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**SOILS TRANSFER FROM HENDREFOILAN TO SWANSEA
BAY CAMPUS**

ECOLOGY REPORT

Prepared for: St Modwen Developments Limited

Date: September 2022

Report Reference: JN00505 / D01

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1. INTRODUCTION

Background

- 1.1 SK Environmental Solutions Limited was commissioned by St Modwen Developments Limited to produce an ecology report in order to assess the impact of the importation of up to 32,900m³ net of clean, naturally occurring soils from the Hendrefoilan development in Swansea to the Swansea Bay Campus site, which is located approximately 5km to the east (see Figure 1, below).
- 1.2 In order to fully understand the current situation with regard to sensitive ecological receptors at the Swansea Bay Campus, an ecological walkover survey was undertaken by Barry Stewart, on behalf of SK Environmental Solutions Limited. This survey recorded all invasive species / species of botanical interest, as well mapping any changes to the habitats present since the previous survey in February 2022.
- 1.3 It should be noted that the recommendations set out within this document do not alter nor supersede the recommendations and ongoing commitments for monitoring invasive species and breeding birds set out within the most recent iteration of the Ecological Monitoring and Management Plan (Appendix 1 - EcMMP - JN00359 / D01 / Rev 08).

Aims and Objectives

- 1.4 The aim of this report is to assess the ecological impact of land raising within the Swansea Bay Campus through the deposition of soil and to establish what, if any, mitigation is required to address ecological impacts. The location of the area where the land is to be uplifted has been informed by an evaluation of the site which confirmed that the area selected is the most suitable for this purpose as it can be delivered without having a deleterious impact to ecological receptors known to be present within the site.

Definition of Terms

- 1.5 For the purpose of this report, the term 'site' refers to the areas shown within the red line boundary on Figure 1 (below) Results of Ecological Walkover Survey – September 2022.

Description of Site

- 1.6 The Swansea University Bay Campus is located approximately 3.5km east of Swansea city centre in south Wales. The development of the campus is ongoing and has been since 2013. The campus borders Swansea Bay immediately to the south, a factor that heavily influences the surrounding habitats. Adjacent to the eastern boundary of the campus lies Crymlyn Burrows SSSI, which is designated for its dune grassland and carr woodland habitats, as well as the rare fen orchid *Liparis loeselii*.

Proposal

- 1.7 A surplus of clean, naturally occurring soil has been identified within the Hendrefoilan development site to the west of the bay campus. As such, a planning application is being prepared in order for the material to be transferred by road to the Swansea Bay Campus site and laid down within areas identified by SK Environmental Solutions Limited / Barry Stewart which will avoid impacts upon ecological receptors. The laying down of the soils from Hendrefoilan at the Bay Campus site will result in raising ground levels within the Bay Campus; so that any future development at the Bay Campus would have extra protection from the effects of the high tides and storms at the site.

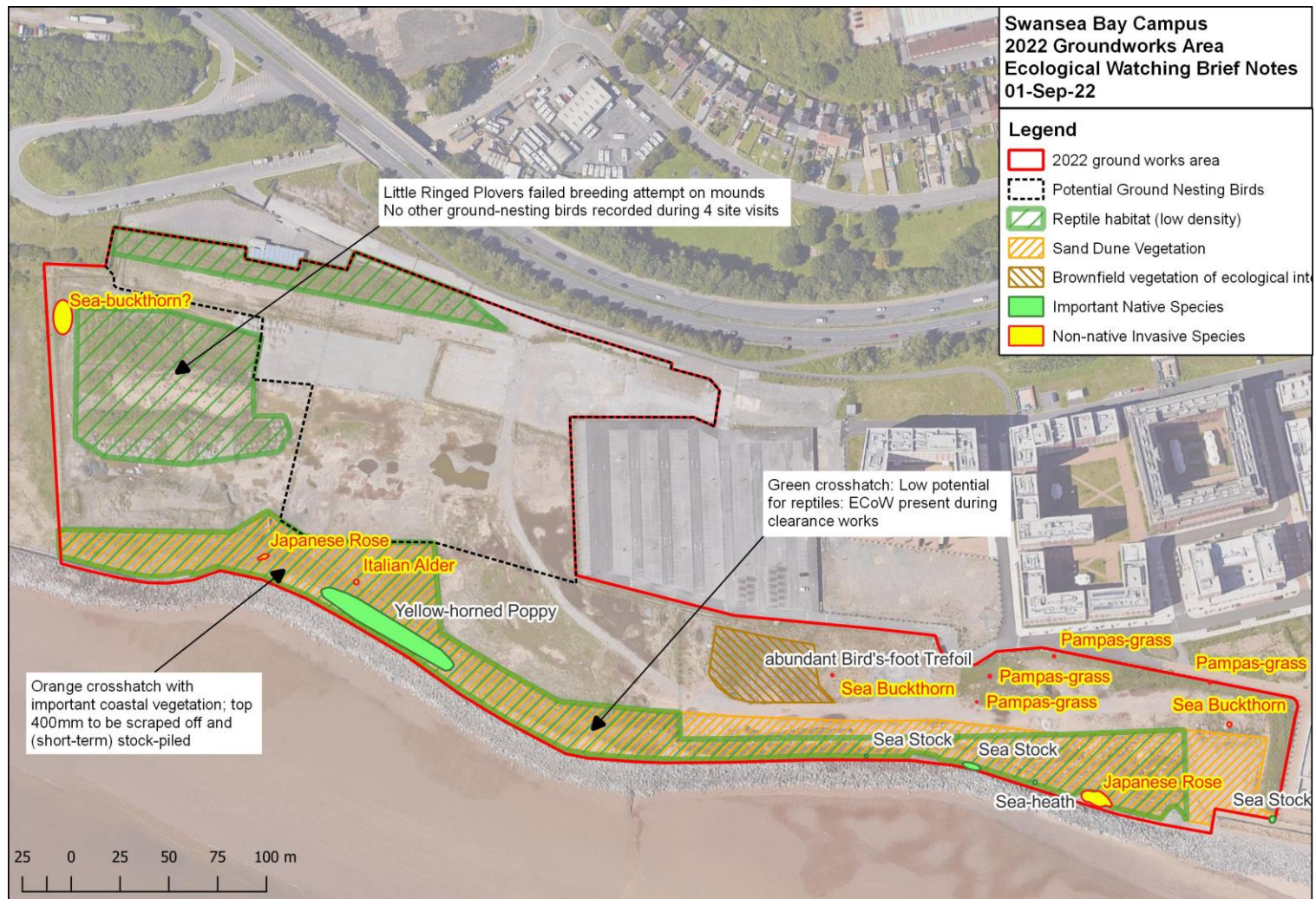


Figure 1 – Results of Ecological Walkover Survey – September 2022

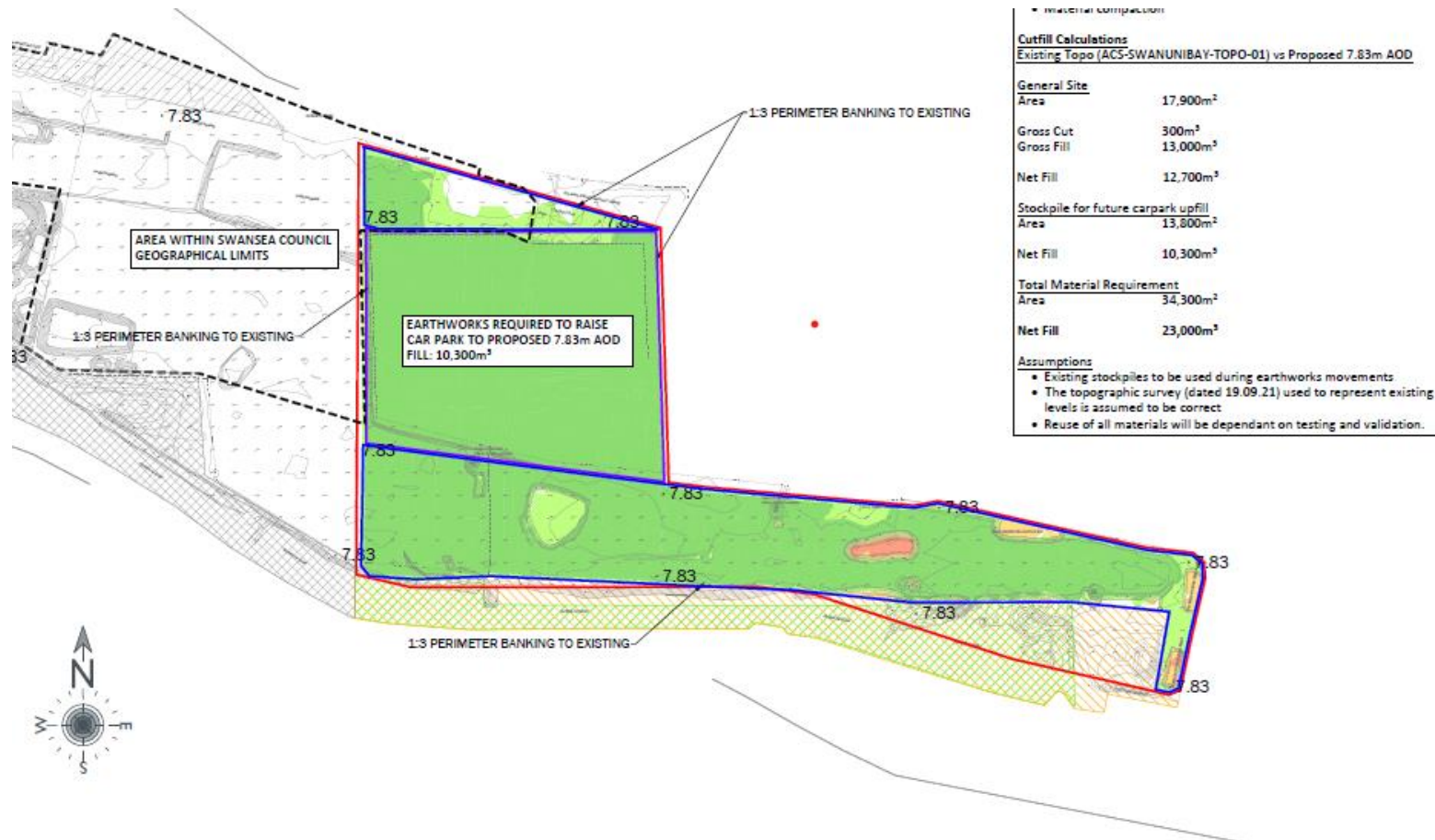


Figure 2 – Areas identified for laying down of imported soils

2. ECOLOGICAL CONSTRAINTS

2.1 During the walkover surveys undertaken by Barry Stewart during the spring and summer of 2021 and 2022, the following potential ecological constraints were identified that could be detrimentally impacted by the proposed material transfer:

- Ground Nesting Birds;
- Coastal Vegetation;
- Brownfield Vegetation; and
- Reptiles.

