

National Grid Cable Tunnel Replacement Project

Outline Landscape and Ecological Management Plan

December 2023



Quality information

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1 Introduction

- 1.1.1 The Outline Landscape and Ecological Management Plan (OLEMP) has been prepared on behalf of National Grid (hereafter referred to as 'the Applicant'). It forms part of the planning applications for the Tilbury to Grain and Tilbury to Kingsnorth (TKRE) Cable Tunnel Replacement Project (hereafter referred to as the 'Proposed Development').
- 1.1.2 It provides a framework for delivering the landscape strategy and the successful establishment and future management of proposed landscape works associated with the Proposed Development. It sets out the short and long-term measures and practices that will be implemented by the applicant to establish, monitor and manage landscape and ecology mitigation and enhancement (biodiversity net gain) measures embedded in the design. The latter will be achieved through habitat creation over and above that used for habitat mitigation.
- 1.1.3 The Proposed Development comprises the following above-ground components at both ends of the **new bored tunnel**:
- **A new cable sealing end compound**: consisting of:
 - **a new tunnel headhouse** which will cover the shaft into the tunnel;
 - **a new overhead line gantry structure** which will connect the overhead line downlead conductors and transfer them to six sealing end structures; and
 - **Modifications to the existing overhead line (OHL)**: The new OHL conductors will be connected to the existing TKRE 400kV OHL conductors via new terminal pylons. The old OHL conductors and existing pylons will be either replaced, refurbished or removed.
- 1.1.4 The Proposed Development is located at two sites, Tilbury in Essex to the north of the River Thames and Gravesend in Kent to the south of the River Thames. A full description of the Proposed Development is described in the Environmental Statement (ES) in ES Volume II Chapter 3: Project Description.
- 1.1.5 The area of land required for the construction and operation of the Proposed Development is defined by the Red Line Boundary (RLB). The land required for permanent uses has informed the preparation of the Outline Landscape and Ecology Plans for Tilbury and Gravesend which are provided in Appendix A. Plate 1 and Plate 2 depict the extent of land this OLEMP covers.

Plate 1: Extent of OLEMP Coverage – Tilbury

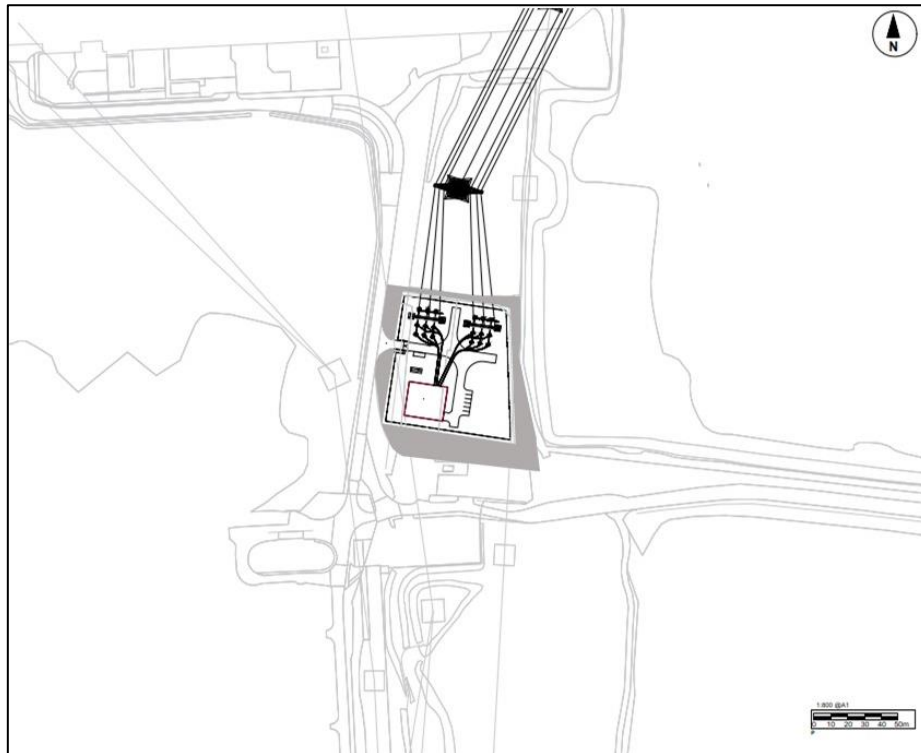
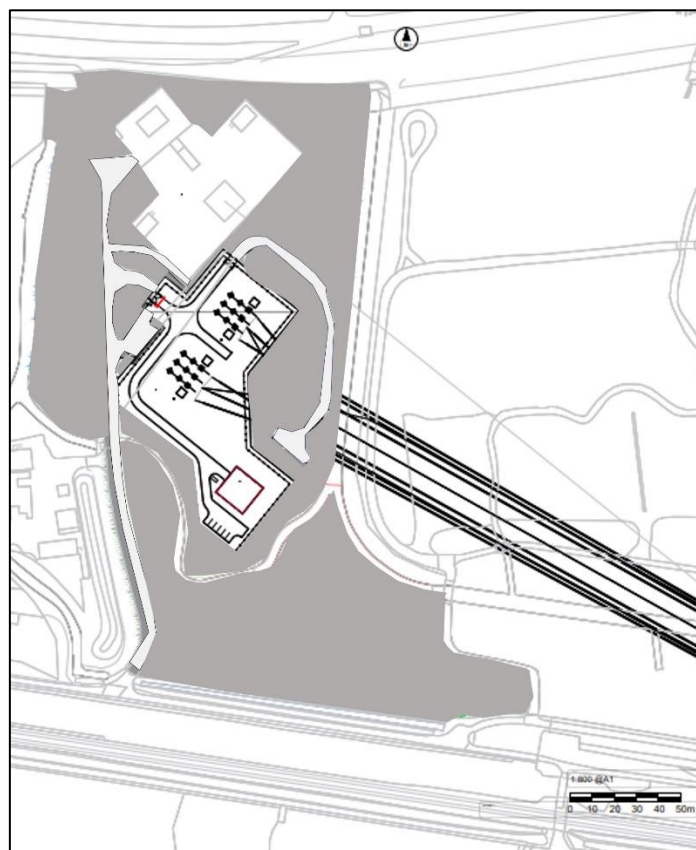


Plate 2: Extent of OLEMP Coverage – Gravesend



- 1.1.7 At Tilbury, the Proposed Development comprises a permanent footprint of approximately 481.75 m² on an area of existing hardstanding in Tilbury, Thurrock, approximate grid reference TQ 66317 75873 on land owned on all sides by the Port of Tilbury, London, and a temporary footprint of approximately 4.72 hectares (ha) for a construction compound, access and laydown. To the north of the proposed SEC is the existing Tilbury Substation. The land east is part of Ingrebourne Valley's Goshems Farm restoration project, raising the land on an historical landfill back to high quality, arable farmland. The existing Tilbury SEC, serving the existing tunnel is approximately 290m south of the proposed Tilbury SEC. The River Thames is approximately 400m south of the permanent footprint of the proposed Tilbury SEC.
- 1.1.8 At Gravesend, the Proposed Development comprises a permanent footprint of approximately 230m² located within a vegetated area which is part of the Canal and Grazing Marsh, Higham Local Wildlife Site (LWS), designated for its grassland habitats and on land owned by National Grid at approximately TQ 67455 74158 and a temporary footprint of approximately 3.71 ha. To the north of the Proposed Development, is the existing cable tunnel and associated headhouse and SEC. The land immediately east is owned by the RSPB and is partially leased and used as a Police Training Centre for rifle shooting. The land immediately west comprises of the Thameside Campus (National Maritime Training Centre), Metropolitan Police Specialist Training Centre (MPSTC) and Thames and the Medway Canal Association. The OLEMP forms part of the strategy for integrating the Proposed Development within these landscapes, and also mitigating related impacts identified within the application.
- 1.1.9 This OLEMP is a live document, the content of which will continue to be updated, refined and (where necessary) added to, based on ongoing discussions between the Applicant, statutory bodies and relevant Local Planning Authorities. It will be updated by the Applicant into a final detailed Landscape and Ecological Management Plan (LEMP) prior to the commencement of works.

1.2 Purpose of the Outline Landscape and Ecological Management Plan

- 1.2.1 The purpose of this OLEMP is to set out the measures proposed:
- To mitigate the effects of the Proposed Development on landscape and biodiversity features;
 - To enhance the biodiversity, landscape, and green infrastructure value of each of the Proposed Development's at Tilbury and Gravesend; and
 - To secure compliance with relevant national and local planning policies.
- 1.2.2 The Proposed Development has been designed, as far as is practicable, to avoid or reduce effects on landscape and biodiversity features through siting of the Proposed Development components, including structures and new planting. For further information see, ES Volume III Chapter 7: Biodiversity - Tilbury, and Chapter 8: Landscape and Visual -Tilbury; and ES Volume IV Chapter 15 Biodiversity - Gravesend, and Chapter 16: Landscape and Visual – Gravesend.
- 1.2.3 This OLEMP is structured as follows:
- Section 1 sets out the context, responsibilities and arrangements for delivery of the plan.
 - Section 2 describes the landscape and ecology strategy for the Proposed Development which incorporate proposals for landscape and biodiversity impact mitigation. The strategy is set out in the Outline Landscape and Ecology Plans (Appendix A).
 - Section 3 details the measures required for the effective management and maintenance of the landscape and biodiversity mitigation proposals.
 - Section 4 describes post-construction monitoring to determine that the functions documented within this OLEMP are being achieved and whether remedial action may be required.

1.3 Objectives

1.3.1 The overarching objectives of the OLEMP are to:

- a. Integrate the Proposed Development into its landscape setting and avoid or minimise adverse landscape, biodiversity, and visual effects as far as practicable;
- b. Promote the conservation, protection and improvement of the physical, natural and historic environment within the Proposed Development and its setting. The landscape framework should be seen as an integral part of the of the surrounding landscape;
- c. Diversify ecological value through the retention of existing habitats, for example through retention of woodland, and to enhance these through restoration and creation of diverse habitats with high distinctiveness; and
- d. Guide the design and management of landscape and biodiversity components that respond to and enhance the character of the landscape, local distinctiveness and sense of place.

