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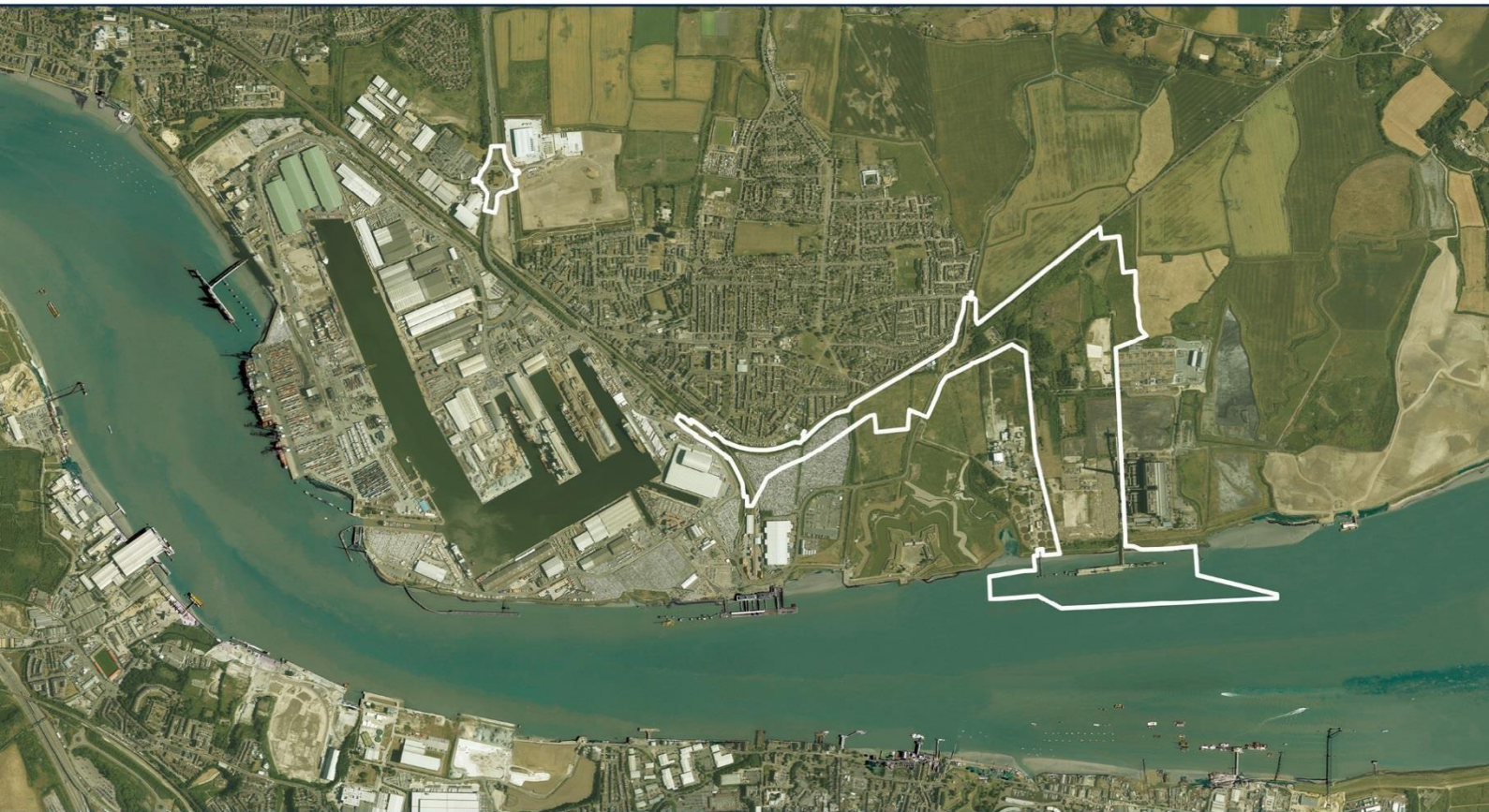
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN V3 – CLEAN

TILBURY2 DOCUMENT REF:
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Figure 1 (July 2018 revision):

Management Compartments

Appendix E:

**Technical Note on Tilbury2
Landscape Mitigation Proposals**

1.0 INTRODUCTION

SCHEME OVERVIEW

- 1.1 Port of Tilbury London Limited (PoTLL) is proposing a new port terminal on the north bank of the River Thames at Tilbury, a short distance to the east of its existing Port. The proposed port terminal will be constructed on largely previously developed land that formed the western part of the former Tilbury Power Station.
- 1.2 The project is known as "Tilbury2." The proposed main uses on the site will be a Roll-on/Roll-off ("RoRo") terminal and a Construction Materials and Aggregates terminal ("the CMAT"), and associated infrastructure including rail and road facilities and revisions to the existing marine infrastructure. The CMAT will include stockpiling of construction materials and some processing of aggregates for the production of asphalt and concrete products. An 'infrastructure corridor' is proposed that will accommodate road and rail links to the existing rail and road network and an enhanced connection with the existing Port.
- 1.3 The project will require works including, but not limited to:
- creation of hard surfaced pavements;
 - improvement of and extensions to the existing river jetty including creation of a new RoRo berth;
 - associated dredging of berth pockets around the proposed and extended jetty and dredging of the approaches to these berth pockets;
 - new and improved conveyors;
 - erection of welfare buildings;
 - erection of a single 10,200sq.m. warehouse;
 - a number of storage and production structures associated with the CMAT;
 - the construction of a new link road from Ferry Road to Fort Road; and
 - formation of a rail spur and sidings.
- 1.4 The proposed volumes of import/export of RoRo units for the terminal exceed the threshold of 250,000 units stated in the Planning Act 2008 for throughput per annum. The Tilbury2 project therefore constitutes a Nationally Significant Infrastructure Project (NSIP).
- 1.5 The scheme also includes elements of retained habitat, proposed habitat creation and soft-landscaping, the management of which during operation is the subject of this Landscape and Ecology Management Plan (LEMP) document.

SCOPE AND PURPOSE

- 1.6 The LEMP covers the terrestrial areas of the site and intertidal or marine habitats falling within the Order Limits. A small area of such intertidal habitats will be disrupted during the construction phase. In the operational phase the current condition of undisturbed intertidal areas and the future condition of the disrupted areas will continue to be maintained by ongoing hydrogeomorphological processes. These processes are not anticipated to be disrupted by the proposals (see Environmental Statement Chapter 10 Terrestrial Ecology, and Chapter 11 Marine Ecology, document reference 6.1/APP-031). However, monitoring of the success of mitigation and compensation measures is proposed for defined areas of the intertidal zone and the LEMP covers this.
- 1.7 For all other areas, the purpose of the LEMP is to set out the general principles for management during operation of both existing terrestrial habitats and retained established planting and that which will be newly created within the Order Limits, in order that these perform their intended ecological and landscape functions during operation of the development. These functions are in part ameliorative (e.g. to screen views from sensitive receptors) and in part mitigation/compensation (e.g. to provide alternative habitat for species displaced by the development). Further information is provided in ES Chapters 9 and 10. Details of the construction of created habitats, including those within the Order Limits, are set out in the Ecological Mitigation and Compensation Plan (EMCP)¹.
- 1.8 Compliance with the LEMP will be a requirement of the DCO. As such, the Port operator must comply with all measures within it.

FUTURE POTENTIAL CUMULATIVE EFFECTS AND MITIGATION

- 1.9 Details of the mitigation and compensation measures to be implemented as part of the Tilbury2 scheme are set out in the EMCP document. The EMCP covers both on and off-site mitigation and compensation. The LEMP, by contrast, is specific to the Tilbury2 site. It focusses on management of the retained and proposed habitats within the Order Limits during the operational phase, including those which will serve to minimise and mitigate the predicted effects of the Tilbury2 proposals alone or in-combination with other future proposals.
- 1.10 As part of the environmental assessment process, a number of potential 'cumulative' projects have been identified, the environmental effects of which in relation to landscape and ecology could, in the future, interact with any net (i.e. not fully mitigated) effects of Tilbury2, creating the potential for cumulative environmental effects if not avoided or fully mitigated within those later schemes. A high level, qualitative, and proportionate Cumulative Effects Assessment of Tilbury2, based on the available data and knowledge at the

¹ The EMCP also deals with matters of mitigation (other than embedded design mitigation which has been employed to avoid impacts occurring in the first place, which is best considered as 'avoidance') and compensation, both on- and off-site. Mitigation includes *inter alia* the measures that will be taken, under licence where necessary and appropriate, to capture and relocate protected species and/or damage or destroy their habitats, or alternatively to prevent the spread of invasive non-native plant species (INNS) during the disturbance associated with construction activity. Compensation includes the measures that will be taken to provide alternative habitats for species displaced or translocated from the development zones, which in some cases is delivered within the development masterplan, in other cases on adjoining land within the DCO limits, and in still other cases will be delivered at locations that are entirely off-site. The future management of off-site compensation features is also dealt with in the EMCP.

date of assessment, with the proposed Tilbury Energy Centre (TEC) and Lower Thames Crossing (LTC) notified NSIP projects, has been undertaken. However, it is not the responsibility of the Tilbury2 project to mitigate these potential cumulative effects, in anticipation of projects that may never come forward and are yet to seek to avoid and mitigate their own effects. It would not be reasonable or practicable to design such mitigation before even the spatial and temporal parameters are fully known and in the absence of adequate detail for those proposed schemes being known.

