



LV21 Vessel Gravesend

**Intertidal Phase 1 Biotope
Survey and Environment
Impact Assessment**

For

Gravesham Borough Council

Project No.: GRA004-002

October 2024

London & South East

Compass House
Surrey Research Park
Guildford
GU2 7AG . UK
t: +44 (0)1483 466 000

North East

Unit 4
Carrwood Park
Leeds
West Yorkshire
LS15 4LG. UK
t: +44 (0)113 247 3780

North West

Kennedy House
31 Stamford St
Ground Floor
Altrincham
Greater Manchester
WA14 4DZ
t: +44 (0)161 676 1160

Wales & South West

Sophia House
28 Cathedral Road
Cardiff
CF11 9LJ UK
t: +44 (0) 2920 660180

Midlands

605 Holly Court, Holly Farm Business Park
Honiley, Kenilworth
Warwickshire
CV8 1NP
t: +44 (0) 121 726 3494

Enquiries

e: enquiries@thomsonec.com

w: www.thomsonec.com



Project Number	Report No.
GRA004-002	001

Revision No.	Date of Issue	Author	Reviewer	Approver
001	18/10/2024	Isabella Kelsey	Dale Irvine	Tessa Harding
002	25/10/2024	Isabella Kelsey	Tessa Harding	Tessa Harding

Disclaimer:

Copyright Thomson Environmental Consultants Limited. All rights reserved.

No part of this report may be copied or reproduced by any means without prior written permission from Thomson Environmental Consultants Limited. If you have received this report in error, please destroy all copies in your possession or control and notify Thomson Environmental Consultants Limited.

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed in writing by Thomson Environmental Consultants Limited, no other party may use, make use of or rely on the contents of the report. No liability is accepted by Thomson Environmental Consultants Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the report are on the basis of Thomson Environmental Consultants Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as to their accuracy. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to Thomson Environmental Consultants Limited has been made.

Contents

Tables and Figures	5
Summary	6
2. Introduction	11
2.1 Development Background	11
2.2 The Brief and Objectives	11
2.3 Limitations	12
2.4 Surveyors	12
3. Methodology	13
3.1 Desk study	13
3.2 Intertidal Phase 1	13
3.3 UKHab Survey	15
3.4 Biodiversity Metric 4.0	16
4. Results	17
4.1 Desk Study	17
4.2 Field Survey Site description	42
4.4. Intertidal Phase 1	43
4.3 UKHab Survey / Condition assessments	47
4.4 Habitat condition assessment	47
4.5 Annex 1 habitats	47
4.6 Incidental Fauna Records	48
4.7 Invasive & Non-native Species	48
5. Legislation and Planning Policy Considerations	49
5.1 Background	49
5.2 Designated Sites	49
5.3 Priority Habitats	51
5.4 Protected Species	52
5.5 Species of conservation concern	52
5.6 Invasive non-native species	53

6. Ecological Constraints	54
6.1 Designated sites	54
6.2 Priority habitats	54
6.3 Protected species	54
6.4 Invasive and non-native species	56
7. Conclusions and Recommendations	57
7.1 Conclusions	57
7.2 Recommendations	57
8. References	59
Appendix 1: Environment Agency Benthic Invertebrate Data	60

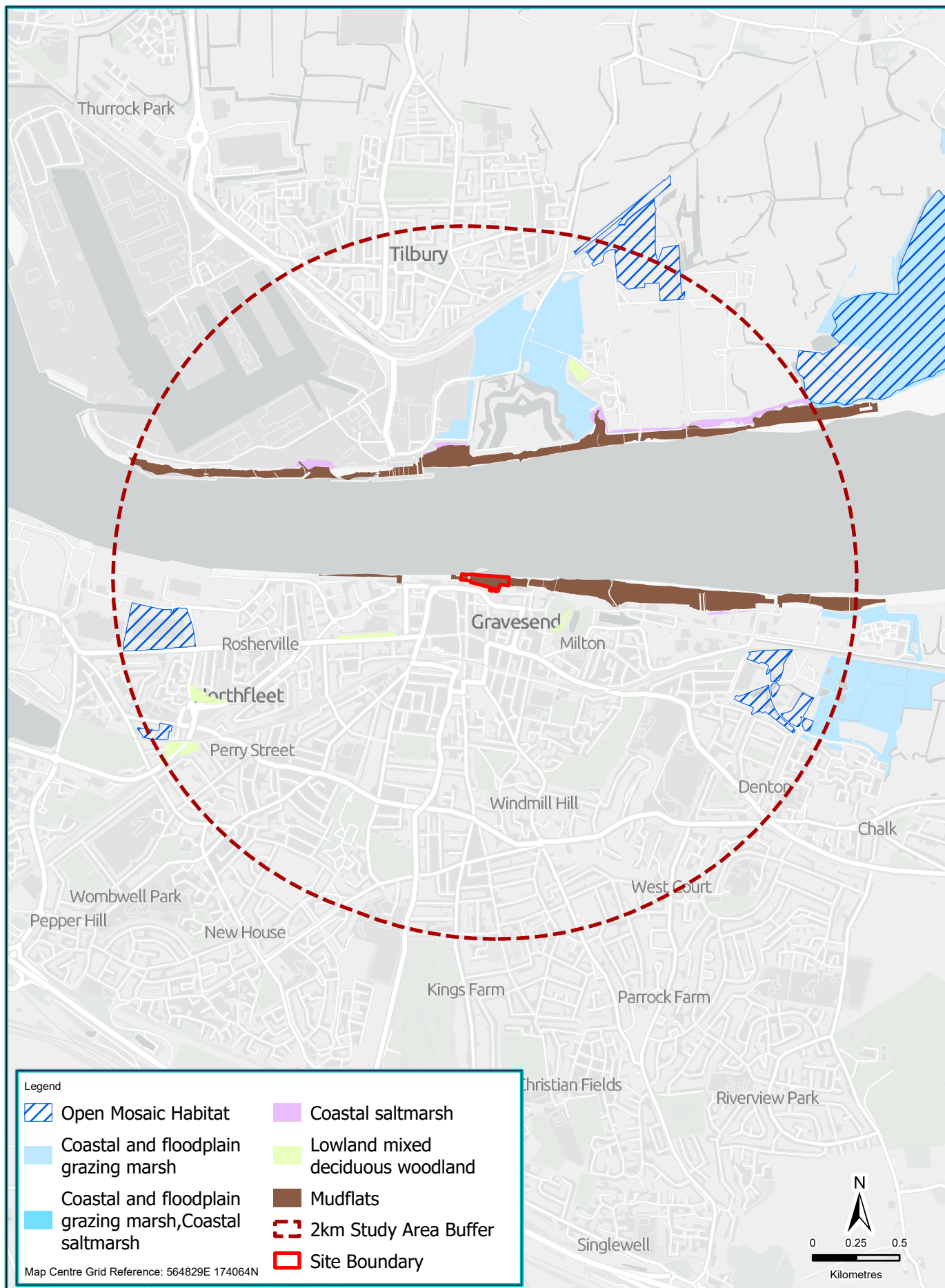
Tables and Figures

Table 1: Survey meta-data	16
Table 2: Designated sites	17
Table 3: Priority Habitat within 2km of the site	18
Table 4: Species records derived from the desk study	21
Table 6: Invasive non-native species	41
Table 7: Biotopes identified in the survey area	46
Table 8: Habitat biodiversity metrics	47
Table 9: Incidental species sightings	48
Figure 1: Site Location, study area and desk study results.	7
Figure 2: Intertidal Phase 1 Biotope Survey Results.	8
Figure 3: Target note photographs	9
Figure 4: Photographs of the site	10

Summary

- 1.1.1** Icen on behalf of their client Gravesham Borough Council commissioned Thomson Environmental Consultants to carry out an Intertidal Phase 1 survey, desk study and Ecological Impact Assessment. The survey follows the EUNIS JNCC biotope and UK Habitat Classification methodology, and covers the environments surrounding the Light Vessel 21 (LV21) at Gravesend. LV21 is located on the riverfront north bank of the River Thames, London (TQ 64857 74445, Figure 1).
- 1.1.2** The term "biotope" refers to a specific environment that supports a particular community of organisms. Two biotopes were identified and mapped during the Phase 1 walkover survey, namely "Littoral mud" and "Littoral mixed sediments". These biotopes are mapped in Figure 2.
- 1.1.3** Annex I habitats and sub-features are classifications defined by the European Union's Habitats Directive, which aims to protect biodiversity across Europe. Annex I Habitats are natural habitats that are considered to be of European importance due to their rarity, vulnerability, or ecological significance. Annex I Sub-features are specific components or variations of the broader Annex I habitats. They recognise distinct ecological characteristics within a habitat type that may also require targeted conservation measures. The annex 1 habitat "Mudflats and Sandflats not covered by seawater at low tide" and the annex 1 sub feature "Intertidal mixed sediment" were found on site. Neither of the examples of these habitats qualify for specific legal protection, these intertidal sediments have a widespread distribution around the UK and are frequently found in estuaries.
- 1.1.4** There are two sites with a statutory designation within 2km of the site; The South Thames Estuary and Marshes SSSI and Thames Estuary and Marshes Ramsar site. There is one non-statutory designated site known as Canal And Grazing Marsh, Higham Local Wildlife Site less than 1km from the site.
- 1.1.5** The desk study returned records of 30 protected species and 129 species of conservation concern within the 2km search area.
- 1.1.6** The site is situated within a priority habitat 'mudflats'; However the change in land use does not propose any dredging activities or impact pathways thus 'mudflats' will not be impacted by the works.
- 1.1.7** Nine Invasive Non- Native Species (INNS) were identified within 2km of the site. Species recorded include Japanese Knotweed, Japanese Rose, Tree-of-heaven, Virginia-creeper, Chinese Mitten Crab, Western Conifer Seed Bug, Western Conifer Seed Bug, Wall Lizard. No INNS were identified during the survey, however the non-native barnacle *Austorminius modestus* was recorded during the walk-over survey.
- 1.1.8** The site is currently subject to high levels of disturbance from the surrounding anthropogenic activities and the birds foraging there are therefore considered to have a high tolerance to disturbance.
- 1.1.9** The change in land use to ensure permanent mooring of the LV21 vessel will not result in any temporary or permanent disturbance during the bird nesting season (February to August).
- 1.1.10** The permanent mooring of the LV21 Vessel is not likely to result in temporary or permanent impacts on any protected species.

Filepath: S:\Live Projects\Water Ecology\GRA004-002_1 - LV21 Vessel Gravesend - EclA6 - Mapping\Working\GRA004_002_ReportFigures_ET_211024.aprx
Contains Ordnance Survey data © Crown copyright and database right 2024. This map must not be copied or reproduced by any means without prior written permission from Thomson Environmental Consultants.



