedge with trees - species poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank
- Broadleaved semi-natural woodland
- Broadleaved plantation woodland
- Coniferous plantation woodland
- Mixed semi-natural woodland
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Unimproved calcareous grassland
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid dry dwarf shrub heath
- Dry heath/acid grassland
- Fen
- Fen - basin mire
- Swamp
- Inundation vegetation
- Standing water
- Running water
- Coastal grassland
- Coastal heathland
- Hard standing
- Inland cliff
- Scree
- Other exposure - acid/neutral
- Other exposure - basic
- Quarry
- Spoil
- Arable
- Amenity grassland
- Ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Other

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF A5025 OFF-LINE HIGHWAY IMPROVEMENTS

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_A5025OFFLINE 2.4

FIGURE 2.5

Broadleaved woodland along 275m of water course

Marshy grassland

Broadleaved woodland

Improved grassland

Improved grassland

Improved grassland

20 19 18 17 16

A

N W E S

Legend

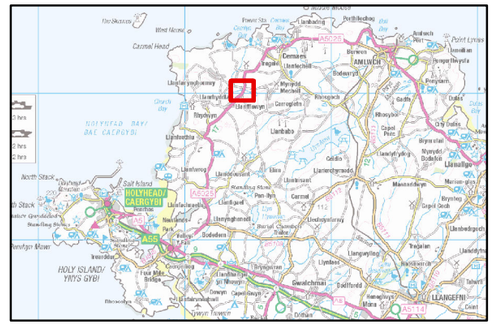
Site boundary in which 2018 validation took place

Phase 1 habitats

- Broadleaved pakland/scattered trees
- Coniferous parkland/scattered trees
- Bracken - scattered
- Scrub - scattered
- Scattered scrub - linear
- Scattered broadleaved trees - linear
- Scattered coniferous trees - linear
- Scattered mixed trees - linear
- Upland species-rich ledges
- Running water
- Intact hedge - species rich
- Intact hedge - species poor
- Defunct hedge - species rich
- Defunct hedge - species poor
- Hedge with trees - species rich
- Hedge with trees - species poor
- Fence
- Wall
- Dry ditch
- Boundary removed
- Earth bank
- Broadleaved semi-natural woodland
- Broadleaved plantation woodland
- Coniferous plantation woodland
- Mixed semi-natural woodland
- Mixed plantation woodland
- Dense scrub
- Scattered scrub
- Scattered trees
- Unimproved acid grassland
- Unimproved neutral grassland
- Semi-improved neutral grassland
- Unimproved calcareous grassland
- Improved grassland
- Marshy grassland
- Poor semi-improved grassland
- Continuous bracken
- Tall ruderal
- Acid dry dwarf shrub heath
- Dry heath/acid grassland
- Fen
- Fen - basin mire
- Swamp
- Inundation vegetation
- Standing water
- Running water
- Coastal grassland
- Coastal heathland
- Hard standing
- Inland cliff
- Scree
- Other exposure - acid/neutral
- Other exposure - basic
- Quarry
- Spoil
- Arable
- Amenity grassland
- Ephemeral/short perennial
- Introduced shrub
- Building
- Bare ground
- Other

2018 phase 1 validation

Target notes — Phase 1 polygon class updated



Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	OCT 18	PHASE 1 VALIDATION	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