Ground Nesting Birds

2.2 The site has been subjected to a number of breeding bird surveys over recent years to inform and provide mitigation for the previous development works associated with the Swansea Bay Campus. During these surveys a number of ground nesting bird species have been identified, opportunistically utilising the bare ground areas that have been created as part of the previous development works, these include:

- Little ringed plover *Charadrius dubius*;
- Ringed plover *Charadrius hiaticula*; and
- Lapwing *Vanellus vanellus*.

2.3 These species are known to forage and nest within the areas outlined in black on Figure 1.

Coastal Vegetation

2.4 The orange hatching on Figure 1 above indicates areas where floristically interesting coastal flora have been identified during the walkover survey in summer 2021 by Barry Stewart.

2.5 Species here include a diverse suite of species associated with sand dune, a significant number of which are used for selecting Sites of Importance for Nature

Conservation (SINCs). Species noted at the site that are listed either 'Primary Vascular Plant Species [PS] and Contributory Vascular Plant Species [CS]' including:

- *Ammophila arenaria* Marram Grass
- *Anthyllis vulneraria* Kidney Vetch
- *Arenaria serpyllifolia* Thyme-leaved Sandwort
- *Atriplex glabriuscula* Babington's Orache CS
- *Beta vulgaris* subsp. *maritima* Sea Beet
- *Blackstonia perfoliata* Yellow-wort CS
- *Calystegia soldanella* Sea Bindweed CS
- *Carex arenaria* Sand Sedge
- *Catapodium marinum* Sea Fern-grass
- *Catapodium rigidum* Fern-grass
- *Cerastium diffusum* Sea Mouse-ear
- *Chenopodium rubrum* Red Goosefoot
- *Cochlearia officinalis* Common Scurvygrass
- *Crithmum maritimum* Rock Samphire
- *Cynoglossum officinale* Hound's-tongue NT
- *Echium vulgare* Viper's-bugloss CS
- *Elytrigia atherica* Sea Couch CS
- *Erodium lebelii* Sticky Stork's-bill NS / PS
- *Eryngium maritimum* Sea-holly CS

- *Euphorbia paralias* Sea spurge CS
- *Euphrasia confusa* Eyebright CS
- *Euphrasia tetraquetra* eyebright PS
- *Glaucium flavum* Yellow horned-poppy CS
- *Glaux maritima* Sea-milkwort
- *Hippophae rhamnoides* Sea-buckthorn NS / Invasive
- *Honckenya peploides* Sea Sandwort CS
- *Lotus corniculatus* Common Bird's-foot-trefoil
- *Myosotis ramosissima* Early Forget-me-not
- *Oenothera glazioviana* Large-flowered Evening-primrose
- *Oenothera x fallax* Hybrid Evening-primrose
- *Ononis repens* Common Restharrow
- *Orobanche minor* Common Broomrape CS
- *Phleum arenarium* Sand Cat's-tail CS
- *Picris hieracioides* Hawkweed Oxtongue CS
- *Pilosella praealta* Tall Mouse-ear-hawkweed
- *Poa infirma* Early Meadow-grass NS
- *Polypogon monspeliensis* Annual Beard-grass NS
- *Raphanus raphanistrum* subsp. *maritimus* Sea Radish
- *Rorippa islandica* Northern Yellow-cress NS

- *Sagina maritima* Sea Pearlwort CS
- *Sedum acre* Biting Stonecrop
- *Senecio viscosus* Sticky Groundsel
- *Silene vulgaris* Bladder Campion
- *Stellaria pallida* Lesser Chickweed
- *Trifolium arvense* Hare's-foot Clover
- *Trifolium campestre* Hop Trefoil
- *Trifolium scabrum* Rough Clover CS
- *Tripleurospermum maritimum* Sea Mayweed
- *Vulpia fasciculata* Dune Fescue NS / CS

Brownfield Vegetation

- 2.6 An area of recolonising vegetation located to the south of the current car parking area (identified by a brown hatch on Figure 1) was identified within the 2018 walkover surveys as being of interest. This area is now dominated by bird's foot trefoil *Lotus corniculatus*.

Reptiles

- 2.7 Over the last ten years, various elements of survey work have been undertaken at the site for reptiles. SK Environmental Solutions Limited have worked with Neath Port Talbot local authority ecologist Becky Sharp on a number of mitigation strategies / translocations of common lizard *Zootoca vivipara* over recent years.
- 2.8 As such, it is considered that a sufficient amount of knowledge of the species range within the site has been established and that no further survey work is required.

- 2.9 The green hatched areas shown on Figure 1 (above) identifies locations where common lizard may be present and as such could pose a constraint to the laying down of the imported soils.

3. LEGISLATION

UK Legislation

- 3.1 All British reptiles are protected from intentional killing, injuring and sale under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). These are as follows:
- Adder *Vipera berus*;
 - Grass snake *Natrix natrix*;
 - Slow worm *Anguis fragilis*; and
 - Common lizard *Lacerta vivipara*.
- 3.2 This legislation aims to protect them from persecution and also exploitation in the pet trade.
- 3.3 Our rarest terrestrial reptile, the sand lizard (*Lacerta agilis*), and all our marine turtles also receive protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) from the following:
- disturbing whilst occupying a place of shelter or protection;
 - obstructing access to a place of shelter or protection; and / or
 - sale / offering for sale.
- 3.4 Common lizard are listed on Section 7 of the Environment (Wales) Act 2016 (list of the living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales) as a species of principal importance in Wales.
- 3.5 Furthermore, all reptile species are designated as Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities Act (2006). This sets out a duty for decision makers to contribute towards maintaining, and where possible enhancing, the conservation status of any Section 41 Species of Principal Importance found on a site.

European Legislation

3.6 Sand lizard and marine turtles are protected under the Conservation of Habitats and Species Regulations 2017). This is because they have declined throughout Europe in recent decades.

3.7 Under the Habitats Regulations, it is an offence if you:

- Deliberately capture, injure or kill any wild animal of an EPS;
- Deliberately disturb wild animals of any such species;
- Deliberately take or destroy the eggs of such an animal; or
- Damage or destroy a breeding site or resting place of such an animal
- Disturbance is defined as that which is likely:
 - to impair their ability –
 - To survive, to breed or reproduce, or to rear or nurture their young, or
 - In the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- To affect significantly the local distribution or abundance of the species to which they belong

4. ECOLOGICAL RECEPTORS

Breeding Birds

- 4.1 Four surveys were undertaken across spring and summer 2022 to identify ground nesting birds at the site and also to evaluate the success of the nest boxes installed within buildings on earlier phases of the wider development. These surveys are a requirement set out in the EcMMP (Appendix 1).
- 4.2 No evidence of ground nesting birds, other than one failed attempt by a pair of little ringed plover, was observed during the course of the surveys.
- 4.3 No evidence was observed within the nest boxes that have built into buildings as part of earlier construction.
- 4.4 The lay down of soils will be undertaken outside of the nesting bird season. If this is not possible due to delays, then weekly checks will be undertaken across the site to ensure any ground nesting breeding birds with active nests are identified, avoided and suitable stand offs are agreed between the site ecologist (Barry Stewart) and the ground works contractor.

Coastal Vegetation

- 4.5 As detailed above, habitats of floristically interesting coastal vegetation have been identified within the hatched orange areas on Figure 1.
- 4.6 However, these areas will be avoided during the lay down of the soil's material and as such no impact is anticipated – see Figure 2 for proposed lay down areas for imported soils.
- 4.7 Final levels formed by the imported soils will be topographically lower than the dunes to the immediate south. Therefore, run off from the fill area into the dunes is not expected.

Brownfield Vegetation

- 4.8 As discussed above an area of naturally recolonising brownfield vegetation, dominated by bird's foot trefoil is present on site just south of the existing car park.

- 4.9 In order to ensure this vegetation and seed bank are not lost through the laying down of imported soils, the top 300mm of the area will be carefully excavated and used to form a sloped batter, running away from the seaward edge of the imported soils, away from the dunes. This will be constructed during the lay down process and will be overseen by an Ecological Clerk of Works. This will ensure that the potential for run off from the imported soils into the coastal vegetation areas is minimised as much as possible, whilst simultaneously safeguarding the brownfield vegetation. See Appendix 2 & 3.
- 4.10 The exact location of the storing of this material will be agreed on site between the ecological clerk of works (ECoW – Barry Stewart) and the landscape contractor.

Reptiles

- 4.11 Habitat suitable for reptiles is shown on Figure 1 by a green hatch. These areas are considered likely to support a low population of common lizard.
- 4.12 There will be no requirement to lay any material down in these areas and as such there is negligible potential for the reptiles present on site to be negatively impacted by the proposed importation of soils - see Figure 2 for proposed lay down areas for imported soils.

5. DISCUSSION

- 5.1 It is anticipated that the importation of up to 32,900m³ of clean soils from Hendrofoilan will have negligible impact upon the ecological receptors present at the Swansea Bay campus, as long as the soils are laid down within the areas identified on Figure 2, with any relevant mitigation discussed above is adhered to.

6. REFERENCES

Froglife (1999). Reptile Survey; an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Advice Sheet 10.

Gent A. H. & Gibson S. D. (1998). Herpetofauna Workers' Manual. Peterborough, Joint Nature Conservation Committee.

Gent A. H. & Gibson S. D. (2003). Herpetofauna Workers' Manual 2nd Edition, Peterborough, Joint Nature Conservation Committee.

