ENVIRONMENTAL STATEMENT – VOLUME 1 - CHAPTER 2 SITE AND PROJECT DESCRIPTION

Drax Bioenergy with Carbon Capture and Storage

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

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2.1. SITE DESCRIPTION

2.1.1. The Site refers to the land within which the Proposed Scheme would be located. The Order Limits are shown on **Figure 1.1 (Order Limits)** (document reference 6.2.1.1) and refer to the outer perimeter of the Site, including the maximum extent of all potential permanent and temporary works required as part of the Proposed Scheme, but excluding the Off-site Habitat Provision Area, detailed in **paragraph 2.1.3** below**.**

2.1.2. The Site is approximately 125 ha and is split into the following parcels:

a. Drax Power Station Site – the land occupied by the Drax Power Station;

b. East Construction Laydown Area –area required during the construction phase of the Proposed Scheme for temporary works situated to the east of the Drax Power Station, across New Road. (N.B. There are several parcels of land within the Drax Power Station Site which would be used for construction laydown. These areas have been termed 'Drax Power Station Site Construction Laydown Areas');

c. Habitat Provision Area – the land within the Order Limits that may be used for environmental mitigation for the Proposed Scheme. This parcel is located to the north and north east of the Drax Power Station; and

d. Surrounding road network.

2.1.3. In addition, an Off-Site Habitat Provision Area has been identified within land outside of the Order Limits, to the west of the Site, that will be used to provide some of the ecological mitigation and compensation associated with the Proposed Scheme. This area is shown on **Figure 1.3 (Off-Site Habitat Provision Area)** (document reference 6.2.1.3). The provision of these works will be secured via a development consent obligation under section 106 (see **Heads of Terms** for this section 106 agreement, (document reference 7.1).

DRAX POWER STATION SITE

2.1.4. Drax Power Station was originally built, owned and operated by the Central Electricity Generating Board. It had a capacity of just under 2,000 megawatt ('MW') when Phase 1 was completed in 1975, increasing to 4,000 MW from six coal-fired units after the construction of Phase 2 in 1986.

2.1.5. It is now owned and operated by Drax Power Limited (the 'Applicant'). Four of the six main generating units (units 1 to 4) run on biomass, making Drax Power Station the UK's largest single site renewable power generator.

2.1.6. The two remaining coal units (units 5 and 6) stopped generating electricity commercially in March 2021 and will cease operations entirely prior to works to construct the Proposed Scheme commencing.

2.1.7. The Applicant has the benefit of a Development Consent Order ('DCO') (The Drax Power (Generating Stations) Order 2019), which allows it to repower up to two of the existing coal-powered generating units with new gas turbines that can operate in both combined cycle and open cycle modes ("Drax Repower"). The new units would have a new combined capacity of up to 3,600 MW in combined cycle mode (1,800 MW each). The Applicant has publicly stated that it has no plans to progress Drax Repower, and this is confirmed by a proposed article in the **draft DCO** submitted with the Application (document reference 3.1). As such, for the purposes of the Application for the Proposed Scheme including this ES, it has been assumed that Drax Repower will not be built.

2.1.8. The Applicant has full planning permission under the Town and Country Planning Act 1990 for the demolition of the redundant Flue Gas Desulphurisation ('FGD') Plant and associated restoration works at Drax Power Station. The decommissioning and demolition works are scheduled to take place between 2022 and 2027. The decommissioning and demolition works of Absorber Units 4, 5 and 6 are scheduled to take place prior to the start of the construction of the Proposed Scheme, whilst the demolition of Absorber Units 1, 2 and 3 are assumed to take place following the completion of the Proposed Scheme. The demolition of Units 1, 2 and 3 are assessed in **Chapter 18 (Cumulative Effects)** (document reference 6.1.18).

2.1.9. The Existing Drax Power Station is characterised by a number of large structures, including the main generating station buildings housing the four biomass units (retrofitted sequentially at Drax Power Station since 2013) and two coal units, a main emissions stack of 259 m in height, 12 cooling towers each of 116.5 m in height (six to the north and six to the south of the generating station buildings), offices, storage buildings and ash handling facilities, as well as overhead electricity cables and rail infrastructure.

2.1.10. Drax Power Station currently operates in accordance with Environmental Permits as required by the Environmental Permitting (England and Wales) Regulations 2016 which are implemented under an environmental management system certified to ISO 14001:2015. The management system was developed to manage the operations in line with the permit requirements and compliance obligations through a series of processes and documented systems. These systems are audited biannually internally on a risk basis targeting circa 8 audits per annum and externally, with two surveillance visits and two verification audits generally carried out every year by the regulator.

2.1.11. The Applicant will submit a separate application for a variation to the existing Environment Permit, EPR/VP3530LS, for the Drax Power Station. This will be developed in parallel to the DCO Application and submitted to the Environment Agency at the same time, or shortly after, the DCO Application is submitted to PINS.

2.1.12. Three Public Rights of Way ('PRoW') run adjacent to the Drax Power Station Site (see **Figure 1.2 (Indicative Site Layout Plan**) (document reference 6.2.1.2)). PRoW 35.47/6/1 runs from New Road along part of the northern edge of the Drax Power

Station Site (eastern side) and connects to PRoW 35.6/12/1. PRoW 35.6/12/1 also runs along part of the northern edge of the Drax Power Station Site (western side) and connects PRoW 35.47/6/1 with PRoW 35.47/10/1. PRoW 35.47/10/1 runs along the western boundary of the Drax Power Station Site and connects with PRoW 35.6/11/1 and part of PRoW 35.47/11/1. Further detail is shown on **Figure 2.1 (Environmental Constraints)** (document reference 6.2.2.1).

CONSTRUCTION LAYDOWN AREAS

2.1.13. The construction laydown areas for the Proposed Scheme are made up of the East Construction Laydown Area, which is situated to the east of the Drax Power Station, across New Road and the Drax Power Station Site Construction Laydown Areas, which are several parcels of land within the Drax Power Station Site.

2.1.14. PRoW 35.47/1/1 runs adjacent to the northern boundary of the East Construction Laydown Area. Further detail is shown on **Figure 2.1 (Environmental Constraints).**

2.1.15. Further details of the proposed use and reinstatement of the different construction laydown areas are set out in **paragraphs 2.3.7. to 2.3.10.**

HABITAT PROVISION AREA

2.1.16. Land to the north and north east of the Drax Power Station Site within the Order Limits (shown on **Figure 1.1**) consists of mainly agricultural fields. New Road landfill site, an historic landfill, is located to the north east of the Drax Power Station Site, partially within the Order Limits.

2.1.17. Drax Augustinian Priory Scheduled Monument, Foreman's Cottage and Drax Abbey Farm fall outside of the Habitat Provision Area but are either partially or entirely bounded by it.

2.1.18. One Public Right of Way ('PRoW') runs within the Habitat Provision Area (see **Figure 1.2 (Indicative Site Layout Plan**) (document reference 6.2.1.2)). PRoW 35.47/6/1 runs from New Road along part of the Habitat Provision Area, to be used for access for planting and maintenance on proposed hedgerows. PRoW 35.47/1/1 runs adjacent to the southern boundary of the Habitat Provision Area, to the south of Pear Tree Avenue. Further detail is shown on **Figure 2.1 (Environmental Constraints)**.

OFF-SITE HABITAT PROVISION AREA

2.1.19. The Off-Site Habitat Provision area sits outside of the Order Limits, to the west of the Drax Power Station Site, and is shown on **Figure 1.3 (Off-Site Habitat Provision Area)**. This land consists of a northern section, referred to as 'Arthurs Wood' and a southern section referred to as the 'Fallow Field'. The Off-Site Habitat Provision Area is situated partially within the Skylark Centre and Nature Reserve, established and run by Drax Power Limited.

2.1.20. The Off-Site Habitat Provision Area within Arthurs Wood comprises broadleaved woodland. An access track forming part of the Nature Reserve runs along the

eastern boundary and Park Lane is to the North. Stable Road bounds the area to the west.

