TERRESTRIAL SITE ALTERNATIVES REPORT: 7.5

DECARBONISATION

Cory Decarbonisation Project

PINS Reference: EN010128

April 2025

Revision B

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations (2009) – Regulations 5(2)(q)

QUALITY CONTROL

Document Reference		**7.2**			
Document Owner		Cory Environmental Holdings Limited			
Revision	**Date**	**Comments**	**Author**	**Check**	**Approver**
Revision A	March 2024	-	LJ	AV	DC
Revision B	April 2025	Updated to account for errata (as requested by the Examining Authority)	CV	LJ	DC

TABLE OF CONTENTS

FIGURES

TABLE

ANNEXES

APPENDIX A

EXECUTIVE SUMMARY

This Terrestrial Site Alternative Report (TSAR) is intended to assist the Examining Authority ('ExA') and Secretary of State ('SoS') by defining the process of how the Applicant selected the preferred development zone for the Carbon Capture Facility, being the primary part of the terrestrial part of the Proposed Scheme. The TSAR includes a summary of the procedure by which the Project Objectives, Project Principles and Design Principles informed the site assessment process (Section 2).

A series of six optioneering principles were developed in accordance with the Project Objectives and Project Principles. These Optioneering Principles were applied to all Development Zones to evaluate the impact to key considerations. The evaluation each Zone against these Optioneering Principles is defined in Section 3. The Optioneering Principles are as follows:

- **Principle 1**: Seek to avoid or minimise adverse impact to locally important biodiversity sites.
- **Principle 2**: Seek to avoid or minimise adverse impact to protected species.
- **Principle 3**: Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.
- **Principle 4**: Seek to avoid or minimise land take within the MOL Accessible Open Land, and impacts on PRoW.
- **Principle 5**: Ease of required connections with the Riverside Campus and the Proposed Jetty.
- **Principle 6**: Seek to minimise engineering complexity and consequent cost.

The site assessment process was refined as the design evolved (Section 2.4) resulting in a phased approach to site selection and the parameter of requirements become more refined. The site alternative comprises three separate phases:

- **Phase 1**: Preliminary Site Parcels. Initial consideration of nine individual parcels (Letter options).
- **Phase 2**: Development Zones. Consideration of four zones, divided between North, East South and West around the existing Riverside 1 and Riverside 2 facility.
- **Phase 3**: Development Zones (South). Following the removal of North, West and East Zones basing on Optioneering Principles evaluation, the Applicant developed five South Zones. Each South Zone possessed an alternate configuration in an attempt to minimise impacts on key considerations.

South Zone 1 demonstrates the most robust option to avoid, minimise and mitigate key constraints identified throughout the process, specifically in consideration to the Optioneering Principles and the Design Principles. The Applicant concludes that the TSAR provides a understandable justification for the preferred site selection.

1. INTRODUCTION

1.1. INTRODUCTION TO THE APPLICANT

1.1.1. Cory Environmental Holdings Limited (hereafter referred to as Cory or the Applicant) is applying to the Secretary of State under the Planning Act 2008 (PA2008) for a Development Consent Order (DCO) in order to construct, operate and maintain a Carbon Capture Facility with associated jetty (the Proposed Scheme) to be known as the Cory Decarbonisation Project. The application will be made to the Secretary of State for Department for Energy Security and Net Zero (DESNZ) and administered by the Planning Inspectorate (PINS).

1.1.2. Cory is part of the Cory Group, one of the UK's leading resource management companies, with an extensive river logistics network in London underpinned by a long history and deep connection to the city stretching back to the late 1700s. The Cory Group has invested heavily in London's waste recycling, energy generation and river logistics infrastructure. In addition to its commercial customers, the Group is a trusted partner for several local authorities in London (serving a combined population of approximately 3 million people). It operates essential infrastructure which London relies heavily upon on a day-to-day basis.

1.1.3. WSP and LDA Design have been commissioned by the Applicant to prepare this report presenting an evaluation of the site alternatives that have been considered for the development zone in which the Carbon Capture Facility will be built.

1.2. INTRODUCTION TO THE PROPOSED SCHEME

1.2.1. The Applicant intends to construct and operate the Proposed Scheme to be linked with the River Thames. Further detail is provided within **Chapter 2: Site and Proposed Scheme Description** of the **Environmental Statement (Document Reference 6.3)** (ES) but in summary the Proposed Scheme includes:

- The Carbon Capture Facility (and its associated Supporting Plant and Ancillary Infrastructure): the construction of infrastructure to capture a minimum of 95% of carbon dioxide (CO2) emissions from Riverside 1 and 95% of CO2 emissions from Riverside 2 once operational, which is equivalent to approximately 1.3Mt CO2 per year. The Carbon Capture Facility will be one of the largest carbon capture projects in the UK.
- The Proposed Jetty: A new and dedicated export structure within the River Thames is required to export the CO2 captured as part of the Carbon Capture Facility.
- The Mitigation and Enhancement Area: Land identified as part of the **BNG Assessment (Appendix 7.6: Biodiversity Net Gain Report (Volume 3))** to provide habitat mitigation, compensation and enhancement (including potential planting for landscaping). The Mitigation and Enhancement Area provides a

valuable opportunity to improve access for users of the Crossness Local Nature Reserve (LNR).

- Temporary Construction Compounds: The use of these areas during construction will include, but not be limited to, office space, warehouses, workshops, open air storage and car parking. The areas will be reinstated to their original use following completion of the construction works for the Proposed Scheme or utilised as part of the Proposed Scheme.
- Utilities Connections and Site Access Works: The undergrounding of utilities required for the Proposed Scheme in Norman Road and the creation of new, or the improvement of existing, access points to the Carbon Capture Facility from Norman Road.

1.2.2. Together, the Carbon Capture Facility, the Proposed Jetty, the Mitigation and Enhancement Area, the Temporary Construction Compounds, the Utilities Connections and Site Access Works a are referred to as the 'Proposed Scheme'.

1.2.3. The land upon which the Proposed Scheme is to be located is referred to as the 'Site' and the extent referred to as the 'Site Boundary'. Other terms used in this report are defined in the Proposed Scheme **Glossary (Document Reference 1.7)**.

1.3. PURPOSE AND STRUCTURE OF THIS REPORT

1.3.1. The Applicant has given careful consideration to the location of Proposed Scheme, considering alternatives for both the Carbon Capture Facility and the Proposed Jetty. This report, the **Terrestrial Site Alternatives Report (TSAR) (Document Reference Number 7.5)** has been prepared to present the process of identifying the chosen development zone for the siting of the Carbon Capture Facility (incorporating all of the Supporting Plant and Ancillary Infrastructure set out in **Chapter 2 Site and Proposed Scheme Description (Volume 1)** of the **ES (Document Reference 6.3)**).

1.3.2. The **Jetty Site Alternatives Report (JSAR) (Document Reference 7.6**) presents the process as applied to identifying the chosen location of the Proposed Jetty. The reader may find it helpful to read this TSAR in conjunction with the JSAR.

1.3.3. The **Design Approach Document (DAD) (Documents Reference 5.6)** provides a narrative of the design approach implemented throughout the evolution of the Proposed Scheme and defines how the scheme design evolved following the selection of the preferred development zone.

1.3.4. Following the introduction in Section 1, this report is structured as follows:

- **Section 2** – describes the Carbon Capture Facility Site Assessment Process;
- **Section 3** – sets out the base operational and constructability considerations for the Development Zones;
- **Section 4** – Development zones –presents the Optioneering Principles analysis; and
- **Section 5** – Conclusion.

2. THE SITE ASSESSMENT PROCESS

2.1. INTRODUCTION TO TERRESTRIAL SCHEME DEVELOPMENT

2.1.1. This section of the TSAR presents the approach taken through the site assessment process to identify the chosen development zone for the Carbon Capture Facility.

2.1.2. Necessarily, the approach starts with recognition of the context of why this process needs to be undertaken.

2.1.3. This section then walks through the site assessment process that was undertaken for the Carbon Capture Facility development zone.

2.1.4. The **DAD (Documents Reference 5.6)**, alongside **Chapter 3 of the Environmental Statement (Document Reference 6.1)**, explains how, once the Carbon Capture Facility development was chosen, the site layout within that development zone was developed. This includes consideration of how pipework routing for connections to Riverside 1 and Riverside 2 were taken forward following selection of the Carbon Capture Facility development zone.

2.2. REASONABLE ALTERNATIVES

OVERVIEW

2.2.1. The **Planning Statement (Document Reference 5.2)** outlines, at paragraph 1.1.3, that the Overarching National Policy Statement for Energy EN-1 (NPS EN-1) provides the primary policy for determination of the DCO application for the Proposed Scheme.

2.2.2. At paragraph 4.3.22, NPS EN-1 states:

'Given the level and urgency of need for new energy infrastructure, the Secretary of State should, subject to any relevant legal requirements (e.g. under the Habitats Regulations) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:

- *the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner; and*
- *only alternatives that can meet the objectives of the proposed development need to be considered.'*

2.2.3. Each of these elements of NPS EN-1 policy: the proportionate response to legislative and policy requirements; and identification of the key principles for an alternative to meet the objectives of the Proposed Scheme, are considered below.

2.2.4. It is also noted that the Proposed Scheme is development that requires an Environmental Impact Assessment (EIA) under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations') and the DCO application is accompanied by an Environmental Statement (ES), which is

required to describe the reasonable alternatives considered for the Proposed Scheme and the main reasons for choosing the proposals are brought forward. This report has been prepared to support **Chapter 3 of the Environmental Statement** in order to enable this requirement to be met.

Proportionate Response

2.2.5. From a legislative perspective, the Applicant notes that the conclusions of the **Water Framework Directive Assessment (Document Reference 6.3)** (no deterioration to WFD waterbodies reported) and the **Statement to support Habitats Regulations Assessment (Document Reference 6.3)** (no adverse effects on integrity reported) are such that alternatives do not need to be considered within those legislative frameworks.

2.2.6. However, it is noted that the Carbon Capture Facility involves third party land, which in the absence of successful negotiations, will need to be compulsory acquired under the DCO. In this context, the Applicant is conscious of the legal requirement to demonstrate a 'compelling case in the public interest' for compulsory acquisition powers. As part of demonstrating that this test is satisfied, Government policy provides that a prospective acquiring authority must be able to demonstrate that acquisition of the land is necessary and that all reasonable alternatives to compulsorily acquiring the land proposed have been explored. This report has been prepared to explain that exploration process and why the development zone for the Carbon Capture Facility contained within the Proposed Scheme, and its associated compulsory acquisition proposals, has been chosen. The **DAD (Document Reference 5.6)** goes on to explore the further design development process within that development zone. Both documents go on to inform the **Statement of Reasons (Document Reference 4.1).**

2.2.7. In relation to policy considerations, whilst the Applicant is mindful of the policy support given to 'critical national priority' projects such as the Proposed Scheme in NPS EN-1; in light of the environmental and policy context in and surrounding the Site Boundary, it recognises that the Secretary of State will need to be satisfied that the Applicant's case is robust, in light of the relevant protective policies in EN-1, namely:

- the need for the mitigation hierarchy to be followed;
- the presence of Metropolitan Open Land, which is treated in London Plan and London Borough of Bexley (LBB) Local Plan terms (and in previous DCO application) as having the same status as Green Belt, and thus needing to demonstrate very special circumstances for building on it;
- the Accessible Open Land being both designated as, and used as, public open space, which has not been deemed surplus to requirements by LBB; and
- the 'due consideration' to be given to impacts to local nature designations such as LNRs and SINCs, both of which are present in the Site.

2.2.8. These policy protections, have informed the factors that have been considered in assessing the different development zone options, as discussed below.

Site alternatives that meet the objectives of the Proposed Scheme

2.2.9. The reasonable alternatives progressed through the analysis within this report are those that sites or locations can meet the objectives of the Proposed Scheme.

2.2.10. The Riverside Campus accommodates the Applicant's residual waste management capacity: Riverside 1 and Riverside 2 (currently under construction). Both of these facilities are consented, and their operation is not a matter for deliberation within determination of the Proposed Scheme DCO Application. Rather, they underpin the development such that their location is materially relevant to the Proposed Scheme, given its function as capturing the carbon from these plants.

2.2.11. Riverside 1 gained consent under the section 36 of Electricity Act 1989 in June 2006. This has been amended several times, with the extant section 36 consent and deemed planning permission being dated 21 December 2021. The facility has been operating since 2011 and is located on the eastern side of the Riverside Campus. It can accept up to 850,000 tonnes per annum ('tpa') of residual waste to generate up to 80.5 megawatts ('MW') of electricity. In 2022, Riverside 1 processed 789,000 tonnes of residual waste and generated 565 gigawatt hours of electricity (sufficient to power 195,000 homes).

2.2.12. Riverside 2 gained consent through the Riverside Energy Park Order 2020, made by the Secretary of State on 9th April 2020[1]. The facility is currently under construction and due to be operational in 2026, providing a typical annual throughput of 665,000 tonnes of residual waste and nominal rated electrical output of 76MW[2]. Riverside 2 has a maximum consented throughput of 805,920 tpa of residual waste.

2.2.13. Together, Riverside 1 and 2 will recover enough electricity equivalent to the needs of 371,000 homes; comparable to providing the electricity required by all the households in Bexley, Bromley and Greenwich (345,000).

2.2.14. Middleton Jetty was purpose built alongside Riverside 1 and has sufficient capacity to operate with Riverside 2, enabling Cory, uniquely within the UK, to substantially use river transport, removing at least 100,000 truck movements from the road each year. Approximately 75% of throughput is brought to the Riverside Campus from the river-based waste transfer stations and recycling facilities located at Smugglers Way in Wandsworth, Cringle Dock in Battersea, Walbrook Wharf in the City of London, Northumberland Wharf in Tower Hamlets and Debden Wharves in Barking.