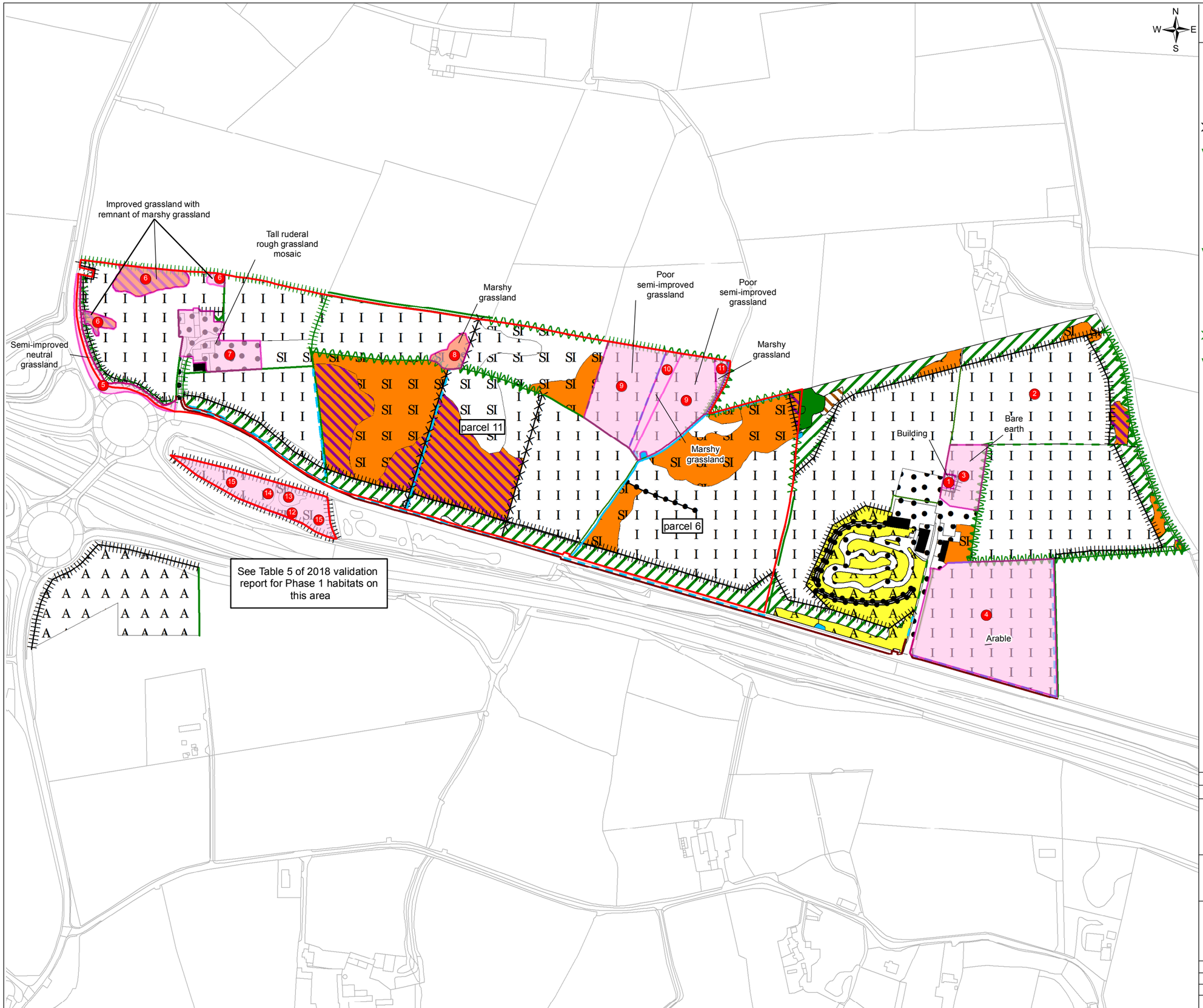
Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY OF A5025 OFF-LINE HIGHWAY IMPROVEMENTS

Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No. 60PO80AG_A8_P1V_A5025OFFLINE 2.5

0 50 100 200 300 400 500 Metres

FIGURE 3



Legend

- Site boundary

Phase 1 Habitats

- Boundary removed
- Defunct hedge - species-rich
- Defunct hedge (species-poor)
- Dry ditch
- Fence
- Intact hedge species-rich
- Intact hedge species-poor
- Running water
- Scattered scrub
- Species-rich hedge with tree
- Species-poor hedge with tree
- Wall
- Amenity grassland
- Arable
- Bare ground
- Broadleaved woodland (plantation)
- Broadleaved woodland (semi-natural)
- Dense/continuous scrub
- Improved grassland
- Marsh/marshy grassland
- Neutral grassland (unimproved)
- Neutral grassland (semi-improved)
- Standing water
- Tall ruderal
- Building

2018 phase 1 validation

- Target notes
- Phase 1 polygon class updated

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	OCT 18	PHASE 1 VALIDATION	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing Title: CHANGES DETECTED IN PHASE 1 HABITAT SURVEY AT DALAR HIR

Scale @ A3	1:4,000	DO NOT SCALE
Jacobs No.	60PO80AG	
Client No.		