Client	Gravesham Borough Council		Drawing Ref	GRA004_002/406403/1	
Figure Number	1		Scale at A4	1:30,000	
Figure Title	Site Location, Study Area and Desk Study Results		Drawn	ET	Checked
			Date	24/10/2024	JB
			Date	24/10/2024	



- Legend
- Biotope
- A2.3 - Littoral mud
 - A2.4 - Littoral mixed sediments
 - Survey Extent

Map Centre Grid Reference: 564867E 174458N

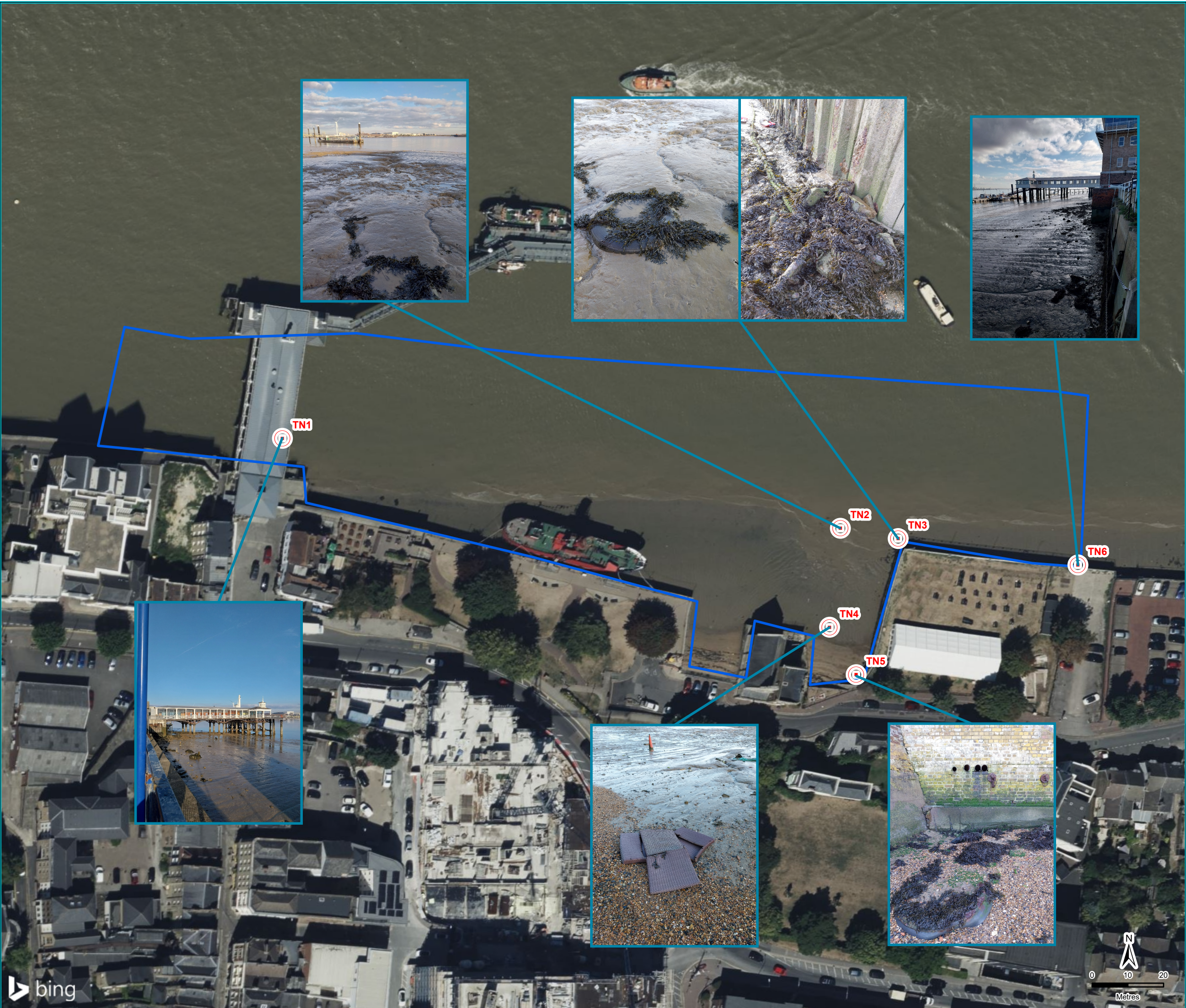
Contains Ordnance Survey data
© Crown copyright and database right 2024.

This map must not be copied or reproduced by any means
without prior written permission from Thomson Environmental
Consultants.

Drawing Ref		GRA004-002/406359/1	
Scale at A3		1:1,000	
Drawn	ET	Checked	JB
Date	24/10/2024	Date	24/10/2024
Client			
Gravesham Borough Council			
Figure Number		2	
Figure Title			

Intertidal Phase 1
Biotope Survey Results

Filepath: S:\Live Projects\Water Ecology\GRA004-002_1 - LV21 Vessel Gravesend - Ec\A\6 - Mapping\Working\GRA004_002_Report\Figures_ET_211024.aprx



- Legend
- Target Note
- Survey Extent

Map Centre Grid Reference: 564867E 174458N

Contains Ordnance Survey data
© Crown copyright and database right 2024.

This map must not be copied or reproduced by any means
without prior written permission from Thomson Environmental
Consultants.

Drawing Ref		GRA004-002/406360/1	
Scale at A3		1:1,000	
Drawn	ET	Checked	JB
Date	24/10/2024	Date	24/10/2024
Client			
Gravesham Borough Council			
Figure Number		3	
Figure Title			

Target Note
Photographs



Photograph 1: Littoral mud (LS.LMu), East of the site.



Photograph 2: *F. vesiculosus* on variable salinity mid eu littoral boulders and stable mixed substrata.



Photograph 3: Littoral mud (LS.LMu), East of the site.



Photograph 4: Littoral mixed sediment (LS.LMx), small bay near Gravesham Arts.



Photograph 5: Littoral mixed sediment (LS.LMx) A2.4.



Photograph 6: Littoral mud (LS.LMu), West of the site.



Photograph 7: Species noted on site
Barnacles *Austrominius modestus*.



Photograph 8: Species noted on site
Shore crab *Carcinus maenas*.

Client	Gravesham Borough Council		Drawing Ref	GRA004-002-001	
Figure Number	Figure 4		Drawn	IK	Checked
Figure Title	Photographs of the Site				DI
			Date	15/10/2024	



www.thomsonec.com
enquiries@thomsonec.com

2. Introduction

2.1 Development Background

2.1.1 Gravesham Borough Council has proposed a change in land use for the Light Vessel 21 (LV21) vessel on the riverfront of the north of St. Andrews Gardens, located within the intertidal zone of the River Thames (TQ648744).

2.1.2 The proposed development comprises of:

- Change of use of river to Use Class F1- Learning and non-residential institutions to facilitate the permanent mooring of a vessel.
- The application comprises the land adjacent to the St. Andrews Gardens, extending 31.8m north from the parks pedestrian walkway in the east and 14.6m north from the west. The proposed development site boundary runs east to west 78.6m in the north and 78.4m in the south.
- The LV21 vessel will remain moored in its current location but permission for use of the 'land' indicated on the site block plan would allow flexibility in the future should the vessel need to be moved or to facilitate an additional vessel without the need for obtaining further planning permissions.

2.1.3 The site and LV21 vessel is located on the River Thames, on the riverfront to the north of St. Andrews Gardens. Built in 1963, the Light Vessel 21 is a 40 metre long, 8 metre wide, steel-hulled red lightship. We understand it has been moored in its current position ('the site') since 2017. LV21 was retired from service in 2008. The 'green space' of St. Andrews Gardens is a formal open space.

2.1.4 The riverside adjacent to where the vessel is proposed to be docked is a Conservation Area. There are a number of listed buildings in close proximity to the site including the Town Pier (Grade II* to the west, the Royal Pier to the east (Grade II), the Three Daws Public House, St Andrew's Arts Centre and The Mission House (all Grade II). There is also a scheduled ancient monument to the east (Gravesend Blockhouse).

2.2 The Brief and Objectives

2.2.1 Thomson Environmental Consultants (TEC) was commissioned by Iceni on behalf of their client Gravesham Borough Council in September 2024 to undertake an environmental study to support the change in land use of the LV21 Vessel. TEC are providing the below deliverables to support the work proposals:

- Phase 1 Walk-over survey report
- Ecological desk study
- Ecological Impact Assessment (EclA) screening

2.2.2 Iceni have also requested on behalf of their client Gravesham Borough Council support on a WFD (Water Framework Directive) and Marine license assents, which will be provided in a separate brief.

2.2.3 The brief for this report was to:

- Carry out an intertidal Phase 1 walk-over survey of the site, recording the biotopes present;
- Assess for the presence of EU Habitats Directive Annex I listed habitats or other protected / sensitive habitats and species;
- Carry out a desk study in conjunction with the ecological survey to identify any protected species records and the location of protected sites within a 2km radius of the site.
- Produce a combined report of the survey and desk study findings. The report will include an introduction, methodology, results, a brief discussion of relevant legal and planning policy issues and our recommendations as to how these might be overcome, including recommendations for further survey and/or mitigation if required, and;
- Produce appropriate digitised mapping of the survey results.

2.3 Limitations

2.3.1 The species data collated during the desk study is mainly derived from records submitted by members of the public and ad hoc surveys undertaken by volunteers. Therefore, it should not be taken as a definitive list of the protected species and other species of conservation concern that occur in the local area.

2.3.2 The limitations encountered during this survey were primarily attributed to the presence of deep mud preventing access to some areas of the site, which hindered comprehensive data collection. The foreshore at the eastern end of the site could not be directly accessed, as well as the western extent of the site. Due to these factors, assessments were conducted from hard standing above the biotope and conditions assessed from this vantage point.

2.4 Surveyors

2.4.1 The survey was carried out by Marine Biologist Isabella Kelsey BSc (Hons) QIMarEst MBA and Assistant Marine Biologist James Cook on the 4th October 2024.

3. Methodology

3.1 Desk study

3.1.1 The survey area extent was defined as the intertidal zone, from MHWS to MLWS and extending from 100m west to 100m east of the planning application boundary, approximately 120m to either side of LV21, see Figure 2. Records of designated sites and for important & protected species were subsequently sought for the whole study area within 2 km.

3.1.2 Sources of information were as follows:

- The Multi-Agency Geographical Information for the Countryside (MAGIC);
- Kent and Medway Biological Records Centre (KMBRC).

3.1.3 Requests for information were sent to the 26th September 2024.

3.1.4 Results were filtered to include only those relevant to the study area and only those recorded in the last ten years.

3.2 Intertidal Phase 1

3.2.1 Prior to the survey, aerial imagery was used to identify possible biotope boundaries and to familiarise the surveyors with the area, ensuring that the survey could be conducted in a safe and time efficient manner.

3.2.2 Intertidal Phase 1 surveys should be conducted between April and October, as this is the period with the most faunal and floral growth on the shoreline. The survey should from mean high water spring to mean low water spring tide level. The survey was carried out on the 4th of October 2024, and therefore within this optimal period. Low tide (time zone GMT) was at 08:50 (1m), the following high tide was at 14:47 (6.5m).