2.2.15. The incinerator bottom ash (a post-combustion residue) from Riverside 1 and 2 (when operational) is transported, via the River Thames, to a processing facility at Tilbury Docks. Here, the incinerator bottom ash is processed (by a third party) to split out the ferrous and non-ferrous metals for recycling elsewhere, with the ash separated into different sizes and blended to create a recycled aggregate that is used in the construction sector, so avoiding the extraction of aggregate minerals.

2.2.16. **Figure 2-1** presents this network of infrastructure along the River Thames.

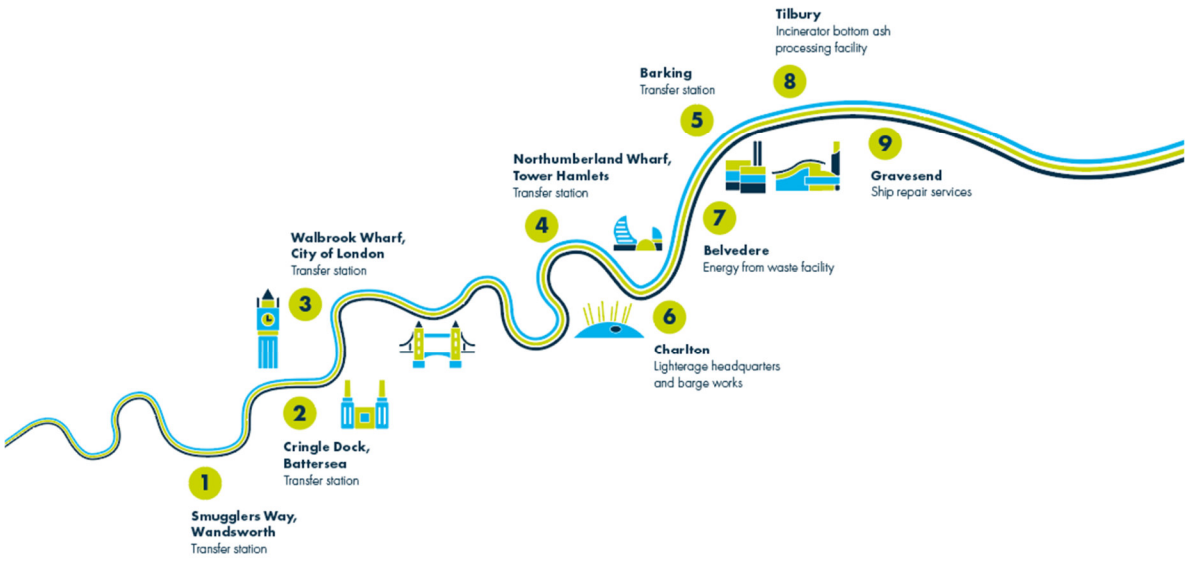


Figure 2-1: Cory Group and associated facilities along the River Thames

2.2.17. Both Riverside 1 and (from 2026) Riverside 2 are properly described as sources of partially renewable, dispatchable energy. NPS EN-3, the technology specific policy for renewable energy infrastructure, expressly includes energy from waste; the facilities continue to be recognised in national policy as partially renewable energy generating stations, and consequently as achieving a positive carbon outcome in comparison to disposing waste to landfill.

2.2.18. Whilst these operations meet current climate change targets (diverting waste from landfill, exporting partially renewable baseload energy, contributing to the circular economy and using the river to minimise road movements) a step change is required to enable the resource management operations at the Riverside Campus to also deliver future net zero carbon priorities.

2.2.19. The Carbon Capture Facility is that step change, being the post-combustion infrastructure necessary to enable permanent storage of the carbon dioxide emissions from Riverside 1 and Riverside 2. Necessarily, the Carbon Capture Facility, needs to be located close to source of the carbon dioxide emissions, the EfW facilities located at the Riverside Campus, and also to the Proposed Jetty required to transport the capture carbon dioxide to its permanent storage location. These spatial requirements therefore limit the area of search to be within the vicinity of the Riverside Campus.

2.2.20. There is also a temporal requirement to meet the objectives of the Proposed Scheme: that it can be delivered quickly. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 made the UK the first major economy to commit to a 'net

zero' target, requiring the UK to bring all greenhouse gas emissions to net zero by 2050. The Sixth Carbon Budget: The UK's Path to Net Zero (Sixth Carbon Budget) was published in December 2020 and enacted by the Government in June 2021. It covers the period 2033 to 2037 and is the first budget to reflect the net zero target. In Box 24 (page 90) the Sixth Carbon Budget confirms that '*All of the pathways explored in our Sixth Carbon Budget advice see the use of carbon capture and storage (CCS) as a critical and cost-effective means of meeting the UK's 2050 Net Zero target.*' It also recognises that all energy from waste plants would need to use CCS and concludes:

'… CCS is essential to achieving Net Zero, at lowest cost, in the UK. The importance of CCS globally further underscores the urgency of progressing CCS plans in the UK.' (page 91)

2.2.21. This reflects the Committee on Climate Change's 2019 view that CCS is a 'necessity', not an option' to meet Net Zero.

2.2.22. The Proposed Scheme seeks to support the Net Zero Government Initiative published in December 2023[3], which reinforces the Government's commitment for the UK to bring all greenhouse gas emissions to net zero by 2050.

2.2.23. The Department for Energy Security and Net Zero published the Carbon Capture and Storage Vision in December 2023[4]. The vision also seeks to increase investor confidence in the sector of storage and transportation of CO_2. The aspiration of the document is for Carbon Capture, Usage and Storage (CCUS) to become a game-changer for the UK's energy transition. It notes that it plans to develop CCUS into a highly valuable national asset that will help the UK reach net zero and boost our economy by up to £5 billion per year by 2050.

2.2.24. On 5 December 2023, Cory entered into a commercial relationship with Viking CCS to collaborate on the transport and storage of shipped CO2 captured from the Riverside EfW facilities. Viking carbon dioxide transport and storage systems were being taken forward in the Track 2 process, defined by the Government in July 2023. The Viking reservoirs provide a storage capacity for some 300m tonnes of CO2 and the project plans to capture and store 10m tonnes of carbon emissions per annum by 2030.

2.2.25. NPS EN-1, paragraph 3.5.1 states that '*There is an urgent need for new carbon capture and storage (CCS) infrastructure to support the transition to a net zero economy*.' At paragraph 3.5.5 the NPS advises that the UK has an estimated 78 billion tonnes of CO2 storage capacity under the seabed of the UK continental shelf, one of the largest potential CO2 storage capabilities in Europe. '***To support the urgent need for new CCS infrastructure, CCS technologies, pipelines and storage infrastructure are considered to be Critical National Priority infrastructure'*** (Paragraph 3.5.8).

2.2.26. In this context, any reasonable alternative to be considered in choosing a location for the Proposed Scheme therefore needed to be aligned with the following Project Objectives:

- located in the vicinity of the Riverside Campus and the River Thames, for efficient connection to EfW facilities and the Proposed Jetty;
- of sufficient size to accommodate the Carbon Capture Facility, including its Supporting Plant and Associated Infrastructure in order to capture and process the carbon created by both Riverside 1 and Riverside 2; and
- deliverable in a timely manner.

2.2.27. Site options that cannot meet these objectives are not reasonable alternatives.

2.3. SITE ASSESSMENT PROCESS

2.3.1. Identifying the preferred location for a project of national significance is, generally, a multi-tiered process, with iteration used to test assumptions and outcomes.

2.3.2. The approach taken through the terrestrial site assessment process is presented in the following sections.

2.4. INITIAL WORK: PRELIMINARY SITE PARCELS

2.4.1. On the basis of the early stage engineering feasibility studies, a preliminary understanding of the site area required for the Carbon Capture Facility was around 4 hectares (ha). Consequently, and further to the objectives, initial consideration was given to nine preliminary site parcels of this size; eight on land and one within the River Thames.

2.4.2. These nine, preliminary site parcels are described in **Table 2-1**; their locations are shown in **Appendix A**.

Table 2-1: Preliminary Site Parcels for the Carbon Capture Facility

Site Options	Description
A	Site Parcel A comprises brownfield, open grassland, ditches and an access road. The Option includes a part of Borax North, with all of Borax South, and Creekside. It is crossed by the Thames Water Access Road.
B	Site Parcel B comprises largely of open grassland. The northern section of is part of Crossness LNR land, and the southern section comprises Borax North and Borax South. It is dissected by the Thames Water Access Road.
C	Site Parcel C comprises a disused sludge incinerator and the Great Breach Pond.
D	Site Parcel D comprises brownfield, hardstanding and grassland. The area consists of three separate land parcels, Creekside, Munster Joinery (an operating business) and Gannon.
E	Site Parcel E comprises the Iron Mountain Records Storage Facility (an operating business).
F	Site Parcel F is the location of a Lidl Warehouse/ Belvedere Regional Distribution Centre (an operating business).
G	Site Parcel G comprises the intertidal zone of the River Thames, to the north of the of the Iron Mountain Records Storage Facility, where the current Belvedere Power Station Jetty (disused) is located. This option would require the creation of a land within the intertidal zone. This parcel's landside connection includes Public Right of Way (PRoW) FP3, FP4, National Cycle Route 1 and England Coast Path.
H	Site Parcels H is located immediately south of Riverside 1 and Riverside 2, within land known as the Eastern Paddock and Western Paddock.
I	Site Parcels I consist of a land parcel adjacent to Riverside 2 which includes the Great Breach Pumping Station. It comprises Crossness LNR land and Erith Marshes SINC land. This option includes PRoW FP2 and FP3.

2.4.3. These preliminary site parcels were evaluated on an understanding of the equipment requirements, site engineering footprint and environmental constraints at that time. Through this initial appraisal, parcels A, B, D and H were preferred for further investigation and development for the following reasons:

- to form a single homogenous area with sufficient space for the necessary footprint of the Carbon Capture Facility;
- the ability to consolidate the direct loss of Crossness LNR land, Erith Marshes SINC land and land designated as MOL;
- avoiding adverse environmental impacts associated with works within the River Thames above and beyond those required for the Proposed Jetty;
- close proximity to Riverside 1 and Riverside 2 for connection of the flue gas ducting and further utilities;
- reasonable proximity to enable connection with the River Thames;
- predominant use of land allocated in the development plan as strategic industrial land; and
- generally ability to deliver land in a timely manner.

2.5. DEVELOPMENT OF OPTIONEERING PROCESS

2.5.1. Even at this time, the Applicant recognised that it would need to continue its scheme development mindful of the constraints in and around the Site and so, with the Project Objectives in mind, started to develop Project Principles, Optioneering Principles and Design Principles for the Proposed Scheme, so that they could be utilised as part of the scheme development process.

2.5.2. The Project Principles, building on the Project Objectives were determined to be as follows:

- Climate;
- People;
- Places; and
- Value.

2.5.3. The Design Principles are set out in the Design Principles and Design Code **(Document Reference 5.7).**

2.5.4. The Optioneering Principles are discussed in Section 2.8 below.

2.5.5. This process is outlined in **Figure 2-2** below: **Interaction of the Design Principles and Optioneering Principles**.

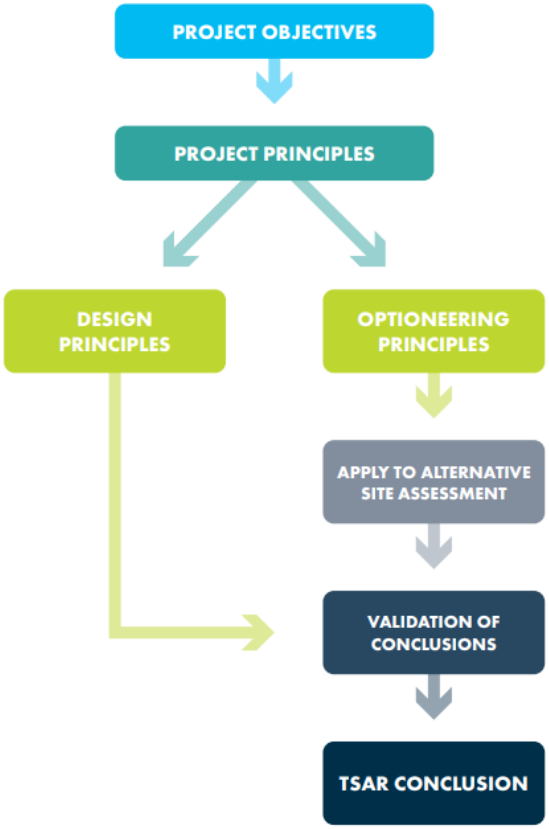


Figure 2-2: Interaction of the Design Principles and Optioneering Principles

2.6. EVOLUTION AND REVIEW OF SITE REQUIREMENTS

2.6.1. Alongside this, the Applicant gained further understanding of the requirements that the Carbon Capture Facility would need to meet.

2.6.2. Further to the analysis of the preliminary site parcels, the **Preliminary Environmental Information Report (Document Reference Number 0.2)** (PEIR) was completed when the pre-FEED[5] design process was still progressing. Although it was understood that the outcomes of this process would necessitate that the 4 hectare land requirement would increase, the precise quantity had not been defined; and the PEIR referenced an expected land requirement of 7ha. The Applicant therefore recognised that a combination and refinement/expansion (as necessary) of the preliminary site parcels referred to above would be needed.

2.6.3. The continuing pre-FEED design process has been informed by input from potential third party carbon capture technology providers. This information has enabled the DCO project team to gain a more accurate understanding of the site size requirement for the Carbon Capture Facility, and in particular its Associated Infrastructure and Supporting Plant.