1.4 Responsibilities

The Applicant and/ or the Appointed Main Works Contractor

1.4.1 The Applicant and/ or appointed main contractor will be responsible for:

- correct instruction of all parties contributing to delivery of the final approved LEMP (including but not restricted to the Applicant's staff and their appointed ecologists, landscape architects, Clerk of Works (CoW), landscape contractors, construction contractors and management organisations);
- compliance with the final approved LEMP, relevant legislation and any relevant planning commitments. This includes appropriate maintenance of new habitats;
- keeping the appointed ecologist/ landscape architect/ CoW informed of work activities that require support and supervision, so that it is clear when attendance on-site is required;
- enacting/ enforcing recommendations made by the ecologist/ landscape architect/ CoW, or otherwise agreeing an appropriate alternative course of action, if it is subsequently determined that previous advice is not practicable or is out of date; and
- keeping a record of measures taken to deliver the requirements of the final LEMP, to provide an auditable record of compliance.

The Appointed Ecologist

1.4.2 The appointed ecologist (including ecological CoW) will be responsible for:

- advising the Applicant on ecological matters and requirements for compliance with relevant legislation and protected species licences, providing support as instructed, and monitoring compliance with the final approved LEMP;
- monitoring and assessing progress with delivery of biodiversity objectives and target condition of habitats on an annual basis;
- reviewing the LEMP at appropriate periodic intervals and revising management requirements as necessary; and
- providing the Applicant with survey reports and other written evidence required in accordance with the agreed scope of work and contractual obligations.

The Appointed Landscape Architect

1.4.3 The appointed landscape architect (including landscape CoW) will be responsible for:

- monitoring and assessing the landscape related elements of the approved LEMP for their effectiveness on an annual basis following commencement of operation of the Proposed Development;
- ensuring that the landscape related elements of the approved LEMP are reviewed at the end of the initial monitoring and assessment stage and amended accordingly subsequently for the duration of implementation of the LEMP. The LEMP shall be amended accordingly to suit any changing landscape conditions and ultimately inform the maintenance operations throughout the operational life of the Proposed Development; and
- ensuring that any reviews associated with landscape related elements of the approved LEMP clearly identifies any changes to site conditions and circumstances, whether the aims and objectives of the approved LEMP are being met, and where identified changes are needed to existing management practices and timeframes.

1.5 Legislation and Policy

1.5.1 The relevant legislation and policies are summarised below. For more detail please refer to:

- ES Volume II Chapter 6: Planning Policy;
- ES Volume III:
 - Chapter 7: Biodiversity – Tilbury;
 - Chapter 8: Landscape and Visual - Tilbury;
- Volume IV:
 - Chapter 15: Biodiversity - Gravesend, and
 - Chapter 16: Landscape and Visual - Gravesend.

Legislation

- a. Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) (Ref 1);
- b. The Conservation of Habitats and Species Regulations 2017 (as amended) (Ref 2);
- c. Wildlife and Countryside Act (WCA) 1981 (as amended) (Ref 3);
- d. Countryside & Rights of Way Act 2000 (as amended) (Ref 4);
- e. Natural Environment and Rural Communities (NERC) Act 2006 (as amended) (Ref 5);
- f. The Environment Act 2021 (Ref 6);
- g. Protection of Badgers Act 1992 (as amended);
- h. Hedgerow Regulations 1997 (as amended);
- i. Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 7);
- j. Animal Welfare Act 2006 (Ref 8);
- k. Invasive Alien Species (Enforcement and Permitting) Order 2019 (as amended); and
- l. The European Landscape Convention 2000 (ELC) (Ref 9).

Planning Policy

- a. National Planning Policy Framework (2023) – Paragraphs 56, 59, 61, 174, 175 & 179 (Ref 10);
- b. Environment Act (2021) Schedule 14 (Ref 11);
- c. Overarching National Policy Statement for Energy (EN-1) (2011) Section 5.3 Biodiversity and Geological Conservation (Ref 12);

- d. Overarching National Policy Statement for Energy (EN-1) (2023) (Ref 13);
- e. National Policy Statement for Electricity Networks Infrastructure (EN-5) (2011) (Ref 14);
- f. National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023) (Ref 15); Planning Practice Guidance (PPG) for the Natural Environment (Ref 16);
- g. Thurrock Borough Council Local Plan (2012) – Policy SS011, SS013, SS019, CSTP18 – Green Infrastructure, CSTP19 Biodiversity, PMD7 – Biodiversity, Geological Conservation and Development. (Ref 17);
- h. Thurrock draft Local Plan (anticipated adoption Summer 2026) (Ref 18);
- i. Thurrock Local Development Framework. Core Strategy and Policies for Management of Development (Ref 19);
- j. The Thurrock Landscape Capacity Study (2005) (Ref 20);
- k. Tilbury Development Framework (Ref 21);
- l. Gravesham Borough Council Local Plan (2014) – Policy CS01: Sustainable Development, and Biodiversity, CS12: Green Infrastructure. (Ref 22);
- m. Kent Environment Strategy (2016) – Policy 5 – Conserve and enhance the quality and supply of the county of Kent's natural and historical resources and assets. (Ref 23); and
- n. South East Marine Plan (Ref 24)

Other Guidance

- a. Landscape Institute, Infrastructure Technical Guidance Note 04/20 (2020) (Ref 25);
- b. Thurrock Design Guide – Design Strategy Supplementary Planning Document (Ref 26);
- c. Kent Design Guide (Ref 27); and
- d. Making it Happen - supplementary information for the Kent Design Guide (Ref 28).

1.6 Biodiversity Net Gain

- 1.6.1 It is government policy in NPS EN1 that development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design and that such opportunities in and around developments should be maximised where appropriate and, in the NPPF 2023, that planning decisions should minimise impacts on and provide net gain for biodiversity.
- 1.6.2 In addition, the Environment Act 2021 (once the relevant provisions are in operation) includes a mandate for at least 10% Biodiversity Net Gain (BNG) for projects. Further information on BNG is provided in the BNG Report and BNG Draft Strategy Report.

1.7 Existing Landscape Features

- 1.7.1 The River Thames passes from west to east through both the Tilbury and Gravesend study areas and is the dominant feature within the area.
- 1.7.2 Neither the Tilbury or the Gravesend sites or respective study areas are covered by any statutory landscape designations. The nearest Area of Outstanding National Beauty (AONB) is the Kent Downs located approximately 3km south of the Gravesend site. Neither site or their respective study areas are within a National Park and there are no Registered Parks or Gardens within either study area.

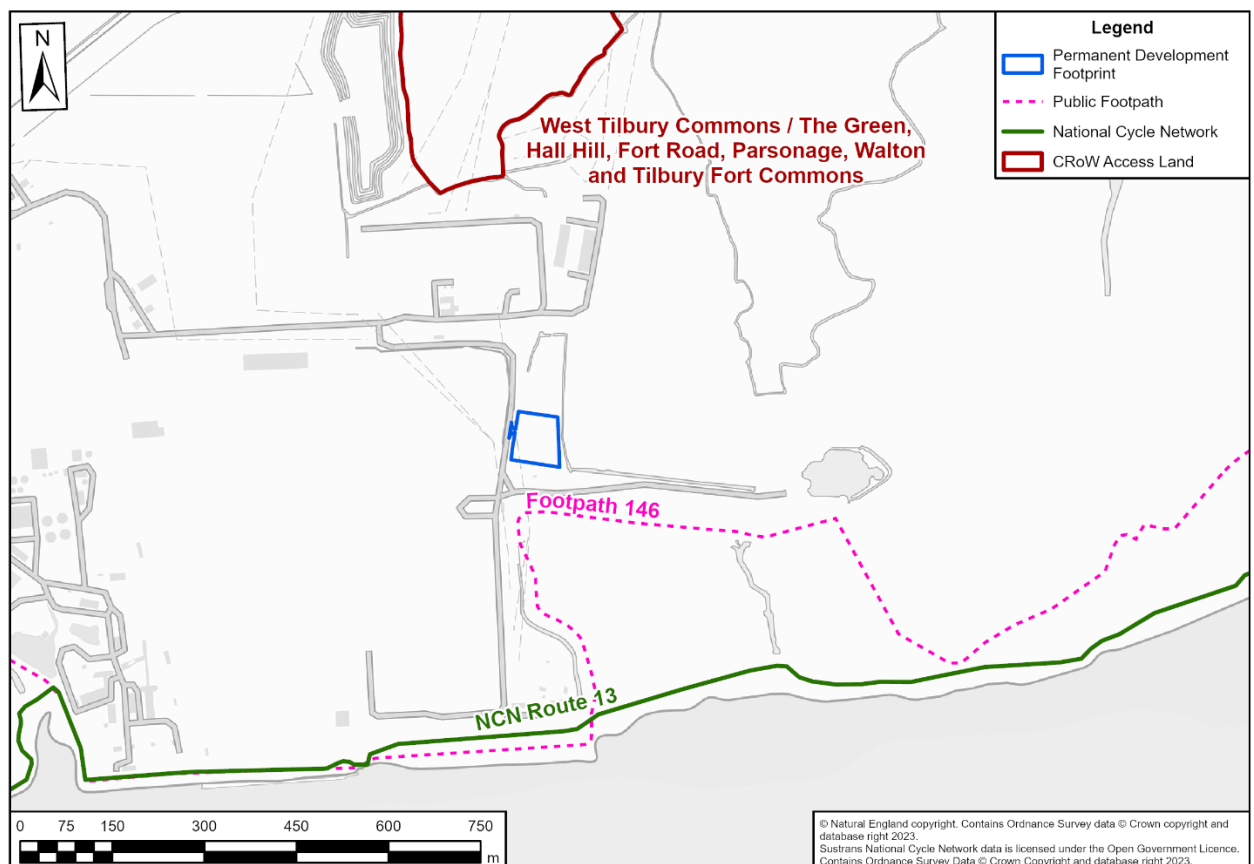
Existing Landscape Features - Tilbury

- 1.7.3 The Tilbury site is located to the southeast of Tilbury with residential properties alongside the northwestern side of the railway line lying approximately 1.3km from the site at the closest point.