3.2.3 Conducting the survey over spring tides ensures that the greatest extent of the intertidal area possible is exposed during low tide periods, thus maximising the area visible for mapping.

3.2.4 The terrestrial Handbook for Intertidal Phase 1 habitat survey (JNCC, 1993) only has broad categories for the intertidal area, which are inadequate to map the full range of intertidal habitats. Therefore, the marine intertidal survey methodology described by Wyn *et al.* (2000) was adopted, to give a greater level of detail than if a solely terrestrial methodology was used. However, identification of soft sediment biotopes was inherently limited by the Intertidal Phase 1 style of the survey, as this does not allow for the production of comprehensive species lists. Full characterisation of soft sediments requires a Intertidal Phase 2 level survey, which involves the collection of quantitative core samples and subsequent laboratory processing to identify all infaunal species and for granulometric analysis. Therefore to gain an understanding of the habitats present along the site, an Intertidal Phase 1 Walk-over approach to assess impacts on habitats, species present and inform any mitigation required as a result of the works.

3.2.5 The survey methodology followed guidelines set out in the Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey (Wyn *et al.*, 2000) for surveying rocky and sediment shores from the splash zone down to the lower shore. The basic recording unit is the biotope from the EUNIS habitat classification and Marine Habitat Classification for Britain and Ireland (EUNIS, 2019;

Connor *et al.*, 2004). A biotope is defined as the combination of abiotic physical characteristics of a habitat (e.g. substratum, wave exposure) and its associated biological community of species. Abiotic characteristics of an environment include physical and chemical properties, such as sediment type, hydrodynamic regime, turbidity, dissolved oxygen and salinity. In the marine environment, there is a strong relationship between the abiotic characteristics of habitats and the biological composition of the communities which they support (Conner *et al.*, 2004).

3.2.6 Biotopes were cross referenced to the classification of habitat types according to Annex I Directive 92/43/EEC (EC, 2013) to identify any potential Annex I habitats present.

3.2.7 The extent of each biotope was mapped using ArcGIS Field Maps on a smartphone by walking the boundaries of the biotopes. Photos were taken of each biotope (Figure 4) and recorded in Field Maps.

Any dominant or noteworthy species were recorded as a Target Note (TN), as were any notable features and incidental habitat patches of <5x5m (the minimum size of a biotope). Target notes are presented in

3.2.8 Figure 3.

3.2.9 Periodic digging was carried out to determine the biotopes present, with sediment sieving to aid identification. In mud areas with high mud content, sediment was spread out on the surface and inspected for conspicuous fauna. Observed fauna were identified to the lowest level possible in the field and returned to their original location along with any sieved sediment.

3.2.10 During the survey, Condition Assessments were made to allow for Biodiversity Net Gain (BNG) calculations to be made following Natural England Biodiversity Net Gain Metric 4.0 methodology.

3.3 UKHab Survey

3.3.1 The Phase 1 survey was supplemented by an additional method; the UK Habitat Classification system (UKHab) (Butcher *et al.*, 2020). This is a nationally recognised habitat classification system that is compatible with the DEFRA Biodiversity Metric for calculating biodiversity net gain values (Panks *et al.*, 2022a).

3.3.2 The UKHab has five hierarchical levels and includes the identification of priority habitats (Habitats of Principal Importance listed under the Natural Environment and Rural Communities Act 2006) and Annex I habitats as listed under the European Habitats Directive. The five levels are:

- Level 1 - Biomes/major ecosystems (terrestrial, freshwater and coastal);
- Level 2 - Ecosystem types (i.e. woodland, grassland, heathland and scrub);
- Level 3 - Broad Habitats, based on those of the UK Biodiversity Action Plan (UKBAP);
- Level 4 - Habitats, including 47 priority habitats; and
- Level 5 - Habitats, including Annex I habitats.

3.3.3 In addition, non-hierarchical secondary codes were used to provide supplementary information. These included mandatory codes for habitat mosaics/complexes, priority and Annex I habitats that occur in multiple primary habitats and habitat origins (codes 10 - 41), plus any additional relevant secondary codes.

3.3.4 Table 1 below shows the meta-data used for this survey.

Table 1: Survey meta-data

Scope and purpose of the survey	Ecological Impact Assessment (EclA)
Area surveyed	Figure 2
Edition of UKHab used	UKHab-Professional
Minimum Mapping Unit (MMU)	25m ² for areas, 5m for linear features
Level of UKHab Primary Hierarchy used	Level 5, where possible
List of Secondary Code groups recorded	All secondary codes
Additional attributes recorded	Habitat condition assessment
Map projection and units	Figure 2
Date of survey	4 th October 2024
Organisation and individual undertaking the survey	Thomson Environmental Consultants, Isabella Kelsey and James Cook
References for any existing datasets that have been used	Kent and Medway Biological Records Centre

3.4 Biodiversity Metric 4.0

Condition Assessments

- 3.4.1** To enable the calculation of biodiversity units with the DEFRA Biodiversity Metric, an assessment of the condition of each habitat was made in accordance with The Biodiversity Metric 4.0: User Guide (Natural England, 2023a). The appropriate condition assessment sheets from Biodiversity Metric 4.0 - Technical Annex 1 - Condition Assessment Sheets and Methodology were used (Natural England, 2023b).
- 3.4.2** Certain habitats are allocated a fixed score and do not need their condition assessed, including u1b Developed land; sealed surface and u1e Built linear features.

4. Results

4.1 Desk Study

- 4.1.1 A response was received from Kent and Medway Biological Records Centre on the 15th October 2024.

Designated Sites

- 4.1.2 There are two sites with a statutory designation (e.g. Ramsar, Site of Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA)) within 2km of the site. The Thames Estuary and Marshes Ramsar site and the South Thames Estuary and Marshes SSSI. At a local level is the non-statutory designated site know as the Canal and grazing marsh, Higham Local Wildlife Site (GR17)]. The condition of the nearest SSSI habitat parcel (GR17) is classified as “Unfavourable no change” on the Magic Map Application (defra.gov.uk).
- 4.1.3 The development site lies within the non-statutory River Thames and tidal tributaries Site of Metropolitan Importance (SMINC) (M031).
- 4.1.4 Details of all designated sites within 2km of the site can be found in Table 2.

Table 2: Designated sites

Site Designation	Grid Reference	Area (ha)	Distance to Site (km)	Description
Statutory sites				
Thames Estuary and Marshes Ramsar Site	TQ790 778	5,289	2km	The site comprises a complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat along the River Thames between Gravesend and Sheerness in Essex and Kent. The habitats support internationally important numbers of wintering waterfowl, and the saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates. The site performs important hydrological functions, including shoreline stabilisation, sediment trapping, flood water storage and desynchronisation of flood peaks, and maintenance of water quality by removal of nutrients. Human uses include yachting, angling, wildfowling (seasonal), jet skiing, waterskiing, and birdwatching; disturbance from some of these is a current issue but is being
South Thames Estuary and Marshes SSSI				

Site Designation	Grid Reference	Area (ha)	Distance to Site (km)	Description
				addressed through negotiation and awareness-raising.
Sites of Importance for Nature Conservation (SINC)				
<i>Sites of Metropolitan Importance</i>				
River Thames and tidal tributaries (M031)	TQ302806	2312.73	0 (within site boundary)	The River Thames and the tidal sections of creeks and rivers which flow into it comprise a number of valuable habitats not found elsewhere in London. The mud-flats, shingle beach, inter-tidal vegetation, islands and river channel itself support many species from freshwater, estuarine and marine communities which are rare in London. The site is of particular importance for wildfowl and wading birds, fish, and invertebrate communities.

Ancient Woodland outside Designated Sites

- 4.1.5** No ancient woodlands occur within the site or within 2km of the site. The closest area of ancient woodland is Brummel Wood, 5km away. The habitat type is not considered further in the assessment.

Priority Habitats

- 4.1.6** A total of 29 parcels of priority habitat, comprising of three priority habitat types, occur within 2km of the site. The closest habitat type being mudflats, which is within the site. The priority habitats within 2km of the site are summarised in Table 3.

Table 3: Priority Habitat within 2km of the site

Priority Habitat Inventory	No. of Parcels	Distance to Site (km)
Mudflats (England)	25	Within site
Coastal Saltmarsh (England)	4	1 km
Coastal and Floodplain Grazing Marsh (England)	10	1.8 km

Protected and Otherwise Designated Species

- 4.1.7** The records of protected and priority species derived from the desk study are summarised in Table 4. These include UKBAP Notable and Locally Protected Species (LPS).
- 4.1.8** Records of 30 protected species and 129 species of conservation concern were identified during the desk study. Details of the species are given in Table 4. The records shown are those that have been submitted within the last ten years and are within the 2km study area. If multiple records for one species exist, then the nearest, most recent record has been given.
- 4.1.9** Records of three amphibians were returned in the desk study. Common frogs are protected as a Habitats Directive Annex 5 species which offers protection to animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures. The common toad is protected by law only from sale and trade but is a biodiversity priority species under the Natural Environment and Rural Communities (NERC) Act (2006) because of recent declines.
- 4.1.10** There were records of three protected fish species within 1km of the site, European eel, Common Goby and Sand Goby. Adult eels migrate through the middle and lower reaches of the Thames to reach the North Sea before migrating across the Atlantic to spawn in the Sargasso Sea. Juvenile eel migrate from the estuary into tributary streams. Eel is a priority species under Section 41 of the Natural Environment and Rural Communities Act and a Local Species of Conservation Concern. In the UK, the Common Goby (*Pomatoschistus microps*) and Sand Goby (*Pomatoschistus minutus*) are protected under the Wildlife and Countryside Act 1981 and the Marine and Coastal Access Act 2009. Further details of fish species recorded in the vicinity of the site are presented in **Error! Reference source not found.** below.
- 4.1.11** The desk study returned records for Slow-Worm (*Anguis fragilis*). This species is protected in the UK under the Wildlife and Countryside Act, 1981, and is a Species of community interest of the European Legislation. The WCA 1981 act gives protection under Section 9 and native species under threat and enhances the protection of SSSI.
- 4.1.12** 108 species of birds were recorded in the desk study from the last 10 years. These include nine species protected under Schedule 1 of the Wildlife and Countryside Act of which three were wading birds; Black-tailed Godwit (*Limosa limosa*), Common Scoter (*Melanitta nigra*), and Little Ringed Plover (*Charadrius dubius*). A further three species are birds of prey (Marsh Harrier (*Circus aeruginosus*), Peregrine (*Falco peregrinus*), and Red Kite (*Milvus milvus*)). From the Phase 1 survey for this project there was an incidental sighting of a Little Egret within the site boundary. These birds are listed under Birds Directive Annex 1 which means that the individuals and their habitat are protected to halt the decline in their numbers.
- 4.1.13** Seven marine mammal species have been recorded at Gravesend including Common Porpoise (*Phocoena phocoena*), Grey Seal (*Halichoerus grypus*), Harbour Seal (*Phoca vitulina*), and Minke Whale (*Balaenoptera acutorostrata*). All of the recorded marine mammal species are protected under the Wildlife and Countryside Act 1981. All pinniped species are to be included in Schedule 5 of the Wildlife and Countryside Act 1981 (WCA 1981), and all offences under section 9 WCA 1981 to be applicable to all cetacean and pinniped species. Additionally the Conservation of Habitats and Species Regulations 2017, Marine (Scotland) Act 2010, Marine and Coastal Access Act 2009 also protect all marine mammals. Both Grey Seal and Harbour Seal are protected by the Conservation of Seal Act 1970, and records were noted less than 1km from the site which may mean that they utilise this stretch of River Thames to forage.