2.6.4. Alongside general site operation efficiency, including the provision of space for maintenance contractors during the operation phase, two specific elements of the Carbon Capture Facility have increased footprint demand:

- The onsite CO_2 storage tanks – the storage tanks required to ensure holding capacity of the liquified CO2 between maritime collection schedules. As part of the Feasibility Study, the Applicant assumed that two large tanks would be able to provide the assumed liquid CO2 storage volume of 24,000m^3. However, when the Applicant engaged with technology providers during pre-FEED design, only solutions involving a larger number of smaller capacity tanks were available, and this required a larger footprint area. There are two potential storage tank design options available; spheres or vertical cylindrical vessels. While the vertical vessels could potentially be accommodated within a smaller footprint, they will have a greater visual impact as they are taller. The number of tanks and individual storage volume per tank also has a bearing on the Quantitative Risk Assessment. The smaller tanks present a higher likelihood of an event, but a lower impact for a larger number of smaller vessels should an event arise; whereas there is a lower likelihood of an event, but higher impact should one arise, for a smaller number of larger vessels.
- Availability of water for cooling - the Feasibility Study had previously assumed cooling water would be available from the existing operations on the Riverside Campus and that a standalone cooling tower would therefore not be required, whereas it is now understood that one is required.

2.6.5. This evolution in site design confirmed that approximately 8ha of site area would be required for the Carbon Capture Facility.

2.6.6. The preliminary site parcels were therefore definitively no longer sufficient to accommodate the footprint of the Carbon Capture Facility, with the consequent need to review appropriate development zones, combining those previous parcels and refining/expanding them as necessary to fit.

2.7. THE DEVELOPMENT ZONES

2.7.1. The essential requirements of any location to be considered a reasonable alternative, as set out in **Section 2.2**, remain applicable as part of consideration of the revised 'Development Zones'. The area in the vicinity of the Riverside Campus, and on all sides (north, east, west and south) was reviewed to identify zones that could provide a development area of 8ha, in a timely manner, incorporating the previous preliminary site parcels and developing its understanding from the initial considerations given to those parcels. At this point, the preferred location of the Proposed Jetty was known, further to the process set out in the **JSAR (Document Reference 7.6)** and as such on-going optioneering focussed on how the different zones could be connected to that location.

2.7.2. The Riverside Campus is located in an urban area and site choice is not extensive. The zone to the north comprises the River Thames and is limited by existing, safeguarded and operational infrastructure. The zone to the east comprises Belvedere Industrial Estate and is limited by existing, operational (including at large scale) business. The zone to the west is limited by development constraining policy allocations, PRoW and operational infrastructure (the Great Breach Pumping Station and Crossness Sewage Treatment Works). The zone to the south is substantially limited by development constraining policy allocations and PRoW, but does benefit from land with development-promoting allocation, albeit this is partially occupied by existing business (Munster Joinery and leasehold to Cory Group) and owned by third parties.

2.7.3. There is no unconstrained site choice, which is not an unusual situation for a infrastructure project of national significance. Consequently, all zones have been considered.

2.7.4. Both in response to Statutory Consultation feedback and in consideration of the mitigation hierarchy, a conscious decision was taken to consider different options within the south zone to areas that fell neither within the Crossness LNR nor on land occupied by existing business, or one or the other. All options would result in the loss of MOL or Erith Marshes SINC designations. This is the only area within the reasonable study area that this could be undertaken. Consequently, five site options were considered within the assessment of the south development zone.

2.7.5. The site options assessed are described in **Table 2-2** below and shown in **Figures 2.3.**

Figure 2-3: Development Zones

Table 2-2: Development Zones for Carbon Capture Facility

Development Zone	Description
North Zone	Comprising the intertidal zone of the River Thames, to the north of the of the Iron Mountain Records Storage Facility, where the current Belvedere Power Station Jetty (disused) is located. This development zone would require the creation of land within the intertidal zone. (preliminary site parcel G)
East Zone	Comprising the Iron Mountain Records Storage Facility, Lidl Warehouse/ Belvedere Regional Distribution Centre (an operating business). (incorporates preliminary site parcels E and F)
West Zone	Comprising the Thames Water disused sludge incinerator and the Great Breach Pond and a parcel adjacent to Riverside 2 which includes the Great Breach Pumping Station. This development zone would also contain parts of Crossness LNR land, MOL, public of space, PRoW and Erith Marshes SINC land. (incorporates preliminary site parcels C and I)
South Zone	Comprising elements of the following land uses as described at **Chapter 2** of the **Environmental Statement**: • brownfield, open grassland, hardstanding, ditches and the Thames Water Access Road; • Metropolitan Open Land; • Public Rights of Way; • the Accessible Open Land (used as and designated as public open space and as the South London Green Chain); • part of Borax North, with all of Borax South, Gannon and Creekside (the latter two owned by third parties); • areas of Crossness Local Nature Reserve (including land known as the Eastern Paddock and Western Paddock), Erith Marshes SINC and Thames Marshes Strategic Green Wildlife Corridor; • land occupied by Munster Joinery (an operating business); and • Crossness LNR. (incorporates preliminary site parcels A, B, D and H plus previously unassessed land)

2.8. OPTIONEERING PRINCIPLES

2.8.1. The Development Zones to be assessed necessarily lie within a relatively small area and many criteria that are often used for this kind of assessment would apply consistently across that study area, for example the existence of the Air Quality Management Area which applies across the London Borough of Bexley, or the Flood Zone 3 categorisation that applies across the study area; and there are no internationally, or nationally, important statutory designated sites within the development zones. In addition, these are elements that can be appropriately manipulated and controlled through detailed design. There is no benefit in using these criteria to assess the Development Zones as they will not usefully differentiate between the options.

2.8.2. As such, and in light of the legal and policy considerations, the Project Objectives and the Project Principles, the following Optioneering Principles were developed to assess each of the development zones:

- **Principle 1**: Seek to avoid or minimise adverse impact to locally important biodiversity sites.
- **Principle 2**: Seek to avoid or minimise adverse impact to protected species.
- **Principle 3**: Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.
- **Principle 4**: Seek to avoid or minimise land take within the MOL Accessible Open Land, and impacts on PRoW.
- **Principle 5**: Ease of required connections with the Riverside Campus and the Proposed Jetty.
- **Principle 6**: Seek to minimise engineering complexity and consequent cost.

2.8.3. In considering Principles 5 and 6, the Applicant has taken into account that the interfaces between Riverside 1 and Riverside 2 and the Carbon Capture Facility and Proposed Jetty are:

- Flue gas;
- High pressure steam;
- Condensate return;
- 132kV power supply;
- Communications link (control purposes); and
- Carbon pipeline connection (above ground) to Proposed Jetty.

2.8.4. The area surrounding Riverside 1 and Riverside 2 have been extensively designated as Strategic Industrial Land under the LBB Local Plan (2023) stating “Strategic Industrial Locations (SIL) will be intensified where possible to optimise the use of this land for appropriate business uses, including waste facilities and wharves”. As a result, the Site Assessment Process sought to maximise land use in these areas where possible.

2.8.5. The flue gas, high pressure steam, and condensate return are all subject to energy requirements for their movement. The transfer of these substances requires pressurised systems which increase in energy demand the longer the routing. It is therefore important to reduce distances of flue gas, high pressure steam and condensate return between Riverside 1 and Riverside 2 and the Proposed Scheme.

2.8.6. Additionally the Applicant sought to ensure sufficient provision of adequate offsets from members of the public (including workers) from the facility and associated infrastructure could be facilitated.

3. DEVELOPMENT ZONES ASSESSMENT

3.1. INTRODUCTION

3.1.1. This section presents the assessment of each of the site options within the Development Zones against the Optioneering Principles outlined in **Section 2.8**.

3.1.2. The Zones were all defined and aligned to existing land ownership boundaries, field boundaries or accounting for designations.

3.1.3. As a result each of the Zones generated a slightly different variation of land take in the context of seeking to achieve an approximate 8ha site in light of the developed understanding of operational requirements discussed in Section 2.6. The terrestrial zones ranged from 6.47ha to 8.80ha. There was a single maritime based zone of 2.84ha.

3.1.4. A summary, and figure showing the area of each Zone is presented in this section with the full assessment tables presented in **Section 3**.

3.2. NORTH ZONE

OVERVIEW

3.2.1. The North Zone is located within the River Thames, bordering the England Coast Path for the full extent of its southern boundary. There is only one site area considered on the Thames; there is no other suitably sized area available for development in proximity to the Riverside Campus as the surrounding area is occupied by or subject to operational requirements, navigational restrictions, safeguarded wharves and associated activities. The North Zone provides an area of 2.83ha. The location of the existing Middleton Jetty to the west and the ongoing operations of both this and the Thames Water Jetty prohibit the development of a larger zone to support CCS development as part of the Proposed Scheme.

SUMMARY OF ASSESSMENT

3.2.2. Location of the North Zone within the River Thames means that it avoids direct adverse impacts on the Erith Marshes SINC, the Crossness LNR, MOL and existing business operations. However, it would be located within, and have the potential for substantial adverse impact on, the River Thames etc (SINC). Development in the North Zone would be wholly visible from the England Coast Path and there would need to be extensive pipework crossing over this PRoW.

3.2.3. Development of the Carbon Capture Facility within the North Zone would not form a single homogenous area with the Riverside Campus, as it would be split by the England Coast Path and FP4 that runs to the east of Riverside1. Substantial ground works would be required to create a new land parcel in the River Thames and the associated financial requirements and environmental consequences would be substantial. Further, it lies within the preferred area for the Proposed Jetty and would

likely prevent its construction. There would also be navigational safety concerns with locating this facility immediately adjacent to the operational Middleton Jetty. At 2.83ha, it would also not be big enough to meet the operational requirements of the Proposed Scheme. Although the zone may have area to support some elements of the CCS, there would be insufficient space to accommodates the necessary storage facilities, ancillary infrastructure and control room.

3.2.4. As such, the North Zone performs poorly against the Optioneering Principles and would therefore fail to meet the Project Principles and Project Objectives and was therefore dismissed at an early stage as a reasonable alternative.

Figure 3-1: North Zone

Table 3-1: North Zone Optioneering Principles Assessment

Optioneering Principle	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites.**	This zone would result in the partial direct loss of the River Thames and Tidal Tributaries Site of Importance for Nature Conservation (SINC) land. Due to the creation of new land in the River Thames, this zone is unable to avoid additional infrastructure in a non-encroachment area (the River Thames). The loss of intertidal habitat would require offsite mitigation.. No direct impacts to Crossness LNR and Erith Marshes SINC are likely in this zone.
2. **Seek to avoid or minimise adverse impact to protected species.**	This zone would result in loss of the River Thames and Tidal Tributaries SINC intertidal habitat which is of importance to wintering bird species, and loss of the Belvedere Power Station Jetty (disused) structure which is used as a roost and nest site. There is potential for indirect impacts to the Swanscombe MCZ approx. 11km east and downstream as part of the construction phase. However, as this zone involves reclaimed land in the River Thames, it would not result in direct impacts to, or loss of Crossness LNR habitat or species.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.**	The Belvedere Power Station jetty has been available on the open market for at least 8 years. It is understood that the jetty has not been used intensively since the now demolished Belvedere Power Station closed in the 1980s. The existing jetty has been maintained and is commercial in its historical use but does not have riparian land attached to it. Further, the existing jetty is not a safeguarded wharf because it

Optioneering Principle	Analysis
	has little or no prospect of returning to intensive commercial use. The riverbed to the high watermark is owned by the Port of London Authority ('PLA'), a statutory undertaker, but this zone is south of the navigational channel of the River Thames and is burdened by the jetty that is owned by Aviva. The Proposed Scheme would return this zone to active use after more than 30 years. This option does not disrupt any business activities, other than a section of the existing jetty may require removal over the Thames Path, which would be needed in the future irrespective of the Proposed Scheme. Given the section of riverbed is currently burdened by the jetty and outside the navigational channel, it is considered that this zone could be acquired without serious detriment to the continuation of the PLA's statutory undertaking.
4. Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.	No direct impacts to Metropolitan Open Land or the Accessible Open Land are likely as these areas do not fall within the boundary of this zone. The Thames Path would be affected, as discussed in connection with Principle 6 below.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • Flue gas ducting shall require routing through Iron Mountain and/or Aviva owned land.

Optioneering Principle	Analysis
	• The estimated length of the flue gas ducting would be 730m. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • The distance between site boundaries is 70m. • The utilities corridor would be required to cross third party land (Iron Mountain and/or Aviva owned land), as well as a PRoW (the England Coast Path), dependent on the routing selected. Ease of connections to the location of the Proposed Jetty • The location of the new land parcel is in line with the Proposed Jetty location, thus it may impact the jetty design. The jetty piping shall have direct jetty access as the Site is located at the riverfront. • The estimated length of the piping to the Proposed Jetty is therefore the shortest in comparison to other sites.
6. Seek to minimise engineering complexity and consequent cost.	A new road access would be required to be created for the Site, which would require to cross the England Coast Path, presenting technical challenges as the footpath would be required to be traversed or diverted. In terms of laydown areas, the Applicant owned (Borax) sites could potentially be utilised for the construction laydown area, moving equipment between the two via Norman Road and the newly created access across the England Coast Path.

Optioneering Principle	Analysis
	Substantial and expensive additional ground works would be required to create the new land parcel on the River Thames. The creation of the required land parcel would place significant restrictions on the operation of Cory's existing Middleton Jetty. It is likely current operations would need to be restricted to the western arm. Additionally the creation of the parcel would require extensive dredging and piling works in the River Thames.