2.1.21. Fallow Field is made up of rank grassland and former arable land which has recently fallen out of agricultural production, separated by a ditch and a native hedgerow. A PRoW (35.6/6/1) runs through the southern half of Fallow Field entering from agricultural land to the west and running approximately south to the southern boundary of the Off-Site Habitat Provision Area.

SURROUNDING ROAD NETWORK

2.1.22. Minor vegetation and street furniture management required to construct the Proposed Scheme within the Order Limits in relation to the transportation of construction materials via the road network. These works would take place along the A645 along the southern boundary of the Order Limits; further detail is provided in **paragraph 2.3.30.**

SURROUNDING AREA

2.1.23. Environmental constraints are shown in **Figure 2.1 (Environmental Constraints)**. Drax Power Station is surrounded by the villages of Drax, approximately 700 m to the south east of the Order Limits, Long Drax approximately 1.3 km north east, Hemingbrough approximately 1.2 km north and Camblesforth approximately 1.5 km south west. Larger towns in the vicinity of the Drax Power Station are Selby approximately 6 km north west and Goole approximately 8 km south east of the Drax Power Station Site.

2.1.24. Rusholme Wind Farm is located approximately 3 km to the east of the Order Limits and Drax Golf Club is across the A645 to the south. There is an industrial site adjacent to the south west of the Order Limits to the. Drax Skylark Centre and Nature Reserve are located to the north west.

2.1.25. The nearest major surface water feature is the River Ouse, located adjacent to the north east of the Order Limits. Approximately 6.2 km downstream from this location, the River Ouse forms part of the Humber Estuary Ramsar site, Special Area of Conservation (‘SAC’), Special Protection Area (‘SPA’) and Site of Special Scientific Interest (‘SSSI’). The River Derwent is the closest SAC, approximately 450 m to the north of the Order Limits. There are various other sites designated for their biodiversity value within the area. All distances are measured from the Order Limits.

2.1.26. PRoW run adjacent to the western and northern borders of the Drax Power Station Site and to the north of the East Construction Laydown Area. A PRoW network extends across much of the surrounding area, with a high concentration between the village of Drax and the River Ouse. The Trans-Pennine trail long distance path and the Sustrans Route 65 run along the eastern bank of the River Ouse.

2.1.27. The road network adjacent to the Order Limits includes the A1041 and the A645, which connect the Drax Power Station to the wider road network including the M62

Junction 36, approximately 6 km south east. Minor roads connect the Drax Power Station to the villages of Drax, Newland and isolated properties.

Further details on environmental constraints are shown in **Figure 2.1 (Environmental Constraints).**

2.2. PROJECT DESCRIPTION – THE PROPOSED SCHEME

2.2.1. The Proposed Scheme would involve the installation of post-combustion carbon capture technology to capture carbon dioxide from up to two existing 660 megawatt electrical ('MWe') biomass power generating units at the Drax Power Station (Unit 1 and Unit 2). The installation of this technology constitutes an extension to the biomass Units 1 and 2 and is referred to as post-combustion carbon capture as the carbon dioxide is captured from the flue gas produced during the combustion of biomass in Units 1 and 2. The Proposed Scheme is designed to remove approximately 95% of the carbon dioxide from the flue gas from these two Units.

2.2.2. The carbon dioxide captured will undergo processing and compression before being transported via a proposed new pipeline for storage under the southern North Sea. Transport and storage infrastructure will be consented through separate applications submitted by other parties (not the Applicant) (see further details on the transport and storage infrastructure below).

2.2.3. Core items of the existing infrastructure at the Drax Power Station would be utilised by installing and integrating the Carbon Capture Plant with existing infrastructure including existing power generating units (Units 1 and 2) for extraction of steam, re-using the cooling water systems, Main Stack and electrical connections.

2.2.4. The description of the Proposed Scheme included within this section has been written and structured to align with the process flow. For a visual representation of the process flow, refer to **Plate 2.1**. The works descriptions included in Schedule 1 of the draft DCO has been structured differently, with the nationally significant infrastructure described under Work No. 1 and the associated development work described in the subsequent Work Nos 2 - 6.

2.2.5. The Proposed Scheme is made up of the following:

a. Up to two Carbon Capture Plants (one associated with Unit 1 and one associated with Unit 2) (Work No. 1D as described in Schedule 1 of the **draft DCO**), each made up of:

i. Flue gas pre-treatment section (includes flue gas booster fans (Work Nos. 1D(v) and (vi)), Gas / Gas Heat Exchangers (Work Nos. 1D(v) and (vi)) and Quench Columns (Work Nos. 1D(i) and (ii)));

ii. One Absorber Column (Work Nos. 1D(i) and (ii));

iii. Solvent Regeneration System (to include up to two Regenerators) (Work Nos. 1D(iii) and (iv));

iv. Rich Solvent / Lean Solvent Heat Exchangers (Work Nos. 1D(iii) and (iv)); and

b. Additional Common Plant infrastructure and modification works to the Drax Power Station that are required to support and integrate with one or both Carbon Capture Plants including:

i. Solvent Storage and Make-up System (comprising up to four bunded solvent storage compounds) (Work No. 1D(vii) in Schedule 1 of the **draft DCO);**

ii. Carbon Capture Wastewater Treatment Plant (Work No. 1D(viii) in Schedule 1 of the **draft DCO**);

iii. Carbon Dioxide Processing and Compression Plant (Work No. 1E in Schedule 1 of the **draft DCO**);

iv. Modification to the existing water pre-treatment plant (Work No. 1A in Schedule 1 of the **draft DCO**);

v. Modification, upgrade and extension of the existing cooling system and distribution of cooling water to the Proposed Scheme (Work No. 1B in Schedule 1 of the **draft DCO**);

vi. Modifications to existing electrostatic precipitators (Work No. 3 in Schedule 1 of the **draft DCO**);

vii. Modifications, upgrade and extension to existing power generating units, boilers and turbines for steam extraction and new steam processing infrastructure for distribution of process steam and electricity supply to the Proposed Scheme (Work No. 1C and Work No. 1F in Schedule 1 of the **draft DCO**); and

viii. Integral electrical connections within the existing generating station and Carbon Capture Plant including upgrades to the existing electrical infrastructure and new electrical infrastructure for the secondary electrical supply to the Proposed Scheme (Work No. 1F in Schedule 1 of the **draft DCO**);

c. Infrastructure to transport compressed carbon dioxide from the Carbon Dioxide Processing and Compression Plant to storage and transport infrastructure operated by National Grid Carbon Limited (Work No. 2 in Schedule 1 of the **draft DCO**);

d. Minor vegetation and street furniture management and other works to facilitate access during construction (Work No. 4 in Schedule 1 of the **draft DCO**);

e. Additional supporting infrastructure and other works for the Proposed Scheme as set out in Section 2.2.49 (Work No. 3 in Schedule 1 of the **draft DCO**);