Large infrastructure is particularly prevalent to the west of the study area. This includes the existing OHL infrastructure to the north of the site, Tilbury Sewage Treatment Works to the west along with the extensive area occupied by Tilbury Docks. Tilbury Fort is a recreational site to the west of the site. The remainder of the study area is rural with scattered farmsteads and isolated properties to the northeast at Buckland.

- 1.7.4 There is a marked contrast between the industrial areas of the Tilbury study area and the residential skyline of the Gravesend study area with the low-lying marshland landscape that makes up the remainder of each study area. The flat, open marshland landscape largely comprises grazing pasture and riparian vegetation lining the drainage ditches with very few trees.
- 1.7.5 The landform of the site is flat and low-lying at approximately 0-20m Above Ordnance Datum (AOD). The landform of the Tilbury study area is flat with no notable change in elevation.
- 1.7.6 There are no Public Rights of Way (PRoW) across the Tilbury site. The nearest PRoW (Footpath 146) is located approximately 30m to the south of the site. Much of this footpath also comprises part of the England Coast Path promoted recreational route and the National Cycle Network (NCN) Route 13 from Tower Bridge to Dereham at approximately 200m to the south of the site. Footpath 144 and Byway 98 to the west of the site, and Footpath 200 to the northeast of the site are the only other PRoWs in the study area.
- 1.7.7 West Tilbury Commons located approximately 700m north of the site, The Green, Hall Hill Common, Fort Road Common, Par Thurrock approximately 900m to the west of the site are areas of accessible Countryside and Rights of Way (CRoW) Act land in the study area.

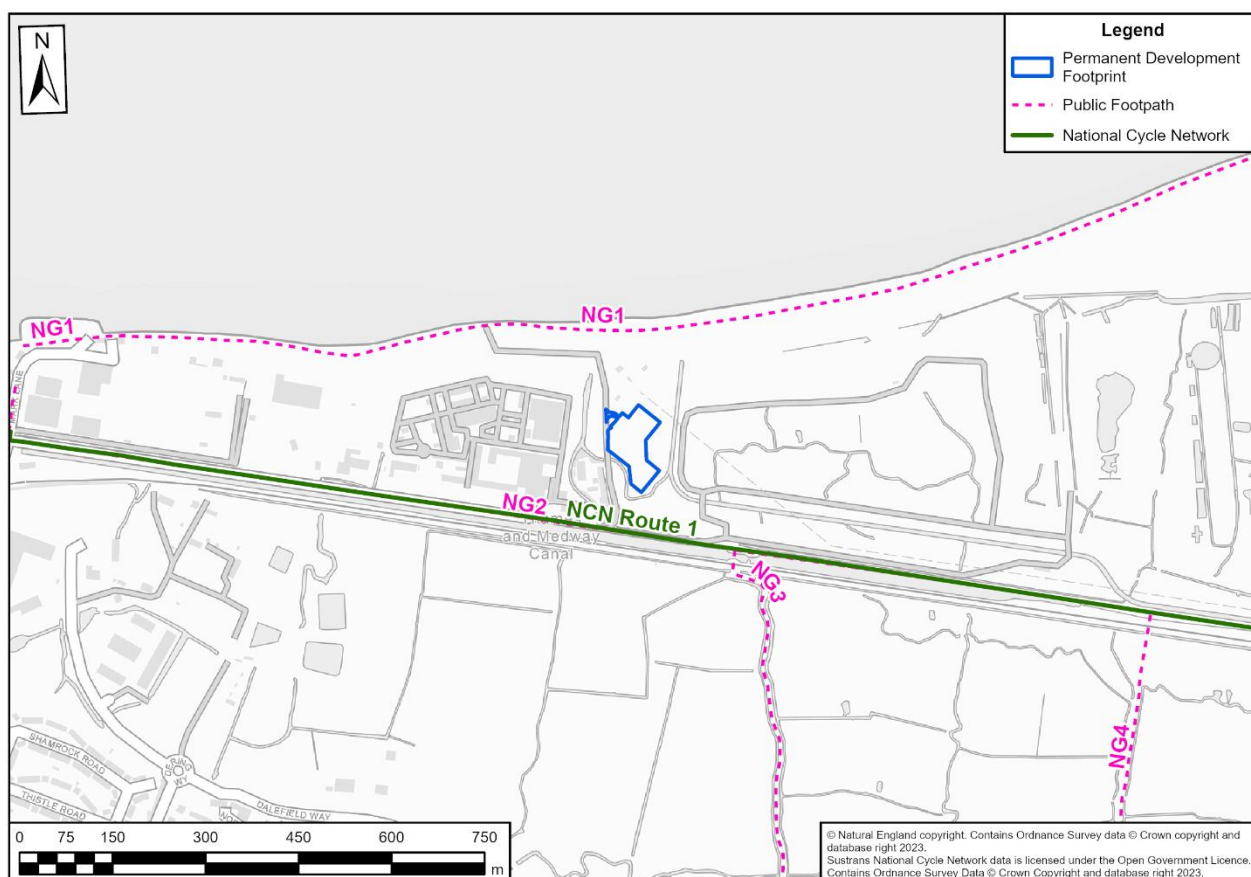
Plate 3: Tilbury Landscape Features



Existing Landscape Features – Gravesend

- 1.7.8 The Gravesend site is located to the east of Gravesend on an area known as the East Court Marshes. The site is adjacent to an industrial area that forms a narrow strip between the River Thames and the Thames and Medway Canal. The nearest residential properties in the settlements of Denton and Chalk are approximately 750m to the south and west of the site. The remainder of the study area is rural with scattered farmsteads and isolated properties to the southeast.
- 1.7.9 There is a marked contrast between the industrial areas of the Tilbury skyline and the residential areas of the Gravesend study area with the low-lying marshland landscape that makes up the remainder of each study area. The flat, open marshland landscape largely comprises grazing pasture and riparian vegetation lining the drainage ditches with very few trees.
- 1.7.10 The landform of the site is flat and low-lying at approximately 0-20m Above Ordnance Datum (AOD). The landform of the Gravesend study area is predominantly flat however the terrain rises up gradually to the west to approximately 15m AOD in the direction of Windmill Hill, and to the south at approximately 20m AOD in the direction of Harts Hill and Shorne Hill.
- 1.7.11 There are no PRoWs across the Gravesend site. The nearest PRoW (Footpath 0328/NG1/1) is located approximately 150m to the north of the site and comprises part of the England Coast Path and Saxon Shore Way promoted recreational routes. A public footpath that runs alongside the Thames and Medway Canal (0328/NG2/2) is located approximately 150m to the south of the site and also forms part of NCN Route 1 from Dover up to the Highlands of Scotland. There are several other PRoWs that run perpendicular to this route (0328/NG3/1 and 0328/NG4/1) to the south of the site and bridleway 0229/NS318/1 to the east of the site. In addition, there are several smaller PRoWs to the edge of the study area, particularly in the vicinity of Chalk and Denton. There are no areas of Registered Common Land or accessible CRow Act land in the study area.

Plate 4: Gravesend Landscape Features



1.8 Existing Biodiversity Features

- 1.8.1 The following section summarises the relevant baseline detail for biodiversity, as presented in ES Volume III Chapter 7: Biodiversity - Tilbury; and ES Volume IV Chapter 15: Biodiversity – Gravesend and Figures 7.1, 7.2 and 15.1 and 15.2 within.

Tilbury

Statutory and non-statutory sites

- 1.8.2 The proposed Tilbury SEC and associated construction area is not located within any designated sites. However, overhead line removal and realignment works to the south of the proposed Tilbury SEC are located within the Tilbury Power Station Local Wildlife Site (LWS).
- 1.8.3 The Tilbury Power Station LWS is a complex of land parcels associated with the old power station sites which are designated on the basis of its importance for both invertebrates, reptiles, birds and protected/notable plants. Natural England are currently considering the area as a potential extension to the Mucking Marshes Site of Special Scientific Interest (SSSI), as such the LWS is considered to be of up to National importance.

Habitats

- 1.8.4 The proposed Tilbury SEC and cable tunnel shaft are located predominately within an area of existing hardstanding, which was disused and starting to revegetate with locally frequent growth of young butterfly bush (*Buddleja davidii*) and occasional ruderal/ephemeral species including broad-leaved dock (*Rumex obtusifolius*), mugwort (*Artemisia vulgaris*), scentless mayweed (*Tripleurospermum inodorum*) and sea beet (*Beta vulgaris*).
- 1.8.5 The area of grassland to the north of the proposed Tilbury SEC that would be subject to temporary works for realignment of pylons and other services showed strongest affinity to the NVC community MG1b *Arrhenatherum elatius* grassland. This area was species poor, dominated by false-oat grass (*Arrhenatherum elatius*) with other grasses including occasional tall fescue and frequent bristly ox-tongue (*Helminthotheca echioides*) and creeping thistle (*Cirsium vulgare*). Areas of dense scrub surround the grassland and scrub species included Russian olive (*Elaeagnus angustifolia*), bramble (*Rubus fruticosus* agg), common hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), common plum (*Prunus domestica*) and buddleja (*Buddleja davidii*). Some areas were dominated by common reed (*Phragmites australis*) and are classified as NVC community S4 *Phragmites australis* swamp and marshes.
- 1.8.6 The eastern margin of the proposed Tilbury SEC location contains a strip of roadside verge (approx. 10m width) dominated by tall fescue (*Schedonorus arundinaceus*) and false-oat grass with encroaching stands of dense scrub.
- 1.8.7 The area of grassland to the south of the proposed Tilbury SEC would be subject to temporary works associated with the removal of existing overhead lines. It consisted of unmanaged grassland with scattered mixed scrub and localised patches of tall ruderals. The 2023 NVC survey found the grassland areas to have closest affinity with the NVC community MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* subcommunity. It was found to be relatively diverse in comparison with the area to the north, dominated by false oat-grass, with frequent common couch (*Elymus repens*), and occasional species including rough meadow grass (*Poa trivialis*), goat's rue (*Galega officinalis*), creeping cinquefoil (*Potentilla reptans*), black medick (*Medicago lupulina*), fennel (*Foeniculum vulgare*), wild carrot (*Daucus carota*), mugwort (*Artemisia vulgaris*) and crow garlic (*Allium vineale*). The areas of grassland were interspersed with dense stands of scrub with a similar range of species to those recorded in the area to the north of the proposed Tilbury SEC.
- 1.8.8 A small area adjoining the ditch in the south of the Tilbury Site is more frequently disturbed and supported a range of ruderal/ephemeral species including hemlock (*Conium maculatum*), creeping

thistle, sea beet, mugwort, common nettle and occasional narrow leaved birds foot trefoil (*Lotus tenuis*).