- 4.1.14** Terrestrial mammal records include five species of bat; Noctule Bat, Nathusius' Pipistrelle Bat, Pipistrelle Bat (45kHz), Pipistrelle Bat (55kHz) and Long-Eared Bat Grey. All bat species in the UK are listed under Habitats Directive Annex 4, which means that populations and their roosts are legally protected.
- 4.1.15** There are 2 records of plants returned in the desk study. In the UK, both Jersey Cudweed (*Filago conyzae*) and Pyramidal Orchid (*Anacamptis pyramidalis*) are protected under the Wildlife and Countryside Act 1981 and Conservation of Habitats and Species Regulations 2017.
- 4.1.16** One species of Chromista was recorded on site, Bladder Wrack (*Fucus vesiculosus*), which is a large brown algae that is found in intertidal areas around UK and is provides shelter and substratum for tubeworms, and surface grazing snails. It is categorised as least risk on the IUCN Red List of Threatened Species.
- 4.1.17** There are two records of invertebrates collected from the desk study search. One of these species, Jersey Tiger moth (*Uplagia quadripunctaria*) is listed under the Habitats and Species Directive Annex 2, which identifies animal and plant species of community interest whose conservation requires the designation of special areas of conservation (SAC). However, the species occurs in insufficient numbers in Kent to qualify for designation as an SAC.

Table 4: Species records derived from the desk study

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
Amphibians						
<i>Rana temporaria</i>	Common Frog	2	2017	TQ6541072957	Wildlife and Countryside Act 1981	KMBRC
<i>Bufo bufo</i>	Common Toad	3	2017	TQ6541072957	Wildlife and Countryside Act 1981	KMBRC
<i>Lissotriton vulgaris</i>	Smooth Newt	26	2020	TQ6473773077	Wildlife and Countryside Act 1981	KMBRC
Fish						
<i>Gadus morhua</i>	Atlantic Cod	3	2017	Denton Wharf	W&CA 1981, The Conservation of Habitats and Species Regulations 2017	KMBRC
<i>Pomatoschistus microps</i>	Common Goby	14	2017	TQ6664674338	W&CA 1981, CoH&SO 2017	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Anguilla anguilla</i>	European Eel	2	2014	TQ6664674338	W&CA 1981, CoH&SO 2017	KMBRC
<i>Pomatoschistus minutus</i>	Sand Goby	20	2017	TQ6664674338	W&CA 1981, CoH&SO 2017	KMBRC
Reptiles						
<i>Anguis fragilis</i>	Slow-Worm	43	2017	TQ63407346	W&CA 1981	KMBRC
Birds						
<i>Sterna paradisaea</i>	Arctic Tern	16	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1	KMBRC
<i>Recurvirostra avosetta</i>	Avocet	69	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1; KRDB3; WCA1	KMBRC
<i>Panurus biarmicus</i>	Bearded Tit	3	2015	Gravesend (TQ6474)	Berne:A2; BoCC5:Green; KRDB3; WCA1	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Cygnus atratus</i>	Black Swan	77	2016	Gravesend (TQ6474)	Non-Native Species, W&CA 1981	
<i>Chlidonias niger</i>	Black Tern	13	2018	Gravesend (TQ6474)	Berne:A2; Bonn:A2; BirdsDir:A1; WCA1	KMBRC
<i>Turdus merula</i>	Blackbird	94	2019	Gravesend (TQ6474)	Berne:A3; BirdsDir:A2.2	KMBRC
<i>Sylvia atricapilla</i>	Blackcap	106	2019	Gravesend (TQ6474)	Berne:A2	KMBRC
<i>Larus ridibundus</i>	Black-headed Gull	109	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; BirdsDir:A2.2	KMBRC
<i>Podiceps nigricollis</i>	Black-necked Grebe	1	2014	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; KRDB1; WCA1	KMBRC
<i>Limosa limosa</i>	Black-tailed Godwit	156	2019	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; Bonn:A2; BirdsDir:A2.2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					KRDB1; S41; WCA1	
<i>Parus caeruleus</i>	Blue Tit	62	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green (subsp. Amber)	KMBRC
<i>Pyrrhula pyrrhula</i>	Bullfinch	5	01/06/1989	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Amber; S41	KMBRC
<i>Branta canadensis</i>	Canada Goose	52	2019	Gravesend (TQ6474)	Berne:A3; Bonn:A2; BirdsDir:A2.1	KMBRC
<i>Corvis corone corone</i>	Carrion Crow	85	2019	Gravesend (TQ6474)	BirdsDir:A2.2	KMBRC
<i>Cettia cetti</i>	Cetti's Warbler	6	2013	Gravesend (TQ6474)	Berne:A2; KRDB3; WCA1	KMBRC
<i>Fringilla coelebs</i>	Chaffinch	68	2018	Gravesend (TQ6474)	Berne:A3; BoCC5:Green (subsp. Amber)	KMBRC
<i>Phylloscopus collybita</i>	Chiffchaff	106	2018	Gravesend (TQ6474)	Berne:A2	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Phylloscopus collybita tristis</i>	Chiffchaff (P.c.tristis)	1	2015	Gravesend (TQ6474)	Berne:A2	KMBRC
<i>Parus ater</i>	Coal Tit	1	1968	Gravesend (TQ6474)	Berne:A2; BoCC5:Green (subsp. Amber)	
<i>Streptopelia decaocto</i>	Collared Dove	58	2018	Gravesend (TQ6474)	Berne:A3; BirdsDir:A2.2	KMBRC
<i>Buteo buteo</i>	Common Buzzard	21	2019	Gravesend (TQ6474)	Berne:A3; Bonn:A2; ECCITES:A	KMBRC
<i>Loxia curvirostra</i>	Common Crossbill	2	14/07/2004	Gravesend (TQ6474)	Berne:A2; WCA1	KMBRC
<i>Larus canus</i>	Common Gull	87	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; BirdsDir:A2.2; KRDB1	KMBRC
<i>Actitis hypoleucos</i>	Common Sandpiper	24	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2	KMBRC
<i>Melanitta nigra</i>	Common Scoter	4	2015	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; Bonn:A2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					BirdsDir:A2.2; S41; WCA1	
<i>Sterna hirundo</i>	Common Tern	81	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1	KMBRC
<i>Fulica atra</i>	Coot	7	2013	Gravesend (TQ6474)	Berne:A3; Bonn:A2; BirdsDir:A2.1	
<i>Phalacrocorax carbo</i>	Cormorant	115	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Green (subsp. Amber); KRDB3	KMBRC
<i>Miliaria calandra</i>	Corn Bunting	1	2008	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; KRDB2; S41	KMBRC
<i>Cuculus canorus</i>	Cuckoo	8	2015	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; S41; KRDB2	KMBRC
<i>Numenius arquata</i>	Curlew	61	2019	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; Bonn:A2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					BirdsDir:A2.2; S41	
<i>Calidris ferruginea</i>	Curlew Sandpiper	7	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2	KMBRC
<i>Calidris alpina</i>	Dunlin	62	2015	Gravesend (TQ6474)	Berne:A2; BoCC5:Red; Bonn:A2; BirdsDir:A1; KRDB2	KMBRC
<i>Prunella modularis</i>	Dunnock	58	2016	Gravesend (TQ6474)	BAP; Berne:A2; BoCC5:Amber; S41	KMBRC
<i>Alopochen aegyptiacus</i>	Egyptian Goose	5	2016	Gravesend (TQ6474)	Berne:A3; Bonn:A2; ECCITES:C	
<i>Columba livia</i>	Feral Pigeon	74	2019	Gravesend (TQ6474)	Berne:A3; ECCITES:A; BirdsDir:A2.1	KMBRC
<i>Anas strepera</i>	Gadwall	8	2015	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					BirdsDir:A2.1; KRDB3	
<i>Carduelis carduelis</i>	Goldfinch	67	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green (subsp. Amber)	KMBRC
<i>Locustella naevia</i>	Grasshopper Warbler	1	2015	Gravesend (TQ6474)	BAP; Berne:A2; BoCC5:Red; KRDB1; S41	KMBRC
<i>Larus marinus</i>	Great Black-backed Gull	75	2019	Gravesend (TQ6474)	BoCC5:Amber; BirdsDir:A2.2; KRDB1	KMBRC
<i>Podiceps cristatus</i>	Great Crested Grebe	4	2019	Gravesend (TQ6474)	Berne:A3	
<i>Dendrocopus major</i>	Great Spotted Woodpecker	19	2018	Gravesend (TQ6474)	Berne:A2; BoCC5:Green	KMBRC
<i>Parus major</i>	Great Tit	51	2019	Gravesend (TQ6474)	Berne:A2	KMBRC
<i>Carduelis chloris</i>	Greenfinch	68	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Red	KMBRC
<i>Tringa nebularia</i>	Greenshank	1	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					Bonn:A2; BirdsDir:A2.2; WCA1	
<i>Ardea cinerea</i>	Grey Heron	103	2019	Gravesend (TQ6474)	Berne:A3; KRDB3	KMBRC
<i>Motacilla cinerea</i>	Grey Wagtail	30	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	KMBRC
<i>Anser anser</i>	Greylag Goose	13	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.1	KMBRC
<i>Larus argentatus</i>	Herring Gull	130	2019	Gravesend (TQ6474)	BAP; BoCC5:Red; BirdsDir:A2.2; S41; KRDB2	
<i>Falco subbuteo</i>	Hobby	10	2019	Gravesend (TQ6474)	Berne:A2; Bonn:A2; ECCITES:A; WCA1	KMBRC
<i>Corvus monedula</i>	House Martin	16	2018	Gravesend (TQ6474)	Berne:A2; BoCC5:Red	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Garrulus glandarius</i>	House Sparrow	96	2019	Gravesend (TQ6474)	BAP; BoCC5:Red; KRDB2; S41	KMBRC
<i>Falco tinnunculus</i>	Jackdaw	11	2019	Gravesend (TQ6474)	BirdsDir:A2.2	KMBRC
<i>Alcedo atthis</i>	Jay	29	2019	Gravesend (TQ6474)	BoCC5:Green (subsp. Amber); BirdsDir:A2.2	KMBRC
<i>Rissa tridactyla</i>	Kestrel	26	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; ECCITES:A	KMBRC
<i>Larus fuscus</i>	Kittiwake	8	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Red; KRDB3	KMBRC
<i>Carduelis cabaret</i>	Lapwing	65	2019	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; Bonn:A2; BirdsDir:A2.2; KRDB2; S41	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Sylvia curruca</i>	Lesser Black-backed Gull	22	2019	Gravesend (TQ6474)	BoCC5:Amber; BirdsDir:A2.2	KMBRC
<i>Carduelis cannabina</i>	Lesser Redpoll	5	2014	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; KRDB1; S41	KMBRC
<i>Egretta garzetta</i>	Lesser Whitethroat	5	2015	Gravesend (TQ6474)	Berne:A2	KMBRC
<i>Tachybaptus ruficollis</i>	Linnet	27	2019	Gravesend (TQ6474)	BAP; Berne:A2; BoCC5:Red; KRDB2; S41	KMBRC
<i>Charadrius dubius</i>	Little Egret	26	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green; ECCITES:A; BirdsDir:A1; KRDB3	KMBRC
<i>Aegithalos caudatus</i>	Little Grebe	4	2015	Gravesend (TQ6474)	Berne:A3;BoCC5:Green	
<i>Pica pica</i>	Little Ringed Plover	3	2019	Gravesend (TQ6474)	Berne:A2; Bonn:A2; KRDB1; WCA1	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Anas platyrhynchos</i>	Long-tailed Tit	45	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Green (subsp. Amber)	KMBRC
<i>Circus aeruginosus</i>	Magpie	55	2019	Gravesend (TQ6474)	BirdsDir:A2.2	KMBRC
<i>Parus palustris</i>	Mallard	129	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.1	KMBRC
<i>Anthus pratensis</i>	Marsh Harrier	18	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2; ECCITES:A; BirdsDir:A1; KRDB3; WCA1	KMBRC
<i>Turdus viscivorus</i>	Meadow Pipit	12	2015	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	KMBRC
<i>Gallinula chloropus</i>	Mediterranean Gull	75	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1; KRDB3; WCA1	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Cygnus olor</i>	Mistle Thrush	63	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Red; BirdsDir:A2.2	KMBRC
<i>Luscinia megarhynchos</i>	Moorhen	161	2019	Gravesend (TQ6474)	Berne:A3; Bonn:A2; BoCC5:Amber; BirdsDir:A2.2	KMBRC
<i>Haematopus ostralegus</i>	Mute Swan	294	2019	Gravesend (TQ6474)	Berne:A3; Bonn:A2; BirdsDir:A2.2	KMBRC
<i>Phasianus colchicus</i>	Oystercatcher	94	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; BirdsDir:A2.2	KMBRC
<i>Motacilla alba yarrellii</i>	Peregrine	39	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green (subsp. Amber); Bonn:A2; ECCITES:A; BirdsDir:A1; KRDB1; WCA1	KMBRC
<i>Corvus corax</i>	Pheasant	4	2015	Gravesend (TQ6474)	Berne:A3; BirdsDir:A2.1	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Milvus milvus</i>	Pied Wagtail	51	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green (subsp. Amber)	
<i>Alectoris rufa</i>	Raven	8	2014	Gravesend (TQ6474)	Berne:A3	KMBRC
<i>Podiceps grisegena</i>	Red Kite	6	2018	Gravesend (TQ6474)	Berne:A3; BoCC5:Green; Bonn:A2; ECCITES:A; BirdsDir:A1; WCA1	KMBRC
<i>Emberiza schoeniclus</i>	Redshank	126	2016	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2; BirdsDir:A2.2	KMBRC
<i>Charadrius hiaticula</i>	Reed Bunting	4	2015	Gravesend (TQ6474)	BAP; Berne:A2; BoCC5:Amber; S41	KMBRC
<i>Psitacula krameri</i>	Reed Warbler	56	2019	Gravesend (TQ6474)	Berne:A2; KRDB3	