3.3. EAST ZONE

OVERVIEW

3.3.1. The East Zone is located within the Belvedere Industrial Estate, bordering the England Coast Path for the whole of its northern boundary. There is only one site option considered within the East Zone; this is considered to be representative of this area as a whole (existing, operational light industrial land uses and associated supporting infrastructure) and any other site options in this area would be further away from the Riverside Campus.

SUMMARY OF ASSESSMENT

3.3.2. Development in the East Zone would avoid direct adverse impacts on impacts on the Erith Marshes SINC, the Crossness LNR, and MOL. There would be potential for impact on the Belvedere Dykes (SINC), albeit it could be possible to mitigate this to an acceptable level. Its proximity to the Proposed Jetty location means the length of piping and ducting would be the shortest of all options. This would result in the lowest combined cost for development, excluding land costs.

3.3.3. The Zone's footprint comprises a document storage facility, operated by Iron Mountain and the Lidl Belvedere Regional Distribution Centre, both substantial, operating businesses. The direct, adverse impact resulting from removal or relocation of these businesses would be substantial. There is nowhere in this area to the east that would provide a site option of 8ha and not have a substantial, direct, adverse impact on existing businesses.

3.3.4. The East Zone would give good connectivity to the Proposed Jetty. However, it would not form a single homogenous area with the Riverside Campus, as it would be split by FP4 that runs to the east of Riverside 1. There would be no way of providing safe movement of people and vehicles between the Carbon Capture Facility and the Riverside Campus without severing FP4, and access to the England Coast Path. In the event that a safe and secure route was found, and FP4 retained, there would need to be extensive pipework crossing over this PRoW.

3.3.5. As such, the East Zone performs poorly against the Optioneering Principles and would therefore fail to meet the Project Principles and Project Objectives and was therefore dismissed at an early stage as a reasonable alternative.

Figure 3-2: East Zone

Table 3-2: East Zone Optioneering Principles Compliance

Optioneering Principle	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites.**	This zone may result in direct impacts or loss of a ditch within the Belvedere Dyke SINC. No direct impacts to Crossness LNR and Erith Marshes SINC are likely in this zone.
2. **Seek to avoid or minimise adverse impact to protected species.**	This zone may result in direct impacts to the European protected species, water vole, which are known to be present within the Belvedere Dykes SINC. This zone would not result in direct impacts to, or loss of Crossness LNR and Erith Marshes SINC and the habitats or species they support.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.**	The land would be required in order to deliver and house the plant and infrastructure for the Proposed Scheme (in particular, the Carbon Capture Facility). Both of the warehouse sites occupied by Lidl and Iron Mountain are developed out with large, modern buildings. It is understood that Iron Mountain currently employs approximately 55 staff and Lidl, following its acquisition of a further 25 acres off Crabtree Manorway to double the capacity of its warehouse operation in Belvedere[6], and it aspires to grow its number of employees from 300 to 400 members of staff at its site[7]. Acquisition of this zone would lead to at least two businesses (i.e. Iron Mountain and Lidl) needing to relocate their operational functions. The acquisition and consequent relocation of these larger, fully developed sites, would be expected to attract a high level of disturbance, including the most acute impact on employment of the Development Zones considered. Further, the

Optioneering Principle	Analysis
	acquisition of part of Lidl's operation, being the larger of its two warehouses off Crabtree Manorway, might lead to permanent impacts even in the event of a successful relocation or the need to acquire a larger site at cost.
4. Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.	No direct impacts to Metropolitan Open Land or the Accessible Open Land are likely as these areas do not fall within the boundary of this zone. FP4 and the England Coast Path would be affected as described in connection with Principles 5 and 6 below.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • Routing of flue gas ducting would be constrained – for Riverside 2, it must run either in the Northern section of the Applicant's Riverside 1 site where there is a slope between the Site ground level and England Coast Path ground level, or around the Western and Southern boundary of the Riverside 1/ Riverside 2 sites, which has the drawback of being one of the longest ducting routes from Riverside 2 of around 630m. • Any route would require crossing FP4 running between the Eastern boundary of Riverside1/Riverside 2 site and the Iron Mountain facility. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply):

Optioneering Principle	Analysis
	• In close proximity to the Riverside 1 and Riverside 2 site boundary, separated only by the strip of third party owned (Aviva) land. Connections would also require crossing a PRoW (FP4). • Routing of steam and condensate from Riverside 2 would require a long length of high-pressure steam and condensate piping East to the Eastern site boundary, with the route requiring to be run through the congested Riverside 1 and Riverside 2 site. Ease of connections to the location of the Proposed Jetty: • Landing point for jetty trestle can be into Carbon Capture Facility. For all sites, jetty trestle and associated piping would need to cross the England Coast Path. • The estimated length of the piping to the Proposed Jetty is shorter in comparison to other sites.
6. Seek to minimise engineering complexity and consequent cost.	Site access can be via the existing access road spur from Norman Road. In terms of laydown areas, the Applicant owned (Borax) sites could potentially be utilised for the construction laydown area, moving equipment between the two via Norman Road. There are no unique challenges with respect to ground conditions in comparison to the surrounding sites. The land is brownfield thus likely easier to develop in comparison to greenfield. The existing Iron Mountain warehouse located on the Site would be required to be demolished prior to commencement of construction. The

Optioneering Principle	Analysis
	existing warehouse foundations are unlikely to be suitable for re-use, thus would require replacement.

3.4. WEST ZONE

OVERVIEW

3.4.1. The West Zone comprises the Crossness Sewage Treatment Works, principally the site of the former sewage sludge incinerator (which is used only for offices), and the northern reach of the Crossness LNR and Erith Marshes (SINC) both of which abut the western boundary of the Riverside Campus. It borders the England Coast Path for the whole of its northern boundary and FP2 runs in a north-south direction from the river embankment down through the MOL.

3.4.2. There is only site option considered within the West Zone. Moving any further west would breach further into the operational area of Crossness Sewage Treatment Works, which is essential infrastructure.

SUMMARY OF ASSESSMENT

3.4.3. Development in the West Zone would have a direct adverse impact on the Erith Marshes SINC, the Crossness LNR, the Southeast London Green Chain and MOL. It could form a single homogenous area with the Riverside Campus but only by severing FP2, and access to the England Coast Path. In the event that a safe and secure route was found, there would need to be extensive pipework crossing over this PRoW. However, connectivity with the Proposed Jetty would be unlikely to be achievable, with extensive pipework needing to cross over the Erith Marshes SINC, Crossness LNR and through the operational Riverside Campus.

3.4.4. The impact on the designated sites would be substantial, leading to the direct loss of MOL (2.48ha), Crossness LNR (2.40ha) and Erith Marshes SINC (4.43ha). Development this location would entirely block views through those areas to the River Thames, limiting the accessible space for visitors and impacting the experience of outdoor spaces and avian connectivity.

3.4.5. Whilst the sewage sludge incinerator is not operational, the wharf is used by Thames Water as part of its operations at the Crossness Sewage Treatment Works and to fulfil its statutory obligations more generally. As essential infrastructure, which may require footprint for future expansion, development directly over this location would have substantial direct adverse impact on an existing business which is also a statutory undertaker. Such impacts are explained further in the **Jetty Site Alternative Report (Document Reference 7.6)**, but this option would be highly likely to be considered a serious detriment to the statutory undertaker.

3.4.6. The feasibility of relocation of the existing operational Great Breach Pumping Station located on the Site has not been determined, with a potential that it is unable to be relocated, and thus the Site would require to be built around it while retaining access for the Environment Agency (operators of the pumping station). Additionally, of relocation of the Great Breach Pumping Station means there could be unknown

impacts on drainage as this stage. The EA is likely to object to the West Zone as a result.

3.4.7. As such, the West Zone performs poorly against the Optioneering Principles and would therefore fail to meet the Project Principles and Project Objectives and it was therefore dismissed at an early stage as a reasonable alternative.

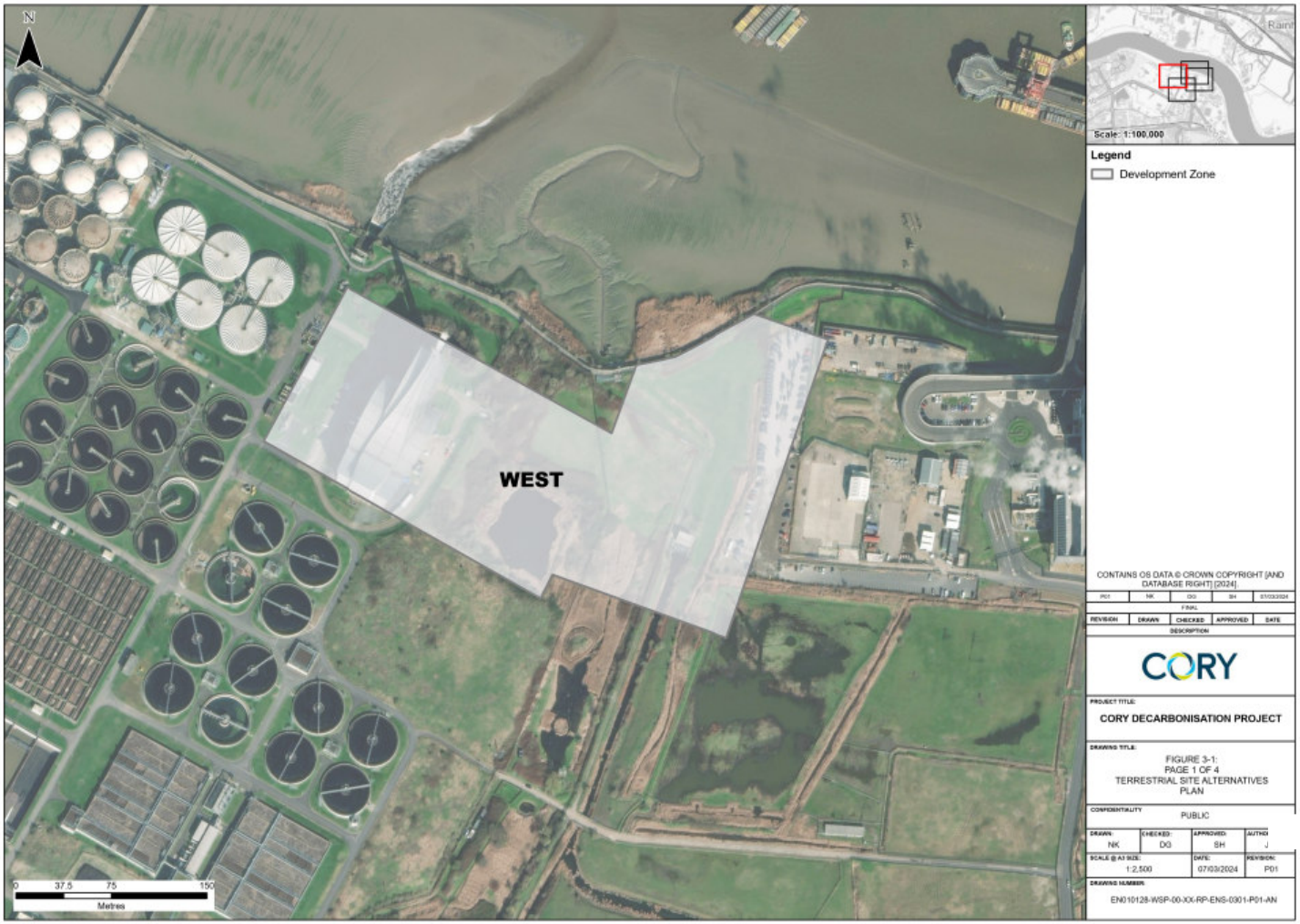


Figure 3-3: West Zone

Table 3-3: West Zone Optioneering Principles Compliance

Optioneering Principle	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites.**	This zone would result in the direct loss of Crossness LNR and Erith Marshes SINC land, which may result in direct impacts or loss of its habitats, including loss of reedbed, coastal floodplain grazing marsh and a large waterbody (pond). The West Zone would result in the loss of 2.93ha Crossness LNR and 4.43ha Erith Marshes SINC. This is larger than three of the South options for Crossness LNR. It is a comparable loss of Erith Marshes SINC to the South Zones barring South Zone One which is 1.57ha smaller.
2. **Seek to avoid or minimise adverse impact to protected species.**	This zone may result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would result in direct impacts to, or loss of Crossness LNR and Erith Marshes SINC and the habitats and species they support.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.**	Adoption of this zone may lead to impacts on the infrastructure associated with the Crossness STW, the sluice gate within the Crossness LNR, and the EA's Great Breach Pumping Station. The treatment works would be subject to Thames Water's statutory undertaking and it is anticipated that the sluice gate

Optioneering Principle	Analysis
	would be subject to the same with Thames Water and the EA, therefore requiring replacement at significant cost. The main structure in the treatment works is a sludge incinerator that is now believed to be redundant. Nevertheless, it is understood that it still has grid connections and as a result is believed to be of continued strategic use to Thames Water's statutory undertaking that, again, may trigger the requirement for a replacement facility to be provided at significant cost, else risking a serious detriment argument being made successfully by Thames Water. The feasibility of relocation of the existing operational Great Breach Pumping Station located on the Site has not been determined, with a potential that it is unable to be relocated, and thus the Site would require to be built around it while retaining access for the Environment Agency (operators of the pumping station) which would affect this option's deliverability and its ability to meet space requirements.
4. Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.	Direct impacts to Metropolitan Open Land and the Accessible Open Land are likely as these areas fall within the boundary of this zone. The West Zone will result in the loss of 0.25ha of AOL. This is smaller than South Zones 3-5 by at least 2.37ha. However it is marginally larger than South Zone One by 0.1ha. Impacts to FP2 as discussed below. Access to the England Coast Path would also be restricted as a result of this

Optioneering Principle	Analysis
	development in this zone. The West Zone would result in the loss of Footpath FP2 between the England Coast Path and Norman Road, and thus require a permanent diversion.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • The route of the flue gas ducting from Riverside 2 would be relatively simple, with the route being less than 20m to reach the Western zone boundary. • The estimated length of the flue gas ducting route from Riverside 1 is 400m in length. The Riverside 1 flue gas ducting would require to be routed through the congested Riverside1/Riverside 2 site or routed South of the Site (running parallel to the Southern fenceline). The route would need to cross at a minimum one PRoW (FP2) to the West of the Riverside 1/ Riverside 2 site boundary. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • Western Zone borders the existing Riverside 1 and Riverside 2 site boundary, closer to Riverside 2. On this basis the routing of steam and condensate from Riverside 2 is a short distance with minimal constraints other than equipment and access roads within the Riverside 1 / Riverside 2 site. • Routing of steam and condensate from Riverside 1 would require a long length of high-pressure steam and condensate piping East to the Eastern site boundary, with the route

Optioneering Principle	Analysis
	requiring to be run through the congested Riverside 1 and Riverside 2 site, or routed to the south of the existing site (running parallel to the Site fenceline). Ease of connections to the location of the Proposed Jetty: • The jetty piping would require to be routed East, either through the congested Riverside 1/Riverside 2 site or routed to the south of the existing site (running parallel to the Site fenceline). • The estimated length of the piping to the Proposed Jetty is therefore the longest in comparison to the other Zones.
6. Seek to minimise engineering complexity and consequent cost.	Site access would initially require to be through the Thames Water Crossness Treatment Works, with a new access road requiring to be constructed independent of the Crossness Treatment Works facility and associated roads. In terms of laydown areas, the Applicant owned Borax sites could potentially be utilised for the construction laydown area, but transferring equipment and materials via road between the two sites would be required. There are no unique challenges with respect to ground conditions in comparison to the surrounding sites. A section of the Zone has a pond which would either require to be relocated to ensure the area can be developed on. The existing decommissioned Thames Water incinerator located on the Site would be required to be demolished prior to commencement of construction.