- 1.8.9 Based on the 2023 survey data only the small reed dominated areas in the north of the Site are considered to be Habitat of Principal Importance (reedbed).
- 1.8.10 Overall, the mosaic of grassland, reedbed, scrub and ruderal habitats to the north and south of the proposed Tilbury SEC provide are of greater value than the individual components, with the structural complexity of the habitats increasing their value for faunal species.
- 1.8.11 Two tidal ditches/drains are located partially within the Site. Both have connectivity with the River Thames and support brackish water.
- 1.8.12 The drain which adjoins the existing Tilbury SEC is steep sided and supports dense marginal stands of common reed, and occasional bulrush (*Typha latifolia*) with no visible submerged or floating aquatic macrophytes. The drain to the east of the proposed new Tilbury SEC is heavily overgrown in sections by scrub from the adjoining embankment, with fringing areas of common reed further to the north and around the base of the existing pylon which would be removed as part of the Proposed Development.
- 1.8.13 The ditches are common of those found within the wider Thames Estuary Marshes.

Species

- 1.8.14 The Tilbury Site is known to support a range of protected and/or notable species as follows
- **Bats:** the Site does not support roosts but is of value for local bat populations foraging/commuting;
 - **Birds:** the Site supports a range of breeding bird species including the specially protected Cetti's warbler (*Cettia cetti*) but surveys suggest neither the adjoining intertidal areas or the Site itself are of significant value for the species for which the nearby Thames Estuary and Marshes SPA/Ramsar is designated;
 - **Great crested newt:** are assumed absent due to brackish water in ditches;
 - **Reptiles:** the wider surrounding habitat at Tilbury supports populations of adder, slow worm, grass snake and common lizard;
 - **Invertebrates:** a diverse assemblage of National importance was identified utilising the Site and adjoining habitats. This included five Species of Principal Importance namely tall fescue planthopper (*Ribautodelphax imitans*); brown-banded carder-bee (*Bombus humilis*); shrill carder-bee (*Bombus sylvarum*); wall butterfly (*Lasiommata megera*) and small heath butterfly (*Lasiommata megera*). In addition, phoenix fly (*Dorycera graminum*); and five-banded weevil fox (*Cerceris quinquefasciata*) were not recorded but are considered likely to be present. Tall fescue planthopper is a UK red data book species and has only been recorded at a small number of other sites within the UK;
 - **Badger:** habitat is suitable but no setts within the Site. One single entrance outlier is located 20m from the Site boundary;
 - **Water vole:** the ditches have previously been found to support populations of water vole and it is assumed they continue to be present. It should be noted that the water vole surveys undertaken for the Proposed Development found no evidence of water vole.

Gravesend

Statutory and non-statutory sites

- 1.8.15 Land approximately 30m to the south of the Gravesend Site forms part of the Thames Estuary and Marshes SSSI and Ramsar site, designated sites of international importance. The SSSI/Ramsar consists of a mosaic of grazing marsh, saltmarsh and ditches that are international important for

their diverse assemblage of birds they support, and also of value for notable plants and invertebrates.

- 1.8.16 The Gravesend Site is located within the wider Canal and Grazing Marsh, Higham LWS which incorporates managed and unmanaged coastal and floodplain grazing marsh, salt marsh, reedbed and a long stretch of the Thames and Medway Canal. The LWS supports good populations of reptiles, bats as well as bird and invertebrate assemblages. The LWS is of County importance.

Habitats

- 1.8.1 With the exception of the existing Gravesend SEC, the majority of the Site is identified within Natural England's Priority Habitat Inventory as Coastal and Floodplain Grazing Marsh. Grazing marsh is defined as '*periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed and some are cut for hay or silage*'. As such it is a habitat type defined in part by the presence of suitable hydrological and topographical conditions rather than strictly the botanical communities present.
- 1.8.2 The pony grazed grasslands in the west of the Site currently have the greatest diversity in both species composition and structurally, based on the marginal areas of longer grassland, tall ruderal and scrub. The grazed grassland areas showed greatest affinity with the NVC community MG6 *Lolium perenne* – *Cynosurus cristatus* grassland, with some species indicating previous flooding with brackish water, and some areas of bare ground around entrances/feeding areas. The sward was dominated by creeping bent (*Agrostis stolonifera*), with frequent meadow barley (*Hordeum secalinum*), perennial rye-grass (*Lolium perenne*), common couch (*Elymus repens*) and white clover (*Trifolium repens*). With occasional species including sea beet (*Beta vulgaris* subsp. *maritima*), hoary cress (*Lepidium draba*) and spear-leaved orache (*Atriplex prostrata*).
- 1.8.3 In small patches of slightly raised ground within these fields there are small areas of NVC community MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* subcommunity grassland with cock's-foot (*Dactylis glomerata*), soft brome (*Bromus hordeaceus* ssp. *hordeaceus*), hoary cress, yarrow (*Achillea millefolium*), ribwort plantain (*Plantago lanceolata*), common couch and red fescue (*Festuca rubra* agg.). At the margins of the fields and scattered through the shorter grazed grassland in the two smaller southern fields are longer sward areas containing frequent false-oat grass, and locally frequent tall ruderals including common nettle (*Urtica dioica*), hemlock (*Conium maculatum*) and creeping thistle (*Cirsium arvense*). In addition, there were occasional stands of mixed scrub including hawthorn and bramble.
- 1.8.4 Fields to the south of the Milton Rifle Range support unmanaged species poor grassland. The easternmost section which includes the existing pylon and immediate surrounds showed the closest affinity to the NVC community MG1b *Arrhenatherum elatius* grassland – *Urtica dioica* subcommunity. This area comprises species poor tall unmanaged grassland with false oat-grass common couch, common nettle and cleavers (*Galium aparine*).
- 1.8.5 The MG1b habitat transitions to the north to NVC community S4 *Phragmites australis* swamp and to the west into areas dominated by tall ruderals, including creeping thistle (*Cirsium arvense*) and hemlock (*Conium maculatum*).
- 1.8.6 Brackish water filled drains are present throughout the Gravesend Site. These are fringed with common reed, bulrush (*Typha latifolia*) sea club-rush (*Bolboschoenus maritimus*), sea aster (*Aster tripolium*) and celery leaved buttercup (*Ranunculus sceleratus*). The drains are adjoined by stands of scrub dominated by bramble and hawthorn.
- 1.8.7 Within the Rifle Range the habitat varies between areas of short sward species poor amenity grassland managed for the shooting operation, and surrounding areas of largely unmanaged grassland containing frequent false oat-grass (*Arrhenatherum elatius*) and cock's-foot (*Dactylis glomerata*) with occasional herbaceous species.

Species

1.8.8 The Gravesend Site is known to support a range of protected and/or notable species as follows:

- **Bats:** the Site does not support roosts but is of value for local bat populations foraging/commuting;
- **Birds:** the Site supports a diverse range of breeding bird species including the specially protected Cetti's warbler (*Cettia cetti*) but surveys suggest it is not of significant value for the species for which the nearby Thames Estuary and Marshes SPA/Ramsar is designated;
- **Great crested newt:** are assumed absent due to brackish water in ditches;
- **Reptiles:** the Gravesend Site supports a 'good' population of slow worm and low populations of grass snake and common lizard;
- **Invertebrates:** a diverse assemblage of County importance was identified, including four Species of Principal Importance namely brown-banded carder-bee (*Bombus humilis*); shrill carder-bee (*Bombus sylvarum*); hornet robberfly (*Asilus crabroniformis*) and small heath butterfly (*Coenonympha pamphilus*). In addition, phoenix fly (*Dorycera graminum*) is considered to be very likely to occur, and wall butterfly (*Lasiommata megera*) is considered possible to occur.
- **Badger:** habitat is suitable but no setts found; and
- **Water vole:** the ditches have previously been found to support populations of water vole and it is assumed they continue to be present. It should be noted that the water vole surveys undertaken for the Proposed Development found no evidence of water vole.

2 Landscape and Ecology Strategy

2.1 Landscape Strategy

- 2.1.1 Good design has been a key consideration from the outset. The EIA has informed the iterative design process, guided by design principles developed specifically to address the opportunities and constraints presented by the Proposed Development. These principles have been developed in response to policy requirements, published landscape character assessment guidance and fieldwork analysis.
- 2.1.2 With reference to the Outline Landscape and Ecology Plans (Appendix A), the following design mitigation has been embedded in the design of the Proposed Development to minimise effects on the environment, including landscape character, visual amenity and biodiversity. In developing the landscape design strategy, particular consideration was given to:
- The recommendations contained within relevant landscape guidelines, including Natural England Statements of Environmental Opportunity (SEO) outlined in the profiles for NCA 81;
 - Guidance contained within the Landscape Institute's Infrastructure Technical Guidance Note 04/20;
 - The principles established in the Thurrock Design Guide;
 - The principles established in the Kent Design Guide;
 - Options for sustainable development as defined in the Thurrock Landscape Capacity Study (2005); and
 - Suggested land management guidelines set out in the Gravesham Landscape Character Assessment (Ref 29), and the Landscape Assessment of Kent (Ref 30).
- 2.1.3 The overall objective of the landscape design is to integrate the Proposed Development into its landscape setting and avoid or minimise adverse landscape and visual effects as far as practicable. The design achieves this objective whilst maximising opportunities to deliver net gains in biodiversity. Accordingly, the landscape design aims to achieve the following:
- To integrate the Proposed Development into the existing landscape pattern as far as possible by retaining and following existing features, including vegetation, where practicable;
 - To replace habitat lost because of construction of the Proposed Development and introduce new habitats through areas of new planting and habitat creation; and
 - To filter and screen more prominent components of the Proposed Development in views from visual receptors. Details of the landscape measures embedded into the Proposed Development design, including a summary of their environmental functions and objectives, is presented in ES Volume II Chapter 2 – Alternatives.