- 1.11 Accordingly, the environmental impacts of those schemes will fall to be assessed, consulted on, designed out and/or mitigated by the proponents of those projects once adequate parameters and data of sufficient quality is available and ultimately considered by the relevant decision-makers as and when applications are progressed. Both the LTC and TEC Scoping Reports have identified Tilbury2 as a cumulative project that will be assessed as part of their Environmental Assessment process. This will allow these future proposals to fully take account of the detailed design of Tilbury2, the proposals in this LEMP and in the EMCP document, any on-going monitoring and the design of the proposed landscape and ecological mitigation associated with these cumulative projects.
- 1.12 That said, given that the Tilbury2 EIA process has identified at a high level the potential for cumulative effects, if or when these projects are brought forward, and where those impacts have not been avoided or designed out, then there will be potential for landscape scale mitigation as part of those projects, thus ensuring that the cumulative effects that could arise are properly addressed in the wider spatial environment, taking account of landscape and ecological character zones and habitat types.

2.0 RETAINED ECOLOGICAL & LANDSCAPE FEATURES

- 2.1 The baseline condition of the retained features of ecological interest is described in detail within ES Chapter 10: Terrestrial Ecology, and set out in the associated Figures and Appendices. Features of landscape interest are defined within the ES Chapter 9: Landscape Character and Visual Amenity and associated Figures and Appendices.
- 2.2 This LEMP is concerned only with the management and/or monitoring of those ecological and landscape features that will remain on completion of construction. These are as illustrated on Figure 9.9 (Landscape Strategy) of the Environmental Statement and at Figure 1 (On-Site Ecological Mitigation and Compensation) of this LEMP and annotated with the boundaries of the various management compartments discussed at Section 4 of this document.

RETAINED PARTS OF EXISTING ECOLOGICAL AND LANDSCAPE DESIGNATIONS

- 2.3 The Order Limits encompass a number of non-statutory ecological designations. The 'Tilbury Marshes' Local Wildlife Site (LoWS) is a 39.8ha designation which overlaps with the infrastructure corridor but is in large part located to the south of it. Of the 5.3ha of this LoWS within the Order Limits, up to 3.4ha will be subject to permanent DCO use, with a further 0.1ha to be used only temporarily during construction and restored for wildlife² post-development. The restored area will revert to common land and be subject to associated reinstated grazing rights, and therefore falls outside the scope of this LEMP. A further area of 1.35ha serves as replacement common land and will not be subject to any permanent or temporary construction use, and therefore also falls outside the scope of this LEMP.
- 2.4 The 'Tilbury Centre' LoWS will be removed during construction. Most of the 'Lytag Brownfield' LoWS will also be removed but a small (0.7ha) area will be retained in the northern edge of the Green Belt land. This comprises management compartment 7 as described in Section 4 of this LEMP.
- 2.5 An area of approximately 7.8ha of designated Green Belt land north-east of the CMAT and rail spur will also be encompassed within the Order Limits. This comprises compartments 5, 6 and 7 as described in Section 4 of this LEMP.

RETAINED HABITATS / LANDSCAPE FEATURES

- 2.6 Terrestrial and intertidal habitat and landscape features that will be retained through the construction and operation of the development include the following Section 41 (S41) Habitats³, as described further within Chapter 10 of the ES:
- Open Mosaic Habitats on Previously Developed Land (0.3 ha);

² Specifically restored to Coastal and Floodplain Grazing Marsh priority habitat type. For an account of the change in these calculated figures since the production of the ES, please refer to the response to FWQ 1.2.8 and 1.2.9; and to tabulated response to FWQ 1.2.10 provided within the Applicant's Deadline 2 submission document.

³ Species and habitats of principal importance in England pursuant to the obligations levied by the Natural Environment & Rural Communities Act, 2006 (section 40-42).

- Hedgerows (c.180m); and
- Ponds (1 no.); and
- Intertidal habitats, ie. Coastal Saltmarsh (0.6ha) / Intertidal Mudflat (3.8ha).

2.7 Other non-S41 retained habitat features include:

- Drainage ditches (c.1005m);
- Tree lines (c.950m);
- Scrub (0.1-0.5ha); and
- Other grassland (c.2.5ha).

3.0 NEWLY CREATED HABITATS / LANDSCAPE FEATURES

NEW HABITATS / LANDSCAPE FEATURES

- 3.1 New habitat creation forms part of both the On-Site Ecological Mitigation and Compensation Strategy (see Figure 10.13 of the ES, and also Figure 1 of this document) and the Landscape Strategy (see Figure 9.9 of the ES, as updated by the Technical Note presented at Appendix E). It is a condition of this LEMP that these features are constructed and managed in accordance with this LEMP and as indicated on Figure 1. Further details of the processes of construction of these new habitats are set out in the EMCP. This LEMP deals only with their aftercare and management.
- 3.2 Newly created or restored habitat features include the following S41 Habitats (Habitats of Principal Importance further to section 41 of the NERC Act 2006) or ecologically similar equivalents:
- Open Mosaic Habitat on Previously Developed Land;
 - Coastal and Floodplain Grazing Marsh;
 - Lowland Mixed Deciduous Woodland / Hedgerows⁴;
 - Ponds (2 no.);
 - Reedbed; and
 - Intertidal habitats (Coastal Saltmarsh / Intertidal Mudflat)⁵.
- 3.3 Other newly created habitat and landscape features will include the following:
- Wet ditches (suitable for water voles);
 - Dry ditches (including surface water / highway drainage attenuation); and
 - Scrub and woodland planting.

NEWLY CREATED FEATURES FOR PROTECTED SPECIES

- 3.4 The species of ecological interest identified in the assessment of baseline conditions are described in detail within the ES Chapter 10: Terrestrial Ecology, and associated Figures and Appendices.
- 3.5 In addition to the ditches and ponds above, which will provide habitat for water voles, and scrub intended to provide some measure of replacement habitat for displaced nesting birds, a number of other species will require specific provision of new ecological features as follows:

⁴ Non-S41 but ecologically very similar habitats will be created through screen planting and other scrub creation

⁵ Discussions are ongoing with the Environment Agency about the possibility of creating new intertidal habitats within the Order Limits. Details of habitat creation would be presented within the EMCP, but no on-going management of these habitats is deemed necessary due to their being maintained by hydrogeomorphological processes and thus this does not form a management compartment within the LEMP.

- Artificial sett creation for badger;
- Suitable grassland habitat for translocated reptiles, and;
- Replacement bat roosts (bat boxes).

4.0 HABITAT & LANDSCAPE MANAGEMENT MEASURES

GENERAL MEASURES

- 4.1 The following measures apply to all management prescriptions outlined in Section 4.

Works to retained trees

- 4.2 All tree inspections and arboricultural works indicated in the following sections of this LEMP are to be carried out by an approved member of the Arboricultural Association. The results of inspections and interventions should be documented in writing.
- 4.3 Where and to the extent that materials and workmanship are not fully specified they are to be in accordance with good prevailing arboricultural practice or the current British Standard with reference to:
- BS 3998: Recommendations for tree work;
 - BS 4428: Code of practice for general landscape operations.

New planting

- 4.4 Aftercare and establishment works are to be carried out by an approved landscape contractor in accordance with good horticultural practice or the current British Standard with reference to:
- BS 4428: Code of practice for general landscape operations;
 - BS 7370: Grounds maintenance;
 - BS 8545: Trees: from nursery to independence in the landscape – recommendations.
- 4.5 Three broad aftercare and establishment periods for new planting are identified below, these are not mutually exclusive and a programme of monitoring will be necessary to ensure the landscape objectives are met.

Short term (1-5 years). The initial establishment period will require more frequent maintenance operations. Replacement planting and remedial works will be carried out and planting sundries maintained in good condition.

Medium term (5-10 years). As the planting establishes during this period, less frequent maintenance will be required. Initial thinning may be necessary to ensure planting thrives without competition.

Long term (10-25 + years). As the planting matures, continual monitoring (see Section 5) will inform a rolling maintenance programme, to ensure that effective maintenance is carried out at the appropriate time to meet health and safety requirements.