3.5. SOUTH ZONES

3.5.1. The South Zone has been split into five potential sub zones. These five sub zones have been created in response to the presence of the numerous overlapping designations and land uses, in an attempt to avoid and minimise impact. The designations are outlined below as:

- Metropolitan Open Land;
- Accessible Open Land (land designated as open space and South East London Green Chain that is accessible to the public (i.e. not fenced off) and so constitutes 'public open space' for the purposes of PA 2008);
- Crossness Local Nature Reserve;
- Erith Marshes SINC[8];
- Public Rights of Way, Footpath FP2;
- Munster Joinery[9]; and
- Creekside and Gannon Land.

3.5.2. There was no single South Zone that avoided all destinations and still provided sufficient footprint to support the Proposed Scheme. Each of the South Zones therefore provided an alternate layout to avoid or minimise impacts to different aspects of the aforementioned designations in accordance with the mitigation hierarchy.

3.5.3. All of the South Zones possess road access to the Site to the east, from Norman Road, at a number of locations. A Thames Water secondary access route transects all five zones and would need to be retained or diverted (i.e. not closed) as part of the Proposed Scheme.

3.5.4. All South Zones would also require the Proposed Jetty Access Trestle and associated piping to cross the England Coast Path (FP3) PRoW at elevation permanently. Additionally all five South Zones would require closure during the construction phase and permeant diversion during operational.

3.5.5. None of the South Zone provide unique challenges with respect to ground conditions.

3.5.6. The most south easterly part of the Order limits, north of Eastern Way has not been incorporated into any of the five sub zones. This area has not been utilised to retain a break in the development and ensure the visual openness of the MOL and Crossness LNR is preserved. This area will provide a focal point and serve as the new entrance point to the Crossness LNR as defined by the **DAD** (**Document Reference 5.6**).

3.5.7. **Table 3-4** below provides a comparison of the five South Zones in respect to land take requirements on nine key constraints.

Table 3-4: Interaction with Key Constraints

	Metropolitan Open Land	Accessible Open Land	Crossness LNR	Erith Marshes SINC	Thames Marshes Strategic Green Wildlife Corridor	Footpath 2	Munster Joinery	Creekside and Gannon	Strategic Industrial Land
South 1	2.55ha required Over-sailed – No	0.00ha required	2.55ha required Over-sailed - No	3.05ha required	Area Required	Requires Diversion	Requires Acquisition	Area Required	5.56ha in SIL
South 2	5.51ha required Over-sailed - No	0.00ha required	5.27ha required Over-sailed - No	5.64ha required	Area Required	Requires Diversion	Retained	Area Required	4.00ha in SIL
South 3	3.47ha required 0.08ha Over-sailed	2.80ha required	0.72ha required 0.08ha Over-sailed	3.64ha required	No Impact	Requires Diversion	Requires Acquisition	Requires Over-sail	5.25ha in SIL
South 4	5.62ha required Over-sailed - No	2.46ha required	3.07ha required Over-sailed - No	5.76ha required	Area Required	Requires Diversion	Retained	Area Required	4.13ha in SIL
South 5	4.12ha required 0.08ha Over-sailed	3.48ha required	1.24ha required 0.08ha Over-sailed	4.28ha required	No Impact	Requires Diversion	Retained	Requires Over-sail	4.38 in SIL

SOUTH ZONE 1

Overview

3.5.8. South Zone 1 is adjacent to the southern boundary of the existing Riverside 1 site, with Norman Road located along the eastern boundary. The northern part of the site is situated within MOL, Erith Marshes SINC, and Crossness LNR. The centre of the site is vacant land within the Belvedere Industrial Area, this extends to the south of the site with the exception of Munster Joinery which is located within South Zone 1.

Summary of Assessment

3.5.9. South Zone 1 would facilitate 8.02ha of land for the Proposed Scheme. This is the smallest of all five South options. Development in South Zone 1 would result in the partial loss of the Eastern Paddock of the Crossness LNR, which is also designated MOL (2.55ha), and within Erith Marshes SINC (3.05ha).

3.5.10. The Zone's footprint includes Munster Joinery, an operating business, which would need to be relocated from the site.

3.5.11. South Zone 1 would give good connectivity to the Riverside Campus and would form a single homogenous area with sufficient space for the Carbon Capture Facility. As only the northern part of South Zone 1 is located within MOL, Crossness LNR, and Erith Marshes SINC, developing this zone restricts the direct loss of land within these areas, prevents the creation of isolated open space, and provides opportunities for enhancement as the rest of these areas remain a single entity. Development within South Zone 1 also avoids environmental impacts to the River Thames. South Zone 1 also avoids the loss of any AOL. South Zone 1 would be situated on 5.56ha of SIL allocation.

Figure 3-4: South Zone 1

Table 3-5: South Zone 1 Optioneering Principles Compliance

Optioneering Principles	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites.**	This zone could result in the direct loss of Crossness LNR (2.55ha) and Erith Marshes SINC (3.05ha) land which may result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.
2. **Seek to avoid or minimise adverse impact to protected species.**	This zone could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would result in direct impacts to, or loss of Crossness LNR and Erith Marshes SINC land and the habitats and species they support.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.**	The footprint of this zone impacts the Eastern Paddock at its northern end and, to the south, commercial employment sites of which two are owned by the Applicant group, two are Applicant leased from Creekside and Gannon and the other being owned by Landsul Limited (and part occupied by Munster Joinery). The Eastern Paddock is subject to a grazing licence which covers the rest of the Crossness LNR to the west - the overall impact on grazing would therefore be slight. The freeholders of the two Applicant leased sites (Creekside and Gannon) would be entitled to compensation. Interest

Optioneering Principles	Analysis
	holders may also be entitled to compensation in the event of acquisition. The Munster Joinery building is considerably smaller than the buildings considered in the East Zone. The acquisition of Munster Joinery could result in the loss of 50 direct employment roles[10].
4. Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.	Direct impacts to Metropolitan Open Land (2.74ha) in parcels East Paddock and Norman Road Field which is also Non-Accessible Open Land. No impacts to Accessible Open Land. South Zone 1 would be situated on 5.56ha of SIL allocation. The England Coast Path would be affected, as discussed in Principle 6 below.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • South Zone 1 neighbours the southern boundary of the existing Applicant Riverside1/Riverside 2 site, thus the flue gas ducting should be able to be routed directly to the new facility. The ducting would be required to cross Riverside 1 and Riverside 2 access roads. • The estimated length of the flue gas ducting (Riverside 1 and Riverside 2) is 450m in length.

Optioneering Principles	Analysis
	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • South Zone 1 neighbours the southern boundary of the existing Applicant Riverside 1 / Riverside 2 site, thus routing of utilities would only require to consider constraints on the Riverside 1 / Riverside 2 site, before reaching the South Zone 1 boundary Ease of connections to the location of the Proposed Jetty: • Route of piping would be required to run along the Eastern boundary of the Riverside 1 / Riverside 2 site. • The estimated length of the piping to the Proposed Jetty is estimated to be the same as South Zone 2 and South Zone 5 at 380m[11], shorter in comparison to other South Zones.
6. Seek to minimise engineering complexity and consequent cost.	Site access and continuity of land parcels: • Consists of several separate land parcels; with the two Applicant owned (Borax sites) split by a Thames Water access road. If the access road was retained, this would likely require a pipeline bridge to link the Sites, otherwise the access road may be required to be diverted. • The remaining brownfield Site to the East of Norman Road, Creekside, would require to be utilised as laydown area.

SOUTH ZONE 2

Overview

3.5.12. South Zone 2 is adjacent to the southern boundary of Riverside 1 and Riverside 2 (under construction), and north of Munster Joinery, with Norman Road located along the eastern boundary. The majority of the site is situated within MOL, Erith Marshes SINC, southeast London Green Chain, and Crossness LNR. The southeast part of the site is vacant land within the Belvedere Industrial Area.

Summary of Assessment

3.5.13. South Zone 2 would provide a total of 8.71ha of land for the Proposed Scheme. This is the second largest of all five South options.

3.5.14. South Zone 2 would give good connectivity to the Riverside Campus, provides the largest available area to be utilised as a laydown area, and would not require the relocation of the operating business Munster Joinery.

3.5.15. Development in South Zone 2 would result in the direct loss of MOL (5.51ha), and land within Crossness LNR (5.27ha), Southeast London Green Chain and Erith Marshes SINC (5.64ha). This would result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.

3.5.16. South Zone 2 would not require the loss of any AOL and would utilise 4.00ha of SIL.

Figure 3-5: South Zone 2

Table 3-6: South Zone 2 Optioneering Principles Compliance

Optioneering Principles	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites**	This zone would result in direct loss of Crossness LNR (5.27ha) and Erith Marshes SINC (5.64ha) land, which would result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.
2. **Seek to avoid or minimise adverse impact to protected species**	This zone could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would result in direct impacts to, or loss of Crossness LNR and Erith Marshes SINC land and the habitats and species they support.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.**	This zone requires the acquisition of the Creekside site (which the Applicant holds a leasehold over). The zone also requires use of the Borax site for which the Applicant holds the freehold. Unlike South Zone 1, the Gannon and Munster Joinery sites are not included within the boundary of South Zone 2.
4. **Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.**	Direct impacts to Metropolitan Open Land (5.51ha) in parcels East Paddock and West Paddock which is Non-Accessible Open Land. No impacts to Accessible Open Land

Optioneering Principles	Analysis
	The England Coast Path would be affected, as discussed in Principle 6 below. The England Coast Path would be affected, as discussed in Principle 6 below. The Zone would be situated on 4.00ha of SIL allocation.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • South Zone 2 neighbours the southern boundary of the existing Applicant Riverside1/Riverside 2 site, thus the flue gas ducting should be able to be routed directly to the new facility. The ducting would be required to cross access roads on site. • The estimated length of the flue gas ducting (Riverside 1 and Riverside 2) is shorter in comparison to other sites at 300m in length. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • South Zone 2 neighbours the southern boundary of the existing Applicant Riverside 1 / Riverside 2 site, thus routing of utilities would only be required to consider constraints on the Riverside 1 / Riverside 2 site, before reaching the South Zone 2 boundary. Ease of connections to the location of the Proposed Jetty • Route of piping would require to run along the Eastern boundary of the Riverside 1 / Riverside 2 site.

Optioneering Principles	Analysis
	• The estimated length of the piping to the Proposed Jetty is estimated to be the same as South Zone 1 and South Zone 5 at 380m[8], shorter in comparison to other South Zones
6. Seek to minimise engineering complexity and consequent cost	Site access and continuity of land parcels: • Single continuous land parcel. • There is road access to the Site to the East from Norman Road, there is no road access from the North, South, or West. Construction considerations inclusive of site access, laydown area and site preparatory works required: • No demolition of existing assets is required, and no terracing shall be required which would require earthwork movement. • In terms of laydown areas, there is a greater area available in comparison to other South Zones as both of the Applicant owned Borax sites would be available as laydown, as would the other brownfield sites to the West of Norman Road (other than Munster Joinery).

SOUTH ZONE 3

Overview

3.5.17. The eastern part of South Zone 3 is located within vacant land within the Belvedere Industrial Area and includes Munster Joinery. Norman Road is located along the eastern boundary. The southwest of the site is within MOL, Southeast London Green Chain and Erith Marshes SINC, Crossness LNR borders the site to the west.

Summary of Assessment

3.5.18. South Zone 3 would facilitate a total of 8.56ha of land for the Proposed Scheme. This is the 0.98ha larger than the smallest, South Zone 1.