2.2 Overview Landscape Design Principles

- 2.2.1 This section describes the landscape design principles which underpin the outline landscape design and explains how they have been applied to the design of the Proposed Development.

Careful Siting in the Landscape

- 2.2.2 The Proposed Development has been carefully sited to avoid or minimise adverse effects to landscape and visual amenity receptors. Headhouses and new OHLs have been located in proximity to existing infrastructure to reduce any cumulative effects in the view. Infrastructure and temporary construction areas have also been sited to minimise effect on the landscape character of the site and adjacent areas.

Conserving Existing Vegetation Patterns

- 2.2.3 The layout of the Proposed Development has been designed to minimise the loss of, and avoid significant impacts on, existing landscape features. This includes minimal disturbance of existing vegetation through priority use of existing sealed land where feasible. The layout also seeks to extend and enhance the functional characteristics of water management provided in the areas.
- 2.2.4 The proposed planting design responds to the existing character of the landscape within the study area and seeks to strengthen connections to the priority marshland habitats at Tilbury and Gravesend. The planting design also responds to the distinctiveness of the area by using elements that are typical to the area that maintain the perceptual feel by allowing views to remain open where screening is not required.

Creating New Green Infrastructure

- 2.2.5 The Proposed Development has been designed to integrate with the local green infrastructure network, improving ecological connectivity across the sites. Planting and design layout will be reflective of the Natural England Coastal floodplain and grazing marsh priority habitat. This will be supplemented by recommendations made by Buglife and the local RSPB groups.

2.3 Ecology Strategy

- 2.3.1 This section describes the ecological design principles which underpin the outline design and explains how they have been applied to the design of the Proposed Development.

Application of the mitigation hierarchy

- 2.3.2 The mitigation hierarchy (i.e. avoid → Reduce/Mitigate → Compensate) has been applied, seeking in the first instance to avoid impacts on ecological features through sensitive design, and reduce habitat losses as far as is reasonably practicable. For example, the proposed SEC at Tilbury was moved from a location within the Tilbury Power Station LWS to an area of existing hardstanding outside of the LWS boundary.
- 2.3.3 As the project enters the construction phase, the Contractor will be encouraged to continue to find any opportunities to reduce the loss of semi-natural habitats during the works. For example, through retaining large buffer zones around ditch habitats and/or where possible retaining trees or scrub on the boundary of the Site.
- 2.3.4 Through maximising habitat retention and minimising impacts on adjacent habitats, the Proposed Development will seek to temporarily displace faunal species associated with these habitats for the duration of construction, but ensure adjacent populations remain present suitable to naturally recolonise the Site when construction is complete.
- 2.3.5 Where impacts do occur, the proposed planting design seeks to respond to the existing features of ecological value and provide compensatory area of habitat creation that are of equal or higher value than those lost. For example, losses of tall fescue dominated habitat suitable to support tall fescue planthopper will be mitigated through translocation of tall fescue tussocks and incorporation of these into the final planting design surrounding the new Tilbury SEC.

Updated surveys

- 2.3.6 The ecological CoW will complete a walkover prior to construction works to reconfirm the ecological baseline conditions and to identify any new ecological risks. The walkover will be completed sufficiently far in advance of the works to allow for the completion of any additional, seasonally constrained surveys (e.g. surveys in support of any identified requirements for protected species licences) that may be required. These surveys (where required) would be undertaken in advance of the preparation of the detailed LEMP and the Plan will be developed in line with the findings of these surveys.

- 2.3.7 Immediately prior to site clearance and start of construction, further site walkover surveys will be undertaken by an ecologist to confirm that the risks associated with the Proposed Development remain as previously assessed and, or to confirm the correct impact avoidance measures are being implemented (e.g. checks for protected and/or notable plant species; protected species stand-offs and other protection measures).

Protected Species Licences

- 2.3.8 At present the only works expected to require supervision by a protected species licence holder are works at both sites to install outfalls to the adjacent tidal ditches. The works areas will be reviewed by a holder of Natural England's class licence allowing water vole displacement. Where possible a location with no water vole activity will be utilised. However, if this is not possible then the licence holder will advise on and supervise works to reduce habitat suitability in the agreed location of works and encourage displacement of water vole from the small section of bank needed to undertake these works.
- 2.3.9 Where baseline conditions alter during the works the ecological CoW will identify any further requirements for protected species licences.

Ecological Clerk of Works

- 2.3.10 An ecology CoW will supervise key stages of both habitat clearance and habitat creation works. Further detail on those activities to be subject to supervision will be included in the detailed LEMP.

Precautionary Working Methods

- 2.3.11 Site clearance works will be subject to precautionary working methods, as set out within the Environmental Statement and the CEMP.

Tree Works

- 2.3.12 An Arboricultural Impact Assessment (AIA) has been produced and submitted with the Planning Applications. There were 253 tree features identified within the tree survey undertaken to inform the AIA, including 149 individual trees, 90 tree groups and 14 hedgerow features.
- 2.3.13 The most significant tree identified by the survey was T139, which was identified as veteran due to the presence of a number of veteran features including extensive stem decay, cavities and crown dieback. This is located at the Gravesend site, XY 567361, 174204. Refer to the Tree Protection Plan (Appendix D of the AIA).
- 2.3.14 The Proposed Development will require the removal or part removal of 49 tree features; this includes two individual trees classed as moderate quality (Category B), 21 individual trees, eight part tree groups, 13 tree groups, one part hedgerow and three hedgerows classified as low quality (Category C) and the remaining one individual tree is classified as very low quality (Category U).
- 2.3.15 In addition a number of tree features are classified as very low quality and are considered to be unsuitable for retention regardless of the Proposed Development and are recommended to be removed. Some removal and pruning of mature trees may be required to facilitate vehicle access during construction.
- 2.3.16 Where works in close proximity to retained trees cannot be practicably avoided, these works would be undertaken in accordance with current best practice at the time of the works. In November 2023, current best practice is defined in:
- British Standard (BS) 5837: 2012 Trees in relation to design, demolition and construction – Recommendations; and
 - National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

- 2.3.17 All necessary protective fencing would be installed prior to the commencement of any site clearance or construction works. This is set out in the AIA.
- 2.3.18 Prior to any tree felling works the ecological CoW would undertake an updated bat roost suitability assessment, and where necessary make recommendations for further surveys or supervision to ensure no adverse effects on roosting bats.

3 Management Prescriptions

3.1 Introduction

3.1.1 This section describes how existing and new habitats illustrated on the Outline Landscape and Ecology Plans in Appendix A will be protected or implemented during construction, maintained following implementation and managed in the long term. The retained existing and new landscape types illustrated on the Outline Landscape and Ecology Plans, Appendix A are:

- Existing retained trees and shrubs (including existing hedgerows with trees, woodland and mature trees);
- Individual trees (Gravesend only);
- Scrub (Gravesend only);
- Coastal and floodplain grazing marsh:
 - Tussocky grassland incorporating translocated tussocks of tall fescue (Tilbury site);
 - Tussocky ungrazed grassland in the northern field and grazed pasture in southern two fields (Gravesend site);
- Natural regeneration;
- Wetland planting around field drains and ephemeral land scrape pools; and
- Biodiverse brown roofs.

3.2 Native Planting

3.2.1 The following steps and working methods will be included in the specification:

- a. Areas identified for planting will be clearly marked out and agreed with the Landscape Architect (LA) / Landscape Clerk of Works (LCoW) in advance;
- b. Planting will take place in the first available planting season and at a time of the year appropriate to the species being planted;
- c. Plants will be inspected by the LA / LCoW at the nursery and on delivery to site prior to planting;
- d. Planting will be timed to avoid periods of frost, drought, or other inclement weather, as far as practicable;
- e. Plants will be protected from strimming activities and damage from animals. The type of guard selected appropriate to species and growth habit; and
- f. Trees will be staked to protect against wind-rock.

3.3 Existing Retained trees and shrubs

3.3.1 Existing trees and shrubs within the RLB will be retained, as indicated on the Outline Landscape and Ecology Plans (Appendix A).

Function

3.3.2 The primary function of the retained trees and shrubs will be to maintain established habitats, visual amenity and character of the landscape and provide a structure for the addition of the new planting and other features of the Proposed Development.

Implementation

- 3.3.3 During construction the retained trees and scrub vegetation will be protected. Measures to be employed will include the use of clearly defined stand-offs, managing the structure and integrity of the retained vegetation, and undertaking any pruning outside of the bird breeding season.
- 3.3.4 Retained trees will be periodically inspected by an arboriculturist during construction. Where construction works are adjacent to retained trees, works will be undertaken under a watching brief to record root loss and to recommend further arboricultural works where required.

Long Term Management

- 3.3.5 Long term management of existing retained vegetation is provided under the specific landscape types below.

3.4 Individual Trees

- 3.4.1 Individual trees will be planted along the southern boundary of the Gravesend site only.

Function

- 3.4.2 Mature trees are not a representative element of the character area at Tilbury or Gravesend. Planting is limited to a narrow row of trees that will supplement the retained individual trees. These individual trees will provide habitat diversity and tie into the industrial hinterland edge at Gravesend. They will also provide screening to sensitive receptors at Gravesend, Denton and Chalk. Tree species will be selected to prevent carr invasion¹.

Implementation

- 3.4.3 The locations for proposed individual trees are illustrated on the Outline Landscape and Ecology Plans (Appendix A).
- 3.4.4 Indicative species selection will include tree species that are native and present locally and may include:
- *Prunus spinosa* (Blackthorn);
 - *Crataegus monogyna* (Hawthorn);
 - *Prunus avium* (Wild Cherry).
- 3.4.5 The following species will not be included due to their potential for carr invasion:
- *Alnus glutinosa* (Alder);
 - *Salix* spp. (Willow); and
 - *Betula* spp. (Birch).
- 3.4.6 The following steps and working methods will be included in the specification:
- a. Areas identified for tree planting will be clearly marked out and agreed with the LA / LCoW in advance.
 - b. Planting will take place in advance of construction or in the first available planting season.
 - c. Plants will be inspected by the LA / LCoW at the nursery and on delivery to site prior to planting.