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Erithacus rubecula</i>	Ringed Plover	38	2015	Gravesend (TQ6474)	Berne:A2; BoCC5:Red; Bonn:A2	KMBRC
<i>Corvus frugilegus</i>	Ring-necked Parakeet	6	2019	Gravesend (TQ6474)	Berne:A3; ECCITES:C	KMBRC
<i>Sterna dougallii</i>	Robin	83	2019	Gravesend (TQ6474)	Berne:A2; Bonn:A2	KMBRC
<i>Acrocephalus schoenobaenus</i>	Sand Martin	10	2016	Gravesend (TQ6474)	Berne:A2; BoCC5:Green	KMBRC
<i>Tadorna tadorna</i>	Sandwich Tern	20	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; BirdsDir:A1; KRDB3	KMBRC
<i>Anas clypeata</i>	Sedge Warbler	4	2015	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	
<i>Alauda arvensis</i>	Shelduck	75	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2	KMBRC
<i>Turdus philomelos</i>	Shoveler	3	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					ECCITES:C; BirdsDir:A2.1	
<i>Accipiter nisus</i>	Skylark	16	2019	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Red; BirdsDir:A2.2; KRDB2; S41	KMBRC
<i>Porzana porzana</i>	Song Thrush	45	2019	Gravesend (TQ6474)	BAP; Berne:A3; BoCC5:Amber; BirdsDir:A2.2; KRDB2; S41	KMBRC
<i>Muscicapa striata</i>	Sparrowhawk	48	2019	Gravesend (TQ6474)	Berne:A3; Bonn:A2; BoCC5:Amber; ECCITES:A	KMBRC
<i>Saxicola torquata</i>	Starling	99	2019	Gravesend (TQ6474)	BAP; BoCC5:Red; BirdsDir:A2.2; S41; KRDB2	KMBRC
<i>Hirundo rustica</i>	Stock Dove	6	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; BirdsDir:A2.2	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Apus apus</i>	Stonechat	3	2015	Gravesend (TQ6474)	Berne:A2; Bonn:A2; KRDB1	KMBRC
<i>Anas crecca</i>	Swallow	43	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Green	KMBRC
<i>Aythya fuligula</i>	Swift	76	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Red	KMBRC
<i>Arenaria interpres</i>	Teal	57	2016	Gravesend (TQ6474)	Berne:A3; BoCC5:Amber; Bonn:A2; ECCITES:C; BirdsDir:A2.1; KRDB1	KMBRC
<i>Bombycilla garrulus</i>	Turnstone	105	2016	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2	KMBRC
<i>Sylvia communis</i>	Wheatear	1	2018	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber; Bonn:A2; KRDB1	KMBRC
<i>Phylloscopus trochilus</i>	Whimbrel	6	2019	Gravesend (TQ6474)	Berne:A3; BoCC5:Red; Bonn:A2;	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
					BirdsDir:A2.2; WCA1	
<i>Columba palumbus</i>	Whitethroat	26	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	KMBRC
<i>Troglodytes troglodytes</i>	Willow Warbler	14	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	KMBRC
<i>Motacilla flava</i>	Wood Pigeon	88	2019	Gravesend (TQ6474)	BirdsDir:A2.1; BoCC5:Amber	KMBRC
<i>Larus michahellis</i>	Wren	57	2019	Gravesend (TQ6474)	Berne:A2; BoCC5:Amber	KMBRC
Mammals						
<i>Phocoena phocoena</i>	Common Porpoise	12	2015	Gravesend (TQ6474)	1 & 2	KMBRC
<i>Halichoerus grypus</i>	Grey Seal	4	2014	TQ6484574828	1 & 2	KMBRC
<i>Phoca vitulina</i>	Harbour Seal	3	2014	TQ6484574828	1 & 2	KMBRC
<i>Balaenoptera acutorostrata</i>	Minke Whale	1	2013	TQ6374	ECH_IV, Bern_III, WCA5, CRoW 1 & 2	KMBRC

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Mustela erminea</i>	Stoat	2	2016	TQ667741	Bern_III	KMBRC
<i>Arvicola amphibius</i>	Water Vole	11	2021	TQ66817407 & Gravesend Marshes	WCA5, CRoW	KMBRC
<i>Delphinapterus leucas</i>	White Whale	2	2018	TQ6587674822	ECH_IV, Bonn_II, Bern_III, WCA5	KMBRC
Chromista						KMBRC
<i>Fucus vesiculosus</i>	Bladder Wrack	1	2024	On site and recorded as incidental sighting	RedList_GB-Lr(NT)	KMBRC
Plants						KMBRC
<i>Gnaphalium luteoalbum</i>	Jersey Cudweed	1	2022	TQ6472	WCA8	KMBRC
<i>Anacamptis pyramidalis</i>	Pyramidal Orchid	1	2017	TQ6273	CITES	KMBRC
Marine						
<i>Ostrea edulis</i>	Common Oyster	1	2018	1.251	NERC Act Section 41	KMBRC
Insects						

Scientific name	Common name	No. of records	Year of most recent record	Distance/ Location to site of closest record (km)	Conservation designation	Source
<i>Euplagia quadripunctaria</i>	Jersey Tiger	8	2021	TQ65637275	Bern_II	KMBRC
<i>Danaus plexippus</i>	Monarch Butterfly	1	2022	TQ632734	Bonn_II	KMBRC

1 = Conservation of Habitats and Species Regulations 2017 (as amended).

2 = Wildlife and Countryside Act 1981 (as amended).

3 = Species of Principal Importance listed under S41 of the NERC Act.

4 = Local Biodiversity Action Plan Species

5 = Listed as Red or Amber on Birds of Conservation Concern (Stanbury et al., 202

Benthic Invertebrates

- 4.1.18** No Environment Agency benthic invertebrate monitoring sites were identified. Other sites were outside the search area which was set at 2 km for desk study records. However, review of aerial imagery identified that the habitat typology at the nearest EA monitoring sites on the Thames are representative of the habitats likely to be present in the vicinity of the site.
- 4.1.19** A full species list is presented in Appendix 1: Environment Agency Benthic Invertebrate Data. One INNS has been recorded, a Chinese mitten crab (*Eriocheir sinensis*) in 2017.

Invasive Non-Native Species

- 4.1.20** There are 9 records for Invasive Non-Native Species (INNS) recorded within the study area. These records are summarised in Table 5 below.