3.5.19. Development in South Zone 3 would result in the loss of MOL (3.47ha), AOL (2.80ha) and parts of Erith Marshes SINC and the Southeast London Green Chain (3.63ha) having direct impacts to associated habitats and species, and user amenity. There would be no development within Crossness LNR, however it would be required to accommodate the installation of pipework and utilities connections, having visual impacts, and impacts to amenity. This pipework would require an additional development area of 0.08ha in the Crossness LNR and MOL within East Paddock.

3.5.20. Development in South Zone 3 would also result in the Eastern Paddock within Crossness LNR to become surrounded by development It would be partly situated on SIL (5.25ha).

3.5.21. South Zone 3 is not located directly adjacent to the Riverside Campus and would therefore require longer pipework to connect to Riverside 1 and Riverside 2 than South Zones 1, 2 and 4, and there is limited availability within the site for a laydown area.

Figure 3-6: South Zone 3

Table 3-7: South Zone 3 Optioneering Principles Compliance

Optioneering Principles	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites**	This zone could result in direct loss of Erith Marshes SINC land, which may result in direct impacts or loss of its habitats, including ditches, reedbed habitat, coastal floodplain grazing marsh. No direct impacts to Crossness LNR. South Zone three would require the installation of pipework connection to Riverside 1 and Riverside 2. This would result in a land requirement due to oversailing of pipe work through the Crossness LNR and Erith Marshes SINC of 0.08ha. The burial of subterrain pipework is not possible due to the low temperature requirements of the pipe, which if placed underground would freeze the surrounding soil.
2. **Seek to avoid or minimise adverse impact to protected species**	This zone could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would not result in direct impacts to, or loss of Crossness LNR and the habitat or species it supports, but would have direct impacts to the Erith Marshes SINC and the habitats and species it supports.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners**	This zone impacts Applicant owned sites and the Creekside, Munster Joinery and Gannon sites in a similar way to South Zone 1.

Optioneering Principles	Analysis
	The acquisition of Munster Joinery could result in the loss of 50 direct employment roles. In removing the Eastern Paddock to the north, this zone now includes Tilfen and Gannon owned land so is anticipated to have a similar overall impact to South Zone 1, if not slightly greater.
4. Seek to avoid or minimise land take within the MOL Accessible Open Land, and impacts on PRoW	Direct impacts to Metropolitan Open Land (3.47ha) (Borax North, Borax South, Norman Road Field) and the Accessible Open Land (2.80ha) are likely as these areas fall within the boundary of this zone. An additional 0.08ha of MOL would be required from East Paddock to support pipework and utilities connection from the Proposed Scheme to Riverside 1 and Riverside 2. The England Coastal Path would be affected, as discussed in Principle 6 below. The Zone would be situated on 5.25ha of SIL allocation.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • South Zone 3 is approximately 160m from the southern boundary of the existing Applicant Riverside1/Riverside 2 site. The ducting would require to travel South from the existing site, and cross Crossness LNR land before reaching the South Zone 3 boundary. This would require Crossness LNR land to be utilised.

Optioneering Principles	Analysis
	• The estimated length of the flue gas ducting (Riverside 1 and Riverside 2) at approximately 575m in length. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • South Zone 3 is approximately 160m from the southern boundary of the existing Applicant Riverside1/Riverside 2 site. Routing of utilities would need to cross Crossness LNR land before reaching the South Zone 3 boundary. This would require Crossness LNR land to be utilised. Ease of connections to the location of the Proposed Jetty: • Route of piping to Proposed Jetty would require to run through Crossness LNR land prior to running along the Eastern boundary of the Riverside 1 / Riverside 2 site. This would require Crossness LNR land to be utilised. • The estimated length of the piping to the Proposed Jetty is the second longest in comparison to other South Zone sites at 500m.
6. Seek to minimise engineering complexity and consequent cost	Site access and continuity of land parcels: • Consists of several land parcels; with the two Applicant owned (Borax sites) split by a Thames Water access road. If the access road was retained, this would likely require pipeline bridge to link the Sites, otherwise the access road may be required to be diverted.

Optioneering Principles	Analysis
	Construction considerations inclusive of site access, laydown area and site preparatory works required: • No demolition of existing assets is required, and no terracing shall be required which would require earthwork movement. • Least beneficial South Zone in terms of laydown area, as brownfield Borax sites available are being utilised early for the development. Laydown would need to be offsite or utilising any space available on site prior to full site installation.

SOUTH ZONE 4

Overview

3.5.22. South Zone 4 is adjacent to the southern boundary of the existing Riverside 1 site, with Norman Road located along the eastern boundary. The northern part of the site is situated within MOL, Erith Marshes SINC, Crossness LNR and the Southeast London Green Chain. The centre of the site is vacant land within the Belvedere Industrial Area. The south of the site is located within MOL, Erith Marshes SINC, and the Southeast London Green Chain, and Crossness LNR borders the south of the site to the west.

Summary of Assessment

3.5.23. South Zone 4 would provide a total of 8.80ha of land for the Proposed Scheme. This is the 0.78ha larger than the smallest South Zone, 1.

3.5.24. South Zone 4 would give good connectivity to the Riverside Campus, provides a brownfield site to be utilised as a laydown area, and would not require the relocation of operating business Munster Joinery .

3.5.25. Development in South Zone 4 would result in the largest loss of MOL (5.62ha), as well as loss of Crossness LNR (3.07ha), Erith Marshes SINC (5.76ha), AOL (2,46ha) and the Southeast London Green Chain than other South Zones. This would result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.

3.5.26. South Zone 4 would be situated on 4.13ha of SIL allocation.

Figure 3-7: South Zone 4

Table 3-8: South Zone 4 Optioneering Principles Compliance

Optioneering Principles	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites**	This zone would result in the direct loss of Crossness LNR and Erith Marshes SINC land, which may result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.
2. **Seek to avoid or minimise adverse impact to protected species**	This zone could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would result in direct impacts to, or loss of Crossness LNR (3.07ha) and Erith Marshes SINC (5.76ha) land and the habitats and species they support.
3. **Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners**	The perceived impact of this is similar to South Zone 2 in that compensation costs would be comparatively lower (to South Zones 1 and 3) by excluding the Munster Joinery and (Applicant leased) Gannon Sites. However, South Zone 4 would require the acquisition of both the Eastern Paddock and some of the Tilfen land, both of which are used for grazing.

Optioneering Principles	Analysis
4. Seek to avoid or minimise land take within the MOL Accessible Open Land, and impacts on PRoW	Direct impacts to Metropolitan Open Land (5.62ha) (East Paddock, Borax North, Borax South, Norman Road Field) and the Accessible Open Land (2.46ha) are likely as these areas fall within the boundary of this zone. The England Coast Path would be affected, as discussed in Principle 6 below. South Zone 4 would be situated on 4.13ha of SIL allocation.
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • South Zone 4 neighbours the southern boundary of the existing Applicant Riverside1/Riverside 2 site, thus the flue gas ducting should be able to be routed directly to the new facility. The ducting would need to cross access roads on the Riverside 1 and Riverside 2 site. • The estimated length of the flue gas ducting (Riverside 1 and Riverside 2) is shorter in comparison to other sites at 450m in length. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • South Zone 4 neighbours the southern boundary of the existing Applicant Riverside 1 / Riverside 2 site, thus routing of utilities would only require to consider constraints on the Riverside 1 / Riverside 2 site, before reaching the South Zone 4 boundary.

Optioneering Principles	Analysis
	Ease of connections to the location of the Proposed Jetty: • Route of piping would require to run along the Eastern boundary of the Riverside 1 / Riverside 2 site. • The estimated length of the piping to the Proposed Jetty is estimated to be the same as South Zone 1 and South Zone 2 at 380m.
6. Seek to minimise engineering complexity and consequent cost	Site access and continuity of land parcels: • Consists of a number of land parcels; with the two Applicant owned (Borax sites) split by a Thames Water access road. If the access road was retained, this would likely require pipeline bridge to link the Sites, otherwise the access road may require to be diverted. Drawback in that the most Southern section of the Site is accessed through a narrow corridor – reducing the use-able footprint within the overall area indicated. Construction considerations inclusive of site access, laydown area and site preparatory works required: • No demolition of existing assets is required, and no terracing shall be required which would require earthwork movement. • The remaining brownfield Site to the West of Norman Road, Creekside, would be available to be used as laydown area.

SOUTH ZONE 5

Overview

3.5.27. The northern part of South Zone 5 is located within vacant land within the Belvedere Industrial Area, north of Munster Joinery, and includes a small section of MOL, Erith Marshes SINC, Southeast London Green Chain, and Crossness LNR. Norman Road is located along the eastern boundary. The southeast of the site is located within vacant land within the Belvedere Industrial Area, south of Munster Joinery. The southwest of the site is within MOL, Erith Marshes SINC, and Southeast London Green Chain, Crossness LNR borders the site to the west.

Summary of Assessment

3.5.28. South Zone 5 would require a total of 8.38ha of land for the Proposed Scheme. This is the 0.36ha larger than the smallest, South Zone, 1.

3.5.29. South Zone 5 is the most southern of zones and would therefore require the longest pipework connection from Riverside 1 and Riverside 2 which would be required to cross Crossness LNR, impacting user amenity.

3.5.30. Development of South Zone 5 would not require the relocation of the operating business Munster Joinery, however development of this zone would result in Munster Joinery premises becoming surrounded.

3.5.31. South Zone 5 is located furthest south of all South Zones. As a result it is the closest to the residential and commercial receptors sensitive to noise and particle emissions during the construction phase.

3.5.32. Development in South Zone 5 would result in the loss of MOL (4.12ha), Erith Marshes SINC (4.28ha), AOL (3.48ha) and the Southeast London Green Chain. South Zone 5 require installation of pipework and utilities connections in East Paddock (MOL), having visual impacts, and impacts to amenity. This pipework would require an area of 0.08ha in addition to the MOL figure previously stated.

3.5.33. South Zone 5 would be situated in 4.38ha of SIL allocation.

Figure 3-8: South Zone 5

Table 3-9: South Zone 5 Optioneering Principles Compliance

Optioneering Principles	Analysis
1. **Seek to avoid or minimise adverse impact to locally important biodiversity sites.**	This zone would result in the direct loss of Erith Marshes SINC land, which may result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh. No direct impacts to Crossness LNR are likely. South Zone 3 would require the installation of pipework connection to Riverside 1 and Riverside 2. This would result .in land take through oversailing of pipe work within the Crossness LNR and SINC, comprising an area of 0.08ha. The burial of subterrain pipework is not possible due to the temperature requirements of the pipe impacting the soil quality and habitats.
2. **Seek to avoid or minimise adverse impact to protected species**	This zone could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species. This zone would not result in direct impacts to, or loss of Crossness LNR and the habitat or species it supports, but would have direct impacts to the Erith Marshes SINC and the habitats and species it supports.

Optioneering Principles	Analysis
3. Seek to avoid or minimise the level of adverse impact on existing businesses/third party landowners.	The overall impact is similar to South Zone 3 with the exception that the acquisition requirements for the Munster Joinery site would be removed and the reduction in compensation liability and risk of job losses that would be attributed to that site as a consequence. In removing the Eastern Paddock to the north, this zone now includes Tilfen and Gannon owned land so is anticipated to have a similar overall impact to South Zone 1.
4. Seek to avoid or minimise land take within the MOL, Accessible Open Land, and impact on PRoW.	Direct impacts to Metropolitan Open Land (Norman Road Field, Borax North and Borax South) (4.12ha) and the Accessible Open Land (3.48ha) are likely as these areas fall within the boundary of this zone. An additional 0.08ha of MOL would be required from East Paddock to support pipework and utilities connection from the Proposed Scheme to Riverside 1 and Riverside 2. The England Costal Path would be affected, as discussed in Principle 6 below. South Zone 5 would be located on 4.38ha of SIL allocation.

Optioneering Principles	Analysis
5. Ease of required connections with the Riverside Campus and the Proposed Jetty.	Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting: • South Zone 5 is approximately 160m from the southern boundary of the existing Applicant Riverside1/Riverside 2 site – furthest of all South Zones. The ducting would be required to travel South from the existing site, through Crossness LNR land. This would require Crossness LNR land to be utilised. • The estimated length of the flue gas ducting from Riverside 2 (greater distance than Riverside 1) is longer in comparison to other sites at 575m in length. This would increase the pressure drop across the ducting and have the potential to require a new induced draught fan to increase the gas pressure. Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply): • South Zone 5 is approximately 160m from the southern boundary of the existing Applicant Riverside1/Riverside 2 site. Routing of utilities would require to consider constraints on the Riverside 1 / Riverside 2 site, and cross Crossness LNR land before reaching the South Zone 5 boundary. This would require Crossness LNR land to be utilised. Ease of connections to the location of the Proposed Jetty • Route of piping to Proposed Jetty would require to run through Crossness LNR land prior to running along the

Optioneering Principles	Analysis
	Eastern boundary of the Riverside 1 / Riverside 2 site. This would require Crossness LNR land to be utilised. • The estimated length of the piping to the Proposed Jetty is longer in comparison to other South Zone sites at 550m.
6. Seek to minimise engineering complexity and consequent cost	Site access and continuity of land parcels: • Consists of several land parcels. Drawback in that one section of the Site, in order to retain existing business Munster Joinery, is narrow – reducing the usable footprint within the overall area indicated. Construction considerations inclusive of site access, laydown area and site preparatory works required: • The remaining brownfield Site to the West of Norman Road, Borax North, would be available to be as laydown area.

4. SUMMARY OF ANALYSIS OF SOUTH ZONE

4.1.1. Following the dismissal of the three other Development Zones (north, west and east) from further consideration, the South Zone remained as the viable Development Zone. The analysis of the five sub zones within the South (South Zones 1, 2, 3, 4 and 5) was undertaken to identify the preferred option.