¹ Carr / carr woodland is also known as wet woodland which occur on poorly drained or seasonally wet soils. Alder, birch and willow are typically found as the predominant tree species. These species should be avoided along the southern edge of the site in order to limit encroachment of the adjacent areas of open wetland.

- d. Planting will be carried out in winter (November to March) and will be timed to avoid periods of frost, drought, or other inclement weather, as far as practicable.
- e. Plants will be protected from strimming activities and damage from animals by double staked 300x60cm weld mesh guard. The type of guard selected appropriate to species and growth habit.
- f. Trees will be staked to protect against wind-rock.
- g. Mulch will be applied around the tree to create a 1 metre weed-free area.

Establishment Maintenance

- 3.4.7 A detailed plan for the establishment and management of new native trees will be developed for the five year establishment maintenance period.
- 3.4.8 The aim of establishment maintenance will be to support bushy growth and the development of a form characteristic of the species at maturity.
- 3.4.9 The trees should be maintained in line with the recommendations of the LA / LCoW. Establishment maintenance will be based on the following principles and outline prescriptions:
 - a. Maintain a 1 metre weed-free circle around trees through mechanical control.
 - b. Water new plants to minimise failures in periods of drought.
 - c. Remove litter, rubbish, and debris from around the trees throughout the year.
 - d. Re-firm soil around roots to ensure trees are supported and remain upright in Spring.
 - e. Inspect and adjust guards, ties and stakes in Spring and Autumn and after strong wind events.
 - f. Inspect and top-up mulch as required.
 - g. Undertake any formative pruning if required.
 - h. Check and record failed or defective trees in September annually.
 - i. Replace failed or defective trees with matching species of the same size during the next planting season after failure.
 - j. Undertake quarterly check of trees to record their growth and condition.

Long Term Maintenance

- 3.4.10 Individual trees will be managed according to best arboricultural practice in accordance with:
 - a. BS 8545:2014 Trees: from nursery to independence in the landscape.
 - b. BS3998 is the British Standard for Tree Work – Recommendations.
- 3.4.11 The long-term management of new and existing specimen trees will focus on the following interventions:
 - a. All specimen trees will undergo an annual condition assessment and an appropriate programme of works developed to address changes in condition and site requirements.
 - b. From year 5, guards, ties and stakes will be removed from new specimen trees if they have fulfilled their intended purpose, e.g. guards will be removed once the risk of bark damage from grazing animals has reduced.
 - c. Formative pruning of trees will be undertaken if required under the direction of an arboriculturist.
 - d. Trees adjacent to public rights of way will be actively maintained and monitored on health and safety grounds, and to maintain access.

3.5 Scrub

3.5.1 Scrub will be planted modestly across the Gravesend site only.

Function

3.5.2 The primary function of the scrub planting is to create and maintain a diverse mosaic of scrub and grassland habitat. This includes providing shelter and food resources for birds and other wildlife. Patchy areas of scrub are characteristic of the priority habitat area. At Gravesend, carr invasion is prevented by traditional cattle grazing methods and creates the characteristic of the open landscape of coastal and floodplain grazing marsh.

Implementation

3.5.3 The location for proposed scrub are illustrated on the Outline Landscape and Ecology Plans (Appendix A).

3.5.4 Indicative species selection will include shrub species that are native and presented locally and may include:

- *Sambucus nigra* (Elder);
- *Prunus spinosa* (Blackthorn); and
- *Crataegus monogyna* (Hawthorn).

3.5.5 The following species will not be included due to their potential for carr invasion:

- *Viburnum opulus* (Guelder rose);
- *Rubus fruticosus* (Bramble);
- *Rhamnus cathartica*. (Buckthorn); and
- *Rosa canina* (Dog rose).

3.5.6 The following steps and working methods will be included in the specification:

- a. Areas identified for scrub planting will be clearly marked out and agreed with the LA / LCoW in advance.
- b. Planting will take place in advance of construction or in the first available planting season
- c. Plants will be inspected by the LA / LCoW at the nursery and on delivery to site prior to planting.
- d. Planting will be carried out in winter (November to March) and will be timed to avoid periods of frost, drought, or other inclement weather, as far as practicable.
- e. Plants will be planted randomly at 1.5m centres in single species groups of 3's, 5's and 7's.
- f. Plants will be protected from damage from animals with individual biodegradable spiral guard supported on a bamboo cane. The type of guard selected appropriate to species and growth habit.

Establishment Maintenance

3.5.7 A detailed plan for the establishment and management of new scrub will be developed for the five year establishment maintenance period. The aim of establishment maintenance will be to support the early stages of growth to encourage bushy growth and a resilient framework ahead of future long-term management. Maintenance works will to be planned to avoid the nesting bird season. Establishment maintenance will be based on the following principles and outline prescriptions:

- a. Maintain a 1 metre weed-free circle around shrubs through mechanical control.
- b. Check for presence of Russian olive at Tilbury site and remove any establishment.

- c. Water new plants to minimise failures in periods of drought.
- d. Remove litter, rubbish, and debris from planted areas throughout the year.
- e. Re-firm soil around roots to ensure plants are supported and upright in Spring.
- f. Inspect and adjust guards in spring and autumn.
- g. Check and record failed or defective plants in September annually.
- h. Replace failed or defective plants with matching species of the same size during the next planting season after failure.
- i. Undertake quarterly check of plants to record their growth and condition.

Long term management

- 3.5.8 The long-term management of new scrub will focus on the following interventions:
- a. All scrub planting plots will undergo an annual condition assessment and an appropriate programme of works developed to address changes in condition and site requirements.
 - b. Planted areas will be reviewed and thinned out as necessary to remove any poor or weak specimens, dense thickets should not be allowed to develop.
 - c. Arisings from thinning or other scrub management functions will be retained on site in the form of dedicated brash and wood piles or wind-rows, for the benefit for fungi, lichen, and invertebrates other than in the southern fields at Gravesend where grazing will occur.
 - d. Where necessary, arisings from scrub management will be chipped and spread to a depth no greater than 75mm.

3.6 Coastal and Floodplain Grazing Marsh

- 3.6.1 Coastal and floodplain grazing marsh will be established across the Proposed Development. This will be through reinstatement of existing areas that are temporarily affected during construction as well as reinstatement of degraded and sealed land areas. Tall fescue dominated tussocky grassland at Tilbury will be removed from proposed construction areas and stored during construction for use in reinstatement following construction.

Function

- 3.6.2 In accordance with the Natural England Guidance, the defining features of coastal and floodplain grazing marsh landscape type are hydrological and topographical rather than botanical. The coastal and floodplain grazing marsh is likely to be periodically inundated with water from the field drains and ditches in the vicinity providing water regulation to the wider area. The coastal and floodplain grazing marsh will also enhance value for wildlife, in particular bird species of high conservational value.

Implementation

- 3.6.3 The location for proposed coastal and floodplain grazing marsh are illustrated on the Outline Landscape and Ecology Plans (Appendix A).
- 3.6.4 Indicative species selection will include grass species that are native and presented locally and may include:
- *Alopecurus pratensis* (meadow foxtail);
 - *Cynosurus cristatus* (crested dog's tail);
 - *Lolium perenne* (rye grass);
 - *Holcus lanatus* (Yorkshire fog);

- *Festuca rubra* (red fescue); and
- *Agrostis stolonifera* (creeping bent).

3.6.5 In addition to the above, at Tilbury, the landscaped area to the south of the proposed SEC (as depicted on the Outline Landscape and Ecology Plans in Figure A in Appendix A) will have translocated tall fescue tussocks, which will have been lifted and stored prior to construction.

3.6.6 The prescriptions at Gravesend will differ to those at Tilbury. As depicted on the Outline Landscape and Ecology Plan in Figure B in Appendix A, the field to the north is expected to remain ungrazed and a tussocky meadow mix (or similar approved by the ecological CoW) will be utilised to provide habitat with good structural diversity for biodiversity. The fields to the south of the Gravesend permanent development, as depicted on the Outline Landscape and Ecology Plan in Figure B in Appendix A, are more practical to promote ongoing grazing.

3.6.7 The following steps and working methods will be included in the specification:

- a. Where practicable, seed will be obtained from a local source for the purpose of maintaining continuity with local coastal and floodplain grazing marsh.
- b. On-site material will be retained and re-used during the landscape and ecology mitigation works. If additional material is required, receiving soils will be prepared to reduce nutrients where possible. This could include spraying with a herbicide to remove existing material and incorporating a substrate to reduce nutrient levels or removing topsoil to expose the sub-soil.
- c. Once the nutrient level is reduced, all clods will be broken up and alien material (such as plastics and metals) above 50mm in size will be removed. The top 50mm of the soil will then be raked to prepare a fine tilth for the seedbed. Based on the high invertebrate value of the surrounding areas the Contractor will be directed to ensure reinstatement leaving a varied topography incorporating vehicle ruts and gentle scrapes and mounds, and exposing sub-soil layers in some areas to encourage areas of less vigorous vegetation growth.
- d. Seeding will be completed in either autumn or spring and only once the receiving soils have been tilled and adequately prepared.
- e. Seeding will be carried out in dry weather and access will be prohibited to seeding areas until seed has germinated and a sward has established (see establishment maintenance section below).

Establishment maintenance

3.6.8 A detailed plan for the establishment and management of coastal and floodplain grazing marsh will be developed.

3.6.9 The aim of establishment maintenance will be to encourage development of a diverse (botanically and structurally) sward of grasses and herbs. The prescriptions will differ for the Tilbury and Gravesend sites reflecting the different aims and objectives of these areas of planting.

3.6.10 Grazing by ponies is the desired final management prescription for the fields in the south of the Gravesend Site. However, these areas will be cut initially and grazing will not be introduced until initial establishment criteria have been met. These will be set out in the final LEMP.