- 4.6 During the Short Term (initial establishment) period, inspections shall take place annually in October/November to determine the effectiveness of the

establishment and aftercare provisions to that point, paying particular attention to:

1. Planting disease, damage or death;
 2. Vandalism;
 3. General appearance and condition;
 4. Any invasive or non-native species;
 5. Any evidence of protected species (such as nesting birds).
- 4.7 If required, the LEMP will be revised and forthcoming maintenance operations adjusted accordingly.
- 4.8 Reviews will continue to take place beyond the initial 5 year period subject to an assessment of the prevailing conditions on site as part of the 5 year LEMP review (see Section 5). These shall also identify any necessary remedial works on planting affecting publicly accessible areas. Safety issues reported by the public shall also be investigated as soon as practically possible and remedial works undertaken as necessary.

Works to ditches and ponds

- 4.9 Maintenance works to adopted highways drains, including the swales proposed to run adjacent to the link road along the infrastructure corridor, are anticipated to fall within the responsibility of the adopting authority. They are thus not addressed here, albeit that some of the same principles will apply, and they are expected to form some degree of mitigation and compensation function (e.g. against losses of dry grassed ditch within current grazing land).
- 4.10 Management works to controlled watercourses, including diverted sections of the 'main rivers' of Pincock's Trough, Chadwell Sewer, Chadwell Cross Sewer and East Dock Sewer will need to be carried out in accordance with approvals from the Environment Agency pursuant to their protective provisions in the DCO.
- 4.11 Management of ditches created with ecological or landscape objectives overriding in the design can be carried out without recourse to permitting regimes and thus fall fully within the ambit of this LEMP. Standard best practice procedures shall apply to such activities^{6,7}, and species-specific guidance shall be taken into account where relevant, such as for water vole^{8,9}.

⁶ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

⁷ Buisson *et al.* (2008). *The Drainage Channel Biodiversity Manual: Integrating Wildlife and Flood Risk Management*. Association of Drainage Authorities and Natural England, Peterborough.

⁸ Strachan, Moorhouse & Gelling, (2011). *Water Vole Conservation Handbook*, 3rd edition. WildCRU.

⁹ Dean, Strachan, Gow and Andrews, (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds. F Mathews & P Chanin. The Mammal Society, London.

Maintenance of operational mitigation measures

- 4.12 The success of on-site mitigation and compensation for both landscape effects and ecological effects will be dependent not just on aftercare and management, but also on ensuring the value of retained and created habitats is not compromised by negative influences arising due to proximity to the operational Tilbury2 development.
- 4.13 Chapter 10 of the ES includes assessments of the impacts of noise, dust and lighting on retained and new habitat features, taking into account outputs from the studies reported on in Chapters 15-18 and the embedded mitigation proposed in those chapters.
- 4.14 The Operational Management Plan (OMP) submitted with the DCO application sets out measures to ensure the embedded mitigation commitments referred to in the ES, and relied upon in the Chapter 10 assessment, are upheld in respect of ground and surface water quality, noise and dust. These measures are assumed to be in place for the purpose of this document and are not repeated here. The requirement for non-obtrusive lighting and minimal overspill into retained areas adjoining the operational site is also set out in Chapters 9 and 10 of the ES and similarly reflected in the lighting designs included in the Preliminary Lighting Strategy at Appendix 9.J of the ES. Again, for the purpose of this document it is assumed that a lighting scheme in general accordance with the Preliminary Lighting Strategy is in place as is required by the DCO and that maintenance of embedded mitigation (such as cowls) will fall within standard operational management of the site.

Invasive Non-native Species (INNS)

- 4.15 Chapter 10 of the ES, and the CEMP, set out the baseline position as regards INNS and the measures that will be taken to identify and control INNS through the construction phase. In the post-construction phase, vigilance for INNS will form part of the annual walkover surveys set out in section 5 of this LEMP, and where identified, appropriate controls will be put in place to ensure control and eradication, in line with prevailing best practice standards and legal requirements.

MANAGEMENT BY COMPARTMENT

- 4.16 Figure 1 attached shows the location of the retained and newly created habitats relative to the development, and also indicates the boundaries of the nine compartments under which management measures are grouped. Each management compartment is briefly described below and the prescriptions for it outlined:

Compartment 1

Summary Description

- 4.17 This comprises a belt of retained mixed deciduous and coniferous trees forming a visually important screen at the western edge of the development. Key tree species are Monterrey pine, white poplar, London plane, weeping willow and ash. The compartment also includes an adjoining drainage ditch which is to be re-profiled in much of its southern section to meet surface water drainage requirements. In the northern part of the compartment, adjoining

Station Approach Road, this ditch comprises a retained section of established watercourse (Pincock's Trough) that supports water voles, although the westernmost end of this will be affected by diversion and culverting works. Contained within this compartment will be bat boxes on mature trees installed as compensatory provision for the loss of a minor common pipistrelle roost in an existing building (Building B7 as referred to in ES Chapter 10).

Management Objectives

- 4.18 Maintain structure as a screen of mature mixed deciduous/coniferous trees and shrubs to ameliorate visual effects, in particular on views towards the Tilbury2 site from the west. This will serve the complementary function of maintaining a sheltered tree-line for bat foraging, with mature and over-mature trees being likely to develop features suitable for bat roosting, and dense vegetation offering suitable habitat for bird nesting. Retain/enhance existing macrophyte vegetation in ditch/Pincocks Trough where possible and encourage its expansion along re-profiled channel to encourage water voles and other species. Ensure bat roosting provision is maintained.

Management Prescriptions

- i) Inspect retained mature trees annually in autumn and after major storms to identify structural defects, including dead or broken branches, cracks, decay and root decay. Where representing a potential health and safety hazard or a significant risk to tree health, remove any dead, dying or diseased wood, broken branches and stubs at the earliest opportunity ensuring due regard is had to the possibility of bat roosts and nesting birds, and seeking specialist ecologist advice where in any doubt and aiming at all times to ensure no net reduction in nesting/roosting opportunities. All pruning/cutting of mature trees to be carried out in accordance with Arboricultural Association leaflet 'Mature Tree Management'¹⁰.
- ii) Maintain and/or enhance screening function of existing vegetation through periodic (e.g. biannual) and targeted autumn/winter coppicing and pruning interventions by a qualified arboriculturalist, ensuring due regard is had to the possibility of bat roosts when working with mature/over-mature trees and seeking specialist ecologist advice where necessary.
- iii) During operation (i), identify and mark sapling or young trees for recruitment and undertake any measures necessary to promote their vigorous growth (e.g. 'haloing'). Consider planting of some coniferous species if no seedling recruitment observed.
- iv) Prevent excessive overshadowing of retained/re-profiled ditch systems by cutting back over-hanging woody vegetation annually each autumn.
- v) Assess development of macrophyte vegetation in ditches at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles and/or affecting surface water drainage function. All maintenance to be carried out in accordance with current best practice to minimise

¹⁰ Arboricultural Association (2005). LEAFLET 8 Mature Tree Management.

effects on ecology and ensure legal compliance in respect of protected species such as water vole^{11,12}.

- vi) Check bat boxes at least annually in accordance with the terms of any prevailing licence and related monitoring requirements. Thereafter, ground-based checks will be sufficient to ensure they remain *in-situ* with any replacements put into effect to ensure continued compensatory provision.

Compartment 2

Summary Description

- 4.19 This comprises a length of retained wet ditch and some adjacent verge and planted trees immediately to the south of Substation Road and at the northern edge of the Ro-Ro terminal. The ditch supports water voles (at least at times) and the verges have some botanical interest (e.g. bee orchid).

Management Objectives

- 4.20 Ensure retention of existing interest as far as possible through maintaining current mowing regime and ensuring ditch management continues to provide habitat suitable for water voles. Work towards enhancing value of this compartment as providing an east-west conduit across the Tilbury2 site for bats.

Management Prescriptions

- i) Maintain and/or enhance existing tree planting via targeted interventions by a qualified arboriculturalist, ensuring due regard is had to the possibility of bat roosts when working with mature/over-mature trees and seeking specialist ecologist advice where necessary.
- ii) Prevent excessive overshadowing of retained/re-profiled ditch systems by cutting back over-hanging woody vegetation annually each autumn.
- iii) Mow verge grasslands annually in February and again in October, with all arisings removed to encourage low fertility species-rich grassland and maintain conditions favourable to species such as bee orchid.
- iv) Assess development of macrophyte vegetation in ditches at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles and/or affecting surface water drainage function. All maintenance to be carried out in accordance with current best practice to minimise

¹¹ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

¹² Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

effects on ecology and ensure legal compliance in respect of protected species such as water vole^{13,14}.

Compartment 3

Summary Description

- 4.21 This comprises a strip of land between the new rail siding and the Tilbury2 site boundary with Network Rail land to the north. Other than provision for a 3m access track adjoining the siding (which also encompasses an easement for buried infrastructure) and a noise-attenuation barrier, the rest of this land will be given over to dense scrub planting to provide a visual screen, and a length of wet ditch designed to provide habitat for water voles and other wetland flora and fauna. Pockets of the S41 habitat 'open mosaic habitat on previously developed land' are also anticipated to survive closer to the Network Rail boundary.

