ENVIRONMENTAL STATEMENT: 6.1 CHAPTER 2: SITE AND PROPOSED SCHEME DESCRIPTION

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

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The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations (2009) - Regulation 5(2)(a)

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2.1. SITE DESCRIPTION

2.1.1. The Site refers to the land within which the Proposed Scheme would be located. The Site is displayed in **Figure 1-1: Site Boundary Location Plan (Volume 2)** and **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**. The Site Boundary is located in Belvedere, within the LBB.

2.1.2. The Site covers approximately 77 hectares (ha) (comprising of 32ha marine and 45ha terrestrial) and is split into the following works areas, which are shown on the **Works Plans (Document Reference 2.3)** and described in Schedule 1 of the **Draft DCO (Document Reference 3.1)**:

- Carbon Capture Facility (Work No. 1 (including Work No. 1A, 1B, 1C, 1D, and 1E)) which also includes:
  - Carbon Capture Plant(s) (Work No. 1A);
  - Absorber Column(s) and Stack(s) (Work No. 1B);
  - CO_2 Processing Plant (Work No. 1C);
  - a Liquid Carbon Dioxide (LCO_2) Buffer Storage Area (Work No.1D); and
  - Supporting Plant (Work No. 1E).
- Modification and Interconnection Riverside 1 and Riverside 2: being the areas where connections and interconnection to the existing Riverside 1 and Riverside 2 energy from waste (EfW) facilities will take place (Work No. 2 (including Work No. 2A, 2B and 2C)). Adjacent to the east of Riverside 1 is also the continuation of LCO_2 Piping and Utilities Connection to the Proposed Jetty (Work No. 5);
- a Utilities Connection and Site Access Works (Work No. 3);
- Proposed Jetty (including LCO_2) which comprises of:
  - the retention (with modifications) or removal of the existing Belvedere Power Station Jetty (disused) (see **Section 2.5** below for an explanation of the approach to this) (Work No. 4A);
  - works to create the Proposed Jetty and its associated Access Trestle (Work No. 4B);
  - dredging associated with creating the Proposed Jetty (Work No. 4C); and
  - the remaining area of piping and utilities on the Proposed Jetty.
- the start of the LCO_2 Piping and Utilities Connection to the Proposed Jetty (Work No. 5);
- Temporary Construction Compounds (including Work No. 6A Core Construction Compound, 6B Western Temporary Construction Compound, 6C Proposed Jetty Temporary Construction Compound);
- Mitigation and Enhancement Area (Work No. 7);

- potential relocation of existing access road to the adjacent Thames Water site (Work No. 8); and
- Ancillary Infrastructure.

2.1.3. In addition, a Biodiversity Net Gain (BNG) Opportunity Area has been identified within land outside of the Site Boundary, located approximately 1km to the west. The BNG Opportunity Area is displayed in **Figure 7-7: Proposed Habitat and Creation Enhancements (Volume 2)**. The provision of these works will be secured by a Section 106 agreement.

2.1.4. Further spatial information on the facilities, designations and surrounding area of the Site are described below.

THE CARBON CAPTURE FACILITY

2.1.5. This component of the Proposed Scheme includes the land intended for the construction of up to two Carbon Capture Plant(s)[a], to be located in the centre of the Site to the south of Riverside 1 and Riverside 2 as Work No. 1A of the **Works Plans (Document Reference 2.3)**. The Carbon Capture Facility component also includes the following elements:

- Utilities Connection and Site Access Works (Work No. 3);
- the start of the LCO_2 Piping and Utilities Connection to the Proposed Jetty (Work No. 5);
- potential relocation of existing access road to the adjacent Thames Water site (Work No. 8); and
- maintenance laydown.

2.1.6. Further description of the Carbon Capture Facility is presented within **Section 2.1**.

2.1.7. The Carbon Capture Facility component contains seven land parcels of approximately 8ha in total named:

- the East Paddock;
- the Stable Paddock;
- Borax North;
- Borax South;
- Creekside;
- Munster Joinery[b]; and

[a] The evolving design is on the basis of two Carbon Capture Plants, however, as part of ongoing design development the potential for a single Carbon Capture Plant will be considered at the detailed design stage. For the purposes of this ES each environmental topic has anticipated a reasonable worst case in their assessment, and this is detailed within each of the topic chapters.

[b] It is recognised that this parcel is owned by Landsul Limited and part occupied by Munster Joinery, however, it is referenced as Munster Joinery throughout this ES and the rest of the Application documentation.

- Gannon, as shown in **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**.

2.1.8. Norman Road would be used for accessing the Riverside Campus.

2.1.9. Work No. 3 of the **Works Plans (Document Reference 2.3)** Utilities Connection and Site Access Works incorporates those parts of Norman Road that are within the Site Boundary. The Carbon Capture Facility component can be accessed directly from Norman Road using existing gateways into the Gannon, Munster Joinery and Creekside land parcels. Access into the Stable Paddock is gained via the Thames Water Access Road. In addition, there are currently temporary accesses into Borax North and South land parcels which have been put in place for the construction of Riverside 2.

2.1.10. The East and Stable Paddocks are part of Crossness LNR; they are gated and are considered as Non-Accessible Open Land[c]. The entirety of Crossness LNR covers approximately 25.5ha, including the East and Stable Paddocks. Crossness LNR comprises both publicly Accessible[d] and Non-Accessible Open Land within the Site Boundary and a Members only restricted area which is located behind Thames Water fencing adjacent to the Site Boundary to the west[1].

2.1.11. East and Stable Paddocks cover approximately 2.5ha and comprise coastal and floodplain grazing marsh habitat, dominated by typical neutral grassland species. The East Paddock is used by a grazier and their associated horses all year round and so has a shorter sward than the Stable Paddock, which is occasionally grazed. The remainder of the Crossness LNR typically contains areas of grazing marsh[2], with ponds and ditches, and areas of scrub and rough grassland.

2.1.12. The Carbon Capture Facility is located partially within the Erith Marshes Site of Importance for Nature Conservation (SINC), and partially within the Belvedere Dykes SINC[3]. The Thames Marshes Corridor (denoted in the Bexley Local Plan[7]) passes through the Carbon Capture Facility. There are areas designated as Metropolitan Open Land (MOL)[4,e], which stretches south of the A2016 Picardy Manorway/Eastern Way. The component also includes a section of the Thames Marshes Corridor, a designated Strategic Green Wildlife Corridor as well as an area of the Southeast London Green Chain[5]. The Carbon Capture Facility falls within the Belvedere Industrial Area, which is land designated as a Strategic Industrial Location[4].

[c] Non-Accessible Open Land: Land of open character, but which is not accessible to the public (due to it being fenced off). The Applicant considers that this land is not classified as 'public open space' for PA2008 purposes as it is not able to be used for recreational purposes. A full definition is provided in the **Glossary (Document Reference 1.7)**.

[d] Accessible Open Land: Land of open character within the Site that is accessible to the public. The Applicant considers that this land can also be classified as 'public open space' for PA2008 purposes as it is accessed and used by the public for recreational walking and activities. A full definition is provided in the **Glossary (Document Reference 1.7)**.

[e] The MOL designation shown within the Bexley Local Plan Polices Map[4] has been used during the preparation of this report.

2.1.13. A secondary Thames Water Access Road is situated within this component, located between the Borax North and South land parcels, as shown in **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**. The access road connects Norman Road to the Crossness Sewage Treatment Works (primarily for emergency vehicle access) and also provides access to the Stable Paddock and Great Breach Pumping Station. The access road is considered as Non-Accessible Open Land.

2.1.14. The southern section of PRoW FP4 sits within this component, as shown in **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.15. The Carbon Capture Facility sits within Flood Zone 3[6], as shown on **Sheet 2: Flood Zones** of the **Environmental Features Plans (Document Reference 2.7)**, and areas designated as Functional Floodplain (Flood Zone 3b)[4].

2.1.16. An intermediate pressure gas main owned and operated by Southern Gas Networks runs to the east of, and parallel to, the Iron Mountain Records Storage Facility and Asda Access Road. Underground electricity cables lie within the Borax North, Borax South, Creekside, Munster Joinery and Gannon land parcels and along Norman Road, in a north to south direction.

2.1.17. There are two Thames Water clean water mains that run along Norman Road, supplying water to Riverside 1 and Riverside 2. A foul sewer, with three accompanying manholes, is located at the southern end of Norman Road, in the southernmost area of the Carbon Capture Facility. A surface water sewer runs immediately to the east of the foul sewer.

2.1.18. An electricity substation is located in the southeast of the Gannon land parcel within the Mitigation and Enhancement Area. There are underground electricity cables that cross this area in a west to east direction, within the Norman Road Field land parcel.

RIVERSIDE 1 AND RIVERSIDE 2

2.1.19. Riverside 1 and Riverside 2 are located in the centre of the Site. Modification and interconnections to Riverside 1 and Riverside 2 are required as part of the Proposed Scheme in the locations shown as Work No. 2 on the **Works Plans (Document Reference 2.3)**. Further detail about the proposed modification and interconnections to Riverside 1 and Riverside 2 is presented in **Section 2.2**.

2.1.20. This component is designated in the Bexley Local Plan[7] policy as a Strategic Waste Management Site and forms part of the Belvedere Industrial Area, which is land designated as a Strategic Industrial Location[4]. It is accessible via Norman Road and includes the land occupied by Cory's existing (Riverside 1) and future (Riverside 2) EfW facilities. At the time of writing, Riverside 2 is under construction.

2.1.21. Riverside 1 is one of the largest EfW facilities in the UK, with a maximum consented waste throughput of 850,000 tonnes per annum (tpa)[12]. Riverside 1 received 789,000 tonnes of non-recyclable waste in 2022.

2.1.22. Riverside 2 will be operational in 2026 as one of the most efficient EfW facilities in the UK. Riverside 2 has a maximum consented waste throughput of 805,920 tpa of non-recyclable waste[9].

2.1.23. As with Riverside 1, Riverside 2 will utilise well-established moving grate incineration technology[8], which has been successfully deployed across numerous operational EfW facilities in the UK and globally.

2.1.24. Combined, Riverside 1 and Riverside 2 will generate enough electricity to power approximately 300,000 homes each year[9]. The two facilities combined represent some 98% of the Applicant's total carbon footprint; hence the intention to incorporate new carbon capture infrastructure (i.e. the Proposed Scheme).

2.1.25. Riverside 1 and Riverside 2 are located on the River Thames, and, uniquely within the UK, utilise river transport. The majority of waste delivered to Riverside 1 is transported via barge shipment along the River Thames, and future waste will predominantly be delivered to Riverside 2 in this way. Incinerator bottom ash (IBA), ash from the combustion process, from Riverside 1 is transferred via the River Thames to the Port of Tilbury, to be processed into aggregate products for use in construction, in road paving and low-grade concrete[9]. Once operational the Riverside 2 IBA will be exported, and processed, in the same way.

2.1.26. The operation of the Carbon Capture Facility and the Proposed Jetty will have no impact on the waste throughput (and associated traffic and vessel movements) of Riverside 1 and Riverside 2.

2.1.27. The Riverside 1 and Riverside 2 components encompass a section of the England Coast Path (which is also designated as a Public Right of Way (PRoW) (FP3)) and National Cycle Network Route 1 (NCN1), and PRoW FP4, as shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.28. The Riverside 1 and Riverside 2 components sit within Flood Zone 3[13] as shown on **Sheet 2: Flood Zones** of the **Environmental Features Plans (Document Reference 2.7)**.

THE PROPOSED JETTY

2.1.29. The Proposed Jetty is the northernmost area of the Site, predominantly located within the River Thames as shown as Work No. 4B on the **Works Plans (Document Reference 2.3)**. It will contain the new Proposed Jetty to export the LCO_2 and associated dredging, Above Ground Pipelines, as well as works to the adjacent existing Belvedere Power Station Jetty (disused). Further description of the Proposed Jetty and Belvedere Power Station Jetty (disused) are presented in **Section 2.2** and **Section 2.5** respectively.

2.1.30. This component contains two existing jetties that extend into the River Thames: Middleton Jetty (approximately 280m length), located adjacent (north) of Riverside 1; and the Belvedere Power Station Jetty (disused), which is located north of Iron Mountain Records Storage Facility. Middleton Jetty is designated as a Safeguarded

Wharf[5] whereas the Belvedere Power Station Jetty (disused) is not listed amongst the Directions for safeguarded wharves issued by the Secretary of State on 19 February 2021[10] nor marked as a Safeguarded Wharf[5] on Bexley Local Plan Policies Map[5]. Both jetties bridge across England Coast Path (FP3/NCN1).

2.1.31. Approximately 75% of the waste processed at Riverside 1 is delivered to Middleton Jetty by tug pulled barges; removing the equivalent of 100,000 heavy goods vehicle (HGV) journeys per annum from the road[11]. There are generally five tug and barge arrivals and five departures a day under current operations. Eight barges can be moored alongside Middleton Jetty at any one time (utilising both the river and shore facing sides). The waste is unloaded at Middleton Jetty and transferred, by crane, onto dock tractors and trailers and driven to the Riverside 1 tipping hall[12]. Middleton Jetty is also used for the transport of IBA from Riverside 1 to a recycling facility at the Port of Tilbury. River-based transport will be used in the same way for Riverside 2 when operational.

2.1.32. The Belvedere Power Station Jetty (disused) is located within the intertidal zone within the River Thames, is a non-designated heritage asset comprising of the following associated structures:

- Main Deck - a reinforced concrete deck (approximately 180m length) supported on a combination of steel and concrete, raked and vertical piles;
- Dolphins – a reinforced concrete deck supported on a combination of steel and concrete raked and vertical piles;
- Walkways – suspended beneath the main deck; and
- Access Trestle – a steel truss structure with a concrete deck, providing access from the land to the main deck.

2.1.33. The Proposed Jetty is located within the River Thames and Tidal Tributaries SINC, as shown on **Sheet 3: Statutory and Non-Statutory Ecological Designated Sites** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.34. The Proposed Jetty sits within Flood Zone 3[13] as shown on **Sheet 2: Flood Zones** of the **Environmental Features Plans (Document Reference 2.7)**.

TEMPORARY CONSTRUCTION COMPOUNDS

2.1.35. Construction works will take place across the Site as required. However, there are three areas of focus proposed for construction related activities: two temporary construction compounds designated for terrestrial works, shown as Work No. 6 on the **Works Plans (Document Reference 2.3);** and one specifically for the construction activities related to the Proposed Jetty and Belvedere Power Station Jetty (disused), shown as Work No. 6 on the **Works Plans (Document Reference 2.3)**.

Core Temporary Construction Compound

2.1.36. The core Temporary Construction Compound will be located centrally within the Site, within the Carbon Capture Facility component as shown as Work No. 6A on the **Works Plans (Document Reference 2.3)**.

2.1.37. The core Temporary Construction Compound comprises five land parcels: Borax North, Borax South, Creekside, Munster Joinery and Gannon. Norman Road runs to the east of the compound, as shown in **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**. The northern perimeter of Creekside contains an area of Non-Accessible Land, and the Thames Water access road is considered Accessible Land as shown on **Figure 14-1: Accessible and Non-Accessible Open Land (Volume 2)** and **Figure 14-2: Accessible and Non-Accessible Open Land Satellite Imagery (Volume 2)**.

2.1.38. The core Temporary Construction Compound is surrounded by the Erith Marshes SINC, Metropolitan Open Land, South East London Green Chain, Flood Zone 3[13], and the area is designated as Functional Floodplain (Flood Zone 3b)[4] but is substantially not covered by any of these designations, as shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land**, **Sheet 2: Flood Zones** and **Sheet 3: Statutory and Non-Statutory Ecological Designated Sites** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.39. The core Temporary Construction Compound can be accessed via Norman Road using existing gateways into the Gannon, Munster Joinery and Creekside land parcels. In addition, there are currently temporary accesses into Borax North and South land parcels which have been put in place for the construction of Riverside 2. The Applicant is seeking the flexibility to utilise any combination of these points (and any new accesses that may be required) throughout construction and operation of the Proposed Scheme.