Long term management

3.6.11 The management of coastal and floodplain grazing marsh will be undertaken to maintain a relatively stable grassland community in the long-term, and to avoid areas naturally progressing into tall, dense, grass-dominated areas. The ongoing management will act to maintain structural complexity within these areas as per the current conditions - this will involve careful control of grazing to ensure some areas of tall ruderals and bare ground remain.

3.6.12 Measures for coastal and floodplain grazing marsh will focus on a regime of:

- a. Low level grazing by cattle/ponies during the summer months.
- b. Visual inspections during the growing season.

3.7 Drainage ditches and land scrapes

- 3.7.1 New drainage ditches and land scrapes will be established across the proposed development. Drainage ditches will be profiled to enhance biodiversity. Contouring of areas within the proposed development will facilitate the initial formation of land scrapes. Adventitious land scrapes formed by cattle grazing will be encouraged.

Function

- 3.7.2 Drainage ditches are considered to be the element of greater importance to the coastal and floodplain grazing marsh landscape type. Whilst providing an important function to water management and regulation, they also maintain a valued habitat for water margin fauna and invertebrates. Acting as linear ponds and opportunities to develop small areas of reedbed habitat, the variability in salinity, water depth, particulate levels, and flow rate create an increased level of habitat opportunity.

- 3.7.3 Land scrapes are shallow pools of water that are typically less than 1m in depth. They generally hold rain or flood water seasonally but stay damp for most of the year but can also be ephemeral water bodies during periods of drought. Land scrapes provide excellent opportunity to enhance biodiversity.

Implementation

- 3.7.4 The location for proposed scrapes are illustrated on the Outline Landscape and Ecology Plan (Appendix A).
- 3.7.5 A variety of ditch profiles should be developed across the proposed development to provide an opportunity to increase the diversity of habitats. The angle of slope should be reduced to 35 degrees or less to allow for cattle access. Mild poaching by cattle at the ditch margin will increase the potential for invertebrate habitat creation through the creation of bare mud patches and uneven surfaces with mini pools at the ditch margins. Cattle trampling at the ditch edges can lead to the formation of a beneficial berm².
- 3.7.6 Connection into the existing field drains (managed by the Environment Agency) will facilitate managed saline incursion and flooding.
- 3.7.7 Land scrapes will be located to ensure a variety of water sources are available. This will include in areas where the land scrape is fed by surface water from a wider catchment area on the site and groundwater fed surface areas. Land scrapes will be located in the vicinity of field drains to ensure habitat connectivity opportunity for invertebrates but will not be directly fed by field drains.
- 3.7.8 Land scrapes will also be located in the vicinity of managed scrub but will not be located in the shadow of a tree belt.
- 3.7.9 A series of smaller irregular sized land scrapes is preferable to one single larger one. The contouring of the land scrape will ensure gentle gradients at the edge of the scrape and avoid steep edges. Slopes should be pronounced and gradual. Slopes should be less than 1:5 and preferably less than 1:20.
- 3.7.10 Topsoil removed as part of the construction work will not be spread in or around the pond margins to ensure the pond remains a nutrient poor area.

Berm – a ridge or small embankment

- 3.7.11 Where practicable, seed will be thinly spread and obtained from a local source for the purpose of maintaining continuity with local coastal and floodplain grazing marsh. Bare ground will also be left to offer adventitious naturalisation from adjacent areas.

Establishment maintenance

- 3.7.12 A detailed plan for the establishment and management of field drains and land scrapes will be set out in the final LEMP.
- 3.7.13 The aim of establishment maintenance will be to encourage development of a diverse habitat, and in some areas encourage establishment of reeds to mimic the mosaic habitats present prior to construction. Establishment maintenance will be based on the following principles and outline prescriptions will include:
- Immediately after planting and sowing, the ground will be left undisturbed and un-watered to allow the grassland to establish naturally;
 - Adjacent scrub should be managed to ensure the field drains land scrapes and not shaded out. Pollarding and coppicing may be required for well established existing areas of scrub. Piles of wood and brash should be kept in separate piles in proximity, but should not be placed to shade out the field drain or land scrape;
 - Cattle grazing or poaching by animal hooves should be limited in during establishment but introduced once plant colonies are established as this process brings enhanced ecological benefit as part of the management;
 - Water new plants to minimise failures in periods of drought;
 - Remove litter, rubbish, and debris from planted areas throughout the year;
 - Check and record failed or defective plants in September annually; and
 - Ecological monitoring to confirm value of new habitats.

Long Term Management

- 3.7.14 Any new ditches/scrapes will require management, to avoid silting up and become choked with vegetation. However this removal of silt should be performed on a rotational basis to ensure that there is continuity of habitat at all stages of siltation.
- 3.7.15 Clearing all ditches at the same time is therefore to be avoided with a rotational ditch management plan adopted. Clearance of drainage ditches should be staggered so that only short sections are cleared in any one year. This will allow cleared areas to be re-colonised from adjacent uncleared sections. This rotational management plan should dovetail with the management plan in use by the Environment Agency at adjacent sites to the proposed development.
- 3.7.16 Some stretches of ditches that are completely choked with vegetation should be allowed to remain on a site.
- 3.7.17 Over-management of field drains, including over-deepening, has an adverse effect on the habitat quality. Care therefore needs to be taken that the process of silt removal is not too destructive. Roding, if necessary, should be carried out in winter and vegetation left on banks until it dries out before being removed, to enable the invertebrates in the material to return to the ditch. Care should also be taken not to smother the marginal vegetation during this process.
- 3.7.18 Low level cattle/pony grazing is recommended to maintain plant diversity and open conditions at the edge of the field drain and land scrapes. Grazing should be undertaken during the summer months when the ground is drier, although it maybe possible to extend this to account for seasonal changes due to climate change.

- 3.7.19 Visual inspections will be made during the growing season. If the field drain or land scrape is becoming dominated by a single species it may be necessary to remove some and create areas that allow emergence plant growth. A suitably cautious approach to the management of field drains and land scrapes would be to remove no more than 25% of the plants over a three-year period.

3.8 Biodiverse Brown Roofs

- 3.8.1 Biodiverse Brown Roofs are proposed for the new headhouse buildings at Tilbury and Gravesend. A detailed prescription for each roof will be provided in a subsequent update to the LEMP. The prescriptions will be based on the following principles:

- Utilise a low nutrient substrate;
- Variation in the substrate depth between 80-150mm;
- Roof to be sown sparsely with seed collected from adjoining sites, leaving scope for some natural colonisation; and
- Where possible incorporate enhancement features such as the presence of pebbles, sand or deadwood.

- 3.8.2 Establishment maintenance during Year 1 will adhere to the installers guidance but will include checks to hand pull any undesirable species, and check establishment.

- 3.8.3 During and following establishment a programme of monitoring will be established to monitor key factors such as botanical species diversity, percentage of bare ground and presence of any undesirable species.

Table 3-1: Time to Target Condition for Habitat Creation

Broad Habitat	Proposed Habitat	Area (hectares)	Condition		Time to Target Condition (years)
			Condition	Score	
Urban	Artificial unvegetated, unsealed surface	0.062	N/A - Other	0	0
Urban	Developed land; sealed surface	1.173	N/A - Other	0	0
Grassland	Other neutral grassland	2.293	Moderate	2	5
Heathland and shrub	Mixed scrub	0.207	Moderate	2	5
Sparsely vegetated land	Ruderal/Ephemeral	0.223	Moderate	2	3
Urban	Other green roof	0.07	Condition Assessment N/A	1	1
Urban	Sustainable drainage system	0.122	Moderate	2	3
Wetland	Reedbeds	0.046	Moderate	2	7
Individual trees	Rural tree	0.22	Moderate	2	27
Wetland	Reedbeds	0.05	Moderate	2	7

4 Pre – and Post Construction Monitoring

- 4.1.1 Monitoring is required in order to determine that the functions documented within this OLEMP are being achieved and whether any remedial management action may be required. The baseline against which the effects of the actions resulting from the monitoring can be compared against, comprise the pre-construction baseline data.
- 4.1.2 A post-construction monitoring programme will be formalised and agreed as part of the planning application and included within the detailed LEMP.
- 4.1.3 Post-construction monitoring for flora, birds (breeding and non-breeding), riparian mammals, badgers, bats (bat box roosting and activity survey), great crested newt and reptiles (presence/absence) will be undertaken in the respective seasons, with annual to bi-annual visits post-construction. This is likely to involve similar or scaled-down methods to the baseline surveys to enable cross-comparison with baseline data, to assess any changes in biodiversity as a result of the Proposed Development. This may include use of invertebrate survey, breeding bird survey, and targeted reptile surveys.
- 4.1.4 Results from the post-construction monitoring will feed into the management plan and if required management may be amended accordingly based on this monitoring.