Management Objectives

- 4.22 Encourage development of a dense screen of mature deciduous scrub to ameliorate visual effects, in particular on views towards the Tilbury2 site from the north and north-west. This will serve the complementary function of maintaining a linear scrub belt with lee-sides and edges for bat foraging, and a dense structure suitable for nesting birds such as linnet and possibly nightingale. Steer maturation of the created ditch habitat towards a condition favourable for water voles, with scrub/ditch interface suitable for Cetti's warbler.

Management Prescriptions

- i) Encourage development of dense impenetrable scrub through interventions during establishment period to replace failures and encourage dense growth down to ground level, including through periodic pruning and coppicing in autumn/winter, whilst being mindful to minimise scrub growth and related leaf-fall issues close the London-Southend railway, in line with Network Rail guidance¹⁵.
- ii) Encourage the development of dense macrophyte vegetation in ditch, including common reed, but also species such as *Glyceria* to encourage water voles and other wetland species. Thereafter assess development of macrophyte vegetation at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles. All maintenance to be carried out in accordance with current best practice

¹³ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

¹⁴ Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

¹⁵ Network Rail. *Vegetation Management Explained*. (PEIR consultation response document).

to minimise effects on ecology and ensure legal compliance in respect of protected species such as water vole^{16,17}.

- iii) Prevent excessive overshadowing of retained/re-profiled ditch systems and open mosaic habitats by cutting back over-hanging/colonising woody vegetation annually each autumn, except where conflicting with landscape screening objective.

Compartment 4

Summary Description

- 4.23 This comprises a strip of land on the outer radius of the new rail siding and separating the CMAT from the habitat compensation area and Green Belt land within the Order Limits to the north-east. Parts of this land will be given over to scrub planting to provide a visual screen and also to combat airborne transport of fugitive dust emissions from stockpiled aggregates. Other areas are likely to comprise retained, translocated or newly created representations of the S41 habitat 'open mosaic habitat on previously developed land'.

Management Objectives

- 4.24 Encourage development of a mixed boundary strip of hedgerow, scattered scrub and early-succession habitats to provide a buffer between the CMAT and the compensation habitats to the north-east, while also offering some bird nesting habitat. In other areas, encourage the development of sparsely vegetated artificial substrates including rail clinker, sands and gravels from marine dredged origin and possibly elements of PFA and/or Lytag to replicate brownfield conditions and secure representations of open-mosaic habitats on previously developed land.

Management Prescriptions

- i) Encourage development of continuous linear representations of dense scrub or hedgerow reflecting finalisation of uses on the adjoining CMAT in order that such vegetation can perform a useful function in capturing airborne dust, should that be necessary.
- ii) In other areas, assess brownfield substrates annually and ensure maintenance as sparse vegetation with a high proportion of lichens, annual plants and low cover of grasses or woody vegetation, including by cutting back of overshadowing/colonising woody vegetation. Where necessary to arrest processes of succession, periodic mechanical disturbance and compaction should be employed on no more than 25% of the extent of such habitats within the compartment.

¹⁶ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

¹⁷ Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

Compartment 5

Summary Description

- 4.25 This compartment contains the majority of the compensatory wetland habitat installed in advance and/or under the DCO as a ready receptor for water voles, including concentric rings of multiple ditch channel extending in total to around 2.5km of ditch and two new ponds with surrounding reedbed. Small representations of open mosaic habitat may also be created in the central area (between the ponds and the innermost rings of ditch), possibly using substrates translocated from the Lytag Site. Retained ditch, hedgerow/scrub and coarse grassland habitats along the eastern and southern boundaries are also included. The land lies within the Green Belt.

Management Objectives

- 4.26 Much of the habitat in this area is planned to be established in advance of construction by means of a separate but parallel planning consent for the concentric rings of ditches¹⁸, in order that adequate size and maturity of receptor habitat for water voles will be available prior to the translocation of animals from development areas. If advanced construction is not possible, it will be constructed as a requirement of the DCO. Further details will be set out in the EMCP. The management objectives falling under this LEMP are to continue the development of the created habitats to optimise their value and carrying capacity for water voles (and other species using the same habitats), and to work towards complete replication of lost reedbed habitat.

Management Prescriptions

- i) Encourage the development of dense macrophyte vegetation in ditches, this to be rich in foodplant species such as *Glyceria* to maximise value to water voles. Thereafter assess development of macrophyte vegetation at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles. Particular attention to be paid to the potential presence of INNS, and if present then measures taken to remove/control them. All maintenance to be carried out in accordance with prevailing best practice to minimise effects on ecology and ensure legal compliance in respect of protected species¹⁹.
- ii) Encourage the development of dense reedbed around ponds and in the central part of the compartment aiming to achieve 0.5ha cover (consistent with anticipated extent of losses to the proposals). Thereafter assess development at five-yearly intervals and put into effect staggered cut-back/clearance operations where reed thatch is adjudged to be too dense. All maintenance to be carried out in accordance with prevailing best practice to minimise effects on

¹⁸ Thurrock Council planning reference 18/00893/CONDC.

¹⁹ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

ecology²⁰ and ensure legal compliance in respect of protected species such as water vole²¹.

- iii) Assess brownfield substrates annually and ensure maintenance as sparse vegetation with a high proportion of lichens, annual plants and low cover of grasses or woody vegetation, including by cutting back of overshadowing/colonising woody vegetation. Where necessary to arrest processes of succession, periodic mechanical disturbance and compaction should be employed on no more than 25% of the extent of such habitats within the compartment.

Compartment 6

Summary Description

- 4.27 This compartment comprises the previously installed and now maturing compensatory wetland habitat constructed by RWE for water voles, as well as the surrounding terrestrial area that was intended by them to serve as receptor habitat for reptiles from part of the former power station site. The recent grazing of this area has ceased and following repair of the surrounding reptile fencing, reptile hibernacula features have been installed and this grassland is being allowed to continue to develop an appropriate structure in order that it can accommodate a proportion of the reptile population needing to be moved from the Tilbury2 development. Further details are set out in the EMCP. The wetland habitat will be left as existing as it can no longer be used to receive water voles having already been colonised. This compartment is also the intended location for the artificial badger sett and this LEMP assumes that this has become occupied in the course of mitigation activities as set out in the EMCP and pursuant to a licence from Natural England, should it be required. The land lies within the Green Belt.

Management Objectives

- 4.28 Encourage development of suitable tussocky grassland structure in the land areas to maximise reptile carrying capacity, and thereafter maintain in optimum condition, allowing some limited development of bramble or woody scrub to provide shelter, scrub-interface conditions and sun-traps. Maintain waterbody as an open water feature with broad and dense bands of emergent vegetation around the margins. Encourage maturation of scrub planting around and on top of artificial badger sett to continue to integrate this with its surroundings.

Management Prescriptions

- i) Inspect grassland areas every three to five years to assess sward structure and scrub development and address excess of either with management interventions, to include localised hand strimming in relation to the former and hand cutting in relation to the latter. Operations to be carried out in accordance with prevailing best practice at all times to avoid impacts on reptiles or nesting birds and ensure legal compliance.

²⁰ Hawke, C. J. & Jose, P. V. (1996). *Reedbed Management for Commercial and Wildlife Interests*. RSPB, Sandy.

²¹ Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

- ii) Assess development and condition of macrophyte vegetation around pond at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles. Particular attention to be paid to the potential presence of INNS, and if present then measures taken to remove/control them. All maintenance to be carried out in accordance with prevailing best practice to minimise effects on ecology and ensure legal compliance in respect of protected species²², particularly water vole²³.
- iii) Ensure establishment of scrub on and around artificial badger sett, including replacement of planting failures if required and appropriate and/or coppicing to encourage dense growth habit and structure. All work to be carried out in cognisance of legal provisions related to an occupied sett, in accordance with best practice^{24,25} and taking advice from specialist ecologists where in any doubt.

Compartment 7

Summary Description

- 4.29 This compartment comprises an area of open mosaic habitat adjoining the existing London-Southend railway and a strip of existing dense scrub to the south of it. The open mosaic habitat forms the only part of the Lytag Brownfield Local Wildlife Site (LoWS) that will be retained.

Management Objectives

- 4.30 Maintain dense scrub as an element of continuity of this habitat and its associated interest for nesting passerine birds, including species of conservation concern such as linnet.

Management Prescriptions

- i) Assess open mosaic habitat resource annually and ensure maintenance as sparse vegetation with a high proportion of lichens, annual plants and low cover of grasses or woody vegetation, including by cutting back of overshadowing/colonising woody vegetation. Where necessary to arrest processes of succession, periodic mechanical disturbance and compaction should be employed on no more than 25% of the extent of the habitat within the compartment.
- ii) Maintain scrub belt on a no (or low) intervention basis, albeit whilst being mindful to minimise excessive growth close to and potential leaf fall onto the London-Southend railway, in line with Network Rail guidance²⁶. Assess condition at five-yearly intervals and put into effect

²² For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

²³ Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

²⁴ Natural England (June 2009). *Interpretation of 'Disturbance' in relation to badgers occupying a sett*.