Western Temporary Construction Compound

2.1.40. The western Temporary Construction Compound will be located along and within the western and southern boundaries of Riverside 2, as shown as Work No. 6B on the **Works Plans (Document Reference 2.3)**.

2.1.41. The western Temporary Construction Compound currently comprises of Riverside 2, grassland, a ditch and part is located within Crossness LNR. The compound also sits within Erith Marshes SINC, Metropolitan Open Land, South East London Green Chain, Flood Zone 3[13] and is adjacent to the England Coast Path (FP3/NCN1) as shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land**, **Sheet 2: Flood Zones** and **Sheet 3: Statutory and Non-Statutory Ecological Designated Sites** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.42. The area of the western Temporary Construction Compound that does not fall within Riverside 2 is designated as Non-Accessible Open Land as shown on **Figure 14-1: Accessible and Non-Accessible Open Land (Volume 2)** and **Figure 14-2: Accessible and Non-Accessible Open Land Satellite Imagery (Volume 2)**.

2.1.43. The western Temporary Construction Compound will be accessible from the access roads within Riverside 2.

Proposed Jetty Temporary Construction Compound

2.1.44. The Proposed Jetty Temporary Construction Compound is located to the northeast of Riverside 1, adjacent to the England Coast Path (FP3/NCN1) and includes the northern section of the Iron Mountain Records Storage and Asda Access Road adjacent to Norman Road, as shown as Work No. 6C on the **Works Plans (Document Reference 2.3)**.

2.1.45. The Proposed Jetty Temporary Construction Compound is located in land that is designated as urban open space and sits within the Belvedere Dykes SINC and Flood Zone 3[13] as shown on **Sheet 2: Flood Zones** and **Sheet 3: Statutory and Non-Statutory Ecological Designated Sites** of the **Environmental Features Plans (Document Reference 2.7)**. The Thames Marshes Corridor (denoted in the Bexley Local Plan[7]) passes through the Proposed Jetty Temporary Construction Compound along the existing Iron Mountain Records Storage Facility and Asda Access Road.

2.1.46. The entirety of the Proposed Jetty Temporary Construction Compound is deemed as Non-Accessible Open Land as shown on **Figure 14-1: Accessible and Non-Accessible Open Land (Volume 2)** and **Figure 14-2: Accessible and Non-Accessible Open Land Satellite Imagery (Volume 2)**.

2.1.47. FP4 intersects the Proposed Jetty Temporary Construction Compound. The PRoW is shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.48. The Proposed Jetty Temporary Construction Compound will be accessible via the existing Iron Mountain Records Storage Facility and Asda Access Road.

MITIGATION AND ENHANCEMENT AREA

2.1.49. The Mitigation and Enhancement Area is located in the central, south and west of the Site as shown as Work No. 7 on the **Works Plans (Document Reference 2.3)**. The land within this component has been identified as part of the mitigation proposals suggested by **Chapter 7: Terrestrial Biodiversity (Volume 1)**, the BNG Assessment (included in **Appendix 7-1: Biodiversity Net Gain Report (Volume 3)**) and the design development explained in the **Design Approach Document (Document Reference 5.6)** to provide habitat mitigation, compensation and enhancement, planting for landscape integration purposes as well as mitigation and enhancement proposals in light of the Proposed Scheme's impacts to Metropolitan Open Land and access.

2.1.50. The Mitigation and Enhancement Area comprises of, the remainder of the Crossness LNR located within the Site and the Norman Road Field land parcel as shown on **Figure 1-2: Satellite Imagery of the Site Boundary Plan (Volume 2)**. The Mitigation and Enhancement Area can be accessed via the Thames Water Access Road, the England Coast Path (FP3/NCN1) and a gateway at the southern end of Norman Road.

2.1.51. This Mitigation and Enhancement Area also falls within the Erith Marshes SINC[3], Metropolitan Open Land[4] and Southeast London Green Chain[5]. The Thames

Marshes Corridor (denoted in the Bexley Local Plan[7]) passes through the Mitigation and Enhancement Area. These designations are shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land** and **Sheet 3: Statutory and Non-Statutory Ecological Designated Sites** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.52. The Mitigation and Enhancement Area sits within Flood Zone 3[13], as shown on **Sheet 2: Flood Zones** of the **Environmental Features Plans (Document Reference 2.7)**, and areas designated as Functional Floodplain (Flood Zone 3b)[4].

2.1.53. FP1 intersects the southwestern portion of the Mitigation and Enhancement Area adjacent to the A2016 (Eastern Way) and is connected to FP2. FP2 extends parallel along the western edge of the Site Boundary, crossing the Thames Water Access Road and northwards to intersect England Coast Path (FP3/NCN1). A second arm of FP2 is located along the Thames Water Access Road and continues in a southerly direction through the Mitigation and Enhancement Area to Norman Road. The access road is considered as Non-Accessible Open Land. FP3 extends from the Crossness Sewage Treatment Works and through the northwestern area of the Mitigation and Enhancement Area and northern portion of the Site, adjacent to the River Thames. The PRoW are shown on **Sheet 1: Public Rights of Way, Cycle Routes and Metropolitan Open Land** of the **Environmental Features Plans (Document Reference 2.7)**.

2.1.54. The Mitigation and Enhancement Area comprises areas of Non-Accessible Open Land across the north, west and southern perimeter of the Site Boundary. Areas of Accessible Open Land are located within Norman Road Field.

2.1.55. The Mitigation and Enhancement Area includes several waterbodies in the southern and western portions of the area. These include eleven ponds, Great Breach Lagoon (MR2), Great Breach Dyke West (MR11), Great Breach Dyke North Culvert (MR12), West Paddock Ditch (OW3) and Stable Paddock Ditch (OW6). The northwestern portion of the Mitigation and Enhancement Area includes the Great Breach Pumping Station and the Great Breach Outfall. These are shown on **Figure 11-2: Surface Water Features (Volume 2)**. The Mitigation and Enhancement Area sits within Flood Zone 3[6], as shown on **Sheet 2: Flood Zones** of the **Environmental Features Plans (Document Reference 2.7)**.

SURROUNDING AREA

2.1.56. The Site is located within the Belvedere Industrial Area, a Strategic Industrial Location[5] comprising a number of industrial estates, including:

- Hailey Road Industrial Estate, approximately 60m south of the Site Boundary;
- Fishers Way Industrial Estate, approximately 45m southeast of the Site Boundary;
- Waldrist Way Industrial Estate, approximately 270m south of the Site Boundary;
- Crabtree Manorway North, approximately 600m east of the Site Boundary; and
- River Wharf Business Park, approximately 600m east of the Site Boundary.

2.1.57. The closest individual business operations adjacent to the Site Boundary are the Lidl Warehouse/Belvedere Regional Distribution Centre located adjacent (southeast), and Iron Mountain Records Storage Facility (adjacent east). Asda Belvedere Distribution Centre is located adjacent (east) of the Site Boundary. Other individual business operations in proximity to the Site Boundary include:

- The Morgan Pub and Restaurant, approximately 20m south;
- Travelodge London Belvedere, approximately 30m south;
- Snap Fitness, approximately 70m south;
- Ctr Group, approximately 70m south;
- Howdens Joinery, approximately 70m south;
- Intersped Logistics (UK) Limited, approximately 90m south;
- Tap'in 3PL Ltd, approximately 95m south;
- HS Carlsteel Engineering Ltd, approximately 95m south;
- Starbucks Drive Thru, approximately 90m southeast;
- Freshasia Foods Ltd., approximately 100m south;
- Lidl, approximately 150m southeast;
- Asda ASC Recycling Centre, approximately 340m east;
- Belvedere Wharf, approximately 380m east; and
- The Amazon UK DBR1 and Erith Driving Test Centre, approximately 390m east.

2.1.58. The Crossness Sewage Treatment Works located approximately 5m the west of the Site Boundary, includes a disused sludge incinerator and the Crossness Pumping Station. The Crossness Sewage Treatment Works treats wastewater from south and southeast London and is operated by Thames Water. To the north of the Crossness Sewage Treatment Works is the Thames Water Jetty.

2.1.59. The residential area of Belvedere, which includes Franks Park and Bexley College, is located approximately 170m south of the Site Boundary at its closest point. Thamesmead residential area is located approximately 1.3km west of the Site Boundary. Rainham Landfill is located approximately 2km east of the Site Boundary on the northern bank of the River Thames. Community facilities lie within 100m of the Site Boundary including: the Morgan Public House, approximately 20m south (on the A2016 Picardy Manorway); Travelodge London Belvedere approximately 30m south; and churches and primary schools all located approximately 60m southeast. The London LOOP is located approximately 1km southeast of the Site Boundary. Further information about residential properties and community facilities presented in **Chapter 14: Population, Health, and Land Use (Volume 1)**.

2.1.60. The Site is accessed by Norman Road, which connects with the A2016 Picardy Manorway to the south and east. Belvedere Railway Station is located approximately 580m south of the Site Boundary and there are numerous bus stops in the surrounding area. ProW FP1, FP2, The England Coast Path (FP3/NCN1), FP4 and FP242 are located within 500m of the Site Boundary.

2.1.61. The Rainham Marshes LNR and Inner Thames Marshes Site of Special Scientific Interest (SSSI) are located approximately 900m east of the Site Boundary, across the River Thames. The Lesnes Abbey Woods LNR is located approximately 1.2km south of the Site Boundary. Further information on sites designated for their biodiversity value is provided in **Chapter 7: Terrestrial Biodiversity (Volume 1)** and **Chapter 8: Marine Biodiversity (Volume 1)**.

2.1.62. Crossness Conservation Area is located approximately 680m to the west of the Site Boundary. The Conservation Area includes three listed buildings; Workshop Range to southeast of Main Engine House (A2), Crossness Pumping Station (A3) and Workshop Range to southwest of Main Engine House (A4), the listed buildings are all located approximately 760m west of the Site Boundary. Grade II listed No. 4 Jetty and Approach at Dagenham Dock located 750m northwest of the Site Boundary. The Site and surrounding area include one other heritage feature (in immediate proximity to the Site) which is the Belvedere Power Station Jetty (disused) located to the north of the Site Boundary. The location of these assets is shown in **Sheet 4: Heritage Features** of the **Environmental Features Plans (Document Reference 2.7)**. The Site Boundary lies within the Thamesmead and Erith Marshes Archaeological Priority Area. Further information on heritage assets is provided in **Chapter 9: Historic Environment (Volume 1)**.

2.2. PROPOSED SCHEME DESCRIPTION

2.2.1. This description of the Proposed Scheme has evolved from that presented in the PEIR[14] as a result of:

- ongoing design development;
- changes to the Site Boundary as described in **Section 1.1** of **Chapter 1: Introduction (Volume 1)**;
- feedback gathered during EIA, informal and statutory consultation (as summarised in **Section 4.4** of **Chapter 4: EIA Methodology (Volume 1)**; and
- the findings of Hazard Identification (HAZID) and process safety studies undertaken.

CARBON CAPTURE FACILITY (WORK NO.1)

2.2.2. The Carbon Capture Facility is the installation of post combustion carbon capture technology to capture CO_2 from Riverside 1 (in operation) and Riverside 2 (due to be operational by 2026). It will capture a minimum of 95% of CO_2 emissions from Riverside 1 and 95% of CO_2 emissions from Riverside 2, which is equivalent to approximately 1.3Mt CO_2 per year[15]. Furthermore, with the feedstock to Riverside 1 and Riverside 2 comprising approximately 50% biogenic content, the Carbon Capture Facility would result in net-negative CO_2 emissions of approximately 0.6Mt per year of CO_2[10]. As such, the Proposed Scheme will be part of a global, national and regional effort to enable the decarbonisation of emissions in the UK, and London and the south east of England in particular.

2.2.3. The Carbon Capture Facility could be delivered with the construction of two separate Carbon Capture Plant(s), one for Riverside 1 and one for Riverside 2; or the construction of a single Carbon Capture Plant. A single Carbon Capture Plant will have the same capacity as two plants and will be able to process the flue gas from both Riverside 1 and Riverside 2. The parameters for the Proposed Scheme (see **Section 2.3)** and **Works Plans (Document Reference 2.3)**) allow for both a single plant and two plant design. The optimum solution will be agreed after the selection of a Carbon Capture Technology Vendor as part of the detailed design of the Proposed Scheme. For the purposes of this ES each environmental topic has anticipated a reasonable worst case in their assessment in respect of this flexibility, and this is detailed within each of the technical chapters.

2.2.4. The CO_2 will be captured in the Carbon Capture Plant(s) before being processed through compression, conditioning, and liquefaction, prior to being stored onsite ready for export. The CO_2 will be temporarily stored onsite in a liquid form (LCO_2) and then loaded and transported via shipping vessel for permanent sequestration underground. The supply chain and potential transportation and LCO_2 Buffer Storage Area has been considered as part of the development of the Proposed Scheme to ensure it is compatible with the operational model of available storage sites. However, the transportation and permanent storage of LCO_2 does not form part of the Proposed Scheme (albeit the emissions from these activities is dealt with in **Chapter 13: Greenhouse Gases (Volume 1)**). Further details are provided in the LCO_2 Geological Storage Locations section (see **Paragraph 2.2.91** and **Paragraph 2.2.92**).

2.2.5. The Carbon Capture Facility is likely to contain the following elements (shown below in **Figure 2-1: The Key Elements of the Carbon Capture Facility**):

- Carbon Capture Plant(s) (Work No. 1A), each comprising:
  - Flue Gas Pre-Treatment;
  - Absorber Column(s) and Stack(s) (Work No. 1B);
  - Back Pressure Turbine and Generator;
  - Solvent Regeneration System;
  - Rich Solvent/Lean Solvent Heat Exchanger; and
  - Solvent Storage.
- CO_2 Processing Plant (Work No. 1C), each comprising:
  - Compression;
  - Dehydration;
  - Liquefaction; and
  - CO_2 Vents.
- LCO_2 Buffer Storage Area (Work No. 1D) comprising:
  - Temporary Storage; and
  - Boil Off Gas Processing.

- Supporting Plant (Work No. 1E), comprising:
  - Cooling System;
  - Chemical Storage and Distribution Handling Facilities;
  - Water Treatment Plant (Process Water Supply);
  - Wastewater Treatment Plant; and
  - Gatehouse, Control Room, Welfare Facilities, Stores and Workshop.

2.2.6. **Table 2-1** below summarises the elements of the Carbon Capture Facility for both a single plant and two plant design.

2.2.7. The key elements of the Carbon Capture Facility are described further below. An **Engineering Plans: Indicative Equipment Layout (Document Reference 2.5)** has been produced which shows one, example, way in which these elements could be built out within the parameters established by the **Works Plans (Document Reference 2.3)** and **Table 2-2**.

2.2.8. This plan has been produced to aid understanding and appreciation of the nature of the Proposed Scheme but does not form the basis of assessment in this ES.