Drawing No.: 60PO80AG_A8_P1V_DALARHIR

Appendix B. Target Notes

Table 4: Target Notes for WNDA

Target Note Number	Notes
1	Marshy grassland strip which was not present in either of the previous surveys, 5m wide at its widest part, and narrowing to 2m. Includes soft-rush (*Juncus effusus*), black knapweed (*Centaurea nigra*), greater bird's-foot trefoil (*Lotus pedunculatus*) and redshank (*Persicaria maculosa*).
2	Fields which were improved grassland have now reverted to poor semi-improved grassland. Grasses present include sweet vernal grass (*Anthoxanthum odoratum*), crested dog's tail (*Cynosurus cristatus*), creeping bent (*Agrostis stolonifera*), common bent (*Agrostis capillaris*), cock's-foot (*Dactylis glomerata*), red fescue (*Festuca rubra*). Forbs present include creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), greater, yellow rattle (*Rhinanthus minor*), creeping bent (*Agrostis stolonifera*), sheep's sorrel (Rumex acetosella) and vetches (Vicia spp), greater bird's-foot trefoil, and ribwort plantain (*Plantago lanceolota)*.
3	Area previously recorded with buildings which are now bare earth and semi-improved neutral grassland after demolition of the buildings.
4	Areas previously recorded as mixed broadleaved woodland plantation reclassified as broadleaved woodland with six mature Monterey pine (*Pinus radiata*) along its border with the road. Mature trees include wych elm (*Ulmus glabra*), horse-chestnut (*Aesculus hippocastanum*), lime (*Tilia europea*) and ash (*Fraxinus excelsior*). Understorey species included wild privet (*Ligustrum vulgare*), bay (*Laurus nobilis*), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), brambles (*Rubus fruticosus* agg.), cherry (*Prunus avium*) and beech (*Fagus sylvatica*).
5	The ground in this area of previously marshy grassland was dry and had low cut soft-rush stems amongst fields commonly present in poor semi-improved grassland. It was being manged in the same way as the surrounding improved grassland.
6	This previously unsurveyed area lay adjacent to heavily vegetated water course. Includes an area of dense goat willow adjacent to an area of swamp, which has abundant reed canary grass (*Phalaris arundincaea*). Meadow sweet (*Filipendula ulmaria*) is present to the east of this area, and in the drier margins rosebay willow herb (*Chamerion angustifolium*) is present.
7	Mosaic of scrub, tall ruderal and semi grassland on rocky raised plateau. Blackthorn (Prunus spinose), western gorse (*Ulex gallii*), brambles, hogweed (*Heracleum sphondylium*), nettle (*Urtica dioica*), false oat grass (*Arrhenatherum elatius*), cock's foots, docks (*Rumex* spp) and common couch (*Elytricia repens*).
8	More dense scrub, most of which is western gorse, is present on this headland than in previous surveys.
9	More dense bracken (*Pteridium aquilinum*) is present on this headland than recorded in the previous surveys.
10	More tall ruderals and bracken are recorded in this area than are shown in previous surveys.
11	Archaeological excavation taking place in July 2018.
12	Mature sycamore (*Acer pseudoplatanus*) and wych elm (F) and turkey oak (*Quercus cerris*) (O). Mature ash by gate (R). A mature Monterey cypress (*Cupressus macrocarpa*) is present. Sparse understory includes hawthorn, elder and laburnum (*Laburnum anagyroides*). Ground flora includes hedge woundwort (*Stachys sylvatica*), ground ivy (*Glechoma hederacea*) and wood dock (*Rumex sanguineus*).
13	Disused games pitch and road margins reverting from amenity grassland to poor semi-improved grassland, with hogweed, cleavers (*Galium aparine*), black knapweed, creeping buttercup, herb Robert (*Geranium robertianum*), nettle, cock's foot, Yorkshire fog (*Holcus lanatus*), sweet vernal grass, red fescue, common bent, creeping bent, common ragwort (*Senecio jacobaea*), spear thistle, willowherb species
14	A new bare earth track runs adjacent to a marshy grassland dominated by soft rush, with red shank. The marshy grassland was inspected from new track.
15	Improved grassland reverted to poor semi-improved grassland with some dense scrub (brambles).
16	The extent of the bare ground present in the 2013 survey has been extended and converted to hard standing to accommodate vehicles and compounds.
17	Poor semi-improved grassland has been converted to bare earth.