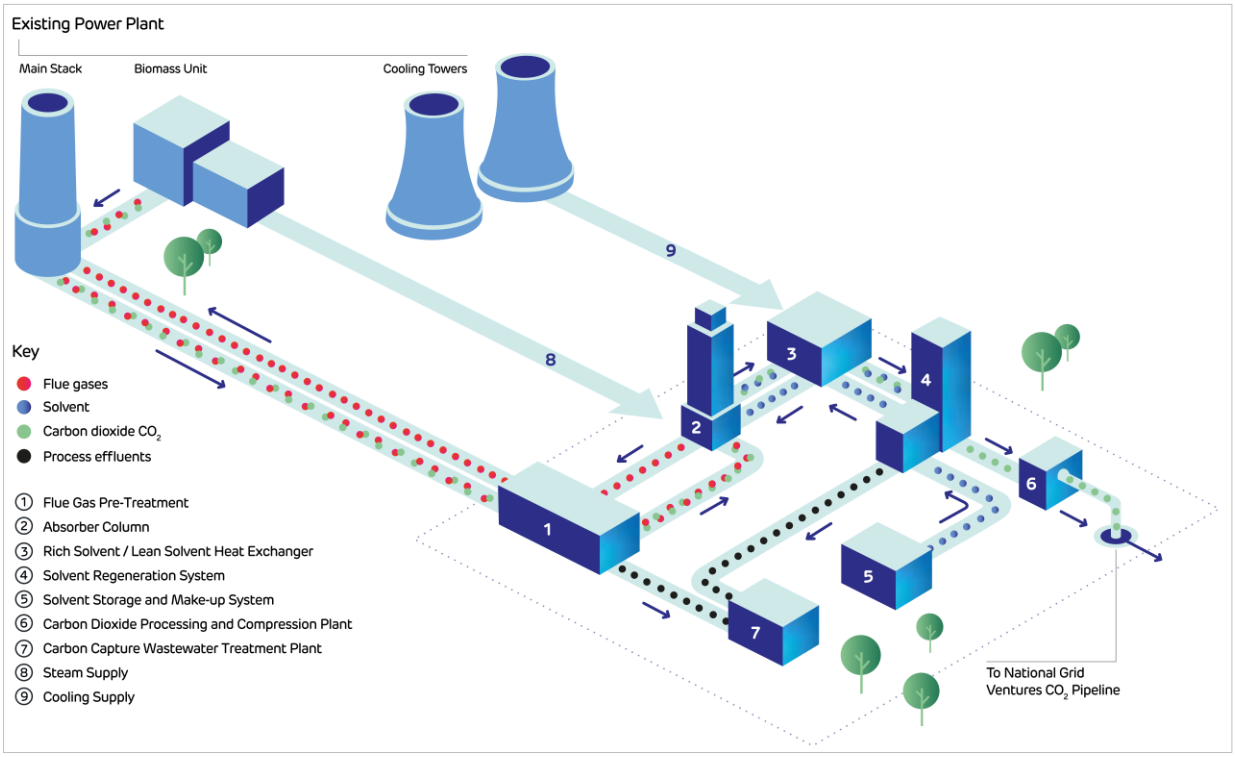
f. Temporary construction laydown areas (Drax Power Station Site Construction Laydown Areas and the East Construction Laydown Area) (Work No. 5 in Schedule 1 of the **draft DCO**); and

g. Habitat Provision Area (Work No. 6 in Schedule 1 of the **draft DCO**).

2.2.6. A process block flow diagram showing a schematic of the Proposed Scheme is provided in **Plate 2.1 (Process Block Flow Diagram for the Proposed Scheme)**

below. To help describe the process, a Carbon Capture Plant associated with a single unit has been shown, alongside Common Plant which would support both a Carbon Capture Plant for each of Unit 1 and Unit 2. The diagram is a schematic for illustrative purposes only, including the main process components and does not represent the scale or number of equipment items anticipated for the Proposed Scheme.

Plate 2.1 - Process Block Flow Diagram for the Proposed Scheme



2.2.7. An illustrative 3D drawing showing the indicative plant equipment layout for the main Carbon Capture Plant components alongside the Existing Drax Power Station infrastructure has been provided in **Plate 2.2 (Illustrative 3D Plant Equipment Layout Drawing)**. A more detailed 2D indicative plant equipment layout drawing has been included in **Figure 2.2 (Indicative Plant Equipment Layout)** (document reference 6.2.2.2).

Plate 2.2 - Illustrative 3D Plant Equipment Layout Drawing

CARBON CAPTURE PLANT (WORK NO. 1D)

2.2.8. The following sub-sections describe the process and equipment for a Carbon Capture Plant for a single biomass unit. Where applicable, reference has been made to the plant components identified in **Plate 2.1** and **Plate 2.2** presented above.

Flue Gas Pre-Treatment (Work No. 1D(i), (ii), (v) and (vi))

2.2.9. Hot untreated flue gas produced by the existing biomass boilers passes through an existing boiler feed water heater and then the Gas / Gas Heat Exchanger (up to two Gas / Gas Heat Exchangers per Carbon Capture Plant (Work No. 1D(v) & (vi))) where it is cooled against the returning cold treated flue gas from the Absorber Column (see below for description of the Absorber Column).

2.2.10. After cooling, the untreated flue gas passes through the Quench Column (Work No. 1D(i) & (ii)) (up to two Gas / Gas Heat Exchangers per Carbon Capture Plant) where water vapour and other condensable components (sulphuric and nitric acids) within the untreated flue gas are removed by a recirculating water spray. The associated effluent stream is sent to the Carbon Capture Wastewater Treatment Plant (Work No. 1D (viii)).

2.2.11. Flue gas booster fans are used within the flue gas cycle to ensure adequate pressure is maintained.

2.2.12. The Gas / Gas Heat Exchangers and Quench Columns are shown as Item 1 on **Plate 2.1** and **Plate 2.2**.

Absorber Column (Work No. 1D(i) & (ii))

2.2.13. After the initial flue gas pre-treatment, the now cooled untreated flue gas is passed through the Absorber Column (one Absorber Column per Carbon Capture Plant) (Item 2 on **Plate 2.1** and **Plate 2.2**) and reacts with the amine solvent which absorbs the carbon dioxide from the untreated flue gas. The result is a carbon dioxide-rich solvent which is separate from the remaining, now treated, flue gas.

2.2.14. The treated flue gas from the Absorber Column passes through the cold side of the Gas / Gas Heat Exchanger (as described in the flue gas pre-treatment section above), taking heat from the incoming hot untreated flue gas. Effectively, the waste heat in the hot untreated flue gas is transferred to the returning treated flue gas to ensure it is at the required temperature prior to being exhausted from the Main Stack.

2.2.15. The Absorber Column also includes a washing section, split into stages to maintain the Absorber Column's water balance, recover chemical vapor and mist, and control chemical emissions.

Solvent Regeneration System (Regenerators and Solvent Processing) (Work No. 1D(iii), (iv), (v) and v(i)

2.2.16. Downstream of the Absorber Column and prior to reaching the Solvent Regeneration System, the carbon dioxide-rich solvent passes through the Rich Solvent / Lean Solvent Heat Exchangers where it is pre-heated to ensure it is at the required temperature for the regeneration process (See below further description for Rich Solvent / Lean Solvent Heat Exchangers).

2.2.17. The Solvent Regeneration System (Item 4 in **Plate 2.1** and **Plate 2.2**) consists of Regenerators (up to two Regenerators per Carbon Capture Plant) and a solvent processing system. After it is pre-heated by the Rich Solvent / Lean Solvent Heat Exchangers, the carbon dioxide-rich solvent solution is passed through Regenerators using solvent pumps (Work No. 1D(v) & (vi)) and steam is used to indirectly heat the carbon dioxide-rich solvent solution to reverse the original reaction and separate the carbon dioxide from the amine solvent. The process results in a high purity carbon dioxide stream and a carbon dioxide-lean solvent.

2.2.18. Prior to the carbon dioxide-lean solvent being recirculated using solvent pumps (Work No. 1D(v) & (vi)), it passes through the solvent processing system where the solvent is treated to remove minor contaminants and lost solvent is replenished into the system from the solvent storage, this solvent is then recirculated through the system.

2.2.19. The steam would be supplied from existing Drax Power Station infrastructure (see below section for details on steam extraction).

Rich Solvent / Lean Solvent Heat Exchangers (Work No. 1D(iii) & (iv))

2.2.20. Following the separation of the amine solvent from the carbon dioxide in the Regenerators and after passing through the solvent processing system, the amine solvent needs to be cooled before it can be reused. This is achieved via heat

integration within the Rich Solvent / Lean Solvent Heat Exchangers (Item 3 on **Plate 2.1** and **Plate 2.2**), whereby the carbon dioxide-lean solvent exchanges its heat with the carbon dioxide-rich solvent. This heat integration within the process reduces external cooling demands, while also reducing the amount of steam required to heat the Regenerators.

2.2.21. The Rich Solvent / Lean Solvent Heat Exchangers would be located at elevation on the Main Process and Service Rack.

ADDITIONAL INFRASTRUCTURE AND MODIFICATION WORKS

2.2.22. This section describes the additional infrastructure and modification works that are required to Drax Power Station to support one or both Carbon Capture Plants.