Table 2-1: Carbon Capture Facility Summary – Single Plant vs. Two Plant

	Single Plant Design – No./Common	Two Plant Design – No./Common
Carbon Capture Plant(s)		
Flue Gas Pre-Treatment	1	2
Absorber Column(s) and Stack(s)	1	2
Back Pressure Turbine and Generator	1	2
Solvent Regeneration System	1	2
Rich Solvent/Lean Solvent Heat Exchanger	1	2
Solvent Storage	1	1
CO_2 Processing Plant		
Compression	1	2
Dehydration	1	2
Liquefaction	1	2
CO_2 Vents	1	2
LCO_2 Storage		
LCO_2 Buffer Storage Area	1	1

	Single Plant Design – No./Common	Two Plant Design – No./Common
Boil-Off Gas Processing	1	1
Supporting Plant		
Heat Transfer System	1	1
Cooling System	1	1
Chemical Storage and Distribution Handling Facilities	1	1
Water Treatment Plant (Process Water Supply)	1	1
Wastewater Treatment Plant	1	1
Gatehouse, Control Room, Welfare, Stores and Workshop	1	1
Modification and Interconnection with Riverside 1 and Riverside 2		
Flue Gas Supply Ductwork	Separate ducting required from Riverside 1 and Riverside 2.	
Heat Offtake Infrastructure, Process Steam and Condensate	Separate points of extraction from Riverside 1 and Riverside 2, combined into one system.	
Electrical Connections	1	1
Piping and Utilities to Jetty	1	2

THE CARBON CAPTURE PLANT(S)

Flue Gas Pre-Treatment (Work No. 1A)

2.2.9. A new connection into the existing flue gas lines of Riverside 1 and Riverside 2 will be required, prior to the connection point to their existing exhaust stacks[f], to route the flue gas through new Flue Gas Supply Ductwork (Work No. 2B) of the **Works Plans (Document Reference 2.3)** into the Carbon Capture Plant(s).

2.2.10. Flue gas conditioning is achieved through a Direct Contact Cooler. This cools and condenses water out of the saturated flue gas and treats residual components (sulphuric and nitric acids) within the flue gas prior to it reaching the Absorber Column(s) and Stack(s).

2.2.11. Induced draft fans will be installed within the Flue Gas Pre-Treatment area to increase the pressure of the cooled flue gas and overcome the pressure drop across the Carbon Capture Plant(s).

Absorber Column(s) and Stack(s) (Work No. 1B)

2.2.12. In the Absorber Column(s) the cooled flue gas will move upwards through the Column, with the amine-based solvent being supplied from the top. As the flue gas moves upwards, the CO_2 within the flue gas will be absorbed by the amine-based solvent. Post CO_2 absorption, the flue gas will continue upwards to the water wash component of the Absorber Column(s). This will maintain the flue gas water balance, recover chemical vapour and control chemical emissions. Air quality modelling has been undertaken to demonstrate compliance with environmental limits, particularly regarding the amine degradation products in the flue gas (further details are provided in **Chapter 5: Air Quality (Volume 1)**).

2.2.13. The treated flue gas will be re-heated prior to being emitted to the atmosphere. The heat source for this re-heat can be supplied from the steam condensate being returned to Riverside 1 and Riverside 2 from the Carbon Capture Plant(s), or from the incoming flue gas from Riverside 1 and Riverside 2 prior to it reaching the Direct Contact Cooler – the latter would be undertaken via an indirect heat transfer medium such as treated water or a glycol/water blend.

2.2.14. The treated flue gas will then be emitted into the atmosphere, via new Emissions Stack(s) at the top of the Absorber Column(s). The treated flue gas emitted from the Absorber Column(s) and Emissions Stack(s) will be reheated prior to discharge in order to mitigate against visible plumes across most weather conditions. There will be a Stack on each Absorber Column, adding up to two new stacks to the Riverside Campus on the basis of two Carbon Capture Plant(s). The flue gas emissions will be continuously monitored via a Continuous Emissions Monitoring System (CEMS).

[f] Riverside 1 has three flue gas lines and one common exhaust stack in which the three flues are not combined, and Riverside 2 (once constructed) will have two flue gas lines and two exhaust stacks.

2.2.15. The CO_2 rich amine-solvent will accumulate at the bottom of the Absorber Column(s), separate from the now treated flue gas. The CO_2 rich amine-solvent will be pumped through a solution heat exchanger to the Regenerator Column (described above). The Absorber Column(s) will include navigational lighting.

Solvent Regeneration System (Work No. 1A)

2.2.16. The Solvent Regeneration System consists of the Regenerator Column and Solvent Processing System.

2.2.17. In the Regenerator Column, low-pressure steam indirectly heats the CO_2-rich amine-based solvent solution, stripping the CO_2 from the amine-based solvent solution. A condenser then condenses the solvent vapours, releasing the (wet) CO_2-rich stream to be sent for downstream CO_2 Processing.

2.2.18. The steam will be supplied from the Riverside 1 and Riverside 2 boilers. The Back Pressure Turbine is utilised to provide steam at the temperature and pressure conditions required by the regenerator reboiler while also generating electricity.

2.2.19. The Solvent Processing System consists of a filtration and reclamation system, to remove any heat stable salts (HSS) and degradation products in the amine-based solvent. Lost solvent will be replaced by fresh solvent from the Solvent Storage Tanks located in this component.

2.2.20. Solvent Storage Tanks will supply fresh amine-solvent for the Carbon Capture Facility. Small volumes of amine-loaded sludge will be produced as a by-product of the carbon capture process. This will be temporarily stored onsite prior to being transported offsite to an appropriate waste treatment facility as hazardous waste, further details are provided in **Chapter 18: Landside Transport (Volume 1)**.

Rich Solvent/Lean Solvent Heat Exchanger (Work No. 1A)

2.2.21. The CO_2-lean solvent is required to be cooled prior to be being sent back to the Absorber Column(s) to absorb CO_2 once again from the incoming flue gas.

2.2.22. The CO_2-rich solvent is required to be pre-heated prior to the regeneration process as part of the Solvent Regeneration System.

2.2.23. A Rich Solvent/Lean Solvent Heat Exchanger is utilised. This acts to:

- cool the CO_2-lean solvent[g] at the Regenerator Column outlet before it is further cooled via the Cooling Water System, prior to the Absorber Column(s); and
- heat the CO_2-rich solvent[h] at the Regenerator Column inlet.

2.2.24. This heat integration within the Carbon Capture Plant(s) both reduces external cooling demands (and hence energy consumption of the Cooling Water System) and reduces the amount of steam required. The CO_2-lean solvent is further cooled via the Cooling

[g] Lean Solvent: Solvent that has had the CO_2 stripped out from it in the Regeneration Column.
[h] Rich Solvent: Solvent that is loaded with CO_2 removed from the flue gas in the Absorber Column.

System (within the Supporting Plant section, described in **Paragraph 2.2.46** to **Paragraph 2.2.61** below).

Back Pressure Turbine and Generator (Work No. 1A)

2.2.25. The Carbon Capture Plant requires low pressure steam; however, steam is only available from Riverside 1 and Riverside 2 at high pressure. To maximise process efficiency, the Carbon Capture Plant(s) will be supported by one Back Pressure Turbine and one Pressure Reducing De-Superheating Station. The Back Pressure Turbine will maximise the extraction of energy within the steam during pressure reduction. The Pressure Reducing De-Superheating Station will refine the temperature and pressure of the steam exiting the Back Pressure Turbine, to make it suitable for use in the Solvent Regeneration System.

2.2.26. In addition to conditioning the steam required for the carbon capture process, the Back Pressure Turbine will also supply an amount of the electrical power required for the Proposed Scheme. The thermal energy within the steam entering the Back Pressure Turbine will be used to rotate the turbine shaft and subsequently drive the generator, thus generating power. Further to the shared Ancillary Infrastructure described in **Paragraph 2.2.106** to **Paragraph 2.2.121** below, electrical power is also required for the following elements of the Carbon Capture Facility:

- Flue Gas Pre-Treatment;
- Rich Solvent/Lean Solvent Heat Exchanger;
- CO_2 Processing Plant; and
- Supporting Plant (including the cooling system).

2.2.27. The remaining power supply for the Proposed Scheme will be supplied from the power generated by Riverside 1 and Riverside 2.

CO_2 Processing Plant (Work No. 1C)

2.2.28. In order for the captured CO_2 to be transported and permanently sequestered at a CO_2 storage site, the Applicant will engage in a contract with a CO_2 transport and storage operator(s). The operator(s) may operate the CO_2, storage site and any associated receiving terminal, and may also operate the vessels for transport of CO_2. The CO_2 storage operator(s) will have a specification that all emitters using the service must adhere to. This requires the captured CO_2 to undergo the following processes to meet the stipulated conditions:

- compression;
- dehydration; and
- liquefaction.

Compression

2.2.29. The captured (wet) CO_2 will be transferred from the Regenerator Column to the Compression Plant, using Above Ground Pipelines. There will be up to two Compressors, one for each Carbon Capture Plant(s). Compression of the low

pressure, wet CO_2 will be undertaken in stages with the CO_2 cooled using cooling water or through direct air cooling between compression stages.

2.2.30. The compressed CO_2, at approximately 16 bar pressure and a temperature of – 40°C, will be routed via Above Ground Pipelines for dehydration (described below).

Dehydration

2.2.31. After compression, the CO_2 stream will need to be dehydrated prior to liquefaction, as it will still be water saturated, to avoid the water freezing in the liquefaction plant.

2.2.32. Solid desiccant dehydration will be used; this is a process utilising adsorption to retain water on the surface of the desiccant particles (such as molecular sieve or silica gel), typically within adsorber vessels.

2.2.33. The dry CO_2 will be routed for liquefaction and refrigeration via Above Ground Pipelines.

Liquefaction

2.2.34. Liquefaction requires the dry CO_2 stream to be cooled; this can be undertaken via expansion of the gas to a liquid-vapour state via a control valve or turbine (open-cycle), or through a heat exchange system, in which it is condensed against an evaporating ammonia or propane refrigerant (closed-cycle). Both liquefaction technologies are considered, as described in **Chapter 3: Consideration of Alternatives (Volume 1)**. Technology selection will be undertaken as part of the detailed design for the Proposed Scheme.

2.2.35. Further conditioning equipment will be required (such as a distillation column) to remove non-condensable components present in the CO_2 stream as a result of co-absorption into the amine solvent from the flue gas, such as oxygen and nitrogen, so that the CO_2 export specification can be met. The non-condensable components are vented to atmosphere. This equipment will be defined as part of the detailed design of the Proposed Scheme but will be within the parameters of the assessment set out in **Section 2.3** of this chapter.

CO_2 Vents

2.2.36. There will be a need for operational and emergency venting of CO_2. Operational venting occurs during start-up and shutdown (during maintenance outages or emergency shutdown scenarios) of the Carbon Capture Facility, and emergency venting in the event of any unscheduled shutdown.

2.2.37. There will be separate supported CO_2 Vents for small volumes of CO_2 venting, with larger volumes such as those during start-up/shutdown to be routed back into the new Stack(s) at the top of the Absorber Column(s).

2.2.38. The specific venting requirements and locations of the CO_2 Vents will be determined as part of the detailed design of the Proposed Scheme.

2.2.39. Any operational and emergency venting of CO_2 will be required to meet any environmental limits set out in the future Environmental Permit as issued by the Environment Agency.

LCO_2 Buffer Storage Area (Work No. 1D)

2.2.40. Buffer storage is required to store the LCO_2 prior to onwards vessel export via the Proposed Jetty. This will be provided as insulated, pressurised, Above Ground Storage Tanks. As detailed in **Chapter 3: Consideration of Alternatives (Volume 1)**, two options are being considered and both options will be taken forward to detailed design:

- multiple tall vertical Above Ground Storage Tanks located landside; or
- multiple spherical Above Ground Storage Tanks located landside.

2.2.41. In terms of the assessments being undertaken within this ES, **Chapter 10: Townscape and Visual (Volume 1)** has assessed tall vertical tanks (representative of the worst case) whilst the remainder of the technical chapters have assessed the spherical tanks, which have a slightly greater footprint. However, because this difference in footprint is small it does not affect the overall land required for the Carbon Capture Facility.

Boil Off Gas Processing

2.2.42. As the LCO_2 is stored at saturated conditions, a small amount of boil-off gas (BOG) will be generated due to the ingress of heat into the Above Ground Storage Tanks.

2.2.43. The CO_2 vapour returned from the vessels during loading operations will be combined with the BOG from the Above Ground Storage Tanks and sent to be re-liquefied at either of the Carbon Capture Plant(s). If there is any BOG that is unable to be re-liquefied, it would be vented via a separate supported CO_2 Vent. However, venting of BOG will not be a normal operation and will be a very infrequent event.

Re-Routing of Thames Water Access Road (Work No. 8)

2.2.44. A secondary Thames Water Access Road is situated within the Carbon Capture Facility, located between the Borax North and South land parcels, connecting Norman Road to the Crossness Sewage Treatment Works.

2.2.45. There is potential for the Thames Water Access Road to require diversion as the design of the Carbon Capture Facility develops. It would be intended to realign the Thames Water Access Road at a location that provides the minimum operational disruption for the Carbon Capture Facility, minimum access challenges for Thames Water and minimum impact to the Crossness LNR and Metropolitan Open Land. It would not be proposed to reduce the current width of the Thames Water Access Road and it would be ensured that the vehicles that are required to use this road are still able to do so. It is not anticipated that the number of vehicles using this road will differ greatly in comparison to the current usage once the Proposed Scheme is operational.

Supporting Plant (Work No. 1E)

Cooling System

2.2.46. There is no spare capacity within either of the cooling systems for Riverside 1 or Riverside 2. A new, standalone Cooling System will be provided for the Carbon Capture Facility.

2.2.47. Hybrid (Wet-Dry) Cooling Towers or Dry Cooling Towers have been determined to be the two most suitable options for the Carbon Capture Facility (as concluded in **Chapter 3: Consideration of Alternatives (Volume 1)**). Consequently, the system will include either Hybrid Cooling Towers fitted with plume abatement or Dry Cooling Towers, a cooling water circuit (including make up and blowdown in the case of hybrid cooling) and cooling water supply pumps.

2.2.48. For the hybrid approach, demand for potable water will be minimised by the internal recycling of the process wastewater using the Water Treatment Plant.

Chemical Storage and Distribution Handling Facilities

2.2.49. Chemical Storage and Distribution Handling Facilities are necessary to process the amine-based solvent required for both the Carbon Capture Plant(s) and the Water Treatment Plant (described in **Paragraph 2.2.52** to **Paragraph 2.2.56**). This will comprise of new chemical Above Ground Storage Tanks and warehousing for chemicals. The chemicals anticipated to be used during operation include:

- amine-based solvent;
- caustic soda;
- anti-foam;
- water treatment chemicals (sodium hypochlorite, sulphuric acid, sodium bisulphite, antiscalent);
- cleaning chemicals;
- lubricating oils; and
- nitrogen (for purging of plant equipment).

2.2.50. In addition to the above, there is potential for ammonia or propane to be used for the first fill of the refrigeration plant as part of the liquefaction section of the CO_2 Processing Plant. This is a closed-loop system; thus, there is no requirement to deliver or store ammonia or propane onsite as no top up will be required. The selection of liquefaction technology will be undertaken as part of the detailed design for the Proposed Scheme.

2.2.51. All liquid chemicals stored onsite will be kept in bunded controlled areas (LCO_2 Buffer Storage Area) to minimise the risk of contamination to process and surface water.

Water Treatment Plant (Process Water Supply)

2.2.52. A Water Treatment Plant is required within the Carbon Capture Facility to provide process water for the evaporative cooling (should hybrid cooling be selected), wash water and chemical makeup systems. The feed water supply will likely use a combination of potable water from Thames Water (Water Supply Zone: 0105), and recycled effluent from the Carbon Capture Facility. For further information on the feed water supply see **Section 3.6** of **Chapter 3: Consideration of Alternatives (Volume 1)**. The design of the Carbon Capture Facility has included water recycling where possible, to minimise potable water demand and wastewater generation from the Carbon Capture Facility.

2.2.53. The potable water requires minimal treatment for use in the Cooling System, focussed on chemical dosing for scale and biological control.

2.2.54. The condensate from the flue gas Direct Contact Cooler will be cooled before treatment, by ultrafiltration, to remove particulate matter. The filtered flue gas condensate will then either:

- be blended with potable water for use in the Cooling System; or
- undergo further treatment by reverse osmosis to produce the demineralised water used in the flue gas water wash (Absorber Column(s)).