²⁵ Natural England and DEFRA (29 March 2015). *Badgers: protection and licences. What you must do to avoid harming badgers and when you'll need a licence*. [Accessed from: <https://www.gov.uk/guidance/badgers-protection-surveys-and-licences>]

²⁶ Network Rail. *Vegetation Management Explained*. (PEIR consultation response document).

staggered cut-back/coppicing operations where necessary to prevent succession to secondary woodland and shading out of dense structure near ground-level.

Compartment 8

Summary Description

- 4.31 This compartment comprises the eastern part of the infrastructure corridor between Chadwell Cross Sewer and Fort Road and which is currently part of the Tilbury Marshes LoWS. For reasons of logic and convenience, the compartment as shown on Figure 1 encompasses land anticipated to be adopted and managed by the highways authority (Thurrock Council), but the prescriptions below do not apply to that adopted land. A variety of habitats will be created in this compartment, some ancillary to other functions (e.g. highways drainage) and some in order to serve a specific landscape and/or ecology function (e.g. dense planting to screen views of the road and rail infrastructure from Tilbury Fort). Representations of scrub, dry ditches (grassed swales), wet ditches, and sparsely vegetated habitats of an essentially brownfield nature will be created. Further details relating to planting are given at Appendix E.

Management Objectives

- 4.32 Encourage development of a dense and broad screen of mature deciduous scrub to ameliorate visual effects, in particular on views towards the infrastructure corridor from the open common land and the heritage asset of Tilbury Fort to the south. This will serve the complementary function of maintaining a linear scrub belt with lee-sides and edges for bat foraging, and a dense structure suitable for nesting birds such as linnet and possibly nightingale. Steer maturation of the created ditch habitat towards a condition favourable for water voles, with scrub/ditch interface suitable for nightingale and Cetti's warbler.

Management Prescriptions

- i) Encourage development of dense impenetrable scrub through interventions during establishment period to replace failures and encourage dense growth down to ground level, including through periodic pruning and coppicing in autumn/winter, whilst being mindful to minimise excessive growth close to and leaf fall onto the London-Southend railway, in line with Network Rail guidance²⁷.
- ii) Encourage the development of dense macrophyte vegetation in ditch, including common reed, but also species such as *Glyceria* to encourage water voles and other wetland species. Thereafter assess development of macrophyte vegetation at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation deemed to be too dense than optimum for water voles. All maintenance to be carried out in accordance with current best practice

²⁷ Network Rail. *Vegetation Management Explained*. (PEIR consultation response document).

to minimise effects on ecology and ensure legal compliance in respect of protected species such as water vole^{28,29}.

- iii) Prevent excessive overshadowing of retained/re-profiled ditch systems and open mosaic habitats by cutting back over-hanging/colonising woody vegetation annually each autumn, except where conflicting with landscape screening objective.

Compartment 9

Summary Description

- 4.33 This compartment comprises the western part of the infrastructure corridor between Ferry Road and Chadwell Cross Sewer and north of the Fortland Distribution Park. For reasons of logic and convenience, the compartment as shown on Figure 1 includes some land anticipated to be adopted and managed by the highways authority (Thurrock Council), and the prescriptions below do not apply to that land. The compartment encompasses the retained landscape screening bund at the northern edge, which has associated interest for reptiles and brownfield invertebrates, as well as new habitat created to the south of it, including lengths of wet ditch, dry ditches (grassed swales), pockets of brownfield habitat and woodland and scrub screen planting.

Management Objectives

- 4.34 Encourage development of a dense and broad screen of mature deciduous scrub transitional to woodland to ameliorate visual effects, in particular on views from the infrastructure corridor southwards over the Fortland Distribution Park. This will serve the complementary function of maintaining a linear scrub/woodland belt with lee-sides and edges for bat foraging, and a structure suitable for nesting birds. Steer maturation of the created ditch habitat towards a condition favourable for water voles, with brownfield habitats to represent an extension of the interest found at the edges of and on the pre-existing bund.

Management Prescriptions

- i) Encourage development of dense woodland/scrub screen through interventions during establishment period to replace failures, encourage dense growth down to ground level and select standards for growing on to maturity, including through periodic pruning and coppicing in autumn/winter, and being mindful to minimise excessive growth close to and leaf fall onto the London-Southend railway, in line with Network Rail guidance³⁰.
- ii) Encourage the development of dense macrophyte vegetation in ditch, including common reed, but also species such as *Glyceria* to encourage water voles and other wetland species. Thereafter assess development of macrophyte vegetation at five-yearly intervals and put into effect staggered cut-back/clearance operations where vegetation

²⁸ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

²⁹ Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

³⁰ Network Rail. *Vegetation Management Explained*. (PEIR consultation response document).

deemed to be too dense than optimum for water voles. All maintenance to be carried out in accordance with current best practice to minimise effects on ecology and ensure legal compliance in respect of protected species such as water vole^{31,32}.

- iii) Prevent excessive overshadowing of retained/re-profiled ditch systems and open mosaic habitats by cutting back over-hanging/colonising woody vegetation annually each autumn, except where conflicting with landscape screening objective.
- iv) Assess brownfield substrates annually and ensure maintenance as sparse vegetation with a high proportion of lichens, annual plants and low cover of grasses or woody vegetation, including by cutting back of overshadowing/colonising woody vegetation. Where necessary to arrest processes of succession, periodic mechanical disturbance and compaction should be employed on no more than 25% of the extent of such habitats within the compartment.

Compartment 10

Summary Description

- 4.35 This compartment comprises the intertidal habitats south of the seawall, which contain coastal saltmarsh and intertidal mudflat. A small area (of approximately 0.035ha) will be subject to works relating to construction of the marine infrastructure and installation of a surface water outfall to the Thames; and subsequent ecological mitigation and compensatory measures as described in the EMCP (section 8). The intertidal habitats represented within this compartment are otherwise to be retained *in situ*.

Management Objectives

- 4.36 The habitats here will continue to be maintained by coastal hydrogeomorphological processes, and no need for management is anticipated following creation and establishment of the intertidal habitats, as described within the EMCP.

Monitoring

- i) Monitor the habitat creation works so as to determine whether the measures are working as anticipated, i.e. that reinstated saltmarsh vegetation on the course of the outfall pipe is recovering and that the newly installed groynes are working to retain and accrete fine sediments, and that saltmarsh vegetation is colonising this area (see EMCP section 13). Monitoring will take the form of botanical surveys and fixed-point photography. Should this monitoring determine the need for further intervention during the establishment phase, this will fall under the remit of the EMCP. Following the establishment phase, it

³¹ For example: Essex County Council Flood and Water Management Team, (November 2014). *Guide to Ordinary Watercourse Maintenance*. [Accessed from: <https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/Watercourse-regulation/Documents/ditch-maintenance.pdf>]

³² Natural England and DEFRA (28 March 2015). *Water voles: surveys and mitigation for development projects*. [Accessed from: <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences>]

is anticipated that condition of the habitats will be maintained by ongoing hydrogeomorphological processes.

5.0 MONITORING & REVIEW

GENERAL

- 5.1 Management of the areas covered by this LEMP will continue for the life of the development, unless and as agreed otherwise by Thurrock Borough Council in consultation with Natural England. As the habitats develop, the LEMP will need to be reviewed. The measures set out in this section will also be kept under review as other developments in the vicinity of Tilbury2 that will affect the ecological proposals contained within this LEMP are brought forward. This will be informed by the results of regular monitoring of the condition of the habitats, and by relevant species monitoring. Details of this are set out below.