Sewell D, Griffiths R. A., Beebee T. J. C., Foster J. and Wilkinson J. W. (2013). Survey protocols for the British herpetofauna (Version 1.0). Survey 4 – 23rd August;

APPENDIX 1



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THE BAY SCIENCE AND INNOVATION CAMPUS

PHASE 2

**ECOLOGICAL MONITORING AND MANAGEMENT PLAN –
UPDATE FOR PHASE 2 AND WIDER OPP LAND –
2019 (ECMMP)**

Prepared for: St Modwen Developments Ltd.

Date: November 2019

Report Reference: JN00359 / D01 / Rev08

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JN00359 / DW02	REPTILE ARTIFICIAL COVER OBJECTS (ACOS) LOCATION PLAN
JN00359 / DW04	ECOLOGY PHASES PLAN
JN00359 / DW05	INVASIVE SPECIES UPDATED PLAN
JN00359 / DW06	REPTILE MITIGATION PLAN
JN00359 / DW08	PHASE 2B DEVELOPMENT PROPOSAL

APPENDICES

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APPENDIX 3	INVASIVE AND NON-NATIVE SPECIES UPDATE SURVEY REPORT (JN00359 / D02)
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1. INTRODUCTION

Background

- 1.1 Phase 1 of the development at Swansea Bay Campus is now complete (final Phase (1C) works were completed in September 2017). Phase 2 works commenced in summer 2017, with the construction of two new buildings (International College and a new Residential building) and improvement to flood defences immediately in front of the new International College, which primarily comprised raising the height and length of the rock armour in this area. Method statements were produced by SK Environmental Solutions Limited (2017) in order to ensure that no detrimental effects were caused by these works on a range of ecological receptors. These method statements were agreed with Rebecca Sharpe at Neath Port Talbot Council (NPTC) and included:
- A Wintering Birds Mitigation Strategy (JN00268 D02);
 - A Dune Relocation Mitigation Strategy (JN00268 D03); and
 - A Reptile Mitigation Strategy (JN00268 D04).
- 1.2 The Ecology Phases Plan (Drawing Number JN00359 / DW04) shows the completed Phase 1 development as well as the boundary for the Phase 2 development and the wider land within the OPP boundary; text boxes have been included to show areas of interest from an ecological point of view.
- 1.3 Following a meeting between representatives from NPTC, Prosurv Consult, Savills, PJA Engineering, Swansea University and SK Environmental Solutions Limited, a strategy was agreed for taking forward the remainder of the proposed works for Phase 2b and the wider land within the OPP boundary.
- 1.4 This document details the agreed ecological measures to be undertaken in order to safeguard all remaining ecological receptors associated with the site, during the construction and subsequent occupation of the Swansea Bay Campus Development.

Works Undertaken

- 1.5 Since the recent completion of the International College, the residential buildings and the rock armour sea defence improvements in Autumn 2018, no further works have been undertaken at the Swansea University Bay Campus Site.

Future Development Proposals

- 1.6 It is considered likely that the next step in the development of Swansea University Bay Campus will be the construction of a Law School in the location of the existing temporary multi use games area (MUGA) and further residential accommodation, in the form of townhouses, to the west of the newly proposed MUGA location. The current MUGA is to be relocated to facilitate the new Law School (see Drawing Number JN00359 / DW08 Phase 2b Development Proposal).
- 1.7 There will be a requirement to improve the rock revetment associated with these two areas (both to the east and west of the recent rock revetment improvement area), in

order to safeguard future development of the townhouses and the Law School from inundation during periods of high tide and storms. These plots were intended to be developed in the original outline planning application and the impact of doing so has therefore been tested through the Environmental Impact Assessment.

- 1.8 Future phases of the Swansea Bay Campus Development proposals will be detailed within this EcMMP report as and when the information becomes available; this document is intended to be a fluid document that will be regularly reviewed and updated as proposals are granted planning permission and subsequently built out. The next update of this document is currently scheduled for October 2020.

Summary of Future Development Proposals

- 1.9 The proposals associated with Phase 2b comprise:

- The construction of a new Law Building within the location of the existing Multi Use Games Area (MUGA) and facilities including improvements to existing rock armour revetments;
- The relocation of the existing MUGA to an area immediately west of the recently constructed International College;
- The construction of town houses to the west of the proposed new MUGA location;
- The creation and planting of new diverse habitats comprising native species of local provenance to ensure the landscaping of the new areas of development is robust and in line with the provision of ecosystem resilience as part of the development in Phase 2b and the remaining campus as a whole;

N.B. The production of a cohesive landscaping and biodiversity enhancement strategy has been prepared with the assistance of Barry Stewart (Celtic Wildflowers) for the site as a whole to ensure the development meets its targets associated with ecosystem resilience throughout the wider Swansea University Bay Campus works; and

- The construction of a permanent car parking solution (the location of which has not yet been agreed).

- 1.10 Please see Drawing Number JN00359 / DW08 Phase 2b Development Proposal for locations of the above proposed developments.

Ecological Monitoring and Management Plan (EcMMP) Aims

- 1.11 The production and subsequent updating of an EcMMP is required under Planning Condition 50 of the outline planning permission and requires St. Modwen Developments and Swansea University to manage the potential ecological impacts of the development. The EcMMP is a live document and as such it will be added to and amended as appropriate. As this document is updated, all new versions will be submitted to the LPA in October of each calendar year for the remaining years relating to the completion of the development associated with the outline planning permission for the campus as a whole.

1.12 The EcMMP will be implemented in line with the information contained below and will be consistent with the any future Construction Environmental Management Plan's (CEMP's) prepared for future development proposals, within the parameters of the wider outline planning permission, which is yet to benefit from detailed planning permission or reserved matters approval.

1.13 One of the fundamental aims of this document is to provide certainty and assurances that the future phases of the development will deliver on the concept of ecosystem resilience and habitat connectivity through careful and considered design of the landscaping as part of any future phase of development. The design and construction of 'habitat islands' to promote connectivity across the Phase 2b development where possible will form the primary basis for achieving this objective. Details of these habitat islands can be seen within Appendix 1 Public Realm and Landscape Strategy.

1.14 The following survey work has been undertaken and mitigation strategies have been produced where appropriate / necessary and these have been summarised below.

N.B. These mitigation strategies will be implemented as part of the ongoing ecological monitoring and management of the Swansea University Bay Campus with regard to future development proposals within the parameters of the outline planning permission:

Reptiles

Survey Work

1.15 Reptile surveys were undertaken in April, May, June and September 2018. The survey results (see Appendix 5 JN00359 / D04 Reptile Survey Results and Mitigation Strategy Report, 2019) concluded that there is a small population of common lizard using the dune grassland habitats in Area A along the southern site boundary (see Drawing JN00359 / DW02 Reptile ACO Location Plan).

Mitigation Summary

1.16 The mitigation strategy for reptiles will include translocation from Area A, habitat improvements within the remnant dune triangle located to the east of the current development Area B (see Drawing JN00359 / DW02 Reptile ACO Location Plan - Area B) and a two phased habitat degradation of the blue hatched area shown on Drawing Number JN00359 / DW06 Reptile Mitigation Plan to encourage reptiles to naturally disperse eastward toward Crymlyn Burrows SSSI. Full details regarding the reptile surveys and mitigation strategy are provided in Appendix 5 JN00359 / D04 Reptile Survey Results and Mitigation Strategy Report, 2019.

Vegetation

Survey Work

1.17 An NVC survey was undertaken in July 2018, along the remnant dune area located to the west of the newly constructed academic building. An NVC report (see Appendix 2 JN00359 / ERS01 NVC Phase 2 Survey Report) has been completed.

Mitigation Summary

- 1.18 Survey work concluded that much of the vegetation within the survey area comprised species that would be considered unsuitable for the SSSI, therefore the movement of the top 300mm of the substrate from this area would not be proposed for translocation onto the beach area in front of the SSSI, as has been the strategy for previous areas. However, following discussion with Barry Stewart on the 11th April 2019 during a site visit, it was agreed that this material could be used to form part of the wider landscaping for either the backslope of the revetment or the 'stepping stones' that will comprise the connective corridor to achieve ecosystem resilience.

Invasive Species

Survey Work

- 1.19 An invasive species survey was undertaken in September 2018 and a report detailing the survey findings was produced (see Appendix 3 JN00359 / D02 Invasive and Non-Native Species Update Report). No invasive species were identified within the Phase 1, Phase 2a or Phase 2b areas.

Mitigation Summary

- 1.20 As a result of the survey work, no formal mitigation is proposed, however it is recommended that a follow up monitoring surveys will be undertaken every other year for the duration of the works, commencing in summer 2020, to monitor any potential future encroachment of invasive species.

Ground Nesting Birds

Survey Work

- 1.21 Surveys of the areas of bare ground to the west of the recent rock revetment works has been undertaken during the breeding season 2019. These surveys commenced in April 2019, with the final survey being completed in August 2019. A report is being produced and will be submitted to NPT for review before the end of 2019.

Mitigation Summary

- 1.22 The report will detail the findings of the survey work and will be completed by the end of 2019 and submitted to NPT for review.

Breeding Birds

Survey Work

- 1.23 No formal survey work has been undertaken to assess the success of breeding birds within the nest boxes that have been erected as part of previous mitigation. Previous discussion with Ben Sampson at Swansea University identified that none of the boxes (swift and sparrow boxes) have been used since they were erected. However, since the latest submission of this document for review, anecdotal evidence has been passed on by Becky Sharp regarding some efforts by birds to use these boxes.

- 1.24 Correspondence was undertaken between Ben Sampson and SK Environmental Solutions Limited via email on the 25th October 2019.
- 1.25 Through this correspondence Ben Sampson confirmed that he does not 'routinely monitor the bird boxes on campus' and as such he does not 'have any evidence of them being used'. However, as discussed with Ben this does not 'mean that they are definitely not being used'. Ben does not believe that any swifts are using the boxes yet, however numbers across the area have been low this summer.
- 1.26 It was subsequently agreed that more formal monitoring of the boxes would be undertaken in 2020 (by SK Environmental Solutions Limited) and that future phases would be discussed between Ben Sampson and SK Environmental Solutions Limited as to the best location and type of nest boxes to be used, going forward.