Target Note Number	Notes
18	Semi-improved neutral grassland with common bent, Yorkshire fog, creeping thistle (*Cirsium arvense*), tormentil (*Potentilla erecta*), black knapweed, brambles, red fescue, sweet vernal grass, docks, cock's foot, western gorse, ribwort plantain, crested dog's tail, yellow rattle, rest harrow (*Ononis repens*).
19	In 2013 this area was semi-improved neutral grassland, but in 2018 it was classified as poor semi-improved grassland. South of the east-west fence line running parallel with the coast line, species present in 2018 included false oat grass, cock's foot, perennial rye grass (*Lolium perenne*), annual meadow grass (*Poa annua*), sheep's sorrel (*Rumex acetosella*), smaller cat's-tail (*Phleum bertolonii*), hogweed, common bird's foot trefoil (*Lotus corniculatus*), sweet vernal grass, ribwort plantain, common ragwort, meadow buttercup, creeping cinquefoil (*Potentilla reptans*), silver weed (Potentilla anserine), creeping thistle and white clover (*Trifolium repens*).
20	Archaeological excavation and mounds creating bare earth.
21	Poor semi-improved grassland and tall ruderal have succeeded the amenity grassland which previously surrounded the now demolished house
22	Improved grassland has taken the place of the previously present poor semi-improved grassland probably as a result of agricultural improvement. Species present include perennial rye grass, false oat grass, common bent, false oat grass and cock's foot.
23	Improved grassland has taken the place of previously present poor semi-improved grassland at this location. Species present include Yorkshire fog, creeping bent and perennial rye grass.
24	Improved grassland was recorded in July 2018, as was recorded in 2013. However, the 2017 validation recorded poor semi-improved grassland at this location which, following the 2018 survey is not considered to be correct. Improved species recorded in 2018 included perennial ryegrass, white clover, redshank, meadow butter cup, creeping buttercup, smooth meadow grass (*Poa pratensis*), rough meadow grass (*Poa trivialis*) and dock species.
25	Improved grassland was present at TN25, and not marshy grassland as was recorded in 2013 and the 2017 verification.
26	An archaeological excavation was recorded during the 2018 survey, creating bare ground, and not the poor semi-improved grassland previously recorded here.
27	Improved grassland was recorded during the 2018 survey, not the arable recorded during the 2013 survey. Improved grassland was recorded during the 2017 validation survey.
28	Poor semi-improved grassland was recorded during the 2018 survey and in 2017, not the dense scrub that was recorded in 2013
29	Poor semi-improved grassland and tall ruderal mosaic was recorded during the 2018 survey, which has succeeded the amenity grassland recorded in 2013 and 2017.

Table 5: Target Notes for A5025 off-line

Target Note Number	Notes
1	This area was recorded as semi-improved neutral grassland in 2018 but was recorded as poor semi-improved neutral grassland in 2013. Species recorded in 2018 included common cat's ear (*Hypochaeris radicata*), tormentil, black knapweed, marsh penny wort (*Hydrocotyle vulgaris*), silverweed, hairy sedge (*Carex hirsuta*), lesser spearwort (*Ranunculus flammula*), horsetail (*Equisetum arvense)*, tare (*Vicia* sp), soft rush, meadow vetchling (*Lathyrus pratensis*), white clover, dandelion (*Taraxicum officinale* agg), greater bird's foot trefoil, (LA), common sorrel (*Rumex acetosa*), marsh thistle (*Cirsium palustre*), and red fescue.
2	Semi-improved neutral grassland in 2018, with same species as Target Note 1.
3	Standing water is no longer present within the in semi-improved neutral grassland, and in its place were shallow vegetated depressions barely distinguishable from the surrounding field and managed in the same way as the surrounding field.