Solvent Storage and Make-up System (Work No. 1D(vii))

2.2.23. Chemical storage and distribution handling facilities would be required to process the amine solvent required for the Carbon Capture Plant. This is expected to include new Solvent Storage and Make-up System compounds for materials including but not limited to: amine solvent, caustic soda, anti-foam, sulphuric acid and amine solvent waste. Some hazardous waste storage is likely to be required.

2.2.24. There would be up to four Solvent Storage and Make-up System compounds located within the Drax Power Station Site (Item 5 on **Plate 2.1** and **Plate 2.2**). There would be up to 30 storage tanks within the Solvent Storage and Make-up System compounds, of which approximately one third would house a supply of fresh amine solvent for the Carbon Capture Plant and approximately two thirds would be empty and required only during initial fill and to drain the process for maintenance activities.

Carbon Capture Wastewater Treatment Plant (Work No. 1D(viii))

2.2.25. A Carbon Capture Wastewater Treatment Plant (Item 7 on **Plate 2.1** and **Plate 2.2**) is required to treat effluents recovered from the Proposed Scheme and enable the re-use of water. The origin of the different effluent streams sent to the Carbon Capture Wastewater Treatment Plant and the associated treatment process has been outlined below:

a. Effluent from the Quench Column – The effluent contains condensable species (sulphuric and nitric acids) removed from the untreated flue gas. The effluent would be sent to the steam stripping columns and sludge thickening process within the Carbon Capture Wastewater Treatment Plant where it is treated to produce a water stream of suitable quality to be re-used as cooling tower system make-up water. The concentrated sludge waste stream would be collected for offsite disposal.

b. Effluent from the Absorber Column – At the top of the Absorber Column, a demineralised water / acid mix would be added to remove amine solvent that has been carried over within the treated flue gas. The collected effluent at the bottom of the Absorber Column would be sent to the amine solvent concentrator process, The amine solvent concentrator process involves the addition of heat

(steam) to produce a clean water stream, which is recycled back into the Absorber Column washing section, and a concentrated amine solvent waste stream which cannot be re-used within the process. The concentrated amine solvent waste stream would be temporarily stored on the Drax Power Station Site before being transported off-site as per the procedure outlined below.

c. Effluent from the Carbon Dioxide Processing and Compression Plant – Effluent streams / drains from the compressors and driers may contain traces of amine solvent and so cannot be discharged to site drains. The effluent streams / drains would be re-used within the Solvent Regeneration System process. A reclaimer drum would be used to pull out concentrated waste streams from the Solvent Regeneration System process to maintain a water balance within the system. The waste stream from the reclaimer drum would be collected and removed by vacuum truck.

2.2.26. Waste streams from these processes would be temporarily stored on the Drax Power Station Site in storage tanks with appropriate tank containment bunds and in line with COSHH regulations for each effluent, before being treated for reuse or transported off-site to an appropriate waste treatment facility.

Other Common Supporting Infrastructure for the Carbon Capture Plant (Work No. 1D(viii))

2.2.27. Supporting infrastructure integral to the Carbon Capture Plant including:

a. Up to eight chemical storage areas;

b. Road tanker loading and unloading areas;

c. Firefighting systems including up to four fire water tanks; and

d. Works connecting Work Nos. 1D(i) to 1D(vii) to Work No. 1E and the existing generating station.

Carbon Dioxide Processing and Compression Plant (Work No. 1E)

2.2.28. In order to connect into National Grid Carbon Limited's low carbon pipeline (owned and operated by National Grid Ventures), the carbon dioxide would adhere to National Grid Ventures' pipeline specification, which requires the carbon dioxide to be dried, have contaminants removed and be compressed before entering the transport system. The carbon dioxide exiting the Regenerators in both Carbon Capture Plants would be transferred via an elevated Carbon Dioxide Pipe Bridge to a common Carbon Dioxide Processing and Compression Plant (Item 6 in **Plate 2.1** and **Plate 2.2**).

2.2.29. The Carbon Dioxide Processing and Compression Plant would be located to the west of the existing northern cooling towers. The processing would consist of up to four carbon dioxide dryers and associated treatment and exporting plant (Work No. 1E(i)) & (ii)). The compression would consist of a single compression centre comprised of up to eight Carbon Dioxide Compressor Buildings housing up to sixteen carbon

dioxide compressors (eight compressors and four buildings for each Unit) (Work No. 1E(i) & (ii)) and up to two Carbon Dioxide Main Vent Stacks (Work No. 1E(iii) & (iv)).

2.2.30. There would be a requirement for operational venting and venting outside of normal operation of carbon dioxide at the Carbon Dioxide Processing and Compression Plant through the Carbon Dioxide Main Vent Stacks. Operational venting of carbon dioxide would be required for short periods during planned start-ups and shutdowns. Venting of carbon dioxide outside of normal operation may also be required for short periods during outages or unavailability of the downstream carbon dioxide Transport and Storage Infrastructure. For both the operational venting and venting outside of normal operation, the carbon dioxide would be released through the Carbon Dioxide Main Vent Stacks to the atmosphere at a designated, safe area.

Modifications and upgrade to the Existing Water Pre-Treatment Plant (Work No. 1A)

2.2.31. To ensure suitable quality of circulating water through the Proposed Scheme, retrofitting works are required to the four existing Sedimentation Tanks within the water pre-treatment plant area. Early design work indicates that the Sedimentation Tanks will have lamella plate technology installed to improve performance.

2.2.32. All work would be at the existing Sedimentation Tank area. No work would be carried out to the existing river off take and associated supply line to the existing Sedimentation Tanks, to the existing treated water forwarding pumps and associated supply line to the Drax Power Station water supply system or to the discharge line from the purge chamber back to the outfall structure.

Modification, upgrade and extension of the Existing Cooling System (Work No. 1B)

2.2.33. Following cooling in the Rich-Solvent / Lean-Solvent Heat Exchanger, the lean solvent requires further cooling before it can be recirculated to the Absorber Column. Cooling is also required in the Carbon Dioxide Processing and Compression Plant area as well as other areas within the process.

2.2.34. Cooling requirements would be provided using the existing northern cooling towers (Item 9 on **Plate 2.2**) at the Drax Power Station Site. The cooling towers would be redundant following cessation of coal operations. The cooling supply is shown as Item 9 on **Plate 2.1**.

2.2.35. Drax Power Station currently uses hyperbolic (natural draught) cooling towers that are 116.5 m in height. River water is abstracted from the River Ouse and pumped to the station where it is treated to remove solids and other material. The treated river water is then used for cooling. No changes would be required to existing water abstraction or discharge permits and consents. The only modification works would be to the existing cooling water pumps and reconfiguration of the cooling water discharge manifold. From the reconfigured discharge manifold, new pipework and biocide / chemical dosing will be provided to components and heat exchangers associated with the Proposed Scheme.

Steam Extraction and New Steam Processing Infrastructure for Distribution of Process Steam and Electricity Supply to the Proposed Scheme (Work No. 1C and 1F)

2.2.36. Steam is required for several processes within the Proposed Scheme. Predominantly, steam is supplied for indirect use in the Regenerators, in which heat is dissipated to release the carbon dioxide from the carbon dioxide-rich solvent.

2.2.37. For each Carbon Capture Plant, steam would be extracted from the associated biomass unit (Item 8, **Plate 2.2**) and supplied on an elevated Steam Pipe Bridge (**Plate 2.1** - the arrow represents steam supply from the biomass units). Work was undertaken to identify the optimum point of interconnection with the associated biomass unit, with this either being interconnection to the existing unit boiler or interconnection with the existing unit turbine. At this stage, it has been confirmed that the steam supply for the process by an interconnection to the existing unit boiler is the preferred option. However, the Applicant will retain the option to interconnect with the existing turbine open to maintain full flexibility as the Proposed Scheme moves into detailed design (Work No. 1C(i) & (ii)). Pipelines and pipeline supports will be used to return condensate for each Carbon Capture Plant to the condensate system of the associated biomass unit (Item 8, **Plate 2.2**).