Mitigation Summary

- 1.27 An assessment of the current situation with regard to nest boxes and their locations will continue over the 2020 breeding season. Provision of such nest boxes should continue throughout future development phases however the location and type of nest boxes should be discussed and agreed between SK Environmental Solutions Limited and Ben Sampson.
- 1.28 Habitat for non, ground nesting birds is scant within the areas associated with Phase 2b of the Swansea Bay Development site. However, a number of small trees / shrubs are present around the existing MUGA location. These trees / shrubs will be checked prior to any works being undertaken in association with either the removal of the existing MUGA or the construction of the new Law Building to ensure no nesting birds are harmed as a result of the proposed development.

Overwintering / Wading Birds

Survey Work

- 1.29 No formal survey work has been undertaken since winter 2015 / 2016. However, it has been noted through discussion with Becky Sharp and Barry Stewart that numbers of roosting birds in this area have reduced over recent years. It is not clear what the main factors attributed to this are.

Mitigation Summary

- 1.30 Works associated with rock revetment improvements to the east (in relation to the proposed construction of the new Law School) and to the west (associated with the proposed townhouse development) will be required as part of Phase 2b development. If possible, these works will be undertaken outside of the winter months.
- 1.31 Whilst timescales relating to the delivery of development projects, which have the potential to effect wading birds, are unknown at this stage, the following mitigation should be followed to ensure that the works do not have a detrimental effect on roosting birds. Fundamentally, the winter months are the most likely time when large numbers of

roosting / wading birds will be encountered on the foreshore, however at most times of the year there is a possibility of encountering some roosting birds in the early morning on the foreshore.

1.32 As such the mitigation strategy to minimise the impact upon roosting birds on the foreshore will include the following:

- A toolbox talk will be given to all site staff to provide information regarding roosting birds on the foreshore. This toolbox talk will set out the species of bird that are likely to be encountered roosting on the foreshore, the importance of not disturbing roosts and the protocols to be followed to ensure disturbance does not occur as a result of construction activities;
- A representative from the contracts team will be chosen to act as the 'Designated Roost Assessor', it will be their responsibility to undertake checks each morning prior to works commencing to ensure roosting birds have been allowed to naturally wake and move away from the working area prior to works commencing. The 'Designated Roost Assessor' will be assisted by an experienced ornithologist on the first two mornings to provide guidance on what to look for and when to allow works to commence;
- The 'Designated Roost Assessor' will keep a detailed log of each daily assessment and recorded times the assessment took place and the time when works were allowed to commence;
- Fortnightly visits will be undertaken by the experienced bird assessor on random mornings to ensure the methodology is being satisfactorily adhered to;
- Noise from vehicles and lighting will be minimised during the period before the roosting birds have left the area; and
- A final report will be produced from the information kept in the daily logs and submitted to the LPA at the end of each month and following the completion of the works, to monitor the success of the mitigation strategy and detail any shortfalls and necessary remedial action if required.

1.33 A formal mitigation strategy document will be produced incorporating the above points once the timescales for the works are finalised.

2. KEY ECOLOGICAL ISSUES

Statutory Designated Sites

- 2.1 During the desk study for Extended Phase 1 Habitat Survey (Appendix 4 JN00304 / D01) six statutory designated sites within 2km of the site boundary:
- Crymlyn Burrows Site of Special Scientific Interest (SSSI);
 - Crymlyn Bog Ramsar Wetland of International Importance;
 - Crymlyn Bog / Cors Crymlyn Special Area of Conservation (SAC);
 - Crymlyn Bog / Cors Crymlyn Site of Special Scientific Interest (SSSI);
 - Pant-y-Sais Site of Special Scientific Interest (SSSI); and
 - Crymlyn Bog and Pant-y-Sais National Nature Reserve (NNR).

Crymlyn Burrows Site of Special Scientific Interest (SSSI)

- 2.2 Crymlyn Burrows SSSI is located approximately 400m to the east of the International College building and the existing and associated rock revetment works. The principal reasons for the designation of this SSSI are the sand dunes and saltmarsh with wet dune slacks and carr woodland which the site supports. There are a number of notable species of local occurrence, including rock sea lavender and variegated horsetail and the strandline beetle.
- 2.3 Given the location of the works associated with the Phase 2b development plots of the Bay Campus and the distance from Crymlyn Burrows SSSI (separated by the existing Phase 1 and 2a development proposals at the Campus), it is not anticipated that any direct impact will occur as a result of future development. An assessment of potential air quality impacts of the Phase 2b development could be provided by an air quality consultant should screening of the individual planning applications undertaken by NPT highlight the need for this.
- 2.4 The only potential involvement that Crymlyn Burrows may have with the future development sites within the parameters of the outline planning permission works, would be as a receptor site for reptiles which may require translocation from the wider Bay Campus. Prior to any potential translocation being undertaken within the SSSI, permission would be sought from NRW.
- 2.5 If any other requirement for access into Crymlyn Burrows SSSI is identified during the process of future development works, then a safe working strategy and ecological monitoring methodology will be produced and agreed with NPTC and Natural Resource Wales (NRW) prior to any access into the SSSI occurring.

Crymlyn Bog

- 2.6 Crymlyn Bog SAC/ RAMSAR/ NNR/ SSSI is located approximately 750m to the north of the proposed development site. Crymlyn Bog SSSI, South Wales is the largest example of valley floodplain mire in Wales. There is no other known example of this type with a comparable complexity and diversity of vegetation in Britain. The site occupies a total area of 243.9 ha of which 60ha are managed as National Nature Reserve. Crymlyn Bog is part of a large inter-estuarine complex which includes the adjacent Panty-Sais Fen SSSI. It is classified as a mire type intermediate between that of valley and floodplain and shares hydrological and vegetation characteristics of both.
- 2.7 Other plant species of interest include bog-sedge *Carex limosa*, dioecious sedge *Cerex dioica*, greater spearwort *Ranunculus linigua*, least bur-reed *Sparganium natans* and black bog rush *Schoenus nigricans*.
- 2.8 Within the Crymlyn Bog site is one of the largest wet woodlands in Wales. It is dominated with alder *Abus glutinosa*, but also contains alder buckthorn *Frangula alnus*, downy birch *Betula pubescens* and grey willow *Salix cineria*.
- 2.9 The dense areas of large perennial grasses *Phragmites sp.* support a large population of breeding warblers, including the reed warbler *Acrocephalus scirpaceus* and sedge warbler *Acrocephalus schoenobaenus*.

Pant-y-Sais

- 2.10 Pant-y-Sais is an area of lowland fen that is located within a narrow valley; the previous course of the River Neath. The fenland communities supported within the site include areas of bryophytes (mosses, liverworts and hornworts), including *Sphagnum sp.*, and purple moor-grass *Molinia caerulea*. In addition to the fen, there are areas of swamp which support a large population of great reedmace *Typha latifolia* and lesser reedmace *Typha angustifolia*.
- 2.11 The Tennant Canal runs through the area, and the section within the Pant-y-Sais SSSI supports a variety of plants that are not otherwise found on site, including the locally rare flowering rush *Butomus umbellatus*.

Likelihood of Impact

- 2.12 Given the nature of the proposed development and the distance from the statutory designated sites it is considered unlikely that Phase 2b will have any detrimental effect upon any of those identified.
- 2.13 It is well documented that increases in nitrates on the statutory designated sites in close proximity to the development site, in particular Crymlyn Bog could have a detrimental effect on the ecological receptors present through nitrogen deposition and decreases in pH. However, it is understood that air pollution assessments undertaken at the outset of the original outline planning application as part of the Environmental Statement, have confirmed that the increase in traffic numbers at the site will not have a significant effect in terms of nitrate deposition at any of the statutory designed sites.
- 2.14 Any works associated with the Phase 2b development would be subject to best practice guidelines for minimising air pollution and dust, such as damping down across working areas etc.

Non-Statutory Designated Sites

Swansea Bay Site of Importance for Nature Conservation (SINC)

- 2.15 Swansea Bay has been designated by the City and County of Swansea Council as a Site of Importance for Nature Conservation (SINC). This designation does not cover the proposed working area associated with future works, as the designation ends approximately 3.2km to the west. It is not anticipated that Swansea Bay SINC will be impacted as a result of future works and therefore this site is not considered further within the EcMMP at this time.

Amazon Woodlands Site of Importance for Nature Conservation (SINC)

- 2.16 Amazon Woodlands SINC lies approximately 350m north of the proposed site and constitutes the remnants of what was formerly an extensive area of wet woodland that had established itself on the blown sands of the coastal plain. It is an uncommon woodland type that is now isolated in this location by industrial developments, but still acts as a stepping-stones between habitats of a similar nature; for example, Crymlyn Burrows and Crymlyn Bog. It is designated for Native Woodlands and Vascular Plants and is regularly flooded.

Neath Estuary Site of Importance for Nature Conservation (SINC)

- 2.17 Located approximately 1.7km east of the site at its closest point, the Neath Estuary SINC runs westwards from Tonna to Briton Ferry, meeting the sea at Baglan Burrows. Wetland habitats within the site include Coastal Saltmarsh, Reedbeds, Intertidal Mudflats and Floodplain Grazing Marsh. It is one of several SINC's in the immediate area designated for their wetland habitats and is known to be grazed predominantly by cattle on the floodplain. Several protected and priority species have been recorded within the Neath Estuary including otter, reed bunting, whimbrel and peregrine; however Japanese knotweed and Himalayan balsam have been noted as invasive species within the site.

Tennant Canal Site of Importance for Nature Conservation (SINC)

- 2.18 Approximately 500m north of the proposed site lies the Tennant Canal SINC, designated for its Standing Open Water and Canals. It supports an exceptional range of aquatic and emergent flora and acts as a connector between Pant y Sais Fen and Crymlyn Bog. There are wet grassland and carr woodland habitats adjacent, as well as industrial land. Otter and water shrew have been recorded within the riparian zone, whilst the banks support a number of orchid species. Several other statutory and non-statutory designated sites for nature conservation are located in close proximity to the Tennant Canal, which no longer supports craft and has not done so since the 1930's.

Likelihood of Impact

- 2.19 Given the nature of the proposed development and the distance from the non-statutory designated sites it is considered unlikely that Phase 2b will have any detrimental effect upon any of those identified.