ANNUAL WALKOVER

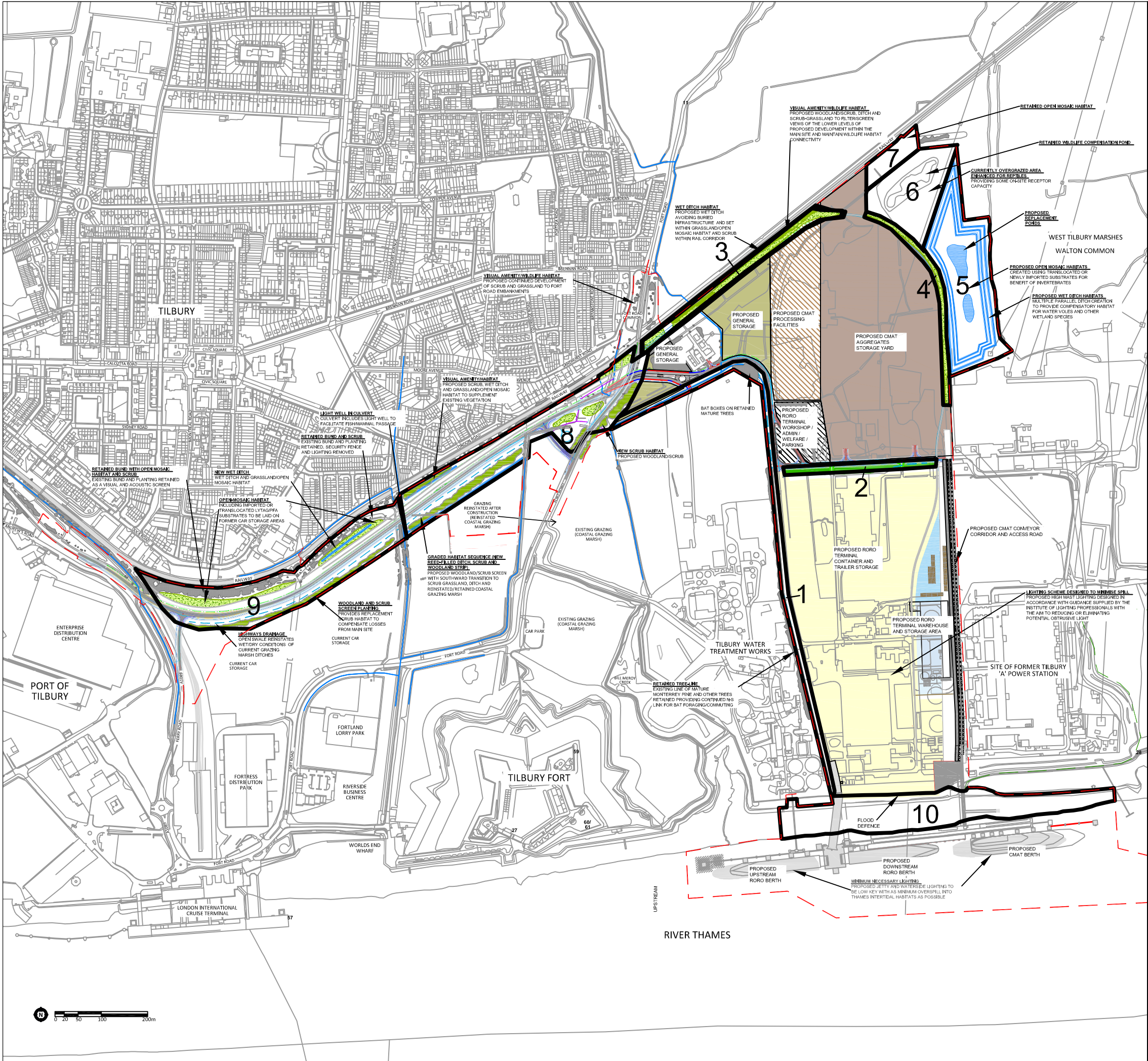
- 5.2 All management compartments and their constituent habitats will be subject to an annual walkover inspection by a suitably qualified ecologist. This inspection will be additional to those discussed under the previous sections (e.g. as required to ensure establishment of tree and shrub planting and the maintenance of appropriate condition in retained mature trees at Sections 4.2 - 4.8 above and the monitoring in Compartment 10) and will be in addition to any follow-up monitoring surveys or inspections required by the applicable protected species licences (i.e. for bats, water voles or badgers) and/or further to the agreed post-translocation protocols for reptiles.
- 5.3 The objective of the annual walkover will be to assess the condition of retained and created habitats against target objectives, including those for the individual management compartment and (where relevant) the requirements of protected species licences and approved translocation strategies.
- 5.4 Following the walkover inspection, an annual monitoring report will be produced detailing any remedial actions or interventions determined to be necessary in order to meet the relevant species or habitat objectives. Examples may include:
- Scrub control or cutting back of adjoining scrub where threatening to overshadow open mosaic habitats;
 - Cutting and removal of reed or other dense macrophyte vegetation to prevent build up of thatch and drying out of watercourses/waterbodies;
 - Disturbance interventions to create or maintain bare ground for annual plants, other early succession species and thermophilic invertebrates;
 - Addressing any INNS noted to have colonised the site.

FIVE-YEARLY SURVEY AND REVIEW

- 5.5 The performance of the retained and created habitats in relation to their target objectives, including in providing alternative habitat for key species impacted by the development, will be assessed by means of more involved surveys at five-yearly intervals, the first to be undertaken five years after the cessation of construction or habitat creation activities in all management compartments.

- 5.6 The following surveys, at minimum, will be included in the five-year reviews:
- Protected species surveys: bats, badger, water vole, reptiles;
 - Breeding birds survey, with particular focus on any use of the management compartments by nightingale, Cetti's warbler and barn owl;
 - Botanical surveys, focusing on early season surveys of open mosaic habitats on previously developed land and including sampling of lichens;
 - Intertidal habitat surveys, to map extent of saltmarsh cover, and record the species composition of the areas affected (including translocated turves and any new areas of colonisation);
 - Invertebrate surveys.
- 5.7 The results of the surveys will be analysed in order to identify any revisions to the management prescriptions deemed to be required in order to meet the objectives for each compartment and/or address any problems. Revised prescriptions would then be produced to guide the next five years. This information would be presented as a 'Five Year Monitoring Report' to be shared with relevant stakeholders, including Thurrock Council, Natural England, the Environment Agency and any others deemed relevant. Feedback and suggestions from these stakeholders would be used to guide the next five-year plan.
- 5.8 Nothing in paragraphs 5.5 to 5.7 precludes PoTLL seeking to change the prescriptions set out in this LEMP prior to the end of each five year period. Such changes would be able to take place with the approval of Thurrock Council, in consultation with Natural England.

FIGURE 1



- ORDER LIMITS
- PROPOSED ROAD
- PROPOSED RAIL ACCESS & SIDINGS PROVISION
- PROPOSED NOISE BARRIER
- PROPOSED NEW WATERBODIES FOR WILDLIFE HABITAT
- PROPOSED NEW WET DITCHES FOR WILDLIFE HABITAT
- PROPOSED SURFACE WATER/HIGHWAY DRAINAGE ATTENUATION
- PROPOSED DIVERTED WET DITCH/DRAIN
- EXISTING DITCH RETAINED
- PROPOSED NEW SCRUB/GRASSLAND/OPEN MOSAIC HABITAT
- PROPOSED NEW SCRUB/WOODLAND
- EXISTING VEGETATION RETAINED
- PROPOSED ARTIFICIAL BADGER SETT (LOCATION NOT SHOWN)
- 1 MANAGEMENT COMPARTMENT AND NUMBER

REV	DATE	DESCRIPTION
DRAWING TITLE		
LEMP- Management Compartments (Rev A)		

SCALE	DRAWN
1:8264 @ A3	BC
DATE	CHECKED
JUL 2018	DW

LEMP FIG.1



APPENDIX E

Prepared by: **Jim Meadowcroft**

Date: **9th March 2018**

Project **Tilbury 2**

Ref: **2500**

For: **Port of Tilbury**

Page: **1 of 9**

Subject: **Recommended Width of Deciduous Planting to Achieve Visual Screening**

General

This technical note has been prepared in order to provide additional clarification in respect of the Landscape Strategy (ES Appendix 9.9 Document Reference AS-027) as it is secured in the Landscape and Ecological Management Plan (LEMP), as updated for Deadline 1 (Document Reference PoTLL/T2/EX/42).

The southern urban edge of Tilbury in this location comprises a mix of two storey residential property and the mainline railway. Deciduous trees and scrub line the railway on either side. This vegetation provides a modest degree of visual screening of the urban edge to views from the south of Tilbury, where the upper levels of housing tend to remain visible.

The rail-side vegetation also provides visual screening from the ground floor of housing at the southern margins of Tilbury, specifically London Road, Elizabeth Close, Edinburgh Mews, The Beeches and Bown Close. First floor views from these properties are often much more extensive, occurring through and over gaps in the rail side vegetation to passing trains, Tilbury Marshes, Tilbury Fort and Gravesend.

Closer to the Fort Road railway bridge, tall conifer trees predominate and completely screen views in either direction. Scattered scrub elsewhere within the Tilbury Marshes adds to this effect, which is recorded in the submitted LVIA (Appendix 9.C, viewpoints 13A and 56). Urban development further to the west, including two storey housing within Tilbury and the lower levels of development within the Port of Tilbury, is screened by a combination of tall fencing, hedging and vegetated bunds.

Proposed Development and Landscape Mitigation

The infrastructure corridor will create a new southern urban edge to Tilbury. In the absence of mitigation the route, including its road and rail traffic, will be visible to a wide range of visual receptors including occupiers of residential property in Tilbury, users of roads and public rights of way and visitors to the area including Tilbury Fort. The corridor would also affect the landscape character of the Tilbury Marshes and the contribution it makes to the setting of Tilbury Fort.