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Appendix A Outline Landscape and Ecology Plans

- Notes:
- Outline landscape plan does not take account of underground service constraints which would be reviewed as part of the production of detailed landscape and ecology design drawings
 - Excess topsoil to be distributed across the site to create localised bunds and scrapes to provide an uneven surface for invertebrates. Localised profiles to be identified on site in conjunction with the ecological clerk of works

Area to the north of the fence line to regenerate naturally back to rough tussocky grassland and bare ground. Seed sown thinly with 2gm² mix of seeds collected from adjacent habitats

Grass strips thinly sown with 2gm² mix of seeds collected from adjacent habitats to allow some areas to self seed from adjacent areas

New buildings and infrastructure including access road

Grass strips to be created with characteristic mix of native species to match surrounding grassland

Biodiverse brown roof on headhouse

Tall fescue tussocks lifted and stored prior to construction will be translocated to this area

Gently undulating landform with bare earth and land scrapes to create ephemeral water pools to support invertebrates

1:10,000 @A1. For illustrative purposes only

AECOM

PROJECT

TKRE Cable Tunnel Replacement Project - National Grid

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LEGEND

- Red Line Boundary (RLB)
- Proposed Other Neutral Grassland
- Existing drainage ditches (partially culverted)
- Biodiverse brown roof on headhouse
- Proposed building and infrastructure areas
- Proposed Overhead Line / Pylon to be removed

ISSUE/REVISION

I/R	DATE	DESCRIPTION
3	07Dec2023	Natural England updates
2	06Dec2023	Updated following client review
1	08Nov2023	Initial drawing

KEY PLAN



SCALE

1:400 @A1



PROJECT NUMBER

60677311

SHEET TITLE

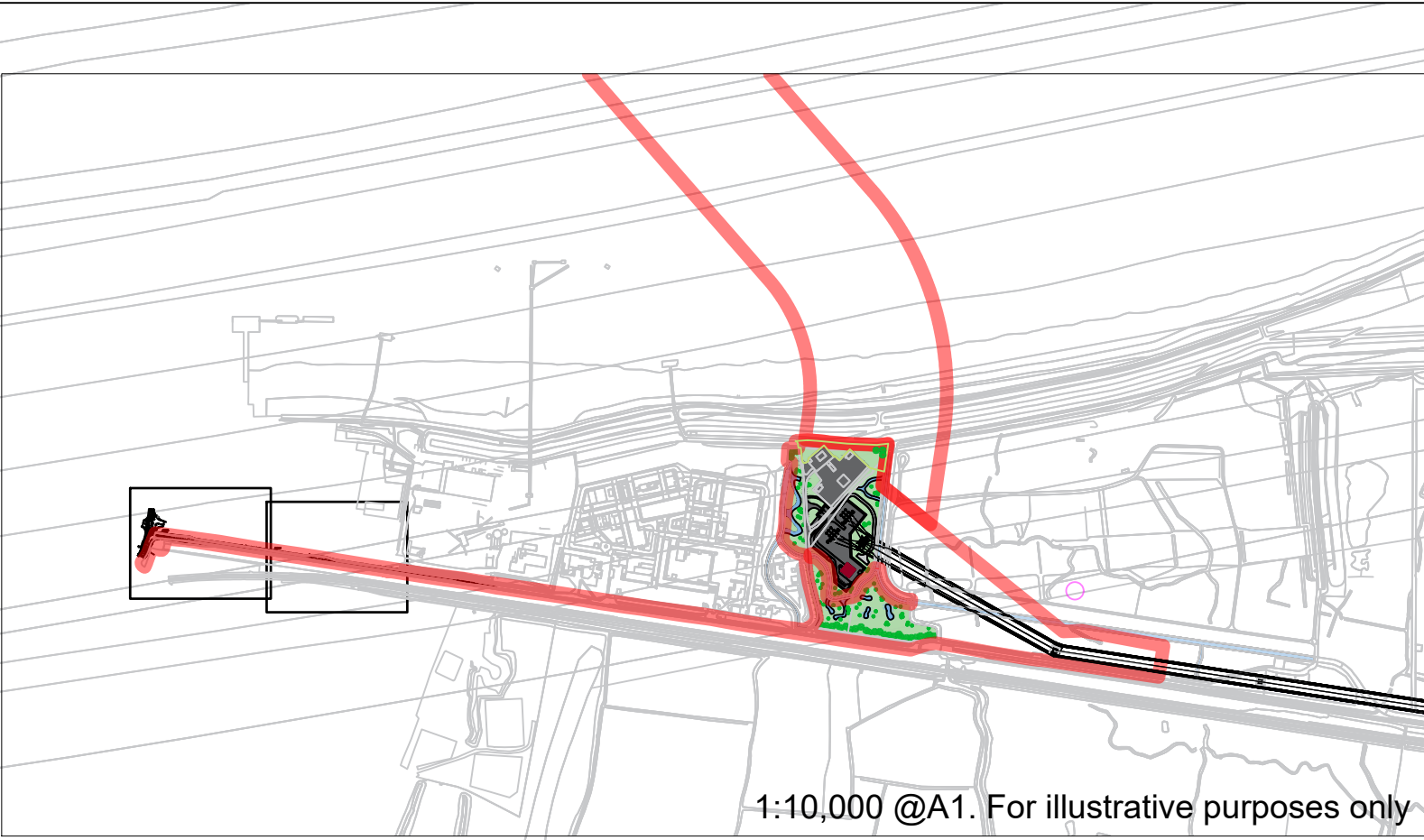
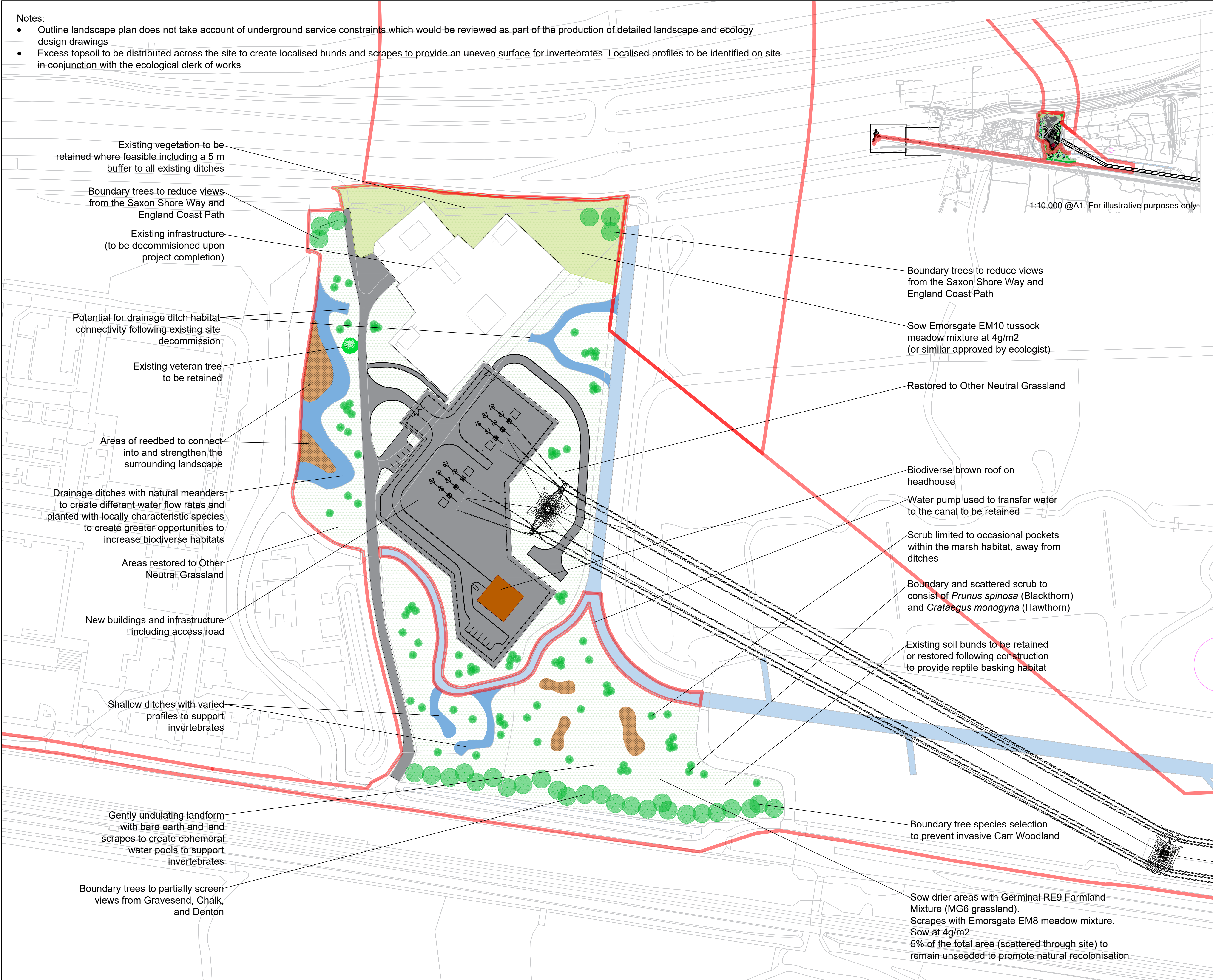
Outline Landscape and Ecology Plan
Tilbury

SHEET NUMBER

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Last Plotted: 2023-12-06
Project Management Initials: Designer: _BM_ Checked: _RM_ Approved: _RM_ ISO A1 994mm x 841mm

- Notes:
- Outline landscape plan does not take account of underground service constraints which would be reviewed as part of the production of detailed landscape and ecology design drawings
 - Excess topsoil to be distributed across the site to create localised bunds and scrapes to provide an uneven surface for invertebrates. Localised profiles to be identified on site in conjunction with the ecological clerk of works



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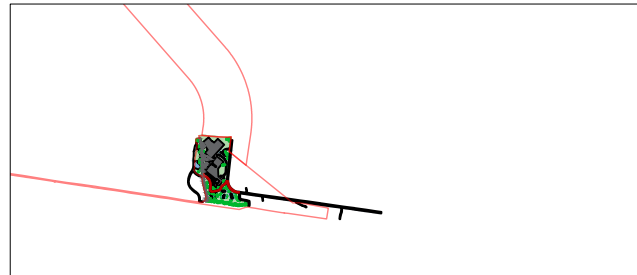
LEGEND

- Red Line Boundary (RLB)
- Proposed tree
- Proposed scrub vegetation
- Existing veteran tree
- Existing drainage ditches (partially culverted)
- Proposed field drain / ephemeral water scrape
- Proposed Other Neutral Grassland
- Retained vegetation where feasible
- Biodiverse brown roof on headhouse
- Proposed reedbeds
- Proposed building and infrastructure areas

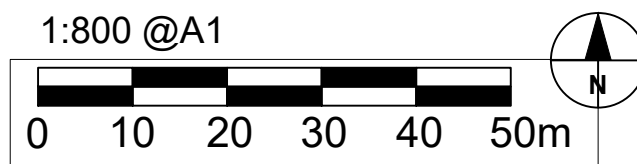
ISSUE/REVISION

I/R	DATE	DESCRIPTION
2	06Dec2023	Updated following client review
1	08Nov2023	Initial drawing

KEY PLAN



SCALE



PROJECT NUMBER

60677311

SHEET TITLE

Outline Landscape and Ecology Plan
Gravesend

SHEET NUMBER

60677311-ACM-00-XX-DR-LA-000002