Table 5: Invasive non-native species

Common Name	Latin Name	WCA Schedule 9 or Invasive Alien Species Order 2019	Distance to Site (km)
Winter Heliotrope	<i>Petasites fragrans</i>	WCA9ii	Gravesend south - Windmill Hill
Japanese Knotweed	<i>Fallopia japonica</i>	WCA9ii	Gravesend - Denton north
Japanese Rose	<i>Rosa rugosa</i>	WCA9ii	Northfleet south
Tree-of-heaven	<i>Ailanthus altissima</i>	WCA9ii	Rosherville
Virginia-creeper	<i>Parthenocissus quinquefolia</i>	WCA9ii	Gravesend - Kings Farm - Parrock Farm
Chinese Mitten Crab	<i>Eriocheir sinensis</i>	WCA9ii	Gravesend, Kent (TQ6664674338)
Western Conifer Seed Bug	<i>Leptoglossus occidentalis</i>	WCA9ii	Gravesend, Kent
Western Conifer Seed Bug	<i>Leptoglossus occidentalis</i>	WCA9ii	Gravesend, Kent
Wall Lizard	<i>Podarcis muralis</i>	WCA9i	Gravesend DA11, UK

4.2 Field Survey Site description

- 4.2.1 The survey site was orientated approximately east to west, and access was gained from the stairs located at TQ648744. The area surveyed was approximately 275m long and was surveyed by walking the biotopes where safe to access.
- 4.2.2 The western extent of the site was surveyed from the public footpath adjacent to the site due to deep muddy sediments deemed unsafe to access. The furthest western extent of the site encompassed the Town Pier, where observations of this biotope were made. A similar area was present at the eastern site boundary towards Royal Pier and observations were made from both walking the extent of the biotope and from publicly accessible land adjacent to the site, using binoculars from a safe viewing point. The river foreshore in these areas consisted of littoral mud (LS.LMu).
- 4.2.3 The central area surrounding the LV21 vessel predominantly featured “Littoral Mud ” with some ephemeral algae observed growing on the vessel and adjacent sheet piling river defence structure.
- 4.2.4 Two small bays were present east of LV21, near Gravesham Arts, the biotopes observed were very similar in these two bays. The biotope consisted of Littoral Mixed Sediment (LS.LMx) with a high gravel content in the upper shore to littoral mud in the low shore. The sediment in the eastern portion of the site directly beneath the access steps was comprised of mud, gravel and coarse sand. A strandline was present in this area consisting of a layer of unattached, dead fucoids.
- 4.2.5 The seawall and artificial hard structures to the east of Gravesham Arts were comprised of a mix of timber and sheet piling, the timber sections were colonised by Bladder Wrack (*Fucus vesiculosus*). Continuing eastward, the material transitioned away from timber frames, *F. vesiculosus* coverage fell and the sheet piling was predominantly colonised by ephemeral algae.
- 4.2.6 The western extent of the site, adjacent to the LV21 vessel, was characterised by a “Littoral Mud biotope ” exhibiting an anoxic layer approximately 15 cm deep. Sparse rocks and boulders present within the littoral mud appeared to be remnants from discarded bricks, boulders and cement.
- 4.2.7 The upper shore in the west of the site directly below the river wall down to the foreshore consisted entirely of littoral mud. Occasional bricks and boulders on the surface of the littoral mud were present underneath the Town Pier and running perpendicular to the river wall.

4.4. Intertidal Phase 1

There were three biotopes identified within the survey area, which are described below, listed in Table 6, and their distribution shown in Figure 2.

Littoral Mud - LS.LMu - A2.3

- 4.2.8** The biotope “Littoral Mud” (LS.LMu) dominated the site (A2.3 Figure 2; Figure 4) consisting of fine mud typically found on extensive mudflats. The central area surrounding the LV21 vessel predominantly featured littoral mud, with some ephemeral algae observed growing on the vessel and adjacent sheet piling fixtures. Immature *F. vesiculosus* was identified on the moorings and chains securing the LV21 vessel. During the survey, a little egret (*Egretta garzetta*) and several pigeons (*Columba livia domestica*) were observed perched on the vessel.
- 4.2.9** Deep, soft mud prevented safe access to the eastern foreshore extent of the site. As a result, biotope identification was conducted from the hard ground above, confirming that littoral mud dominated the area. At the base of the Royal Pier small boulders, bricks, and metal pipes with *F. vesiculosus* growth were observed, though no additional species could be identified from this vantage point (Figure 3, Target note 6). Within the littoral mud biotope several channels were present between the mid to low shore (Figure 3, Target note 2).
- 4.2.10** At the base of the sheet piling within the eastern extent of the site, an area of *Fucus vesiculosus* on variable salinity mid eulittoral boulders and stable mixed substrata (LR.LLR.FVS.FvesVS) was noted (Figure 3, Target note 3). Within this area of large boulders, the barnacle *Austrominius modestus* was noted to be present on the large cobbles and rocks (Figure 4, Photograph 7).
- 4.2.11** The upper shore in the west of the site directly below the river wall down to the foreshore consisted entirely of littoral mud. Occasional bricks and boulders on the surface of the littoral mud were present underneath the Town Pier and running perpendicular to the river wall (

4.2.12 Figure 3, Target note 1).

Littoral Mixed Sediments - LS.LMx - A2.4

4.2.13 Two small bays were present east of LV21, near Gravesham Arts. The biotopes observed were very similar in these two bays comprising a transition from littoral mixed sediment (LS.LMx) with a high gravel content in the upper shore to littoral mud in the low shore. Several outfall pipes were located in the river wall in the east of this biotope (Figure 3, Target note 5). At the strandline the biotope included gravel and sand, with bedrock identified at approximately 15 cm depth. The strandline contained a layer of debris and fucoids, predominantly Bladder Wrack (*F. vesiculosus*). This area was classified as "Littoral Mixed Sediments LS.LMx" (A2.4 Figure 2; Figure 4).

4.2.14 This biotope consisted of coarse sediment and gravel, with anthropogenic litter noted to be frequent within the biotope (Figure 3, Target note 4). Digging in this area revealed no fauna or flora within the sediment. The steps leading to Gravesham Arts were covered in primarily *F. vesiculosus*. Vegetation including sea beet (*Beta vulgaris maritima*) was growing within the upper section of the small seawall adjacent to the access stairs at TQ648744 (Figure 4, Photograph 4).

-
- 4.2.15** The seawall and artificial hard structures to the east of Gravesham Arts were comprised of a mix of timber and sheet piling. Within the timber structures, *F. vesiculosus* dominated, along with barnacles (*Austrominius modestus*) and a Common Shore crab (*Carcinus maenas*) (Figure 4, Photograph 7 & 8). Continuing eastward, the river wall material changed from timber frames to sheet piling. *F. vesiculosus* coverage fell with the sheet pile predominantly colonised by ephemeral algae. Ephemeral green algae was present along lower and mid sections of the river wall, however, the uppermost region of the river wall and sheet piling were bare where areas remained dry at high tide.
- 4.2.16** Below this area the shore consisted of littoral mud. No fauna were observed on the surface or while digging in this area, and the sediment became anoxic approximately 15cm below the surface.

Table 6. Biotopes identified in the survey area

EUNIS / UKHab Code	EUNIS / UKHab name	JNCC 04.05 Code / JNCC Habitat Code	Notes	Biotope Group
A2.3	Littoral Mud	LS.LMu	Fauna: <i>Austrominius modestus</i> Flora: <i>Fucus vesiculosus</i> and Ephemeral green algae	Mud
A2.4	Littoral mixed sediment	LS.LMx	Fauna: <i>Austrominius modestus</i> , Common Shore crab <i>Carcinus maenas</i> Flora: <i>Fucus vesiculosus</i> and Ephemeral green algae	Shingle, coarse sand and mixed sediment

4.3 UKHab Survey / Condition assessments

Littoral Mud

- 4.3.1** Littoral mud biotopes under the Natural England Biodiversity Net Gain methodology (Littoral Mud Table 7), were assessed as being in “Moderate condition” with a score of 11 out of 15.
- 4.3.2** This habitat parcel scored Good for criterion A (due to no impacted coastal processes) and Good for criterion B (due to no INNS present and only one noted non-native species *Austrominius modestus* within this biotope). This habitat parcel scored Moderate for criterion C for some obvious signs of water pollution, Poor for D for clear signs of direct human impacts and scored Moderate for criterion E due to low levels of litter.

Littoral Mixed sediment

- 4.3.3** Littoral mixed sediment biotopes are also classified as “littoral mixed sediment” under the Natural England Biodiversity Net Gain methodology (A2.4 Figure 2; Littoral Mixed Sediments Table 8). These were assessed as being in “Moderate condition” with a score of 11 out of 15.
- 4.3.4** This habitat parcel scored Poor for criterion A (due to the presence of the river wall, thus highly impacted coastal processes) and Good for criterion B (due to no INNS presence). This habitat parcel scored Good for criterion C and D, for no obvious signs of water pollution and no clear signs of direct human impacts and scored Poor for criterion E due to high levels of litter (Figure 4, Photograph 4).

4.4 Habitat condition assessment

- 4.4.1** Biodiversity Net Gain metrics are provided in Table 7 below to aid future biodiversity net gain calculations.

Table 7: Habitat biodiversity metrics

Habitat Parcel	Area (ha)	Habitat Distinctiveness		Habitat Condition		Strategic Significance		Habitat Units
		Distinctiveness	Score	Condition	Score	Significance	Score	
Littoral Mud	0.1279	High	6	Moderate	2	High	1.15	1.765
Littoral Mixed Sediment	0.0553	High	6	Moderate	2	Medium	1.1	0.729
Total Habitat Units								2.495

4.5 Annex 1 habitats

- 4.5.1** The EU Habitats Directive Annex 1 habitat “Mudflats and sandflats not covered by seawater at low tide” was found within the Littoral Mud (A2.3) biotope and the NE sub feature “Intertidal mixed sediments” was found within Littoral Mixed Sediment (A2.4) biotope.

- 4.5.2 These intertidal sediments have a widespread distribution around the UK and frequently form part of the sediment typical of estuaries (Legislation and Planning Policy Considerations5.

4.6 Incidental Fauna Records

- 4.6.1 During the survey any species observed foraging within the survey area were recorded, these are listed in Table 8 below.

Table 8: Incidental species sightings

Common Name	Latin name	Protected & Conservation Status
Feral Pigeon	<i>Columba livia domestica</i>	Wildlife and Countryside Act 1981
Egret	<i>Egretta garzetta</i>	Wildlife and Countryside Act 1981, EU Birds Directive & Conservation of Habitats and Species Regulations 2017

4.7 Invasive & Non-native Species

- 4.7.1 No INNS were identified within the survey area; however nine records of invasive non-native species were returned in the desk study.
- 4.7.2 The non-native barnacle *Austorminius modestus* was recorded during the survey.

5. Legislation and Planning Policy Considerations

5.1 Background

5.1.1 The content of this section is the legislation and planning policy considerations that are known to be relevant based on the desk study and the Intertidal Phase 1 habitat survey. Potential further ecological considerations are discussed in Section 6.

5.1.1 This report refers to 'ecological features' which includes:

- Statutory designated sites for nature conservation
- Non-statutory designated sites for nature conservation
- Priority habitats for nature conservation, including ancient woodland
- Protected species;
- Species of conservation concern; and
- Invasive non-native species.

5.2 Designated Sites

5.2.1 Designated sites for nature conservation are protected under UK legislation and have different levels of conservation importance.

5.2.2 Statutory designated sites of 'international importance' include SACs and SPAs which receive protection under the Conservation of Habitats and Species Regulations 2017 (as amended).

5.2.3 Statutory designated sites of 'national importance' include SSSIs which are protected under the WCA, Countryside and Rights of Way Act 2000 (CRoW Act) and Natural Environment and NERC Act. National Nature Reserves (NNRs) are a selection of the very best parts of England's SSSI's, protected under the WCA and CRoW Act.

5.2.4 Local Nature Reserves (LNRs) are designated sites of 'local importance' that receive protection under the National Parks and Access to the Countryside Act 1949.