In order to reduce the landscape and visual impact of the corridor as well as the existing urban edge, the recommended landscape mitigation that forms part of the LEMP introduces a mix of native tree and scrub and shrub planting. The planting width and species mix will vary according to location and will meet the following criteria:

- provide visual screening of road traffic during the winter season;
- incorporate proposed ecological mitigation as defined in the Landscape Strategy and LEMP;

- reduce the visual impact of proposed acoustic barriers;
- screen the upper levels of road and rail traffic as viewed from residential property;
- be sympathetic to the landscape character of the Tilbury Marshes;
- reduce potential harm to the setting of Tilbury Fort;
- from the point of view of people using the corridor, screen detracting elements and provide an attractive and interesting travelling experience; and
- reduce the extent of urban development in view south of the route.

The proposed planting would also provide a measure of additional screening to views from residential property at the southern margins of Tilbury to other aspects of built development in the locality. These include the water treatment works and proposed container storage and warehousing within the main site.

The section of the corridor passing immediately north of Tilbury Fort is more open to views and has been assessed in the submitted LVIA as requiring the greatest width of planting mitigation. The landscape strategy in this location is to create a 30 metre deciduous margin south of the road, planted so as to achieve a transition from woodland to scrub, scrub grassland, an ecological mitigation ditch and a grazed marsh margin.

Proposed planting will reflect ecological mitigation requirements and will contain native species characteristic to the locality and of local provenance where these are available. The proposed species are listed in the Table below.

Table: Proposed Plant Species

Item	Species	English Name	Predicted height at maturity (m) ¹
1	<i>Acer campestre</i>	Field Maple	7
2	<i>Alnus glutinosa</i>	Common Alder	16
3	<i>Crataegus monogyna</i>	Hawthorn	8
4	<i>Cornus sanguinea</i>	Dogwood	2
5	<i>Hedera helix</i>	Common Ivy	n/a
6	<i>Ligustrum vulgare</i>	Privet	3
7	<i>Prunus spinosa</i>	Blackthorn	3
8	<i>Rosa canina</i>	Dog Rose	3
9	<i>Rubus fruticosus</i>	Bramble	2
10	<i>Salix caprea</i>	Goat Willow	8
11	<i>Salix cinerea</i>	Grey Sallow	8
12	<i>Salix fragilis</i>	Crack Willow	14
13	<i>Sambucus nigra</i>	Elder	4

In selecting primarily deciduous species it is recognised that a significant depth of vegetation is required to achieve all year-round visual screening. The sole evergreen component is ivy, selected as a climber to conceal acoustic screen fencing from views from residential property, and which will have no effect on its noise attenuation properties. Bramble would also be used to provide additional screening and similarly would have no effect on noise attenuation. Both of these plants will provide food for wildlife. The

¹ Predicted heights based on recorded heights of existing vegetation within the Tilbury 2 site or minimum mature heights defined by the Royal Horticultural Society.

remaining plants include some relatively fast growing species as well as others which have a dense branching habit, such as hawthorn. To assess the depth requirement a number of assumptions have to be made, these are outlined below.

Depth of Planting

General

To achieve a visual screen of proposed development the following considerations apply:

1. Height of screening required and rates of growth.
2. The growing conditions.
3. The form, density and habit of proposed planting over time.
4. Management and long-term aftercare.

Visual screening requirements range from the minimum i.e. capable of providing substantive screening of the infrastructure corridor and associated road and rail traffic during the winter period; to the maximum- namely the entirety of proposed development and any significant existing detracting visual elements.

Height of Screening Required and Rates of Growth

Available views towards the infrastructure corridor from locations within Tilbury and the Tilbury Marshes would be from broadly similar elevations to the proposed road and rail traffic.

The highest-level views are also the most distant, associated with Gravesend at approximately 2.0-3.0 km distance. At this distance and height, views take in much of the wider context of Tilbury and adjoining development as well as the landscape beyond. The proposed infrastructure corridor would represent a relatively minor component of the view. Consequently, attention has been focussed on mitigating visual amenity in closer proximity, circa 1.0km from the corridor.

The effect on views is illustrated on the attached cross section. The section is taken broadly north-south from residential property in London Road, through the infrastructure corridor, Tilbury Marshes, Tilbury Fort and the Thames riverside. It more closely defines the broad parameters of screening associated with the landscape strategy.

From the perspective of residential occupiers, available views from first floor level would, following construction completion, be through or over mainline railway vegetation to the upper levels of roadside lighting, taller road vehicles and rail traffic above acoustic fencing. Other elements such as ditches and new planting, north of the proposed rail cord, may also be visible to a greater or lesser extent.

As proposed planting establishes the acoustic fencing would be obscured by proposed ivy and bramble growth and this in turn by intervening proposed woodland and scrub planting. By the time the planting reaches approximately 6 metres high it will begin to screen or filter residual views of traffic and highway lighting. Full screening during the growing season would be achieved once the planting reaches 7.5 metres high, with heavily filtered or substantively screened views during the winter period depending on the presence or absence of the existing rail side vegetation.

Mitigation planting south of the corridor reflects a graduated approach from reed fringed grazing marsh ditch to grassland/scrub, leading to scrub and then woodland and a roadside hedge. The planting design in this location combines substantive winter screening with ecological mitigation and reflects a sympathetic approach to the landscape character of the Tilbury Marshes.

Substantive winter screening of the corridor and the existing urban context beyond would occur within approximately 28 years of planting, assuming a very conservative average growth rate of 0.25m per

annum and planting approximately 0.5m high at time of planting. Faster growth rates are more likely to occur however and a significant level of screening should be achieved 5-10 years after planting.

The speed at which screening will occur is defined by the size of plants at the time of planting and their respective growth habits. Whilst larger, more mature plants will achieve a more significant visual effect sooner at an early stage, it is a less suitable approach in purely horticultural terms. Younger plants establish more rapidly and require less support infrastructure than the equivalent mature or semi-mature specimens. Consequently, it is anticipated that proposed planting will be mainly comprised of smaller nursery stock (typically 45-120cm height) with larger specimens mainly reserved for other areas where specific amenity or maintenance considerations are identified.

Growing Conditions

At present little is known about existing soil profiles within the infrastructure corridor, their physical characteristics and groundwater quality and levels². That said, field survey has identified a wide range of deciduous and coniferous tree and scrub species growing within the site and adjoining land. As such, it is reasonable to assume that the growing conditions will be suitable for the proposed species.

Form, Density and Habit over Time

The plant species selection described above takes into account the need to incorporate densely branched species that retain this characteristic into maturity, such as hawthorn and blackthorn.

Management and Long-Term Aftercare

Proposed management and aftercare will reflect combined landscape and ecological functions as described in the LEMP (ES Appendix 10.P, clause 4.34), namely to develop habitat and retain screening within the constraints imposed by the former. This will include the removal of tree guards after establishment.

² T2 EIA Chapter 16.0: Water Resources and Flood Risk

Examples

The effectiveness of a 30m depth of deciduous planting can perhaps be best judged by example. The photographs below demonstrate the winter screening effects of mature tree planting at these depths. For comparison a 5.0m wide tree belt is shown first.

1. 5 metre wide tree belt. Original planting approximately 1.0m centres, wide mix of species, becoming narrow in form due to overcrowding. Housing beyond and the sky clearly visible.



2. Mature tree belt, 30 metres wide and containing a high proportion of crack willow. Some thinning and pollarding evident. A reasonably high level of screening has been achieved though the sky remains visible and (upon closer inspection) the outlines of a large building beyond. Ivy growth contributes to the screening effect.



3. Mature tree belt on a bund, 30 metres wide, containing a broad mix of species including the occasional isolated conifer. Planting density approximately 2.0m centres, no thinning observed. This achieves a substantive screen above the bund. Heavily filtered views of a large industrial building beyond.



4. Mature tree belt, 30 metres depth with an edge shrub layer (predominantly dogwood). Wide mix of species on sloping ground where thinning has taken place. The scrub layer provides a good measure of lower level screening. The thinned tree belt permits filtered views beyond.