4.1.2. All South Zones would have an impact on at least one of the Optioneering Principles set out in Section 2.3.

4.1.3. A number of South Zones or all South Zones would have the same compliance with the Optioneering Principles, as set out below:

- All South Zones include areas situated in Metropolitan Open Land.
- All South Zones include areas situated in Erith Marshes SINC.
- South Zones 3, 4 and 5 include areas situated in Accessible Open Land.
- South Zones 2, 4 and 5 would avoid the requirement to acquire the Munster Joinery premises.

4.1.4. The following Sections outline the individual South Zone conformity of each against the Optioneering Principles.

PRINCIPLE 1: SEEK TO AVOID OR MINIMISE ADVERSE IMPACT TO LOCALLY IMPORTANT BIODIVERSITY SITES

4.1.5. All of the South Zones are located within Erith Marshes SINC, and development within them would result in the direct loss of Erith Marshes SINC land, which may result in direct impacts or loss of its habitats, including ditches, reedbed habitat and coastal floodplain grazing marsh.

4.1.6. All South Zones are located within Crossness LNR, and development within them would result in the direct loss of Crossness LNR land. This would result in direct impacts to habitats and species it supports.

4.1.7. South Zone 4 would result in the largest loss of Erith Marshes SINC at 5.66ha. South Zone 1 would result in the smallest loss of Erith Marshes SINC of all options at 3.05ha. South Zone 1 is 1.04ha smaller than the next smallest, Zone 3.

4.1.8. South Zones 2 and 4 would result in the largest areas of land from Crossness LNR and Erith Marshes SINC being lost to the development than the other South Zones. South Zone 2 would result in 5.27ha of Crossness LNR and 5.64ha Erith Marshes SINC being lost. South Zone 4 would result in 3.07ha of Crossness LNR and 5.76ha Erith Marshes SINC lost.

4.1.9. Development in South Zone 3, which locates the development further south to allow for the retention of the Eastern Paddock Crossness LNR land would mean that the Eastern Paddock immediately south of Riverside 2 would be ‘surrounded’ by the

Riverside 1 Campus and the Proposed Scheme and would in any event require pipes to be laid over it.

4.1.10. Development in any of the South Zones would result in impact to a locally designated biodiversity sites. South Zone 1 would result in a slightly larger land requirement for Crossness LNR compared to South Zones 3 and 5, 1.83ha and 1.31ha larger respectfully but smaller than Zones 2 and 4. However South Zone 1 would result in a smaller loss of Erith Marshes SINC compared to all four other South Zones. This includes South 3 and 5, 0.59ha and 1.23ha respectfully.

4.1.11. South Zone 1 provides the preferred balance of all Zones in relation to impact to locally important biodiversity sites due to the least amount of land take on the Erith Marshes SINC. Although there are two zones with smaller impacts to Crossness LNR, these are marginal differences and have greater SINC impacts. The area of Crossness LNR retained through South Zone 1 provides greater opportunities for enhancements compared to other Zones as defined in the **DAD** (**Document Reference 5.6**) and **outline LaBARDS (Document Reference 7.9)**.

PRINCIPLE 2: SEEK TO AVOID OR MINIMISE ADVERSE IMPACT TO PROTECTED SPECIES.

4.1.12. Development in all South Zones could result in the potential loss or culverting of a number of ditches, which would result in direct impacts to water vole, a European protected species which are known to be present. These ditches may also have the potential to provide important habitat for European eel which is also a European protected species.

4.1.13. All South Zones would result in the loss of Erith Marshes SINC and Crossness LNR land which would have direct impacts to the aforementioned habitat and species of Water Vole.

4.1.14. As identified in Optioneering Principle 1, South Zone 1 would have the smallest impact on the Erith Marshes SINC of all South Zones. It is considered that South Zone 3 performs marginally better than South Zones 1, 2, 4 and 5 under this Principle, as development within it would impact a less area on habitat within the Crossness LNR.

PRINCIPLE 3: SEEK TO AVOID OR MINIMISE THE LEVEL OF ADVERSE IMPACT ON EXISTING BUSINESSES/THIRD PARTY LANDOWNERS.

4.1.15. Development of South Zone 3 would require the acquisition of the Landsul Limited land which is occupied by Munster Joinery. Developing this site would also require the sites leased from Creekside and Gannon. The footprint of South Zone 3 also includes land owned by Tilfen which is used for grazing. South Zone 3 would have a marginally greater impact on existing businesses and third party land owners compared to South Zone 1 and significantly greater impacts than Zones 2, 4 and 5.

4.1.16. Development in any South Zone would require the acquisition of third-party land (vacant and/or grazing land), and development of South Zones 1 and 3 would require the relocation of an operating business (Munster Joinery). Development of South Zone 5 could also result in indirect impact to Munster Joinery during construction of the Proposed Scheme.

4.1.17. It is considered that South Zone 2 has the least impact under this principle as it would not require the acquisition of Munster Joinery, and the compensation for the commercial sites would be comparatively lower than other South Zones. South Zone 2 would retain the Munster Joinery business and not result in it being surrounded by development which would occur with South Zone 5.

PRINCIPLE 4: SEEK TO AVOID OR MINIMISE LAND TAKE WITHIN THE MOL AND ACCESSIBLE OPEN LAND, AND IMPACTS ON PROW.

4.1.18. The Proposed Scheme would result in development on part of the MOL and Accessible Open Land regardless of the South Zone option selected.

4.1.19. Development on part of the MOL would also reduce its performance against its purposes as it will reduce the extent of safeguarding from encroachment.

4.1.20. Development in all of the South Zones would result in land take of MOL however South Zone 1 would result in the smallest requirement of land take. The areas of MOL which will be developed for each South Zone options are as follows: South Zone 1 would have the smallest requirement for land take at 2.55ha. The remaining four South Options would result in the loss of between 3.47ha and 5.63ha of MOL.

4.1.21. The areas of Accessible Open Land which will be developed for each South Zone options are as follows: South Zones 1 and 2 would result in no Accessible Open Land land take. In comparison South Zones 3, 4 and 5 would all result in excess of at least 2.5ha each.

4.1.22. South Zones 1 and 2 would require only a small localised diversion of PRoW FP2. This is a result of the proximity of the PRoW, if left in situ, to the operational Carbon Capture Facility and the necessary buffer as defined by the quantitative risk assessment for safety. South Zones 3, 4 and 5 would all require the permanent closure of PRoW FP2. This is due to the configuration of the Zones (3,4 and 5) being situated within the alignment of the route.

PRINCIPLE 5: EASE OF REQUIRED CONNECTIONS WITH THE RIVERSIDE CAMPUS AND THE PROPOSED JETTY.

Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for routing of flue gas ducting

4.1.23. South Zones 1, 2 and 4 adjoin the southern boundary of Riverside 1 and Riverside 2. Flue gas ducting from Riverside 1 would be able to be routed directly to the Proposed Scheme to each of these Zones. A route for the flue gas ducting from Riverside 2 was assumed to follow the boundary between Riverside 2 and CLNR.

4.1.24. South Zones 3 and 5 are approximately 140m from the southern boundary of Riverside 1 and Riverside 2. The flue gas ducting would need to be routed south from Riverside 1 and Riverside 2 and oversailing Eastern Paddock. For both South Zone 3 and 5 this would require approximately 0.08ha.

4.1.25. The estimated lengths of the flue gas ducting required for each Zone are:

- South Zone 1 – 450m
- South Zone 2 – 300m
- South Zone 3 – 575m (with oversailing)
- South Zone 4 – 450m
- South Zone 5 – 575m (with oversailing)

4.1.26. It is therefore considered that South Zone 2 provides the most suitable option for routing of flue gas ducting.

Ease of connections between Riverside 1 and Riverside 2 and the Carbon Capture Facility for utilities provision (steam, condensate return, power supply)

4.1.27. South Zones 1, 2 and 4 adjoin the southern boundary of Riverside 1 and 2, and therefore routing of utilities would only require consideration of constraints on the Riverside 1 and Riverside 2 site. With regards to South Zone 4, there is also potential for Riverside 2 utilities to be required to be located adjacent, running parallel with existing Riverside 1 and Riverside 2 site Southern fenceline.

4.1.28. South Zones 3 and 5 are approximately 160m from the southern boundary of Riverside 1 and Riverside 2. Routing of utilities for both these Zones would require consideration of constraints on the Riverside 1 and Riverside 2 site and be required to cross Crossness LNR, therefore resulting in construction impact and potential future disturbance from maintenance procedures.

4.1.29. It is therefore considered that South Zones 1, 2 and 4 provide the most suitable options for utilities provision.

Ease of connections to the location of the Proposed Jetty

4.1.30. All South Zones, would need to tie into Option A, selected for the jetty as defined by the **JSAR (Document Reference 7.6)**. As a result, all Zones would require routing of connection to the jetty to be east of Riverside 1.

4.1.31. Routing of piping for South Zones 3 and 5 would be required to oversail through Crossness LNR land prior to running along the eastern boundary of the Riverside 1 and Riverside 2 site.

4.1.32. The estimated lengths of piping required for each Zone to connect to the jetty trestle are as follows:

- South Zone 1 – 380m
- South Zone 2 – 380m
- South Zone 3 – 500m
- South Zone 4 – 380m
- South Zone 5 – 550m

4.1.33. It is therefore considered that South Zones 1, 2 and 4 provide the most suitable options for connection to the proposed Jetty.

PRINCIPLE 6: SEEK TO MINIMISE ENGINEERING COMPLEXITY AND CONSEQUENT COST.

4.1.34. South Zones 4 and 5 both have narrow sections, to avoid the requirement for acquisition of Munster Joinery. As a result this reduces the useable footprint within the overall area and would require the Proposed Scheme to change orientation and process, increasing the complexity of the engineering and operability requirements (for example maintaining security and safety where there would be ‘blind spots’). South Zones, 1, 2 and 3 all follow a more simplistic north-south linear route.

4.1.35. Brownfield sites would be available to be utilised as a laydown area within South Zones 1, 2, 4, and 5. South Zone 2 would have the greater area available as both Applicant owned Borax sites and other brownfield sites to the west of Norman Road are within the Zone.

4.1.36. Both South Zones 1 and 2 perform well under this principle as they both provide brownfield sites which can be utilised as laydown areas and pose no unique challenges with respect to ground conditions.

4.1.37. It is considered that South Zone 3 performs the worst under this principle as there is potential that the laydown area would need to be offsite, however it’s also recognised that South Zone 5 also performs badly due to the narrow section of land, and the existing pond adjacent to the site.

CONCLUSION REGARDING OPTIONEERING PRINCIPLES

4.1.38. Following the consideration of the optioneering principles, South Zone 1 was chosen as the preferred option.

4.1.39. South Zone 1 would provide a total of 7.68ha of land for the Proposed Scheme. This is the smallest of all five South options and ranges in saving of between 0.81ha and 1.06ha compared to other South Zones.

4.1.40. Development of South Zone 1 would result in:

- The smallest loss of MOL of all South Zones at 2.55ha.
- The smallest loss of Erith Marshes SINC of all South Zones at 3.05ha.
- No loss of Accessible Open Land.
- South Zone 1 would result in the loss of 2.55ha of Crossness LNR. This is the third smallest of the five South Zones. Notably, South Zone 1 would require considerably less of Crossness LNR compared to South 2 which requires 5.27ha.

4.1.41. South Zone 1 takes advantage of maximising the eastern edge of the site being adjacent to Norman Road. By maximising use of Norman Road as a spine to access and service south Zone 1 in multiple locations, it enhances operational efficiency.

4.1.42. All of the South Zones would result in the loss of MOL. As stated above development in South Zone 1 would result in smallest area of a loss than development in South Zones 2 – 5.

4.1.43. South Zone 1 would utilise the largest area of land designated as SIL at 5.56ha.

4.1.44. Protected habitats and species would be impacted by all South Zones. However, the positioning of South Zone 1 adjacent to Riverside 1 and Riverside 2 means that the remaining Crossness LNR, Erith Marshes SINC and MOL would remain as one land parcel, which will allow the retention of openness and provide opportunity for enhancement for users, allowing the Applicant to more easily mitigate impact. South Zones 3 and 5 would have resulted in the areas, including Eastern Paddock, becoming surrounded by overbearing development on three sides and still require the routing of above ground utilities connections through the area.

4.1.45. Developing South Zone 1 will require the relocation of operating business Munster Joinery, and the acquisition of grazing land (Eastern Paddock and Stable Paddock). The Applicant will seek to mitigate this impact through negotiations with land owners, and users.

4.1.46. South Zone 1 also provides brownfield land which can be utilised for a laydown area and there are no unique challenges with respect to ground condition.

4.1.47. South Zone 1 is adjacent to the southern boundary of the existing Riverside 1 and Riverside 2, allowing the flue gas ducting from Riverside 1 and utilities to be routed directly to the Proposed Scheme. Flue gas ducting from Riverside 2 can be located on its boundary, with the potential to minimise impact through detailed design.

REMAINING SOUTH ZONES

4.1.48. **South Zone 2** performed well under Principle 3 (impact to third-party landowners and premises) and Principle 6 (engineering complexity) and is also located adjacent to the southern boundary of the Riverside 1 minimising the utilities lengths required and avoid the need to acquire third party land in the form of Munster Joinery. South Zone 2 however would result in the largest loss of Crossness LNR (5.27ha) and second largest areas of loss to Erith Marshes SINC (5.64ha), Metropolitan Open Land (5.51ha) and overall land requirement of 8.71ha, than compared to South Zone 1. South Zone 2 would use the smallest area of SIL at 4.00ha. Therefore, South Zone 2 was dismissed in favour of South Zone 1.