2.2.55. Blowdown water from the Hybrid Cooling Towers (if selected) will be treated in an independent process by nanofiltration. Recycling the blowdown cooling water minimises the demand on potable water and substantially reduces the volume of effluent produced.

2.2.56. A single Water Treatment Plant will provide water to the Carbon Capture Plant(s), and for CO_2 Processing. The Water Treatment Plant will be contained within the same building as the Wastewater Treatment Plant (described below).

Wastewater Treatment Plant

2.2.57. Wastewater will be generated by the Water Treatment Plant itself. This will include backwash water from the ultrafiltration membrane process, concentrate from the nanofiltration membrane process and membrane cleaning solutions. Backwash water will be treated and recycled back into the cooling water supply (should hybrid cooling be selected). Membrane cleaning solutions will be neutralised.

2.2.58. Treated wastewater will be discharged to the local foul sewer (with or without treatment, depending on trade effluent consents). Prior to discharge the sludge produced would go through a settlement process. Nanofiltration concentrate and neutralised cleaning solutions will be blended before discharge into the local foul sewer.

2.2.59. It is not proposed to recycle wastewater that has been in contact with any amine compounds into the Water Treatment Plant. The volume of amine wastewater effluent is expected to be comparatively small; therefore, the waste will be disposed of by specialised appointed Contractor(s), taking the waste offsite for disposal via road tanker.

2.2.60. The Wastewater Treatment Plant will be contained within the same building as the Water Treatment Plant (described above).

Gatehouse, Control Room, Welfare Facilities, Stores and Workshop

2.2.61. The Proposed Scheme is a supporting facility to Riverside 1 and Riverside 2 for operational reasons and will include the following:

- gatehouse and car park;
- control room and welfare facilities; and
- workshop and stores.

MODIFICATION AND INTERCONNECTION WITH RIVERSIDE 1 AND RIVERSIDE 2 (WORK NO. 2)

2.2.62. The modification and interconnections with Riverside 1 and Riverside 2 will include the following:

- Process Steam and Condensate;
- Flue Gas Supply Ductwork; and
- Electrical Connections.

Process Steam and Condensate (Work No. 2A)

2.2.63. Steam is required for several processes within the Carbon Capture Facility. Predominantly, steam is supplied for indirect use in the Solvent Regeneration System, in which heat is dissipated to release the CO_2 from the CO_2-rich amine-based solvent.

2.2.64. For the Carbon Capture Plant(s), steam will be extracted from Riverside 1 and Riverside 2 respectively and supplied to the required process.

2.2.65. Once the steam has been used within the Carbon Capture Facility, the resulting condensate will be returned to Riverside 1 and Riverside 2 respectively. It is likely to follow a similar route to the process steam piping.

Flue Gas Supply Ductwork (Work No. 2B)

2.2.66. A new connection into the Riverside 1 and Riverside 2 flue gas lines, known as flues (which are incorporated within a single stack, for Riverside 1 and two stacks for Riverside 2) will be required, prior to their respective exhaust stacks, to route the flue gas via new ducting to the Carbon Capture Plant(s). The new ductwork tie-ins to the flues will include a damper (shut-off valve) to enable flue gas to be directed to either the Carbon Capture Plant(s), or to the respective Riverside 1 or Riverside 2 exhaust stacks if the Carbon Capture Facility is not able to operate or is operating at reduced capacity.

Electrical Connections (Work No. 2C)

2.2.67. The power for the Proposed Scheme will be supplied from the power generated by Riverside 1 and Riverside 2, as well as the power generated from the Back Pressure Turbine and Generator.

2.2.68. Riverside 1 and Riverside 2 each have a separate 132kV substation. Both substations would require modification to facilitate a 132kV cable connection to the Carbon Capture Facility. The route of the electrical connections between Riverside 1 and Riverside 2 to the Carbon Capture Facility is not yet known. The route of the electrical power cables shall be within the Carbon Capture Facility and/or within the land for the Utilities Connections and Site Access Works. There will be two separate 132kV cable connections, one from Riverside 1 and one from Riverside 2, with the cables running to a 132kV switchroom that is proposed as part of the Carbon Capture Facility.

MARITIME WORKS (WORK NO. 4)

Proposed Jetty (Work No. 4B)

2.2.69. A new and dedicated export structure is required to export the LCO_2. The Proposed Jetty will be located in the River Thames, approximately 130m downstream of the existing Middleton Jetty, with its front face approximately 140m from the southern bank of the River. The Proposed Jetty will comprise the following key features:

- Loading Platform;
- Breasting Dolphins;
- Mooring Dolphins;
- Access Trestle; and
- Access Catwalks.

2.2.70. The main function of the Loading Platform is to facilitate the loading of LCO_2 into the tanks within the vessels. The LCO_2 will be loaded through one or more manifolds located around the centre of the vessels. The loading equipment would be sized so that vessel turnaround time is less than 12 hours. To provide a level of redundancy, three marine loading arms are envisaged.

2.2.71. The structure will be formed of a concrete reinforced deck supported by steel piles (approximately 45 piles). In addition to quick release hooks, the topside infrastructure will feature the following elements: the marine loading arms and vapour return arm; elevated process pipe bridge; lighting; fire suppression systems; and space for a standard London Fire Brigade fire engine to manoeuvre. The Loading Platform will also be equipped with a gangway to allow embarkation and disembarkation of the LCO_2 vessel.

2.2.72. The Breasting Dolphins will be positioned either side of the Loading Platform, comprising two fender cones arranged vertically with fender panels. The fenders will be supported by steel piles. The purpose of the Breasting Dolphins is to absorb some of the loads whilst vessels are berthing.

2.2.73. The Mooring Dolphins will be positioned on either side of the Loading Platform, to secure vessels with mooring lines. The concrete decks will support a double-quick release hook, assisting vessel berthing, and will be supported by steel piles. The Mooring Dolphins will be positioned back from the Loading Platform to ensure mooring lines are of a suitable length and angle.

2.2.74. The Access Trestle will connect the Loading Platform to land and support Above Ground Pipelines and utilities, including for LCO_2, running the length of the Proposed Jetty. It will also provide access for pedestrians, emergency and maintenance vehicles. The Access Trestle will run from the northern/eastern side of the Riverside 1 building, over the England Coast Path (FP3/NCN1) and flood wall, to the rear edge of the Loading Platform. The Access Trestle comprises a deck with a concrete and tarmac roadway atop a steel frame structure, which will be supported by steel piles.

2.2.75. The Access Trestle for the Proposed Jetty will span over the Belvedere Power Station Jetty (disused). Design development is considering whether to retain or demolish and remove this jetty as part of the construction process of the Proposed Jetty, further detail is provided in **Section 2.5** and in **Chapter 3: Consideration of Alternatives (Volume 1)**. In the event that the Belvedere Power Station Jetty (disused) (see below) is retained (with modifications), the proposed Access Trestle will have to be designed and constructed to accommodate it (i.e. wider pile spacing at that location). Regardless of whether the Belvedere Power Station Jetty (disused) will be retained or not the England Coast Path (FP3/NCN1) will be retained; however, overhead construction activities will be undertaken across it.

2.2.76. Access Catwalks will connect the Mooring Dolphins to the Loading Platform providing pedestrian access (with railings for safety).

2.2.77. A minimum water depth will be required alongside the berth to provide vessel access at all states of the tide. Construction dredging (Work No. 4C) of the **Works Plans (Document Reference 2.3)** will therefore be required to provide access to/from the River Thames shipping channel to the Proposed Jetty, including the creation of a berthing pocket for berthing of vessels, further information is provided in **Section 2.4**. Maintenance dredging of this area will also be required, as explained in **Section 2.6**.

2.2.78. To reduce the extent of dredging required, a sheet pile retaining wall equipped with a capping beam will be installed. The wall will be positioned under the Loading Platform at the edge of the berth pocket and run between the outer Mooring Dolphins towards the riverbank. The top of the capping beam will approximately be at the existing riverbed level.

2.2.79. It is proposed that berthing facilities for the Applicant's tugs operating at the Middleton Jetty are integrated to the Proposed Jetty. It is not safe or practicable to include these facilities on the Middleton Jetty, due to the presence of the crane that operates on it. The berthing of tugs will be facilitated via a landing pontoon that will be located at the rear of the Proposed Jetty.

2.2.80. The landing pontoon will provide the Applicant's marine operations with a more flexible approach and allow for safe marine operations within the vicinity of the Proposed Jetty, and in particular:

- safe access and egress for maintenance teams to carry out duties and repairs to the Proposed Jetty without requiring the operating LCO_2 berth to be vacated/out of service;

- safe access and egress for berthing crews to attend the mooring lines of the LCO_2 vessel via workboat;
- safe access and egress for pilots attending the LCO_2 vessel via river transport;
- safe low level access/egress for potential 'man overboard/rescue' from water;
- safe access for LCO_2 vessel supply, maintenance or repair requirements; and
- safe crew access/egress for operation of the Middleton Jetty (to date unavailable).

2.2.81. The envisaged form of construction is a proprietary pontoon restrained by steel piles for vessel access at various states of the tide. Access to the landing pontoon will be via a linkspan connected to the Loading Platform. To ensure access to the tug berth, dredging will be required at the tug berth location. Further information on dredging can be found in **Paragraph 2.4.58** to **Paragraph 2.4.62**.

2.2.82. The LCO_2 Buffer Storage Area provides sufficient buffer volume to store captured LCO_2 for several days of operation, should the Proposed Jetty be non-operational. Should the LCO_2 Buffer Storage Area reach capacity, the Carbon Capture Facility would have to be taken out of service for that period. In this situation, CO_2 would be released to atmosphere in unabated flue gas from the Riverside 1 and Riverside 2 exhaust stacks, in line with current operations.

Proposals for Belvedere Power Station Jetty (disused) (Work No. 4A)

2.2.83. The Belvedere Power Station Jetty (disused) lies in the northeast corner of the Site Boundary within the River Thames and within the intertidal zone. The Belvedere Power Station Jetty (disused) is an 180m long open pile structure with a concrete deck and an open pile dolphin on each end.

2.2.84. Retention of the Belvedere Power Station Jetty (disused) is subject to compatibility with the evolving design of both the Carbon Capture Facility and Proposed Jetty and will be considered as part of the detailed design of the Proposed Scheme.

2.2.85. Appended to the **Jetty Site Alternatives Report (Document 7.6)** is an appendix which sets out the different considerations which inform the choice of which option will be taken forward. The Applicant considers that these impacts are balanced, and in light of the conclusions of this ES' topics, considers that it would be environmentally appropriate for either option to be able to be brought forward, with relevant mitigation measures in place pursuant to the **Outline Code of Construction Practice (Outline CoCP) (Document Reference 7.4)**.

2.2.86. It is noted that this appendix references the possibility of the structure, if it was retained, being used for ecological enhancements, or if it was removed, the existing piles being cut to above water level to enhance marine habitat. As the **Draft DCO (Document Reference 3.1)** does not mandate either one of these two options to be brought forward, this ES and **Appendix 7-1: Biodiversity Net Gain Report (Volume 3)** do not assume delivery of either enhancement.

2.2.87. Retention of the Belvedere Power Station Jetty (disused) would involve modification to the structure, which falls within the footprint of the Proposed Jetty's Access Trestle.

2.2.88. Currently, two options are being considered for the decommissioned jetty:

- Full Demolition; or
- Retention of the Belvedere Power Station Jetty (disused) (potentially with modifications described in **Section 2.5** below, to remove the obstructive parts of the structure and facilitate construction of the Access Trestle of the Proposed Jetty.

2.2.89. The **Draft DCO (Document Reference 3.1)** includes a requirement for the Applicant to confirm the choice it has made to LBB.

Proposed Dredging (Work No. 4C)

2.2.90. Proposed dredging requirements for the construction and operation phases of the Proposed Scheme are set out in **Section 2.4** and **2.6** respectively.

LCO_2 Geological Storage Locations

2.2.91. The permanent CO_2 storage locations do not form part of the Proposed Scheme. However, these locations have been considered for the purposes of the assessment of the 'downstream' effects of the vessel export movements for transporting the LCO_2 for the following two geological storage options (further information is provided within **Chapter 13: Greenhouse Gases (Volume 1)**):

- Storage location in North Sea: considered to be representative of a reasonable worst case scenario, requiring transportation of LCO_2 from the Proposed Scheme for geological storage at a location in the North Sea, approximately 1,150km shipping distance from the Site Boundary.
- Viking (Humber, UK): considered to be the most likely destination option for final storage of CO_2 captured by the Proposed Scheme. This would require transportation of LCO_2 to the Immingham Green Terminal approximately 450km shipping distance from the Site Boundary, and onward transfer via pipeline to the Viking offshore geological storage location in the southern North Sea.

2.2.92. Of the options listed within **Chapter 3: Consideration of Alternatives (Volume 1)** the final CO_2 storage location is likely to be the carbon capture and storage project in the Viking area of the southern North Sea.

PIPING AND UTILITIES CONNECTION TO PROPOSED JETTY (WORK NO. 5)

2.2.93. The LCO_2 will be pumped from the Temporary LCO_2 Storage Tanks to the Proposed Jetty via Above Ground Pipelines[i]. The pipelines will follow a route on the landside elevated process pipe and duct bridge, leading to the elevated process pipe bridge on the Proposed Jetty.

2.2.94. The loading process will displace CO_2 vapour within the tanks within the vessels. This will be routed back to the Carbon Capture Plant(s) via a vapour return arm located on the Proposed Jetty, and a vapour return pipeline as part of the Piping and Utilities Connection to Jetty.

2.2.95. Electrical power is required for the following elements of the Proposed Jetty: lighting; marine loading arms; vapour return arm; and the associated control panel. The electrical power will be supplied from Riverside 1 or Riverside 2 (once operational). Shore power connection to the LCO_2 vessel while berthing at the Proposed Jetty is also being considered. The provisions for shore power will be accommodated within the indicated footprint of the Loading Platform.

UTILITIES CONNECTIONS AND SITE ACCESS WORKS (WORK NO. 3)

Utilities Connections

2.2.96. The Utilities Connections includes the following components:

- Water Supply;
- Wastewater Discharge; and
- Other utilities.

Water Supply

2.2.97. The water supply will likely use a combination of potable water from Thames Water (Water Supply Zone: 0105), and recycled effluent from the Carbon Capture Facility.

2.2.98. Provision of potable water will require a new potable water connection and will be required from a Thames Water main. This connection will likely be located within the southern area of Norman Road within the Site Boundary and as such connecting pipework will need to be installed within Norman Road.

[i] While certain process pipework may have the potential for a buried network, this does not apply to the LCO_2 pipework, which operates at sub-zero temperatures. Burial of this pipework would result in the freezing of the surrounding ground, causing frost heave and potential damage to both the pipework and other facilities within the Site. Above Ground Pipelines also facilitate maintenance activities.

2.2.99. To reduce impact on Thames Water's water network and provide some resilience, it is proposed to include Water Supply Storage Tank(s), which will serve as a feed water tank to the water supply network for the Proposed Scheme. The Water Supply Storage Tank(s) will hold water supply overnight.

Wastewater Discharge

2.2.100. The wastewater streams are the flue gas condensate from the Direct Contact Cooler; the effluent from the CO_2 Absorber Column(s); the blowdown water from the cooling tower system; and wastewater from the Water Treatment Plant. A new of discharge routes/options were considered, as presented in **Chapter 3: Consideration of Alternatives (Volume 1)**. Both Route 1 and Route 4 have been taken forwards.

2.2.101. Route 1 (discharge to the local sewer) is the preferred option as it involves the least engineering complexity and has the lowest CAPEX. This assumes that the local sewer has sufficient capacity, and a new connection can be obtained from Thames Water. Engagement with Thames Water has been undertaken and is ongoing as part of the design development.