5.2.5 Non-statutory designated sites, such as Local Wildlife Sites (LoWS) are of 'local importance'. These sites are not protected under legislation. However, local authorities take account of local sites when formulating local plans and when considering planning applications.

5.2.6 The importance of 'sites for biodiversity' is also recognised in Paragraph 174 (a) of the National Planning Policy Framework, 2021 (NPPF) which states that '*Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)*'.

5.2.7 The London Plan 2021 identifies the need to protect biodiversity and to provide opportunities for people to access nature through local green spaces. The best examples of key habitats and green spaces are identified as SINCS. SINCS are non-statutory designated sites identified by local authorities and are recognised as part of the planning process.

5.2.8 Policy OS3 of the draft City Plan 2036 specifically addresses biodiversity and states that development should aim to secure net gains for biodiversity where possible by incorporating measures to enhance biodiversity, including: Retention and enhancement of habitats within Sites

of Importance for Nature Conservation (SINCs), including the River Thames, measures recommended in the City of London Biodiversity Action Plan (BAP) in relation to particular species or habitats, green roofs and walls, gardens and terraces, soft landscaping and trees, green corridors and biodiversity links, wildlife-friendly features, such as nesting or roosting boxes, a planting mix and variation in vegetation types to encourage biodiversity, planting which will be resilient to a range of climate conditions, with a high proportion of native plants, and a lighting scheme designed to minimise impacts on biodiversity.

- 5.2.9** The City of London Open Space Strategy, which was adopted as a Supplementary Planning Document (SPD) in January 2015, sets out the principles to help improve the quality, management and accessibility of the open spaces of the Square Mile. The strategy comprises of ten strategic objectives which include ensuring that existing and new spaces make a positive contribution to the biodiversity value of the City through appropriate plant choice and habitat creation.
- 5.2.10** The development proposals will therefore be compliant with the relevant legislation and policy with respect to statutory designated sites.
- 5.2.11** There are two sites with a statutory designation (e.g. Ramsar, Site of Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA)) within 2km of the site. The Thames Estuary and Marshes Ramsar site and the Canal and grazing marsh, Higham SSSI (GR17). No LNR's were returned within the 2km of the site. Local Nature Reserves (LNRs) are a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities. LNRs are for people and wildlife. They are places with wildlife or geological features that are of special interest locally.
- 5.2.12** The proposal will not affect any statutory designated sites and there are no impact pathways connecting them. The LV21 Vessel lies within the River Thames and tidal tributaries SMINC. There will be no loss of foreshore habitat due to the placement of the LV21 Vessel, also sediment may accrete over time and potentially encourage invertebrate communities and flora to establish.

5.3 Priority Habitats

5.3.1 In this report priority habitats for nature conservation include:

- Habitats of Principal Importance listed under Section 41 of the NERC Act
- Habitats listed under Local Biodiversity Action Plans (LBAPs); and

5.3.2 The NERC Act requires planning authorities to have particular regard to the Habitats of Principal Importance listed under Section 41 of the act which should be treated as a material consideration in the planning process.

5.3.3 The 'priority habitats' identified by the London Biodiversity Partnership that are most relevant to the Square Mile are 'parks and urban green spaces' with an 'important habitat' identified as 'built structures'. The Action Plans have been developed to take into consideration these priority habitats. A further habitat recognised as a London biodiversity target within the City of London is standing water and the Tidal Thames, which is also the City's only Site of Metropolitan Importance for Nature Conservation (SMINC). Whilst there are some sites with standing water that are dealt with in the BAP, the Tidal Thames is the prime responsibility of the Port of London Authority, with the City Corporation's responsibilities for the riverside and foreshore are detailed in draft City Plan 2036 Strategic Policy S17, Thames Policy Area. This states that development should not have an adverse impact on the SMINC and should seek opportunities to create or enhance riverside habitats.

5.3.4 Priority habitats are those listed under Section 41 of the NERC Act. *Priority habitats receive no statutory protection but are a material consideration in planning policy, and the National Planning Policy Framework (NPPF, 2021) states that local planning authorities should "promote the conservation, restoration and enhancements of priority habitats".*

5.3.5 The site is situated within an area classified as littoral mud during the survey. This biotope falls within the UK BAP priority habitats "intertidal sediment" and "intertidal mudflats", however the change in land use does not propose any dredging activities or impact pathways thus 'Intertidal mudflats' will not be impacted by the works.

5.4 Protected Species

5.4.1 Rare and declining plant and animal species in the UK are generally protected under national legislation. Species protected under the Conservation of Habitats and Species Regulations 2017 (as amended) are often referred to as European Protected Species (EPS) because the requirement to protect them under national legislation originally derives from the fact that these species are listed under the European Habitats Directive. These species can be considered to be of 'international importance' because they are rare or declining in Europe as well as the UK. These species are not only protected from killing and injury, but their breeding sites and resting places (habitat) are also protected. These species include:

- Great crested newt, natterjack toad and pool frog;
- Sand lizard and smooth snake;
- Bats;
- Dormouse; and
- Otter.

5.4.2 Other species are protected under the WCA. In addition to the species listed above, which also receive some protection under the WCA, protection under this legislation is given to prevent killing and injury of:

- Common lizard, slow worm, adder and grass snake
- Birds; and
- Water vole.

5.4.3 In the case of birds, as well as adult birds being protected from killing or injury, it is also an offence to take, damage or destroy a nest that's in use or being built and to take or destroy eggs of wild birds. Additional protection applies to birds listed in Schedule 1 of the WCA, meaning it is also an offence to disturb these species when building a nest or when the nest is active.

5.4.4 Following the London Biodiversity Partnership plan and taking into consideration local, regional and national priorities the following species have been selected as target species: House Sparrow (*Passer domesticus*), Black Redstart (*Progenitures ochruros*), Swift (*Apus apus*), Peregrine Falcon (*Falco peregrinus*), Bats (*Chiropter* spp.), Wild Bees (Bumblebees and Solitary Bees), Stag Beetle (*Lucanus cervus*). These species are exemplars of their ecological niches, the interaction the species has with the surrounding environment, and also are in many cases highly adapted to the urban environment. They have been selected to highlight their importance within the City of London and to focus conservation management and monitoring. The target species selected also take into consideration national priority habitats and species are defined under Section 41 of the Natural Environment & Rural Communities Act 2006.

5.5 Species of conservation concern

5.5.1 Other rare or declining species may not receive strict legal protection but may be recognised on published lists as species of conservation concern that should be protected as a matter of best practice. Under Section 41 of the NERC Act, the Secretary of State must, as respects England, publish a list of the living organisms which in the Secretary of State's opinion are species of principal importance for the purpose of conserving biodiversity. Planning authorities are required

to have particular regard to these species and treat them as a material consideration in the planning process. Most protected species are also listed as species of principal importance.

5.5.2 Rare or declining bird species are listed as red or amber in Birds of Conservation Concern, a list that is periodically updated. Species considered of local nature conservation importance may also be listed in Local Biodiversity Action Plans.

5.5.3 Consideration of species of conservation concern during development projects is a requirement of the NERC Act which states that any *“public authority must, in exercising its functions, have regard ... to the purpose of conserving biodiversity”* and *“conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat”*.

5.6 Invasive non-native species

5.6.1 There are 36 species of invasive alien plants that are listed as species of special concern because they cause severe problems for native UK plants and the environment.

5.6.2 In the UK it is an offence to *“plant or otherwise cause to grow in the wild”* any plant species listed in Schedule 9 of the WCA or Schedule 2 of the Invasive Alien Species (Enforcement and Permitting) Order 2019.

6. Ecological Constraints

6.1 Designated sites

- 6.1.1** There will be no impacts on Thames Estuary and Marshes Ramsar and SSSI from the change in planning status of the mooring or from any future changes in location of vessel within the red line boundary. The possible future addition of a second vessel on the mooring is also not anticipated to result in any impacts on the designated sites. The designated sites lie approximately 2km to the north and east and although the addition of a second vessel will increase the number of visitors to the mooring, it lies within an urban area and any additional noise and disturbance will not exceed background levels.
- 6.1.2** The vessel lies within the River Thames and tidal tributaries SMINC (M031). Future changes in position of the vessel could result in additional loss of foreshore habitats unless the original site is restored. It is anticipated that there will be compaction of sediment and some changes in topography of the foreshore beneath the vessel. The addition of a second vessel will result in additional loss of foreshore habitat. This is minor in the context of the overall area of the SMINC (2312ha) but could be contrary to Strategic Policy S17 of the City Plan 2036 (paragraph 5.3.3) depending on the details of the scheme. Potential measures to compensate for habitat loss and to achieve biodiversity net gain are covered in Section 7.

6.2 Priority habitats

- 6.2.1** A total of 29 parcels of priority habitat, comprising of three priority habitat types, occur within 2km of the site. The closest habitat type being mudflats, which is within the site. The proposed change in status of the mooring to permanent will not result in impacts to priority mudflat habitat. As described in paragraph 6.1.2 future changes in the position of the vessel may result in the loss of a small area of mudflat if the original position is not restored. The addition of a vessel will result in a small net loss of intertidal mudflat and could be contrary to Strategic Policy S17. Potential measures to compensate for habitat loss and to achieve biodiversity net gain are covered in Section 7. There will be no impacts on the other priority habitat types within the study area, namely coastal saltmarsh and coastal and floodplain grazing marsh.

6.3 Protected species

Birds

- 6.3.1** The proposals will not result in any additional noise or disturbance from human activity which would affect breeding or wintering birds, therefore no further survey is recommended. The site is currently subject to high levels of disturbance from the surrounding activities and the birds foraging there are therefore considered to have a high tolerance to anthropogenic disturbance.
- 6.3.2** The desk study returned records four WCA Schedule 1 wading species, less than 1km from the site which may occasionally use the foreshore in the vicinity of the LV21 Vessel for foraging. The proposals will not affect the overall availability of foraging habitat, although future mooring of a second vessel would result in a minor decrease in the availability of foraging habitat. The area is

heavily disturbed due to its urban location and therefore represents sub-optimal foraging habitat for wading bird species.

- 6.3.3 No further surveys for birds or mitigation measures are considered necessary.

Marine Mammals

- 6.3.4 The desk study returned records for seven marine mammal species; Common Porpoise (*Phocoena phocoena*), Grey Seal (*Halichoerus grypus*), Harbour Seal (*Phoca vitulina*), and Minke Whale (*Balaenoptera acutorostrata*). Given that the river is currently disturbed from regular vessel movements, marine mammals are likely to be using the area only occasionally for migrating and foraging. There is no proposed risk of disturbance to marine mammals from the site change in land use. No specific control measures are needed to reduce disturbance.

Fish

- 6.3.5 A total of four Records of protected fish species were returned from the desk study. Three species, the European eel (*Anguilla anguilla*), common goby (*Pomatoschistus microps*), and sand goby (*Pomatoschistus minutus*) were returned in the desk study as being less than 1km away. These species may use shallow intertidal habitats in the vicinity of the site for foraging and migration. The change of status to a permanent mooring or future changes to the vessel position will not result in impacts on the use of the habitat by fish. The mooring of an additional vessel will result in a minor reduction in habitat availability in the area although similar habitat is widespread in the vicinity.