Target Note Number	Notes
4	Poached, dried out pond. This is likely to be as a result of the hot dry spell of weather preceding the survey.
5	Improved grassland, with Yorkshire fog, cock's foot, common sorrel, docks, creeping buttercup, common nettle and ribwort plantain.
6	Dense scrub including blackthorn (*Prunus spinosa*), hawthorn, with occasional semi-mature trees by the water course including trees including ash and sycamore. Poor semi-improved grassland species included Yorkshire fog, tufted hair grass (*Deschampsia cerspitosa*), cuckooflower (*Cardamine pratensis*), and meadow sweet.
7	South of Target Note 7 is a damp ditch, with abundant riparian vegetation, including angelica (*Angelica sylvestris*), watermint (*Mentha aquatica*), meadowsweet, willowherb, fools watercress (*Apium nodiflorum*), common water plantain (*Alisama plantago-aquatica*), reed canary grass and branched burweed (*Sparganum erectum*). Shrubs lining eastern side of this ditch include grey willow (*Salix cinera*), hawthorn, common gorse (*Ulex europeus*). The ditch branches to the east at Target Note 7 (lying outside the Order Limits) and contains standing water.
8	In 2018, a damp ditch lay to the east of the hedgerow and a further damp ditch lay to the west of the hedgerow, which in earlier surveys been classified as standing water. The ditch contained hawthorn, brambles, soft rush, false oatgrass, Yorkshire fog, creeping bent, creeping thistle, common nettle, horsetail, European gorse, yarrow (*Achillea millefolium*), creeping buttercup. York fog and common sorrel. Fools water cress was rare in the ditch to the east. This is likely to be as a result of the hot dry spell of weather preceding the survey.
9	In 2018, this habitat was predominantly tall ruderal vegetation, and not poor semi-improved grass recorded in the 2017 validation survey. The tall ruderal vegetation included broadleaved dock, spear thistle, knotgrass (*Polygonum aviculare*), greater plantain (*Plantago major*), ribwort plantain, creeping bent, redshank, common chickweed (*Stellaria media*), creeping thistle, white clover, mouse ear (*Cerastium fontanum*), creeping buttercup and Himalayan balsam (*Impatiens glandulifera*).
10	In 2018, this area adjacent to the layby was recorded as poor semi improved grassland, with scattered young broadleaved trees. Grassland species included cocks foot, Yorkshire fog, creeping bent, yarrow, tufted vetch (*Vicia cracca*), red fescue, ribwort plantain, silverweed, black knapweed and greater birds foot trefoil. Planted young trees include white poplar (*Populus alba*), silver birch (*Betula pendula*), ash, sycamore. White poplar saplings.
11	Broadleaved woodland ~0.3ha over grassland glade. Several mature ash and mature sycamore. Evidence of grazing due to lack of understorey and lush grasses making up ground layer. Creeping bent, common bent meadow grasses, common nettle, creeping buttercup and chickweed.
12	Pond drying, and lacking water. Damp pond earth dominated by bulrush (*Typha latifolia*) with frequent branched burweed. Deergrass (*Trichophorum cespitosum*) and fool's water-cress at margins. This is likely to be as a result of the hot dry spell of weather preceding the survey.
13	The 2018 survey marshy grassland was present in a strip adjacent to the hedgerow close to the A5025 but occupied a reduced area than recorded in previous surveys. Now present were areas of improved grassland and manure which had previously been mapped as marshy grassland. Marshy grassland species included soft rush, marsh thistle, sharp flowered rush Yorkshire fog, common bent, creeping bent, creeping buttercup, silverweed and broad-leaved dock (*Rumex obtusifolius*).
14	Improved grassland, with creeping bent and perennial rye grass.
15	Improved grassland- recently sown. Includes creeping bent and perennial rye grass.
16	Improved grassland with meadow grass, white clover, perennial rye grass, dock, chick weed and knotgrass. In the southern field are occasional rocky outcrops with some patches of dense European gorse.
17	Improved grassland, with perennial rye grass, white clover, creeping bent, meadow grass, mouse ear, docks and common nettles.
18	Sycamores of ages ranging from mature to young, planted on earth bank.
19	Marshy grassland with abundant soft rush and yellow iris. Amphibious bistort (O) (*Polygonum amphibium*). Greater birds foot trefoil, marsh thistle, sedges (*Carex* spp), black knapweed, creeping buttercup, water mint, common sorrel, reed canary grass, lesser spearwort, mash bedstraw (*Galium palustre*), meadow sweet, wild angelica, hemlock water dropwort (*Oenanthe crocata*) and clustered dock (*Rumex conglomeratus*).
20	Woodland strip along watercourse, trees including mature ash, mature sycamore, with shrubs including grey willow, hawthorn, European gorse, brambles and the climber honeysuckle.