2.2.102. Route 4, the Zero Liquid Discharge solution would both utilise process wastewater as make up water in the Riverside Campus and concentrate waste within the wastewater into a solid for disposal offsite. This has a high OPEX in comparison to the routes detailed above. Route 4 will not be progressed unless further study of Route 1 shows that Route 4 is required or could economically compete.

2.2.103. Technical assessments have been undertaken based on Route 1, discharge to the local Thames Water sewer as this is considered representative of the worst case scenario.

Other Utilities

2.2.104. Within Norman Road, as well as the insulated pipework associated with the Heat Recovery and Transfer System, it may also be necessary to include other electrical or telecommunications connections, as appropriate.

Site Access

2.2.105. The Proposed Scheme will establish a one-way site road network system for operational staff vehicles and HGVs. This system will likely involve two entrances connecting to and from Norman Road, one located at the southern end of the Carbon Capture Facility and the Gatehouse and one to the north of the Carbon Capture Facility connecting to and from Norman Road. Further information regarding the access roads within the Site will be defined as detailed design for the Proposed Scheme.

ANCILLARY INFRASTRUCTURE

2.2.106. The following sections describe the Ancillary Infrastructure required within the Proposed Scheme. Ancillary infrastructure is located across the **Works Plans (Document Reference 2.3)**.

Heat Recovery and Heat Transfer System

2.2.107. The carbon capture process produces heat, which is typically wasted. The Proposed Scheme will incorporate a Heat Recovery and Heat Transfer System so that this energy can instead be captured and redirected into a district heating network, such as the Riverside Heat Network. The Riverside Heat Network is under development and is currently capable of diverting up to 28.6MWth of heat from Riverside 1, benefitting up to 25,000 homes and businesses in the local area. The Proposed Scheme has the potential to provide over 100MWth of additional heat which would benefit an even greater number of homes and businesses. This additional heat from Riverside 2 and the Proposed Scheme may be utilised by significantly scaling the Riverside Heat Network or by directing the heat to other district heat networks.

2.2.108. A Heat Transfer Station will be installed as the interface between the Proposed Scheme and the receiving heat network. It will accommodate the main operating plant and water treatment equipment necessary to support the heat transfer system, including thermal storage, and provide a connection into the receiving heat network within the Utilities Connections and Site Access Works Area (Works No. 3) and potentially backup heat generating plant in the event of outages.

2.2.109. The Heat Recovery and Heat Transfer system will include the following:

- heat recovery equipment for the reuse of heat within the Carbon Capture Plant(s);
- heat offtake equipment to either transfer the waste heat from the Carbon Capture Plant(s) to the circulating heat transfer medium, or route hot process streams directly to the heat transfer system via separate insulated pipes;
- insulated pipework that will run from the heat offtake equipment or heat sources to the Heat Transfer Station; and
- a Heat Transfer Station, as above.

Access Roads and Site Boundary Fencing

2.2.110. The Proposed Scheme will require new internal site roads, with access from Norman Road. The Applicant will seek to use existing access points along Norman Road where practicable, however, new access points may be required, which will be determined as part of the detailed design of the Proposed Scheme.

2.2.111. The Proposed Scheme will have security fencing installed around the Carbon Capture Facility.

2.2.112. International Ship and Port Security (ISPS) fencing will be provided to restrict unauthorised access to the Loading Platform and LCO_2 vessels on the Proposed Jetty.

2.2.113. Additional information on Site Boundary fencing is included in the **Design Approach Document (Document Reference 5.6)**.

Main Electrical Infrastructure

2.2.114. Electrical infrastructure will comprise the following main components:

- 132kV switchroom for the main 132kV power supply, incoming from Riverside 1 and Riverside 2;
- transformers to facilitate the supply of power to the elements of the Proposed Scheme that require electrical power, including the Proposed Jetty;
- uninterruptible power supply (UPS);
- backup power in the form of backup power generators, requiring diesel storage tanks local to the generators;
- motor control centres to control the electric motors of equipment onsite; and
- site cabling.

Drainage Infrastructure

2.2.115. The Proposed Scheme will require a new drainage system within the Site. The drainage system will use some of the existing ditches within the Site as a point of connection, with attenuation tanks, filter drains and ponds utilised to control the discharge quality and rate to the ditches. The proposed drainage would include a system of containment to mitigate the potential risk of pollution to the Site and the surrounding area and/or environment. This would include bunded areas around chemicals for the Direct Contact Cooler and the Absorber Column(s), solvent storage/make up system, Temporary LCO_2 Storage, backup power generator and diesel storage, compressor lube oil and refrigerant areas. Additionally, a downstream defender will be installed at all outfall locations. These, in combination with the filter drains and any open Sustainable Drainage Systems (SuDS) (such as attenuation ponds) will provide an adequate level of pollution control from the Proposed Scheme.

2.2.116. A highway surface drain runs adjacent to Norman Road, which will be modified to accommodate the change in levels and the needs for access, ultimately leading to discharge into a new watercourse in the south of the Carbon Capture Facility and further into the Mitigation and Enhancement Area. The highway is drained via kerb drains on both sides.

2.2.117. An **Outline Drainage Strategy (Document Reference 7.2)** has been developed and included within the Application; a **Draft DCO (Document Reference 3.1)** requirement requires that a full Drainage Strategy is brought forward for approval by LBB in substantial accordance with this outline strategy. Additional information on surface water drainage is included in the **Design Approach Document (Document Reference 5.6)**.

Lighting and CCTV

2.2.118. Lighting infrastructure including lighting columns will be required onsite. Pole top luminaires have been provided for the new roads, carpark and turning areas, on approximately 6m poles. The Proposed Jetty lighting is likely to include a combination of 6m pole top luminaires and bollard type lighting. The above will be compliant with the obtrusive light requirements set out in BS EN 12464-2:2014[16].

2.2.119. Further details on lighting can be found in the **Outline Lighting Strategy (Document Reference 7.3)** which has been developed and included within the Application; a **Draft DCO (Document Reference 3.1)** requirement requires that a full Lighting Strategy is brought forward for approval by LBB in substantial accordance with this outline strategy. Additional information on lighting infrastructure is included in the **Design Approach Document (Document Reference 5.6)**.

2.2.120. Security infrastructure including closed-circuit television (CCTV) will be required onsite.

Operational Contractor Maintenance Laydown Area

2.2.121. A permanent Operational Contractor Maintenance Laydown Area is required for the tools, materials, equipment and vehicles as necessary for the maintenance of the Carbon Capture Facility.

MITIGATION AND ENHANCEMENT AREA (WORK NO. 7)

2.2.122. The Mitigation and Enhancement Area is located to the south and west of the Carbon Capture Facility. No new operational plant and equipment associated with the Carbon Capture Facility or Proposed Jetty is proposed to be located on the Norman Road Field land parcel.

2.2.123. An outline and explanation of the reasoning for the proposals being considered for the Mitigation and Enhancement Area are set out in the **Outline Landscape, Biodiversity, Access and Recreation Delivery Strategy (Outline LaBARDS) (Document Reference 7.9)** and are summarised below. The basis of assessment in this ES is what is set out in the **Outline LaBARDS (Document Reference 7.9)**.

2.2.124. The detail of these proposals, and their management and maintenance, will be set out in one or more full LaBARDS to be approved by LBB, pursuant to a DCO Requirement. Further information is also set out in the **Design Approach Document (Document Reference 5.6)**.

2.2.125. The Mitigation and Enhancement Area is crossed by the existing PRoW FP2. A series of additional permissive paths are proposed as improved connections and access for users of this area. Raised walkways are intended to be provided so that Crossness LNR and Norman Road Field remain accessible during wet periods. Permissive paths and waymarked circular active routes will be used to provide improved connections within the Mitigation and Enhancement Area (including improvements to FP2 and the England Coast Path (FP3/NCN1)) improving the connections to the surrounding areas such as Southmere Park and Thamesmead.

2.2.126. Additionally, examples of new features that are being considered for implementation within the Mitigation and Enhancement Area are described below. Further information is also set out in the **Design Approach Document (Document Reference 5.6)** and the **Outline LaBARDS (Document Reference 7.9)**. These include:

- approximately three areas of proposed improvements to coastal and floodplain grazing marsh habitat located to the west and south of the Carbon Capture Facility;
- boardwalks located to the south of the Carbon Capture Facility;
- tree planting to provide screening along the southern and western sides of the Carbon Capture Facility and Riverside Campus;
- outdoor classroom or similar located to the west of the Carbon Capture Facility;
- proposed car park with associated footpath access to Norman Road Field via new bridge located adjacent to the south section of the Carbon Capture Facility;
- new ditches and sluice gates; and
- new stable block and paddock for graziers.

BIODIVERSITY NET GAIN OPPORTUNITY AREA

2.2.127. The proposed works to be undertaken within the BNG Opportunity Area are intended to provide compensation and enhancement for ecological losses resulting from the construction of the Proposed Scheme, further details are described in **Section 4.19** of **Chapter 4: EIA Methodology (Volume 1)**. The BNG Opportunity Area is located within land at the former Thamesmead Golf Course, which is located approximately 1km to the west of the Site Boundary and is shown on **Figure 7-7: Proposed Habitat and Creation Enhancements (Volume 2)**. Habitat creation and enhancements will occur including:

- creation of Open Mosaic Habitat and Reedbed; and
- enhancement of Neutral Grassland to improve its ecological value through management and planting of new species such as seeding with wildflowers.

2.2.128. The above measures have been developed to directly offset loss of habitat as a result of the Proposed Scheme where onsite measures cannot provide sufficient enhancement.

2.2.129. It is anticipated that each of these BNG measures will be delivered and managed by the landowner Peabody, with funding by the Applicant, pursuant to a development consent obligation. The BNG measures will form part of a wider masterplan ambition identified in the Thamesmead ‘Living in the Landscape’ strategy and forming part of the ‘Pathways to the Thames’ project.

2.2.130. Indicative proposals for access improvements in the surrounding area, alongside further information on the BNG Opportunity Area are provided in the **Design Approach Document (Document Reference 5.6)** and **Outline LaBARDS (Document Reference 7.9)**.

2.3. PARAMETERS OF ENVIRONMENTAL ASSESSMENT

2.3.1. The "Rochdale Envelope" approach enables robust environmental assessment of NSIP or PNS within 'clearly defined parameters' relating to the design of the intended project. Planning Inspectorate Advice Note Nine[17] provides guidance on the use of the Rochdale Envelope; a term used to describe those elements of the Proposed Scheme where design is yet to be finalised but can be constrained within certain parameters that are used to assess the likely significant effects on identified receptors and reported in this ES.

2.3.2. The Advice Note[17] sets out that, when using the Rochdale Envelope to accommodate flexibility within a DCO application, the promoter should use a reasonable (or "cautious") worst case approach to identifying likely significant effects and should incorporate mitigation accordingly within the parameters of the Proposed Scheme being considered.

2.3.3. The parameters of assessment for the Proposed Scheme, which form the Rochdale Envelope that is being assessed, are identified in **Table 2-2** and **Table 2-3** overleaf.

2.3.4. The assessments within this ES have been based upon a Proposed Scheme design that has been sufficiently developed to allow the assessment to be undertaken within the parameters of assessment identified in **Table 2-2** and **Table 2-3** overleaf.

2.3.5. These parameters of assessment are secured via a requirement in the **Draft DCO (Document Reference 3.1)**, together with the DCO limits of deviation (being the spatial limits for each Work Number on the **Works Plans (Document Reference 2.3)**) have been used as the basis of assessment to ensure that potentially significant environmental effects associated with the Proposed Scheme have been adequately assessed in the EIA and the parameters of that assessment are secured.

DESIGN ASSUMPTIONS

2.3.6. The following assumptions apply to the assessment of the design of the Proposed Scheme:

- standard practice and regulatory compliance within the adopted management framework and compliance with the management documents secured via the **Draft DCO (Document Reference 3.1);**
- the design, installation, commissioning, operation and maintenance of plant, drainage systems, equipment and machinery, including associated systems, will take into account good engineering practice[j];
- in accordance with good safety management principles, all risks that have the potential to be major accidents or disasters, and could impact a local environmental receptor, would be managed using the As Low As Reasonably

[j] Good engineering practice is engineering and technical activities that ensure the quality and safety of products or processes based on established codes, standards, or best practices.

Practicable (ALARP) principle, as secured pursuant to the management plans presented as part of the DCO application and those which will be required to be produced pursuant to the requirements of the **Draft DCO (Document Reference 3.1)** or regulatory requirements; and

- the **Design Principles and Design Code (Document Reference 5.7)** will be followed, as is secured by DCO requirement.

Table 2-2: Parameters for the Carbon Capture Facility

Component/Building/ Area	Works Area	Maximum Number	Maximum Height (m) per Component/ Building/ Area	Maximum Height (m) AOD (taking account of development platform of approximatley 3m)	Further Parameters
Carbon Capture Facility					
Direct Contact Cooler	1A	2	30	33	N/A
Absorber Column(s) and Stack(s)	1B	2	110	113	Minimum distance between top of Absorber Column(s) and top of Stack(s) - 30m
Regenerator	1A	2	50	53	N/A
Compression Plant	1C	2	45	48	N/A
CO_2 Dehydration	1C	2	25	28	N/A
CO_2 Liquefaction	1C	2	30	33	N/A
CO_2 Vents	1C	2	45	48	N/A
LCO_2 Buffer Storage Area	1D	16	45	48	N/A
Hybrid or Dry Cooling Tower	1E	2	32	35	N/A
Water Treatment Plant and Wastewater Treatment Plant	1E	2	20	23	N/A
Back Pressure Turbine and Generator	1A	2	35	38	N/A

Table 2-3: Proposed Maximum Design Parameters for the Proposed Jetty

Component/Building/ Area	Works No.	Maximum Number	Dimensions per Component/ Building/ Area		Maximum Height Chart Datum (m)
			Maximum Length (m)	Maximum Width (m)	
Proposed Jetty					
Berth Pocket	4C	1	420	55	-10.5m
Loading Platform*	4B	1	40	50	+11.5m
Breasting Dolphins	4B	2	n/a	n/a	+11.5m
Mooring Dolphins	4B	6	7	7	+11.5m
Access Trestle Start Point*	4B	1	335	10	+20m
Note: *Not inclusive of topside infrastructure and equipment.					

2.4. INDICATIVE CONSTRUCTION METHODOLOGY

INDICATIVE CONSTRUCTION PROGRAMME

2.4.1. Construction for the Proposed Scheme is expected to start in 2026. There are two options for construction of the Carbon Capture Facility:

- Option 1 – Two-Phase Construction: First, one Carbon Capture Plant and CO_2 Processing Plant is constructed along with the LCO_2 Buffer Storage Area and LCO_2 Piping and Utilities to Proposed Jetty (Work No. 5) of the **Works Plans (Document Reference 2.3)**, the Supporting Plant, Proposed Jetty, and Ancillary Infrastructure. Then the second Carbon Capture Plant and CO_2 Processing Plant is constructed sequentially (expected duration 60 months).
- Option 2 – Single-Phase Construction: All elements of the Carbon Capture Facility, the Proposed Jetty and the Ancillary Infrastructure are constructed in parallel (expected duration 42 months). Option 2 encapsulates either two plant design or a single plant design[k].

2.4.2. Further information on the two construction options is presented in **Section 2.4** of **Chapter 3: Consideration of Alternatives (Volume 1)**.

2.4.3. Both options are being progressed as part of the Proposed Scheme. An option will be chosen as part of the detailed design process.

2.4.4. **Table 2-4** below shows a preliminary construction programme for Option 1, **Table 2-5** shows a preliminary construction programme for Option 2 (single plant) and **Table 2-6** shows a preliminary construction programme for Option 2 (two plants).