- 2.20 It is well documented that an increase in nitrate deposition on statutory designated sites in close proximity to the development site, in particular Crymlyn Bog, could have a detrimental effect on the ecological receptors present as nitrogen deposition can contribute to decreases in pH. However, it is understood that air pollution assessments undertaken at the outset, submitted as part of the Environmental Statement and approved in the original outline planning permission, confirmed that the increase in traffic numbers at the site will not have a significant effect in terms of nitrate deposition on Crymlyn Bog. s such it is considered unlikely to have a detrimental impact on any of the nearby sites designated as SINC's in the intervening period.
- 2.21 In addition, the first reserved matters approval (P2012/0888) was permitted by NPT on 5th December 2012. An Air Quality Assessment Technical Note prepared by Atkins was submitted with the reserved matters application pursuant to Condition 47 of the outline planning permission and covered the extent of the Bay Campus site. The Technical Note concluded that concentrations of all pollutants arising from the development of the Campus as a whole would, in the case of effects on the Crymlyn Bog Habitat, remain insignificant. Since the development of the Campus remains well within the parameters of the overarching outline planning permission, there is no reason to suggest that the conclusions reached in respect of air quality will have changed and therefore, despite the subsequent designation of a number of SINC's in the area, it is considered that there is no requirement to revisit the likely effects of the development on these habitats at this stage.
- 2.22 Any works associated with the Phase 2b development would be subject to best practice guidelines for minimising air pollution and dust, such as damping down across working areas etc.

Area adjacent to and including the proposed revetment works area (not currently designated)

- 2.23 Neath Port Talbot Borough County Council (NPT) is currently reviewing their non-statutory (SINC) designations. Current policy states that all areas/sites that meet the SINC criteria should be considered the same way as those already identified. Given that the area adjacent to the proposed revetment improvement works supports important numbers of wading birds it is considered that the area should be considered as a SINC within the planning process and when considering potential ecological impacts associated with future development proposals.

Likelihood of Impact

- 2.24 As part of the on-going improvements and developments at Swansea Bay campus site, further works to improve the rock revetment will be required. This could have an impact on roosting and over wintering wader species.
- 2.25 If possible, these works will be undertaken outside of the winter months. If this is not achievable then a similar methodology to that used for the previous rock revetment works will be employed, where a check would be made each morning, prior to works commencing, to identify whether any roosting birds are located within close proximity to the working area that they could be disturbed through the commencement of construction activities. This will ensure that roosting / overwintering waders are not

disturbed as result of works relating to the implementation of the rock revetment improvements. As discussed above in Paragraph 1.31, upon receipt of the relevant information regarding the timing and method of working, SK Environmental Solutions Limited will produce a bespoke method statement which will be agreed with the LPA and closely adhered too by the contractor during the rock revetment works.

- 2.26 It is well documented that increases in nitrates on the statutory designated sites in close proximity to the development site, in particular Crymlyn Bog, could have a detrimental effect on the ecological receptors present through nitrogen deposition and contribute to decreases in pH. However, it is understood that air pollution assessments undertaken at the outset, submitted as part of the Environmental Statement and approved in the original outline planning permission, confirm that the increase in traffic numbers at the site will not have a significant effect in terms of nitrate deposition at any of the statutory designed sites. As such it is considered unlikely that air pollution (resulting from the proposed development) will have a detrimental impact on any of the nearby sites designated as/or currently being considered for designation as SINC's in the intervening period.
- 2.27 Any works associated with the Phase 2b development would be subject to best practice guidelines for minimising air pollution and dust, such as damping down across working areas etc.

Habitats

Section 7 of the Environment (Wales) Act 2016

- 2.28 Section 7 of the Environment (Wales) Act 2016 replaces the duty in Section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales.
- 2.29 An area of dune habitat within the parameters of the wider outline planning permission working area was subject to an NVC survey in 2018, to establish whether the habitats present could be assigned to any known NVC communities in Rodwell, (2001) and if the previously used methodology, of relocating the top 300mm of dune material onto the beach and allowing natural dispersal, remains suitable. See Appendix 2 JN00359 / ERS01 for the NVC survey area.
- 2.30 The NVC report concluded that although some areas showed similarities to SD19 - *Phleum arenaria*- *Arenaria serpyllifolia* dune annual community and SD16a - *Salix repens*-*Holcus lanatus*: sub-community. *Ononis repens*, dune slack community, unfortunately the habitats had become invaded throughout by bramble *Rubus fruticosus* agg. It is therefore considered inappropriate to relocate the substrate and associated vegetative material into Crymlyn Burrows SSSI. Furthermore, the presence of concrete rubble within the sand matrix would preclude relocation of the material as it would appear that at some past time brownfield material was dumped at this part of the site. As such the habitat present is not considered suitable for relocation onto the foreshore, for natural dispersal into the SSSI as per previous mitigation strategies.

- 2.31 Given the results of the NVC survey, it is not considered that this habitat is appropriate for classification as S7 sand dune habitat and as such no compensation for its loss is recommended. However, as discussed below the material and its component parts will be stored for reuse in the landscaping scheme as part of the creation of habitat islands and the material for the backslope of the revetment improvement.
- 2.32 It is however deemed appropriate that this material could be stored in windrows until such time that it could be used to supplement the material that will be required for the creation of the backslopes on the two areas of proposed revetment improvements.
- 2.33 The area to be lost as a result of the development measures approximately 1550sq.m. This will be replaced with approximately 1325sq.m through the planting up of the proposed east and west revetment backslopes and the creation of habitat islands. It is anticipated that even though this area may be smaller in size than the area lost, the existing area is considered to be comparatively species poor and the proposed mitigation will maximise the potential for biodiversity gains through utilising a wider range of native species within both the planting of the backslope of the revetment improvements and the creation of habitat islands where possible, whilst still retaining the habitat connectivity along the front of the site.
- 2.34 Furthermore, over 600 sea stock plants are being planted in the next planting session in these locations by Celtic Wildflowers, which will make a significant contribution toward increasing the population of wild sea stock across the UK by 10%.

Species

Reptiles

- 2.35 Survey work for reptiles was undertaken within Area A, Area B and Area C (see Drawing JN00359 / DW02 - Artificial Cover Object Location Plan) in May, June and September 2018 to determine a population size class estimate. A small population of common lizard was identified within Area A.
- 2.36 The remnant dune section (Area B) and Crymlyn Burrows SSSI (Area C) were included within the survey to allow a baseline population for these areas to be determined. These areas were surveyed in order to identify a potential receptor site, for the translocation of reptiles from Area A ahead of the future development works. The baseline results identified a 'Low' population of common lizard within Area B (the remnant triangle) and an 'Exceptional' population of common lizard with Area C (the SSSI).
- 2.37 No survey work was undertaken within the area immediately south of the existing MUGA as low-level reptile presence is assumed. The narrow strip of habitat in this area is not considered to be any more suitable/of higher quality for reptiles than the habitats to the east and west (which were surveyed). Surveys to the east and west identified a Low population of common lizard. It therefore stands to reason that the area immediately south of the MUGA is unlikely to support a larger population. Therefore, given the connectivity of this area with the wider habitat to the east (i.e. the remnant dune and SSSI) it is proposed that a two phased habitat degradation approach is undertaken here to encourage natural dispersal of reptiles into these areas. Full details of this approach and the proposed translocation of reptiles from Area A to Area B can be seen in

Appendix 5 JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy, 2019.

- 2.38 **N.B.** it should be noted that NRW were consulted on 23rd March 2018 with regard to placing the Artificial Cover Objects (ACO's) within the SSSI and they had no objection on the proviso that care was taken with the locations chosen for their placement.

Breeding Birds

- 2.39 The disturbed ground areas to the west and south of the currently undeveloped parts of the site, have the potential to support ground nesting bird species such as lapwing *Vanellus vanellus*, skylark *Alauda arvensis* and ringed plover *Charadrius hiaticula* amongst others. Breeding bird surveys across these areas were completed in August 2019; the results will be provided within a report to be submitted to NPT for review prior to the end of 2019.
- 2.40 However, in summary, one solitary pair of ringed plover *Charadrius hiaticula* were observed nesting close to the entrance to the temporary car park, which is located outside of the area earmarked for development as part of Phase 2b. No evidence to support the fact that the nesting attempt was successful was recorded by the surveyor (Barry Stewart) during the surveys.
- 2.41 As the unsuccessful nesting attempt occurred outside of the development boundary associated with the proposed Phase 2b development, it is not considered necessary to discuss the requirement for any mitigation at this stage, given that the area will remain untouched for the foreseeable future. However, consideration and monitoring of the situation at the site for ground nesting birds will be ongoing and if mitigation is deemed necessary as part of future phases, then this can be discussed and agreed at this point.
- 2.42 Prior to any works occurring in these areas, a walkover survey will be undertaken by an experienced ornithologist to ascertain if any ground nesting birds are present. If any active nests are identified (or nests under construction) then a suitable stand-off will be observed until such time that the ornithologist can safely declare the nest free of young; this approach will only be required during the breeding bird season (March to August inclusively) and where possible works in these areas will be scheduled outside of the breeding bird season.
- 2.43 Future phases of the development will still require mitigation in the form of bird boxes. Specifics for the location and type of boxes will be discussed and agreed with Ben Sampson on a plot by plot basis.

Roosting / Wading Birds

- 2.44 The foreshore in front of the campus has two main known roosts of wading birds and gulls. These are primarily occupied by the largest number of individual birds during the winter months (October – February) however there are wading birds at the site most of the year round.
- 2.45 Wading bird activity is predominantly influenced by the tide, all bird activity has an increase around the hours immediately after dawn and prior to dusk. These are the hours

within which feeding is often the most important, as overnight feeding is often not possible, or reduced.

- 2.46 A mitigation strategy will be produced to ensure that disturbance is minimised to these roosting birds during operations associated with works close to the foreshore. This mitigation strategy will be formalised once timescales for the works have been finalised but will incorporate the information provided above in paragraph 1.32.