2.2.38. In addition to the steam extraction, new infrastructure would be installed to maximise process efficiency. New infrastructure to be supplied for each Carbon Capture Plant (Work No. 1C(iii)) would include up to two Combined Power Turbines and generator sets including all balance of plant and ancillaries enclosed in up to two Combined Power Turbine Buildings to maximise the extraction of energy within the steam, and up to two Pressure Reducing De-Superheating Stations enclosed in up to two Pressure Reducing De-Superheating Stations Buildings, which would be used to refine the temperature and pressure of the steam to make it suitable for use in the Regenerators when the Combined Power Turbines are not in operation. (This infrastructure is schematically shown in **Plate 2.1** and **Plate 2.2** but has been included in **Figure 2.2 (Indicative Plant Equipment Layout)**).

2.2.39. In addition to conditioning the steam required for the Carbon Capture Plant, the Combined Power Turbines would also supply the electrical power required for the Proposed Scheme. (The thermal energy within the steam entering the Combined Power Turbine would be used to rotate the turbine shaft and subsequently drive the generator). Each Combined Power Turbine will have a power control cubicles and associated generator step-up transformer and new distribution voltage infrastructure, including associated HV and LV transformers and distribution voltage cabling to and from up to 30 Switch Room Buildings, which would be used to distribute electrical power to the Proposed Scheme (WN1F).

Secondary Electrical Supply to the Proposed Scheme (Work No. 1F)

2.2.40. To ensure uninterruptable operation of the Proposed Scheme during start-up / shutdown, transient and fault conditions (when power from the Combined Power Turbine is not available), an alternate secondary electrical supply is required.

Although supply of electricity to the Proposed Scheme will be primarily from the Combined Power Turbines, the secondary electrical supply is essential as it ensures continuous operation of the Proposed Scheme can be maintained.

2.2.41. The secondary electrical supply would be provided from the existing 132 kV air insulated switchgear. To facilitate the secondary electrical supply, upgrade works would be required to the existing 132 kV air insulated switchgear including, but not limited to, upgrades to circuit breakers, busbar disconnectors and earth switches. Subject to the completion of system studies, upgrade works may also be required in the existing 400 kV National Grid substation. In addition, further works are required on the interconnection from the existing 132 kV air insulated switchgear to the Proposed Scheme. This includes decommissioning and removal of existing oil-filled underground cabling and installation of upgraded 132 kV underground cabling and destringing, upgrading and restringing of existing 132 kV overhead powerlines to form the interconnection from the existing 132 kV air insulated switchgear to the newly installed distribution voltage infrastructure.

CARBON DIOXIDE TRANSPORT AND PERMANENT STORAGE

2.2.42. The captured carbon dioxide would ultimately be transported via new National Grid Transport and Storage Infrastructure for permanent storage in naturally occurring aquifers under the southern North Sea. This infrastructure would be developed by National Grid Carbon Limited.

2.2.43. A new connecting carbon dioxide pipeline would be required from the Carbon Dioxide Processing and Compression Plant to a new Carbon Dioxide Delivery Terminal Compound where the captured carbon dioxide would be injected into the National Grid Transport and Storage Infrastructure (Work No. 2). The new Carbon Dioxide Delivery Terminal Compound would be maximum 100 m by 100 m in size and contain above ground pipework, pigging station, metering, filters and provisions to allow the system to be purged as per the National Grid Carbon Limited requirements. Buildings to house any instrument requirements for the terminal and security requirements such as boundary fencing, and cameras will also be included. Lighting for the compound would be minimal other than for maintenance purposes. The compound would be operated by National Grid Carbon Limited.

2.2.44. It is proposed to situate the new Carbon Dioxide Delivery Terminal Compound to the north of the Drax Power Station, however final agreement between the Applicant and National Grid Carbon Limited beyond the submission of the DCO Application would be required to confirm the exact location. The two location options for the compound still to be agreed have been outlined below:

a. Location of the new Carbon Dioxide Delivery Terminal Compound within the Order Limits – For this option, the Proposed Scheme would include the compound and a carbon dioxide pipeline connecting the Carbon Dioxide Processing and Compression Plant to the new compound (Work No. 2(a)); and

b. Location of the new Carbon Dioxide Delivery Terminal Compound outside the Order Limits – For this option, the Proposed Scheme excludes the compound. Instead, the Proposed Scheme would only require a carbon dioxide pipeline connecting the Carbon Dioxide Processing and Compression Plant to a terminal point to be agreed with National Grid Carbon Limited, within the Order Limits (Work No. 2(b)).

2.2.45. This Application is seeking consent by the DCO for both options. However, only one of the two options outlined above would be built as part of this DCO Application. National Grid Carbon Limited will separately seek consent for inclusion of the compound as part of their application, to cover for the scenario the compound is to be located outside of the Order Limits.

2.2.46. For the purpose of the assessments, location of the Carbon Dioxide Delivery Terminal Compound within the Order Limits has been assumed. In addition, flexibility has been maintained for the Application by adopting the 'Rochdale Envelope' approach (Refer to Chapter 4 – EIA Methodology for further details of this approach) in which the different environmental assessments have assumed a worst-case location of the compound within Work No. 2A (as outlined on the Works Plans). Further details on the worst-case scenario assumed by the specific environmental assessments can be found in the relevant Environment Statement chapters.

2.2.47. The wider National Grid Transport and Storage Infrastructure would be consented under a separate DCO. This DCO Application does not seek consent for carbon dioxide transport or storage. However, the Applicant is working closely with National Grid Carbon Limited to identify the most appropriate pipeline route to Drax Power Station Site.

2.2.48. It is expected that other schemes will connect into the National Grid Transport and Storage Infrastructure at other points in the network, with the Proposed Scheme forming one of the Zero Carbon Humber cluster projects, however, this DCO Application does not seek their consent. However, the cumulative effects of any known schemes have been considered in **Chapter 18 (Cumulative Effects)** of this ES (document reference 6.1.18).

ADDITIONAL SUPPORTING INFRASTRUCTURE AND OTHER WORKS (WORK NO. 3)

2.2.49. Other works likely to be included within the Proposed Scheme are as follows:

a. A new pipeline or pipelines connecting Work Nos. 1A and 1B to the existing generating station's on-site purge chamber;

b. Surface water collection and drainage pipe works to discharge to cooling towers;

c. Modification to and refurbishment of existing electrostatic precipitators of Unit 1 and Unit 2 of the existing generating station;

d. Cable connection back to existing generating station central control room;

e. Service and pipeline connections for supply of heat to wastewater treatment plant;

f. Replacement of the main generator transformers for Unit 1 and Unit 2 of the existing generating station;

g. Other minor auxiliary infrastructure required to support the Carbon Capture Plant;

h. Ground raising and ground preparation works;

i. Electricity, water, wastewater, control and telecommunications and other services;

j. Trenching works;

k. Security and site lighting infrastructure, including cameras, perimeter fencing and lighting columns;

l. Tree and hedge removal;

m. Hard and soft landscaping including tree planting, ecological mitigation, temporary and permanent fencing and other boundary treatments;

n. Civil works and support structures;

o. Works required in order to protect existing utilities infrastructure;

p. Internal roadways, car parking, pedestrian network, cycle parking and hardstanding; and

q. Site drainage and waste management infrastructure, including relocation of existing infrastructure as required.

WORKS TO FACILITATE CONSTRUCTION ACCESS (WORK NO. 4)

2.2.50. Temporary removal or reinstatement of structures, features and landscaping within the Order Limits would facilitate the movement of large components or plant on to site and around site and allow for the transport of abnormal indivisible loads ('AILs').

2.2.51. In the vicinity of the South Entrance of Drax Power Station, street furniture would need to be removed, along with the clearance of vegetation and pruning. Further detail is provided in **paragraph 2.3.30**.

2.2.52. Some temporary works would be required outside the Order Limits to facilitate transport of plant and AILs to the Site during construction. Further detail is provided in **paragraph 2.3.18 – 2.3.31**.