2.4.5. Each technical chapter of this ES has assessed the worst case preliminary construction programme for each technical topic as described in that topic chapter.

[k] A two-plant design will be the worst case scenario, requiring a larger quantity of plant and equipment in comparison to the single-plant design and having a longer duration at 42 months. A single-plant design will have a shorter duration of 36 months.

Table 2-4: Preliminary Construction Programme – Option 1 (Two-Phase Construction) – Two Plant Design

	2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proposed Scheme Wide																				
Site Establishment																				
Groundworks (inc. Piling)																				
Mitigation and Enhancement Area																				
One Carbon Capture Plant, CO_2 Processing Plant, LCO_2 Buffer Storage Area, Piping and Utilities to Jetty, Supporting Plant and Ancillary Infrastructure																				
Civil Works																				
Installation Works																				
Commissioning																				
Reliability Period[l]																				
Proposed Jetty																				
Dredging																				
Construction (inc. Piling)																				

[l] This period is for ensuring the first Carbon Capture Plant, CO_2 Processing Plant, LCO_2 Buffer Storage Area, Piping and Utilities to Jetty, Supporting Plant and Ancillary Infrastructure is operating correctly ahead of constructing the second Carbon Capture Plant and CO_2 processing plant.

	2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Commissioning																				
Second Carbon Capture Plant and CO_2 Processing Plant																				
Civil Works																				
Installation Works																				
Commissioning																				

Table 2-5: Preliminary Construction Programme – Option 2 (Single-Phase Construction) – Two Plant Design

	2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proposed Scheme Wide																				
Site Establishment																				
Groundworks (inc. Piling)																				
Mitigation and Enhancement Area																				
All elements of the Carbon Capture Facility (inclusive of up to two Carbon Capture Plants) and the Ancillary Infrastructure																				
Civil Works																				
Installation Works																				
Commissioning																				
Proposed Jetty																				
Dredging																				
Construction (inc. Piling)																				
Commissioning																				

Table 2-6: Preliminary Construction Programme – Option 2 (Single-Phase Construction) – Single Plant Design

	2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Proposed Scheme Wide																				
Site Preparation and Clearance																				
Groundworks (inc. Piling)																				
Mitigation and Enhancement Area																				
All elements of the Carbon Capture Facility (single Carbon Capture Plant design) and the Ancillary Infrastructure																				
Civil Works																				
Installation Works																				
Commissioning																				
Proposed Jetty																				
Dredging																				
Construction (inc. Piling)																				
Commissioning																				

CONSTRUCTION SEQUENCE

Permitted Preliminary Works

2.4.6. In addition to the construction activities set out in **Table 2-4** to **Table 2-6** the Applicant intends to undertake preliminary works between the DCO coming into effect and commencement of construction, as defined by the **Draft DCO (Document Reference 3.1)**.

2.4.7. Preliminary works is defined for the purpose of the Proposed Scheme as operations consisting of:

- archaeological surveys and investigations (if required – see **Section 9.9** of **Chapter 9: Historic Environment (Volume 1)**);
- environmental surveys and monitoring;
- establishment of Temporary Construction Compounds (including car parks and welfare facilities);
- investigations for the purpose of assessing and monitoring ground conditions and levels (marine and terrestrial);
- pre-construction ecological mitigation (including vegetation clearance);
- erection of Site fencing;
- temporary display of Site notices or information;
- Utilities Connections and Site Access Works in the Site (excluding the Norman Corridor); and
- Utilities Connections and Site Access Works in the Norman Road Corridor.

2.4.8. These preliminary works shall be undertaken in accordance with relevant commitments of the **Outline CoCP (Document Reference 7.4)** only, as shown in **Appendix 2-1: Permitted Preliminary Works (Volume 3)**. With these commitments in place, the preliminary works would have negligible or relatively minor environmental effects.

Carbon Capture Facility

Site Establishment and Groundworks

2.4.9. Enabling works will be undertaken to include the preparation of the Temporary Construction Compounds, car parks, internal access roads and site establishment.

2.4.10. The appointed Contractor(s) will prepare and level the Site for the Proposed Scheme as necessary. Prior to any works taking place, grid sampling across the entire Site would be undertaken to further characterise the presence of contaminated materials, such as asbestos within the made ground material. A material management process will be put in place to segregate and validate the material prior to reuse or disposal from Site, as described in the **Outline CoCP (Document Reference 7.4).** In locations where ground sloping cannot be achieved due to space restrictions, sheet piled walls will be installed

around the perimeter of the Site, to retain the engineering backfill used to raise the land. It is anticipated that the sheet piled wall will be approximately 15m in depth (approximately 2m of this above existing ground level and 10m below). It has been established that the founding geology strata is likely to be Taplow Gravels. Dewatering is not anticipated to be required for the sheet piling installation. Once the sheet piles have been installed, engineering backfill to a finished ground level of approximately 3m AOD will be used to raise the ground level of land for the Carbon Capture Facility[m].

2.4.11. Further information about the trees that are likely to require removal is provided in **Appendix 10-3: Arboricultural Impact Assessment (Volume 3)**.

Civil Works

2.4.12. Piling for the foundations of the Proposed Scheme will be required. It is anticipated that driven piles, which are end bearing in the Taplow Gravel Formation (approximately 10m below existing ground level) will be required for most structures. The material used for hard/soft landscaping will then be added to achieve the final Site levels. It is anticipated that the heaviest load from the equipment will be the Absorber Column(s) and Stack(s), Regenerator (as part of Solvent Regeneration System) and the Compression Plant (CO_2 Processing Plants).

2.4.13. No percussive piling will be undertaken in Work No. 1E of the **Works Plans (Document Reference 2.3)**. Any piling within this work area will be undertaken using Continuous Flight Auger (CFA), unless otherwise approved by LBB. CFA is a cast in-situ process, suited to soft ground where deep casings or use of drilling support fluids might otherwise be needed. The relevant chapters of this ES have assessed the worst case piling method.

2.4.14. Upon completion of piling activities, the remaining concrete foundations of the Carbon Capture Facility would be constructed. The foundations would consist of large concrete rafts bearing directly on the piles. At the same time as constructing the foundations, new underground drainage networks would be constructed, together with the new roads around the perimeter of the buildings. Underground works would also include other critical services such as fire mains, potable water, wastewater and electrical cables.

Installation Works

2.4.15. Following ground and civils works, the appointed Contractor(s) will commence the equipment installation, summarised below:

- Temporary support at tie in points – steam, condensate, flue gas;
- Structural steelwork supports;

[m] Detailed information relating to the top of platform, finished floor level and critical equipment height are described within **Appendix 11-2: Flood Risk Assessment (Volume 3)**.

- Flue gas ductwork from tie in point to Direct Contact Coolers as part of Carbon Capture Facility;
- Steam and condensate pipework from Riverside 1 and Riverside 2 to Carbon Capture Facility;
- Electrical connection installation from Riverside 1 and Riverside 2 to Carbon Capture Facility;
- Direct Contact Cooler Column(s) (as part of Flue Gas Pre-Treatment);
- Absorber Column(s) and Stack(s);
- Solvent Regeneration System;
- Rich Solvent/Lean Solvent Heat Exchanger;
- Compression;
- Dehydration;
- Liquefaction;
- CO_2 Vents;
- Cooling System;
- Back Pressure Turbine and Generators;
- Chemical Storage and Distribution Handling Facilities;
- Solvent Storage;
- Water and Wastewater Treatment Plant;
- Water Supply Storage Tank(s);
- Fire water tanks;
- Process and service pipelines; and
- Other utilities.

2.4.16. Equipment for installation is likely to be brought to Site in sections or on skids that will be lifted into position using cranes (mobile and tower). Building erection and plant installation will be carried out as concurrent activities; there is potential for not all buildings to be erected prior to the commencement of plant install. Large plant may be first placed on foundations with steelwork erected around it afterwards (for example the Compression Plants).

2.4.17. Required electrical infrastructure and the control system for the Carbon Capture Facility would then be installed. Most of the electrical equipment would be delivered to Site in prefabricated modular units.

2.4.18. The route of the Electrical Connections between Riverside 1 and Riverside 2 is not yet confirmed. The cables would generally be installed in groups, within a cable trench. Cables can be brought above ground on suitable sized pipe bridge/racking arrangement

if required for crossings. Cable trenches can be installed in proximity to Site access roads. The trench will be suitably sized according to the final cable installation design.

Water Supply

2.4.19. A new water supply connection would be made to an existing potable water main as operated by Thames Water in Norman Road.

2.4.20. The connection will be an underground pipeline. This will likely be installed via an open-cut method, in line with wastewater connection.

2.4.21. This will require the water pipe to cross the highway ditches located to the west of Norman Road, between Norman Road and the boundary of the Carbon Capture Facility. The water pipe will run beneath the Norman Road and Picardy Manorway carriageway.

Wastewater Discharge

2.4.22. A new connection would be made to nearest foul sewer which is located at the junction between Norman Road and A2016 Picardy Manorway, as operated by Thames Water.

2.4.23. The connection will be an underground pipeline. This will be installed via an open-cut method, in line with water supply pipe installation.

2.4.24. This will require the wastewater pipe to cross the highway ditches located to the west of Norman Road between Norman Road and the boundary of the Carbon Capture Facility. The wastewater pipe will run beneath the Norman Road and Picardy Manorway carriageway.

Proposed Jetty

2.4.25. Several methods can be adopted for construction of the Proposed Jetty and will be determined by the appointed Contractor(s). The anticipated construction sequence is presented below:

- Sheet pile retaining wall - To reduce the extent of dredging required, a sheet pile retaining wall equipped with a capping beam will be installed. The wall will be positioned under the Loading Platform at the edge of the berth pocket and run between the outer Mooring Dolphins towards the riverbank. The top of the capping beam will be approximately at the existing riverbed level. It is anticipated that the sheet piled wall will be approximately 15m in depth.
- Piling – Piling for the Loading Platform, vertical berthing and mooring dolphin, Access Trestle and tug mooring platform are likely to be installed using a 50m crane barge, which would be capable of supporting a 300 tonne crawler crane. This would be used to lift piles from a support barge into positions where they will be installed. Piling would begin closest to the shore, moving further into the River Thames as the process progresses, with support and supply barges moored riverward of the crane barge. It is anticipated that any piles that are inclined would be installed using a jack-up barge.

- Dredging – To ensure the stability of the foreshore dredging, operations will be completed after the sheet pile retaining wall is installed. The two activities can be phased and planned to be undertaken in turns. The dredging methodology is described further in **Paragraph 2.4.58** to **Paragraph 2.4.62**.
- Deck construction – The decks for the Loading Platform, Mooring Dolphins, and Access Trestle will be constructed after the dredging. At this stage, it is anticipated that these elements will comprise of reinforced concrete pre-cast units, topped in-situ. Pre-cast sections will be delivered to the Site by barge and craned into position, with rebar then added before an in-situ concrete is placed.
- Tug Mooring Pontoon – The pontoon body will be manufactured offsite and transported via the River Thames to the Site. It will then be lifted into place over the guide piles and final construction activities will be undertaken.
- Catwalks installation – Walkway sections will be prefabricated offsite and transported to the construction site. They can then be craned into position and secured to the Loading Platform and Mooring Dolphins.
- Installation of equipment required for the Proposed Jetty to function would be undertaken once construction of the decks is completed, the following equipment is likely to be required:
  - Marine Loading Arms;
  - Quick Release Hooks;
  - Lifesaving Equipment (emergency ladders, throw lines, safety chains etc.);
  - Operational and Navigational Lighting;
  - Fire Suppression Systems;
  - Guardrails;
  - Fences; and
  - Gates.

Construction Plant

2.4.26. The likely type and numbers of plant to be used during the construction period have been identified, further information is provided in **Appendix 6-6: Construction Noise (Volume 3)**. The plant that will be used during construction is likely to include, but not be limited to:

- Tower Cranes;
- Generators;
- Trucks;
- Piling machines;
- Excavators;
- HGV;

- Bull dozers;
- Compaction vibrating rollers;
- Mobile cranes;
- Telehandlers;
- Access platforms (Mobile Elevating Work Platforms (MEWP));
- Road washers;
- Forklifts; and
- Jack-up barge.

2.4.27. There may be a requirement for point of use generators for site power during construction. Details of the number of generators, sizing and modes of operation are not yet available. These will be defined by the appointed Contractor(s), as appropriate depending on aggregated plant capacities and Environmental Permit.

CONSTRUCTION STAFF

2.4.28. It is estimated that a peak workforce of approximately 1,000 staff will be required for construction of the Proposed Scheme in both construction programme options. The potential effects associated with employment generation during the construction phase are assessed and presented in **Chapter 15: Socio-economics (Volume 1)**.

CONSTRUCTION WORKING HOURS

Landside

2.4.29. This ES has assumed that standard working hours during the construction phase for the landside activities will be Monday to Friday 07:00 to 19:00. On Saturdays, standard working hours will be 07:00 to 13:00. It is not expected that construction work will be undertaken on Sundays or Bank Holidays. The working hours do not apply to construction works where these are (a) are carried out within existing buildings or buildings constructed as part of the Proposed Scheme; (b) are carried out with the prior approval of the relevant planning authority; or (c) are associated with an emergency. Further information on landside construction working hours is provided in the **Outline CoCP (Document Reference 7.4)**.

2.4.30. Deviations to the standard working hours may be required for some activities and these would be agreed with LBB.

Proposed Jetty

2.4.31. Marine construction activities (Proposed Jetty) will be in a tidal environment and therefore could take place 24 hours a day and 7 days a week. Further information on marine construction working hours is provided in the **Outline CoCP (Document Reference 7.4)**.

TEMPORARY CONSTRUCTION COMPOUNDS (WORK NO. 6)

2.4.32. Construction activities will take place across the Site across three Temporary Construction Compounds as shown on the **Works Plans (Document Reference 2.3)**. The surface material of construction compounds will be permeable to allow rainwater to percolate to ground, with suitably bunded locations identified as storage areas for any hazardous, polluting materials or chemicals to prevent the risk of pollution.

The Core Temporary Construction Compound

2.4.33. The core Temporary Construction Compound will be located centrally within the Site, within the Carbon Capture Facility component.

2.4.34. The core Temporary Construction Compound will be used during construction for uses including but not limited to, construction activities, site offices, welfare, warehouses, workshops, open air storage and car parking. The core Temporary Construction Compound will be located across Borax North, Borax South, Creekside, Munster Joinery and Gannon land parcels. These land parcels other than Munster Joinery are currently in use as part of the construction of Riverside 2. This is beneficial in that these sites are already set up, surfaced and have utilities connections (drainage, water and power). Additionally, there are appropriately made, existing accesses from Norman Road.

2.4.35. Site clearance, levelling and ground preparation works for the Munster Joinery land parcel may be undertaken to provide a suitable working compound if the existing ground and surface is found to be inadequate.

2.4.36. Following completion of the construction works, the land in the core Temporary Construction Compound will be utilised as part of the Caborn Capture Facility.

2.4.37. Designated Contractor(s) car parking will be focussed on the core Temporary Construction Compound, for further information see the **Framework Construction Traffic Management Plan (Framework CTMP) (Document Reference 7.7)**.

The Western Temporary Construction Compound

2.4.38. The western Temporary Construction Compound will be utilised to support the construction of flue gas ducting from Riverside 2, which borders the southern, western and partial northern perimeters of Riverside 2. The western Temporary Construction Compound can be accessed utilising the Riverside 2 internal access roads (which are currently under construction) and by a new ditch crossing.

2.4.39. Following completion of construction works most of the western Temporary Construction Compound will be reinstated to its prior use. A small section along the eastern border of the compound, will be utilised for the Flue Gas Supply Ductwork (Work No. 2B) of the **Works Plans (Document Reference 2.3)**.