Existing Backslope on the Artificial Fixed Dune Area

- 2.47 During the works relating to the rock armour improvement, a section of artificial dune was created, to mitigate, in some part, for the loss of the dune habitat in this area. This artificial dune habitat was planted with marram grass plugs in late 2017. The marram plugs were monitored in October 2018 to establish success. It was noted that some of the plugs had failed, however this is likely to be as a result of the hot summer in 2018.
- 2.48 Upon review of the situation in April 2019 with Barry Stewart (Celtic Wildflowers), it was agreed that the marram plugs should be given another growing season and the situation revisited in October 2019. A recent site visit by Barry Stewart (19th October 2019) has confirmed that the marram grass is now steadily colonising the back slope.
- 2.49 Additional planting of other dune species was undertaken in June 2019 by Barry Stewart in line with the species mix detailed in Appendix 7).. Appendix 8 is a report produced by Celtic Wildflowers to demonstrate the progress made during the first planting session.
- 2.50 Barry Stewart (Celtic Wildflowers) has recommended that the netting (which was anticipated to be biodegradable) be removed, as self-seeded plants are growing through the sand but are being trapped by the netting. It is anticipated that the removal of the netting will not affect stability of the backslope as monitoring of the backslope planting by Celtic Wildflowers during the first planting phase found that the substrate seemed relatively stable in the small trial sections where netting was temporarily removed.
- 2.51 Further planting was undertaken in October 2019 (which is to be supplemented by additional planting in late October / early November 2019). A second interim report will be prepared by Barry Stewart and will be submitted to the LPA. During the October 2019 planting, more sections of the netting have been rolled down the slope to allow seedlings to come through; monitoring of the slope stability will be on-going, and the netting will be replaced if needed.
- 2.52 A scheme for monitoring the success of the proposed planting undertaken in June and October 2019, and an assessment of the marram (and any remedial action considered necessary) will be produced by Barry Stewart in April 2020, following the completion of the final phase of planting in early spring 2020; the final report will be submitted to NPT for comment at this time.

Non-Native Invasive Flora

- 2.53 An invasive species survey was undertaken in 2018 and a report detailing the survey findings was produced (see Appendix 3 JN00359 / D02 Invasive and Non-Native Species Update Report). No invasive species were identified within the Phase 1, Phase

2a or Phase 2b areas. As a result of the survey work, no formal mitigation is proposed, however it is recommended that a follow up monitoring surveys be undertaken every other year for the duration of the works, commencing in summer 2020, to monitor any potential future encroachment of invasive species.

3. MANAGEMENT CONTROLS

Schedule of Works

- 3.1 Ground preparation associated with the construction of the Law Building on the site of the current MUGA is anticipated to commence in 2019. The area associated with the current MUGA and its immediate surroundings are not anticipated to pose any ecological constraints to the proposed Law Building, however any vegetation present that will require removal would be checked for nesting birds prior to its removal (dependent upon the time of year).
- 3.2 Further areas of development within Phase 2b are still at discussion stage; however, the table below details the timings of the required ecological survey work to be completed for the future phases.
- 3.3 **N.B.** where specific receptors remain undeveloped and where necessary, the remainder of the Swansea Bay Campus will be monitored annually to ensure that the most up-to-date ecological data can be provided with various planning application submissions which may be submitted to NPT for approval in the fullness of time.
- 3.4 Tables 1, below detail the timings of ecological works that will accompany the scheduled development works:

Table 1. Schedule of Ecology Works for Future Development			
Species / Habitats	Timescale	Personnel	Comments
Ground Nesting Birds	Mar – Aug 2019	SK Ornithologist	Surveys have been completed for 2019 breeding bird season and only one solitary pair of ringed plover were observed attempting to nest near the temporary car park. This is an opportunistic species that will attempt to utilise any potential suitable habitat for nesting. As the unsuccessful nesting attempt occurred outside of the development boundary associated with the proposed Phase 2b development, it is not considered necessary to discuss the requirement for any mitigation at this stage, given that the area will remain untouched for the foreseeable future. However, consideration and monitoring of the situation at the site for ground nesting birds will be ongoing and if mitigation is deemed necessary as

Table 1. Schedule of Ecology Works for Future Development

Species / Habitats	Timescale	Personnel	Comments
			part of future phases, then this can be discussed and agreed at this point. A report is being prepared regarding the results of the survey work and will be submitted to NPT for review prior to the end of 2019.
Nesting Bird Check	March – August (annually)	SK Ornithologist	If any vegetation clearance is required or ground works are needed in areas where ground nesting birds may be found, in order to facilitate future development plots, nesting bird checks will be undertaken (where such works are required to take place during the breeding bird season which runs from March to August inclusively). If any active nests are identified, then further checks will be undertaken until the area can be declared free of nesting birds and the vegetation can then be removed/ground works can then be undertaken.
Roosting Birds	TBC	SK Ornithologist / Designated Roost Assessor	A mitigation strategy to minimise the effect of works close to the foreshore associated with the revetment improvements will be produced which will incorporate the elements summarised in paragraph 1.32.
Check nest boxes and erect boxes on new buildings	March – August 2020	Ben Sampson	Observations will be undertaken over the 2020 breeding season SK Environmental Solutions Limited. SK will share findings of nest box surveys with Ben Sampson and NPT. The results of the monitoring over 2019 will inform mitigation strategies for future phases.

Table 1. Schedule of Ecology Works for Future Development

Species Habitats	Timescale	Personnel	Comments
Undertake monitoring of marram plugs on the existing revetment backslope and replace if required.	October 2019 / April 2020	SK Ecologist / Barry Stewart	An assessment of the success of the marram plugs was undertaken in October 2019. Much better colonisation and growth was recorded across the backslope. Further monitoring will be undertaken in line with the monitoring of the remaining planting on the backslope in April 2020. Barry Stewart has undertaken two phases of planting on the backslope as of October 2019. A further phase is scheduled prior to the end of October 2019, with the final phase being undertaken in early spring 2020. The first interim report produced by Barry Stewart of Celtic Wildflowers (Appendix 8) highlights the number and species of plants planted during the first planting phase in May 2019, a second interim report will be produced to illustrate the number and species planted during the second phase of planting (completed in October 2019) and a final report detailing the success / failure of this planting will be produced in April 2020, following the final phase of the planting.
Undertake planting and sowing of native plants of local provenance on the existing revetment backslope.	May 2019 / October 2019 / April 2020	Barry Stewart	
Creation of Habitat Islands	TBC once the timescales for the upcoming Phase 2b development is finalised.	TBC once the timescales for the upcoming Phase 2b development is finalised	Habitat islands, such as those indicatively illustrated in Appendix 1 Public Realm and Landscaping Strategy will be considered for implementation in any viable areas in order to increase ecosystem resilience and improve habitat connectivity throughout the development.

Table 1. Schedule of Ecology Works for Future Development			
Species / Habitats	Timescale	Personnel	Comments
Invasive Species Survey	Biennially commencing summer 2020	SK Ecologist	Report on findings of invasive species survey and mitigation if required in the future. See Appendix 3 Invasive and Non-invasive species update survey report (JN00359/D02).
Reptile Translocation	2020	SK Ecologist	Reptiles will be translocated from Area A to Area B (see Appendix 5 JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report) prior to works in Area A commencing. Habitat improvements will be undertaken in Area B and commitments for ongoing monitoring and management will be agreed with NPT in order to increase the potential carrying capacity. See Appendix 5 JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report.
Two Phased Habitat Deconstruction to facilitate Natural Reptile Dispersal	May 2020	SK Ecologist	The area to the immediate south of the existing MUGA location will be subject to a two-phased habitat deconstruction process in line with recommendations made in JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report (see Appendix 5) to encourage natural dispersal of reptiles ahead of the relocation of the existing MUGA and the upcoming Law School development.

3.5 Table 2 (below) identifies potential works elements for future phases of the development that have the potential to impact upon ecological receptors and the ecological timing constraints / mitigation measures that will be required in order to ensure that no detrimental impact upon the identified ecological receptors occurs as a result of the works.

Table 2 – Ecological Works and Timing Constraints

Works Element	Potential Ecological Receptor Impacted	Mitigation Measures to Reduce Likelihood of Potential Impact
Vegetation Clearance	Nesting Birds	Only undertake clearance works outside of breeding bird season where possible (March – August inclusive). If clearance work cannot be avoided during this period, then the areas must be thoroughly checked by an experienced ornithologist in order to declare the areas free of nesting birds.
Vegetation Clearance	Reptiles	Any areas of vegetation to be cleared where survey work has identified the presence of reptiles or where this is the potential reptiles to be present, must not be undertaken until satisfactory mitigation measures have been undertaken. i.e. either translocation work or two phased habitat deconstruction. These mitigation measures can only be undertaken during the active reptile season between April – October inclusive (weather depending) and in accordance with JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report (see Appendix 5).
Site preparation including ground clearance / earth moving	Ground nesting birds	If possible, only undertake clearance works outside of breeding bird season where possible (March – August inclusive). If clearance work cannot be avoided during this period, then the areas must be thoroughly checked by an experienced ornithologist in

Table 2 – Ecological Works and Timing Constraints

Works Element	Potential Ecological Receptor Impacted	Mitigation Measures to Reduce Likelihood of Potential Impact
		order to declare the areas free of nesting birds.
Site preparation including ground clearance / earth moving	Reptiles	Any site preparation works including earth moving / ground clearance within areas identified as having reptiles present or where there is the potential for reptiles to be present, will not be undertaken until satisfactory mitigation measures have been undertaken i.e. translocation works or two phased habitat deconstruction. These mitigation measures can only be undertaken during the active reptile season between April – October inclusive (weather depending) and in accordance with JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report (see Appendix 5).
Vegetation clearance and site preparation including ground clearance / earth moving	Invasive species	Biennial checks will be made site wide for invasive species, however if a new phase of development comes forward where the most recent check is over 12 months old, then a walkover of the area will be undertaken immediately prior to works commencing to ensure no encroachment of invasive species has occurred.
Works with the potential to affect the foreshore	Roosting birds	A mitigation strategy will be produced to ensure that disturbance is minimised to roosting birds during operations associated with works close to the foreshore. This mitigation strategy will be formalised once

Table 2 – Ecological Works and Timing Constraints		
Works Element	Potential Ecological Receptor Impacted	Mitigation Measures to Reduce Likelihood of Potential Impact
		timescales for the works have been finalised but will incorporate the information provided above in paragraph 1.32.