Table 6: Target Notes for Dalar Hir

Target Note Number	Notes
1	Bare earth
2	Improved grassland
3	Bare earth
4	Recently sown arable crop (viewed from Go-Kart access track)
5	Semi-improved neutral grassland on embankment and verge adjacent to road. Species include black knapweed, docks, wild carrot (*Daucus carota*), greater bird's foot trefoil, Yorkshire fog, common bent, creeping bent, smooth meadow grass, rough meadow grass, sweet vernal grass, soft rush perforate St Johns wort (*Hypericum perforatum*), hairy sedge, sedges (*Carex* spp), meadow buttercup, creeping buttercup, red clover marsh thistle, ribwort plantain, creeping cinquefoil, crested dog's tail and selfheal (*Prunella vulgaris*).
6	The 2018 survey showed remnant of marshy grassland where in 2013 marshy grassland was very apparent. Species present in 2018 indicating the presence of marshy grassland included soft rush and lesser spearwort. Improved grassland species were frequent such as perennial rye grass, white clover and creeping bent.
7	In the 2018 survey this area was a mosaic of tall ruderal/poor semi-improved grassland, with some areas of bare ground. Previous surveys had recorded this area as bare ground. Species present included greater bird's foot trefoil, common nettle, Yorkshire fog, perennial rye grass, sweet vernal grass, creeping thistle, yellow loosestrife (*Lysimachia nemorum*), creeping thistle, broad leaved dock, rosebay willow herb (*Chamaenerion angustifolium*), herb robert (*Geranium robertianum*), cleavers (*Galium aparine*), spear thistle, the invasive species montbretia (*Crocosmia x crocosmiiflora*)
8	Marshy grassland, in the corner of improved field in a low depression. Rushes dominate, including sharp flowered rush (*Juncus acutiflorus*) soft rush, marsh thistle, greater bird's foot trefoil, lesser spearwort, crested dogs tail, Yorkshire fog, marsh bedstraw (*Galium palustre*) and square stalked willowherb (*Epilobium tetragonum*).
9	The 2018 survey recorded this field as poor semi-improved grassland and not improved grassland that was recorded in previous surveys. Species present in 2018 included perennial rye grass, white clover, Yorkshire fog, red fescue, creeping bent, common bent, lesser spearwort, greater bird's foot trefoil, silverweed, creeping buttercup and sedges (*Carex* spp).
10	The 2018 survey recorded a strip of marshy grassland running the length of this field parallel to the ditch which was previously recorded as improved grassland. Species present included hard flowered rush, soft rush, sweet vernal grass, crested dog's tail, lesser spearwort, greater bird's foot trefoil, Yorkshire fog, creeping buttercup, common bent, creeping bent, perennial rye grass and white clover.
11	The 2018 survey recorded a strip of marshy grassland at this location. Plants recorded included soft rush (D), hard rush (F), dock, (F), creeping thistle, water mint, purple loosestrife (*Linaria purpurea*), marsh woundwort (*Stachys palustris*), water pepper (*Persicaria hydropiper*), meadow sweet, hoary willowherb (*Epilobium parviflorum*) and common nettle.
12	Dense scrub on sloping faces, dominated by brambles and European gorse.
13	Small area of marshy grassland at the base of a shallow depression. Viewed from top of bank using binoculars. Species present included redshank, soft rush and water pepper.
14	Tall ruderal vegetation forming a band (~3m wide) at the top to the slope. Species present include common ragwort, spear thistle, creeping thistle, great willow herb (*Epilibium hirsutum*), ribwort plantain, broadleaved dock, common nettle, large bindweed (*Calystegia sylvatica*), cock's foot and hemlock (*Conium maculatum*).
15	The semi-improved neutral grassland, with diverse species, and included ox-eye daisy(*Leucanthemum vulgare*), silverweed, meadow sweet, perforate St John's wort, red bartsia (*Odontities vernus*), black knapweed, cock's foot, creeping bent, red fescue, ribwort plantain, sneezwort (*Achillea ptarmica*), common ragwort, dandelion, white clover, creeping buttercup, meadow buttercup, spear thistle, tufted vetch (*Vicia cracca*), common mouse ear (*Cerastium fontanum*), wild carrot, sweet vernal grass, white campion (*Silene dioica*), great willow herb, broadleaved dock, mash woundwort (LA), mugwort (*Artemisia vulgaris*), greater bird's foot trefoil and yarrow.
16	Semi-improved neutral grassland with the same species recorded for Target Note 15 in the row immediately above.

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