Proposed Jetty Temporary Construction Compound and Laydown

2.4.40. The Proposed Jetty Temporary Construction Compound will be used to facilitate construction activities related to the Proposed Jetty and Belvedere Power Station Jetty (disused), specifically to support construction of the Access Trestle for the Proposed Jetty.

2.4.41. The Proposed Jetty Temporary Construction Compound will be accessed via the Iron Mountain Records Storage and Asda Access Road. Nearby businesses are not anticipated to be disrupted by the construction of the Proposed Scheme.

2.4.42. Following completion of the construction works of the Proposed Scheme, the Proposed Jetty Temporary Construction Compound will be reinstated to its prior use but will be available for maintenance access during the operation phase. However, the Applicant is seeking permanent rights to utilise part of this land in the future for any required maintenance works to the Proposed Jetty, as shown on the **Land Plans (Document Reference 2.2)**.

CONSTRUCTION DELIVERIES AND ACCESS

2.4.43. Assumptions for the transport of construction plant and materials of the Proposed Scheme differ across the landside and marine elements (further information is provided in the **Framework CTMP (Document Reference 7.7)**.

Landside

2.4.44. For the landside elements transport will only be road-based.

Indicative Construction Vehicle Movements

2.4.45. During Site establishment and groundworks, particularly when the ground raising exercise will be undertaken, there will be an estimated peak of 72 HGV per day (resulting in 144 two-way movements), for a period of approximately 3 months, depending on the construction programme.

2.4.46. Following Site establishment and groundworks it is projected that at the construction peak, in all construction programme options, the Proposed Scheme would generate approximately 25 HGV per day (resulting in 50-two-way movements) with a maximum of two HGV unloading simultaneously (taking up to 60 minutes), with a further HGV waiting to be unloaded. These deliveries will be spread across the construction phase with up to three deliveries anticipated across the AM peak hours (07:00-10:00) and the remainder occurring throughout the day. No deliveries are expected after 18:00. This is based upon an assessment of similar sized schemes and taking into consideration localised factors (HGV loading areas etc.). The indicative construction vehicle movements will be refined and updated during detailed design.

2.4.47. There are likely to be Abnormal Indivisible Loads (AIL) required for the construction of the Proposed Scheme. However, the frequency of these vehicles is likely to be small and AIL movements will be actively managed under the approved CTMP to be developed tobe in substantial accordance with the **Framework CTMP (Document Reference 7.7)**.

2.4.48. The Transport Assessment for the adjacent Riverside 2[18] (now under construction) anticipated construction traffic routing from the north/west via the A2016 Eastern Way (25%), and the southeast (towards the M25) via the A2016 Bronze Age Way and A206 (75%). Yarnton Way has a 3.0t weight restriction so would not be suitable for any HGV. The Riverside 2 Transport Assessment[17] was developed with input and approval from the local highways authorities; consequently, the same assumptions have been applied for the Proposed Scheme. Agreement on these assumptions has been made with the relevant local highways authorities as part of the ongoing consultation for the scope of the Transport Assessment for the Proposed Scheme, as shown in **Section 18.3** of **Chapter 18: Landside Transport (Volume 1)**.

2.4.49. The Applicant may also need to use the Iron Mountain Records Storage and Asda Access Road which runs adjacent to Norman Road in order to access the Proposed Jetty Temporary Construction Compound.

2.4.50. Further information regarding vehicle movements is provided in **Chapter 18: Landside Transport (Volume 1)** and the associated **Appendix 18-1: Transport Assessment (Volume 3)**.

Proposed Jetty

2.4.51. Middleton Jetty is used by the Applicant for waste deliveries and IBA export, to and from Riverside 1, operations that will intensify with Riverside 2 commencing operation. It is not practicable to use Middleton Jetty for the delivery of construction plant and materials for the landside or marine elements of the Proposed Scheme without compromising the effectiveness of the operations at Riverside 1 and Riverside 2 (once operational).

2.4.52. For the Proposed Jetty (i.e. steel piles, precast concrete units and marine equipment such as fenders) transport will primarily be via the River Thames.

2.4.53. The plant and materials brought in for the construction of the Proposed Jetty will be limited to the material quantities needed for construction activities being undertaken at that time, and which are designed to be constructed within the River Thames. Where appropriate, plant and materials may be temporarily stored on a jack-up barge.

Indicative Construction Vessel Movements

2.4.54. The number of vessel movements will depend on the construction activities being undertaken at that point in time. However, it is estimated that on average two barges per working day will be required to visit the Site. This includes delivery of materials and removal of the capital dredging arisings. Each barge movement will require the assistance of a tugboat. In addition to the tugs, a small passenger boat is expected at the end of each working shift, to transport construction staff to and from the terrestrial Site.

2.4.55. The jack-up barge used for piling will be in close proximity to the construction area and will be moved within the Proposed Jetty location every few days throughout the duration of the construction process. When no longer required, the jack-up barge will be removed from the Site.

2.4.56. A safety vessel will be present when construction activities for the Proposed Jetty are underway.

2.4.57. Additionally, vessels will be required for capital dredging. Further information on capital dredging is provided below.

CAPITAL DREDGING

2.4.58. To ensure that vessels can berth, capital dredging of the berth pocket will be required prior to the construction of the Proposed Jetty; the volume of dredging is related to the location of the Proposed Jetty.

2.4.59. As described in **Chapter 3: Consideration of Alternatives (Volume 1)** the preferred position for the location of the Proposed Jetty is Option 3 (halfway between Option 1 and 2 positions).

2.4.60. The capital dredge volume for Option 3 is approximately 110,000m^3, to a depth of approximately -10.5m (CD).

2.4.61. Backhoe dredging will be adopted for the Proposed Scheme and the assessments presented within this ES are based upon this method. Backhoe dredging is where an excavator mounted on the edge of a floating pontoon or barge is utilised, which reaches into the water and scoops bed material out. A separate vessel or barge will be moored alongside, which the dredged material is deposited directly into.

2.4.62. The dredged arisings will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

CONSTRUCTION LIGHTING

2.4.63. During construction, temporary artificial lighting will be used to provide a safe working site during hours of darkness. The Contractor(s) will follow relevant legislation and guidance to ensure potential adverse effects from temporary artificial lighting required are minimised.

2.4.64. The principles for ensuring appropriate use of lighting during the construction phase are set out in the **Outline CoCP (Document Reference 7.4)**.

OUTLINE CODE OF CONSTRUCTION PRACTICE

2.4.65. The **Outline CoCP (Document Reference 7.4)** is the mechanism used to ensure the successful management of the likely environmental effects resulting from construction activities. Mitigation measures to minimise potential effects such as noise, vibration and disturbance to terrestrial and marine receptors, including measures associated with piling, have been recorded in an **Outline CoCP (Document Reference 7.4)**.

2.4.66. A **Draft DCO (Document Reference 3.1)** requirement will ensure that the measures identified to mitigate the effects of the construction phase are included in one or more full CoCP(s), to be prepared for the Proposed Scheme by the Contractor(s) prior to the construction phase commencing. This will detail the environmental controls, environmental protection measures and safety procedures that will be adopted during the construction phase. Any full CoCP(s), as submitted under the requirement, will be approved by LBB as the relevant planning authority (and highway authority) prior to construction commencing.

PUBLIC RIGHTS OF WAY TEMPORARY AND PERMANENT DIVERSIONS

2.4.67. FP2 is located within the Site and would need to be permanently diverted as a result of the construction activities and for the operational requirements of the Carbon Capture Facility. Such diversions are likely to be localised and may differ between the construction and operational phases. In both cases, the diversion route will be approved by LBB as part of the full CoCP(s) (for construction) and pursuant to the DCO (for operation).

2.4.68. Wherever practicable the England Coast Path (FP3/NCN1) will remain open. During specific construction activities for the Proposed Jetty limited closures of the England Coast Path (FP3/NCN1/FP4) may be required, the Contractor(s) will manage closures in the following priority order:

- using a banksman to provide safe escorted access across the construction area, keeping waiting times to less than:10 minutes during peak times; and 30 minutes during off-peak times;

- nighttime closures, between 23:00 and 05:00 (non-peak times: 23:00 - 05:00 and peak times 07:00 - 19:00) when the England Coast Path (FP3/NCN1/ FP4) is infrequently used; and
- in occasional situations, where the above options are not practicable, a signed diversion route will be provided. The diversion route will be of a hard surface and will be suitable for all users.

2.4.69. Footpath 1 (FP1) and Footpath 242 (FP242) will remain open throughout the construction phase.

2.4.70. In light of the above, the following measures are to be implemented ahead of construction to mitigate any adverse impacts on walkers and cyclists:

- clear directions/signage for any alternative routes and appropriate alternative diversions would be clearly publicised by the Contractor(s) to maintain public access; and
- public notices would be issued in advance so to inform local residents and businesses of dates and durations of road and rights of way closures. The Contractor(s) would ensure provision and maintenance of suitable and sufficient signs and barriers indicating temporary and permanent closures to public accesses and rights of way.

2.4.71. When diversions are in place the Contractor(s) should ensure that the following measures are implemented:

- diversion routes would be maintained for the types of users of the public right of way that is affected including reasonable adjustments to maintain or achieve inclusive access; and
- where the usual means of access must be diverted or blocked off alternative safe routes for persons with reduced mobility would be identified, considering existing hazards and obstructions such as pavement kerbs.

2.4.72. Further detail about any temporary diversions will be included within the full CoCP(s). The permanent diversions will be set out in the full CTMP(s).

COMMISSIONING

2.4.73. Commissioning of the Proposed Scheme will include several activities: mechanical checks such as cleaning and flushing of pipework; pressure testing and leak testing; electrical checks; initial plant start-up; performance verification; and training of operational staff, all to ensure operational readiness of the Proposed Scheme. This is estimated to take up to six months.

2.4.74. A commissioning plan will be agreed with the Environment Agency under the Environmental Permit, which will specify monitoring and control procedures to be used and set out a commissioning activities schedule.

2.4.75. These activities will be carried out using inert materials such as air, water (including steam), and nitrogen. Commissioning will not require hydrocarbons.

2.4.76. Commissioning of the onsite pipework and Above Ground Pipelines will involve pressure testing using nitrogen. On completion, nitrogen may be vented to the atmosphere at appropriate height and rate for safe dispersion.

2.5. DEMOLITION

2.5.1. The Proposed Scheme includes construction on the existing Munster Joinery land parcel. Munster Joinery UK Limited utilises a portal frame steel structured building, with metal cladding on the walls and roofing. The building sits upon an existing foundation slab with boundary palisade fencing.

2.5.2. The Munster Joinery land parcel is proposed as part of the core Temporary Construction Compound, shown on the shown on the **Works Plans (Document Reference 2.3)**. Once construction is complete, the Munster Joinery land parcel will be utilised as part of the Proposed Scheme, with demolition of the Munster Joinery premises therefore required. Mitigation measures on controlling fugitive releases of demolition dust will be implemented by the Contractor(s) under the **Outline CoCP (Document Reference 7.4)**. At the time of writing, the Applicant is engaging with Landsul Limited and Munster Joinery UK Limited with the objective of identifying a relocation site. A relocation site has not yet been identified.

BELVEDERE POWER STATION JETTY (DISUSED)

2.5.3. In the event of the Belvedere Power Station Jetty (disused) being retained a removal of some elements of the jetty may be required to facilitate construction of the Access Trestle of the Proposed Jetty. This could involve the removal of:

- overhead gantry structures;
- fenders; and
- building/s constructed on the Belvedere Power Station Jetty (disused) deck.

2.5.4. Additional, strengthening works to the Belvedere Power Station Jetty (disused) may also be required if it is retained.

2.5.5. If the Belvedere Power Station Jetty (disused) is to be removed demolition would be undertaken either manually or mechanically using large hydraulic equipment, from within the River Thames. All concrete and brick will be crushed into rubble, and the potential to reuse within the Proposed Scheme is considered. Metal, glass and other recyclable construction waste shall be recycled. Piles will be cut down to below the riverbed level.

2.6. OPERATION AND MAINTENANCE

RIVERSIDE 1 AND RIVERSIDE 2 INTERFACE

2.6.2. Riverside 1 and Riverside 2 are both located within the Site Boundary, as the Proposed Scheme will need to be physically integrated with these two facilities. The key interfaces are:

- Flue Gas Supply Ductwork – flue gas is to be routed from both Riverside 1 and Riverside 2 to the Carbon Capture Facility;
- Process Steam and Condensate – modification to Riverside 1 and Riverside 2 will be required to supply steam to the Carbon Capture Facility; and
- Electrical Connections – electrical connections will be made to transfer electricity generated by Riverside 1 and Riverside 2 to the Carbon Capture Facility and the Proposed Jetty.

2.6.3. The supply of steam to the Carbon Capture Facility will reduce the amount available to drive the steam turbines of Riverside 1 and Riverside 2 (once operational), decreasing their power generation. The Carbon Capture Facility will also add parasitic load. Consequently, the supply of steam and electricity to the Proposed Scheme will reduce the amount of electricity exported from Riverside 1 and Riverside 2 by around 40%.

2.6.4. The quantities of waste received by Riverside 1 and Riverside 2 (once operational) will not change as a consequence of the Proposed Scheme.

HOURS OF WORKING

2.6.5. The Proposed Scheme will operate concurrently with Riverside 1 and Riverside 2 (once operational), which are designed, and consented, for continuous operation. Therefore, other than for periods of maintenance and unplanned shutdowns, the Carbon Capture Facility will operate continuously. Planned maintenance of the Carbon Capture Facility will coincide with planned maintenance of Riverside 1 and/or Riverside 2 requiring high numbers of Contractor(s) onsite to support the outage activities.

OPERATION STAFF

2.6.6. A workforce of approximately 27 Full Time Equivalent (FTE) staff are expected to be required for operation and maintenance activities. The administrative and human resources staff for Riverside 1 and Riverside 2 (once operational) are expected to be shared across the Riverside Campus and as such additional administrative and human resources staff are not anticipated.

2.6.7. The effects associated with employed generation during the operation phase are assessed and presented in **Chapter 15: Socio-economics (Volume 1)**.

OPERATION VEHICLE MOVEMENTS AND ACCESS

2.6.8. As detailed in **Chapter 18: Landside Transport (Volume 1)** the Proposed Scheme will generate a small number of vehicle movements during the operation phase which, in agreement with the Planning Inspectorate and LBB[19], have been scoped out of the landside transport assessment. The vehicle movements will be from the following:

- operation staff travelling to/from the Proposed Scheme;
- additional Contractor(s) for maintenance activities not undertaken by the operational workforce;
- delivery of diesel for the backup power generators;
- delivery of chemicals and proprietary amine-based solvent; and
- emergency services.

2.6.9. Access to the Site will be via Norman Road, the Applicant will seek to use existing access points along Norman Road where practicable, however, new access points may be required, which will be determined as part of detailed design of the Proposed Scheme. Indicative onsite access arrangement would predominantly use a one-way system. Primary pedestrian access would be via Norman Road and the PRoW network. In accordance with the London Plan[20] the Applicant will provide car parking, which will include blue badge and electric vehicle provision.

2.6.10. The Proposed Jetty will provide the riverside access point to be used for the export of LCO_2.

OPERATION VESSEL MOVEMENTS

2.6.11. Based on a preliminary operational capacity assessment, up to five marine vessels will call at the Proposed Jetty each week to collect and transport LCO_2 to meet the annual throughput; this forms the basis of assessment in this ES. The marine vessel number has been calculated on an assumed marine vessel capacity and the anticipated weekly CO_2 capture rate of the Proposed Scheme. For the purposes of assessment, it has been assumed that the marine vessels will have a LCO_2 capacity of approximately 7,500m^3 each.