Landscaping and the Wider Site

- 3.6 Stride Treglown and SK Environmental Solutions Limited have been in consultation with Barry Stewart (Celtic Wildflowers) to produce a definitive planting scheme that will provide native species of local provenance, that are appropriate for the location and that are known to be important pollinator/host species that will deliver significant ecological benefits and enhance connectivity of the coastal fringe. (see Appendix 1 Public Realm and Landscape Strategy and Appendix 6).
- 3.7 A meeting was held on site between Barry Stewart (Celtic Wildflowers), Greg McKay (Stride Treglown) and Michael Kurs (SK Environmental Solutions Limited) on the 11th April 2019.
- 3.8 The meeting focussed on ways the landscape planting associated with the northern edge of the proposed revetment improvements (where it is proposed to create 'habitat islands' (islands of diverse native planting') and planting up of both the backslope of the existing revetment as well as the backslopes of the two proposed revetment areas associated with the Law School and the townhouses, will ensure that the targets for improving connectivity and delivering ecosystem resilience as part of the Phase 2b development are achieved.
- 3.9 As a result of the meeting, a planting schedule has been produced by Barry Stewart (Celtic Wildflowers) which will ensure that all plants and seed will originate from native stock of local provenance, using species which are proven pollinator / host species which will deliver significant ecological benefits and enhance connectivity along the coastal fringe. Appendix 7 details the species proposed for each area.
- 3.10 Planting is proposed for the following areas within the schedule produced by Barry Stewart:
- Backslope of existing revetment (artificial fixed dune area) with dune species;
 - Backslope of proposed revetment improvements areas;

- Habitat islands associated with the norther edge of the revetment improvement works (adjacent to the south of both the proposed townhouses and the Law School);
- The rocky crest of the revetment improvement areas (on both the existing and proposed revetment works) to soften the 'edge' habitat using species that are tolerant of inundation by sea water; and
- Planting within the proposed reptile mitigation area as part of the habitat improvement works.

Crymlyn Burrows SSSI Management Plan

- 3.11 It is not anticipated that any of the future development works associated with the delivery of the Phase 2b of the Swansea University Bay Campus will have any impact upon Crymlyn Burrows SSSI. An updated SSSI management plan has been produced by Ben Sampson. Consideration of this SSSI management plan should be undertaken to ensure any future developments work do not have a detrimental impact upon the SSSI.
- 3.12 If any future works were considered necessary that would potentially impact the SSSI, then discussion between Ben Sampson, NRW and the developer would need to be undertaken to ensure a robust working strategy was produced and adhered to.

4. ROLES AND RESPONSIBILITIES

- 4.1 The key stakeholders and organisations involved in this project have been outlined in the CEMP. These include the duties of the Contract Manager, Environmental Manager, design team and contractor. Within the EcMMP, the roles and responsibilities relating just to ecology will be outlined.
- 4.2 Contract Manager (Client): The Contract Manager is ultimately responsible for the effective resourcing of the project through appropriate instructions and commissions, to ensure the environmental requirements identified in the EcMMP and any subsequent management plans are undertaken and for ensuring that construction activities comply with the requirements of the EcMMP and any subsequent management plans. The Contract Manager may designate appropriate personnel to act on his/her behalf.
- 4.3 The Contract Manager's duties will include:
- Ensuring adequately trained and competent resources are provided to implement the EcMMP and any subsequent management plans;
 - Overall responsibility for complaints and non-compliances; and
 - Approval and authorisation of the EcMMP and subsequent management plans.
- 4.4 The Contract Manager will appoint SK Environmental Solutions Limited, as required, to undertake ecological supervision and to liaise with the design team and principal contractor(s) to ensure that the following activities are undertaken at the appropriate time during the remediation and construction phases:
- 4.5 Tool Box Talks: Toolbox talks will be presented as required to all personnel involved with particular elements of work throughout the future of the development of Swansea University Bay Campus. This ensures that all personnel are aware of the presence of legally protected / notable species and habitats. The talks will include information on the locations/areas of protected/ notable species and/or notable habitats, any relevant legislation/policies relating to the species/ habitat and the appropriate action to take. It is the responsibility of the Contract Manager to ensure (via the Principal Contractor(s)) that the relevant personnel will receive the toolbox talk, and to make sure that any new personnel who have not attended the original toolbox talk receive the information through the site contractor's induction. Any toolbox talks will be undertaken by an experienced ecologist.
- 4.6 Watching Briefs: Watching Briefs are required during key elements of the work stages of the project where sensitive species and/or habitats have been recorded, and there is the potential for them to be affected. The Watching Briefs will be undertaken by an experienced ecologist (or appropriately trained site staff) responsible for ensuring that the agreed methods (including a Precautionary Method of Works (PMW) if appropriate) are implemented and adhered to throughout the works. For example, systematic two stage removal of vegetation to prevent harm to reptiles should be carried out under a Watching Brief under the supervision of an experienced ecologist.

- 4.7 **Liaising with the Principal Contractor:** The principal contractor(s) is required to appoint a representative, the Site Supervisor, who is responsible for monitoring the works taking place on site during the various phases of the development. The Site Supervisor will be present during each phase of the works and will inspect the works, areas connected with the construction stage of the work (i.e. site and storage compounds and access routes) and areas neighbouring the works.
- 4.8 **Liaising with NRW and other relevant stakeholders:** An SK Environmental Solutions Limited representative will be appointed to liaise with the local authority ecologist and NRW during the habitat creation and restoration phases of the work and during the management and monitoring elements of these areas.

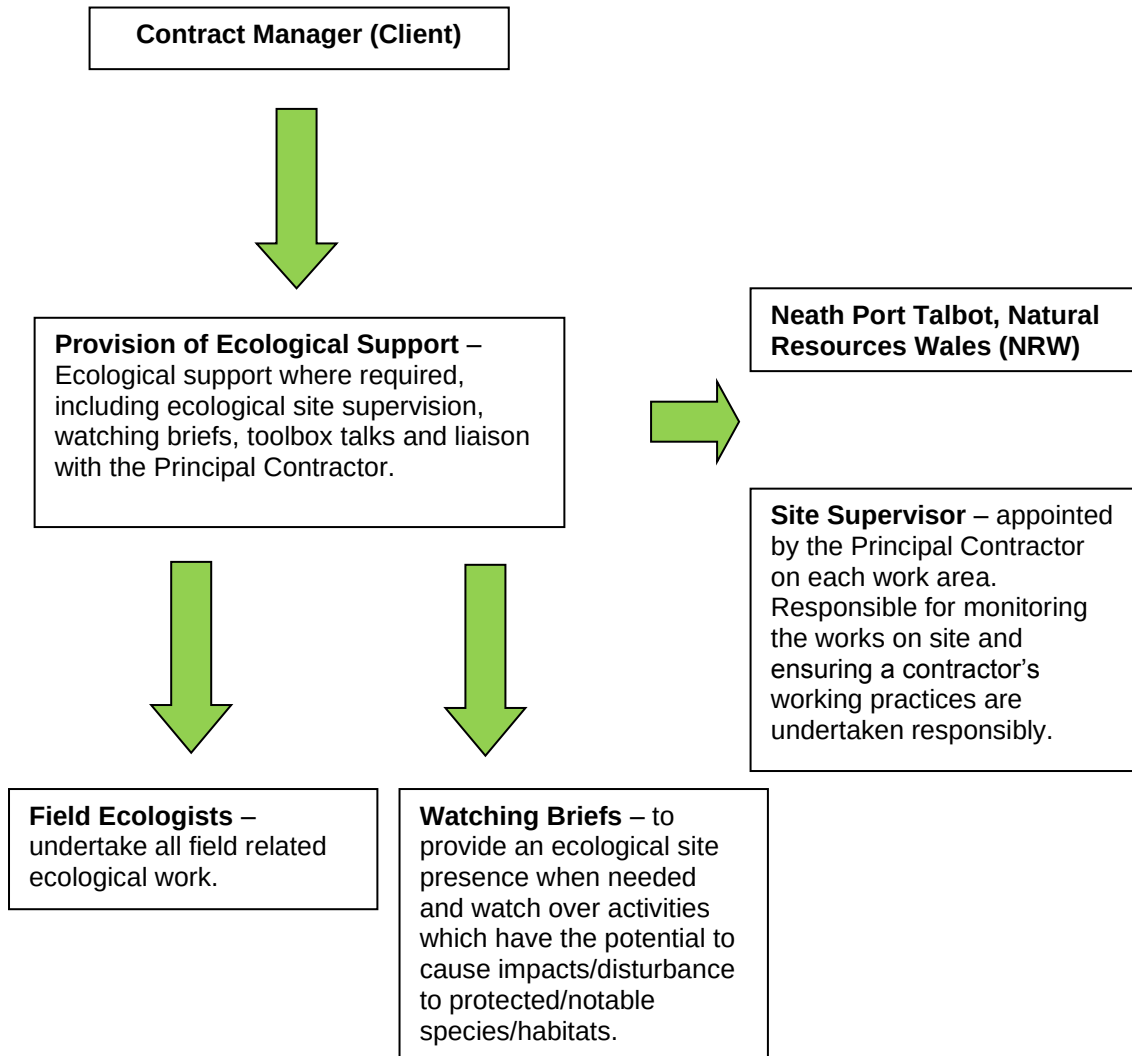
Contractor Duties

- 4.9 The Contractor will recognise that ecological management during the construction stage is critical to the control of the environmental risks, and that these environmental risks can have cumulative effects with other works being undertaken on the site and in the immediate surrounds.
- 4.10 The Contractor will be responsible for the installation and maintenance of the reptile fencing around remnant dune area to the west of the site where a small population of common lizard were identified during surveys in 2018. The contractor will also be responsible, under guidance from SK Environmental Solutions Limited to undertake habitat improvement works within the remnant triangular dune area to the east of the Phase 1 development and / or the SSSI if permission is gained from NRW to use this area as part of a receptor area, if required.
- 4.11 The Contractor will be responsible for the management and treatment of invasive weeds on site, in particular sea buckthorn if encountered further when delivering development associated with the delivery of the wider Swansea University Bay Campus development.