CONSTRUCTION LAYDOWN AREAS (WORK NO. 5)

2.2.53. Details of the temporary construction laydown areas (East Construction Laydown Area and Drax Power Station Site Construction Laydown Areas) are set out in the Construction Section, **paragraphs 2.3.7 to 2.3.10**.

HABITAT PROVISION AREA (WORK NO. 6)

2.2.54. Land has been identified to the north and north east of the Drax Power Station Site for environmental mitigation, compensation and enhancement. No new infrastructure is proposed on this land.

2.2.55. The details of the environmental mitigation and compensation to be provided within the Habitat Provision Area have been developed alongside the assessments of

landscape and visual and biodiversity impacts, including a **Biodiversity Net Gain Assessment** (document reference 6.10) and as such proposed mitigation including the creation and enhancement of habitats is set out in the DCO Application and accompanying ES.

2.2.56. An **Outline Landscape and Biodiversity Strategy** (document reference 6.6) is provided as part of the application which details the landscape proposals for the Proposed Scheme including habitat creation and enhancement measures, security fencing, gates, boundary treatment and other means of enclosure.

OFF-SITE HABITAT PROVISION AREA

2.2.57. Land to the west of the Drax Power Station Site, which sits outside of the Order Limits will be secured via a S106 Agreement, and is proposed to be used for ecological mitigation, compensation and enhancement.

2.2.58. Proposals for the northern section, Arthur's Wood, include enhancement of the existing woodland through removal of invasive non-native species and coppicing. For the southern section, Fallow Field, proposals would include allowing scrub to succeed to woodland, enhancing existing scrub and hedgerow to species rich, enhancing grassland to species rich and creating hedgerow. Refer to **Outline Landscape and Biodiversity Strategy** (document reference 6.6) and **Heads of Terms** (document reference 7.1) for further details.

PRIMARY DESIGN MITIGATION

2.2.59. Primary mitigation measures are those that are integral to the Proposed Scheme and have been incorporated into the design in order to mitigate environmental impacts. Measures have also been taken to avoid impacts, in line with the EIA mitigation hierarchy, through a process of iterative design. The following primary mitigation has been included in the Proposed Scheme:

a. A 30 m offset from the River Ouse has been implemented to avoid impacts to habitats related with the watercourse;

b. The four, water pre-treatment plant Sedimentation Tanks, which form part of the Existing Drax Power Station plant, will be retrofitted to improve performance. This will ensure suitable quality of circulating water through the Proposed Scheme;

c. The ammonia stripper columns within the Carbon Capture Wastewater Treatment Plant would utilise a closed steam stripper system which eliminates ammonia emission points. This system also does not require any additional electrical loads and has a small footprint;

d. The captured carbon dioxide would be compressed in single compressors (rather than split low pressure and high pressure compressor streams). This would allow the Carbon Dioxide Processing and Compression Plant to be located in a single compressor area (located to the west and south of the existing gypsum and limestone buildings) which would reduce the overall spatial requirements of the Carbon Dioxide Processing and Compression Plant and footprints of its associated equipment items significantly;

e. A colour palette for the exterior of major buildings / structures has been selected based on a combination of historic design guidance, known colours used within the Drax Power Station Site and observations made during site visits. Design principles informing the colour palette for the Proposed Scheme (to be adopted as part of the detailed design) comprise:
    i. To adhere where possible with this original guidance on massing and colour;
    ii. Recognition of horizontal and vertical scales and their importance to the overall massing of the power station;
    iii. Employing lighter colour tones for high buildings/structures in context with associated massing of existing buildings; emphasis on the wider perception of the power station, such as 'Goosewing Grey' BS10A05 for storage tanks and pipework, and 'Ash Grey' (BS9093) for buildings over 15m;
    iv. Employing darker colour tones for buildings up to 15m in height which will be 'Dark Camouflage Brown' (BS381C-436);
    v. Relationship to human scale and visibility of buildings against a backdrop of other existing built form and/or vegetation; and
    vi. To restrict the use of colour tones to those already agreed/employed within the power station and indicative colour tones which fulfil the design principle objectives.
f. Habitat Provision Areas have been provided as part of the Proposed Scheme to provide ecological mitigation and compensation;
g. An Off-site Habitat Provision Area has been included to provide habitat mitigation, creation and enhancement for the Proposed Scheme;
h. The Proposed Scheme's Carbon Capture Plants and associated infrastructure have been designed in line with best practice to accommodate temperatures up to 35 degrees and components for worst-case scenario temperatures;
i. Any street furniture and pavement management within the Order Limits will be carried out in compliance with the National Highways Manual of Contract Documents for Highway Works (Volume 1 - Specification for Highway Works) specification for highway works which covers all UK adopted road design. This would help to minimise impacts from worst-case scenario temperatures;
j. An alternate secondary electrical supply would be provided from the existing 132 kV air insulated switchgear which would be designed to withstand an extreme temperature event. This would ensure uninterrupted operation of the Proposed Scheme during start-up / shutdown. It would also provide power when power from the Combined Power Turbine is not available;
k. The capacity of the existing firewater system in place on site would be extended to contain and mitigate fires on the BECCS plant to minimise the risk of spread to the other Control of Major Accident Hazards (COMAH) installations. Furthermore,

the capacity of the existing firewater tank would be increased as required for the new plant;

l. The following has been incorporated into the design to mitigate noise impacts:

i. A single acoustic enclosure for the Combined Power Turbine Building to ensure the noise levels set out in **Appendix 7.2** (document reference 6.3.7.2) are achieved;

ii. A single acoustic enclosure for the pumps that require noise reduction such that the noise level at 1m from each pump does not exceed 80 dB(A);

iii. Double acoustic enclosures for the Carbon Dioxide Compressor Buildings. The Carbon Dioxide Compressor Buildings would include mechanical ventilation with appropriate noise silencing on air louvres;

iv. Double acoustic enclosures for the gas flue blower fans. Acoustic cladding for the ducting of the flue gas blower fans; and

v. Cladding on the building envelope of the Carbon Dioxide Compressor Building achieving the acoustic performance detailed in **Appendix 7.2.**

2.3. CONSTRUCTION

CONSTRUCTION SEQUENCE

2.3.1. Construction works would include, but are not limited to:

a. Earthworks;

b. Enabling works including the preparation of the laydown areas, car parks, haul roads and site establishment; and

c. Site preparation, levelling and piling.

2.3.2. Civil works would include:

a. Tie in of cooling water supply to the existing cooling water system;

b. Underground cooling water flow and return lines (includes deep sheet piled excavations 6 to 7 m deep);

c. Piling; and

d. Pile cap and foundations.

2.3.3. The Carbon Capture Plant and Installation would include:

a. Temporary support at tie in points;

b. Structural steelwork supports;

c. Ductwork from tie in point to Gas / Gas Heat Exchangers;

d. Gas / Gas Heat Exchangers;

e. Absorber Columns;

f. Quench Columns;

g. Regeneration columns;

h. Chemical storage areas;

i. Combine power turbines and Pressure Reducing De-Superheating Stations;
j. Wastewater treatment plant;
k. CO_2 Compression;
l. Sedimentation Tanks;
m. Switchrooms;
n. Fire water tanks; and
o. Process and Service Pipe Racks.

CONSTRUCTION PROGRAMME

2.3.4. Two options are being considered for the construction of the Proposed Scheme:

a. Option 1: The Carbon Capture Plant associated with Unit 2 is programmed to be constructed first along with the Common Plant, with the Carbon Capture Plant associated with Unit 1 to follow sequentially.
b. Option 2: The Carbon Capture Plant associated with Unit 1 and Unit 2 as well as the Common Plant to be constructed at the same time.

2.3.5. As set out in **paragraph 2.1.8** the Applicant has full planning permission for the demolition of the redundant FGD Plant and associated restoration works at Drax Power Station. For both construction Option 1 and Option 2 the demolition of the Absorber Units of the FGD Plant would only take place before or after the construction phase of the Proposed Scheme and not in parallel.

2.3.6. For the purposes of the EIA the worst case construction programme for each topic may differ, therefore the construction programme option which has been assessed is set out in each individual topic chapter of the ES, along with an explanation of the approach taken to optionality more broadly.