2.6.12. To provide flexibility for prospective change in vessel type, the Proposed Jetty will be designed to accommodate marine vessels with a capacity of up to 15,000m^3 per vessel, which would then result in a lower number of calls per week than the five referenced above. There will also be up to ten tug movements from the rear of the structure of the Proposed Jetty, to assist in the berthing of the vessels.

OPERATION LIGHTING

2.6.13. External lighting is used for Riverside 1 and will be used for Riverside 2 (under construction).

2.6.14. During operation, external artificial lighting will be required to ensure safe and secure use of the Proposed Scheme, see **Paragraph 2.2.118** to **Paragraph 2.2.120**. An **Outline Lighting Strategy (Document Reference 7.3)** has been prepared and submitted alongside the Application for development consent. This has been developed in accordance with relevant legislation and guidance to minimise effects from light intrusion, sky glow and glare. Any new lighting is likely to comply with the same standards as Riverside 2.

2.6.15. A **Draft DCO (Document Reference 3.1)** requirement will ensure that the full Lighting Strategy is brought forward, to be in substantial accordance with the **Outline Lighting Strategy (Document Reference 7.3)**, to be prepared for the Proposed Scheme prior to the operation phase commencing and as approved by LBB.

HAZARD PREVENTION AND EMERGENCY PLANNING

2.6.16. The approach to the consideration of major accidents and disasters in relation to the EIA for the Proposed Scheme is described in **Chapter 20: Major Accidents and Disasters (Volume 1)**.

2.6.17. Given the Hydrogen Project is no longer part of the Proposed Scheme, it will not be regulated under the Control of Major Accident and Hazards ('COMAH') Regulations, 2015[21]. CO_2 and LCO_2 are not currently classed as a Hazardous Substance under the COMAH Regulations and as such the Site would remain a non-COMAH site with the Proposed Scheme in place.

2.6.18. An **Outline Emergency Preparedness and Response Plan (Outline EPRP) (Document Reference 7.11)** has been prepared and submitted alongside the application for development consent. A **Draft DCO (Document Reference 3.1)** requirement will ensure that a Full EPRP is brought forward, to be in substantial accordance within the **Outline EPRP (Document Reference 7.11)**, to be prepared for the Proposed Scheme prior to the operation phase commencing and approved by LBB in consultation with the lead local flood authority, Metropolitan Police, London Fire Brigade and the Environment Agency.

2.6.19. In order to ensure that risks to users of PRoW, Norman Road and adjacent industrial premises remain safe with new processes and storage in place as a result of the Proposed Scheme, the design has ensured that storage volumes and clearance spaces have been sufficiently set to keep risks ALARP for this stage of design, including through the limits of deviation on the **Works Plans (Document Reference 2.3).** Consequently, a diversion of FP2 will be required.

2.6.20. Safety will remain a matter of focus through detailed design.

PUBLIC RIGHTS OF WAY DIVERSIONS

2.6.21. Improvements and diversions to the existing PRoW and new public routes proposed within the Site are indicated in the **Design Approach Document (Document Reference 5.6)** with new or diverted public rights of ways shown on the **Access and Rights of Way Plans (Document Reference 2.4)**. The Applicant has undertaken discussions with the landowners within the Site in relation to the PRoW and public route proposals, which are ongoing.

2.6.22. The design of the PRoW and public routes has the objective of securing improved connections for local users, a more generous access strategy across the Mitigation and Enhancement Area and to support the use of land designated as MOL. In addition, the Proposed Scheme seeks to provide physical and visual separation from the operational plant associated with the Carbon Capture Facility. Further information is provided in the **Design Principles and Design Code (Document Reference 5.7)**.

MAINTENANCE

Landside

Carbon Capture Facility

2.6.23. Maintenance of the Proposed Scheme will involve routine, planned maintenance and system checks, as well as reactive maintenance and repairs.

2.6.24. Major routine and planned maintenance of the Proposed Scheme will be aligned with regulatory inspection requirements and outage schedules for Riverside 1 and Riverside 2 (once operational), where practicable. This approach will minimise the number of scheduled outages and minimise the quantity of CO_2 that is emitted to the atmosphere during maintenance of the Proposed Scheme.

2.6.25. The routine and planned maintenance activities that are anticipated to be undertaken during scheduled outages will include inspections of column internals (Absorber Column(s), Solvent Regeneration System and Direct Contact Cooler), inspections of the Heat Transfer System (to identify corrosion and replacing oil) and inspections of the key components of the CO_2 Processing Plant.

2.6.26. The operational procedures, including maintenance, will be set out in an Operational Environmental Management Plan (Operational EMP), which will be prepared prior to the Proposed Scheme commencing operation, such plan to be in accordance with the measures set out in the **Mitigation Schedule (Document Reference 7.8)**.

Management of the Mitigation and Enhancement Area and Biodiversity Net Gain Opportunity Area

2.6.27. The Applicant has been undertaking discussions with the relevant landowners of the Mitigation and Enhancement Area and Biodiversity Net Gain Opportunity Area which are ongoing. Measures required to be undertaken to manage the Mitigation and Enhancement Area and Biodiversity Net Gain Opportunity Area are described in the **Outline LaBARDS (Document Reference 7.9)**.

2.6.28. A **Draft DCO (Document Reference 3.1)** requirement will ensure that one or more full LaBARDS(s) is brought forward, to be in substantial accordance with the **Outline LaBARDS (Document Reference 7.9)** prior to the operation phase commencing. Offsite improvements will be secured by a Section 106 agreement.

Maintenance Dredging Requirements

2.6.29. Periodic maintenance dredging will be required to ensure the Proposed Jetty remains accessible. The typical frequency of the maintenance dredging is approximately 12 monthly; however, this may vary depending on the intensity of coastal processes and frequency of berth usage. It is anticipated that the annual maintenance dredge volume will be approximately 9,000m^3.

2.6.30. Maintenance dredging will be managed in accordance with relevant legislation and will be disposed of offsite (via vessel and only if dredged arisings are deemed suitable for this disposal method and conform with the permits for disposal sites). The removal of the dredged arisings will be undertaken by an appropriately licenced waste carrier.

2.7. APPROACH TO DECOMMISSIONING

2.7.1. The Proposed Scheme is intended to operate for at least 25 years. However, for the purpose of assessing a reasonable worst case scenario it is anticipated that it could have a design life of 50 years, as per typical design life of the civil and structural elements of the Proposed Scheme.

2.7.2. At the end of the 50 year period, the Proposed Scheme may have some residual life remaining, and an investment decision will be made as to whether the operational life of the Proposed Scheme is to be extended. If it is not appropriate to continue operation, the plant will be decommissioned.

2.7.3. Any decommissioning would be likely to be completed in less time than construction of the Proposed Scheme and, whilst the Applicant has no plans to decommission and remove the Proposed Scheme, were it to be removed, it would be likely to require a similar degree of plant, equipment, and disturbance to that predicted during construction. It is considered that the potential sensitivity of receptors during decommissioning are likely to be similar to those during construction but with a lower magnitude of impact due to the shorter timeframe associated with any decommissioning.

2.7.4. **Table 2-7** describes, at a high-level, by technical topic why there are unlikely to be any new or different significant effects during decommissioning than those identified during construction, see **Chapter 5: Air Quality (Volume 1)** to **Chapter 21: Cumulative Effects (Volume 1)**. In many cases the effects are likely to be of a lower significance than construction due to the anticipated lower magnitude of effects anticipated during decommissioning. **Table 2-7** has been prepared based on the mitigation measures outlined throughout this ES.

2.7.5. In light of this and given that the Applicant has no plans to decommission the Proposed Scheme, further consideration of decommissioning is not considered appropriate. A Decommissioning Environmental Management Plan will be prepared in advance of decommissioning commencing, as will be required by the **Draft DCO (Document Reference 3.1)**.

Table 2-7: High-level Decommissioning Appraisal

Topic	Summary of Appraisal
Air Quality	Emissions to air may be generated by decommissioning activities such as vehicle exhausts and generators. However, at a time when decommissioning takes place (in at least 50 years) it is likely that improvements would have been made to vehicles and machinery to reduce air quality emission generated. There may also be dust arising. However, these effects would be managed by standard good practice measures applied at the time and pursuant to the Decommissioning Environmental Management Plan. Therefore, there are unlikely to be significant effects on air quality during decommissioning.
Noise and Vibration	The activities required during decommissioning, such as demolition of the Carbon Facility, Proposed Jetty and Ancillary Infrastructure could generate noise for short periods of time at a local level. However, this is unlikely to exceed the noise levels assessed within the construction phase. In addition, at a time when decommissioning takes place (in at least 50 years) it is likely that improvements would have been made to vehicles and machinery to reduce noise generated. If noise levels exceed thresholds, it is anticipated that best practicable means would be employed, including selecting low noise/vibration equipment and methodologies, pursuant to a Decommissioning Environmental Management Pan. Therefore, there are unlikely to be significant effects on noise and vibration during decommissioning.

Topic	Summary of Appraisal
Terrestrial Biodiversity	The footprint of any decommissioning works is likely to be smaller than the ground disturbed during construction of the Proposed Scheme and the effects would be no worse than those identified during construction. There could be effects to protected species and habitats at the time of decommissioning, including through light impacts. However, these are likely to be managed through standard good practice measures and/or the measures set out in the relevant consents at the time, for example, European Protected Species licences for foraging bats. Therefore, there are unlikely to be any significant effects to terrestrial biodiversity during decommissioning.
Marine Biodiversity	The footprint of any decommissioning works is likely to be smaller than the ground disturbed during construction of the Proposed Scheme and the effects would be no worse than those identified during construction. There could be effects to protected species and habitats at the time of decommissioning, however, these are likely to be managed through standard good practice measures and/or the measures set out in the relevant consents at the time. Therefore, there are unlikely to be any significant effects to marine biodiversity during decommissioning. Additionally, full demolition would increase the availability of intertidal mudflat habitat that was previously lost to construct the Proposed Jetty. Should the intertidal mudflat return to pre-existing conditions, the temporary adverse effects to marine biodiversity through decommissioning are unlikely to significantly outweigh the long-lasting benefit of habitat restoration.
Historic Environment	The footprint of any decommissioning works is likely to be smaller than the ground disturbed during construction of the Proposed Scheme. As the ground within this area would already have been disturbed during construction, it is unlikely that archaeological remains would be present. Therefore, there are unlikely to be any significant effects to archaeology during decommissioning. Removal of the Proposed Scheme could have beneficial effects on heritage assets through the removal of modern development within their setting. However, these are unlikely to be significant, given the conclusions of the assessment in this ES. There is also the potential for decommissioning works to have a temporary

Topic	Summary of Appraisal
	adverse effect on heritage assets through the introduction of noise and visual intrusion within their setting during construction. However, this would be temporary and unlikely to be significant.
Townscape and Visual	The demolition of the Proposed Scheme could have beneficial effects on views and the landscape character of the area. There would be decommissioning vehicles present within the landscape and views, but these would be temporary and transient throughout the Site. However, these effects are not likely to be different or worse than those presented in **Chapter 10: Townscape and Visual (Volume 1)**.
Water Environment and Flood Risk	There is the potential for short term temporary effects to watercourses (e.g. pollution risks) and land drainage during decommissioning. However, these effects would be managed by standard good practice measures applied at the time, pursuant to a Decommissioning Environmental Management Plan. Therefore, there are unlikely to be any significant effects to the water environment during decommissioning. Under decommissioning, the removal of impermeable surfaces at the Site may be beneficial to the areas overall flood risk.
Climate Resilience	The activities required during decommissioning may be subject to temporary adverse effects as a result of climate variables including extreme precipitation events (flooding), extreme temperature events and high winds and storms. Such events will cause temporary disruption to decommissioning activities. Measures including drainage and the use of silt traps will ensure that these climate variables are unlikely to have a significant adverse effect. At a time when decommissioning takes place (in at least 50 years) similar adverse effects would arise (or indeed could be improved given expected developments in technology over time) given design optimisation is expected to maximise resilience.
GHG	Considering decommissioning of the Proposed Scheme in isolation would likely require a similar degree of plant, equipment, and disturbance to that predicted during construction. Similar effects would arise (or indeed could be improved given expected developments in technology over time) given design optimisation to minimise emissions to reflect the carbon reduction hierarchy as

Topic	Summary of Appraisal
	well as other measures. Further to the decommissioning of the Proposed Scheme, given when operational it is expected to result in a substantial decrease in GHG emissions compared to the baseline scenario, decommissioning will likely bring adverse effects to the quantity of emissions should Riverside 1 and Riverside 2 remain operational without the Proposed Scheme in place (capturing the CO_2).
Population, Health and Land Use	As decommissioning work is not permanent the effects from decommissioning activities will be temporary and short term in nature, having limited effects on surrounding sensitive receptors. Walkers and cyclists making use of routes through the Site will be temporarily disrupted by decommissioning activities. However, the public would be informed of the nature, timing and duration of works and provided with appropriate alternative diversion routes with clear signage and directions pursuant to a Decommissioning Environmental Management Plan. Therefore, effects to these receptors are not expected to be significant. Noise and air pollution levels are likely to be generated as a result of decommissioning activities, though these effects would be managed by standard good practice measures and best practicable means. Therefore, these effects are unlikely to be significant.
Socio-economics	Decommissioning employment represents a positive economic effect that can be estimated as a function of the scale and type of activities required. The temporary loss of operational employment is not expected to have significant effects to the local economy.
Materials and Waste	Decommissioning activities will follow best practise construction methods to minimise as far as possible impacts from the demolition of construction materials, pursuant to a Decommissioning Environmental Management Plan. This includes the view to maximise the potential for re use and recycling of materials/elements at the end-of-life stage. Any unsalvageable elements of the Proposed Scheme would contribute to waste generation. Waste generation is unlikely to exceed that of initial construction activities. Therefore, there are unlikely to be significant effects on materials and waste during decommissioning.

Topic	Summary of Appraisal
Ground Conditions and Soils	There is the potential for short term temporary effects to ground conditions (e.g. potential for contaminated land) during decommissioning. However, these effects would be managed by standard good practice measures applied at the time. Therefore, there are unlikely to be any significant effects on the geology of the area during decommissioning.
Landside Transport	Decommissioning activities will likely result in temporary cyclist and pedestrian severance and subsequent delay. Surrounding public transport networks may also experience slight disruption resulting from decommissioning. As a result of the short term nature of decommissioning activities, these delays are not expected to be experienced for a prolonged period of time, and so any adverse effect is not expected to be significant.
Marine Navigation	During the decommissioning of the Proposed Jetty, it is likely that similar vessel movements and activities within the River Thames will be required as those required for the construction of the Proposed Jetty and these effects are not anticipated to be significant. Once the decommissioning of the Proposed Jetty is complete this would likely result in eased marine congestion. Additionally, where the Proposed Jetty constituted a contact hazard for existing operations, alternative vessels and tankers will no longer need to consider the potential negative effects of the Proposed Jetty. Therefore, decommissioning activities, once complete, are expected to have beneficial effects on marine navigation. As part of the Decommissioning Environmental Management Plan, an update to the Navigational Risk Assessment will be undertaken to ensure any change in baseline vessel movements is understood prior to decommissioning commencing.
Major Accidents and Disasters	Decommissioning activities will proceed in accordance with standard health and safety systems and risk management systems as utilised throughout construction. As a result, the risk of adverse effects on major accidents and disaster during this decommissioning are expected to be minimal.

Topic	Summary of Appraisal
Cumulative Effects	The intra-project cumulative effects would depend on the potential effects identified from the different aspects at the time. However, it is unlikely that the effects would be different to those identified during construction and therefore there would be no new or different significant effects for the decommissioning phase when compared to construction of the Proposed Scheme. The inter-project cumulative effects assessment would depend on the proposed other developments within the vicinity at the time of decommissioning. Therefore, an assessment of inter-project cumulative effects is not possible at the current time.

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