4.1.49. Development in **South Zone 3** would require the second least loss of MOL (3.47ha) and fourth on Accessible Open Land (2.80ha), both greater than South Zone 1 by 0.58ha and 2.80h respectively. Although South Zone 3 would require a smaller land take of Crossness LNR for the Proposed Scheme, it is located 140m south of the Riverside 1 site and would require a length of overground pipework to form a connection. This connection would transverse the Crossness LNR in the Eastern Paddock due to oversailing, requiring a land take of 0.08ha. This would adversely impact the Crossness LNR. Furthermore, development of this site would result in the Eastern Paddock within Crossness LNR becoming surrounded by development. Additionally, there is limited opportunity for a laydown area within South Zone 3, and this may need to be located offsite. South Zone 3 offers no benefits against South Zone 1 for the retention of employment opportunities. South Zone 3 was therefore dismissed in favour of South Zone 1.

4.1.50. Development within **South Zone 4** would be located adjacent to the southern boundary of the Riverside 1 site, minimising the requirement for above ground pipeline connections. South Zone 4 contains brownfield sites available to be utilised as a laydown area. This is the same approach for South Zone 1. South Zone 4 would not require the relocation of operating business Munster Joinery. However, South Zone 4 would result in a significantly larger level of loss to designations compared to South Zone 1: specifically 2.7.3ha more of MOL, 2.46ha more of Accessible Open Land, 0.52ha more of Crossness LNR, 2.69ha more of Erith Marshes SINC. Therefore, South Zone 4 was dismissed in favour of South Zone 1.

4.1.51. Development in **South Zone 5** would not require the relocation of an existing business, namely Munster Joinery. South Zone 5 would require a 1.31ha less of Crossness LNR compared to South Zone 1 as the Eastern Paddock and Stable Paddock are not required. However, South Zone 5 it is located 140m south of the Riverside 1 site and would therefore require the largest length of above ground pipework. This pipework would be required to oversail Crossness LNR, and result in an area of loss (0.08ha) of Eastern Paddock. South Zone 5 would require more land take of the following compared to South Zone 1: MOL 1.23ha greater, AOL 3.48ha greater and SINC 1.23ha greater. Additionally, South Zone 5 has a complex layout with a narrow section of land which reduces the ability to deliver a linear scheme in

support of Principle 6 (Minimise Engineering Complexity). The complex layout of the Zone would prohibit the functionality of the Carbon Capture Facility, its distance between components and the inability to locate a centralised control room. South Zone 5 was therefore dismissed in favour of South Zone 1.

5. VALIDATION OF CONCLUSIONS AGAINST DESIGN PRINCIPLES

5.1.1. Following the completion of the analysis based on the Optioneering Principles, the Applicant has validated the results against the Design Principles to ensure the preferred site is supported by them, given that they are also derived from the Project Principles (and ultimately the project objectives).

5.1.2. The key reasons for selecting South Zone 1 support and are consistent with the Design Principles, as follows:

- forms a single homogenous area with sufficient space for the necessary footprint of the Carbon Capture Facility;
- close proximity to Riverside Campus for connection of the flue gas ducting and further utilities in line with Design Principles PL 1.4;
- ability to restrict the direct loss of Crossness LNR land, Erith Marshes SINC land and land designated as MOL to a single area. It would avoid the creation of isolated areas such as Eastern Paddock being surrounded by development. The retention of these designated area as a single entity provides great opportunities for enhancement in line with Design Principles VA 1.2, VA 1.3 and VA 1.4; and
- avoids adverse environmental impacts associated with works within the River Thames in line with Design Principle PL 1.8.

5.1.3. The Applicant sought to avoid the relocation of Munster Joinery, exploring several South Zone options to development adjacent to the operational business leaving it in situ. The analysis identified that retaining the Munster Joinery business meant that achieving the necessary footprint for development, resulted in areas to the west and/or south being required. The development in these western or southern locations would result in a greater loss of designated areas including MOL, AOL, Erith Marshes SINC and Crossness LNR. Should the Proposed Scheme result in the increased loss of such designated areas it would undermine Design Principles VA 1.2, VA 1.3 and VA 1.4**.** Additionally, South Zone 1 keeps the Proposed Scheme located out of the River Thames and removes the impact on PL 1.8, which seeks to avoid risk of damage and contamination to existing watercourse.

5.1.4. The retention of Munster Joinery, if surrounded by the Proposed Scheme, as with South Zone 5, would also undermine Design Principle VA 1.5. This Design Principle seeks to ensure appropriate security and safety measures are be applied across the Proposed Scheme. The Design Principle seeks to establish a perimeter security fence, controlled access points, and a contiguous operational area uninterrupted by non-Cory land ownership. The existence of a private business in and around the Proposed Scheme would undermine this. Additionally the Applicant seeks to provide provision of adequate offsets from members of the public (including workers) from the facility and associated infrastructure. The Applicant would be unable to implement

such safety measures due to the proximity of Munster Joinery and would therefore have to make unacceptable operational compromises.

5.1.5. The selection of a South Zone that is directly adjacent to Riverside 1 and Riverside 2, such as South Zone 1, minimises the areas of MOL, Erith Marshes SINC and Crossness LNR and avoids the retention of any MOL and Crossness LNR areas becoming surrounded by development. The Design Principles seek to minimise loss of open land (Design Principles VA 1.2 and VA 1.3) and focus on the retention and delivery of a more attractive and usable Crossness LNR, ensuring the openness (Design Principle VA 1.4). Having a single small area of affected designations provides greater opportunities to secure enhancement through good design and management, improved interpretation, and access as defined by Design Principle PL 1.6.

5.1.6. Furthermore, South Zone 1's location adjacent to Riverside 1 and Riverside 2 provides the opportunity to support Design Principle PL 1.4. Ensuring the development is located as far north as possible and further from residential and visual receptors the south. South Zone 1 provides the strongest possibility to ensure building massing and structure height could be stepped down from high in the north to low in the south, reflecting the transition from the industrial river corridor to local community. Lower-level development to the south would allow for some intervisibility between buildings. The retention of the East Paddock (Crossness LNR) and MOL between the Proposed Scheme and Riverside 1 and Riverside 2 would mean the delivery of Design Principle PL 1.4 would not be achievable.

5.1.7. In light of the above, South Zone 1 is considered to be consistent the Design Principles.

6. CONCLUSION

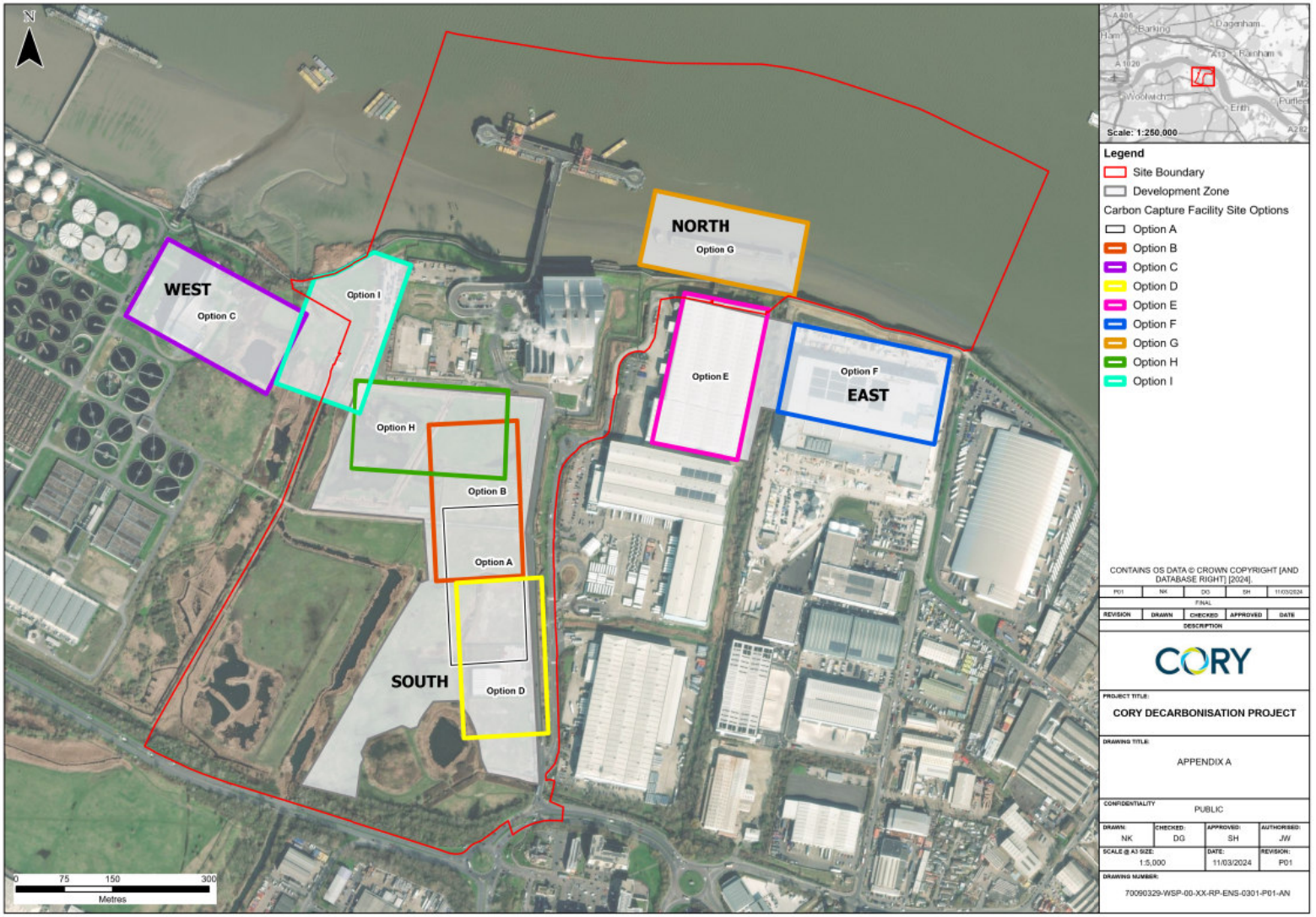
6.1.1. The Cory Decarbonisation Project is being pursued directly in response to the global climate emergency, to reduce carbon dioxide emissions to air, and to deliver critical national priority infrastructure, to achieve the UK's net zero energy aspiration. The Applicant operates energy generating infrastructure at the Riverside Campus, which diverts residual waste from landfill and supplies partially renewable energy. This infrastructure delivers extant residual waste policy priorities; however, without abatement, this essential infrastructure would continue to release carbon dioxide into the atmosphere. The Carbon Capture Facility is the supporting infrastructure necessary to capture, for permanent acquisition, those carbon dioxide emissions. Necessarily, the Carbon Capture Facility, including its Supporting Plant and Ancillary Infrastructure, needs to be located close to the source of carbon dioxide emissions, located at the Riverside Campus, and also to the associated Proposed Jetty. South Zone 1 was selected as the preferred development zone for the Carbon Capture Facility following a rigorous optioneering process of numerous options, including development in the River Thames and in locations surrounding the existing Riverside 1 and Riverside 2 facilities.

6.1.2. South Zone 1 provides the most robust option to address key constraints identified through the process to date, including through consideration of the Optioneering Principles and the Design Principles.

6.1.3. Following its selection as the preferred development zone, South Zone 1 has been subject to ongoing design development in accordance with the evolution of Design Principles, in response to a detailed operational brief, local environment constraints, and stakeholder and technical consultation feedback. This design development included refinement of the Site boundary for the operational layout. This is explained further in the **DAD** (**Document Reference 5.6**).

Appendix A

DEVELOPMENT ZONE CREATION



APPENDIX A – DEVELOPMENT ZONE CREATION

7. REFERENCES

[1] This has been amended by the Riverside Energy Park (Correction) Order 2021 which came into force on 10 March 2021 and the Riverside Energy Park (Amendment) Order 2023, which came into force on 17 February 2023.

[2] The Riverside Energy Park Order 2020 (SI2020/419) consents an energy generating station with an output of up to 96MW and limits annual throughput to 805,920 tonnes residual waste (Schedule 1 of the Order).

[3] Net Zero Government Initiative, Net Zero Government Initiative: UK Roadmap (December 2023) Department for Energy Security and Net Zero https://assets.publishing.service.gov.uk/media/6569cb331104cf000dfa7352/net-zero-government-emissions-roadmap.pdf

[4] Carbon Capture, Usage and Storage A Vision to Establish a Competitive Market (December 2023) Department for Energy Security and Net Zero https://assets.publishing.service.gov.uk/media/6594718a579941000d35a7bf/carbon-capture-usage-and-storage-vision-to-establish-a-competitive-market.pdf

[5] The pre-FEED stage (short for preliminary Front-End Engineering Design) comes after feasibility and before the FEED stage. It is the final part of conceptual engineering, with a key deliverable being the Basis of Design (BOD) document, which lists the principles, requirements, criteria, assumptions and reasoning on which design calculations and decisions are based.

[6] https://www.thegrocer.co.uk/property-and-planning/lidl-to-double-capacity-at-warehouse-in-belvedere-london/593688.article

[7] https://pa.bexley.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=R4J1J7BEKZQ00

[8] The Erith Marshes SINC includes the Thames Marshes Strategic Green Wildlife Corridor;

[9] Throughout the DCO Application documentation, this land parcel is known as ‘Munster Joinery’. This parcel is owned by Landsul Limited, and part leased to and occupied by Munster Joinery (UK) Limited.

[10] This is a worst-case estimate as explained in Chapter 14 of the Environmental Statement.

[11] Measurement taken from South Zone site boundary to landing point for Proposed Jetty

DECARBONISATION

10 Dominion Street
Floor 5
Moorgate, London
EC2M 2EF
Contact Tel: 020 7417 5200
Email: enquiries@corygroup.co.uk
corygroup.co.uk