Conclusions

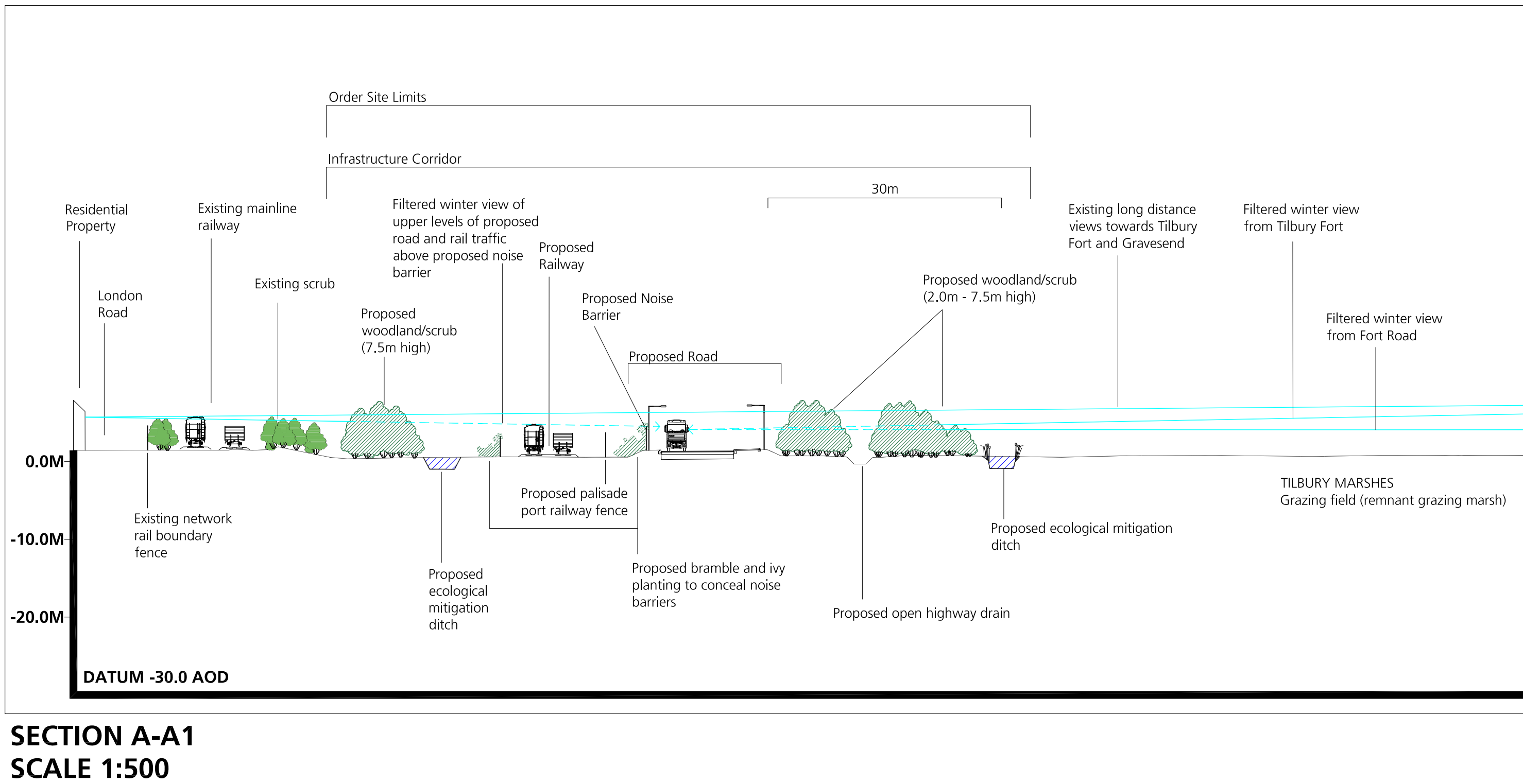
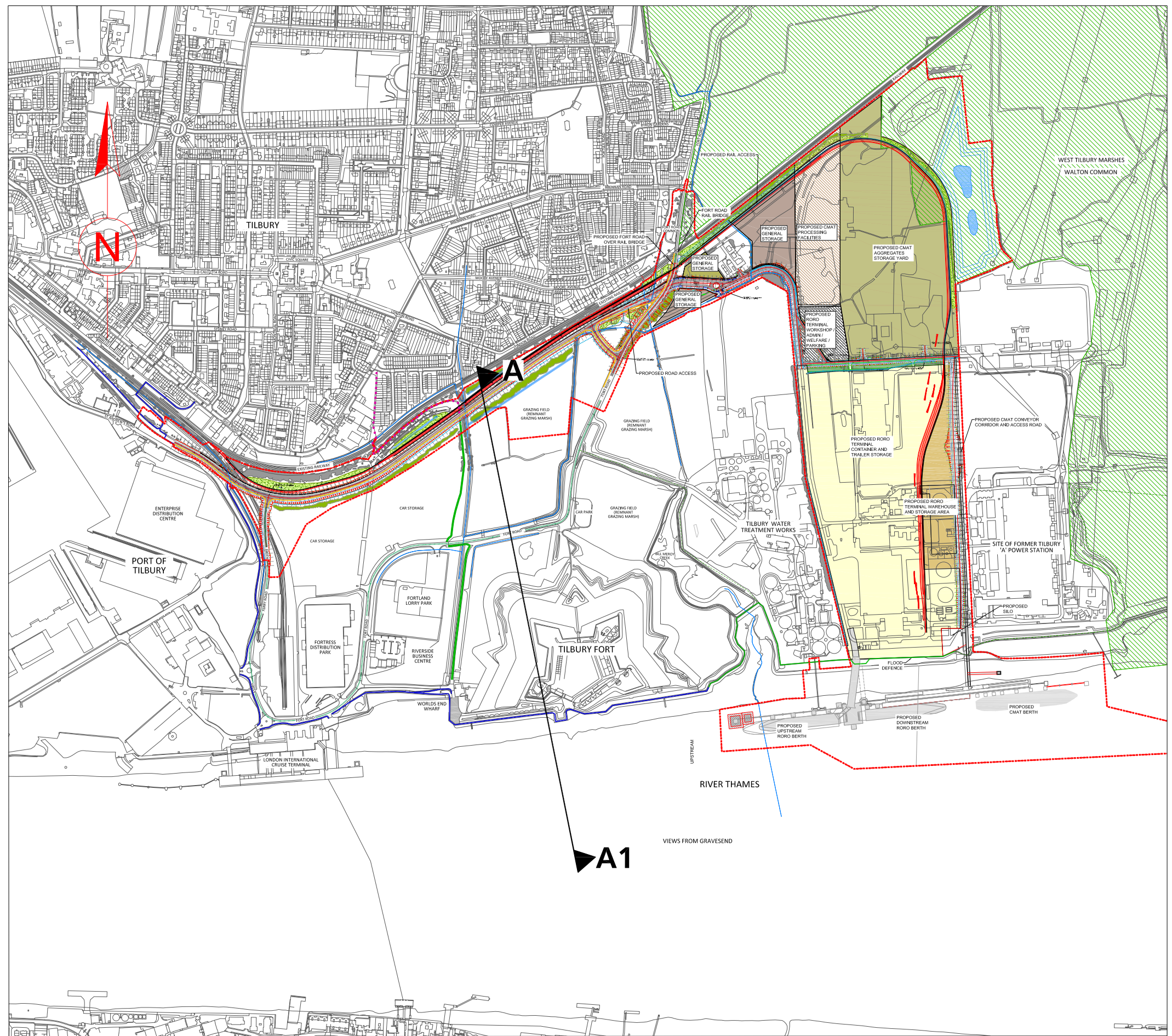
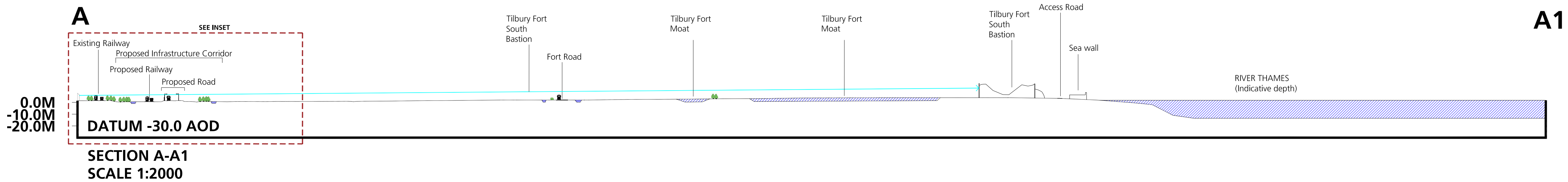
A 30-metre depth of deciduous tree and scrub planting will be capable of providing a substantive visual screen to lighting and road and rail traffic using the infrastructure corridor. Examples of representative views are presented at ES Appendix 9.5 (viewpoints 56 and 62).

The screening effect has been assessed during the winter period, reflecting the 'worst case' and making due allowance for planting sizes, growth rates and local conditions, supported by examples and cross section analysis. Full screening would be achieved during the growing season.

The level of screening recommended is considered necessary and appropriate to meet the relevant criteria described above.

0
10
20
30
40
50
60
70
80
90
m

KEY
VIEW LINE 4.5M
(FROM FIRST FLOOR)



REV | DATE | DESCRIPTION
DRAWING TITLE
Visibility from London Road

SCALE
1:2000 @ A1
DATE
FEB 2018

DRAWN
JL
CHECKED
JM

DRAWING N°
FIGURE 9.10

TILBURY2