5. COMMUNICATION AND LIAISON

Communication Pathway

Figure 1



6. MONITORING AND REPORTING

6.1 Monitoring and reporting will be undertaken on the task below:

- **Habitat Improvements and Translocation of Reptiles:**
 - As reptiles were recorded in Area A (see Drawing JN00359 / DW02 Reptile Artificial Cover Objects Location Plan) during the 2018 surveys a translocation will need to be undertaken during the appropriate time of year (i.e. avoiding the hibernation period October – March) however, no current timeframe for works affecting these areas has been agreed yet. It is anticipated that once the suggested reptile receptor site has been agreed (see Appendix 5 JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report) with NPT and habitat improvement works have been undertaken, that a translocation will be undertaken. Following the completion of the habitat enhancement works it is proposed that reptiles within Area A, the 'Donor Site', be translocated (captured and then released) into Area B, the 'Receptor Site';
 - It is proposed that the perimeter of Area A be fenced with temporary reptile exclusion fencing. This fencing will be formed of UV-stable plastic sheeting, 600mm in height, dug into the ground to 150mm depth with a 100mm turn, and supported by wooden stakes at c.1.5m intervals. The reptile fencing will prevent the movement of reptiles into the 'Donor Site' during the translocation. In order to aid in the capture effort, the 'Donor Site' will be further sub-divided into compartments with internal temporary reptile fencing. See JN00359 DW09 Reptile Fencing Plan for indicative location of the reptile fencing. Installation of the fencing by a specialist contractor during the reptile active season (between April and September), will be conducted under the supervision of an ECoW to ensure that no reptiles are accidentally killed or injured during the works. The reptile fencing will be maintained in good condition for the duration of the translocation and will be carefully removed under ECoW supervision during the reptile active season following the completion of the translocation works. Once the reptile fencing is in place, ACOs will be placed within the 'Donor Site' at a minimum density of 50 ACO/ha;
 - The ACOs will then be left to settle for c. 2 weeks. The capture and relocation exercise will be undertaken in suitable weather conditions between March and September / October. The ACOs and any existing natural/semi natural refugia will be checked each day for a minimum of 30 days. Any lizards encountered during the checks will be carefully captured and released into Area B, the 'Receptor Site';
 - After 30 days of checking to include five consecutive days with zero captures (which may be the last five days of the capture effort i.e. days 26 to 30) the translocation exercise can stop. Should captures continue after 30 days then the translocation exercise must continue until such a time as five consecutive days of zero captures is achieved. Habitat manipulation will take place as

trapping progresses in order to increase the likelihood of capturing reptiles; this will only be undertaken by or under the supervision of an ECoW;

- The habitat manipulation will involve reducing the height of vegetation in areas with low capture rates. This will be undertaken in two phases; one cut to around 10-15cm and a day later, the second cut as low as possible. Once the translocation is complete (five days of zero capture have been achieved) it is proposed that the habitats within Area A, the 'Donor Site' be subject to a destructive hand search. This will involve hand searches and ECoW supervision of mechanical excavation of all habitats within Area A. This will be carried out during the active reptile season to avoid any disturbance to hibernating reptiles (March to September / October, in suitable weather conditions);
 - All habitats will be carefully dismantled and searched for reptiles by an ecologist. This effort aims to clear any few remaining individuals from the 'Donor Site'. Once the ecologist is satisfied with the level of search effort, a toothed digger will be used to remove the roots and top 100mm of substrate with periodic checks being completed by an ecologist; and
 - Area A will then be maintained as unsuitable habitat with no vegetation cover and the temporary fencing will be removed (under ECoW supervision) to allow the construction phase of the proposed development to commence.
- **Habitat Improvements, Vegetation Planting and Removal:**
 - Following the habitat improvement works in the remnant dune triangle (the proposed receptor site for the reptile translocation - see Appendix 5 JN00359 / D04 Reptile Survey Results and Proposed Mitigation Strategy Report) an assessment of the success of the habitat improvements in terms of species planting / sown and their establishment will be undertaken annually from October 2019 for three years. The monitoring will be undertaken by Barry Stewart and a subsequent report for each year to detail the results of the monitoring and the requirements for any further mitigation will be prepared annually and sent to NPT for information;
 - Following the works to improve the revetment in the areas associated with the townhouse development and the new Law School development, planting will be undertaken on both backslopes of the revetment and the habitat islands as detailed in the Public Realm and Landscape Strategy (see Appendix 1). This work is anticipated to be undertaken by Barry Stewart and Celtic Wildflowers. A report detailing the monitoring requirements for these areas will be produced by Barry Stewart following the initial planting (N.B. no firm timescales are in place as of yet for these works and as such this EcMMP will be updated accordingly when definitive timescales are agreed;
 - If any vegetation requires removing around the location of the existing MUGA / the location of the new law building), then an ECoW will be present during vegetation removal to ensure no harm occurs to breeding birds as a result

of the ground preparation (this will only be required where vegetation is to be removed between March and August inclusively);

- Annual monitoring of invasive species across the site will be undertaken from 2020; and
- Barry Stewart (Celtic Wildflowers) will be planting up the back slope of the existing revetment backslope (also known as the artificial fixed dune) in May 2019. Barry Stewart will then undertake a monitoring survey of the success of the planting and the earlier marram planting in October 2019 to assess the success of the habitat creation works. Following the monitoring in October 2019 a report will be produced detailing what, if any, mitigation will be required in order to aid in the successful establishment of the artificial dune habitat in this location. This process will be repeated in May 2020 and October 2020.

- **Bird Boxes**

- The location of bird boxes within future phases of the development will be determined following discussion with Ben Sampson and a scheme for monitoring their use thoroughly will be produced and agreed with NPT. Liaison with Ben Sampson in October 2019 has highlighted that no formal monitoring is on-going and as such no evidence has been produced of birds utilising these nest boxes. However, in 2020 SK Environmental Solutions Limited will undertake formal monitoring of the boxes once a month.
- Future phases of the development should still be erecting nest boxes; however it has been suggested that the box type and location for each will be agreed between Ben Sampson and SK Environmental Solutions Limited.

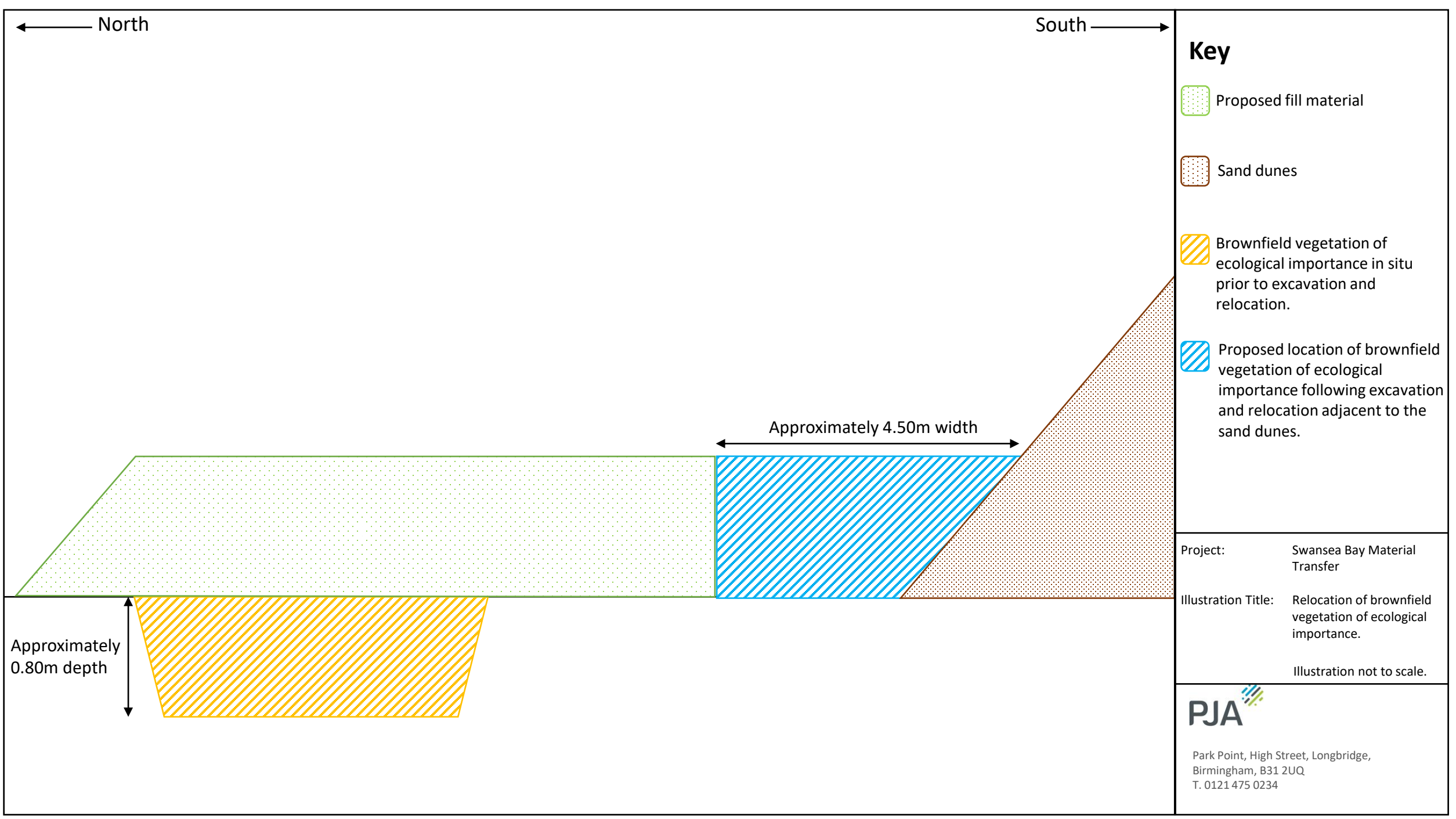
7. REVIEW AND AMENDMENTS

Management Review

- 7.1 The EcMMP will be reviewed by the Contract Manager (client) and appointed ecologist to ensure that it meets its objectives. The review will be carried out at regular intervals during the construction process with the next review to be undertaken in October 2019.
- 7.2 The EcMMP will also be updated as new design details and ecological survey results are available and upon any change to the following:
- The Masterplan;
 - The schedule of works;
 - The legal requirements including licensing;
 - Changes to members of the project delivery team; and/or
 - Any other significant change;

All updated versions of the EcMMP will be submitted for review to NPTC.

APPENDIX 2



APPENDIX 3