2.3.7. **Table 2.1** below shows an illustrative construction programme for Option 1 and **Table 2.2** shows a preliminary illustrative construction programme for Option 2. For both options, construction is expected to start in early 2024. In both options the first Unit would be operational by the end of 2027, with the second unit operational by the end of 2029.

Table 2.1 – Indicative Construction Programme for the Proposed Scheme (Option 1)

	2024				2025				2026				2027				2028				2029			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Mobilisation and Tendering																								
Earthworks																								
Civil works																								
1st Carbon Capture Plant and Common Plant Installation																								
1st Carbon Capture Plant and Common Plant Commissioning																								
2nd Carbon Capture Plant Installation																								
2nd Carbon Capture Plant Commissioning																								

Table 2.2 - Indicative Construction Programme for the Proposed Scheme (Option 2)

	2024				2025				2026				2027				2028				2029			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Mobilisation and Tendering																								
Earthworks																								
Civil works																								
1st Carbon Capture Plant and Common Plant Installation																								
1st Carbon Capture Plant and Common Plant Commissioning																								
2nd Carbon Capture Plant Installation																								
2nd Carbon Capture Plant Commissioning																								

CONSTRUCTION LAYDOWN AREAS

2.3.8. Temporary construction compounds and laydown areas would be required for the construction of the Proposed Scheme. The main laydown area would be on agricultural land to the east of the Drax Power Station Site, across New Road (the "East Construction Laydown Area"). Additionally, it is anticipated that several smaller, local laydown areas within the Drax Power Station Site would be utilised (the "Drax Power Station Site Construction Laydown Areas"). For details of the location of the construction laydown areas, see **Figure 2.3 (Construction Laydown Plan**) (document reference 6.2.2.3))

2.3.9. The East Construction Laydown Area would be used for laydown of plant, equipment and materials, light fabrication, storage of topsoil from the area and as an overflow car park during construction. The land currently consists of arable fields surrounded by hedgerow and would be reinstated to arable use following completion of the construction period for both Units.

2.3.10. The Drax Power Station Site Construction Laydown Areas are made up of the following areas:

a. The existing northern site entrance car park, which would be maintained as car parking for construction workers;

b. A hardstanding area to the west of the car park which would be used for the Contractor Village (designated area for offices and welfare facilities);

c. An area to the north currently characterised as the Woodyard. This area would be used for laydown and heavy fabrication;

d. The existing limestone and gypsum storage buildings which, following cease of coal operation, would be redundant. These buildings would be used for covered laydown and fabrication; and

e. Six smaller hardstanding areas local to the BECCS construction, which would be used for laydown, fabrication and local construction.

2.3.11. The Drax Power Station Site Construction Laydown Areas, with the exception of the Woodyard, would be reinstated back to their previous use following completion of the construction phase for both Units.

CONSTRUCTION LIGHTING

2.3.12. Temporary lighting during the hours of darkness would be provided to enable the Proposed Development to be constructed safely, and for security purposes. Lighting would be required within the Drax Power Station Site and the East Construction Laydown Area. Directional lighting would be used to avoid light spill and to minimise nuisance to sensitive receptors. Details of lighting would be provided by the Contractor for approval prior to construction as part of the Construction Environmental Management Plan (CEMP). A **Draft Lighting Strategy** (document reference 6.7) has been produced and is submitted as part of the DCO Application.

CONSTRUCTION STAFF

2.3.13. A peak workforce of up to 1,000 workers would be required to construct the Proposed Scheme, based on both Options 1 and 2.

2.3.14. Construction workers will park within the existing 500 carparking spaces available within the Drax Power Station Site. However, provision for 300 overflow car parking spaces would be provided within the East Construction Laydown Area. The combined capacity of 800 carparking spaces across the two areas will not be required throughout the entire construction programme but is included to ensure operational resilience throughout the construction phase as the existing operational units will still require maintenance and outages.

CONSTRUCTION WORKING HOURS

2.3.15. During the construction phases, it is expected that standard working hours would be Mondays to Friday 07:00 to 19:00 with all personnel working a nine-hour period within this timeframe. Start-up and shutdown activities would take place in relation to the Proposed Scheme during a one-hour window either side of standard working hours. “Start-up” activities would take place prior to physical construction works starting for the day and include activities such as the opening up of the site, the arrival of workers, changing into work wear and pre-work briefings. “Shut down” activities would take place after physical construction works have finished for the day and include activities such as changing out of work gear, the departure of workers, post-work briefings and closing and securing the site take place.

2.3.16. On Saturdays, working hours would be 07:00 and 14:30. Start-up and shutdown activities would take place in relation to the Proposed Scheme during a one-hour window either side of working hours.

2.3.17. Any noisy activities that would be required to take place outside these working hours, including on bank holidays would be agreed in advance with SDC and NYCC.

2.3.18. There may be some quiet activities that would be carried out outside these working hours, including, for example those within existing buildings or buildings constructed as part of the Authorised Development. Activities may also be required outside these core hours as a result of emergency conditions.

CONSTRUCTION DELIVERY AND ACCESS

2.3.19. Regular transport of construction materials would be via the road network, with HDVs routing from J36 M62. However, the construction works would include delivery of AIL and it is anticipated that there would be no more than 15 AILs, not including transformers.

2.3.20. It is anticipated that AILs would be delivered to the Port of Goole (Boothferry Terminal) where each AIL would be transferred from water to road. The size and weight of the AILs will vary and the following is based on the largest AIL to assess the worst case scenario.

2.3.21. In order to exit the Port of Goole, temporary dismantling of the gate at the entrance to the terminal at the A161 / Bridge Street junction would be required, along with the temporary removal of street furniture. The AIL route would travel west along the A161. At the A161 Andersen Road / A161 Normandy Road roundabout, the AIL would bear right using the eastbound circulatory carriageway. No street furniture would be required to be removed at the roundabout.

2.3.22. The AIL route would continue west along the A161 using the full width of the highway crossing over the South Railway Bridge and North Railway Bridge.

2.3.23. At the A161 / Andersen Road signal-controlled junction, the AIL route would continue west along the A161. Temporary street furniture removal would be required at this location.

2.3.24. The AIL route would continue west along the A161 to the A161 / Tom Pudding Way roundabout where it would use the westbound part of the circulatory carriageway and part of the central island. Temporary street furniture removal would be required at the junction along with the clearance of vegetation and pruning.

2.3.25. The next section of the A161 includes a highway improvement scheme which includes a signal-controlled junction and link road to the west of the A161 and it is anticipated that it will be constructed in Autumn 2022. Temporary removal of street furniture may be required, but further survey work would need to be undertaken following completion of the highway improvement scheme to confirm this.

2.3.26. At this point, the AIL would use the northbound section of the A161 dual carriageway until it reaches the M62 Junction 36 Dumbbell roundabout.

2.3.27. There are two AIL route options to cross the M62 as follows, both of which would require up to 15 night-time closures of the M62:

a. Option 1 - travel along the westbound carriageway of the M62 and cross the vehicle over the central reserve to change to the eastbound carriageway of the M62 and travel up the eastbound exit slip to the M62 Junction 36. Clearance of vegetation and pruning would be required on the slip road.

b. Option 2 - travel along the westbound carriageway in an easterly direction. Similar to the first option, there is a central reserve to change to the eastbound carriageway travelling west.

2.3.28. Street furniture would need to be temporarily removed, including at the M62 Junction 36 Dumbbell roundabout, irrespective of which route is taken along the M62. On the M62 itself, the safety barrier in the central reserve would need to be temporarily removed. It is anticipated that standard National Highways diversion routes would be used for the extent of the temporary road closure.

2.3.29. On the north side of the M62, the AIL route would continue west at the A614 / Airmyn Road using the westbound section of the circulatory carriageway and the full width of the highway on the A614. Street furniture would be required to be temporarily removed in this location, along with ground preparation to the east of the roundabout

to allow the SPTM to continue. A power line crossing the carriageway would also need to be temporarily disconnected and removed.