Terrestrial mammals

- 6.3.6 Records of common pipistrelle (*Pipistrellus pipistrellus*), noctule (*Nyctalus noctula*) and Long-Eared Bat (*Plecotus austriacus*) soprano pipistrelle (*Pipistrellus pygmaeus*), were found during the desk study. The legal protection afforded to bats is summarised in Table 4. The hull and the above deck structures on the LV21 Vessel had no visible crevices which might support bats and therefore it is deemed unsuitable for roosting bats. No further surveys such as a Preliminary Roost Assessment (PRA) are required on the buildings on site.
- 6.3.7 The Thames represents an important foraging corridor for bats. The change in use to a permanent mooring and any future changes in position, or addition of a second vessel is not considered to affect the foraging potential of the local river environment.
- 6.3.8 There is no habitat for any other protected terrestrial mammal species on site.

Other terrestrial groups

- 6.3.9 The permanent mooring of the LV21; future changes to the position of the vessel and the addition of a vessel will not cause adverse impacts or temporary disturbance to terrestrial invertebrates or plants.

6.4 Invasive and non-native species

- 6.4.1** Nine records of invasive non- native species were returned in the desk study. These include species for which it is a legal offence to cause their spread (under the Invasive and Alien Species (Enforcement and Permitting) Order 2019 or Schedule 9 of the of the Wildlife and Countryside Act 1981), these species are listed by the GB Non-Native Species Secretariat as representing a threat to the marine environment.
- 6.4.2** The change in status of the mooring to permanent will not result in an increased risk of spread of INNS. Biosecurity measures for any maintenance work or changes in location of the vessel are covered in Section 7.2.

7. Conclusions and Recommendations

7.1 Conclusions

- 7.1.1 The site lies within the River Thames and tidal tributaries SMINC, and within 2km of the Thames Estuary and Marshes Ramsar and SSSI. The LV21 mooring location and the immediate vicinity supports several intertidal biotopes include littoral mud and littoral mixed sediment.
- 7.1.2 The change in status of the mooring from temporary to permanent is not considered to result in impacts on the designated site or the priority habitat. Future changes in position of the vessel and the addition of a second vessel will result in loss of foreshore habitats unless the site is restored and additional habitat created. This could be contrary to Strategic Policy S17 of the City Plan 2036 (paragraph 5.3.3) depending on the details of the scheme and would require a mitigation plan. Potential measures to achieve the statutory 10% biodiversity net gain required for this application are covered in Section 7.1.
- 7.1.3 No impacts are anticipated on protected species including intertidal birds, marine and terrestrial mammals and fish and no further surveys, or specific control measures are required. There is no risk of spread of INNS from the change in status of the mooring although changes in the position of the vessel or the addition of a vessel could result in INNS spread. Appropriate biosecurity measures are covered in Section 7.2.

7.2 Recommendations

- 7.2.1 Recommendations for habitat enhancement are based on observations made during the site visit and on Environment Agency approved measures from the Estuary Edge guidance. A number of potential biodiversity enhancement areas were identified during the survey. Notably, the artificial hard structures on the eastern extent of the site and the steps leading to Gravesham Arts present opportunities for Bladder Wrack (*Fucus vesiculosus*) establishment and the subsequent creation of microhabitats. Introducing timber fendering or fixings to these sheet pilings and walls could facilitate colonisation by bladder wrack and other species, including the common shore crab (*Carcinus maenas*) previously noted (Figure 4, Photograph 8).
- 7.2.2 Introducing a granular substrate into the gap between the sheet piling and the fendering could promote the establishment of macrobenthic communities, providing a food source for wading birds. Furthermore, it was observed that birds, particularly pigeons, used the LV21 vessel ledges as perching and potential nesting sites. Facilitating the permanent establishment of these sites will naturally occur when the vessel is permanently moored, encouraging these and other birds to nest on the structure.

- 7.2.3** Implementing nature-based solutions alongside timber structures in the artificial hard areas would enhance habitat complexity and foster the establishment of a wider range of organisms, enhancing habitat complexity and increasing biodiversity. Given that some habitats have already established within the existing timber structures along the eastern extent, it is likely that similar structures will support comparable ecological communities.
- 7.2.4** Appropriate biosecurity protocols should be implemented to prevent the spread of any INNS if works to the vessel are proposed, including changes in location. This should include biosecurity measures such as spray cleaning of equipment using appropriate biocide prior to arrival at site, and 'check, clean, dry' procedures for hand tools, PPE and other equipment. With these measures in place, the risk of spreading INNS during any stage should be minimal.

8. References

- 8.1.1 Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020) The UK Habitat Classification User Manual Version 1.1 at <https://ukhab.org/>.
- 8.1.2 Connor, D. W, Allen, J.H, Golding, N., Howell, K. L., Lieberknecht, L.M., Northen, K. O. & Reker, J. B. 2004. The marine habitat classification for Britain and Ireland, Version 04.05 JNCC, Peterborough. Available online: www.jncc.gov.uk/MarineHabitatClassification
- 8.1.3 [EA Ecology & Fish Data Explorer](#)
- 8.1.4 Estuary Edges guidance (<https://www.estuaryedges.co.uk/>)
- 8.1.5 EUNIS, 2019. <https://eunis.eea.europa.eu/habitats.jsp> [Accessed 25/06/2024].
- 8.1.6 European Commission (2013). Interpretation Manual of European Union Habitats. Available at: https://inpn.mnhn.fr/docs/natura2000/Manuel_d_interpretation_EUR_28.pdf
- 8.1.7 Joint Nature Conservation Committee. 1993. Reprinted Handbook for Phase 1 habitat survey - a technique for environmental audit. England Field Unit Nature Conservancy Council 1990.
- 8.1.8 Kent & Medway Biological Records Centre (<https://www.kmbrc.org.uk/>)
- 8.1.9 [Magic Map Application \(defra.gov.uk\)](#)
- 8.1.10 Panks S., White N., Newsome A., Nash M., Potter J., Heydon M., Mayhew E., Alvarez M., Russell T., Cashion C., Goddard F., Scott S., Heaver M., Scott S H., Treweek J., Butcher B., & Stone D. (2023a) Biodiversity metric 4.0: Auditing and accounting for biodiversity - User Guide. Natural England
- 8.1.11 Panks S., White N., Newsome A., Potter J., Heydon M., Mayhew E., Alvarez M., Russell T., Scott S., Heaver M., Scott S H., Treweek J., Butcher B., & Stone D. (2023b) Biodiversity metric 4.0: Auditing and accounting for biodiversity -Technical Annex 2 - Technical Information. Natural England.
- 8.1.12 [Protected plants.pdf \(publishing.service.gov.uk\)](#)
- 8.1.13 Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747. Available online at <https://britishbirds.co.uk/content/status-our-bird-populations>.
- 8.1.14 Wyn, G., Brazier, P., Birch, K., Bunker, A., Cooke, A., Jones, M., Lough, N., McMath, A. & Roberts, S. (2000) Handbook for Marine Intertidal Phase 1 Biotope Mapping Survey. Countryside Council for Wales, Bangor.

Appendix 1: Environment Agency Benthic Invertebrate Data

	Year									
Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
<i>Ampullaceana balthica</i>										
<i>Apocorophium lacustre</i>					8	4	1			
<i>Asellidae</i>	1					1				
<i>Asellus aquaticus</i>		1			4	5		2		
<i>Baetis vernus</i>								1		
<i>Bithynia leachii</i>									1	
<i>Caenis horaria</i>	1									
<i>Chelicorophium curvispinum</i>	6					4				
Chironomidae	5	2	1				1	2	2	

<i>Chironomini</i>				1		3				
<i>Cloeon dipterum</i>					1					
<i>Corbicula fluminea</i>		1			2				2	
<i>Corixidae</i>						1				
<i>Corophiidae</i>				5						
<i>Corophium</i>									1	
<i>Corophium multisetosum</i>		1								
<i>Crangon</i>									7	
<i>Crangon crangon</i>		13	Not specified but recorded	47	34	Not specified but recorded	11		Not specified but recorded	
<i>Cyathura carinata</i>					1	2				
<i>Dendrocoelum lacteum</i>			Not specified but recorded							
<i>Dina lineata</i>					2			1		

<i>Dolichopodidae</i>								1		
<i>Eiseniella tetraedra</i>								1		
<i>Enallagma cyathigerum</i>		1								
<i>Eriocheir sinensis</i>				1				1		
<i>Erpobdella</i>	1									
<i>Erpobdella octoculata</i>		5	1					1	1	
<i>Erpobdella testacea</i>		3	1						1	
<i>Erpobdellidae</i>			1	1		1		1		
<i>Euglesa nitida</i>						1		3		
<i>Gammarus</i>				Not specified but recorded	2	9				
<i>Gammarus zaddachi</i>	Not specified but recorded	Not specified but recorded	Not specified but recorded	36	77	3	18	33	19	Not specified but recorded

<i>Girardia tigrina</i>		1			1					
<i>Glossiphonia complanata</i>		1	Not specified but recorded						1	
<i>Helobdella stagnalis</i>			Not specified but recorded							
<i>Ischnura elegans</i>					1					
<i>Lekanesphaera hookeri</i>						1				
<i>Lekanesphaera rugicauda</i>					7	1				
<i>Leuctra</i>				1						
<i>Limnephilidae</i>	1									
<i>Limnophora</i>					1					
<i>Mysidae</i>									Not specified but recorded	
<i>Neomysis integer</i>		Not specified but recorded			3	3			Not specified but recorded	

<i>Oligochaeta</i>	Not specified but recorded	Not specified but recorded	25	23	30	5	Not specified but recorded	60	13	6
<i>Orthocladinae</i>					Not specified but recorded			1		
<i>Palaemon</i>						3	1			
<i>Palaemon elegans</i>				7						
<i>Palaemon longirostris</i>	3		Not specified but recorded	4	Not specified but recorded	4			4	
<i>Palaemon macrodactylus</i>						5				
<i>Palaemonetes</i>									5	
<i>Palaemonetes varians</i>	Not specified but recorded									
<i>Palaemonidae</i>					16				3	
<i>Pericoma</i>								1		
Pisidium		Not specified but recorded	1	1	4			1	4	

<i>Planariidae</i>									1	
<i>Polychaeta</i>						1				
<i>Potamopyrgus antipodarum</i>	24	60	13	62	39	78	32	69	19	
<i>Proasellus meridianus</i>					1					
<i>Prodiamesinae</i>							3			
Psychodidae					2			1		
Simuliidae		3								
<i>Simulium</i>						2				
<i>Sphaeroma</i>				1						
<i>Tanytarsini</i>								8		
<i>Theodoxus fluviatilis</i>	1	1	3	5		Not specified but recorded				
<i>Tubificidae</i>				10	59	4				