2.3.30. At the A614 / A645 roundabout, the AIL route would use the eastbound section of the circulatory carriageway and then continue west on the A645 using the full width of the highway boundary. Street furniture would need to be temporarily removed in the vicinity of the junction, along with the clearance of vegetation and pruning. A telephone line and a power line crossing the carriageway would also need to be temporarily disconnected and removed.

2.3.31. The AIL route would use the full width of the A645 carriageway and the Newlands Bridge over the River Aire. At the A645 / New Road roundabout, the AIL would travel west and then right into the South Entrance of Drax Power Station. Street furniture would need to be removed in the vicinity of this location, along with the clearance of vegetation and pruning.

2.3.32. The Applicant would require certain highway powers in order to temporarily remove barriers, street furniture, overhead lines, communication lines, and carry out minor tree surgery including trimming back vegetation and pruning. The extent and duration of the road closures is to be determined, but in order to minimise impact on local residents and businesses, it is anticipated that the largest AIL would be carried at off-peak times. Smaller AILs would not have the same impact.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

2.3.33. Environmental mitigation required during construction is recorded in the **Register of Environmental Actions and Commitments (REAC)** (document reference 6.5) submitted with the DCO Application. A DCO Requirement (17) ensures that environmental mitigation identified during the EIA which is required to be implemented during construction is included in a CEMP, to be prepared for the Proposed Scheme before construction begins. The CEMP will be used to manage and mitigate the potential environmental impacts that could result from the construction of the Proposed Scheme.

2.4. OPERATION AND MAINTENANCE

2.4.1. Following construction, the Proposed Scheme associated with Unit 2 is expected to be operational in 2027 and the Proposed Scheme associated with Unit 1 in 2029. This is the case irrespective of which construction option (i.e., Option 1 or 2 as detailed above) is chosen.

2.4.2. Major maintenance of the plant will be aligned with the regulatory inspection requirements such as Pressure Systems Safety Regulations (PSSR) and also in line with the current site outage strategy on the main generating units.

2.4.3. Operational requirements will include activities which are already established on the site such as chemical deliveries and waste effluent removals.

OPERATIONAL LIGHTING

2.4.4. Lighting arrangements are in place at the Existing Drax Power Station. It is assumed that any new lighting will comply with the same standards. Further detail is provided in the **Draft Lighting Strategy**.

HOURS OF WORKING

2.4.5. The Proposed Scheme would operate 24 hours per day, seven days per week with planned and unplanned periods of maintenance.

SITE STAFF

2.4.6. During the operational phase of the Proposed Scheme a workforce of 50 full time staff would be required for operation and maintenance activities.

OPERATIONAL AND MAINTENANCE REQUIREMENTS

2.4.7. The operation and maintenance of the Proposed Scheme will follow in line with how the Existing Drax Power Station currently operates, with the requirement for disposal of process wastes in line with existing site waste management systems and replenishment of process chemicals.

2.4.8. Examples of additional activities associated with the Proposed Scheme may include but not limited to

a. Removal of degraded Amine solvent and filter media; and

b. Replenishment of process chemicals such as Sulphuric acid, Fresh Amine solvent, and Caustic soda.

HAZARD PREVENTION AND EMERGENCY PLANNING

2.4.9. The Drax Power Station Site is and will remain regulated under the Control of Major Accident and Hazards ('COMAH') Regulations, 2015.

2.4.10. Under the COMAH Regulations, the Applicant has a duty to take all measures necessary to prevent Major Accidents and to limit their consequences for human health and the environment. The COMAH management system and its associated documentation would be reviewed and updated to ensure that operations associated with the Proposed Scheme are included.

2.5. DECOMMISSIONING

2.5.1. The Proposed Scheme is anticipated to operate for at least 25 years. At the end of the 25-year period, the facility may have some residual life remaining and an investment decision would be made as to whether the operational life of the Proposed Scheme would be extended. If it is not appropriate to continue operation, the Proposed Scheme would be decommissioned.

2.5.2. The decommissioning phase is anticipated to be no longer than the construction phase. It is expected that all above ground plant structures would be removed.

2.5.3. A full Environmental Departure Audit would be carried out prior to decommissioning. This would examine, in detail, all potential environmental risks existing at the Drax Power Station Site and make comprehensive recommendations for any remedial action required to remove such risks. Following completion of decommissioning, a Final Environmental Departure Audit would be carried out to ensure that all remedial work has been completed successfully; the audit reports would be made available to any future users of the Drax Power Station Site.

2.5.4. Decommissioning would be in accordance with the requirement of the Environmental Permit for the Proposed Scheme under the Environmental Permitting (England and Wales) Regulations 2016 (or subsequent replacement legislation). Under condition of the Environmental Permit, as part of decommissioning works of the Proposed Scheme, changes to the Environmental Permit would be agreed with the Environment Agency. This would include the provision of a Site Condition Report to the Environment Agency. A Site Condition Report describes and records the condition of the land and environment at a site at particular points in time. It would demonstrate that the land and environment have been protected during the lifetime of the Proposed Scheme and that the land is in a satisfactory state at the point at which the Proposed Scheme is decommissioned.

2.5.5. Prior to decommissioning of the Proposed Scheme, the Environment Agency would be notified, and the results of the Environmental Departure Audit would be submitted for consultation on the proposed decommissioning methodology.

2.5.6. For the purpose of the EIA, decommissioning impacts are anticipated to be no worse than those during the construction phase following the implementation of a Decommissioning Environmental Management Plan which would be required for the works.

2.6. DESIGN PARAMETERS

2.6.1. The design of the Proposed Scheme is being developed using an iterative process which has and will continue to take into account the following information as it becomes available:

a. Environmental assessment information;

b. Statutory Consultee responses;

c. Non-statutory Consultee responses; and

d. Design development outputs.

2.6.2. For the purposes of the environmental assessment a Rochdale Envelope approach has been adopted, further detail is set out in **Chapter 4 (EIA Methodology)**.

2.6.3. The maximum parameters used for the purposes of the EIA are set out in **Table 2.3** below and Schedule 14 of the **dDCO**.

Table 2.3 - Anticipated maximum parameters (number and dimensions) of each main component / building / area when fitting BECCS to two biomass units

Component / Building / Area	Maximum number	Maximum length (m)	Maximum width (m)	Maximum height (m) [1]
Gas / Gas Heat Exchanger	4	25	25	45 [2]
Quench Column	2	50	30	40
Absorber Column	2	50	30	95
Regenerator	4	15	15	70
Carbon Capture Wastewater Treatment Plant Area	1	80	70	40
Solvent Storage and Make-up System Compound	4	55	45	25
Combined Power Turbine Building [3]	2	50	45	35
Pressure Reducing De-Superheating Station Building[3]	2	15	45	15
Carbon Dioxide Compressor (HP and/or LP) Building [3]	8	45	40	30
Carbon Dioxide Main Vent Stacks	2	10	10	30
Steam Pipe Bridge Connection (Connection with Existing Drax Power Station infrastructure)	1	30	10	65
Steam Pipe Bridge	1	300	20	25
Main Process & Service Rack [3,4]	2	150	20	25
Carbon Dioxide Pipe Bridge	1	500	20	20
Switchroom Building [3]	30	30	16	20

Component / Building / Area	Maximum number	Maximum length (m)	Maximum width (m)	Maximum height (m) [1]
Carbon Dioxide Delivery Terminal Compound (National Grid Carbon Limited)	1	100	100	12
Fire Water Tanks	4	15	15	15

1. Maximum heights stated are above ground level (AGL) (finished ground level). Final above ordnance datum (AOD) heights of all buildings / components have been included in Schedule 15 of the draft DCO.
2. Component to be located at elevation (i.e., located within the duct). Height stated is the maximum height component could be AGL.
3. Buildings / Structures may be coupled together. Total building volume will however not exceed volume required for maximum number of buildings. Maximum height stated is for all configurations. Switchrooms may also be double stacked.
4. The Rich Solvent / Lean Solvent Heat Exchangers would be located at elevation on the Main Process and Service Rack.